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## *Executive summary*

# Near patient testing in diabetes clinics: appraising the costs and outcomes

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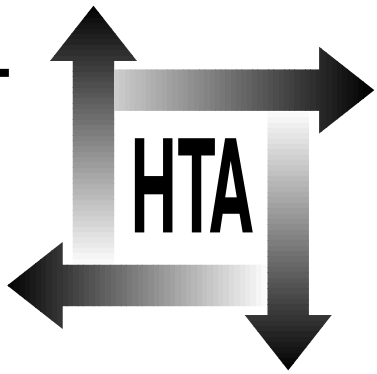

# Executive summary

## Aim

To compare the costs and consequences of providing test results by near patient testing (NPT) compared with conventional testing. The effect of the testing method on the process of care, the accuracy of testing, patient satisfaction, clinical attitudes, and health service and patient costs was investigated. A secondary aim was to generate hypotheses concerning the effect of the testing method on clinical outcome.

## Methods and results

Three alternative strategies for analysing and providing test information for patients attending routine diabetes clinics at the Guy's & St Thomas's Hospitals NHS Trust were considered.

1. **Conventional testing**: when a patient attended the clinic the doctor had the option of requesting a test. Results were then sent for processing at a central laboratory with a delay of 5–7 days before requested results were returned. An NPT service for the measurement of glycosylated haemoglobin ($HbA_{1C}$) existed but was only used for a minority of patients. This represented existing care at Guy's Hospital.
2. **Laboratory NPT**: specialised laboratory personnel operated a testing service next to the diabetes clinic. Test results for blood glucose, $HbA_{1C}$, lipids and creatinine were available prior to the patient's consultation with the doctor. This represented existing care at St Thomas's Hospital.
3. **Nurse NPT**: samples for testing were analysed by a nurse using desktop analysers in the clinic. The results of tests requested by doctors were available prior to the patient's consultation. This scheme was piloted at Guy's Hospital over a 3-month period.

### Process of care

A controlled trial compared the effect of the testing method on the process of care. A total of 599 patients were alternately allocated to either nurse NPT or conventional testing. The number of management changes to the patients' diet, insulin or tablet therapy was recorded for all the patients. The results showed that patients were more likely to have a change in management related to their glycaemic control if they had been in the NPT rather than the conventional testing group (odds ratio 1.52; 95% confidence interval (CI) 1.02–2.26). Subgroup analysis showed that patients with poor glycaemic control were more likely to have management changes in the NPT than in the conventional group (odds ratio 1.75; 95% CI 1.12–2.76). For patients with good control the number of management changes did not differ according to the test-ing method employed (odds ratio 0.92, 95% CI 0.35–2.44). This suggested that the process of care may be improved if results related to glycaemic control ($HbA_{1C}$) are provided by NPT.

There did not seem to be any improvement in the process of care from providing lipid or creatinine results immediately, which suggests that the merits of NPT are likely to vary according to the test in question.

### Accuracy of test results

NPT in general maintained acceptable standards of quality control.

### Patient satisfaction and patient knowledge

Self-administered patient questionnaires were used to assess levels of patient satisfaction with the alternative strategies. Patients for both NPT strategies were significantly more satisfied with the test information provided, than those who were conventionally tested (laboratory NPT versus conventional, $p = 0.004$; nurse NPT versus conventional, $p < 0.001$).

A higher proportion of users of the NPT services recalled being told the result of their $HbA_{1C}$ test (64%) compared with those who used the conventional testing service (19%). For a minority of patients in the conventional group, $HbA_{1C}$ results were provided immediately.

### Clinical attitudes

A sample of doctors interviewed stated that immediate access to $HbA_{1C}$ results meant that they could make more informed decisions about what changes in management should be implemented.

They also said that without immediate access to test results, changes in patient management might be sub-optimal.

Conventional testing was considered adequate for lipids and creatinine results. Some clinicians were concerned that NPT may lead to organisational delays in the diabetes clinic.

### Clinical outcome

A retrospective cohort study compared intermediate clinical outcome, measured by mean $HbA_{1C}$, between patients using conventional ($n = 500$) and laboratory NPT ($n = 500$) strategies. This aspect of the study aimed to generate further hypotheses concerning the effect of testing method on clinical outcome. After controlling for case-mix variables, mean $HbA_{1C}$ was significantly lower for the NPT cohort compared with the conventional testing cohort. The potential for confounding in the design of the study means that a prospective randomised controlled trial (RCT) is required to investigate further the effects of NPT on patient outcome.

### Health service costs

The number of tests and the use of staff time was measured for a sample of patients tested by each method. The costs of conventional testing were then compared with both NPT strategies. Mean visit costs were £3.80 higher for laboratory NPT and £12.60 higher for nurse NPT than for conventional testing, reflecting the greater number of tests conducted at NPT visits and the higher capital equipment costs of NPT. However, sensitivity analysis showed that the additional costs fell if NPT was used just for $HbA_{1C}$ tests. In this study, the mean difference in annual costs between the two approaches was not significant as the mean number of visits per year was lower for laboratory NPT.

### Patient costs

Patient questionnaires were used to measure the patient costs associated with each method. Patient time per visit did not vary according to the testing method used. Users of the laboratory NPT service made fewer visits to the diabetes clinic (1.81 per annum) compared with users of the conventional testing clinic (2.28 per annum). This meant that in the settings examined, annual patient costs were higher for conventional testing than for NPT.

### Frequency of patient visits

Health service and patient costs are affected by the impact of NPT on the frequency of patient visits to clinics. In this study, users of an established NPT service made fewer hospital visits per annum than those of a conventional service. However, it is not possible to say that these differences were a direct result of NPT or due to other differences in clinical practices and the organisation of care between the two hospital sites.

Other results from this study support a hypothesis that there may be a direct link between NPT and the frequency with which patients need to attend hospital clinics. Generally, under conventional testing, results which were not immediately available were not mailed to either the patient or their general practitioner. The users of the test information were thus hospital doctors and the next available time that the information could be used to support a management change was during the patient's next hospital appointment. This method of transmitting and using test information may mean that under conventional care patients need to be called to the clinic more frequently.

A prospective RCT is needed to firmly establish the link between NPT and the frequency of patient visits to clinics.

## Future research

The results of this initial research project indicate that providing $HbA_{1C}$ results by NPT seems to improve the process of care and aspects of patient satisfaction. A prospective RCT of NPT in diabetes clinics is now needed. The aims of this trial should be to establish:

- the impact of NPT on clinical outcomes
- the impact of NPT on the frequency of patient visits to clinics
- the impact of any changes in the above on health service and patient costs.

## Publication

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# NHS R&D HTA Programme

The overall aim of the NHS R&D Health Technology Assessment (HTA) programme is to ensure that high-quality research information on the costs, effectiveness and broader impact of health technologies is produced in the most efficient way for those who use, manage and work in the NHS. Research is undertaken in those areas where the evidence will lead to the greatest benefits to patients, either through improved patient outcomes or the most efficient use of NHS resources.

The Standing Group on Health Technology advises on national priorities for health technology assessment. Six advisory panels assist the Standing Group in identifying and prioritising projects. These priorities are then considered by the HTA Commissioning Board supported by the National Coordinating Centre for HTA (NCCHTA).

This report is one of a series covering acute care, diagnostics and imaging, methodology, pharmaceuticals, population screening, and primary and community care. It was identified as a priority by the Diagnostics and Imaging Panel and funded as project number 93/06/22.

The views expressed in this publication are those of the authors and not necessarily those of the Standing Group, the Commissioning Board, the Panel members or the Department of Health. The editors wish to emphasise that funding and publication of this research by the NHS should not be taken as implicit support for the recommendations for policy contained herein. In particular, policy options in the area of screening will be considered by the National Screening Committee. This Committee, chaired by the Chief Medical Officer, will take into account the views expressed here, further available evidence and other relevant considerations.

Reviews in *Health Technology Assessment* are termed 'systematic' when the account of the search, appraisal and synthesis methods (to minimise biases and random errors) would, in theory, permit the replication of the review by others.



The editors have tried to ensure the accuracy of this report but cannot accept responsibility for any errors or omissions. They would like to thank the referees for their constructive comments on the draft document.

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