

Information for Clinicians

Clinical Biochemistry Department

Diagnosis of Diabetes Mellitus

Who should be tested?

1. Presentation of probable **Type 1 Diabetes** (irrespective of age):

- A short history (<1 month) of thirst, urinary frequency and or weight loss.
In this situation HbA1c should NOT be used as a diagnostic test.

Check:

- Urine for ketones
- Finger prick glucose
- Send a venous sample for glucose to the lab

Refer adults in the community: urgently via Diabetes Specialist Nurses:

BANES: 01225 824527 ruh-tr.communitydsn@nhs.net

Wiltshire (North, East and West): 01249 456483 WHC.diabetesreferrals@nhs.net

Wiltshire (South): 01722 425176 WHC.diabetesreferrals@nhs.net

For adults inpatients contact RUH inpatient DSNs: 01225 824198 ruh-tr.disnteam@nhs.net

Refer paediatrics: for same day assessment by the RUH Duty Paediatric Team, contact through RUH switchboard (01225 428331). **Out of hours advice:** Paediatric Registrar via RUH switchboard 01225 428331 bleep 7205.

2. Symptoms of **Type 2 Diabetes**, may include:

- Thirst
- Polyuria/nocturia (passing lots of urine especially at night)
- Incontinence in older people
- Tiredness/lethargy
- Mood changes (irritability)
- Weight loss
- Blurred vision
- Thrush infections (particularly genital)
- Recurrent infections (particularly skin)
- Tingling/pain/numbness (feet, legs, hands)
- Unexplained symptoms

3. **Patients at risk of developing Type 2 Diabetes e.g. identified during a NHS Health Check appointment:**

- BMI ≥ 30 (or ≥ 27.5 if Indian, Pakistani, Bangladeshi, other Asian or Chinese)
- BP $\geq 140/90$

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How should patients be tested for Type 2 Diabetes?

An individual patient's diagnosis of Type 2 Diabetes may be based on **EITHER** laboratory **glucose** **OR HbA1c** analysis but **NOT A COMBINATION** of these tests.

Note that whilst HbA1c testing may often be preferred by patients and clinicians, , there are a number of patient groups in which **HbA1c may be misleading** and **should not** be used to diagnose Diabetes.

HbA1c must NOT be used for diagnosis in situations where high glucose has developed rapidly (as it may not be increased):

- Possible Type 1 diabetes
- Symptoms less than three months
- Acutely ill patients
- Medication that may cause rapid rise in glucose e.g. corticosteroids, antipsychotics
- Acute pancreatic damage or pancreatic surgery
- In pregnancy for the investigation of gestational diabetes; OGTT is required.

**TO AVOID THE RISK OF FALSELY REASSURING RESULTS OR DELAYED DIAGNOSIS
HBA1c SHOULD NOT BE USED FOR DIAGNOSIS IN CHILDREN.**

HbA1c must NOT be used in the presence of factors affecting its formation or measurement:

- Iron and vitamin B₁₂ deficiency
- Haemolytic anaemias
- Administration of iron, vitamin B₁₂ or erythropoietin
- Chronic liver disease
- Chronic renal failure (CKD 4 and 5)
- Alcoholism
- Rheumatoid arthritis
- Splenomegaly or splenectomy
- Haemoglobinopathies
- Drugs that may affect erythrocyte lifespan e.g. antiretrovirals, ribavirin, dapsone

From August 2023 the HbA1c method performed by the Blood Sciences department at the RUH is able to detect the presence of haemoglobin (Hb) variants that could interfere with the measurement of HbA1c.

In the presence of the most common Hb variants e.g. HbAS, AD, AC, AE, HbF the HbA1c result provided is analytically accurate but **SHOULD NOT** be used for diagnosis or exclusion of diabetes due to potential influence of the variant on RBC turnover. The HbA1c may be used to monitor an individual's glycaemic control following diagnosis of diabetes by an alternative method e.g. fasting glucose or OGTT.

The presence of some atypical Hb variants and very high HbF levels may prevent a reliable HbA1c from being obtained, in this situation a HbA1c result will not be available. Alternative tests for diagnosis e.g. fasting glucose or OGTT and monitoring of diabetes e.g. Fructosamine should be used.

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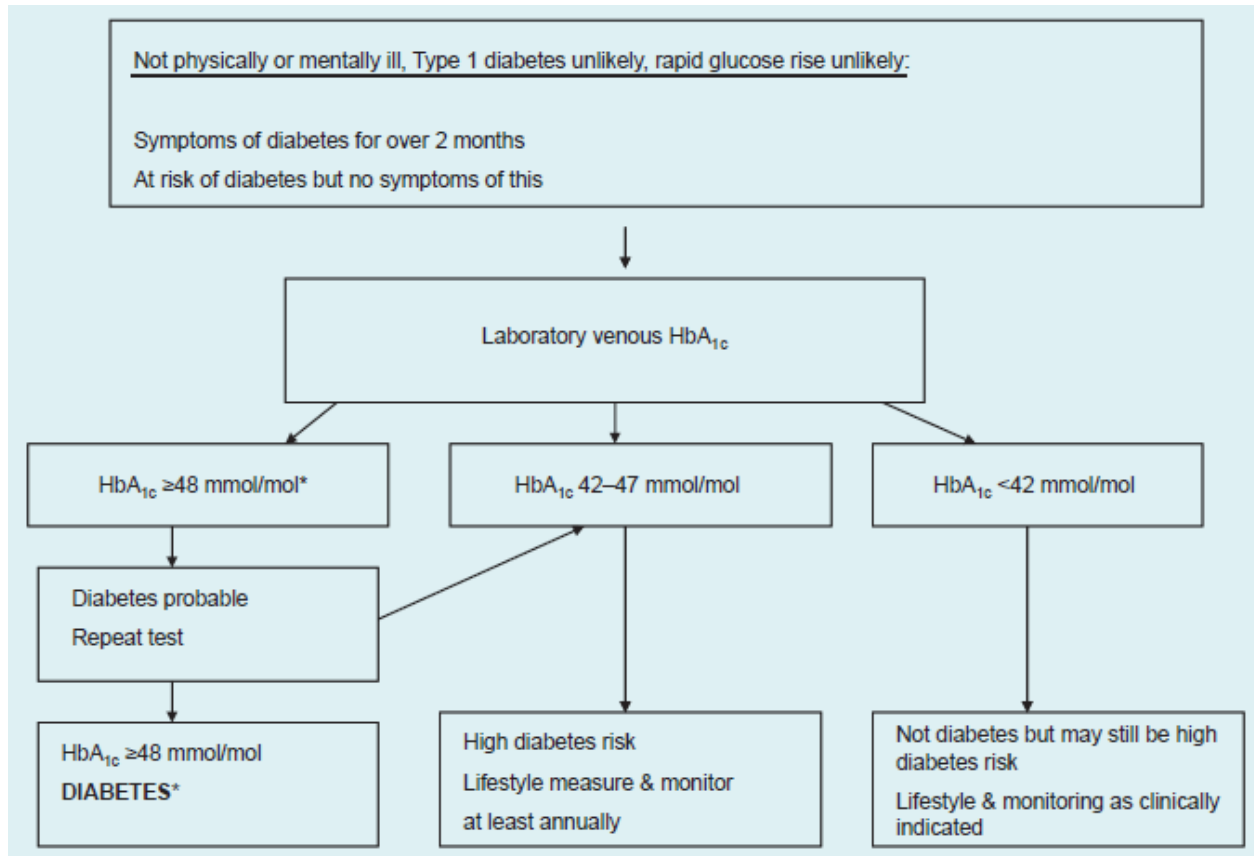
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Where HbA1c has been deemed appropriate for use, the following algorithm may be used:

Algorithm for HbA1c based diagnosis (UK Expert Position Statement 2012)



*HbA1c ≥48 mmol/mol without symptoms; HbA1c should be repeated within 2 weeks.

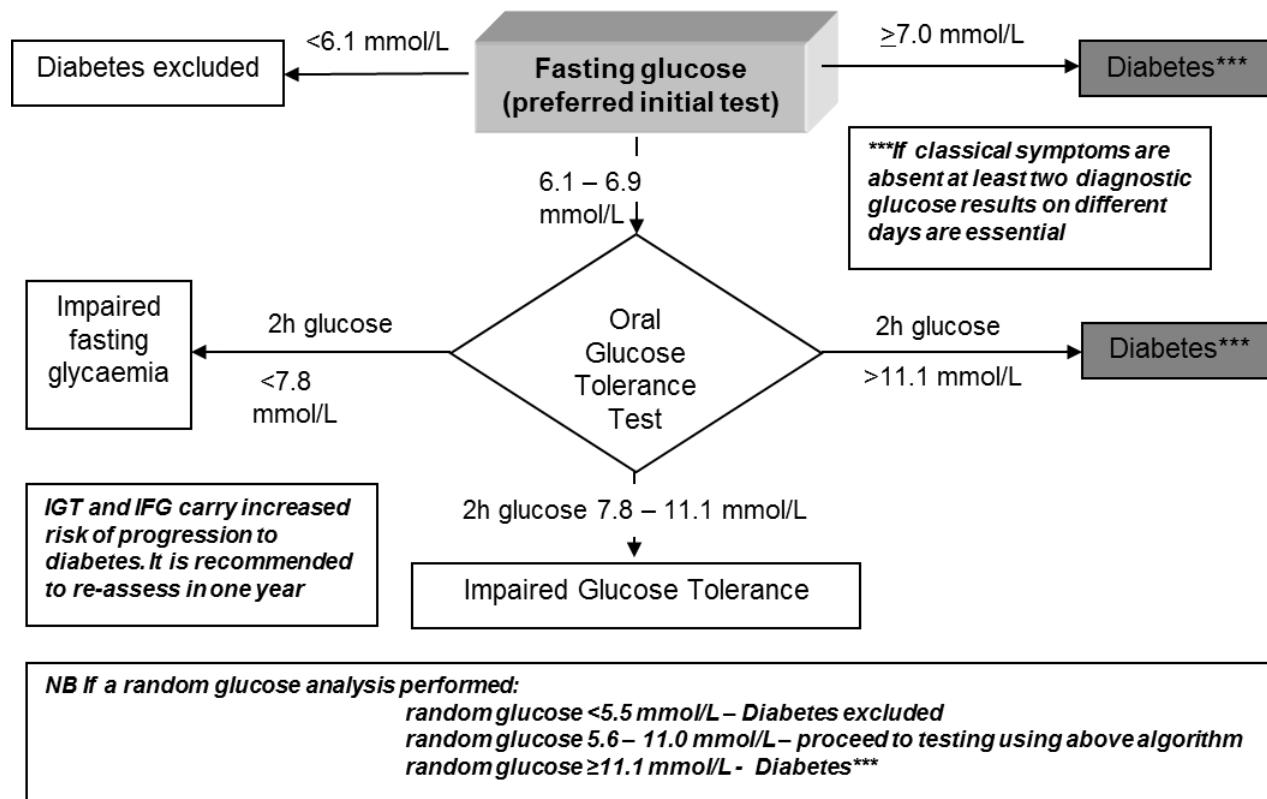
*HbA1c >120 mmol/mol are likely to indicate marked hyperglycaemia which may need urgent assessment.

NB HbA1c is not an urgent laboratory test, results will not routinely be telephoned.

Request venous glucose where results of investigation are required urgently.

Where venous glucose has been deemed the most appropriate test, the following algorithm should be used to classify diabetes or related conditions:

Algorithm for glucose based diagnosis (WHO 2006)



References and useful links

- <https://bathdiabetes.ruh.nhs.uk/>
- W.G. John (on behalf of the UK Department of Health Advisory Committee on Diabetes). 2012. Use of HbA1c in the diagnosis of diabetes mellitus in the UK. The Implementation of World Health Organisation guidance 2011. Diabet. Med.29:1350-1357.
- Use of glycated haemoglobin (HbA1c) in the diagnosis of diabetes mellitus – WHO, 2011 [Use of glycated haemoglobin \(HbA1c\) in diagnosis of diabetes mellitus: abbreviated report of a WHO consultation](#)
- Definition and diagnosis of diabetes mellitus and intermediate hyperglycaemia - Report of a WHO/IDF consultation, 2006 [Definition and diagnosis of diabetes mellitus and intermediate hyperglycaemia : report of a WHO/IDF consultation](#)
- NHS Health Check Best Practice Guidance – Oct 2019 (updated March 2020) <https://www.healthcheck.nhs.uk/commissioners-and-providers/national-guidance/>