



2021 exceptional surveillance of testing for diabetes (NICE guidelines CG178, CG185, CG155, CG158 and NG185)

Surveillance report

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Surveillance decision

We will amend recommendations in the [NICE guidelines on bipolar disorder, psychosis and schizophrenia in adults](#), [psychosis and schizophrenia in children and young people](#) and [antisocial behaviour and conduct disorders in children and young people](#) to clarify that tests of either glycosylated haemoglobin (HbA1c) or fasting blood glucose can be used to assess for diabetes in children and adults who are treated with antipsychotics.

We will also amend [recommendation 1.3.7 in NICE's guideline on acute coronary syndromes](#) to recommend that GPs can test either HbA1c or fasting blood glucose monitoring (rather than both) to assess for diabetes in people who have had hyperglycaemia after acute coronary syndrome but without known diabetes.

Details of all the amendments to these recommendations are provided in [appendix A](#).

Reason for the exceptional review

In March 2021, we received an enquiry querying why there were discrepancies in the recommendations on assessing and monitoring for type 2 diabetes in people on antipsychotic medication between the NICE guidelines on bipolar disorder and psychosis and schizophrenia in adults.

- In NICE's guideline on psychosis and schizophrenia in adults, [recommendation 1.3.6.1 on tests before starting antipsychotic medication](#) and [recommendation 1.3.6.4 on regular monitoring throughout treatment](#), recommend that both HbA1c and fasting blood glucose are measured.
- In NICE's guideline on bipolar disorder, [recommendation 1.2.12 on monitoring physical health](#) also recommends an annual assessment with measurement of both HbA1c and fasting blood glucose. However, [recommendation 1.10.8 on monitoring antipsychotic medication](#) recommends assessing blood glucose (fasting not specified) or HbA1c; and [recommendation 1.10.5 on starting antipsychotic medication](#) recommends measuring either fasting blood glucose or HbA1c.

A second enquiry was also received querying why there was a discrepancy between the recommendations in NICE's guideline on psychosis and schizophrenia in adults and [NICE's clinical knowledge summary on when should I suspect type 2 diabetes in an adult?](#)

- The clinical knowledge summary on type 2 diabetes provides details on random plasma glucose and fasting plasma glucose levels for defining persistent hyperglycaemia and says that if the person is symptomatic, HbA1c or fasting plasma glucose level can be used but notes that 'repeat testing is sensible to confirm the diagnosis'. It states that if someone 'is asymptomatic, do not diagnose diabetes on the basis of a single abnormal HbA1c or [random or fasting] plasma glucose result. Arrange repeat testing, preferably with the same test, to confirm the diagnosis.' The advice therefore indicates that you could do a repeat measurement of random plasma glucose and therefore fasting plasma glucose might not be necessary, although this information is not specific to people on antipsychotic medication.

As [topic expert feedback](#) was that either, rather than both, HbA1c or fasting blood glucose should be tested to assess for type 2 diabetes, we checked for recommendations concerning testing for type 2 diabetes across NICE guidelines to check for instances where both HbA1c and fasting/random blood glucose testing is advised. The following guidelines make recommendations for both tests and are therefore also a focus of this exceptional surveillance review:

- In NICE's guideline on psychosis and schizophrenia in children and young people [recommendations 1.3.16 and 1.3.19 on how to use oral antipsychotic medication](#) recommends testing for fasting blood glucose and HbA1c before and during treatment on antipsychotic medication. The recommendations also cross-refer to [supplementary information on baseline investigations and monitoring](#), which highlight that HbA1c and fasting blood glucose should be measured.
- In NICE's guideline on antisocial behaviour and conduct disorders in children and young people, [recommendations 1.6.5 and 1.6.6 on baseline investigations before starting risperidone \(an antipsychotic\) and during treatment](#), respectively, recommend testing for fasting blood glucose and HbA1c.
- In NICE's guideline on acute coronary syndromes [recommendation 1.3.3 on identification](#) says to offer all people with hyperglycaemia after acute coronary syndrome and without known diabetes tests for HbA1c and fasting blood glucose; and [recommendation 1.3.7 on monitoring](#) says to 'Inform GPs that they should offer at least annual monitoring of HbA1c and fasting blood glucose levels to people without known diabetes who have had hyperglycaemia after an acute coronary syndrome'.

Methods

The exceptional surveillance process consisted of:

- Considering the information that triggered the exceptional review.
- Feedback from topic experts in diabetes.
- Considering the evidence used to develop the guidelines.
- Examining related NICE guidance and quality standards.

We decided that full updated literature searches were not needed because the information we had from existing NICE guidelines on type 2 diabetes and topic experts was enough to establish whether an update to the guidelines was needed.

For further details about the process and the possible update decisions that are available, see [ensuring that published guidelines are current and accurate in developing NICE guidelines: the manual](#).

Topic expert feedback

NICE's diabetes guideline update committee were contacted for their feedback on the following:

- whether there is any reason why recommendations in the 2 NICE guidelines would not be the same?
- whether recommendations for baseline testing and monitoring of diabetes should be the same?
- whether tests of blood glucose and HbA1c are needed, or is either acceptable; and whether fasting blood glucose is always needed, or is random blood glucose also an acceptable measure?

These were discussed in a committee meeting held on 1 June 2021 (see the [committee member list](#) [21 July 2021] for details of members professions). The committee members agreed that recommendations on testing for type 2 diabetes (and prediabetes) should be the same for people with psychosis, schizophrenia and bipolar disorder. They noted that this group are considered to be at high risk of developing type 2 diabetes and that they

are identified in [NICE's guideline on type 2 diabetes: prevention in people at high risk](#) as being a [vulnerable group](#). They said that recommendations on testing and monitoring of diabetes should be the same as in NICE's guideline on type 2 diabetes: prevention in people at high risk, which recommends offering venous blood tests to assess fasting plasma glucose or HbA1c.

Discussions highlighted that HbA1c was considered as the preferred measure, but that fasting blood glucose was an alternative option. However, they also said as fasting may present difficulties for this population, random blood glucose testing should also be an option. They said the key issue is that whichever measure is used, the test results are interpreted according to recommendations on identifying risk and diagnosing type 2 diabetes in NICE's guideline on type 2 diabetes: prevention in people at high risk.

Information considered when developing the guidelines

Psychosis and schizophrenia in adults

[NICE's full guideline on psychosis and schizophrenia in adults](#), provides details in the introductory section about the increased risk of diabetes for people with schizophrenia as the rationale for testing for diabetes in this population. Evidence concerning the use of HbA1c, fasting and/or random blood glucose measures for assessing diabetes was not considered during development of this guideline. A rationale for why both HbA1c and fasting blood glucose are recommended for assessing type 2 diabetes before and during treatment with antipsychotics, rather than either HbA1c or fasting blood glucose being recommended (as is the case in the NICE guideline on type 2 diabetes: prevention in people at high risk) is not provided.

Bipolar disorder

[NICE's full guideline on bipolar disorder](#) also highlights in the introductory section that bipolar disorder is associated with a higher burden of physical illnesses such as diabetes. The rationale for developing recommendations on diabetes was that 'many guidelines now recommend monitoring of glucose and lipid levels for patients prescribed any antipsychotic ... It is also important to note that many people with bipolar disorder may be at high risk of developing diabetes mellitus and dyslipidaemias resulting from aspects of their lifestyle, irrespective of antipsychotic treatment.'

Recommendations 1.10.5, 1.10.8 and 1.2.12 on measuring HbA1c, fasting and/or random blood glucose were described as adapted from the NICE guideline on psychosis and schizophrenia in adults because 'the GDG (guideline development group) agreed that side effects from antipsychotics will occur in the same way in people with bipolar disorder as they do in people with schizophrenia'. The recommendations were 'adapted by the GDG based on their expertise', no further information for the differences between the 2 guidelines' recommendation content was provided.

Psychosis and schizophrenia in children and young people

NICE's guideline on psychosis and schizophrenia in children and young people (recommendations 1.3.16 and 1.3.19) were made in response to the growing evidence for harmful effects of antipsychotic medications, especially in the young. The GDG considered the underlying evidence and recommendations in NICE's guideline on psychosis and schizophrenia in adults published in 2009 and adapted them.

Antisocial behaviour and conduct disorders in children and young people

NICE's guideline on antisocial behaviour and conduct disorders in children and young people (recommendations 1.6.5 and 1.6.6) on testing fasting blood glucose and HbA1c were also based on NICE's guideline on psychosis and schizophrenia in adults published in 2009.

Acute coronary syndromes

NICE's guideline on acute coronary syndromes (recommendation 1.3.3), states to 'offer all people with hyperglycaemia after acute coronary syndrome and without known diabetes tests for:

- HbA1c levels before discharge
- fasting blood glucose levels no earlier than 4 days after the onset of acute coronary syndrome.

These tests should not delay discharge.'

This recommendation was based on evidence from prognostic studies rated as low or very

low quality (see [hyperglycaemia in acute coronary syndromes \[2011 evidence reviews\]](#)) that 'showed that both fasting blood glucose and HbA1c could be used to predict diabetes at follow-up' of people with acute coronary syndrome. The GDG 'agreed that patients with high HbA1c levels and fasting blood glucose on discharge were at higher risk of developing diabetes, therefore these tests should be routinely used in practice'. They 'also discussed the fact that blood glucose levels would be distorted as a result of the acute event. Therefore, test results on day 4 may be more reliable than using test results on admission to identify patients who are at higher risk of a diagnosis of diabetes. It was agreed that formal testing and diagnosis of diabetes will normally take place following referral to primary care after the acute episode.'

Recommendation 1.3.7 on advice and ongoing monitoring for people with hyperglycaemia after acute coronary syndrome and without known diabetes says to 'Inform GPs that they should offer at least annual monitoring of HbA1c and fasting blood glucose levels to people without known diabetes who have had hyperglycaemia after an acute coronary syndrome'. It is reported in the evidence review that there was a lack of evidence on the information and support needs of patients with acute coronary syndrome and hyperglycaemia who have no previous diagnosis of diabetes; and that 'there may be variation in terms of which patients are currently provided with follow-up, so the GDG decided that monitoring of this high risk group would be improved by secondary care staff informing the GP that a patient needs routine follow-up. Specifically, it felt that follow-up should include a biochemical test to ensure that diabetes status is assessed'. Reasons for recommending testing both, rather than either HbA1c or fasting blood glucose levels are not detailed.

Other relevant NICE guidance

Type 2 diabetes: prevention in people at high risk

With regards to identifying an adult's risk of developing or having type 2 diabetes, [recommendations on risk identification in NICE's guideline on type 2 diabetes: prevention in people at high risk](#) (including identifying prediabetes and type 2 diabetes), say to offer venous blood tests to assess fasting plasma glucose or HbA1c. None of the recommendations discuss the use of random blood glucose testing.

Diabetes (type 1 and type 2) in children and young people: diagnosis and management

Recommendations on diagnosis in NICE's guideline on diabetes (type 1 and type 2) in children and young people say to be aware that signs of type 1 diabetes in children and young people include hyperglycaemia, which is defined as 'random plasma glucose more than 11 mmol/litre'. It recommends that type 1 diabetes in children and young people should be confirmed using the plasma glucose criteria in the World Health Organization's 2006 report on the diagnosis and classification of diabetes mellitus, which provides details on measurements of random and fasting blood glucose for helping in diagnosing diabetes. The full guideline reports that in 'young people with severe symptoms, the diagnosis [of type 1 diabetes] can be confirmed by a random plasma glucose concentration ≥ 11.1 mmol/l' and says that 'in the unusual situation where a child presents without definitive symptoms but with a plasma glucose concentration ≥ 11.1 mmol/l, the World Health Organization recommends that a fasting plasma glucose test and/or an OGTT [oral glucose tolerance test] may be required to confirm the diagnosis ... a fasting plasma glucose concentration ≥ 7.0 mmol/l can be used to confirm the diagnosis'. While the GDG agreed with measuring random and fasting blood glucose, they said that 'OGTTs should be discouraged in clinical practice due to their inconvenience, greater cost and lower reproducibility compared with fasting plasma glucose or 2 hours post-glucose plasma glucose tests'.

The guideline recommends that 'when diagnosing diabetes in a child or young person, assume type 1 diabetes unless there are strong indications of type 2 diabetes, monogenic or mitochondrial diabetes' and to 'think about the possibility of type 2 diabetes in children and young people with suspected diabetes who:

- have a strong family history of type 2 diabetes
- are obese
- are of black or Asian family origin
- do not need insulin, or need less than 0.5 units/kg body weight/day after the partial remission phase
- show evidence of insulin resistance (for example, acanthosis nigricans)'.

The recommendations on diagnosis do not discuss the use of measures of HbA1c or fasting blood glucose for diagnosing type 2 diabetes. The guideline provides recommendations on HbA1c targets and monitoring once a diagnosis of type 2 diabetes

has been made.

Clinical knowledge summary on type 2 diabetes in an adult

Clinical knowledge summaries provide primary care practitioners with a readily accessible summary of the current evidence base and practical guidance on best practice. They are not NICE guidance but are hosted on the NICE website. The [basis for recommendations on tests for type 2 diabetes](#) are from on multiple sources, including [NICE's guideline on type 2 diabetes in adults: management](#); no other NICE guidelines are referenced.

While the clinical knowledge summary references NICE's guideline on type 2 diabetes in adults: management as a source for advice, this guideline is for adults already diagnosed with type 2 diabetes, and as such is not relevant to the populations being considered in this review, for whom type 2 diabetes has not yet been diagnosed.

The clinical knowledge summary on testing for type 2 diabetes in adults and on [diagnosis in children and young people](#) advises that persistent hyperglycaemia in children and young people can be measured by fasting or random blood glucose. It reports that 'the definition of persistent hyperglycaemia is based on Classification of Diabetes Mellitus ([WHO, 2019](#)), the ISPAD [International Society for Pediatric and Adolescent Diabetes] clinical practice consensus guidelines ([Mayer-Davis et al. 2018](#); [Zeitler et al. 2018](#)), and expert opinion in a review article ([Candler et al. 2018](#)). The ISPAD guidelines note that 'no diagnostic criteria have been specifically validated in children and young people and are therefore extrapolated from adult definitions'; and 'the recommendation that HbA1c should not be used to diagnose type 2 diabetes in children and young people is based on the ISPAD clinical practice consensus guidelines (Mayer-Davis et al. 2018) and expert opinion in a review article, which notes that the HbA1c cut-off used to diagnose type 2 diabetes in adults is not considered sufficiently accurate in children to make a diagnosis (Candler et al. 2018)'.

Equalities

People with severe mental health problems are at increased risk of type 2 diabetes when compared with the general population. However, there is no reason why testing for type 2 diabetes in this population should differ from the testing recommended for anyone else.

The topic experts highlighted that fasting may present additional difficulties for people with severe mental health problems, making a fasting blood glucose test potentially

impractical. While it was suggested that a random blood glucose test could therefore be considered, there are no recommendations within NICE guidelines concerning the measurement or levels of random blood glucose for considering someone to be at risk of, or confirmed as having type 2 diabetes. A random blood glucose test is most appropriate in people with symptoms of diabetes who are likely to have high blood glucose levels. People who do not have symptoms of diabetes will have random fluctuations in blood glucose during the day and blood glucose may be only slightly elevated, so could be missed by a random blood glucose test. HbA1c provides a measure of the average blood glucose level over the last 10 to 12 weeks and can be measured without the need for fasting. HbA1c is a practical alternative to fasting blood glucose and was highlighted by topic experts as being the preferred test as it provides a long-term view of glucose levels.

There are no NICE guideline recommendations specifying tests for hyperglycaemia that should be used for diagnosing type 2 diabetes in children. Recommendations in NICE's guideline on diabetes (type 1 and type 2) in children and young people: diagnosis and management are for children who are likely to be symptomatic and therefore have higher blood glucose levels which could be detected using a random blood glucose test. In the absence of symptoms of diabetes, it is considered appropriate that monitoring children on antipsychotic medication for signs of hyperglycaemia should be done by testing HbA1c or fasting blood glucose levels, in line with the rationale provided above.

Overall decision

Based on topic expert feedback and existing NICE guidance on type 2 diabetes, we have concluded that recommendations on testing for diabetes should be amended across the NICE guidelines for adults and children taking antipsychotic medication to say that HbA1c or fasting blood glucose should be measured before starting, and during antipsychotic medication. Details, such as timing of tests will remain unchanged. The amendments to the recommendations are provided in [appendix A](#).

Recommendation 1.3.3 in NICE's guideline on acute coronary syndromes provides a clear rationale for why both HbA1c and fasting blood glucose tests are being recommended before discharge from hospital in people with hyperglycaemia after acute coronary syndrome, as such we are not recommending a change to this recommendation. However, recommendation 1.3.7 on GPs testing HbA1c and fasting blood glucose levels in people without known diabetes who have had transient hyperglycaemia during acute coronary syndrome was not based on any evidence; and does not align with the recommendations in the NICE guideline on type 2 diabetes: prevention in people at high risk, to test for either

HbA1c or fasting blood glucose testing. We will therefore amend this recommendation to say 'Inform GPs that they should offer at least annual monitoring of HbA1c or fasting blood glucose levels to people without known diabetes who have had hyperglycaemia after an acute coronary syndrome'.

As clinical knowledge summaries are not NICE products, NICE does not make decisions on whether changes are needed. However, while NICE's guideline on type 2 diabetes: prevention in people at high risk does not specify that random blood glucose can be measured, topic experts agreed that this is an appropriate alternative measure, therefore there does not seem any reason for advising that the summary on 'When should I suspect type 2 diabetes in an adult?' is changed.

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