

Methods used in glycaemic monitoring in children and young people with diabetes in England and Wales

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Introduction

Glycated haemoglobin(HbA1c) remains the most powerful outcome measure for children and young people with diabetes. It is collected at every clinic visit and is used for individualised discussions around diabetes control and for national benchmarking. However, despite DCCT and IFCC standardisation, there is still no overall consensus as to the most appropriate methodology, particularly when assessing patients with haemoglobinopathies that may affect HbA1c measurement.

Aim

To describe the methods of glycaemic monitoring in paediatric diabetes units (PDU) across England and Wales.

Methods

- Cross-sectional surveys to all paediatric diabetes consultants in England & Wales via network coordinators.
- Data:
 - Demographics: diabetes type and ethnicity
 - HbA1c: frequency, timing and methods
 - Variations in clinical practices when HbA1c is limited

Results

- Response rate: 101 / 171 PDU (59%), 16,599 patients
- Diagnosis: Type 1 - 96.9%, Type 2 - 1.7%, Others - 1.4%
- Ethnicity: Caucasian - 87.5%, Black - 2.8%, Asian - 5.7%, Others- 3%, unknown- 1%

When are the HbA1c measured ?

- On the day of the appointment = 95%
- Before the appointment = 5%

How are HbA1c measured in clinic?

Laboratory HbA1c Methods (reported by 78 PDU)	No. of units
Ion-exchange HPLC	39
Affinity HPLC	29
Capillary Electrophoresis	5
Immunoassay	2
Boronic affinity	2
Spectrophotometry	1

HPLC = high performance liquid chromatography

Table 2:
HbA1c method used in local laboratories of the PDU

When are laboratory HbA1c performed ?

- At all annual reviews n=46/82
- When there is clinical indication n=14/82
- Never n= 22/82

Clinical practices when HbA1c may be limited

- 51/101 respondents were aware of interferences in the methods affecting reliability of HbA1c results
- Full blood count is always performed with a HbA1c in 18/82 and only if there is a clinical indication in 10/82.
- 36/80 of PDU would screen patient with diabetes for haemoglobinopathies when there is a clinical indication/suspicion.

Glycaemic monitoring when HbA1c is not applicable (reported by 74 PDU *)	No. of units
Fructosamine	51
HbA1c	32
Glucose pattern from diary/meter	32
Average glucose from meter	30
Continuous glucose monitoring	29
Total glycated HbA	8
Glycated protein	4
Fasting glucose	3

* More than one method per PDU

Table 3:
Reported methods of glycaemic monitoring when HbA1c cannot be accurately measured due to analytical interferences

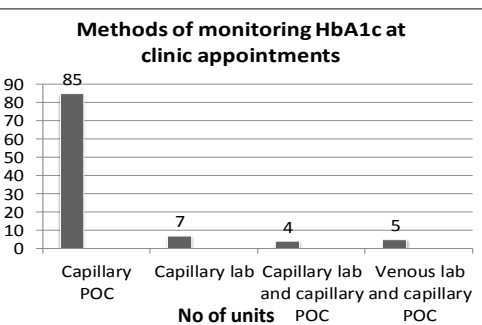


Figure 1:
Methods of HbA1c monitoring at clinic appointments. Capillary point of care is the commonest method reported

Point of Care Devices used by different units (reported by 81 PDU)	No. of units
Siemens DCA Vantage	64
Afinion (Axis-Shield)	11
In2It (Biorad)	2
Others	4

Table 1:
Capillary point-of-care analysers used in different PDU. Siemens DCA Vantage is the most popular device.

Discussion

- The capillary point of care testing by the Siemens DCA Vantage is the most popular HbA1c method reported. This machine faces interference from HbF concentrations greater than 10% (20% for significant interference) which can artificially lower the HbA1c.
- Considerable variation in the methods of glycaemic monitoring in paediatric diabetes patients exists nationally
- There is lack of awareness among clinician of factors which may impinge on HbA1c results and a significant no of units continue to use it when there are obvious interferences

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