

# How does knowing an up-to-date HbA<sub>1c</sub> affect decision making in the outpatient clinic?

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Having an up-to-date HbA<sub>1c</sub> during consultations in the outpatient clinic improves the effectiveness and efficiency of the clinic in the authors' experience. This study examines the impact of having an up-to-date HbA<sub>1c</sub> on a person with diabetes' management and treatment plans. Clinicians' decision-making and the ramifications for the clinic and the multidisciplinary team are also reported.

Glycated haemoglobin (HbA<sub>1c</sub>) measurement has revolutionised the management of diabetes. It gives an accurate guide to the average glycaemia over the preceding 3 months and is now a standard measure of glycaemic control.

Studies have confirmed that the level of HbA<sub>1c</sub> is closely linked to the future development of diabetes-related complications and the risk of developing these complications is significantly reduced if HbA<sub>1c</sub> is less than 7.5% (Writing Team for the DCCT/ Epidemiology of Diabetes Interventions and Complications Research Group, 2002; UK Prospective Diabetes Study Group, 1998; Diabetes Control and Complications Trial Research Group, 1995).

It is routine practice to measure HbA<sub>1c</sub> to determine a patient's level of glycaemic control and QOF points are available for doing so. HbA<sub>1c</sub> measurements are generally performed in diabetes clinics in one of two ways: in the laboratory or as a near-patient test. Using

the laboratory method, blood is taken from the patient before the clinic and sent to the laboratory – unless the patient has had their blood taken before the day of the appointment, the result will not be ready for the consultation.

Near-patient testing (NPT) leads to HbA<sub>1c</sub> results being available at the time of the consultation which is considered to be the main advantage of NPT over laboratory testing.

Grieve and colleagues (1999) conducted an extensive trial comparing laboratory HbA<sub>1c</sub> testing to NPT. This study showed that people with diabetes were more likely to have a change in management if the HbA<sub>1c</sub> was done as a near-patient test compared with laboratory testing. However, from the paper it is not clear what sort of management was changed; whether it was referrals to the DSN or insulin dose changes.

Several other studies compare laboratory-based HbA<sub>1c</sub> testing to NPT. These studies show that using NPT can help to achieve a small but significant decrease in HbA<sub>1c</sub> over

## Article points

1. Knowledge of HbA<sub>1c</sub> result changed management in 44 % of cases.
2. Near-patient testing optimised DSNs time.
3. Management may be unnecessarily implemented in clinics without near-patient testing.

## Key words

- Near-patient HbA<sub>1c</sub> testing
- Clinical decision-making

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**Page points**

1. 328 participants were recruited consecutively from a general diabetes clinic.
2. This study revealed 143 unanticipated changes in management made after the HbA<sub>1c</sub> result was made known to the clinician.

time compared with using laboratory testing (Petersen et al, 2007; Miller et al, 2003; Ferenczi et al, 2001; Thaler et al, 1999).

The current study was designed to investigate any other advantages to the person with diabetes and clinical team by using NPT, specifically what changes in patient management may occur when the HbA<sub>1c</sub> result is directly available during the patient consultation.

**Methods**

Three-hundred and twenty-eight individuals were recruited consecutively from the diabetes clinic at West Suffolk Hospital between November 2003 and February 2004. Blood was taken for an HbA<sub>1c</sub> measurement using a DCA 2000 near-patient HbA<sub>1c</sub> tester (Bayer Diagnostics, Newbury) and the result placed in a sealed envelope. The patient was then seen by a member of the diabetes team and a management plan was formulated and documented on the research sheet as one or more of the following.

- No change to current management.
- Referral to dietician.
- Referral to DSN.
- Change oral medication.
- Change insulin dosage.
- Initiate oral medication.
- Initiate insulin.

In order to mimic the normal clinic as much as possible, the clinician would have the patient's previous HbA<sub>1c</sub> results to hand, so only the measurement on the day of the clinic was blinded. The clinician would then open the envelope and discover the patient's HbA<sub>1c</sub>. The clinician would then review their proposed management plan and change it if necessary in light of the now available HbA<sub>1c</sub> result. The change in management as a result of knowing the HbA<sub>1c</sub> could be one of the following.

- A withheld management change. This occurred when the HbA<sub>1c</sub> is better than anticipated and the proposed management change is no longer deemed necessary.
- An implemented management change. This occurred when during initial interview no change in the patient's management was planned, but when an elevated HbA<sub>1c</sub> result became available a change in management was implemented.

The Suffolk local research and ethics committee approved the project. Statistical testing was not possible due to the design of the study.

**Results**

This study revealed 143 unanticipated changes in management made after the HbA<sub>1c</sub> result was known to the clinician (43.6%; *Table 1*).

The two major changes in management that occurred when the HbA<sub>1c</sub> result was known were related to DSN referral and changing insulin dosage (*Table 2*). Once the HbA<sub>1c</sub> result was known it was agreed by the clinician and patient to change the initial plan: 40 people were referred to a DSN because their HbA<sub>1c</sub> was higher than anticipated. However, a further 16 were no longer required to see a DSN because their HbA<sub>1c</sub> was better than anticipated. The availability of the HbA<sub>1c</sub> result enabled more appropriate referral of clinic patients to the DSN, particularly concentrating on those with higher than expected HbA<sub>1c</sub> measurements, thus cutting back on inappropriate referrals to this hard-pressed service.

Similarly, in 34 patients the clinician decided to make a change in insulin dosage once the

**Table 1. Frequency of changes when an up-to-date HbA<sub>1c</sub> was known.**

Total number of patients	328
Total management changes when HbA <sub>1c</sub> result was available	143 (43.6%)
Implemented treatment change	100 (30.5%)
Withheld treatment change	43 (13.1%)

**Table 2. Types of treatment changes and frequency of occurrence.**

Type of treatment change	Number of patients
DSN referral	56
Changed insulin dose	46
Dietitian referral	21
Changed oral medication	11
Initiated on insulin	5
Initiated on oral medication	4

HbA<sub>1c</sub> result was known and withdrew a planned change in insulin treatment in 12 patients when the result was better than expected. Thus, availability of the HbA<sub>1c</sub> value resulted in more appropriate insulin treatment for 46 patients, 12 of whom were being considered for insulin changes that they did not need.

The value of the HbA<sub>1c</sub> was so unexpected for a few individuals that once it was known, the management plan was overhauled completely and the patients were commenced on oral hypoglycaemic agents (n=4) or insulin (n=5).

### Conclusions

This study demonstrates that if people with diabetes are seen in clinic with an up-to-date HbA<sub>1c</sub> result, then more appropriate management plans can be developed for each person. It appears that if management plans are drawn up without knowing current HbA<sub>1c</sub> result, around half of those with diabetes will require alterations to their plan once the result is available. As there may be a delay of several days or weeks in getting a laboratory HbA<sub>1c</sub> result linked to the patient's record, it is possible that some of these required changes will never be carried through. Therefore having the HbA<sub>1c</sub> result instantly available ensures changes in management can be discussed and implemented there and then.

In addition, having the HbA<sub>1c</sub> result immediately allows more efficient and appropriate referral to other members of the multidisciplinary diabetes team, in particular to the DSN.

Having an instantly available HbA<sub>1c</sub> greatly influenced the decision to refer patients to the DSN and/or dietitian. This highlights the importance of the role of the DSN and the dietitian in improving patients' HbA<sub>1c</sub>. The DSN and dietitian felt that this was appropriate provided it did not prevent patients with a lower HbA<sub>1c</sub> from seeing them if they wished to.

It should be highlighted that although HbA<sub>1c</sub> is an important outcome for glycaemic control in audit and research, it is not the only measure of glycaemic control. People with good glycaemic control have been shown to have undocumented hypo- and hyperglycaemia with continuous glucose monitoring systems (CGMS; Hay et al, 2003). Due to the limited availability of CGMS, home glucose monitoring is the principal method that allows detection of these glucose fluctuations and allows day-to-day changes in treatment in response to changes in lifestyle (Renard, 2005).

The usefulness of an individuals' self-monitoring logbook depends upon their accuracy and, as accuracy can be variable, downloading blood glucose readings from the person with diabetes' meter may be more reliable.

## How does knowing an up-to-date HbA<sub>1c</sub> affect decision-making in the outpatient clinic?

Over recent years NPT has become increasingly popular despite the evidence for its efficiency and cost-effectiveness being limited. It has been suggested that clinicians' confidence in NPT's advantages over laboratory testing that has driven its popularity (Grieve et al, 1999). The availability of a current HbA<sub>1c</sub> result at consultation is perceived as a real advantage as it indicates whether additional treatment is likely and allows patient involvement in treatment decisions and goal setting (Miller et al, 2003). Involving people with diabetes in their treatment decisions is thought to help their motivation and concordance (Greenfield et al, 1988). As near-patient HbA<sub>1c</sub> measurement is nearly as accurate and reliable as laboratory HbA<sub>1c</sub> measurement (Hawkins, 2003) additional cost is less of a barrier to their use.

In conclusion the authors feel that NPT for HbA<sub>1c</sub> is an important tool required for the effective running of an outpatient diabetes service. ■

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