

## **HbA1c: Laboratory Pocket Guide**

### **From 2021, HbA1c is measured by immunoassay, reported in mmol/mol**

The Viapath laboratories will cease dual reporting of HbA1c in % and mmol/mol units in 2021, with results moving forward only being reported in the International Federation of Clinical Chemistry (IFCC) preferred units of mmol/mol. A unit conversion guide is available [**BSAC-LF-245**] **HbA1c Units Conversion Table**.

This change will coincide with the launch of a new measurement platform for HbA1c at Guy's & St. Thomas' – the Roche turbidimetric inhibition immunoassay (TINIA) method, which detects the first 4 amino acids of the haemoglobin beta chain.

- The method is **NOT** affected in patients who are carriers (heterozygotes) of common haemoglobin variants (e.g. HbAC, AD, AE, AS) and HbA1c can be reported with confidence.
- For patients with haemoglobinopathies (homozygotes or compound heterozygotes), an alternate test should be used to assess glycaemic control (e.g. fasting glucose for diagnosis of diabetes mellitus; fructosamine for diagnosed patients).
- Note that the method may cause misleading results when the HbF is >7%. Raised HbF is associated with hereditary persistence of fetal haemoglobin (HPFH), use of hydroxyurea and sickle cell disease. HbF concentrations in normal pregnancy are typically <2%.

### **When to use HbA1c**

The diagnosis and monitoring of diabetes mellitus using HbA1c is dependent on normal erythropoiesis, no genetic or chemically altered haemoglobins, normal glycation and normal erythrocyte destruction rates. HbA1c is affected by a number of factors, some of which are listed in Table 1. Please consider this in your routine patient management, and use complementary measurements in situations where HbA1c may not be reliable.

**Table 1. Some of the factors influencing HbA1c and its measurement (WHO, 2011)**

Factor	Resulting in increased HbA1c	Resulting in decreased HbA1c
<b>Erythropoiesis</b>	Iron / vitamin B12 deficiency Decreased erythropoiesis	Administration of EPO / iron / B12 Reticulocytosis Chronic liver disease
<b>Erythrocyte lifespan</b>	Increased lifespan: - splenectomy	Decreased lifespan: - haemoglobinopathies, - splenomegaly - rheumatoid arthritis - drugs (e.g. antiretrovirals, ribavirin, dapsone)
<b>Glycation</b>	Increased glycation: - alcoholism - chronic renal failure - decreased erythrocyte pH	Decreased glycation: - chronic aspirin use - high dose vitamin C and E - certain haemoglobinopathies - increased erythrocyte pH

### For more information

Please contact the Duty Biochemist on 07738 897061 for more information or to discuss individual cases.

### References

Ibrahim M, Hasan Qari M, Sait W & Abulela M, 2009 Pattern of HB F level rise during normal pregnancies. *Hemoglobin* **33**, 534-538.

World Health Organization (WHO), 2011. Use of glycated haemoglobin (HbA1c) in the diagnosis of diabetes mellitus: Abbreviated report of a WHO consultation.