GUIDELINES

Risk identification and interventions to prevent type 2 diabetes in adults at high risk: summary of NICE guidance

Hilary Chatterton,[1] Tricia Younger,[2] Alastair Fischer,[2] Kamlesh Khunti,[3] on behalf of the Programme Development Group

[1]National Institute for Health and Clinical Excellence, Manchester, UK
[2]National Institute for Health and Clinical Excellence, London WC1V 6NA, UK
[3]Biological Sciences and Psychology Department of Health Sciences, University of Leicester, Leicester, UK
Correspondence to: T Younger
tricia.younger@nice.org.uk

Cite this as: *BMJ* 2012;345:e4624
doi: 10.1136/bmj.e4624

This is one of a series of *BMJ* summaries of new guidelines based on the best available evidence; they highlight important recommendations for clinical practice, especially where uncertainty or controversy exists.

Further information about the guidance, a list of members of the guideline development group, and the supporting evidence statements are in the full version on bmj.com.

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Previous articles in this series

- Management of an acute painful sickle cell episode in hospital: summary of NICE guidance (*BMJ* 2012;344:e4063)
- Management of venous thromboembolic diseases and the role of thrombophilia testing (*BMJ* 2012;344:e3979)
- Recognition, referral, diagnosis, and management of adults with autism (*BMJ* 2012;344:e4082)
- Management of acute upper gastrointestinal bleeding (*BMJ* 2012;344:e3412)
- Prescribing strong opioids for pain in adult palliative care (*BMJ* 2012;344:e2806)

Almost three million people in the United Kingdom have diabetes and 850 000 people may be undiagnosed. It has been estimated that five million people will have diabetes by 2025. About 90% of them will have type 2 diabetes.[1]

About 15% (one in seven) of adults have impaired glucose regulation,[2] and an estimated 5-12% of these people develop type 2 diabetes each year.[1] People with impaired glucose regulation are 5-15 times more likely to develop type 2 diabetes than those with normal glucose values.[3] Successful prevention requires population based action for the whole community,[4] together with interventions targeted at those at greatest risk.

This article summarises the recommendations from the National Institute for Health and Clinical Excellence (NICE) on the identification and management of type 2 diabetes in people aged 18 or more who are at high risk.[5]

Recommendations

NICE recommendations are based on systematic reviews of best available evidence and explicit consideration of cost effectiveness. When limited evidence is available, recommendations are based on expert testimony and the Programme Development Group's experience and opinion of what constitutes good practice. Evidence levels for the recommendations are in the full version of this article on bmj.com.

Risk identification: stage 1

- Use a risk assessment tool, validated for use in UK populations. This can be a self assessment or opportunistic assessment at general practice surgeries, health centres, community pharmacies, dental surgeries, occupational health departments, optical practices and eye hospitals, prison health services and workplaces, job centres, local authority leisure facilities, shops, libraries, faith centres, residential and care homes, and day centres.
- General practitioners and other primary healthcare professionals should use a validated computer based risk assessment tool to identify people on their practice register at high risk of type 2 diabetes. Risk factors include increasing age, ethnicity (South Asian, African-Caribbean, Chinese, or black African descent), being overweight or obese, having a first degree relative with type 2 diabetes, having had a low birth weight, and having a sedentary lifestyle. Certain medical conditions can increase the risk of type 2 diabetes, including cardiovascular disease, hypertension, stroke, polycystic ovary syndrome, a history of gestational diabetes, and mental health problems. In addition, people with learning disabilities and those attending emergency departments, emergency medical admission units, vascular and renal surgery units, and ophthalmology departments may be at high risk.
- The tool should use data that are routinely available from patients' electronic health records. If a computer based risk assessment tool is not available, the healthcare professional should provide a validated self assessment questionnaire.
- Pharmacists, opticians, occupational health nurses, and community leaders should either offer a validated self assessment questionnaire or provide information on how to access specific validated online self assessment tools to the following groups of people:
  - Adults, other than pregnant women, who are aged 40 years or more
  - People of South Asian and Chinese descent aged 25-39 years, except for pregnant women
  - Adults with conditions that increase the risk of type 2 diabetes.
- Advise people with a high risk score to contact their GP or practice nurse for a blood test.

Risk identification: stage 2

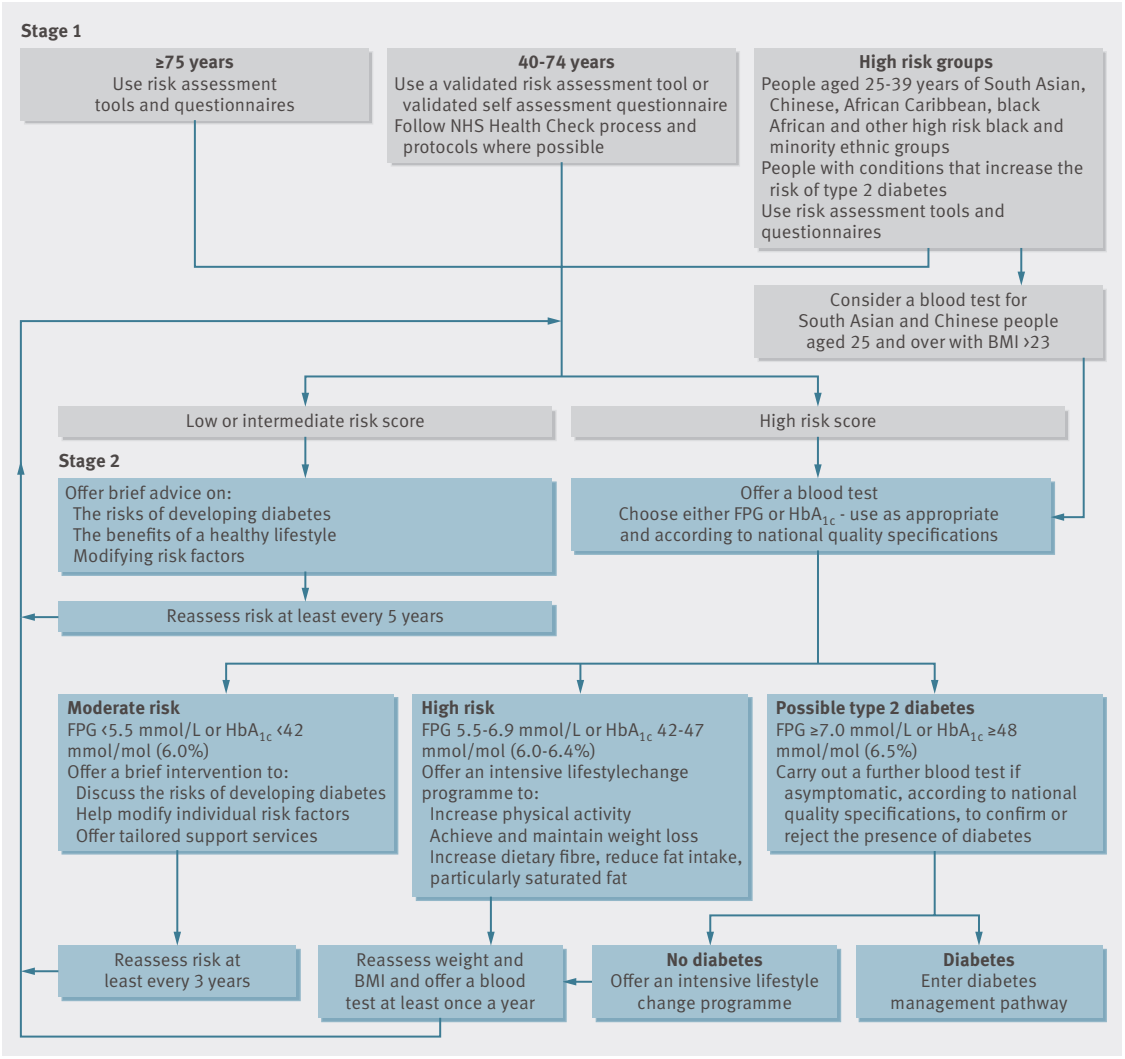
- Trained healthcare professionals should offer venous blood tests (fasting plasma glucose or glycated haemoglobin (HbA_{1c})) to adults with high risk scores. Consider a blood test for those aged 25 years or more of South Asian or Chinese descent whose body mass index (BMI) is greater than 23.
- For people whose fasting plasma glucose is 7.0 mmol/L or above, or whose HbA_{1c} is 48 mmol/mol (6.5%) or above, but who have no symptoms of type 2 diabetes, offer a second blood test to identify possible type 2 diabetes. This test may be a fasting plasma glucose, HbA_{1c}, or an oral glucose tolerance test, according to World Health Organization criteria.[6 7]

Interventions for people at low and moderate risk

The flowchart (figure) outlines the recommendations and indicates interventions for people at various levels of risk.

Intensive lifestyle change programmes for people at high risk

- Offer a quality assured intensive programme of lifestyle change that is culturally sensitive (figure) and has ongoing tailored support. The programme should be aimed at encouraging people to:
  - Undertake a minimum of 150 minutes of "moderate intensity" physical activity a week
  - Gradually lose weight to reach and maintain a BMI within the healthy range



Flowchart outlining the possible interventions for people at low and moderate risk of type 2 diabetes. FPG=fasting plasma glucose; HbA_{1c}=glycated haemoglobin

  - Increase consumption of whole grains, vegetables, and other foods that are high in dietary fibre
  - Reduce the total amount of fat in their diet
  - Eat less saturated fat.
- These programmes may be delivered to groups of 10-15 people who meet at least eight times over 9-18 months.
- Participants should have at least 16 hours of contact time within a group, on a one to one basis, or using a mixture of both approaches.
- Offer follow-up sessions at regular intervals (for example, every three months) for at least two years after the initial intervention period. For those attending group programmes, larger group sizes may be feasible for these maintenance sessions.
- Use behavioural change techniques to support lifestyle change. Prompt participants to set achievable and personally relevant short term and long term goals. For example, a realistic initial target, which would help reduce the risk of type 2 diabetes and provide other health benefits, would be for participants to lose 5-10% of their weight in one year.
- Offer people with a BMI of 30 or more (27.5 or more if South Asian or Chinese) a structured weight loss programme as part of, or a supplement to, the intensive programme of lifestyle change.
- Offer a blood test at least once a year (preferably using the same type of test) and offer to assess weight or BMI for:
  - People at high risk (a high risk score and fasting plasma glucose of 5.5-6.9 mmol/L or HbA_{1c} of 42-47 mmol/mol (6.0-6.4%))
  - People without symptoms of type 2 diabetes with a fasting plasma glucose of 7.0 mmol/L or more, or an HbA_{1c} of 48 mmol/mol (6.5%) or greater at their first blood test, but whose second blood test did not confirm a diagnosis of type 2 diabetes.
- Continue to monitor, support, and care for people with a BMI of 30 or more (27.5 or more if South Asian or Chinese) who join slimming clubs or other weight loss programmes.

Risk assessment and lifestyle programmes for vulnerable and hard to reach groups

- These groups may comprise, for example, people with mental health conditions or learning disabilities, people in residential care or prisons.
- Staff caring for these groups should understand the risk factors for type 2 diabetes and how to increase opportunities for those in their care to be physically active and reduce time spent being sedentary.

- Educate those involved in buying or preparing food in residential care, day centres, and psychiatric units about what constitutes a healthy diet and how to prepare healthy meals.
- Provide integrated risk assessment services and intensive programmes of lifestyle change for prisons and residential homes, or arrange for them to be provided in convenient familiar local venues such as day centres, as appropriate.
- Offer longer appointment times or outreach services to discuss the options after a risk assessment and blood test.
- Ensure risk assessment services and intensive programmes of lifestyle change are delivered by sensitive, well trained, and dedicated people who are also trained to work with vulnerable groups.
- Offer to refer travellers and people from other mobile populations to prevention initiatives in the area they are moving to. Alternatively, use electronic communications (such as telephone or text messages) to deliver programmes or provide ongoing support. Ensure confidentiality is maintained.

Metformin

- Offer standard release metformin to support lifestyle change for adults who are at high risk and:
  - Whose fasting plasma glucose or HbA_{1c} shows they are still progressing towards type 2 diabetes, despite participation in an intensive programme of lifestyle change, or
  - Who are unable to participate in such programmes because of a disability or for medical reasons.
- Continue to offer advice on diet and physical activity along with support to achieve their lifestyle and weight loss goals.
- Start with a low dose (such as 500 mg once daily) and then increase gradually as tolerated to 1500-2000 mg daily. If the person is intolerant of standard metformin consider using modified release metformin.
- Prescribe metformin for 6-12 months initially. Monitor fasting plasma glucose or HbA_{1c} at three monthly intervals and stop the drug if no effect is seen.

Orlistat

- Use clinical judgment on whether to offer orlistat to people with a BMI of 28.0 or more as part of an overall plan for managing obesity. Take into account the person's risk and the level of weight loss and lifestyle change needed to reduce this risk.[8]
- Advise the person to follow a low fat diet that provides 30% of energy as fat, distributed over three main meals a day. Offer information and regular support from a dietitian or other appropriate healthcare professional.[8]
- Review the use of orlistat after 12 weeks. If the person has not lost at least 5% of his or her original body weight, use clinical judgment to decide whether to stop the orlistat. However, as with adults who have type 2 diabetes, those at high risk of the condition may lose weight more slowly than average, so less strict goals may be appropriate.[8]

Overcoming barriers

Diabetes risk assessment is already part of the NHS health check programme for eligible adults aged 40-74 years.[9] The recommendations for risk assessment tools for other groups are inexpensive, quick, and easy to use. General practices may need to offer some additional appointments to provide blood tests for people who are assessed as high risk but are not eligible for the NHS health check programme. However, testing for HbA_{1c} removes the need for fasting and early morning appointments.

The impact will be greater in some areas. Consequently, the PDG recommends tools that allow staff to prioritise by current risk and to invite people with the highest risk scores for further investigation first.

Clear and timely communication between risk assessment providers and primary care will be essential to coordinate stages 1 and 2 of the risk identification process across different settings.

The guidance presents the opportunity to integrate diabetes risk identification and prevention with existing programmes for other chronic diseases so that the most efficient use is made of scarce resources. There is potential for coordination between the NHS health check programme and community based lifestyle and weight management services.

Contributors: All authors contributed to the conception and drafting of this article and revising it critically. They have all approved this version. TY is guarantor.

Competing interests: All authors have completed the ICMJE uniform disclosure form at www.icmje.org/coi_disclosure.pdf (available on request from the corresponding author) and declare:KK has NHS Research and Development support for the submitted work; KK receives funding for research and is a member of advisory boards for Novo Nordisk, Eli Lilly, MSD, Bristol Myers, Squibb and Roche; KK's institution has received funding from the Diabetes Research Network; KK has received sponsorship for attending conferences from Novo Nordisk, Eli Lilly, Sanofi Aventis, Novartis, MSD, BI-Lilly; HC, TY, and AF have no financial relationships with any organisations that might have an interest in the submitted work in the previous three years; none of the authors has other relationships or activities that could appear to have influenced the submitted work.

Provenance and peer review: Commissioned; not externally peer reviewed.

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10-MINUTE CONSULTATION

Blood stained nappy

A R Gatrad,[1 2] A Sheikh[3]

[1]Manor Hospital, Walsall WS2 9PS, UK
[2]University of Kentucky, Lexington, KY 40506, USA
[3]Centre for Population Health Sciences, University of Edinburgh, Edinburgh EH8 9DX, UK
Correspondence to: A R Gatrad abdul.gatrad@walsallhospitals.nhs.uk

Cite this as: *BMJ* 2012;344:e3496
doi: 10.1136/bmj.e3496

This is part of a series of occasional articles on common problems in primary care. The *BMJ* welcomes contributions from GPs.

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Previous articles in this series

- Otitis externa (*BMJ* 2012;344:e3623)
- Blepharitis (*BMJ* 2012;344:e3328)
- Tick bite and early Lyme borreliosis (*BMJ* 2012;344:e3124)
- A child with neck swelling (*BMJ* 2012;344:e3171)
- A scaly rash on the hands (*BMJ* 2012;344:e2252)

A young mother attends the surgery concerned about blood in her 7 month old daughter's nappy.

What you should cover

Was it blood?

Urinary urate crystals can stain the nappy red, but this is not clinically significant. Medications such as rifampicin products that are excreted in the urine can make the stools appear red.[1]

Bleeding and blood

Ask if there is a family history of a bleeding disorder and/or whether the baby has bled from other sites, such as the nose, or has any bruising.

Ask about the colour of the blood, whether it was mixed with the stools, and if there was any associated pain. Bright red blood on a wipe or on a nappy (but not mixed with the stools) suggests bleeding from the anal region. Although constipation and an anal fissure usually coexist in cases of blood in the nappy, constipation is the commonest cause of a rectal bleed beyond the neonatal period, irrespective of whether an anal fissure is visible.[2] A fissure associated with constipation usually results in a baby straining and/or crying with pain during defecation; in contrast, rectal polyps present with more frequent painless bleeds.

Blood mixed in with stool should raise suspicion about possible intussusception. The blood stained mucus that is characteristically passed is sometimes described as having a "redcurrant jelly" consistency; there may be an accompanying history of paroxysmal severe colic and episodic pallor. If the bloody stools are darker than normal or even black (assuming the baby is not being given iron supplements), then consider the possibility that the blood is from much higher up the intestinal tract and may be caused by, for example, oesophagitis secondary to severe gastrointestinal reflux, Meckel's diverticulum, or a duplication cyst. In breastfed infants, cracked nipples can lead to dark maternal blood in the baby's stool.[3]

Stools

Ask about the consistency, frequency, and colour of the stools. If stools are more frequent and looser than usual, *Campylobacter* or *Shigella* infections, or other bacterial infection such as *Clostridium difficile* may be the cause. The latter may develop after the use of antibiotics. Bleeding is very rarely encountered in viral induced gastroenteritis.[4] Ask whether other family members have been affected and about recent travel.

Explore the feeds

Ask about the type of feeds offered and whether there has recently been a change in the feeds. Cows' milk allergy can present with blood in the stools; this is particularly common in formula fed infants with non-IgE mediated food allergy.[5] A family history of allergy and/or a personal history of eczema are often present.

What you should do

Do a general examination—Check for features such as bruising that may indicate a generalised bleeding disorder. Assess also whether the baby is anaemic from a prolonged period of blood loss or dehydrated from vomiting and/or diarrhoea.

Examine the abdomen—Pay particular attention to whether there are palpable stools or distension; the latter, depending on the clinical state of the child and presence of vomiting (often bile stained), may be due to malrotation with volvulus. Can you feel a sausage shaped lump in the right upper quadrant of the abdomen, suggesting an intussusception?

Inspect the anal area and nappy—The anal area may reveal a fissure or broken skin from a severe nappy rash. A rectal prolapse associated with a bleed will be obvious. In cases of suspected gastroenteritis, send stools for culture and liaise with public health colleagues.

Prescribe—Prescribe stool softeners such as lactulose and an anaesthetic jelly for constipation or fissure.

Request an allergy test—Request a test to determine specific IgE against cows' milk protein if you suspect allergy; but remember that there is no good diagnostic test for non-IgE mediated food allergy, and so consider a two to six week therapeutic trial of complete avoidance of cows' milk and products that contain milk.[5]

Refer to a specialist—Refer to a specialist if there is frequent painless bleeding from a suspected rectal polyp; this needs to be done urgently if there are clinical features of severe gastroenteritis or surgical conditions such as a Meckel's diverticulum, an intussusception, or rarely a duplication cyst.

Be alert—Be alert to the possibility of sexual abuse if there is vaginal bleeding or a very abnormal anus.

We thank the peer reviewers for their helpful feedback on an earlier draft of this paper.

Contributors: ARG conceived the idea for the paper; and both authors contributed to writing it and are joint guarantors.

Competing interests: None declared

Provenance and peer review: Not commissioned; externally peer reviewed.

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Accepted: 2 March 2012