



National Audit Office

Department of Health

The management of adult diabetes services in the NHS

Methodology

MAY 2012

Methodology

1 This document accompanies *The management of adult diabetes services in the NHS*, a report published by the Comptroller and Auditor General in May 2012. It outlines the research methods used in the course of our examination, adding further detail to the description of the methodology included in the main report.

Study scope

2 Our report examines whether people diagnosed with diabetes are receiving the standards of care expected by the Department of Health (the Department) as set out in the National Service Framework for Diabetes (the Framework),¹ and more recently the National Institute for Health and Clinical Excellence (NICE) Quality Standard for Diabetes in Adults. In particular, we examined the delivery of nine basic care processes, regarded as the recommended standards of care, which people with diabetes should receive annually.

3 In carrying out our examination our key study questions were:

- Does the Department have a clear strategy for the delivery of diabetes services?
- Is the standard of care provided to people with diabetes consistent across the NHS?
- Could the NHS deliver diabetes services more efficiently?

4 Our study focused on NHS services for people aged 16 and over who have been diagnosed with type 1 or type 2 diabetes. Diabetes in pregnancy, and children and young people with diabetes, were not included within our scope as different clinical standards apply. While we focus on adult services, all health expenditure² and hospital admissions data published by the Department include diabetes services for children. Our fieldwork took place between November 2011 and February 2012.

Study methodology

5 The main methods used during the course of this study were:

- Quantitative analysis of national datasets, including Hospital Episode Statistics (HES), the *National Diabetes Audit*³ and the Quality and Outcomes Framework.
- Visits to ten diabetes services across the NHS in England.

¹ Department of Health, *National Service Framework for Diabetes*, December 2001.

² Except the Quality and Outcomes Framework which only records data on people with diabetes aged 17 and over.

³ NHS Information Centre, *National Diabetes Audit 2009-10*, 2011.

- Semi-structured interviews with the Department, the National Clinical Director for Diabetes and other key stakeholders.
- A review of published literature and published estimates of expenditure on diabetes services.

Quantitative analysis of existing national datasets

6 We obtained and evaluated a range of published and unpublished datasets from the Department, the NHS Information Centre, the Healthcare Quality Improvement Partnership, the National Diabetes Information Service, Yorkshire and Humber Public Health Observatory and NHS Diabetes. Our purpose was to explore:

- delivery of the Framework across the NHS in England;
- the relationship between outcomes for people with diabetes and local performance against recommended standards of care; national trends in hospital admissions and variations across primary care trusts; and
- expenditure on diabetes services.

7 Key datasets obtained and evaluated included:

- The *National Diabetes Audit* (2006-07 to 2009-10), published by the NHS Information Centre;
- Inpatient HES data (2001-02 to 2009-10) collated by the NHS Information Centre;
- Quality and Outcomes Framework data on diabetes (2004-05 to 2009-10), published by the NHS Information Centre; and
- Programme budgeting data on diabetes (2006-07 to 2009-10), published by the Department.

Data analysis on the delivery of the Framework across the NHS in England

8 We reported, and built upon, existing analysis of the Department's *National Diabetes Audit* in order to assess delivery of recommended standards of care. More specifically we assessed:

- the percentage of patients with diabetes receiving the basic nine processes, and variation across the NHS;
- the relationship between local performance against expected standards of care and outcomes for people with diabetes, such as the percentage of people registered with diabetes achieving NICE defined treatment standards for glucose control, blood pressure and blood cholesterol;

- rates of diabetes-related complications;
 - the relationship between factors such as location, age, ethnicity and deprivation on quality of care and health outcomes; and
 - access to structured education to support self-management.
- 9 Where cited within our report, performance and variation statistics were explored over two years to ensure that they were not simply an isolated occurrence.

Trends in diabetes inpatient admissions

10 To understand trends in hospital activity for people with diabetes, we analysed summary and patient level (anonymised) HES data for inpatient admissions (2001-02 to 2009-10).

11 We found that when defining an inpatient admission caused by diabetes, diabetes is rarely listed as the patient's primary condition. In 2009-10, 6 per cent of patients recorded as having diabetes had the condition as their primary diagnosis, indicating that diabetes is frequently coded as a comorbidity of other conditions. For example, a person with diabetes may develop coronary heart disease because poorly controlled blood glucose levels have led to the narrowing of blood vessels which supply the heart. When this person is admitted to hospital, they are more likely to be coded as having heart disease than diabetes. For these reasons it is often difficult to disentangle the costs of diabetes from those of its complications.

12 To mitigate the risk of underestimating the true number of admissions for diabetes, by excluding those for whom diabetes is a comorbidity, we ran two streams of analysis. The first included only those patients with a diagnosis of diabetes in their primary diagnostic field. The second included any patient with a diagnosis of diabetes in any one of up to 14 diagnostic fields. The further away a diagnosis is from the primary diagnostic field, the more unlikely it will be that diabetes will be a key factor in a person's admission, although it may have an impact on their length of stay and the likelihood of them being readmitted.

13 Although not featuring frequently in our report, exploring trends in diabetes inpatient admissions in this way allowed us to validate key departmental statistics cited within our work.

Trends in emergency admissions, emergency readmissions and length of stay

14 To understand trends in emergency hospital admissions, an important indicator of the quality of both hospital and community care, we validated and drew upon a recent paper published by NHS Diabetes which examined the resource use and expenditure on inpatient care for people with diabetes.⁴ The paper comprised analysis of 2009-10 HES data for NHS hospitals in England. Inpatients with diabetes were identified and compared to other inpatients without a recorded diagnosis of diabetes.

4 NHS Diabetes, *Inpatient Care for People with Diabetes: The Economic Case for Change*, November 2011.

15 HES data cover all admissions to NHS Hospitals in England. Admissions are classified by diagnosis codes (ICD 10), procedure codes (OPCS 4), and by Healthcare Resource Group (HRG version 4). HRG's are groupings of clinically similar activities considered to be similar in cost. They are used to determine Payment by Results tariffs for reimbursement of inpatient care. The paper used ICD 10 codes E10-E14 to identify diabetes in any of the diagnosis fields on the HES record. Pregnancy and childbirth admissions (HRG 4 Chapter N) were excluded. Admissions for which no HRG was recorded, or for which the HRG was UZ01Z (data invalid for grouping) were removed from the analysis, as were admissions without a valid admission method.

16 The paper estimated inpatient resource use for people with diabetes by first calculating levels of usage for people without diabetes, matched for age and gender with the diabetes population. Admission rates, readmission rates, length of stay and day case rates directly attributable to diabetes (or the 'excess' attributable to diabetes) were then determined by finding the differences in NHS resource utilisation between the diabetic and non-diabetic population. It is important to note that not all 'excess' expenditure is necessarily avoidable. People with diabetes have high levels of morbidity and it may be that some excess admissions and length of stay are inevitable, even relative to a demographically matched population.

17 An emergency readmission was defined as a patient being readmitted as an emergency within 28 days of the discharge date of a previous spell, which could be either an elective or an emergency admission.

Visits to diabetes services

18 Following an initial pilot visit, we undertook ten in-depth visits to local health economies, each of which involved reviewing diabetes services across a primary care trust area. In carrying out our work, we spoke to a range of staff in primary care (GPs, a general practice manager, a practice nurse and/or a diabetic specialist nurse); secondary care (a consultant diabetologist, podiatrist and ophthalmologist); and to those involved in the commissioning process (the lead commissioner for diabetes at each primary care trust and a commissioner with responsibility for monitoring primary care).

19 The purpose of our visits was to supplement the quantitative analysis already undertaken by exploring the delivery of diabetes care with those directly involved. More specifically, the focus of our visits was to consider:

- potential reasons for any variation in the delivery of recommended standards of care across the NHS;
- action taken by the NHS to address any of these variations;
- the challenges faced in delivering diabetes services (including, where relevant, how they had been overcome);
- the extent to which the NHS is incentivised to improve delivery of diabetes care;

- whether the NHS uses performance against recommended standards of care to benchmark services and identify gaps in service provision; and
- the relative strengths of different delivery models.

20 In order to sample a range of health economies, we selected ten primary care trusts to visit using the Diabetes Area Classification system developed by the Yorkshire and Humber Public Health Observatory. This classification groups primary care trusts into five clusters who share similar levels of need for diabetes services amongst their population based on risk factors such as age, ethnicity, obesity and deprivation.⁵ For each of the five classification groups, we visited the highest performing and most improved primary care trust area as determined by the percentage of people with diabetes receiving the basic nine care processes monitored by the *National Diabetes Audit* between 2006-07 and 2009-10.

Semi-structured interviews with officials from the Department of Health and key stakeholders

21 We conducted semi-structured interviews with the Department and key stakeholders to gain an in-depth understanding of: the implementation of the Framework; the range in quality and delivery of diabetes services; and the extent to which the Department has encouraged and monitored the performance of the NHS in delivering the Framework. More specifically we explored whether the Department has:

- set clear standards for the delivery of diabetes care by the NHS;
- provided guidance on how to achieve the standards;
- effectively monitored performance against the standards; and
- articulated clearly the benefits of complying with the standards.

22 The key stakeholders we interviewed included:

- The National Clinical Director for Diabetes
- The diabetes policy team at the Department
- NHS Diabetes
- The National Diabetes Information Service
- Yorkshire and Humber Public Health Observatory
- Diabetes UK
- The Primary Care Diabetes Society
- The Association of British Clinical Diabetologists.

⁵ Further information on the Diabetes Area Classification groups can be found on the Yorkshire and Humber Public Health Observatory website: www.yhpho.org.uk.

23 The first six of the stakeholders cited above formed a key stakeholder panel of leading diabetes professionals which challenged and informed our emerging findings throughout the fieldwork period.

Analysis of existing estimates of expenditure on diabetes services by the NHS

24 We reviewed the Department's programme budgeting data on diabetes expenditure – the Department's main source of cost information on individual programmes of care. We analysed primary care trust expenditure on diabetes split by primary care (provided by GP practices or in community settings) and secondary care (primarily hospital inpatient and outpatient appointments) from primary care trust programme budgeting submissions.

25 Programme budgeting data are only indicative to demonstrate the trend in changes in NHS expenditure for different disease areas. Continual refinements have been made to the programme budgeting data collection methodology since the first collection in 2003-04. Previous National Audit Office and King's Fund reports have also highlighted issues with programme budgeting data in terms of poor data validation, and the lack of consistency in data collection across primary care trusts. Another issue with programme budgeting data is that they systematically underestimate the cost of specific disease areas, as they exclude capital expenditure, social care, GP consultations, community care and other public health interventions (such as screening or vaccination).

26 We also analysed existing cost information, drawn from a variety of departmental and academic publications, in order to estimate the total cost of diabetes to the NHS. Where necessary and appropriate, we developed existing cost information through further quantitative analysis of selected datasets. The following data sources were used to calculate and corroborate existing cost estimates:

- HES data
- *National Diabetes Audit*
- ePact – an on-line service for pharmaceutical and prescribing advisors which allows real-time analysis of prescribing data
- Quality and Outcomes Framework
- National Diabetic Retinal Screening Programme data.

27 Our work looked at the cost of diabetes divided into secondary care and primary care. Within these categories there are subgroups of costs which we considered key components of the total cost of diabetes (**Figure 1**).

Figure 1
Key components of total cost of diabetes services

Secondary care	Primary care	Departmental costs
Inpatient admissions	Prescribing costs	Costs of Departmental officials, the National Clinical Director for Diabetes and NHS Diabetes
Day case admissions	Annual reviews for people with diabetes	
Outpatients	Ongoing management in primary care	
Ambulance service costs	Retinal screening	
