

# Diabetes care — an evaluation of a community pharmacy based HbA<sub>1c</sub> testing service

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**AIM** • To evaluate the clinical benefits and acceptability of HbA<sub>1c</sub> (glycated haemoglobin) testing by community pharmacists for people with diabetes.

**DESIGN** • A 6-month study in which 260 people with diabetes were to receive three HbA<sub>1c</sub> tests carried out by their local community pharmacist. Patients with poor control were targeted for health care intervention and some were invited to attend education sessions. The acceptability of the service to patients, GP surgeries and related health care professionals was assessed by evaluation questionnaires.

**SUBJECTS AND SETTINGS** • Five community pharmacies were selected for the pilot sites. People with diabetes were selected by their GPs and were invited to attend testing sessions at their local pharmacy.

**OUTCOME MEASURES** • Improvements in diabetic care; acceptability of service to patients and health care providers.

**RESULTS** • Before the study only 57% of people had received an annual HbA<sub>1c</sub> test. All 260 people attended the first HbA<sub>1c</sub> test, of which 44.2% were deemed to have inadequate control. The mean HbA<sub>1c</sub> level for the whole group was 8% which was in the “needs improving” category. 185 people completed a third HbA<sub>1c</sub> test when the mean HbA<sub>1c</sub> level was 7.7%. Although this was not statistically significant it represented an improvement in control. People with poor control were invited to attend an education programme after which 84.6% showed an improvement in HbA<sub>1c</sub> levels. Overall the service was well accepted and was of value to both patients and health care providers. Patients were satisfied with the level of care they had received from the pharmacist and many wanted the service to continue.

**CONCLUSIONS** • Community pharmacists are well placed to provide such testing services. Regular HbA<sub>1c</sub> testing combined with education helped poorly controlled patients to gain better management of their diabetes.

Diabetes mellitus occurs in approximately 2 per cent of the United Kingdom population.<sup>1</sup> Insulin dependent diabetes mellitus (IDDM) usually affects people under the age of 40 years. Non-insulin dependent diabetes mellitus (NIDDM), mainly seen in older adults, affects up to two million individuals in the UK, half of whom are undiagnosed. NIDDM is associated with people over 40 years old, increased obesity and decreased physical activity. The consequences of uncontrolled diabetes include retinopathy, neuropathy, nephropathy and cardiovascular disorders.<sup>2</sup> The burden on the National Health Service of diabetes-related treatment accounts for 4 to 5 per cent of the total annual health care expenditure.<sup>3</sup>

People with diabetes are encouraged to monitor their blood and/or urine glucose levels regularly. In recent years the assessment of glycated haemoglobin (HbA<sub>1c</sub>) levels every few weeks or months has been introduced. HbA<sub>1c</sub> provides a better index of diabetic control than blood or plasma glucose concentration because it is little affected by short-term fluctuations in blood glucose concentration. HbA<sub>1c</sub> levels can also be useful in motivating people to achieve better control of their diabetes, since the results recorded at a clinic visit indicate the overall level of success that they have had in managing the disease in the previous one to three months.

It is recognised that better management of diabetes could significantly reduce both direct and indirect costs of the condition. Recent evidence from the United States has indicated that people with HbA<sub>1c</sub> levels higher than 8 per cent (poor control) cost the health services more than those with good glycaemic control.<sup>4</sup>

In February and March 1997, the diabetes care initiative (DCI) team — made up of members of Bayer Plc's Diagnostic and Pharma divisions — implemented a pilot HbA<sub>1c</sub> testing service within selected community pharmacies and offered monitoring and educational support for people with diabetes. In this paper we evaluate whether glycaemic control in people with diabetes was improved as a result of the testing service and assess the acceptability of the service to patients, pharmacists and GPs.

## METHODS

The initial stages of the project involved identifying suitable pharmacies for pilot sites. Negotiations also took place with local GPs to gain their involvement. In areas

where there was strong support other stakeholders, such as the hospital team and the local health authority, were consulted.

Two diabetic nurse specialists were employed to provide clinical expertise and to assist with the running of the project. They were responsible for training pharmacy staff to perform the HbA<sub>1c</sub> test using a DCA 2000+ machine (Bayer Diagnostics) and for providing general day-to-day support.

**Selection of pharmacies** Several criteria were used in the selection of potential community pharmacy sites. The pharmacist needed both to be interested in providing the service (maybe already offering a value-added service) and to have good working relationships with nearby GPs and practice nurses. Adequate space for establishing a diabetes care centre within the pharmacy was mandatory.

**Selection of GP surgeries** Before the final selection of pharmacy sites was made, discussion with local GP surgeries was initiated with a view to establishing potential partners for the study. GP surgeries chosen needed to have a practice nurse with an interest in diabetes and an adequate number of people on their register of diabetic patients. In addition, the surgery needed to have a good working relationship with the selected pharmacist whose premises needed to be in close proximity.

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**Selection of patients** People were eligible for the study provided that they were over 18 years old, physically able to attend the pharmacy for the test and had the agreement of their GP. People were excluded if they were receiving treatment from a local diabetologist or endocrinologist, were pregnant or were housebound. Those selected were sent a letter inviting them to attend for the first of three tests, and explaining that the intent was for people to attend the pharmacy three times within a six-month period.

**HbA<sub>1c</sub> testing** All HbA<sub>1c</sub> tests were performed in the pharmacy by staff using a DCA 2000+ machine. The results were recorded on the patient's record card, added to an anonymised database and copied to the GP. Patients were informed of their results. The pharmacist gave each person feedback, and referrals were made to the GP depending on the specific needs of each patient. In addition, letters intended to stimulate the intervention of the GP were also sent to those having poor test results. Glycaemic control was categorised depending on the test results (Table 1).

**Diabetes education sessions** Following identification by the pharmacist, people having an HbA<sub>1c</sub> result of above 8 per cent were targeted for health care intervention. Subsequently meetings, co-ordinated by a diabetic nurse specialist, were held with the GP, pharmacist and practice nurses to discuss individual patients, whether any action was required and who would take the action. The primary care team decided who would benefit from attending education sessions. It was agreed that the diabetic nurse specialist would facilitate group education sessions.

The diabetic education sessions covered several areas, including information on diabetes, diagnosis, signs and symptoms, different types of diabetes and treatment. People were also given information on monitoring blood glucose, urinalysis, HbA<sub>1c</sub> testing, clinic attendance and prevention of complications. A local dietician provided advice on a "diabetic diet". At the end of the education sessions all attenders were asked to complete an evaluation questionnaire.

**Stakeholder satisfaction** The thoughts and experiences of all stakeholders were systematically collected and evaluated.

## RESULTS

Three pharmacies in Swansea and two in Chesterfield were selected as pilot sites. These five diabetes care centres involved around 25 GPs with 260 people registered for the first test. The records of 217 people in four centres were audited.

**Patients' characteristics** Most people were Caucasian (97.7 per cent), aged over 50 years (82.9 per cent) and male (60.4 per cent). Of the observed population 88.8 per cent had NIDDM; of these 64.1 per cent were treated with oral hypoglycaemics. Most were being cared for by their GP alone

**TABLE 1: LEVEL OF GLYCAEMIC CONTROL INDICATED BY GLYCATED HAEMOGLOBULIN LEVEL**

Glycaemic control	HbA <sub>1c</sub> level (%)
Excellent	<7
Good	7-7.5
Acceptable	7.5-8
Needs improving	8-9
Poor	9

(80.6 per cent). Almost half the people in the study group were also receiving medication for hypertension.

The mean duration of diabetes was 7.2 years and the mean body mass index was 28.8 kg/m<sup>2</sup> (overweight).

**HbA<sub>1c</sub> test results** Before implementation of the HbA<sub>1c</sub> testing service, the level of annual clinical checks was below average for the whole group, with only 57 per cent of people receiving an annual test; of these only 38.7 per cent had adequate glycaemic control.

**Visit 1** At the first visit, 260 people had an initial HbA<sub>1c</sub> test. The mean test result was 8 per cent. Overall 44.2 per cent of patients were deemed to have inadequate glycaemic control, with the proportion being higher for IDDM patients (65.6 per cent). Furthermore, of those being cared for by a hospital alone, half had poor glycaemic control. People who were ex-smokers tended not to be well controlled. People were encouraged to return for two further visits.

**Visit 2** At the second visit, 224 people returned for a second test. Of these, 57.6 per cent had adequate control and the mean HbA<sub>1c</sub> level was 8 per cent, which was comparable to levels identified at visit 1.

**Visit 3** At the third visit, 185 people returned (at a mean of 152 days after the first test). People who dropped out were more likely to be women, to have IDDM, to be younger and to have poor glycaemic control. The mean HbA<sub>1c</sub> result at visit 3 was 7.7 per cent, which was slightly lower than the mean HbA<sub>1c</sub> level of 8 per cent at visits 1 and 2. Although this change was not statistically significant, it may represent a move from the "need to improve control" to the "acceptable" category. However, it should be noted that at visit 1 there were 260 people compared with 185 at visit 3 and those who dropped out tended to have poorer control. For the 185 patients with visit 1 and 3 data, little change in glycaemic control was recorded, with mean HbA<sub>1c</sub> levels of 7.8 per cent and 7.7 per cent recorded at visits 1 and 3, respectively.

**Evaluation of diabetes education** In Chesterfield a total of four education sessions were set up (two at each site). Out of the 146 people tested in Chesterfield, 75 potentially needed to improve their glycaemic control. Of these 75 people, 70 were invited to attend an education session. In total 29 people attended (41 per cent), and 82 per cent of those attending returned an

education session evaluation form afterwards.

All attenders reported that the sessions were useful and 83 per cent felt that their knowledge of diabetes, treatment, diet, monitoring and prevention of complications had improved. The HbA<sub>1c</sub> test results also indicated that they had benefited from the education sessions. Of the people who had poor glycaemic control at visit 1 and who attended an education session, 84.6 per cent showed an improvement at visit 3, 7.7 per cent showed a deterioration and 7.7 per cent showed no change. This result indicates that more regular HbA<sub>1c</sub> testing combined with specialist nurse intervention is effective at improving glycaemic control.

**Patient satisfaction survey** All those who attended for the first HbA<sub>1c</sub> test were sent questionnaires; 171 (68 per cent) were returned.

As a result of participating in the study, most people (68 per cent) considered that their knowledge of diabetes had improved, with 70 per cent of these indicating that this was due to the advice and information they had received throughout the study. People most commonly credited their GPs (57 per cent) as having the greatest impact on their knowledge of diabetes, with 36 per cent crediting the pharmacist, 32 per cent the diabetic nurse specialist and 31 per cent the practice nurse. In all, 63 per cent of the study group recorded that they had received information from their GP, 49 per cent from the practice nurse, 34 per cent from the diabetic specialist nurse, 16 per cent from the hospital and 14 per cent from Diabetes UK (formerly the British Diabetic Association). Only 17 per cent of patients felt that there had been no improvement in their knowledge, either because they felt they had a high level of knowledge before the study or because they did not receive any feedback from the patients' questionnaire.

As a direct result of participation, 79 per cent of people felt confident about controlling their diabetes, 18 per cent felt fairly confident and 4 per cent were not confident. Of the 70 per cent who attributed better control to participation, 53 per cent identified the reason as being increased level of knowledge and 22 per cent identified a change in treatment.

Nearly all the patients (95 per cent) were either very satisfied or satisfied with the pharmacist carrying out the service. This was largely due to the convenience and flexibility of the service. Only 2 per cent were dissatisfied, through reasons of travelling distance and changes to appointment times. A total of 97 per cent said they would recommend the service to others; 94 per cent considered that if the service was withdrawn it should be replaced.

**Stakeholder satisfaction survey** A satisfaction survey was sent out to the stakeholders in the testing service (GPs, practice nurses, practice manager and pharmacists). All believed that patients were either very satisfied or satisfied with the service. All considered that they had received between one and

three benefits from the study: better assessment of the patient, better control of the patients' diabetes and better education of the patients. Most believed that there was a role for the pharmacy in providing this service with 78 per cent stating they would like to see the service developed in the future.

As a result of the study GPs and practice nurses wanted to change the health care they provided to people with diabetes in three areas: patient education, increased frequency of contact, and a more structured approach to the management of diabetes (ie, through clinics).

## DISCUSSION

The introduction of HbA<sub>1c</sub> testing for all people with diabetes highlighted the fact that almost half the studied population had inadequate glucose control at the start of the study. Over the six months of the study there appeared to be a move towards an overall improvement with a greater percentage of people adequately controlled, with HbA<sub>1c</sub> test results in the "acceptable" category by the third HbA<sub>1c</sub> test. However 29 per cent of the study group (75 from the initial 260 tested) failed to complete the desired three HbA<sub>1c</sub> tests and analysis of this subgroup showed that these patients tended to have poorer glycaemic control than the compliant patients. For those with good compliance, the mean level of glycaemic control remained in the acceptable category throughout the duration of the study. Therefore it was not possible to demonstrate any overall improvement during this study, although our overall results suggest that HbA<sub>1c</sub> testing in the community pharmacy setting, combined with education and the involvement of other members of the primary health care team, is effective in improving glycaemic control.

Indeed, education is a fundamental aspect of the management of diabetes. Its value was clearly demonstrated in Chesterfield, where there was a statistically significant improvement in HbA<sub>1c</sub> results for those with poor glycaemic control at visit 1 who subsequently attended an education session.

The costs involved in HbA<sub>1c</sub> testing are a crucial issue. Although the Government's aims for the NHS are a move towards a patient-centred approach, with primary care

as the focus for health care intervention,<sup>5</sup> the cost implications of more regular testing services could be great, particularly in the short term. However, in the longer term, better patient control could lead to fewer diabetic complications with resulting NHS savings.

Testing was free of charge to those involved because this was a pilot study sponsored by Bayer Plc. Nevertheless, the issue of cost was raised in the satisfaction surveys. It was found that a third of patients would have been prepared to pay for the service. The stakeholders' satisfaction survey revealed that 22 per cent were prepared to pay for the test and 11 per cent were prepared to pay for a combination of testing and education.

## CONCLUSION

General practitioners and primary care specialists are being encouraged to become proactive in managing patients in the community and the community pharmacist may be well placed to play a role in this. Indeed the Government wants to expand the role of community pharmacists,<sup>6</sup> aiming at making better use of their skills and integrating them more into the local health care network. Such opportunities may be attractive to pharmacists as an opportunity to increase both their own profile and their overall role in the community.

Generally, people have more contact with their community pharmacist than they do with their GP. Consequently, the community pharmacist has the potential to become involved in the management and monitoring of various conditions as well as aiding in the education of patients.

The community pharmacy environment offers long-term options for near patient testing. This pilot study has shown that the pharmacist is well accepted by patients as part of an integrated care programme and is a valuable convenient source of information and one-to-one support. The study has also demonstrated that HbA<sub>1c</sub> testing is well suited to the community pharmacy environment and that such a service is of value to both patients and health care specialists alike. However, funding options for this type of service needs further exploration.

**ACKNOWLEDGEMENT** This pilot study was sponsored by Bayer Plc.

## REFERENCES

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The Royal Pharmaceutical Society has established special interest groups for community pharmacists, for veterinary pharmacists, for industrial and technical pharmacists, for hospital pharmacists, for pharmaceutical scientists and for pharmacy academic staff.

The groups hold meetings to consider topics of interest within their own fields of practice and they provide a source of advice to the Society's Council on specialist matters. Each group is administered by a committee, most of whose members are elected by the group, the remainder being members of the Council.

Details of the groups can be obtained from the Royal Pharmaceutical Society, 1 Lambeth High Street, London SE1 7JN (tel 020 7735 9141). Inquiries should be addressed to the following persons: Ms Emma Richards (practice division) for the Community Pharmacists Group and Industrial Pharmacists Group; Miss Liz Griffiths (practice division) for the Veterinary Pharmacists Group and Hospital Pharmacists Group; Dr John Clements (scientific and technical services) for the Academy of Pharmaceutical Sciences of Great Britain; Miss Rachel Ollerearnshaw (education division) for the Academic Pharmacy Group.

## IPSF

The International Pharmaceutical Students Federation was established in 1949, following an initiative by the British Pharmaceutical Students Association. It is a non-political, non-religious organisation represented in more than 45 countries. It has 33 national pharmacy student associations as full members, plus a number of local student organisations as associate members. Individual membership is available to students, new pharmacy graduates and pharmacists who have been registered for less than five years.

IPSF projects include work on national and international educational and health issues and "village concept" schemes, in which pharmacy students work with others to improve the standard of living and health conditions in remote areas of developing countries.

A student exchange scheme gives IPSF members the opportunity to work in another country for a short time. The federation's publishing activities include project reports and a thrice-yearly news.

Those wishing to support IPSF through individual membership should apply to the IPSF Secretariat, International Pharmaceutical Federation, Andries Bickerweg 5, 2517 JP Den Haag, The Netherlands (tel +31 70 3 63 1925; fax +31 70 3 65 9047; e-mail [ipsf@ipf.nl](mailto:ipsf@ipf.nl); website [www.ipsf.org](http://www.ipsf.org)).