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1 Introduction

“Stroke, along with heart disease, has been a clinical priority for NHS Scotland since the middle of the 1990s, a reflection of the burden of death and disease they’ve imposed over the years on the Scottish population. That priority status has led to a sequence of national strategies, and considerable investment in stroke services. These have been underpinned by the clinical guidelines developed by the Scottish Intercollegiate Guideline Network (SIGN), and enhanced by the stroke clinical standards produced by NHS Quality Improvement Scotland (QIS). We’re fortunate as well in having the annual Scottish Stroke Care Audit as a driver of service improvements.”

Nicola Sturgeon, Cabinet Secretary for Health & Well-Being, MSP, December 2009

Stroke is the third commonest cause of death in Scotland and the most common cause of severe physical disability amongst adults. It is estimated that about 15,000 people in Scotland have a stroke each year and over 3,000 of these are under 65 years of age. Hospital care for these patients accounts for 7% of all NHS beds and 5% of the entire NHS budget. The cost of acute medical services for stroke patients in Scotland is at least £100 million per year and the economic cost in terms of lost employment and independence is significant, whilst the impact on family members or friends who care for stroke survivors is huge. The evidence demonstrating benefits of organised specialist stroke care in improving outcomes is now well established, and reflected in the recently updated SIGN Guideline 108 which focuses on acute stroke care and secondary prevention.

The Scottish Stroke Care Audit (SSCA) was established in 2002 and now includes all hospitals managing acute stroke in Scotland. Since its inception SSCA has helped to drive the improvements in stroke care which have contributed to the reduction in mortality rates and improved outcomes for stroke patients.

The first report containing SSCA data was published in 2005. There have been significant improvements in the number of patients admitted to a Stroke Unit at any time during their admission, an increase from 71% to 81%.

There have also been significant improvements against current national standards between 2005 and 2009:

- The percentage of stroke patients admitted to a Stroke Unit on day of admission has increased from 28% to 37%.
- The percentage of stroke patients who had brain imaging on day of admission has increased from 27% to 49%.
- The percentage of stroke patients who had a swallow screen on day of admission has increased from 47% to 61%.
• The percentage of patients who had an ischaemic event who were prescribed aspirin by one day after admission has increased from 41% to 68%.
• The percentage of patients who were seen within 7 days from referral at a neurovascular clinic has increased from 30% to 80%.

In 2009 the Scottish Government published their Action Plan for Heart Disease and Stroke\(^2\). The Action Plan emphasises the importance of participating in the audit to measure performance against the standards and to monitor progress against its aims. Stroke services participating in the audit monitor their progress against the standards set by NHS QIS and those they have set for themselves in their own Quality Assurance Frameworks. In 2010 the SSCA began producing monthly reports that go to the Stroke Managed Clinical Networks (MCNs) in NHS Boards and individual hospitals to ensure awareness of the stroke standards and local performance. An Annual National Report is published and shared with NHS Boards, NHS QIS and the Scottish Government Health Department as well as being made publicly available on the SSCA website (www.strokeaudit.scot.nhs.uk). The SSCA will continue to assist the development of stroke care as knowledge of best practice widens, and help NHS Scotland provide the best care possible for people who have had a stroke.

**Contributions to this report**

This is the first year we have had a Report Writing Sub-Group of the Steering Committee and have invited contribution to the report from stroke MCNs (Appendix A) and Patient Associations (Section 7). In Section 6 we present a selection of case studies detailing methodology used to improve rapid access to specialist stroke care. In Appendix A we have invited each MCN to contribute, in their own words, their plan to improve local performance against NHS QIS Standards.

Each NHS Board has a Stroke MCN and the audit helps the MCNs plan the work required to improve their local stroke services. All the Stroke MCNs have active involvement from people who have had a stroke and from their families and friends; people are encouraged to look at the audit information and comment on it. There is a lay member on the SSCA Steering Committee and feedback from service users is very welcome.

**1.1 Organisational structure of the Scottish Stroke Care Audit**

The Scottish Stroke Care Audit is a national audit within the Quality Improvement Programme at ISD (Information Services Division of National Services Scotland). The audit has its own Steering Committee reporting directly to the National Advisory Committee for Stroke (NACS) and providing strategic direction and clinical input to the audit team, and to optimise the use of the data. See Appendix D for a current list of the members of the Steering Committee.

The organisational structure of SSCA is detailed below:

- **Professor Martin Dennis** Chairman of the Steering Committee
- **Hazel Dodds** National Clinical Co-ordinator
- **Robin Flaig** Quality Assurance Manager
- **Mike McDowall** Audit Support/IT Development
- **David Murphy** Senior Information Analyst
- **Lee Barnsdale** Principal Analyst with IT responsibility
Funding for the central coordination of SSCA for 2010/11 is £207,390. Funding for SSCA data collection has been included in each NHS Boards’ general allocation. Each NHS Board is expected to continue to collect the audit data. Audit staff are employed in each NHS Board and are supported by their Stroke MCN. Staffing levels vary widely between hospitals. Audit staff responsibilities include case ascertainment, data collection, completion of forms and data entry. In all NHS Boards other than NHS Lanarkshire data are entered into the Scottish Stroke Care Audit System (SSCAS). In NHS Lanarkshire a locally developed system (Stroke Audit In Lanarkshire (SAIL)) is used to collect inpatient and outpatient data. Data from SAIL are sent directly to ISD on a monthly basis and are included in national reporting. Data validation is built into the computer systems, with additional local validation at point of data entry. Routine central validation of the data is commencing in 2010.

The information presented in this report highlights the variation in the quality of stroke services across Scotland.

1.2 This report

This year’s report includes data for 2005 – 2009 for Scotland overall and for each hospital. In November 2009 we created for the first time a national database so calculations in this year’s report may not match exactly those presented in previous reports. For the individual hospitals we have displayed these data in charts. Further detailed charts and tables are available on the SSCA website (www.strokeaudit.scot.nhs.uk).

Additional information available on the SSCA website includes:

- Aims and methods of the audit.
- Core dataset definitions.
- Audit documentation, e.g. data collection forms.

In addition to this main report a summary of the national report suitable for members of the public will be distributed to NHS Boards and other interested organisations.

1.2.1 NHS QIS Standards 2009

The NHS QIS Standards for stroke were revised in June 2009. The analyses contained in this report assess performance against these revised 2009 standards.

<table>
<thead>
<tr>
<th>Topic</th>
<th>NHS QIS Standard for Stroke, 2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to Stroke Unit services</td>
<td>60% on day of admission (Day 0) and 90% within 1 day of admission (Day 1)</td>
</tr>
<tr>
<td>Brain imaging</td>
<td>80% on day of admission (Day 0)</td>
</tr>
<tr>
<td>Swallow screen</td>
<td>100% on day of admission (Day 0)</td>
</tr>
<tr>
<td>Aspirin prescribing</td>
<td>100% of ischaemic strokes within 1 day of admission (Days 0 and 1)</td>
</tr>
<tr>
<td>Delay from receipt of referral to neurovascular clinic</td>
<td>80% are examined within 7 days</td>
</tr>
<tr>
<td>Thrombolysis</td>
<td>5 patients treated per 100,000 population per year</td>
</tr>
<tr>
<td>Topic</td>
<td>NHS QIS Standard for Stroke, 2009</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-----------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Carotid Intervention</td>
<td>80% undergoing carotid endarterectomy for symptomatic carotid stenosis have the operation within 14 days of the most recent stroke event</td>
</tr>
</tbody>
</table>

These standards continue to focus on those parameters which have the best evidence for having an effect on patient outcomes, e.g. Stroke Unit care, swallow screening, brain imaging, acute aspirin use, delays to assessments in neurovascular clinics, delivery of thrombolysis and early carotid intervention.
2 Future Plans

“We are determined to provide world-class services that are safe and effective, but, above all, patient-centred. That’s just what a national priority like stroke deserves.”

Nicola Sturgeon,
Cabinet Secretary
for Health & Well-Being,
MSP, December 2009

2.1 Update from 2009-2010

During 2009-2010 SSCA has undergone a significant redesign. We have made the following progress against the future plans described in last year’s report.

Rationalising data collection:

- A full review of datasets for inpatients, outpatients and thrombolysis has been completed and core datasets agreed -
  - Inpatients – all new stroke patients (or those admitted as a query stroke/TIA) are collected.
  - Outpatients – all new attendance at outpatients with a TIA.
  - Thrombolysis – all patients who have undergone thrombolysis.
- A detailed review and redesign of definitions and data collection forms has been completed.
- The SSCA computer system (SSCAS) has been updated to reflect the agreed changes.
- Use of the redesigned core datasets and related documentation commenced 1st January 2010.

Reducing the delays in reporting:

- Prospective collection of data relating to the patients’ first 48 hours in acute care commenced 1st January 2010 in all centres.
- Production of Monthly Reports commenced February 2010. Monthly Reports are distributed to the Stroke MCN in each Board. They reflect activity for the previous month, demonstrating performance against NHS QIS standards thus allowing clinicians and NHS managers to review processes of care and identify areas where work is required to improve delivery of stroke care. These are being modified in the light of experience each month to maximise reliability and usefulness to the clinical teams.

Creating a national database:

- November 2009 - all historical SSCA data were submitted directly to ISD via secure electronic transmission.
- From February 2010 - data were submitted from all hospitals on a monthly basis.
- SSCA data from 2005-2010 are now held centrally and will continue to be added to by monthly extracts.
Thrombolysis:
Some Scottish stroke services (notably in Glasgow) already provided a stroke thrombolysis service but during 2009 thrombolysis was introduced in more centres across Scotland (see Section 5). In 2009, thrombolysis data were entered into SSCAS in some centres, others continued to use the SITS (Safe Implementation of Thrombolysis in Stroke) programme to enter data. Therefore SSCA thrombolysis data are incomplete for 2009. From January 2010 all centres started entering thrombolysis data into SSCAS.

Pre-hospital care:
Work is ongoing between the Scottish Stroke Care Audit team and Malcolm Alexander, Associate Medical Director at NHS24. A Pre-Hospital dataset has been drafted and data items defined (still to be finalised). The proposed dataset is detailed below.

<table>
<thead>
<tr>
<th>DATA ITEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community Health Index (CHI) Number</td>
</tr>
<tr>
<td>Gender</td>
</tr>
<tr>
<td>Date of Birth</td>
</tr>
<tr>
<td>Surname</td>
</tr>
<tr>
<td>Forename</td>
</tr>
<tr>
<td>Patient Postcode</td>
</tr>
<tr>
<td>When was initial call taken by NHS24?</td>
</tr>
<tr>
<td>When was Protocol launched by Call Handler?</td>
</tr>
<tr>
<td>Was call transferred to Nurse Specialist?</td>
</tr>
<tr>
<td>Was call transferred directly to the Scottish Ambulance Service (SAS)?</td>
</tr>
<tr>
<td>When was call transferred to the SAS?</td>
</tr>
<tr>
<td>When was call received by the SAS?</td>
</tr>
<tr>
<td>Time arrived on scene</td>
</tr>
<tr>
<td>Time left scene</td>
</tr>
<tr>
<td>Was the patient taken to hospital?</td>
</tr>
<tr>
<td>Was hospital team alerted that patient en route to hospital?</td>
</tr>
<tr>
<td>If yes, what time was hospital team alerted?</td>
</tr>
<tr>
<td>Time arrived at hospital (Emergency Department/admission ward/Acute/Integrated Stroke Unit/CT scanner/other) (from paramedic sheet)</td>
</tr>
<tr>
<td>Was call transferred to other service, e.g. GP/primary care?</td>
</tr>
</tbody>
</table>

Work is continuing to develop a HEAT target at NHS24/Scottish Ambulance Service (SAS). One ongoing problem has been extreme difficulty in matching NHS24 and SAS data. However, NHS24 and the SAS are in the process of improving data linkage by exchanging and recording Community Health Index (CHI) on all NHS24 to SAS transfers. This will make the pre-hospital data much easier to manage. Once patient data are able to be readily matched between NHS24 and SAS then the plan is to transfer the matched data to ISD. This will allow all the pathways to come under the control of one support structure and facilitate inclusion into SSCA outputs. This addition will help the audit to pick up delays related to the pre-hospital journey.

Future work will facilitate the capture of GP based activities both in and out of hours. Some of this will flow from the capture of “source of referral” within the new core SSCA dataset and allow basic examination of referral pathways.
2.2 What’s next? 2010-2011

Carotid Intervention Pilot Project:
This project aims to build on previous audits of carotid interventions (endarterectomy, angioplasty and stent insertion) and will make use of routine data to monitor delays to surgery and also clinical outcomes such as peri-operative stroke risk and deaths.

A full review of the carotid intervention dataset, definitions and data collection form has been completed and a core dataset for the pilot agreed. SSCAS has been updated to reflect the agreed changes.

The pilot commenced on 1st April 2010 and will run to 30th September 2010 in two centres – Grampian and Lothian (with potential data also being included from Orkney, Shetland and Borders).

Following completion of the pilot the data will be collated and analysed. It is anticipated a full report from the Pilot Project will be available early 2011.

IT Development:
Work is underway to update SSCAS. The aim is to develop a web based data entry system. It is proposed that the new system will facilitate the entry of all SSCA core data and will continue to allow centres to extract their own data, write their own queries and analyse raw data.

Maintenance may involve changes to reflect new NHS QIS standards, sprint audits and the need to collect other data, (e.g. relating to the Heart Disease and Stroke Care Action Plan2).

Future developments may allow us to analyse different aspects of stroke care, e.g. pre-hospital care, carotid intervention and long-term outcomes via linkage to National Datasets, e.g. SMR01 (Scottish Morbidity Record 01).

Redesign of Stroke Audit Website (www.strokeaudit.scot.nhs.uk):
The SSCA website has been redesigned with all information and documentation updated. The new website should be completed by end June 2010.

Evaluation of Patient/Carer Information Leaflets and Posters:
Patient/Carer Information Leaflets and Posters were distributed to all centres in December 2009 informing patients/carers of the purpose of SSCA, that information about them is being collected and highlighting that they do have the right to have their information removed from the audit.

An evaluation of the design and use of the leaflets and posters was completed in May 2010 and a re-print of posters and leaflets is arranged for June/July 2010. The leaflet will be in Easy Access format providing clearer information for patients and carers who have communication difficulties.

Development of a HEAT Target (Health Improvement, Efficiency, Access, Treatment):
The SIGN guideline 108\textsuperscript{1} on the management of patients with stroke or TIA emphasises the importance of getting patients to specialist stroke services quickly to allow prompt diagnosis and treatment. The Better Heart Disease and Stroke Care Action Plan\textsuperscript{2}, suggests that there are a number of ways mortality could be reduced, including getting more people into a Stroke Unit within one day of their stroke, as there is good evidence that this improves survival. The current NHS QIS standard for admission to a Stroke Unit states that 60% of all patients admitted to
hospital with a diagnosis of stroke are admitted to the Stroke Unit on the day of presentation and 90% on the day following presentation, remaining in specialist stroke care until in-hospital stroke related needs are met. Speedy access to a specialist Stroke Unit is also the key to meeting many of the other NHS QIS clinical standards for stroke care.

None of the NHS Boards have met all of the NHS QIS clinical standards for stroke, including the key standard for admission to a Stroke Unit, despite their implementation being a policy requirement.

Therefore, a HEAT target related to admission to Stroke Unit is being developed. A working group has been formed and the HEAT target proposal will be submitted to the Scottish Government in September 2010. If accepted it is anticipated this HEAT target will come into force in April 2011 and that SSCA will provide the data required to report on this HEAT target.

**Ongoing redesign/development of SSCA:**

- Roll out of Carotid Intervention Project (proposed date – April 2011)
- Development of additional supporting documentation, e.g. Audit Protocol
- Case Note Validation
- Pre-hospital data collection
- Collaborative projects/data linkage/academic publications
3 Inpatients

3.1 Summary and key findings relating to inpatient data

The Scotland wide data indicate that about 8,000 patients are hospitalised with strokes each year. Their mean length of stay is 27 days so that these patients occupy almost a quarter of a million bed days per year.

Since 2005, the proportions of patients accessing Stroke Unit care at any time during their admission has risen year on year from 71% to 81%. The proportion of patients accessing Stroke Unit care on the day of admission, and the following day, has risen from 28% to 37% and 49% to 61% respectively. Whilst these improvements are welcome, early access to Stroke Unit care is still well below the new NHS QIS standards of 60% on the day of admission and 90% by the following day. Given the evidence that Stroke Unit care is associated with fewer deaths and less residual disability this is extremely important. In addition, earlier access to Stroke Unit care is likely to be key to improving performance in other aspects of care. Once patients are in a Stroke Unit environment they usually receive the appropriate assessments and interventions. NHS Boards and their Stroke MCNs have plenty of work to do to improve these figures.

Although these standards are challenging the data suggest that they should be achievable. All hospitals admitting more than 40 acute stroke patients per year have a Stroke Unit. Overall, and in most hospitals, there are sufficient numbers of Stroke Unit beds to accommodate all admitted stroke patients for their entire inpatient stay. Only a minority of hospitals appear to have too few Stroke Unit beds – at least with their current lengths of stay. Given the variations in length of stay there is probably scope for this to be reduced in some hospitals which would improve patient access to Stroke Unit beds. In some hospitals there are pressures from the front door. This may lead to many non-stroke patients being admitted to Stroke Unit beds. Improved bed management, a degree of ring-fencing and ensuring that wherever possible stroke patients are looked after in Stroke Unit beds should enable us to meet NHS QIS standards in most hospitals.

Delays from admission to important aspects of stroke care, i.e. a swallow screen, a brain scan and initiation of aspirin in those who have an ischaemic stroke have all shortened significantly since 2005. The proportion having a swallow screen documented on the day of admission has risen from 47% to 61%. The proportion having a brain scan on that day has increased from 27% to 49%. The proportion of patients with an ischaemic stroke, and without other contraindications, who receive aspirin on the day of admission or the following day, has risen from 41% to 68%. The Better Heart Disease and Stroke Care Action Plan commits NHS Boards to work with their Stroke MCNs to ensure that all NHS QIS Stroke Standards are achieved or exceeded by 2012. In Appendix A each MCN summarises the actions they plan to take in their local areas to improve performance against NHS QIS National Stroke Standards and thereby improve the delivery of stroke care to their patients.

Table 2 shows how each hospital is performing against the new and more challenging NHS QIS standards in 2009 compared with 2008. Many hospitals have not met these standards or maintained their 2008 performance. For many, fundamental re-design of the way their stroke services are structured and organised will be required to ensure they meet the standards in future years.
## 3.2 Stroke Unit Information

### Table 1

<table>
<thead>
<tr>
<th>Hospital Name</th>
<th>Admits acute stroke</th>
<th>Number of acute stroke discharged in 2009</th>
<th>Acute Stroke Unit (ASU) beds</th>
<th>Combined ASU/Rehab Stroke Unit (RSU) beds</th>
<th>RSU beds on acute site</th>
<th>RSU beds off acute site</th>
<th>Number of stroke bed days available per year</th>
<th>Mean length of stay (days)</th>
<th>Calculated no. Stroke bed days needed per year</th>
<th>Comments (e.g. Off-site Locations)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aberdeen Royal Infirmary</td>
<td>Yes</td>
<td>557</td>
<td>20</td>
<td>0</td>
<td>0</td>
<td>44</td>
<td>23,360</td>
<td>32.2</td>
<td>17,917</td>
<td>ARI will be losing 4 acute beds from its stroke unit in 2010. ARI off site beds include 38 beds at Woodend and 6 beds at Fraserburgh.</td>
</tr>
<tr>
<td>Dr Grays, Elgin</td>
<td>Yes</td>
<td>84</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>20.9</td>
<td>1,756</td>
<td>9 stroke beds opened in October 2009.</td>
</tr>
<tr>
<td>Ninewells Hospital</td>
<td>Yes</td>
<td>314</td>
<td>18</td>
<td>0</td>
<td>0</td>
<td>12</td>
<td>10,950</td>
<td>21.3</td>
<td>6,675</td>
<td>All off site beds are located at Stracathro Hospital.</td>
</tr>
<tr>
<td>Perth Royal Infirmary</td>
<td>Yes</td>
<td>223</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>0</td>
<td>2,920</td>
<td>35.0</td>
<td>7,814</td>
<td>A new 26 bedded integrated stroke unit opened at PRI in January 2010.</td>
</tr>
<tr>
<td>Royal Infirmary Edinburgh</td>
<td>Yes</td>
<td>388</td>
<td>22</td>
<td>0</td>
<td>0</td>
<td>41</td>
<td>22,995</td>
<td>41.7</td>
<td>16,161</td>
<td>RIE off site beds are divided as follows: 19 beds at Liberton and 22 beds at Astley Ainslie Hospital (A few patients also go to Royal Victoria Hospital and Roodlands Hospital for rehabilitation.)</td>
</tr>
<tr>
<td>St John’s Hospital</td>
<td>Yes</td>
<td>148</td>
<td>0</td>
<td>22</td>
<td>0</td>
<td>0</td>
<td>8,030</td>
<td>38.7</td>
<td>5,729</td>
<td>All off site beds are located at Royal Victoria Hospital.</td>
</tr>
<tr>
<td>Western General Hospital</td>
<td>Yes</td>
<td>442</td>
<td>16</td>
<td>0</td>
<td>0</td>
<td>26</td>
<td>15,330</td>
<td>35.1</td>
<td>15,521</td>
<td>All off site beds are located at Royal Victoria Hospital.</td>
</tr>
<tr>
<td>Royal Infirmary Glasgow</td>
<td>Yes</td>
<td>418</td>
<td>0</td>
<td>16</td>
<td>0</td>
<td>30</td>
<td>16,790</td>
<td>22.1</td>
<td>9,222</td>
<td>All off site beds are located at Lightburn Hospital.</td>
</tr>
<tr>
<td>Stobhill Hospital</td>
<td>Yes</td>
<td>198</td>
<td>8</td>
<td>0</td>
<td>30</td>
<td>0</td>
<td>13,870</td>
<td>20.7</td>
<td>4,096</td>
<td>All off site beds are located at Drumchapel Hospital.</td>
</tr>
<tr>
<td>Western Infirmary Glasgow</td>
<td>Yes</td>
<td>399</td>
<td>14</td>
<td>0</td>
<td>0</td>
<td>30</td>
<td>16,060</td>
<td>22.9</td>
<td>9,148</td>
<td>All off site beds are located at Drumchapel Hospital.</td>
</tr>
<tr>
<td>Southern General Hospital*</td>
<td>Yes</td>
<td>605</td>
<td>4</td>
<td>30</td>
<td>0</td>
<td>20</td>
<td>19,710</td>
<td>22.4</td>
<td>13,532</td>
<td>SGH stroke unit contains 4 hyperacute beds. All off site beds are located at the Victoria Infirmary.</td>
</tr>
<tr>
<td>Inverclyde Royal Hospital</td>
<td>Yes</td>
<td>234</td>
<td>0</td>
<td>17</td>
<td>0</td>
<td>0</td>
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<td>RSU beds off acute site</td>
<td>Number of stroke bed days available per year</td>
<td>Mean length of stay (days)</td>
<td>Calculated no. Stroke bed days needed per year</td>
<td>Comments (e.g., Off-site Locations)</td>
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* These are hyperacute beds.
†† Forth Valley length of stay columns combine data for Stirling Royal Infirmary & Falkirk & District Royal Infirmary.
3.3 Hospital Data

Table 2

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Numbers of stroke patients admitted: 2009 (2008)</th>
<th>Admitted to SU on day of admission %</th>
<th>Admitted to SU &lt;= 1 day %</th>
<th>Swallow screen on day of admission %</th>
<th>Brain scan on day of admission %</th>
<th>Aspirin &lt;= 1 day %</th>
<th>NV Clinic &lt;= 7 days %</th>
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<td>NHQ QIS Standard (from June 2009)1</td>
<td>60%</td>
<td>90%</td>
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<td>Admitted to SU &lt;= 1 day %</td>
<td>Swallow screen on day of admission %</td>
<td>Brain scan on day of admission %</td>
<td>Aspirin &lt;= 1 day %</td>
<td>NV Clinic &lt;= 7 days</td>
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n/a = data not available (hospital does not collect or has not reported the data).
NR = not relevant (usually because service does not exist).
NR* = Inpatient rehab service only, recorded as part of the local acute hospital service.

* These hospitals do not have designated acute Stroke Units. For NHS Orkney, patients are airlifted to Aberdeen Royal Infirmary and a proportion arrive in sufficient time to be admitted to the Stroke Unit within the required NHS QIS standard.

1 Stroke Unit admission percentages based on hospitals with Stroke Units. For 2008 & 2009 the total number of patients admitted to these hospitals was 7824 & 8209 respectively. Aspirin percentages based on denominator that excludes patients contraindicated for aspirin. For 2008 & 2009 the total numbers of patients receiving aspirin were 7506 & 7721 respectively.

2 Southern General Hospital data includes information for Victoria Infirmary.
3 Forth Valley combines information for Stirling Royal Infirmary & Falkirk & District Royal Infirmary.
4 For NHS Orkney, patients are airlifted to Aberdeen Royal Infirmary and a proportion arrive in sufficient time to have brain imaging within the required NHS QIS standard.

5 Uist and Barra data are included in the figures presented for Western Isles in Table 2. It should be noted that Uist and Barra do not have a Stroke Unit or a CT scanner. A proportion of patients may be transferred to Western Isles Hospital and may arrive in sufficient time to have brain imaging and be admitted to the Stroke Unit within the required NHS QIS standard.
National Report - Stroke Services in Scottish Hospitals - Data relating to 2005-2009

Chart 1  Percentage of stroke patients admitted to a Stroke Unit on day of admission (NHS QIS Standard = 60%)

Horizontal line reflects NHS QIS standard (2009) to admit 60% of stroke patients on day of admission.

* These hospitals do not have designated acute Stroke Units. For NHS Orkney, patients are airdropped to Aberdeen Royal Infirmary and a proportion arrive in sufficient time to be admitted to the Stroke Unit within the required NHS QIS standard.

** Uist and Barra data are included in the figures presented for Western Isles on Chart 1. It should be noted that Uist and Barra do not have a Stroke Unit. A proportion of patients may be transferred to Western Isles Hospital and may arrive in sufficient time to be admitted to the Stroke Unit within the required NHS QIS standard.

Chart 2  Percentage of stroke patients admitted to a Stroke Unit within 1 day of admission (NHS QIS Standard = 90%)

Horizontal line reflects NHS QIS standard (2009) to admit 90% of stroke patients within 1 day of admission.

* These hospitals do not have designated acute Stroke Units. For NHS Orkney, patients are airdropped to Aberdeen Royal Infirmary and a proportion arrive in sufficient time to be admitted to the Stroke Unit within the required NHS QIS standard.

** Uist and Barra data are included in the figures presented for Western Isles on Chart 2. It should be noted that Uist and Barra do not have a Stroke Unit. A proportion of patients may be transferred to Western Isles Hospital and may arrive in sufficient time to be admitted to the Stroke Unit within the required NHS QIS standard.
Chart 3  Percentage of stroke patients admitted to a Stroke Unit by number of days to Stroke Unit admission 2009 data

Horizontal lines reflect NHS QIS standards (2009) to admit 60% of stroke patients on day of admission and 90% within 1 day of admission.

*These hospitals do not have designated acute Stroke Units. For NHS Orkney, patients are airlifted to Aberdeen Royal Infirmary and a proportion arrive in sufficient time to be admitted to the Stroke Unit within the required NHS QIS standard.

Chart 4  Mean delay (days) from admission to entry into any Stroke Unit

*These hospitals do not have designated acute Stroke Units. For NHS Orkney, patients are airlifted to Aberdeen Royal Infirmary and a proportion arrive in sufficient time to be admitted to the Stroke Unit within the required NHS QIS standard.

**Uist and Barra data are included in the figures presented for Western Isles on Chart 4. It should be noted that Uist and Barra do not have a Stroke Unit. A proportion of patients may be transferred to Western Isles Hospital and may arrive in sufficient time to be admitted to the Stroke Unit within the required NHS QIS standard.
Chart 5  Percentage of stroke patients with a swallow screen on day of admission  
(NHS QIS Standard = 100%)

Horizontal line reflects NHS QIS standard (2009) of 100% of stroke patients swallow screened on day of admission.

* Data not routinely collected at Royal Alexandra Hospital or Vale of Leven Hospital. 2008 data is not available from North Glasgow hospitals due to data collection issues.

Chart 6  Percentage of stroke patients with a swallow screen by number of days to swallow screen 2009 data

Horizontal line reflects NHS QIS standard (2009) of 100% of stroke patients swallow screened on day of admission.

* Data not routinely collected at Royal Alexandra Hospital or Vale of Leven Hospital.
Chart 7  Percentage of stroke patients with a brain scan on day of admission (NHS QIS Standard = 80%)

Horizontal line reflects NHS QIS standard (2009) of 80% of stroke patients to receive brain imaging on day of admission.

* For NHS Orkney, patients are airlifted to Aberdeen Royal Infirmary and a proportion arrive in sufficient time to have brain imaging within the required NHS QIS standard.

** Uist and Barra data are included in the figures presented for Western Isles on Chart 7. It should be noted that Uist and Barra do not have brain imaging. A proportion of patients may be transferred to Western Isles Hospital and may arrive in sufficient time to have brain imaging within the required NHS QIS standard.

Chart 8  Percentage of stroke patients with a brain scan by number of days to scanning 2009 data

Horizontal line reflects NHS QIS standard (2009) of 80% of stroke patients to receive brain imaging on day of admission.

* For NHS Orkney, patients are airlifted to Aberdeen Royal Infirmary and a proportion arrive in sufficient time to have brain imaging within the required NHS QIS standard.
Chart 9  Percentage of ischaemic patients given aspirin within 1 day of admission  
(NHS QIS Standard = 100%)

Horizontal line reflects NHS QIS standard (2009) of 100% of ischaemic patients to receive aspirin within 1 day of admission.

Chart 10  Percentage of ischaemic patients given aspirin in hospital by number of days to receipt 2009 data

Horizontal line reflects NHS QIS standard (2009) of 100% of ischaemic patients to receive aspirin within 1 day of admission.
3.4 Scotland national trends 2005-2009

Chart 11 Trend in Stroke Unit admission (day of admission or within 1 day of admission), 2005-2009
Horizontal red lines (solid and hashed) reflect NHS QIS standards (2009) to admit 60% of stroke patients on day of admission and 90% within 1 day of admission.

Chart 12 Trend in swallow screen (day of admission), 2005-2009
Horizontal line reflects NHS QIS standard (2009) of 100% of stroke patients to receive swallow screen on day of admission.
Chart 13  Trend in brain scan (day of admission), 2005-2009
Horizontal line reflects NHS QIS standard (2009) of 80% of stroke patients to receive brain imaging on day of admission.

Chart 14  Trend in aspirin use (within 1 day of admission), 2005-2009
Horizontal line reflects NHS QIS standard (2009) of 100% of ischaemic patients to receive aspirin within 1 day of admission.
4 Outpatients

4.1 Summary and key findings relating to outpatient data

A significant minority of hospitals offering neurovascular clinic services still do not collect comprehensive data to reflect their performance. Data were collected on over 4,000 patients with acute cerebrovascular disease seen in neurovascular clinics in 2009. From January 2010 all hospitals offering neurovascular clinic services have been asked to collect core outpatient data and enter it into SSCA.

There has been much greater emphasis placed on the early diagnosis, investigation and treatment of TIAs and minor strokes since the very high early risks of disabling and fatal strokes have been demonstrated. It is therefore very encouraging that since 2005 the proportion of patients seen in TIA clinics within a week of referral has risen from 30% to 80%. Increasingly, patients are being seen within a day or two of referral.

Section 6 outlines strategies NHS Boards have used to reduce the delay from referral to assessment in a specialist outpatient clinic. These reduced delays should translate into more effective prevention and fewer people suffering a stroke.

4.2 Hospital data

Chart 15 Percentage of patients with definite cerebrovascular diagnosis seen in neurovascular clinic with referral to examination time (days): same day and within 1, 2 and 3 days 2009 data

NB. Data from Glasgow is not presented in this chart as data is not entered into SSCAS but is collected locally.
4.3 Scotland national trends 2005-2009

NB. From 2007, data from additional hospitals from Borders, Glasgow and Forth Valley were included and this is a factor in the observed increase in numbers from 2005 to 2009.
5 Thrombolysis

“The introduction of thrombolysis is driving some significant service changes, especially in relation to imaging and the role of telehealth care. Given its importance in preventing permanent disability, we must make sure there is equity of access across Scotland.”

Nicola Sturgeon,
Cabinet Secretary for Health & Well-Being, MSP, December 2009

Hyperacute treatment with recombinant tissue plasminogen activator (rtPA) is an effective treatment for selected patients with acute ischaemic stroke. Data on all patients thrombolysed in Scotland has been entered into SSCA prospectively from January 2010. The NHS QIS standard set in June 2009 was for a treatment rate of 5 patients per 100,000 population per year. If there are 8,000 new ischaemic strokes per year in Scotland, this equates to at least 3% of all new patients. This report includes a retrospective look at the best available information from a variety of local audits and registers to try to provide a national picture about the delivery of rtPA during 2009.

Table 3

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Number of patients receiving thrombolysis in 2009</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scotland summary</td>
<td>411</td>
<td>Not all centres were in a position to offer thrombolysis for the whole of 2009 therefore the numbers reflect varying months' worth of data and are shown to illustrate the developing nature of this service.</td>
</tr>
<tr>
<td>Aberdeen Royal Infirmary</td>
<td>68</td>
<td>Thrombolysis commenced in 2003.</td>
</tr>
<tr>
<td>Dr Grays, Elgin</td>
<td>9</td>
<td>Thrombolysis commenced in December 2008. Patients thrombolysed using telehealth link to Aberdeen Royal Infirmary.</td>
</tr>
<tr>
<td>Ninewells Hospital</td>
<td>13</td>
<td>Thrombolysis commenced in 2009.</td>
</tr>
<tr>
<td>Perth Royal Infirmary</td>
<td>5</td>
<td>Thrombolysis commenced in 2009.</td>
</tr>
<tr>
<td>Stracathro Hospital</td>
<td>0</td>
<td>Service not provided.</td>
</tr>
<tr>
<td>Royal Infirmary Edinburgh</td>
<td>16</td>
<td>Thrombolysis commenced in 2005.</td>
</tr>
<tr>
<td>St John’s Hospital (Livingston)</td>
<td>4</td>
<td>Thrombolysis commenced in 2008.</td>
</tr>
<tr>
<td>Western General Hospital</td>
<td>23</td>
<td>Thrombolysis commenced in 2004.</td>
</tr>
<tr>
<td>Glasgow Royal Infirmary</td>
<td>.</td>
<td>Patients thrombolysed at Western Infirmary Glasgow.</td>
</tr>
<tr>
<td>Stobhill Hospital</td>
<td>.</td>
<td></td>
</tr>
<tr>
<td>Western Infirmary Glasgow</td>
<td>79</td>
<td>Thrombolysis commenced in 1997.</td>
</tr>
<tr>
<td>Hospital</td>
<td>Number of patients receiving thrombolysis in 2009</td>
<td>Comments</td>
</tr>
<tr>
<td>----------</td>
<td>-----------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Southern General Hospital</td>
<td>109</td>
<td>Thrombolysis commenced in 1996.</td>
</tr>
<tr>
<td>Inverclyde Royal Hospital</td>
<td>..</td>
<td>Service not provided.</td>
</tr>
<tr>
<td>Royal Alexandra Hospital</td>
<td>5</td>
<td>Thrombolysis commenced January 2009.</td>
</tr>
<tr>
<td>Vale of Leven (Dumbarton)</td>
<td>..</td>
<td>Service not provided.</td>
</tr>
<tr>
<td>Ayr Hospital</td>
<td>7</td>
<td>Ayr started administering thrombolysis (9-5 Mon-Fri) from June 2009.</td>
</tr>
<tr>
<td>Crosshouse Hospital</td>
<td>0</td>
<td>Phased implementation since March 2010.</td>
</tr>
<tr>
<td>Hairmyres Hospital</td>
<td>..</td>
<td>Piloted in 1 site (Wishaw General) in Lanarkshire.</td>
</tr>
<tr>
<td>Monklands Hospital</td>
<td>..</td>
<td></td>
</tr>
<tr>
<td>Forth Valley (Stirling Royal &amp; Falkirk and District General Hospital)</td>
<td>13</td>
<td>Commenced thrombolysing in 2008.</td>
</tr>
<tr>
<td>Borders General Hospital</td>
<td>0</td>
<td>Thrombolysis commenced August 2009. 14 assessed but none thrombolysed.</td>
</tr>
<tr>
<td>Dumfries &amp; Galloway Royal Infirmary</td>
<td>3</td>
<td>Thrombolysis commenced in 2009.</td>
</tr>
<tr>
<td>Galloway Community Hospital</td>
<td>1</td>
<td>Thrombolysis commenced in 2009. Patients thrombolysed using telehealth link to Dumfries and Galloway Royal Infirmary.</td>
</tr>
<tr>
<td>Raigmore Hospital</td>
<td>32</td>
<td>Thrombolysis commenced in 2007.</td>
</tr>
<tr>
<td>Lorn &amp; Islands (Oban)</td>
<td>..</td>
<td>Service not provided.</td>
</tr>
<tr>
<td>Belford Hospital (Forth William)</td>
<td>0</td>
<td>Thrombolysis commenced in May 2009 (There have been no suitable candidates to date).</td>
</tr>
<tr>
<td>Caithness Hospital</td>
<td>2</td>
<td>Thrombolysis commenced in May 2009.</td>
</tr>
<tr>
<td>Queen Margaret Hospital</td>
<td>5</td>
<td>Thrombolysis commenced (9-5 Mon-Fri) from June 2009.</td>
</tr>
<tr>
<td>Victoria Hospital, Kirkcaldy</td>
<td>3</td>
<td>Thrombolysis commenced (9-5 Mon-Fri) from June 2009.</td>
</tr>
<tr>
<td>Orkney</td>
<td>0</td>
<td>Patients only thrombolysed if arrive at Aberdeen Royal Infirmary in time.</td>
</tr>
<tr>
<td>Shetland</td>
<td>0</td>
<td>Service not provided.</td>
</tr>
<tr>
<td>Western Isles</td>
<td>1</td>
<td>Thrombolysis commenced 2009. Patients thrombolysed using telehealth link to Aberdeen Royal Infirmary.</td>
</tr>
</tbody>
</table>

The numbers (percentage) of stroke patients being treated with rtPA in 2008 and 2009 were 260 (3%) and 411 (5%) respectively. These numbers equate to 5 patients per 100,000 persons in 2008 and 8 patients per 100,000 persons in 2009. Preliminary figures from January and February 2010 suggest that 30 were treated each month which is a treatment rate of 4% (7 patients per 100,000 persons per year). This indicates that overall thrombolysis treatment rates are approaching the current target. However, these figures mask significant regional variations.
In addition, this is a treatment which works best when given very early and we need to ensure that as many eligible patients as possible receive the treatment in a timely manner. The 2011 SSCA Annual Report will include data on treatment (door-to-needle) times and treatment outwith criteria specified in the drug’s licence.

The push to improve acute stroke management has driven a number of new initiatives including the use of telehealth. The Telestroke Programme aims to improve access to stroke thrombolysis for patients across Scotland, by using video conferencing and Picture Archiving and Communication System (PACS) imaging between acute hospitals and consultants’ homes and offices. Telehealth has been used to support thrombolysis in the Western Isles and Elgin (by linking to the Aberdeen Royal Infirmary) and in hospitals in Lanarkshire and Lothian. In addition the Aberdeen Royal Infirmary has established telemedicine links with GP practices in Orkney to provide a rapid TIA service as is described in Section 6. Further information about the Telestroke Programme can be found in Appendix C.
6 Case Studies: Management of TIAs

This is the first time that we have included case studies in our report. This section presents methodologies used to improve rapid access to specialist stroke care in four Scottish NHS Boards.

The average risk of stroke after a TIA is approximately 10% in the first week, and for certain subgroups may be as high as 30%. Therefore, early recognition, diagnosis and initiation of secondary prevention are likely to prevent many more strokes if started immediately after the initial TIA.

The challenge is to organise services to ensure the patient is managed by a clinician with the knowledge and experience to correctly interpret the clinical history to make an accurate diagnosis, investigations to complete the assessment and early initiation of appropriate treatment.

Various models of rapid access TIA service have been described including daily ‘one stop’ TIA clinics, and variations based on emergency medicine departments. These models depend on having not only enough specialists available to see patients everyday, but also imaging capacity to provide immediate access to imaging. This represents a considerable challenge to many NHS Boards. Early SSCA data indicated that delays from referral to specialist outpatient assessment were often longer than the target of seven days stated in the NHS QIS standard.

6.1 NHS Lothian

TIA/stroke telephone hotline: An evaluation of a model to improve rapid access to specialist stroke care.

In Lothian (population approx. 810,000) we have provided one stop rapid access TIA/stroke clinics since 1992. In 2004, various changes were made aiming to reduce delays. These included: expansion of the number of new patient appointment slots, encouraging GPs to send referrals by fax rather than by post; introduction of electronic guideline-driven referrals and telephoning patients with appointment times. Despite these changes the service still failed to meet the NHS QIS standard. In February 2007 we were offering on average 12 new patient slots on Tuesday morning and 10 on a Friday morning at the Western General Hospital (WGH) in Edinburgh. Each clinic was associated with access to same day imaging.

In March 2007 we introduced a 24/7 consultant hotline to provide immediate advice on diagnosis, investigation, emergency treatment of TIA and stroke and to agree the most appropriate care pathway which might include an early appointment in a TIA/stroke clinic. We sent all GPs in Lothian written guidelines and a hotline telephone number. This dedicated number allowed the switchboard to pick up the call within five rings and to route the caller through to the mobile phone of the consultant stroke physician or neurologist on call. The clinical problem could then be discussed and a management plan agreed. The “live interaction” involving the referring GP, consultant and patient allowed aspects of the history to be clarified and if necessary the consultant took the history directly from the patient to refine the diagnosis and decision making. Importantly the consultant could ask the GP to take appropriate blood tests and initiate immediate treatments – most often with antiplatelet therapy and statins.
Chart 18  Results of ongoing prospective audit of a TIA/stroke clinic as part of the SSCA and a three month targeted audit of a TIA/stroke consultant telephone hotline in Lothian (NHS Lothian)

The chart above shows the mean monthly delays between receipt of referral and assessment in the clinic for the period from 01/01/2005 to 31/12/2009. The changes made in March 2007 led to an abrupt and sustained reduction in delays from more than 13 days to about 3 days.

Over the three months (89 days) of the audit, 368 calls were received. The mean number of calls was just over 4 per day (range 0 to 14). 80% occurred between 9am and 5pm, Monday to Friday. The pathway agreed at the time of the calls was: TIA/stroke clinic (54%), see immediately at hospital emergency department (14%), refer for routine same day admission (6%), call emergency ambulance (3%), refer to another service (7%) and no need for further assessment in secondary care (15%). A questionnaire was sent to 324 (88%) of referrers. Of the 273 referrers who responded 3% were satisfied and 94% very satisfied with the advice given over the hotline.

A 24/7 telephone hotline to a consultant is a feasible, effective and popular means of reducing delays to specialist assessment and treatment of patients with TIA and stroke.

6.2 NHS Forth Valley

TIA Services

The 2008 SSCA report showed that Forth Valley performed poorly in delivering timely assessment to patients with possible TIA, although there had been some improvement since the preceding year. This was highlighted as a priority for service development as it provided the opportunity for prevention of incident strokes rather than just improving outcome after the event.

The service has been changed to allow as many patients as possible to be seen either on the day of referral or in the following days. We have based the service around telephone referral via a mobile number accessible to GPs and other acute care medical staff. This is held by either one of the stroke physicians or, alternatively, the Stroke Specialist Nurse (SSN). This allows some discussion of the case aiding prioritisation and triage (admission, TIA clinic or redirection to another service). Protocols are available for use by Emergency Department/Acute Receiving staff for out of hours presentation and incorporate the ABCD2 score (ABCD2 is an algorithm used to identify patients at high risk of stroke following a TIA).
A clinic is held each afternoon, Monday to Friday where patients are reviewed by a stroke consultant. Patients are contacted directly by the SSN and given appointments. Prior to being seen by clinic medical staff the patient is assessed by the SSN, a basic history is obtained, observations are made and bloods, ECG and echocardiography organised. In cases of possible anterior circulation events, carotid dopplers are also requested. In most cases, these results are available for the consultant assessment in the afternoon. Radiological investigations are requested by the consultant after assessment of the patient. These are usually not done the same day but we have agreed a priority service with radiology. If TIA is diagnosed, initial secondary prevention treatment (antiplatelet, statin, ACEI, thiazide) is prescribed in the clinic and dispensed from the hospital pharmacy (28 day supply). The SSN also provides appropriate risk factor advice or onward referral. Appropriate driving advice is also given. The patient leaves with a hand-completed proforma letter, detailing the likely diagnosis, investigations done and significant results, outstanding investigations and any treatment prescribed or recommendations for change. A full typed letter follows shortly.

These changes have resulted in a major improvement in the service to patients. The system is demanding in staff time and investigation resource. There does need to be continued vigilance so that referrals are appropriate as otherwise there is a risk that the major benefit of the system (fast access) is compromised.

**Chart 19  Rapid Access TIA outpatients reviewed January – September 2009 (NHS Forth Valley)**

Reasons for 5 patients with time from referral to review >7 days
3 - Seasonal holiday - reduced clinics
1 - Internal letter from cardiology
1 - Wrong address on referral
6.3 NHS Orkney/Grampian

Collaborative TIA services

The Tele-TIA service in Orkney was set up in June 2008, as a collaborative venture with the Stroke Unit at Aberdeen Royal Infirmary (ARI), led by Dr Mary-Joan Macleod, The Scottish Centre for Telehealth, led by Anne Duthie and clinicians in Orkney, represented by Dr Bob Hazlehurst, Clinical Lead for the Stroke MCN. The team won an award for improvement and innovation in medicine at the 2008 Scottish Health Awards.

As noted above timely review of patients with TIA and minor stroke reduces risks. NHS QIS standards recommend specialist review of the patient within seven days, which is difficult to achieve for patients in a remote and rural setting. Orkney is an archipelago off the North coast of mainland Scotland, with a population of around 20,000. This means that Orkney patients have to travel large distances, in order to access specialist services, involving two return air or ferry journeys, for those living on the smaller Isles.

Prior to the Tele-TIA service, anyone with symptoms suggestive of a TIA or minor stroke was referred to the neurovascular clinic at ARI for a traditional consultation or to the Stroke Unit and would have to return at a later date for any investigations. The whole process took an average of fifteen days and led to those, subsequently found not to have had a TIA making unnecessary trips, requiring several days away from home.

The new service provides a consultation with the on-call stroke physician in Aberdeen, over a Tele-link within 24 hours of onset of symptoms. Because all GP premises in Orkney have teleconferencing facilities, the consultation takes place, usually in the local surgery. The patient’s GP attends the consultation to facilitate a clinical history and examination, providing useful input for the stroke specialist and a learning opportunity for the GP. This allows early diagnosis, intervention with prophylactic medication and a co-ordinated sequence of pre-planned investigations, such as brain scan and carotid doppler, which are not available in Orkney.

An audit of the service has shown that it speeds up investigation and secondary prevention and that it has a high approval rating from users. The time from event to review has been reduced...
from an average of 14 to 8 days, while the time to secondary prevention has been reduced from 9 to 7 days.

Telemedicine plays an increasingly important role in remote and rural communities, allowing equity of access to specialist services which would otherwise be impossible, because of geographical constraints. NHS Orkney has long recognised this and has invested in IT infrastructure and training for local clinicians, facilitating the relatively seamless introduction of this innovative solution to meeting NHS QIS standards for TIA.
7 Collaboration with other national projects

Chest Heart & Stroke Scotland, The Stroke Association Scotland and the STARs (Stroke Training and Awareness Resources) were asked to submit a summary in their own words outlining their involvement in stroke services across Scotland.

7.1 Chest, Heart & Stroke Scotland (CHSS)

CHSS have been involved in stroke services in Scotland for more than 30 years. We are represented on the National Advisory Committee for Stroke, in every Stroke MCN in Scotland, and are heavily involved with NHS QIS, SIGN etc., including facilitating patient representation on project groups. We are currently also working with NHS 24 on the information website NHS Inform.

CHSS provide a range of local patient services for every NHS Board and Local Authority in Scotland. All of these operate in partnership with local NHS stroke services and include:

- Stroke nurses, offering advice, information and support for up to a year after discharge from hospital for patients and their families, and providing nurse-led TIA clinics (6 NHS Board areas, covering more than 50% of stroke survivors in Scotland).
- The Young Stroke Support Service, offering additional help with issues such as sexual and family relationships, access to education and training, vocational rehabilitation and employment (NHS Lanarkshire).
- The Volunteer Stroke Service, offering communication support to people with aphasia, through both group activities and one-to-one support (11 NHS Board areas, covering nearly 90% of stroke survivors).
- The Community Support Network – self-help groups offering a range of activities, mutual support and companionship (13 NHS Board areas).
- Benefits advisory services, provided in partnership with local Citizens’ Advice Bureau (3 NHS Board areas).

CHSS also undertake a range of training and awareness-raising activities, including:

- Specialist stroke training programmes, for NHS staff in acute and primary care, and local authority and other staff involved in stroke care (7 NHS Board areas, covering more than 70% of stroke staff).
- The Stroke Training and Awareness Resources (STARs) e-learning resource, which has already attained an international reputation (detailed in Section 7.3).
- A national programme of training in thrombolysis for all staff involved in thrombolytic therapy.
- Voices Scotland – a unique national programme of training and support for patients and carers wishing to become involved in MCNs, Patient Focus Public Involvement (PFPI) groups and other stroke planning groups, incorporating a specially-adapted programme for people with aphasia.
Local FAST campaigns, undertaken in partnership with local stroke services, to ensure coordination with service development.

CHSS national services aims to assist people affected by heart disease, respiratory conditions and stroke. The majority of people helped by CHSS are stroke survivors and their families. In 2009, more than 7,000 people affected by stroke accessed CHSS local and national services.

The CHSS Advice Line offers professional confidential advice on all aspects of prevention, treatment and care. CHSS patient information is available through booklets, factsheets, DVDs, audio tapes and the CHSS website, which is a recognised NHS Information Provider. Personal support grants offer financial help for those in difficulty because of their condition, for items such as disability equipment, aids and adaptations, and respite care.

CHSS is the only independent Scottish charity funding research in stroke. We offer research fellowships, project grants and small awards commissioning research directly into all aspects of stroke prevention, treatment, rehabilitation and social care. We fund projects not only in all Scottish Universities and Medical Schools, but also in institutions outwith the traditional centres of research, and particularly encourage applications from nurses and allied health professionals.

Contact details:

David H Clark
Chief Executive
phone: 0131 225 6963
email: admin@chss.org.uk

Chest, Heart & Stroke Scotland
65 North Castle St
Edinburgh EH2 3LT
website: www.chss.org.uk

7.2 The Stroke Association Scotland

The Stroke Association Scotland delivers a wide range of activities in Scotland and is committed to increasing the scope and volume of its activities over the next five years and beyond.

7.2.1 Supporting stroke survivors and unpaid carers

The Stroke Association Scotland provides a range of direct support services to stroke survivors:

- Information – We provide high quality, independently accredited information for stroke survivors and unpaid carers through our website, publications and helpline. Our information can be accessed and/or ordered through our website: www.stroke.org.uk/
- Our helpline takes enquiries by phone and email - Stroke Helpline: 0303 3033 100 Email: info@stroke.org.uk
- Talkstroke – We host an online discussion forum for people affected by stroke so they are able to communicate and support each other wherever they live: www.stroke.org.uk/talkstroke
- On-line shop – We offer services for people affected by stroke at a reasonable cost, including holidays and travel and leisure insurance: www.stroke.org.uk/shop
- Life After Stroke Grants – We can make one-off payments of up to £300 to help stroke survivors and families facing financial hardship. For more information please go to the website: www.stroke.org.uk/information/the_stroke_association/grants
We are also working with other organisations in Scotland to empower and involve people affected by stroke and increase their access to a range of important support services including:

- independent advocacy;
- peer support and befriending;
- self management training; and
- stroke training for unpaid carers.

For more information on these initiatives, please go to [www.stroke.org.uk/scotland](http://www.stroke.org.uk/scotland)

### 7.2.2 Supporting professional development and training

We have started to provide our respected stroke training programmes to social care staff in some areas of Scotland and plan to increase provision across Scotland. We also provide information and guidance to professionals working in stroke through our website and by playing a key role in organising the UK Stroke Forum, which is being held in Glasgow for three consecutive years commencing December 2009.

### 7.2.3 Supporting research

The Stroke Association has awarded over £2 million to stroke researchers in Scotland since 1992 and continues to support stroke research in Scotland. Please see our website for more information about our research funding [www.stroke.org.uk/research](http://www.stroke.org.uk/research). In 2009, we commissioned the first UK survey of stroke survivors’ long-term care needs and results will be available in 2010. We are also playing an active role in helping to improve user involvement in stroke research in Scotland. We also provide advice and general support to a range of stroke research initiatives in Scotland.

### 7.2.4 Campaigning and influencing

The Stroke Association Scotland runs a number of campaigns in Scotland to raise awareness of stroke including:

- Stroke Awareness Day (the second Tuesday of May every year)
- Stroke is a Medical Emergency/FAST
- Know Your Blood Pressure

**Contact details:**

The Stroke Association Scotland  
Links House  
15 Links Place  
Edinburgh EH6 7EZ  
phone: 0131 555 7240  
fax: 0131 555 7259  
email: scotland@stroke.org.uk  
Stroke Helpline: 0303 3033 100  
website: [www.stroke.org.uk/scotland](http://www.stroke.org.uk/scotland)
7.3 The Stroke Training and Awareness Resources (STARs)

7.3.1 Background and Context

In 2005 NHS Education for Scotland (NES) published the Stroke Core Competencies which set out the core knowledge and skills required by all staff who care for people affected by stroke. In 2008 the NACS identified training for staff working in Stroke Units as a priority for NHS Scotland. Providing these staff with access to high quality training is likely to have the greatest benefits for stroke patients.

The Scottish Government provided funding to develop an eLearning resource which incorporated the stroke core competencies and more specialised resources aimed primarily at registered staff working in stroke services. This work has been developed jointly by NES, CHSS, the University of Edinburgh and expert stroke clinicians from across Scotland. Each of the NHS boards, through the stroke MCNs have been given the opportunity to be involved in the project.

7.3.2 The Modules

The resource is freely available via: www.StrokeTraining.org and the site consists of 2 levels – the Stroke Core Competencies and the Advancing Stroke Modules. The website aims to provide an interactive way of learning where images, quizzes, animations and video clips are incorporated into a series of virtual patient scenarios. Throughout the resource links to other relevant learning and reference materials are provided. There are tests which the learner may opt to undertake and which, if successfully completed, will award a certificate.

In addition, there is a ‘Thrombolysis Masterclass’ which is aimed at senior staff who are involved in making the decision to treat with thrombolysis. The module consists of a series of virtual patient scenarios which focus on patient history, examination and imaging. Learners have the opportunity to compare their treatment decisions with selected experts and other learners who have completed the scenarios.

The website receives on average 1000 hits per week and in the period from May 2008 – March 2010 over 9300 certificates have been awarded, 59% of these to learners based within Scotland.

7.3.3 NHS QIS Clinical Standards for Stroke Services

Standard 1.7 requires that ‘The service is able to demonstrate that any member of health and social care staff who has been working in the Stroke Unit for more than three months has undergone stroke training relevant to their role, and as a minimum has received training in the NES stroke core competencies.’

The STARs website provides staff with access to training in the stroke core competencies. On successful completion of the Core Competencies Test the learner will attain a certificate of completion.

7.3.4 Module Certificates

Data are collected from the learners who successfully complete any of the tests. At the start of each of the tests the learner is required to enter specific details into a database. These details are only saved for those who successfully complete the test and are awarded a certificate. Data
collected includes name, profession, whether the learner is based on a Stroke Unit, NHS Board area, Agenda for Change band (if applicable) and Module(s) successfully completed.

It is anticipated that in the future this database may be hosted by Information Services Scotland (ISD) and stroke MCNs will be able to access and report on the data.

### 7.3.5 Summary

The STARs website enables anyone, anywhere, at any time to access stroke training. It compliments other stroke training opportunities which are already available such as the CHSS stroke training courses. The site will continue to evolve as new work is produced and made available on a regular basis.

**Contact details:**

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Email: clare.adams@chss.org.uk

**Chest, Heart and Stroke Scotland**  
65 North Castle Street  
Edinburgh EH2 3LT  
website: www.StrokeTraining.org
List of References


Appendix A: Managed Clinical Networks

All NHS Board Stroke Managed Clinical Networks (MCN) were asked to submit a summary in their own words detailing the actions they plan to take in their local areas to improve performance against NHS QIS stroke standards and thereby improve the delivery of stroke care for their patients.

NHS AYRSHIRE AND ARRAN

Admit to Stroke Unit within one day of admission (Day 0 or 1)
- Clinical staff, bed and nursing managers working collaboratively to improve admission processes, early assessment and discharge.
- Hyperacute area in Ayr and Crosshouse Hospitals opened in April 2009 and November 2009 and show improved direct admission:
  - Ayr - over 80% within 24 hours.
  - Crosshouse - all presenting patients admitted without delay, figures for November to January averaging 85% same day admission.

The hyperacute area has improved quality of monitoring for patients in acute phase stroke. Local audit shows delay to admission is eliminated and length of stay greatly reduced.

Swallow screen on day of admission
- Ayr/Crosshouse - Training programme funded by the MCN, for a Speech and Language Therapist - ensuring staff have competencies to perform the swallow screen test.
- Ayr - since April 2009, local audit shows improved swallow screen on day of admission to over 80%.

Brain scan on day of admission
- Crosshouse - New 12 hour and Saturday shifts for radiographers should help meet demands of new standard however resource implications and protocols need to be agreed.
- Ayr will find this challenging within current resources however there has been some improvement since April 2009.

Aspirin on day of admission or day following (Day 0 or 1)
- Patient Group Directive (PGD) for nurses to administer aspirin which should improve adherence to new standard.
- Achieving new standard will depend on brain scans being carried out on day of admission.

Neurovascular Clinic appointment within 7 days of referral
- Ayr - patients seen 4 days/week (2 slots/day) dependent on imaging and cardiophysiology.
- Crosshouse - training of cardiac technician (MCN funded) to do dopplers, spreading the clinics throughout the week rather than as two clinics/week, and screening calls from GPs has reduced referral-to-clinic time to 1-2 days, with some patients seen on day of referral (about 80% seen within 2 days of referral).
- Dispensing medication at the clinic itself rather than previous practice when patients took letters to GPs. Self referral is a potential future development.
Thrombolysis:
In acute ischaemic stroke will be administered on at least 5 per 100,000 population
- Ayr - since June 2009 - commenced a 3 hour symptom onset to thrombolysis model of care (8.30am - 4.30pm service).
- Crosshouse - phased implementation since March 2010.
- Thrombolysed patients are admitted to hyperacute areas with neurological monitoring for first 48 hours.
- Out of hours service is supported by Glasgow hospitals mainly Southern General (limited due to capacity issues).

80% of patients receive the bolus within one hour of arrival
No data on this standard. Multidisciplinary working is planned to achieve this across all departments, either locally or at the tertiary centre.

Carotid Intervention:
80% of patients undergoing carotid endarterectomy have operation within 14 days of the stroke event
- Difficult to achieve within 14 days of event without major redesign and resources although consideration should be given to the substantial financial savings that accrue because of thrombolysis and the effects of the redesigned TIA clinics.

NHS BORDERS
Borders Stroke MCN was re-launched in May 2009, recognising that it had been quiescent for some time. The newly reformed MCN have made SSCA and QIS standards a principal priority for the organisational work plans for this and the coming years.

The current Stroke MCN is also very conscious of the excellent support received from the Radiology Department to achieve scanning on admission, which has exceeded the previous national standard.

We are however, very conscious of and disappointed in the decline in the admission rate to the Stroke Unit within one day of admission and the swallow screening. We have already written an action plan and started work plans to target these areas as a top priority.

We have two key aims for the coming year:
Firstly, improving the efficiency of the stroke admission process and secondly, a review of the length of hospital stay, particularly the management of those patients with a longer hospital stay, including community hospital use.

NHS Borders is currently introducing a LEAN redesign programme partly as a response to these audit results, but also because of the overall priority we give to stroke services and the recognition that an effective stroke service is fundamental to our broader Integrated Health Strategy. We have agreed that stroke will be a priority for this programme. Stroke services have agreed to be involved in a LEAN redesign of the stroke pathway and are committed to the delivery of change and improved patient care.

We are aware of the new NHS QIS standards and have made efforts to address these with our planned service changes. The initiatives listed below have been commenced over the past year.
Admit to Stroke Unit within one day of admission (Day 0 or 1)

Admission Process
- Use of Stroke Admission Telephone held by Stroke Consultants.
- Protocol development for evening admission to Stroke Unit.
- Multidisciplinary white board to identify new patients out with the Stroke Unit.

Reducing length of stay
- LEAN Redesign Project reviewing admission rate to stroke unit, length of stay and community hospital rehabilitation services.
- Early identification of estimated date of discharge or community hospital transfer at Stroke multidisciplinary team meeting.

Swallow assessment on day of admission
- Increased specialist nurse input and Education Program.

Brain scan on day of admission
- Evening and specialist nurse CT scanning protocols.
- Medical staff education, e.g. scanning indications.

Aspirin on day of admission or day following (Day 0 or 1)
- Interventions as for CT scanning and swallow assessment.

Neurovascular Clinic appointment within 7 days of referral
- Neurovascular referral pathway streamlining via the stroke telephone and SCI gateway.

NHS DUMFRIES AND GALLOWAY

The performance of NHS Dumfries and Galloway (D&G) in 2007/2008 has been good overall with particular improvement in our clinic performance. This is despite the service still having only one Physician with an interest in stroke.

Admit to Stroke Unit within one day of admission (Day 0 or 1)

Swallow assessment on day of admission
Performance in the areas of Stroke Unit access and swallow assessment are closely linked.

For patients not admitted promptly to the Stroke Unit, the principal issue is a failure to record swallow assessment rather than failure to carry out the procedure. Nevertheless, the MCN has identified this as a risk area and has been working hard with ward staff to encourage more consistent compliance. These measures have included involving nurse management and senior medical staff, particularly those administratively responsible for acute admission via our Medical Admissions Unit. The MCN will continue to monitor and support this process while still seeking to establish routine direct admission to the Stroke Unit.

Direct Stroke Unit admission 24/7, though a long-held aspiration remains a problem to deliver. Medical bed occupancy rates in D&G Royal Infirmary are extremely high so despite agreement to keep one Stroke Unit bed available for direct admission, this often ends up being used of necessity for non-stroke patients. The reduction in junior doctors’ hours, combined with the national shortage of adequately trained and experienced middle grade doctors, has left us no choice but to concentrate out-of-hours medical cover on the Medical Admissions Unit. As this situation appears unlikely to change for the better, direct Stroke Unit admission out-of-hours...
may only be feasible if nurse-led. This will require expansion of our Advanced Nurse Practitioner role, both numerically and in terms of training.

**Thrombolysis**

Establishing a thrombolysis service has been a major priority of the MCN. In view of the time constraints for giving thrombolysis and the geography of the region, we have had to establish a stroke service at the Galloway Community Hospital in Stranraer in order to offer equity of access to such intervention. The telemedicine links to the stroke service in Dumfries are now in place and a limited service is currently available within normal working hours. Expanding this to a 24/7 service will require the involvement of all our non-stroke physicians assisted by stroke physician support from Lothian when not available locally.

Following the publication of SIGN 108\(^1\), the MCN has reviewed current practice and has presented key recommendations to the SIGN management group for maintaining and improving stroke services.

In addition to stroke thrombolysis, these include:

- Extending out-of-hours availability of CT at both hospital sites.
- Consistent provision of carotid ultrasound in Stranraer.
- Exemption of the stroke clinic service from the ban on public holiday working.
- Expansion of the stroke clinic service from four to five days per week.
- Classification of carotid endarterectomy as an urgent rather than a routine surgical procedure.

It is recognised that achieving these aspirations requires the appointment of a second Consultant with an interest in stroke, but thus far the national shortage of suitably qualified applicants has prevented our current vacant post being filled.

**NHS FIFE**

Audit data were not collected for the period 2008 due to staffing difficulties. However we have actively taken steps to resolve this position to ensure that the 2008 audit data needed to assess NHS Fife’s position in relation to the NHS QIS Clinical Standards for Stroke Services: Care of the Patient in the Acute Setting (March 2004) is available.

NHS Fife shares the view that the quality of stroke care is of high clinical priority.

An action plan was developed which included strategies to complete collection and input of 2008 data as well as completing 2009 data. This involved reviewing the audit facilitator’s role and increasing the amount of time the stroke specialist nurse and stroke co-ordinator spent on the audit.

Like many areas we feel if we could have timely access to Stroke Units for patients our performance in all standards would improve. Direct access to the Stroke Units has been suggested previously and the decision for this at present lies out with the MCN.

Regarding performance against standards a number of initiatives were undertaken including:

**Admit to Stroke Unit within one day of admission (Day 0 or 1)**

- Using a proactive approach in identifying stroke patients by routinely going to medical admissions unit, and trialling the use of a proforma which includes the standards.
Swallow assessment on day of admission
- Development of a dysphagia subgroup.
- Taking training into the Emergency Departments and acute medical admissions units at times to suit staff.
- Water Swallow Screen Test (WSST) also became part of the practice development unit routine nurse training.
- Now looking at WSST becoming part of the induction programme for nurses and also piloting training of Band 3 health care assistants.
- Documentation of WSST is also an issue in several ways and this is part of the training.

Brain scan on day of admission
- We were meeting the standard for this; however the new standard will remain a challenge and require promotion of scanning on day of admission.

Aspirin on day of admission or day following (Day 0 or 1)
- Linked to CT scanning results, so improvement in scanning should aid improvement on this.
- Aspirin is now prescribed more routinely with a loading dose.
However we need to look at other strategies to improve this even more.

Neurovascular Clinic appointment within 7 days of referral
- We have a TIA hotline running and are promoting its use.
- There are two additional clinics which have brain scan and carotid doppler slots attached. This now means one stop TIA clinics running 4 times a week.
- There was also development of a secretary’s role to become an identified person to streamline referral and appointments over the two acute sites.

The audit data being collected will continue to provide an informed basis for the development of our Action Plan to address areas where the standards are not being met, as well as considering how we best meet the challenges set by the improved standards for stroke care.

NHS FORTH VALLEY (FV)
There was a 9% increase in patients admitted with stroke in 2007-8, continuing an upward trend. Despite this there was a reduction in mean length of stay from 32.7 to 28.5 days the preceding year reflecting efforts made to improve flow through the system.

Admit to Stroke Unit within one day of admission (Day 0 or 1)
There was no year-on-year improvement in Forth Valley performance, although this was against a background of increasing admissions of patients with stroke. This is likely to remain a challenge as there are significant pressures impacting the acute general receiving system.
- We have introduced a daily multidisciplinary meeting attended by senior staff to identify patients ready to progress or discharge and to create capacity to accept new admissions into the acute Stroke Unit.
- Stroke specialist nurses (SSN) proactively identify stroke patients admitted acutely and liaise with bed managers for early transfer to the Acute Stroke Unit.
- We are piloting an Early Supported Discharge scheme.
Swallow assessment on day of admission
We plan to:

- Highlight this issue in acute areas outside ASU and support education through SSN and speech and language therapists.
- Encourage key local stakeholders to support staff to attend training.
- Maximise admission to ASU within 24 hours

Brain scan on day of admission
We plan to:

- Work with radiology to facilitate CT scanning at admission.

Aspirin on day of admission or day following (Day 0 or 1)
We plan to:

- As above, work with radiology to facilitate CT scanning at admission.
- Involve pharmacy to highlight prescription.
- Explore non-medical prescribing.

Neurovascular Clinic appointment within 7 days of referral
We have made significant changes:

- Direct telephone referral/advice system for GP’s and acute services.
- Daily clinic Monday to Friday.
- SSN facilitated initial assessment and investigation.
- Expedited access to investigation.

These measures should allow compliance with the new standard.

Thrombolysis:
In acute ischaemic stroke will be administered in at least 5 per 100,000 population
We continue to acquire and develop local experience of thrombolysis. Both stroke and other acute staff have attended training courses. We are not yet in a position to deliver a 24/7 service. We plan to:

- Encourage and support interested acute medical staff to train in stroke thrombolysis.
- Develop a system of telemedicine support with NHS Lothian and others.
- Agree local protocols with Scottish Ambulance Service.
- Support and promote local stroke awareness campaigns to encourage early presentation.

Carotid Intervention:
80% of patients undergoing carotid endarterectomy have operation within 14 days of the stroke event
We plan to:

- Promote early presentation (as above).
- Clarify pathways and agree local protocols with Forth Valley vascular surgeons.
**NHS GRAMPIAN**

Whilst we are pleased with the success to date noted here, namely around timely admission to Acute Stroke Unit and access to neuro-imaging, we are aware of the work that is still required, particularly in light of the new standards which represent an improvement in patient care and some challenges to the existing systems.

Focused work has been ongoing in the Moray area to address the need for specialist stroke care, there is indication of success which we would hope to report next year.

The actions noted in this plan form part of the Annual Plan for the Stroke MCN:

**Admit to Stroke Unit within one day of admission (Day 0 or 1)**

**Aberdeen Royal Infirmary**
- January 2009 - 6 new specialist rehab beds opened in North Aberdeenshire to support stroke flow.
- October 2009 - Early Supported Discharge service initiated for Aberdeen City to support stroke flow.
- Stroke Flow group established to implement gold standard pathway, monitor referrals and streamline flow for reduced bed numbers as a result of Infection Control preventative measures.

**Dr Gray’s Hospital**
- October 2009 - specialised acute stroke beds established following focused redesign workshop.
- MCN sub-group focussing on Moray issues meets regularly.
- As above - Stroke Flow group established.
- Insufficient volume of data to measure compliance at this early stage, sub-group seeking to ensure sufficient audit resource for 2009/10/11.

**Swallow assessment on day of admission**

**Aberdeen Royal Infirmary and Dr Gray’s Hospital**
- Embedding of protocol for trained nurses on all wards to perform and document swallow screen.
- Highlight importance of recording as well as performing test as it is believed compliance is higher than as recorded.
- Highlighted in training programmes, as delivered on all wards.
- Increased staffing levels of Mobile Stroke Team ensuring specialist care for all stroke patients.
- MCN secured partnership funding for full-time Training Coordinator who will reinforce training messages.

**Brain scan on day of admission**

**Aberdeen Royal Infirmary**
- In discussion with neuroradiology to agree how access could be improved.
- Consideration given to increasing numbers of slots for accessing Aberdeen University imaging.
- Newly established flow group to consider pathway and value stream.
Dr Gray’s Hospital
- Newly established flow group, as above.

Aspirin on day of admission or day following (Day 0 or 1)
Aberdeen Royal Infirmary and Dr Gray’s Hospital
Protocols are available on the Acute Medical Admissions Unit and Stroke Unit. Continually requires reinforcement due to rotation of junior medical staff. When time to scan improves, earlier aspirin prescribing will follow.

Neurovascular Clinic appointment within 7 days of referral
Aberdeen Royal Infirmary
- Name of clinic changed to TIA clinic to promote clarity for referrers.
- Most referrals are now made by telephone via 24/7 consultant-on-call service, or electronically with daily vetting. ABCD2 incorporated into electronic referral documents.

Dr Gray’s Hospital
- Dedicated emergency medical clinic slots with patients seen next day.
- Local data collection only recently implemented, insufficient volume of data to measure compliance at this early stage.

NHS GREATER GLASGOW & CLYDE (GG&C)
NHS GG&C Stroke MCN and the operational stroke services have agreed work plans to progress towards meeting the national stroke standards across all our stroke services.

Admit to Stroke Unit within one day of admission (Day 0 or 1)
- Achieved in West and South Glasgow.
- North East hospitals will merge in 2011 and at that time the stroke service will be redesigned to provide an admission pathway from the Emergency Departments directly into the Glasgow Royal Infirmary (GRI) Stroke Unit.
- Work is ongoing in Clyde - Inverclyde Royal Hospital (IRH) stroke beds move into the main hospital in 2010 and a review of the Royal Alexandra Hospital (RAH) and Vale of Leven (VoL) services forms part of the major work on the VoL acute inpatient service re-provision.

Quicker admission to Stroke Units is a key goal.

Brain scan on day of admission
- Glasgow hospitals currently scan 90-100% of stroke admissions within 24 hours of admission.
- The RAH did not meet the national target in the period of the 2009 audit but local work to address this is ongoing.

Swallow assessment on day of admission
- There were local data problems in the last annual audit period: this has been resolved.
- Work is ongoing across NHS GG&C, led at a senior nursing level, to improve awareness and ensure the water swallow test is undertaken and clearly recorded on day of hospital admission.
Aspirin on day of admission or day following (Day 0 or 1)
In the old audit system this issue was clouded by the entry of some patients into research studies instead of routine use of aspirin.

- Focussed work with clinical pharmacy has improved performance in the RAH.

The aspirin target is challenging but performance is currently at 85-95% and further improvement is expected.

Neurovascular Clinic appointment within 7 days of referral
- An action plan for stroke clinic access in the Glasgow hospitals has included clinic profiling, standardisation of vetting of referrals, use of SCI for referral transmission and monthly detailed reviews of referral processing. Steady improvement in performance has been achieved.
- Similar work will be undertaken in Clyde.

Thrombolysis:
In acute ischaemic stroke will be administered in at least 5 per 100,000 population
National targets consistently exceeded.

Carotid Intervention:
80% of patients undergoing carotid endarterectomy have operation within 14 days of the stroke event
- South Glasgow and GRI now meet national standards.
- West Glasgow and Stobhill have improved but need more work on referral pathways.
- A local re-audit will be complete by June 2010 clarifying reasons for delays within referral pathways from Clyde to Glasgow vascular surgery services.

The audit does not cover all national standards. NHS GG&C has invested substantially in many other aspects of stroke care:
- Comprehensive rehabilitation service provided for inpatients and for follow-up including a specific stroke supported discharge service.
- The MCN has a very active Patient Focus Public Involvement (PFPI) group who are involved in all aspects of the MCNs work.
- There is a full-time education co-ordinator for stroke service staff and educational events are provided by stroke clinicians for primary care staff.
- The Stroke Local Enhanced Service follows up Glasgow patients annually after a stroke or TIA and we are currently analysing data from that to inform future service developments.

NHS HIGHLAND
NHS Highland has been targeting the following areas of stroke care: Admission to a Stroke Unit within one day, swallow screening and access to brain scanning.
Admit to Stroke Unit within one day of admission (Day 0 or 1)

Staff members in the Stroke Units are actively looking at improving rates of admission to units within one day, and are exploring ways to raise awareness of the work that they do. Examples include:

**Raigmore**
The patient pathway dictates that all admissions come through the Emergency Medical Ward. Stroke Unit staff are visiting the Emergency Medical Ward every day to discuss admissions and pick up patients suitable for the Stroke Unit. This has resulted in an increase in admissions to the unit.

**Lorn & Islands**
Regular meetings and discussions with colleagues in the local authority is helping to improve discharge rates from the Stroke Unit, in turn supporting earlier admission rates. Where admission to the unit has been a problem, staff from the unit have had input into patient care.

**Training & Education**
Through meetings and seminars with colleagues in Primary Care which highlight and promote NHS Highland pathways and protocols for patients with stroke and suspected stroke.

**Partnerships**
In conjunction with the Long Term Conditions and Unscheduled Care Programmes we are working with the Scottish Ambulance Service, Primary Care and Community Hospital colleagues to provide information on the most appropriate place of treatment for patients.

Challenges remain however and we will continue to work hard with ward staff, bed managers, local authorities etc. to improve our admission and transfer rates.

**Brain scan on day of admission**

**Caithness General Hospital**
- The CT scanner in Caithness General became operational in September 2008 and early indications show that its impact has been significant. It is anticipated that this will become even more apparent in the 2009/10 audit results.

**Swallow assessment on day of admission**

**Training**
additional training and education sessions are being organised for staff around this standard. This locally developed training is being further promoted by STARs, the online learning tool for those interested in Stroke Care.

**Audit Form**
At Raigmore the Stroke Team, in August 2009 developed a new audit form which records where a swallow screen has been done. The result is that all patients admitted to the Stroke Unit at Raigmore are screened.

Similar initiatives are taking place in our Stroke and Rehabilitation Units across NHS Highland and we are actively looking at ways to improve our swallow screen rates across wards.

**Further Information:**
This year the Highland Stroke MCN has reviewed and revised a number of our pathways and protocols:
• Development of new Neurovascular Clinic Services at both Raigmore and Caithness General.
• Development of Thrombolysis Services at Caithness General and Belford Hospital. This is being done against a backdrop of issues around single handed medical staff, AHP shortages etc.

Promotion of updated pathways/protocols and new services is underway. This is being done in a number of ways including via visits to General Practice, Protected Learning Times (PLT) and our Stroke MCN Steering Group Newsletter.

NHS LANARKSHIRE
NHS Lanarkshire Stroke MCN has had a clear focus on developing our practice in line with the NHS QIS Standards. We have a focused clinical effectiveness agenda which has the national standards firmly as its core agenda. NHS Lanarkshire has a method of prospective data collection (Stroke Audit In Lanarkshire - SAIL) which informs all of our staff groups and thus drives service improvement in a timely manner. The new standards will give us some challenges for the year ahead particularly around scanning on day of admission and carotid intervention; two areas which we have already highlighted to our management team as areas which will require specific development. The direct admission of patients from the Emergency Department will challenge us to explore new pathways and change how we deliver our services.

Admit to Stroke Unit within one day of admission (Day 0 or 1)
• Patient journey from front door to Stroke Units is a priority. Working on communication with the Emergency Department and receiving units to ensure direct admission of all stroke patients is a priority.
• Stroke Team presence in the Emergency Department and receiving units on twice daily basis to facilitate the pull through of patients is proving a useful tool.
• We are also working on the three sites with the Emergency Departments and receiving unit staff to embed the national standards into their practice.
• An education programme including stroke awareness, FAST Screening and the use of ROSIER scale currently underway in the three sites.

Swallow assessment on day of admission
• Stroke Team provided in-reach service on twice daily basis to receiving units to ensure patients not yet in the Stroke Unit are able to have swallow screening carried out within timeframe.
• Developed an information poster with CHSS to prompt swallow screening.
• Sharing of audit data, in relation to this standard, with Emergency Department and receiving unit managers to raise awareness.

Brain scan on day of admission
• Work with radiology and management to achieve brain scan on day of admission.
• Sharing of audit data, in relation to this standard, with the radiology team.

Aspirin on day of admission or day following (Day 0 or 1)
• Ensure information relating to standard included in staff induction.
• Work with radiology suggesting call to Stroke Unit staff once brain scan result available.
Neurovascular Clinic appointment within 7 days of referral
- Provide necessary support to clinic systems creating capacity for TIA patients.
- Streamline referral processes.

Thrombolysis:
In acute ischaemic stroke will be administered in at least 5 per 100,000 population
- Pilot on the Wishaw Hospital site has proved successful over the past 12 months.
- Plan to move to the next stage which will offer thrombolysis in two of our three hospitals 9am-10pm 7 days/week.
- During the Wishaw Hospital pilot NHS Lanarkshire has exceeded the national standard for patients treated within that catchment area.

Carotid Intervention:
80% of patients undergoing carotid endarterectomy have operation within 14 days of the stroke event
- Develop timely access to carotid endarterectomy and meet national standards.
- Develop stronger links with radiology and vascular surgery to remove barriers to timely carotid intervention.
- Development of a carotid co-ordinator role provided that funding streams can be identified.

NHS LOTHIAN
It has become clear that NHS Lothian, working with its stroke MCN, will only achieve compliance with all of the new standards by a major redesign of our inpatient, outpatient and community based stroke services. NHS Lothian, at the highest level is now committed to this redesign.

Amongst the recommendations which have arisen from a comprehensive review of our stroke services, which have been approved by our senior management team and will be implemented over the next few years are:

- The creation of integrated Stroke Units on each of our three acute sites. Currently, we have acute Stroke Units on two of our acute sites which feed into three off-site rehabilitation units. For the majority of patients we aim to provide their hyperacute, acute and rehabilitation within a single unit. This should reduce inefficiencies resulting from transfers of patients between units and teams and improve the experience of both patients and carers. Each unit will comprise core Stroke Unit beds with adjacent rehabilitation beds forming a buffer zone where patients can also receive Stroke Unit care when there are peaks in demand.
- The formation of a Stroke Pathway Management Team to oversee and support the operational aspects of stroke services throughout the patient pathway – currently our stroke services do not fall within any one management structure.
- Improved community support to stroke patients and earlier discharge aiming to reduce hospital lengths of stay and thus to improve acute patients’ access to Stroke Unit care.
- Additional consultant stroke physician and radiology capacity to support earlier access to specialist inpatient care including imaging and thrombolysis and enable earlier access to neurovascular clinics across the whole of Lothian.
Introduction of an electronic patient record to ensure that patients are thoroughly assessed, even by non-specialist staff and that important aspects of care (e.g. scanning, aspirin, swallow assessments) are carried out at an appropriate time and in accordance with NHS QIS standards.

Training of both Stroke Unit and front door staff via the STARS on line training modules, thrombolysis masterclasses and through directed CPD.

Roll out of telemedicine links between the acute hospitals and consultants homes. These allow patients to access a specialist reviewing their history, examination and results of imaging even when no specialist is available in the hospital. This facilitates earlier decisions concerning the appropriateness of thrombolysis or other aspects of acute care.

NHS ORKNEY

Over the past year, there has been a series of major changes in the clinical services provided at the Balfour Hospital. Acute services, which were split between two hospital wards, have been rationalised, with one of the wards becoming a receiving and triage area, while the inpatient rehabilitation service has been incorporated within a unit previously providing continuing care, with the closure of a small rehabilitation ward. To offset this, an Intermediate Care Team has been set up, in collaboration with the local authority, to provide early supported discharge for stroke patients and others needing ongoing rehabilitation. This includes Nursing, Physiotherapy, Occupational Therapy and a Stroke Outreach worker as well as rehabilitation support workers. The main constraint is geographical and patients from the smaller Isles will continue to need more protracted stays in hospital, due to the logistics of providing outpatient rehabilitation to those not resident on the Orkney Mainland.

Orkney does not, as yet, have a specialist Stroke Unit. However, it does provide stroke care with the support and assistance of the specialist Stroke Unit in Aberdeen Royal Infirmary. This is exemplified by the Tele-TIA service, which provides access to a consultation with a stroke consultant within 24 hours for anyone who presents with symptoms suggestive of a TIA or minor stroke, allowing early diagnosis, intervention with prophylactic medication and a co-ordinated sequence of pre-planned investigations, such as brain scan and carotid doppler, which are not available in Orkney.

A business case is being presented to NHS Orkney Board which would free up 4 beds in a bay adjacent to the new Assessment and Rehabilitation ward and would allow us the opportunity to provide dedicated acute stroke beds. We welcome the recent discussion at the National Advisory Committee on Stroke MCN subgroup, on the definition of a Stroke Unit, which will help inform the planning of such a facility, while continued close collaboration with the stroke team in Aberdeen, will permit us to remotely utilise their specialist skills, mitigating to some extent the lack of local imaging facilities.

The time devoted by front-line clinical staff to the re-organisation mentioned above has led to routine data collection not being accorded adequate priority and the statistics relating to swallow screen and administration of aspirin reflect this. We are confident that performance against both these targets is higher than has been recorded and that changes in the management structure in the acute area provides an opportunity, along with training opportunities and changes to the documentation, which will allow us to more accurately record what we know to be happening on the ground.

There are ongoing plans to integrate our MCN structures into one Long Term Conditions MCN. This LTCS MCN will continue to deliver, amongst others, the stroke MCN development plans, guided by national and local priorities. Crucially for a small health board, with limited numbers of
personnel, few of whom have highly specialist knowledge or training, this will reduce duplication
of effort across the MCNs and maximise the resources available increasing the capacity to
deliver change in the clinical areas.

**NHS SHETLAND**

**Admit to Stroke Unit within one day of admission (Day 0 or 1)**

The data are not recorded as the centre will not recognise a multi-disciplinary general Medical
Ward environment as an element. Within the current bed-holding it would be impossible to
designate individual beds or therapy time to meet these criteria.

**Swallow assessment on day of admission**

The number of recorded swallowing assessments has increased from 33% to 53% in Shetland
which is comparable with the national average of 46%. I believe documentation of people
with either no swallowing problems or who are moribund probably accounts for the majority of
these omissions. Nurses are to have undergone swallowing training with refreshers and we are
working on a proforma with “tick box” approach to try and improve recording for audit purposes
in the future.

**Brain scan on day of admission**

There has been a significant increase in the number of people that are scanned within 48
hours (50% from 37%), this compares with the national average of 89%. A limited availability of
scanning time means that it would be impractical to assume the 80% target without significant
results and implications.

**Aspirin on day of admission or day following (Day 0 or 1)**

The recorded figures again show an increase from 36%-74% against the national average
of 76%. It is my understanding that the use of other antiplatelet agents extant obvious
complications that are not specifically documented in the context of aspirin prescription or use
of oral anticoagulants such as Warfarin would account for the majority of “omissions”. In some
circumstances the delay for a scan may delay prescription which compares reasonably against
the national average of 76%.

**Neurovascular Clinic appointment within 7 days of referral**

An urgent slot is kept open for referral of TIA or Stroke. This has been circulated to GPs and
they make use of it. Very occasionally a slot is not available in the week of referral but patients
have never been known to wait more than 14 days for assessment.

Carotid scanning is not available on the day of the Medical Clinic.

**NHS TAYSIDE**

The audit shows varying levels of success, particularly in brain scanning and the neurovascular
clinic in Angus which continue to exceed the standards.

In the areas where performance, compared to National Standards, is less than satisfactory we
accept that without reservation improvements must be achieved. The services have worked with
the Stroke MCN to address the issues identified and have outlined plans for improvement.
Admit to Stroke Unit within one day of admission (Day 0 or 1)

- Perth Royal Infirmary (PRI) - a dedicated 26 bedded Integrated Stroke Unit (acute and rehabilitation) opened in December 2009.
- Following a Stroke Rapid Improvement Event, 90% of all patients to be admitted to the Stroke Unit on the day of or day following presentation at hospital.
- Patients will remain in specialist stroke care until hospital stroke related needs are met.

Sustainability of this service is dependent on medical cover.

Swallow assessment on day of admission

- Improvements to ensure that all patients receive swallow screen on day of admission are underway. Progress recently indicates that NHS Tayside is close to achieving 70%.
- Ongoing internal measurement of swallowing assessment will continue.

Aspirin on day of admission or day following (Day 0 or 1)

- Aspirin administration will be audited prospectively to ensure this standard will be met.
- Working practices have been revised.

Neurovascular Clinic appointment within 7 days of referral

- Developments are underway to achieve this target.
- PRI - for a trial period, a facility to see patients on Monday, Tuesday, Thursday and Friday will be introduced. The sustainability of this model will be assessed after 3 months.
- January 2010 - a service with an identified Medical Consultant carrying a dedicated stroke bleep will enable professionals to gain urgent advice on management of patients with TIA/stroke.
- Ninewells - developments are underway for establishing Neurovascular Clinics which will include the ability for immediate response.

Thrombolysis:

In acute ischaemic stroke will be administered in at least 5 per 100,000 population

A draft protocol has been developed and an action plan for delivery of thrombolysis within 1 hour, Monday - Friday, 9am - 5pm has been agreed with senior clinical input for assessment and management of hyperacute stroke and thrombolysis. This will be closely monitored with the aim to deliver thrombolysis to all eligible patients, 24/7, introduced over the next year.

To ensure data are collected in a more focused, efficient and effective manner we have revised the role of the Audit Facilitator. The biggest challenge for NHS Tayside was the accuracy of data collection. Following this appointment it is envisaged that accurate data will inform the MCN of priorities for improvement. The Audit Facilitator will also work more closely with clinical teams raising issues, e.g. poor documentation and ensuring that all data collected accurately reflects the quality of care delivered.

Agreement has been achieved that audit activity is channelled through the established electronic information system stroke (eSIST) in Ninewells Hospital with the proviso that if successful this will be introduced in Perth Royal Infirmary.
NHS WESTERN ISLES

In NHS Western Isles (WI) our revised Stroke Integrated Care Pathway became a live document in March 2010. Following a period of awareness raising, the document will be piloted for three months and its usage and impact audited. It is expected that this will lead to improved outcomes for all NHS QIS stroke targets.

Admit to Stroke Unit within one day of admission (Day 0 or 1)

The expectation is that the document will ensure that as many patients as possible are admitted to the Stroke Unit (dedicated beds with stroke ward), rather than to Medical wards. It will also ensure that swallow screening and other interventions are documented and carried out in the required timescale.

Swallow assessment on day of admission

Although good progress has been made over recent years for swallow screening from 46% in 2007 to 81% in 2008, NHS WI will continue to strive to improve on this. It should also be recognised that at 81% compliance for swallow assessment in 2008, NHS WI had the highest % rate in Scotland.

The MCN is also shortly to commence a real-time audit of suspected stroke patients. The audit will track the first 24 hours for each suspected stroke patient from presentation through to diagnosis. The rationale of the audit is to determine which factors influence admittance to the Stroke Unit and the impact this has on interventions such as CT imaging and commencement of aspirin treatment. Once these factors have been determined, plans will be implemented in order to overcome these issues.

A stroke thrombolysis service was established in WI in August 2009 utilising telemedicine and a Service Level Agreement with Aberdeen Royal Infirmary. This service has allowed the rapid assessment of patients presenting with symptoms suggestive of stroke and the telemedicine link has proved reliable and educational for all local staff.
Appendix B: Core dataset items

Listed below is the core dataset relevant for collection of inpatient data throughout 2009. To find detail of the data definitions used for each of these items please refer to the SSCA website: www.strokeaudit.scot.nhs.uk

**Inpatients**

<table>
<thead>
<tr>
<th>Field Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient identifier (CHI)</td>
</tr>
<tr>
<td>Case reference</td>
</tr>
<tr>
<td>Surname</td>
</tr>
<tr>
<td>Forename</td>
</tr>
<tr>
<td>Sex</td>
</tr>
<tr>
<td>Date of birth</td>
</tr>
<tr>
<td>Date and Time of Initial assessment</td>
</tr>
<tr>
<td>Responsible clinician</td>
</tr>
<tr>
<td>Unit where seen</td>
</tr>
<tr>
<td>Seen as</td>
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<tr>
<td>Date and Time of Admission</td>
</tr>
<tr>
<td>Admitted from</td>
</tr>
<tr>
<td>Discharge date</td>
</tr>
<tr>
<td>Discharged to</td>
</tr>
<tr>
<td>Postcode sector</td>
</tr>
<tr>
<td>Stroke</td>
</tr>
<tr>
<td>Transient ischaemic attack</td>
</tr>
<tr>
<td>Sub-arachnoid haemorrhage</td>
</tr>
<tr>
<td>Retinal artery occlusion</td>
</tr>
<tr>
<td>Transient monocular blindness</td>
</tr>
<tr>
<td>Possible cerebrovascular</td>
</tr>
<tr>
<td>Possible cerebrovascular Details</td>
</tr>
<tr>
<td>Definite non-cerebrovascular</td>
</tr>
<tr>
<td>Definite non-cerebrovascular: Details</td>
</tr>
<tr>
<td>Date of Onset</td>
</tr>
<tr>
<td>Was the patient independent in Activities of Daily Living before event?</td>
</tr>
<tr>
<td>Was the patient living alone at the time of event?</td>
</tr>
<tr>
<td>Can the patient talk?</td>
</tr>
<tr>
<td>Are they orientated in time, place and person?</td>
</tr>
<tr>
<td>Can the patient lift both arms off the bed?</td>
</tr>
<tr>
<td>Able to walk without help from another person</td>
</tr>
<tr>
<td>Current Atrial Fibrillation confirmed on ECG</td>
</tr>
<tr>
<td>Aspirin at onset</td>
</tr>
<tr>
<td>On Warfarin at onset</td>
</tr>
<tr>
<td>Was the patient managed in an acute Stroke Unit?</td>
</tr>
<tr>
<td>Entry to acute Stroke Unit</td>
</tr>
<tr>
<td>Field Name</td>
</tr>
<tr>
<td>------------</td>
</tr>
<tr>
<td>Exit from acute Stroke Unit</td>
</tr>
<tr>
<td>Unit</td>
</tr>
<tr>
<td>Consultant</td>
</tr>
<tr>
<td>Was the patient managed in a rehabilitation Stroke Unit?</td>
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<tr>
<td>Exit from rehabilitation Stroke Unit</td>
</tr>
<tr>
<td>Unit</td>
</tr>
<tr>
<td>Consultant</td>
</tr>
<tr>
<td>Was the patient managed in a rehabilitation unit?</td>
</tr>
<tr>
<td>Entry date</td>
</tr>
<tr>
<td>Exit date</td>
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<tr>
<td>Unit</td>
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<tr>
<td>Consultant</td>
</tr>
<tr>
<td>Whether aspirin given in hospital</td>
</tr>
<tr>
<td>Date aspirin started</td>
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<tr>
<td>Final Discharge from hospital on aspirin</td>
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<tr>
<td>Final Discharge on Clopidogrel (Plavix)</td>
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<tr>
<td>Final Discharge on Dipyridamole (Persantin)</td>
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<tr>
<td>Final Discharge on Warfarin</td>
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<tr>
<td>Final Discharge on an ACE inhibitor</td>
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<tr>
<td>Final Discharge on a Diuretic</td>
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<tr>
<td>Final Discharge on another anti-hypertensive</td>
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<tr>
<td>Final Discharge on a Statin</td>
</tr>
<tr>
<td>CT</td>
</tr>
<tr>
<td>CT Date</td>
</tr>
<tr>
<td>MRI</td>
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<tr>
<td>MRI Date</td>
</tr>
<tr>
<td>Evidence of new haemorrhage on scan</td>
</tr>
<tr>
<td>Classification of Stroke Syndrome</td>
</tr>
<tr>
<td>ICD 10 final diagnosis</td>
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<tr>
<td>Swallow screen recorded</td>
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<tr>
<td>Swallow screen Date</td>
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</tbody>
</table>
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Under this programme project teams have been set up with a clinical lead in each health board allowing pathways to be agreed, equipment trialled, equipment procured, equipment installed, training provided, protocols developed, communications put in place and links to the evaluation team set up.

For further information please contact:
Anne Duthie, Telestroke Programme Manager
Email: anne.duthie@nhs.net

Appendix C: Telestroke Programme

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Email: anne.duthie@nhs.net
## Appendix D: 2009 Steering committee members

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>NHS Board/Organisation</th>
</tr>
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<tbody>
<tr>
<td>Malcolm Alexander</td>
<td>Associate Medical Director</td>
<td>NHS 24</td>
</tr>
<tr>
<td>Tracey Baird</td>
<td>Consultant Physician</td>
<td>NHS GG&amp;C</td>
</tr>
<tr>
<td>Mark Barber</td>
<td>Consultant Geriatrician, MCN Clinical Lead</td>
<td>NHS Lanarkshire</td>
</tr>
<tr>
<td>Karen Barclay</td>
<td>Speech and Language Therapist</td>
<td>NHS Ayrshire and Arran</td>
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<tr>
<td>Lee Barnsdale</td>
<td>Principal Analyst</td>
<td>NSS (ISD)</td>
</tr>
<tr>
<td>Diana Beard</td>
<td>Programme Principal</td>
<td>NSS (ISD)</td>
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<tr>
<td>Katrina Brennan</td>
<td>Stroke MCN Manager</td>
<td>NHS Lanarkshire</td>
</tr>
<tr>
<td>Martin Dennis, Chair</td>
<td>Professor of Stroke Medicine, Consultant Physician, Clinical Lead for SSCA and Stroke MCN Clinical Lead</td>
<td>NHS Lothian and University of Edinburgh</td>
</tr>
<tr>
<td>Hazel Dodds</td>
<td>National Clinical Co-ordinator</td>
<td>NSS (ISD)</td>
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<tr>
<td>Robin Flaig</td>
<td>Quality Assurance Manager</td>
<td>NSS (ISD) and University of Edinburgh</td>
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<tr>
<td>Sandi Haines</td>
<td>Stroke Specialist Nurse</td>
<td>NHS Borders</td>
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<tr>
<td>Therese Jackson</td>
<td>Consultant Occupational Therapist</td>
<td>NHS Grampian</td>
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<tr>
<td>Peter Langhorne</td>
<td>Professor of Stroke Care</td>
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<tr>
<td>Gemma Learmonth</td>
<td>Audit Co-ordinator</td>
<td>NHS GG&amp;C</td>
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<tr>
<td>Lorna Lowdon</td>
<td>Speech and Language Therapist</td>
<td>NHS Ayrshire and Arran</td>
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<tr>
<td>Mary-Joan Macleod</td>
<td>Senior Lecturer in Clinical Pharmacology and Consultant Physician</td>
<td>NHS Grampian and University of Aberdeen</td>
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<tr>
<td>Christine McAlpine</td>
<td>Consultant Physician and Stroke MCN Clinical Lead</td>
<td>NHS GG&amp;C</td>
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<tr>
<td>John McCall</td>
<td>Stroke Specialist Nurse</td>
<td>NHS Forth Valley</td>
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<tr>
<td>Mike McDowall</td>
<td>Audit Support/IT Development</td>
<td>NSS (ISD) and University of Edinburgh</td>
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<tr>
<td>Angela McLeod</td>
<td>Communications Manager and Patient Representative</td>
<td>The Stroke Association Scotland</td>
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<td>Keith Muir</td>
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<td>David Murphy</td>
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<td>John Reid</td>
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<td>Wesley Stuart</td>
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<tr>
<td>Matthew Walters</td>
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<td>NHS GG&amp;C and University of Glasgow</td>
</tr>
<tr>
<td>Peter Williamson</td>
<td>Director of Health Strategy</td>
<td>NHS Tayside</td>
</tr>
</tbody>
</table>
Acknowledgements

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- Patients with stroke who have contributed medical information to the audit.
- Audit, clinical, IT and Managed Clinical Network staff at all units participating in the audit who ran their local data collection, provided local reports and commented on drafts of this national report.
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Contacts

Any questions about SSCA should be referred to the Co-ordinating Centre. Please refer questions on this report to Robin Flaig and David Murphy. Please refer questions on the SSCA computer system to Mike McDowall. For general questions about the Audit please contact Hazel Dodds, National Clinical Coordinator for the SSCA.

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