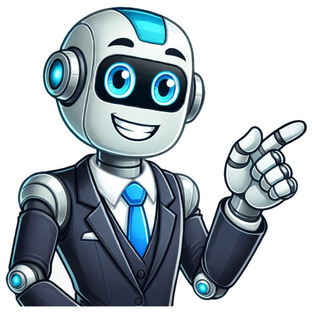
I'm not a robot



View commentaries and related content Please note that this summary was posted more than 5 years ago. More recent research findings may have been published. This is a plain English summary of an original research article. The views expressed are those of the author(s) and reviewer(s) at the time of publication. This NIHR-funded study estimated the long-term cost effectiveness of using two recommended blood tests – glycated haemoglobin or fasting blood glucose - to detect type 2 diabetes during NHS health checks. Several screening strategies were tested. In most cases the glycated haemoglobin test was more likely to be cost effective than a fasting blood glucose. But results were based on modelled data sourced from a Leicestershire diabetes database and populations may be different in other regions leading to different results. The researchers included scenarios with and without pre-screening to filter out people with a low risk of diabetes before either blood test. The lifetime cost savings (£12), and health benefits per person, were small. The HbA1c cost-benefit advantage depended on the tested population having a high prevalence of diabetes and the uptake of glycated haemoglobin being greater than for fasting blood glucose test. Those participating in health checks may prefer the glycated haemoglobin test as it does not require an overnight fast. Commissioners should exercise caution in applying the findings to their local populations if they differ from those studied here in Leicestershire. Why was this study needed? In the UK, an estimated 850,000 people have type 2 diabetes without knowing it, and a further 7 million people are at high risk of developing type 2 diabetes. The NHS health check, a free health MOT for all adults in England aged 40 to 74, checks the health of a person's heart and blood vessels. Identifying people who have type 2 diabetes, or are at high risk of developing it, is part of the check. People in these two categories are offered a blood test to confirm their diagnosis or raised risk. The blood test using glycated haemoglobin (HbA1c) is taken the same day, or after a planned fast in the case of a fasting blood glucose test. The cost of a single fasting blood glucose test is about £12 and an HbA1c test is about £14. The HbA1c test is becoming more popular as it does not require the patient to come back after an overnight fast. This study was funded by the NIHR to establish which of the two available tests was most cost-effective over the long term. What did this study do? This study estimated the long-term cost and health implications of using fasting blood glucose or HbA1c tests to detect adults with, or at high risk of, type 2 diabetes during the NHS Health Check. The main analysis used 8,147 adults from Leicester with a high prevalence of diabetes – around 5.7%. They were contrasted with a group of 3,906 adults from East Anglia with a lower diabetes prevalence of around 2.3%. Long-term costs and health were estimated using an adapted NICE public health guideline model called the Sheffield Type 2 Diabetes Model. This estimated probable treatment pathways, complications, and death rates for people taking the tests over an 80-year period. The study also looked at the impact of pre-screening to select people at highest risk of diabetes before the blood tests. No pre-screening was compared with a general practice computer-based risk score or a finger-prick blood test. What did it find? In most scenarios HbA1c had a higher chance (about 95 to 98%) of being more cost effective than fasting blood glucose. This included scenarios using no pre-screening, computer-based risk scores, or the finger-prick blood tests to filter out people with a low risk of diabetes before the blood tests. In most scenarios the lifetime cost savings, and health benefits per person per year, were very small. The lowest cost option used a computer-based diabetes risk score pre-screening step. In this scenario, compared with fasting blood glucose, HbA1c would save about £12 over a person's lifetime (£78 vs. £66). It also added eight days of life lived in good health per year for each person tested. With no pre-screening stage, HbA1c would save £30 per person compared with fasting blood glucose for the same eight day annual health gain. But the overall costs were slightly higher (£105 vs. £75). The HbA1c cost advantage depended on the population having a relatively high prevalence of diabetes, such as the Leicester group, and the uptake of HbA1c being higher than fasting blood glucose. What does current guidance say on this issue? The 2012 NICE guideline on prevention of type 2 diabetes says that people attending the NHS Health Check who have not been diagnosed with diabetes, cardiovascular disease, stroke or kidney disease should be offered an initial risk assessment. If they are at increased risk of diabetes they will be offered a blood test, either HbA1c or fasting blood glucose, but the guidance does not specify a preference. People identified as being at risk will be advised and helped to lose weight (if appropriate), become more physically active and improve their diet. What are the implications? The findings are consistent with the 2012 NICE guideline and current (2015) NHS Health Check procedures for screening for type 2 diabetes. This study suggested HbA1c is more likely to be cost effective over the long-term compared with fasting blood glucose. But commissioners should be aware that the HbA1c advantage depended on the population having a relatively high prevalence of diabetes and the uptake of HbA1c being greater than fasting blood glucose. These assumptions may not be true in all regions in England. Citation Gillett M, Brennan A, Watson P, et al. The cost-effectiveness of testing strategies for type 2 diabetes: a modelling study. Health Technol Assess 2015;19(33). Bibliography Department of Health Science, University of Leicester. Leicester Practice Risk Score. Leicester: University of Leicester; undated. NHS Choices. What happens at an NHS Health Check? London: NHS Choices; 2014. NHS England. NHS Diabetes Prevention Programme. Leeds: NHS England; 2015. NICE. Preventing type 2 diabetes: risk identification and interventions for individuals at high risk. PH38. London: National Institute for Health and Care Excellence; 2012. Produced by the University of Southampton and Bazian on behalf of NIHR through the NIHR Dissemination Centre NIHR Evidence is covered by the creative commons, CC-BY licence. Written content and infographics may be freely reproduced provided that suitable acknowledgement is made. Note, this licence excludes comments and images made by third parties, audiovisual content, and linked content on other websites. The only way you can find out if you or a loved one has diabetes is from blood tests that measure your blood glucose (sugar) levels. These can be arranged through your GP surgery A diagnosis of diabetes is always confirmed by laboratory results. You'll usually get the results of your blood test back in a few days. If you have symptoms that came on quickly and you've been taken into hospital, the results should come back in an hour or two. A finger prick test using a home testing kit or data from a continuous glucose monitor may show you have high blood sugar levels but won't confirm you have diabetes. You'll need a blood test sent to a laboratory to diagnose diabetes. A normal blood test result will show you don't have diabetes. But the result could also indicate that you are at risk of developing type 2 diabetes. Signs and symptoms of diabetes Anyone can develop diabetes. That's why it's important to get tested if you notice any of the diabetes signs or symptoms. These aren't always easy to spot. In fact, type 2 diabetes is often diagnosed through blood tests for other conditions or health issues instead. Always talk to your doctor about any symptoms you're worried about, even if you've been tested. If you're not offered a test, you can ask for one . If you feel very unwell or your symptoms have come on quickly seek an urgent appointment with your GP or call NHS 111. Testing for type 1 and type 2 diabetes If diabetes is confirmed by the results of a blood test the type of diabetes you have is usually determined by factors like how quickly any symptoms came on, and how severe they were. Weight, age at diagnosis, family history also contribute. The test results can also indicate if you are at risk of developing type 2 diabetes even if you don't have it now. If you're being tested for type 1 diabetes then further blood tests can check your blood ketone levels. Following this you may be sent to hospital for further assessment. A simple test developed by researchers called C-peptide can help identify if someone has type 1 or type 2 diabetes. Testing for your risk of type 1 diabetes Scientists have developed a type 1 diabetes risk test that looks for markers of diabetes in your blood that can show up months or years before any symptoms appear. These markers tell us that the immune system has started to plan an attack against the pancreas. If you have them, it means you're at a high risk of being diagnosed with type 1 diabetes in your lifetime. This test is not the same as a finger-prick test, that a doctor might do to diagnose type 1 diabetes if you already have type 1 diabetes symptoms. Type 1 diabetes screening isn't yet available in the UK outside of research studies. We've got more information about who can get involved in these research studies. Blood tests used to diagnose diabetes We will explain below the different blood tests that could be used to diagnose your diabetes. Your doctor will ask you about any symptoms you have and will then decide which type of blood test to use. Having blood tests doesn't need to be worrying, they're straightforward and shouldn't take very long. Depending on the test you have you may be required to fast beforehand. If you do need to fast, a healthcare professional will let you know in advance. Non fasting blood tests HbA1c An HbA1c test is the main blood test used to diagnose diabetes. It tests your average blood sugar levels for the last two to three months. You don't need to prepare for a HbA1c . It's a quick and simple test where a small amount of blood is taken from a vein in your arm. This is different to a finger-prick test, which is a snapshot of your blood sugar levels at that moment. You'll normally get the test results in a few days. From these results, your healthcare professional will be able to see if you have diabetes. If you didn't have any of the symptoms of diabetes before you were tested, you'll need to have the test again to confirm the result. You have diabetes if your HbA1c level is 48mmol/mol or above. You are at risk of developing type 2 diabetes (often known as prediabetes) if your HbA1c is between 42 and 47mmol/mol. Random blood glucose test If you have severe symptoms of diabetes, you may have a random blood test at any time of the day. This is a quick test, through a finger-prick or a vein in your arm. If you have a finger-prick test, you'll get the results straight away. If you have a blood test through a vein in your arm, you'll get the results in a few days. You or your loved one have diabetes if your blood glucose levels are 11.1mmol/l or more - regardless of how recently you ate. But any diagnosis from a finger prick test will need to be confirmed by a blood test sent to a laboratory for results. Fasting blood tests Fasting blood sugar test This is another blood test used to diagnose diabetes. It is sometimes called a fasting plasma glucose test or FPG for short. A nurse will take some blood from a vein in your arm. You'll need to fast for at least eight hours before, without eating or drinking anything apart from water. This is to stop anything interfering with the results. Fasting overnight and taking the test in the morning is the easiest option if available. You'll get the results in a few days. You'll be diagnosed with diabetes if your blood glucose levels are 7mmol/l or more. Glucose tolerance test (GTT) This blood test shows if your body is having problems handling the sugar you get from food and drinks. It is sometimes called an Oral Glucose Tolerance Test or OGTT for short. This test is used routinely when diagnosing gestational diabetes. There are two parts. First, you have a fasting test. A nurse will take some of your blood from a vein in your arm and your blood glucose levels will be checked. You'll then have a sweet drink, which contains a standard amount of sugar. This is to see if your body can maintain a normal blood sugar level. Two hours later, the nurse will take some more of your blood and check your blood sugar levels again. You normally get the results in a few days. They'll show different levels for the fasting test and the second test you did two hours later. If you are pregnant, you have gestational diabetes if: your fasting glucose is 5.6mmol/l or more (the first test) your 2-hour glucose is 7.8mmol/l or more (the second test) We have more information about gestational diabetes. Other information about testing and diagnosis Urine tests A urine test for glucose on its own can't diagnose diabetes. It will show your doctor if there is any sugar in your urine, not how much or the possible cause. Testing for diabetes at home Home testing kits bought over the counter can't diagnose diabetes. Neither can testing equipment used by people with diabetes, like blood glucose meters. They will show only your blood sugar levels at the moment you test. Eye tests An optician can't diagnose diabetes. But during an eye test, they can spot eye damage that can affect people with diabetes called diabetic retinopathy. They will then advise you to see your doctor to get tested. Type 2 diabetes screening by pharmacists Some pharmacists offer short appointments where you can find out your risk of developing type 2 diabetes. You usually pay a fee for this service, which involves answering a series of questions. A diabetes screening test does not diagnose you and is not completely accurate. Instead, it can be used as a guide. Depending on the results from this screening, you or your loved one may be advised to seek further medical help from your local GP. If you don't appear to be at risk at the time of screening, this doesn't mean you aren't still at risk of developing type 2 in the future. If you later find signs of diabetes it's worth being screened again, or being tested for diabetes. Some pharmacists offer blood tests to diagnose diabetes, but you'll need to pay for these unlike having them through your doctor. Check your risk If you don't want to attend a diabetes screening test but want to know your risk of developing type 2 diabetes, you can check your risk for free by using our online Know Your Risk tool. Diagnosed with diabetes – what next Being told you have diabetes or prediabetes will probably come as a shock. Being diagnosed with a long-term condition feels different for everyone. You might not know how to cope or what to do next. But if you get the right treatment and support, you can manage it and live well with diabetes. It's usually quite difficult to take everything in and remember it. So think about asking a family member or friend to go along with you to meet your healthcare team and make a note of any questions you might have. Often, your GP will start speaking to you about treatment and the steps you can take to start managing diabetes effectively. They'll probably want to discuss your lifestyle habits, including what you eat and what exercise you do. It's important to consider whether you smoke and the amount of alcohol you drink as well. Knowing all this vital information can help them identify what steps need to be taken by you to live with diabetes safely. Our information - where to start You may find it useful to start with our page about the basics of diabetes and eating well with diabetes. If it's your child who's just been diagnosed, we have lots of information to help support you and your child. You can also get in touch with our helpline. Whether it's you, or someone you know who's been diagnosed, we're used to talking to people about all sorts of things. You can find and save pages that are useful to you like recipes and other information using Diabetes and Me. If you or a loved one have been diagnosed, you'll find video tips on eating and looking after diabetes every day on our free Learning Zone. If you're at risk of getting type 2 diabetes Your blood tests may show high levels of blood sugar, but not high enough to be diagnosed with diabetes. So you don't have diabetes, but you're at high risk of developing type 2 diabetes in the future. We have more information about reducing your risk of type 2 diabetes View commentaries and related content Please note that this summary was posted more than 5 years ago. More recent research findings may have been published. This is a plain English summary of an original research article. The views expressed are those of the author(s) and reviewer(s) at the time of publication. This NIHR-funded study estimated the long-term cost effectiveness of using two recommended blood tests – glycated haemoglobin or fasting blood glucose - to detect type 2 diabetes during NHS health checks. Several screening strategies were tested. In most cases the glycated haemoglobin test was more likely to be cost effective than a fasting blood glucose. But results were based on modelled data sourced from a Leicestershire diabetes database and populations may be different in other regions leading to different results. The researchers included scenarios with and without pre-screening to filter out people with a low risk of diabetes before either blood test. The lifetime cost savings (£12), and health benefits per person, were small. The HbA1c cost-benefit advantage depended on the tested population having a high prevalence of diabetes and the uptake of glycated haemoglobin being greater than for fasting blood glucose test. Those participating in health checks may prefer the glycated haemoglobin test as it does not require an overnight fast. Commissioners should exercise caution in applying the findings to their local populations if they differ from those studied here in Leicestershire. Why was this study needed? In the UK, an estimated 850,000 people have type 2 diabetes without knowing it, and a further 7 million people are at high risk of developing type 2 diabetes. The NHS health check, a free health MOT for all adults in England aged 40 to 74, checks the health of a person's heart and blood vessels. Identifying people who have type 2 diabetes, or are at high risk of developing it, is part of the check. People in these two categories are offered a blood test to confirm their diagnosis or raised risk. The blood test using glycated haemoglobin (HbA1c) is taken the same day, or after a planned fast in the case of a fasting blood glucose test. The cost of a single fasting blood glucose test is about £12 and an HbA1c test is about £14. The HbA1c test is becoming more popular as it does not require the patient to come back after an overnight fast. This study was funded by the NIHR to establish which of the two available tests was most cost-effective over the long term. What did this study do? This study estimated the long-term cost and health implications of using fasting blood glucose or HbA1c tests to detect adults with, or at high risk of, type 2 diabetes during the NHS Health Check. The main analysis used 8,147 adults from Leicester with a high prevalence of diabetes – around 5.7%. They were contrasted with a group of 3,906 adults from East Anglia with a lower diabetes prevalence of around 2.3%. Long-term costs and health were estimated using an adapted NICE public health guideline model called the Sheffield Type 2 Diabetes Model. This estimated probable treatment pathways, complications, and death rates for people taking the tests over an 80-year period. The study also looked at the impact of pre-screening to select people at highest risk of diabetes before the blood tests. No pre-screening was compared with a general practice computer-based risk score or a finger-prick blood test. What did it find? In most scenarios HbA1c had a higher chance (about 95 to 98%) of being more cost effective than fasting blood glucose. This included scenarios using no pre-screening, computer-based risk scores, or the finger-prick blood tests to filter out people with a low risk of diabetes before the blood tests. In most scenarios the lifetime cost savings, and health benefits per person per year, were very small. The lowest cost option used a computer-based diabetes risk score pre-screening step. In this scenario, compared with fasting blood glucose, HbA1c would save about £12 over a person's lifetime (£78 vs. £66). It also added eight days of life lived in good health per year for each person tested. With no pre-screening stage, HbA1c would save £30 per person compared with fasting blood glucose for the same eight day annual health gain. But the overall costs were slightly higher (£105 vs. £75). The HbA1c cost advantage depended on the population having a relatively high prevalence of diabetes, such as the Leicester group, and the uptake of HbA1c being higher than fasting blood glucose. What does current guidance say on this issue? The 2012 NICE guideline on prevention of type 2 diabetes says that people attending the NHS Health Check who have not been diagnosed with diabetes, cardiovascular disease, stroke or kidney disease should be offered an initial risk assessment. If they are at increased risk of diabetes they will be offered a blood test, either HbA1c or fasting blood glucose, but the guidance does not specify a preference. People identified as being at risk will be advised and helped to lose weight (if appropriate), become more physically active and improve their diet. What are the implications? The findings are consistent with the 2012 NICE guideline and current (2015) NHS Health Check procedures for screening for type 2 diabetes. This study suggested HbA1c is more likely to be cost effective over the long-term compared with fasting blood glucose. But commissioners should be aware that the HbA1c advantage depended on the population having a relatively high prevalence of diabetes and the uptake of HbA1c being greater than fasting blood glucose. These assumptions may not be true in all regions in England. Citation Gillett M, Brennan A, Watson P, et al. The cost-effectiveness of testing strategies for type 2 diabetes: a modelling study. Health Technol Assess 2015;19(33). Bibliography Department of Health Science, University of Leicester. Leicester Practice Risk Score. Leicester: University of Leicester; undated. NHS Choices. What happens at an NHS Health Check? London: NHS Choices; 2014. NHS England. NHS Diabetes Prevention Programme. Leeds: NHS England; 2015. NICE. Preventing type 2 diabetes: risk identification and interventions for individuals at high risk. PH38. London: National Institute for Health and Care Excellence; 2012. Produced by the University of Southampton and Bazian on behalf of NIHR through the NIHR Dissemination Centre NIHR Evidence is covered by the creative commons, CC-BY licence. Written content and infographics may be freely reproduced provided that suitable acknowledgement is made. Note, this licence excludes comments and images made by third parties, audiovisual content, and linked content on other websites.