



National Audit Office

# Progress in improving stroke care

## Methodology

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# Methodology

This online methodology accompanies our 2010 report, *Progress in improving stroke care*, and gives further detail to the Methodology (Appendix A) included in the main report. The value for money report examined the Department of Health (the Department) and NHS's progress in improving stroke care since the publication of our 2005 report, *Reducing brain damage: faster access to better stroke care*, and subsequent Committee of Public Accounts report published in February 2006.

The study evaluated how stroke care has changed over the last four years, the extent to which these changes have improved the value for money of stroke care provision nationally, and the risks to be managed to ensure that stroke care services continue to improve in future. The report examined stroke care across the entire pathway, from prevention activity for those at risk and awareness of symptoms to long-term social care.

The main elements of our fieldwork, of which the majority was undertaken from April to October 2009, were:

## Literature review

A document review of stroke-related literature was conducted. Literature assessed included relevant policy documents, academic research journals, clinical guidelines and both our previous and the Committee of Public Accounts' reports. The review also included a review of key Department of Health documents, such as the commissioned evaluations of the *Stroke: Act-F.A.S.T.* awareness campaign and summaries of the financial allocations of stroke specific funding.

A qualitative research package, ATLAS.ti version 6, was used to collate and synthesise the findings from the document review and other methods. Over two-hundred documents were reviewed and coded using a two-dimensional (thematic and importance) framework. The coding was reviewed by the team to ensure consistency.

## Ambulance trusts: Structured interviews and data collection

Semi-structured telephone interviews were conducted with all 12 NHS Ambulance Trusts in England. In each case, we interviewed the person the Trust had nominated as responsible for stroke care within the region. These included clinical leads for stroke and medical directors. Additionally, mainly quantitative data on training and numbers of suspected stroke calls, was collected from respondents through an electronic survey, to which 11 of the 12 trusts responded. The interviews and survey were analysed using ATLAS.ti and Microsoft Excel. The interview and survey templates were developed in consultation with and piloted within ambulance trusts.

The information collected from ambulance trusts was also used to create a detailed ambulance trust feedback report, which is available on our website at [www.nao.org.uk/publications](http://www.nao.org.uk/publications).

### **Strategic Health Authorities: Structured interviews and data collection**

Structured interviews were conducted with all 10 Strategic Health Authorities in England. Key SHA policy leads were interviewed between September and November 2009. Respondents included SHA Medical Directors and Directors of Public Health, Performance, Strategy and Reform, and Clinical Engagement. Information taken from SHA interviews was transcribed and analysed using ATLAS Ti. Supplementary information regarding resource allocation was also requested.

### **Audit of hospital trusts (National Sentinel Stroke Audit)**

The National Sentinel Stroke Audit (NSSA) has taken place on a two-year cycle since 1998 and collects both clinical and organisational data. The audit is run by the Clinical Effectiveness and Evaluation unit (CEEu) of the Royal College of Physicians. Further details on the NSSA are available at: <https://audit.rcplondon.ac.uk/sentinelstroke/modules/page/page.aspx?pc=welcom>.

We commissioned a 2009 update of the organisational data from the NSSA. The audit received responses from 221 hospital sites in the UK, including 188 (85 per cent) in England. This represented a 100 per cent response rate. A report from this 2009 audit is available at ([www.nao.org.uk/publications](http://www.nao.org.uk/publications)). The data, entered between 1 April 2009 and 1 May 2009, are collected by the clinicians or audit staff from their own trusts and there was no formal external validation integrated into the audit process. However, we undertook some validation by comparison with other data sources, such as the Hospital Episode Statistics dataset on activity within acute care.

### **Analysis of existing data**

We evaluated secondary data from a number of sources, including a survey of Local Authorities (conducted by The Association of Directors of Adult Social Services, ADASS) and the Department of Health's financial data on Local Authorities' expenditure of the stroke strategy funding. We also carried out our own analysis on the 2008 NSSA clinical data.

## Quality and Outcomes Framework Analysis

We analysed the Quality and Outcomes Framework (QOF) datasets, taken from 2004-05 to 2008-09. Stroke-specific indicators and indicators relating to Hypertension, Atrial Fibrillation, Obesity and Smoking were examined to assess the levels of success relating to the management of key stroke risk factors. Total number of points allocated to GPs by indicator; the percentage of eligible patients treated according to the framework guidelines; and the percentage of total points received by GPs, on average, were calculated for each of the indicators. Consultations were held with the Royal College of General Practitioners, the British Medical Association and the National Institute for Health and Clinical Excellence in order to validate the results of our analysis. The following tables outline the indicators which were not consistent since 2006-07, and a list of the indicators is included at the end of this methodology (Appendix 1).

Prior to 2006-2007	2006-2007 onwards	2008-2009 onwards
<b>Stroke Specific Indicators</b>		
Stroke Indicator 2	Stroke Indicator 11	Stroke Indicator 13
Stroke Indicator 3	Smoking Indicator 1	–
Stroke Indicator 4	Smoking Indicator 2	–
Stroke Indicator 9	Stroke Indicator 12	–
<b>Atrial Fibrillation (AF) Specific Indicators</b>		
n/a	AF Indicator 1	–
n/a	AF Indicator 2	AF Indicator 4
n/a	AF Indicator 3	–
<b>Hypertension Indicator</b>		
Hypertension Indicator 1	–	–
Hypertension Indicator 2	Smoking Indicator 1	–
Hypertension Indicator 3	Smoking Indicator 2	–
Hypertension Indicator 4	–	–
Hypertension Indicator 5	–	–
<b>Obesity Indicator</b>		
n/a	Obesity Indicator 1	–

## Doctors web forum

To supplement our interviews with health professionals, conducted as part of our case studies, and to test our assertions, the views of hospital and general practice doctors were sought using a web forum hosted by BMJ Group's doc2doc service, a free online doctors' network. The GP forum was asked 'Should GPs be commissioned to give opportunistic Atrial Fibrillation checks as a stroke prevention measure?' and 'If not such screening, what services do you think primary care trusts should be commissioning if they want to prevent more strokes occurring? Or are there things that GPs could be doing anyway?' The Medicine forum was asked 'What barriers remain in providing more effective stroke care?' and 'What are your opinions about rehabilitation services – both inpatient and outside hospitals – for stroke patients?' and, in total, there were 21 posts.

## Patient experience survey

Information on stroke patients' experiences was collected in a survey run by Patient View. The aim of the survey was to obtain up-to-date feedback on standards and quality of NHS and social care stroke services from a patient/carer perspective and was undertaken in two parts:

During May-June 2009, an online and postal survey, of predominantly open-ended questions, was conducted among 46 patient groups with an interest in stroke and an English geographical remit. The total number of people with stroke (mainly the groups' members) represented by the respondents is at least 10,576. The contributions made by the 46 patient groups helped to develop a second questionnaire designed for people with stroke (and their carers).

The second survey was undertaken between June and September 2009. An online/postal survey was conducted of 760 people (425 stroke patients, 315 carers for stroke patients and 20 who did not specify whether they were patient or carer) from across England. Respondents were recruited with the support of relevant patient groups, such as Connect, Different Strokes, Speakability, the Stroke Association, and local groups with an interest in stroke.

The views of those patients (and their carers) whose stroke had occurred prior 2005 were compared to those whose stroke had been since 2005. To account for possible recall bias, we assessed differences in patients' perceptions of particular services, over and above the systematic differences between the groups in respect of all services.

To supplement the survey, we ran a web forum, which was hosted by the Stroke Association. The forum 'invited comments on the experiences of stroke survivors and their carers regarding acute care, rehabilitation and social care', and 17 descriptions of people's experience of stroke care were received and analysed.

## Case studies

To understand the interactions between different stakeholders within the stroke pathway and validate our emerging findings, we conducted four in-depth audits of local health economies: London, Greater Manchester, the North East, and the South West (Avon, Gloucestershire, Wiltshire & Somerset Cardiac and Stroke Network). The case studies were undertaken at various stages during the fieldwork allowing us to use them for exploratory, illustrative and validation purposes, where appropriate. We held semi-structured interviews with the key stakeholders within each area, including: Acute care professionals and managers; GPs; Commissioners from Primary Care Trusts and Local Authorities; Strategic Health Authority representatives; Stroke Patients and their carers; and Third Sector (voluntary) organisation representatives.

We also carried out a number of individual case study visits, including with: St Thomas' Hospital, London; Lambeth Early Supported Discharge team; Southwark Early Support Discharge team; Charing Cross Hospital, London; and Cornwall & Isles of Scilly PCT.

In addition to using these case studies to inform our value for money assessment, we also produced a good practice guide outlining some of examples of innovative initiatives designed to improve stroke care. This guide is available at: [www.nao.org.uk/publications](http://www.nao.org.uk/publications).

## Mapping of existing third sector services and contracts

We collected qualitative and quantitative information to assess the change in the number of voluntary sector services and contracts since the introduction of the National Stroke Strategy and associated funding. Data was first collected from the Stroke Association and, based on this information, a proforma was developed to collect data from Connect and Different Strokes (two other Third Sector organisations involved in stroke care). The data was not validated with local services.

## Economic modelling of the impact of changes in the organisation of stroke care

We developed a process model to evaluate the consequences of different care provision schemes and the flow of stroke care, using an incidence-based approach and discrete event simulation model. The different parts of the model were:

- a Time Delay to admission** – This includes the time delay of patients from onset to admission. Patients, in the model, are admitted to a ward by ambulance, as inpatients (if they were already in the hospital when stroke occurred) or other (patients coming on their own or through GP referrals).

- b Inpatient stay element** – This section includes the care of the patient from time of admission to discharge. It includes scanning time and the possibility of thrombolysis. Patients may be treated at a stroke specific unit (including at hyper-acute stage and rehabilitation stage) or at a generic medical ward.
- c Long-term Care** – This section of the pathway allows patients, in the model, to be treated either through early supported discharge (ESD) or conventional discharge follow-up. The patients are followed up for 10 years. The probability of patients receiving conventional discharge is calculated based on the resource constraints on ESD (i.e. whether the patient's location provides ESD services and whether it has sufficient capacity). The model uses the estimate that approximately 20 per cent of patients require no additional rehabilitation after discharge, as agreed with experts. Discharge location of the patients (whether at home or nursing home) is considered due to the different costs attached to these two scenarios. The probabilities of death and stroke recurrence are incorporated in the model through survival curves according to age, disability and treatment of patient.

The model was reviewed by an expert panel, the Department of Health, and tested using various local data. A full report on the model is available at: [www.nao.org.uk/publications](http://www.nao.org.uk/publications).

### **Survey of stroke networks**

The Stroke Improvement Programme undertook an audit of all 28 stroke networks. The questionnaire required each network to report their progress against the actions outlined in the National Stroke Strategy. The responses were collected between September and October 2009.

### **Expert Panel**

We discussed our emergent findings with a range of experts, including the members of the Royal College of Physicians Intercollegiate Stroke Working Party.



# Appendix One

## List of QOF indicators used in our analyses

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### Stroke-Specific Quality and Outcomes Framework Indicators:

<b>Stroke 1</b>	The GP Practice has a register for stroke and TIA patients (4 points)
<b>Stroke 2</b>	The percentage of new patients with presumptive stroke who have been referred for a diagnostic CT or MRI scan (2 points)
<b>Stroke 3</b>	The percentage of stroke or TIA patients who have been recorded smokers within the last 15 months (3 points)
<b>Stroke 4</b>	The percentage of smoking stroke or TIA patients who have received advice or referral to a specialist service within the last 15 months (2 points)
<b>Stroke 5</b>	The percentage of stroke and TIA patients who have had their blood pressure recorded within the preceding 15 months (2 points)
<b>Stroke 6</b>	The percentage of stroke and TIA patients who have a systolic blood pressure reading of 150mm/Hg (5 points)
<b>Stroke 7</b>	The percentage of patients with TIA or stroke who have a record of total cholesterol in the last 15 months (2 points)
<b>Stroke 8</b>	The percentage of patients with TIA or stroke who last measured total cholesterol is 5 mmol/L (5 points)
<b>Stroke 9</b>	The percentage of patients who have a record of prescribed aspirin, anti-platelet therapy or anti-coagulant (4 points)
<b>Stroke 10</b>	The percentage of patients who have had flu immunization (2 points)
<b>Stroke 11</b>	The percentage of new patients who have been referred for further investigation (2 points)
<b>Stroke 12</b>	The percentage of patients shown to be non-haemorrhagic, or a history of TIA, who have a record that an anti-platelet agent (aspirin, clopidogrel, dipyridamole or a combination), or an anti-coagulant is being taken (unless a contraindication or side-effects are recorded) (4 points)
<b>Stroke 13</b>	The percentage of new patients who have been referred for further investigation (2 points)

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**Primary prevention indicators: Atrial Fibrillation Quality and Outcomes Framework Indicators**

- AF 1** The GP practice has a register of patients with atrial fibrillation
- AF 2** The percentage of patients diagnosed after 1 April 2006 with ECG or specialist confirmed diagnosis
- AF 3** The percentage of patients who are currently treated with anti-coagulation drug therapy or an anti-platelet therapy
- AF 4** The percentage of patients with atria fibrillation diagnosed after 1 April 2008 with ECG or specialist confirmed diagnosis

**Primary prevention indicators: Hypertension Quality and Outcomes Framework Indicators**

- BP 1** The GP practice has a register of patients with established hypertension (6 points)
- BP 2** The percentage of patients with hypertension whose notes record smoking status at least once since diagnosis (10 points)
- BP 3** The percentage of patients with hypertension who smoke, whose notes contain a record that smoking cessation advice or referral to a specialist service, if available, has been offered at least once. (10 points)
- BP 4** The percentage of patients in whom there is a record of the blood pressure in the previous 9 months (20 points)
- BP 5** The percentage of patients with hypertension in whom the last blood pressure (measured in the previous 9 months) is 150/90 or less (57 points)

**Primary Prevention Indicators: Smoking Quality and Outcomes Framework Indicators**

- Smoking 1** The percentage of patients with any or any combination of the following conditions: coronary heart disease, stroke or TIA, hypertension, diabetes, COPD or asthma whose notes record smoking status in the previous 15 months. Except those who have never smoked where smoking status need only be recorded once since diagnosis
- Smoking 2** The percentage of patients with any or any combination of the following conditions: coronary heart disease, stroke or TIA, hypertension, diabetes, COPD or asthma who smoke whose notes contain a record that smoking cessation advice or referral to a specialist service, where available, has been offered within the previous 15 months

**Primary Prevention Indicators: Obesity**

- OB 1** The practice can produce a register of patients 8 aged 16 and over with a BMI greater than or equal to 30 in the previous 15 months
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