Scottish Stroke Care Audit

2011 National Report

Stroke Services in Scottish Hospitals
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Map of Scotland showing all hospitals in NHS Boards contributing to the Scottish Stroke Care Audit
1. Introduction

“Stroke, along with heart disease has been a clinical priority for NHS Scotland for over 14 years. In my annual report for 2007, I included a list of clinical treatments and interventions that would reduce mortality, improve survival and enable recovery following a stroke, including treatment of Atrial Fibrillation. I am particularly pleased that, thanks to substantial investment in stroke services and the hard work of staff, NHSScotland has exceeded its target of achieving a 50% reduction in the rate of premature deaths from stroke, taking 1995 as the baseline, a year ahead of schedule.”

“The data for 2010 show sustained improvement in all the aspects of stroke care covered by the audit. While this is enormously encouraging, we recognise that further work is still needed. The new HEAT target, introduced in April this year, requires that by March 2013 90% of all patients admitted to hospital with a diagnosis of stroke are admitted to a stroke unit on the day of admission, or the day following presentation. Achieving that target will make a major contribution to reducing mortality, as well as improving people’s recovery in the community over the longer-term.”

“I welcome the addition of data on stroke thrombolysis and on pre-hospital care in general. Overall, the information contained in this Scottish Stroke Care Audit report will be a powerful tool for the stroke community, in particular the stroke Managed Clinical Network in each NHS Board, to deploy as part of the process of continuous improvement in the quality of all aspects of stroke services.”

Dr Harry Burns, Chief Medical Officer for Scotland April 2011

Stroke matters to the people of Scotland and the Scottish NHS. It is the third commonest cause of death in Scotland and the most common cause of severe physical disability amongst Scottish adults. About 13,000 people in Scotland have a stroke each year and more than 3,000 of them are under 65 years of age. Stroke patients occupy 7% of all NHS beds and their care costs 5% of the entire Scottish 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 for the benefits of organised specialist stroke care in improving outcomes is now clearly established, and reflected in the recently updated SIGN Guidelines 108¹, 118² and 119³ which focus on acute stroke care, secondary prevention and rehabilitation.

The Scottish Stroke Care Audit (SSCA) started collecting information about stroke care in 2002 and now includes all hospitals managing acute stroke in Scotland. Since its inception the SSCA has helped to drive the improvements in stroke care which have contributed to the lower mortality rates and improved outcomes for Scottish stroke patients.
The first report containing SSCA data was published in 2005. There have been significant improvements since then in the number of patients admitted to a Stroke Unit at any time during their admission, an increase from 71% to 82%.

There have also been significant improvements against current NHS Quality Improvement Scotland (QIS)* standards between 2005 and 2010:

- The percentage of stroke patients admitted to a Stroke Unit on day of admission has increased from 28% to 39%.
- The percentage of stroke patients admitted to a Stroke Unit by the day following admission increased from 49% to 63%.
- The percentage of stroke patients who had brain imaging on day of admission has increased from 27% to 52%.
- 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 73%.
- The percentage of patients who were seen within 7 days from referral at a specialist neurovascular clinic has increased from 30% to 82%.

*NB: Healthcare Improvement Scotland (HIS) took over responsibilities of NHS QIS on 1st April 2011.

In 2009 the Scottish Government published their Better Heart Disease and Stroke Care Action Plan. The Action Plan emphasises the key role of the SSCA in measuring performance against the NHS QIS stroke care standards and monitoring Health Boards’ progress against the Action Plan’s aims. Stroke services participating in the audit monitor their progress against the NHS QIS standards for stroke care and those they have set for themselves in their own Quality Assurance Frameworks.

In 2010 the SSCA started producing monthly reports for Stroke Managed Clinical Networks (MCNs) in NHS Boards and individual hospitals to ensure awareness of the stroke standards and local performance. This Annual National Report is published and sent to NHS Boards, NHS QIS (now HIS) and the Scottish Government Health Department as well as being made publicly available on the SSCA website (http://www.strokeaudit.scot.nhs.uk/reports.html).

The SSCA will continue to assist the development of stroke care as knowledge of best practice widens, and will help NHS Scotland provide the best care possible for people who have had a stroke.

Contributions to this report

This year’s report has been written by members of the SSCA Report Writing Sub-Group of the Steering Committee with contributions from other organisations (section 7) and the stroke MCNs (Appendix A). In section 6 we present a selection of case studies detailing methodology used to improve rapid access to specialist stroke care. In Appendix A MCNs have noted, in their own words, how they use the SSCA data locally and their plans to improve local performance against current standards for stroke care.

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; stroke survivors and their carers are encouraged to look at the audit information and comment on it. There is also lay and voluntary organisation representation 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 the Information Services Division of NHS National Services Scotland (ISD). 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 the SSCA website (http://www.strokeaudit.scot.nhs.uk/about/SteerGp.htm) for details of the Steering Committee.

The organisational structure of the SSCA is:

Professor Martin Dennis  Chairman of the Steering Committee
Hazel Dodds  National Clinical Co-ordinator
Robin Flaig  Quality Assurance Manager
David Murphy  Senior Information Analyst
Lee Barnsdale  Principal Analyst with IT responsibility

Funding for the central coordination of the SSCA for 2011/12 is £117k provided by NACS. Funding for the 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.

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

1.2 This report

This years report includes data for 2010 for Scotland overall and for each hospital. The data presented in this report, with the exception of the HEAT target charts are based on final diagnosis of stroke and not initial diagnosis as in the Monthly Reports.

An overview of initial and final diagnosis of stroke is included in the web tables. In summary, of the 10,322 patients admitted during 2010 with a diagnosis of stroke (excluding those admitted in NHS Lanarkshire), 81% (8,364) were admitted with an initial diagnosis of stroke and 73% (7,545) had a final diagnosis of stroke.

Throughout 2010 the SSCA team continued to review the analysis of the data collected and modified definitions when necessary, therefore calculations in this years report may not match exactly those presented in previous reports. Individual hospitals’ data are displayed in charts. Supplemental detailed charts and tables for this report are available on the SSCA website (http://www.strokeaudit.scot.nhs.uk/reports.html).
In addition to this main report a Public Summary of the National Report suitable for members of the public will be distributed to NHS Boards and other interested organisations. It will also be available on the SSCA website.

### 1.2.1 NHS QIS Standards 2009

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

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<tr>
<td>Thrombolysis</td>
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<tr>
<td>Carotid Intervention</td>
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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 specialist neurovascular clinics, delivery of thrombolysis and early carotid intervention.

### 1.2.2 Stroke Care HEAT Target, 2011

The SIGN guideline 108 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, 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.

None of the NHS Boards have met all of the NHS QIS clinical standards for stroke care, 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 has been developed.

**What are HEAT Targets?**

HEAT targets are a core set of ministerial objectives, targets and measures for NHS Scotland. The targets are set each year after consultation with stakeholders and cover a variety of areas. Progress is measured throughout the year and NHS Boards are held to account during annual review with the Scottish Government.
The key targets fall into four main areas:

**Health Improvement** – improving health and life expectancy;

**Efficiency and Governance Improvements** – continuously improving the effectiveness and efficiency of the NHS in Scotland;

**Access to services** – recognising patients’ need for quicker and easier use of NHS services; and

**Treatment appropriate to individuals** – ensuring patients receive high quality services that meet their needs.

The HEAT target relating specifically to Stroke Unit admission was introduced on 1st April 2011 in all Boards across NHS Scotland. The target reads:

“To improve stroke care, 90% of all patients admitted with a diagnosis of stroke will be admitted to a Stroke Unit on the day of admission, or the day following presentation by March 2013.”

There is to be an interim target of 80% achievement by March 2012.

For the purpose of this target a Stroke Unit is defined as a designated ward satisfying the following conditions:

- A defined bed area where stroke patients are preferentially admitted;
- Medical, nursing and allied health professionals in that area have undertaken specific training in stroke; and
- Patients are discussed at a multi-disciplinary meeting at least weekly.

The performance data for the HEAT Target is collected and reported via the SSCA. NHS Boards will be able to monitor their performance against the HEAT Target through monthly reports. NHS Boards and the Scottish Government will receive quarterly reports presenting performance against the HEAT target.

Note that the denominator for the HEAT target excludes: in-hospital strokes, patients discharged within 1 day and transfers in.
Chart 1: Percentage of stroke patients eligible for HEAT target and admitted to a Stroke Unit within 1 day of admission using HEAT target definition – indicative baseline performance, 2010 data

Horizontal lines reflect NHS QIS standard (2009) to admit 90% of stroke patients to a Stroke Unit within 1 day of admission (solid line) and HEAT interim target, for March 2012, for 80% of stroke patients to be admitted to a Stroke Unit within 1 day (dashed line at 80%)

* 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.

As noted above the evidence for the benefits of organised specialist stroke care in improving outcomes is now clearly established. The stroke care standards focus on those parameters which have the best evidence for having an effect on patient outcomes, i.e. admission to Stroke Unit, swallow screening etc.

Chart 2 presents a ‘bundle’ analysis for patients eligible for the HEAT target, displaying percentages of patients who also received swallow screen, brain imaging and aspirin within NHS QIS standards. This compares care received by patients admitted to the Stroke Unit within one day of presentation and those admitted after this or those never admitted to a Stroke Unit; and confirms patients admitted to a Stroke Unit within one day of presentation achieve more standards than those admitted after this or those never admitted to a Stroke Unit.
Chart 2: ‘Bundle’ analysis for patients eligible for HEAT target - percentages who also receive swallow screen, scan and aspirin within NHS QIS targets, 2010 data

* 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.
2 Future Plans

2.1 What have we achieved in 2010-2011?

During 2010-2011 the redesign of the SSCA has continued. The following progress has been made against the future plans described in last year’s report.

**Rationalising data collection:**
Completed a detailed review of all datasets in October 2010. Core datasets agreed were:

- Inpatients – all new stroke patients (or those admitted as a query stroke/ TIA).
- Outpatients – all new attendance at outpatients with a TIA.
- Thrombolysis – all patients who have undergone thrombolysis.
- Carotid Intervention – all patients who have undergone carotid intervention.

Completed a detailed review and redesign of definitions and data collection forms.

Changes will be implemented at the launch of eSSCA (new web based SSCA IT system) in summer 2011.

**Reducing the delays in reporting:**
From February 2010, Monthly Reports distributed to Stroke MCNs in each Board reflecting activity for the previous month and performance against standards. Clinicians and NHS managers use these reports to review processes of care and identify areas where improvement is required. These reports are being modified in the light of experience each month to maximise reliability and usefulness to the clinical teams. From May 2011 they will contain Stroke Care HEAT Target data described in Section 1.2.2.

**Creating a national database:**
SSCA data from 2005-2011 is held centrally and added to through monthly extracts.

Historical data (from 01.01.10 to launch date) will be included in eSSCA.

**Thrombolysis:**
From January 2010 all centres have been collecting thrombolysis data which is included in monthly reporting (see section 5).

**Pre-hospital care:**
It is important to ensure that when a call is made to either NHS24 or the Scottish Ambulance Service (SAS) from patients displaying symptoms of potential acute stroke that these patients are transferred rapidly to an appropriate acute facility. Work continues between the SSCA team, NHS24 and colleagues at the SAS to link data collected by both services and the receiving hospital to map the patient journey. This linkage requires the use of a unique identifier and the Community Health Index (CHI) number is the preferred choice.
Progress update:

- Initial difficulties were encountered matching NHS24 and SAS data due to lack of CHI. However, there is now >70% CHI transfer from NHS24 to the SAS on all ambulance requests.
- By linking CHI between NHS24 and SAS we can start to link individual patient journeys and examine the pre-hospital care of patients who have suffered a stroke. At present only FAST positive symptoms are chosen to be linked and tracked to diagnosis.
- Stroke is now a category A response (within 8 minutes) and FAST is incorporated in the new SAS IT system with thrombolysis highlighted with a timeline of <4 hours. The aim is to ensure that all patients who are potentially suitable for thrombolysis are transported to the nearest hospital capable of providing thrombolysis within 60mins of the first call to the SAS.
- Potential future analyses include:
  - Examining the difference between call handling time (NHS24) to transfer to SAS, SAS call pick up to retrieval and arrival at hospital and arrival at A&E – SAS versus arrival at hospital time recorded in the SSCA.
  - Link back from the SSCA data to where the patient was referred from, tracking back query stroke to actual stroke (initial and final diagnosis on the SSCA), and feedback on outcomes to SAS, in particular paramedics.
  - Tracking back to NHS24 – initial ‘stroke calls’ that end up with a final diagnosis of stroke, tracking back to NHS24 – those who were not transferred as ‘stroke’ but ended up with this as a final diagnosis (true negatives), tracking back to NHS24 – those who were transferred as ‘stroke’ but ended up without this as a final diagnosis (false positives).
- Identification of true negatives and false positives is potentially useful for refining protocol for stroke identification by call handlers.
- Work is continuing to develop a HEAT target at NHS24/ SAS around the timelines noted above.
- 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 core SSCA dataset and allow basic examination of referral pathways.

Thanks to Malcolm Alexander, Associate Medical Director, NHS24.

Carotid Intervention Pilot Project:
The SSCA will make use of routine data to monitor delays to surgery and clinical outcomes such as peri-operative stroke risk and deaths.

A pilot was completed on 30th September 2010. The two main centres involved were – NHS Grampian and Lothian.

The outcomes of the pilot were:

- Minimal data received and analysed, i.e. in Grampian there was an issue as the Vascular Surgeons were already collecting the data to feed into the National Vascular Society Database and did not see the value of collecting this information twice. Though data was collected routinely throughout 2010 for Carotid Intervention in Lothian due to issues in Grampian a thorough analysis of the data post pilot was not carried out.
- Due to the above issues it was agreed not to progress the validation process with the Vascular Surgeons during the pilot.
The project team met to discuss the outcomes of the pilot and the following was agreed:

- To modify the forms and definition documents to reflect feedback from pilot.
- Collect carotid intervention data from the launch of eSSCA.
- Include patients who have received a carotid intervention following referral from stroke services (this should equate to around 80% of referrals).
- Review of the processes and the number of patients that are missing from the audit, by linking the SSCA with SMR01 (Scottish Morbidity Record) data.
- Don’t progress with the validation aspect of the audit with the Vascular Surgeons at this stage.

Development of eSSCA:
The development of eSSCA commenced in 2010. eSSCA will be a web-based system, accessible through any NHS computer. eSSCA will facilitate the entry of all SSCA core data from all centres (including NHS Lanarkshire who previously entered information in their own system) and will allow centres to extract their own data, write queries and analyse raw data. The system tracks patients through hospital transfers between boards. It also allows for robust validation at point of data entry and central validation of patient data.

A working group, including representation from the SSCA Project Team, four of the Audit Coordinators and colleagues from the Systems Interface Group in ISD have progressed the development of eSSCA (we would like to thank Audit Coordinators Gemma Learmonth, Anne Tripney, Margrethe van Dijke and Justin Wilson for their time commitment, support and enthusiasm during the development of eSSCA).

We expect the new system to be ready in summer 2011. This development will provide the SSCA with a centralised National Database.

Redesign of Stroke Audit Website (www.strokeaudit.scot.nhs.uk):
The SSCA website has been redesigned and continues to be updated and developed. Two new areas added to the website are:

- Research page – guidelines and documentation for research and adhoc requests for use of the SSCA data. It will also in the future contain outcomes of any further research featuring the SSCA data.
- Quality Improvement page – links between the SSCA and the Quality Improvement agenda. It will host, e.g. Best Practice statements, evidence of good practice and use of improvement methodology in NHS Boards across Scotland.

Evaluation of Public Summary:
The first version of the SSCA Easy Access Public Summary was published in June 2010. An evaluation of the design and content of the Public Summary was completed in December 2010 with valuable input from patients/ carers, voluntary organisations and health professionals.

The second version was published in June 2011 providing clearer information for patients and carers who have communication difficulties.

The SSCA National Meeting:
The content and delivery of the SSCA Annual National Meeting was changed in 2010 to incorporate not only a review of the SSCA findings from 2009 but to present and discuss ‘Innovations in Stroke Care’. In addition to the plenary sessions there were exhibition stands at
break times. For the first time, members of the public, patients and carers were invited to attend the meeting.

The 2011 SSCA Annual National Meeting will be held on Tuesday 20th September 2011 at the Royal College of Physicians, Queen Street, Edinburgh. Further information can be found on the SSCA website (www.strokeaudit.scot.nhs.uk).

**Presentation of the SSCA data:**
The SSCA has been discussed and presented in various forums during the last year:

- Posters presented at the UK Stroke Forum and the Scottish Stroke Nurses Forum.
- Collaboration with colleagues in Australia resulted in inclusion of the SSCA data in a poster presentation at the World Stroke Conference in Seoul in October 2010.
- A poster showing trend analysis from 2005 to 2009 was presented at the European Stroke Conference in Hamburg in May 2011.
- Initial discussions have taken place with colleagues in Canada to look at the development of a rehabilitation dataset for inclusion in the SSCA.

**2.2 What’s next in 2011-2012?**

**Launch of Stroke Care HEAT Target:**
As noted in section 1.2.2 the Stroke Care HEAT Target was launched on 1st April 2011. The first quarterly report on HEAT Target progress against trajectories will be produced in July 2011 presenting data from the first quarter of year 2011-12.

**Development of IT system:**
eSSCA will be launched in summer 2011 and will be used to collect the SSCA data by all hospitals admitting acute stroke patients across Scotland.

**Pre-hospital care:**
Plan to progress development of Pre-Hospital Dataset and analysis of linked data described in section 2.1 above.

**Research Sub-Group – Use of the SSCA data:**
The Research Subgroup of the SSCA Steering Group (Dr MJ Macleod, Professor M Dennis, Professor P Langhorne and Dr M Barber) have obtained funding from Chest Heart and Stroke Scotland (CHSS) to facilitate linkage of the SSCA data with other datasets held within ISD. A research fellow is being appointed to assist initially with data linkage and validation, and then with potential linkage projects. These data will be available primarily for researchers based in Scotland who have contributed to the Audit, but open to other researchers also. Information about the SSCA Research subgroup and forms for requesting data are available on the SSCA website (www.strokeaudit.scot.nhs.uk).

**Ongoing redesign/ development of the SSCA:**
- Development of additional supporting documentation, e.g. Audit Protocol
- Case Note Validation
- Collaborative projects/ data linkage/ academic publications
3 Inpatients

3.1 Summary and key findings relating to inpatient data

The Scotland wide data indicate that over 8,000 patients were hospitalised with stroke in 2010, a small increase over previous years. The number of Stroke Unit beds has increased from 781 in 2009 to 799 in 2010. The mean length of hospital stay for the stroke patients included in the audit was 25 days which is 2 days lower than last year, so that despite treating more inpatients the number of hospital beds occupied by stroke patients has fallen. This is encouraging since it should mean that patients will have better access to Stroke Unit care.

Last years report showed a trend towards better performance against all NHS QIS standards from 2005 to 2009. The data from 2010 show that this trend continues for most standards.

Since 2005, the proportions of patients accessing Stroke Unit care at any time during their admission has risen year on year from 71% to 82%.

Chart 3: Length of stay for stroke patients - percentage of stay in Stroke Unit and percentage of patients admitted to a Stroke Unit during their stay, by NHS board of hospital, 2010 data

Square marker (□) on chart indicates percentage of stroke patients who spent part of their stay in a Stroke Unit.
The proportion of patients accessing Stroke Unit care on the day of admission, and the following day, has risen from 28% to 39% and 49% to 63% respectively. However, early access to Stroke Unit care is still well below the 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. The adoption of a HEAT target relating to early admission to Stroke Unit care (section 1.2.2) will hopefully be associated with substantial improvements in performance in all Scottish hospitals over the next couple of years. We expect earlier access to Stroke Unit care will be associated with improvements in other aspects of care (chart 2). Once patients are in a Stroke Unit environment where staff have been specifically trained to care for stroke patients they would be expected to receive the appropriate assessments and interventions.

Delays from admission to important aspects of stroke care, i.e. a brain scan and initiation of aspirin in those who have an ischaemic stroke have shortened significantly since 2005. The proportion having a brain scan on that day has increased from 27% to 52%. 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 by 10% over the last year and from 41% to 73% since 2005. The proportion having a swallow screen documented on the day of admission has risen from 47% to 61% since 2005 although we saw a disappointing slight (1%) fall in the last year.

The Better Heart Disease and Stroke Care Action Plan commits NHS Boards to work with their Stroke MCNs to ensure that all NHS QIS standards for stroke care 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 standards for stroke care and thereby improve the delivery of stroke care to their patients.
## 3.2 Stroke Unit Information

<table>
<thead>
<tr>
<th>Hospital Name</th>
<th>Admits acute stroke</th>
<th>Number of acute stroke discharged in 2010</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 beds 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>Ayr Hospital</td>
<td>Yes</td>
<td>303</td>
<td>15</td>
<td>0</td>
<td>0</td>
<td>20</td>
<td>12,775</td>
<td>25.9</td>
<td>7,840</td>
<td>Until Nov 2010 all off site beds were located at Biggart Hospital. From Nov 2010 rehab beds are onsite.</td>
</tr>
<tr>
<td>Crosshouse Hospital</td>
<td>Yes</td>
<td>348</td>
<td>21</td>
<td>0</td>
<td>0</td>
<td>20</td>
<td>14,965</td>
<td>27.7</td>
<td>9,641</td>
<td>All off site beds are located at Ayrshire Central Hospital.</td>
</tr>
<tr>
<td>Borders General Hospital</td>
<td>Yes</td>
<td>230</td>
<td>0</td>
<td>15</td>
<td>0</td>
<td>0</td>
<td>5,475</td>
<td>20.3</td>
<td>4,671</td>
<td>The Combined Stroke Unit consists of 6 male, 6 female and 3 side room beds</td>
</tr>
<tr>
<td>Dumfries &amp; Galloway Royal Infirmary</td>
<td>Yes</td>
<td>232</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3,650</td>
<td>25.3</td>
<td>5,875</td>
<td></td>
</tr>
<tr>
<td>Galloway Community Hospital</td>
<td>Yes</td>
<td>32</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>365</td>
<td>22.2</td>
<td>711</td>
<td></td>
</tr>
<tr>
<td>Queen Margaret Hospital</td>
<td>Yes</td>
<td>228</td>
<td>8</td>
<td>0</td>
<td>15</td>
<td>0</td>
<td>8,395</td>
<td>33.9</td>
<td>7,731</td>
<td>All off site beds are located at Cameron Hospital. It also has 6 beds for stroke patients aged under 65.</td>
</tr>
<tr>
<td>Victoria Hospital Kirkcaldy</td>
<td>Yes</td>
<td>300</td>
<td>0</td>
<td>23</td>
<td>0</td>
<td>0</td>
<td>12</td>
<td>29.8</td>
<td>8,954</td>
<td></td>
</tr>
<tr>
<td>Stirling Royal Infirmary*</td>
<td>Yes</td>
<td>575</td>
<td>15</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>16,425</td>
<td>24.2</td>
<td>13,927</td>
<td>The Stroke Unit at the new Forth Valley Royal Hospital will open in July 2011.</td>
</tr>
<tr>
<td>Falkirk and District Royal Infirmary*</td>
<td>No</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>30</td>
<td>0</td>
<td>16</td>
<td>24.7</td>
<td>13,877</td>
<td>ARI off site beds include 34 beds at Woodend (this is an average figure as was variable through 2010 due to staffing issues) and 6 beds at Fraserburgh.</td>
</tr>
</tbody>
</table>

Table 1 was revised (R) in August 2011 to correct two inaccuracies relating to Crosshouse Hospital. There are 21 ASU beds in Crosshouse (not 15 as previously noted), this changes the bed days available to 14,965 (not 12,775 as previously noted). Also off site beds are at Ayrshire Central Hospital (not Ayr Central Hospital). Consequently totals are also affected. For further information refer to the Revisions Log at www.strokeaudit.scot.nhs.uk
<table>
<thead>
<tr>
<th>Hospital Name</th>
<th>Admits acute stroke</th>
<th>Number of acute stroke discharged in 2010</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>Dr Gray’s Hospital</td>
<td>Yes</td>
<td>82</td>
<td>0</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td>3,285</td>
<td>20.3</td>
<td>1,661</td>
<td>Patients are moved to Community Hospitals, in some instances to continue generic rehabilitation.</td>
</tr>
<tr>
<td>Glasgow Royal Infirmary</td>
<td>Yes</td>
<td>314</td>
<td>0</td>
<td>16</td>
<td>0</td>
<td>30</td>
<td>16,790</td>
<td>24.9</td>
<td>7,808</td>
<td>Off site beds formerly located at Lightburn Hospital. From March 2011 two 19-bed acute wards at GRI and no stroke beds at Lightburn.</td>
</tr>
<tr>
<td>Stobhill Hospital</td>
<td>Yes</td>
<td>203</td>
<td>8</td>
<td>0</td>
<td>30</td>
<td>0</td>
<td>13,870</td>
<td>24.2</td>
<td>4,910</td>
<td>Acute Stroke Unit at Stobhill closed March 2011 when all acute services moved to GRI. All acute admissions now go to GRI; 24 stroke rehabilitation beds remain at Stobhill.</td>
</tr>
<tr>
<td>Western Infirmary Glasgow</td>
<td>Yes</td>
<td>468</td>
<td>14</td>
<td>0</td>
<td>0</td>
<td>30</td>
<td>16,060</td>
<td>25.9</td>
<td>12,143</td>
<td>All off site beds are located at Drumchapel Hospital.</td>
</tr>
<tr>
<td>Southern General Hospital</td>
<td>Yes</td>
<td>578</td>
<td>4</td>
<td>30</td>
<td>0</td>
<td>20</td>
<td>19,710</td>
<td>22.4</td>
<td>12,925</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>232</td>
<td>0</td>
<td>17</td>
<td>0</td>
<td>0</td>
<td>6,205</td>
<td>27.0</td>
<td>6,272</td>
<td>IRH service re-located to main hospital in 2010 with service re-design.</td>
</tr>
<tr>
<td>Royal Alexandra Hospital</td>
<td>Yes</td>
<td>317</td>
<td>0</td>
<td>30</td>
<td>0</td>
<td>0</td>
<td>10,950</td>
<td>21.7</td>
<td>6,882</td>
<td>All acute stroke admissions go to the RAH with subsequent move to the VoL for rehabilitation if required.</td>
</tr>
<tr>
<td>Vale of Leven Hospital</td>
<td>Yes</td>
<td>55</td>
<td>0</td>
<td>12</td>
<td>0</td>
<td>0</td>
<td>4,380</td>
<td>32.2</td>
<td>1,770</td>
<td>Acute admissions to the VoL ceased in December 2010. There are 6 stroke rehabilitation beds in the VoL but no other inpatient stroke provision.</td>
</tr>
<tr>
<td>Hospital Name</td>
<td>Admits acute stroke</td>
<td>Number of acute stroke discharged in 2010</td>
<td>Acute Stroke Unit (ASU) beds</td>
<td>Combined ASU/Rehab Stroke Unit (RSU) beds</td>
<td>RSU beds on acute site</td>
<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>
</tr>
<tr>
<td>----------------------------</td>
<td>---------------------</td>
<td>------------------------------------------</td>
<td>-----------------------------</td>
<td>--------------------------------------------</td>
<td>------------------------</td>
<td>------------------------</td>
<td>-----------------------------------------------</td>
<td>----------------------------</td>
<td>---------------------------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>Raigmore Hospital</td>
<td>Yes</td>
<td>368</td>
<td>0</td>
<td>22</td>
<td>0</td>
<td>0</td>
<td>8,030</td>
<td>23.2</td>
<td>8,524</td>
<td></td>
</tr>
<tr>
<td>Lorn &amp; Islands Hospital</td>
<td>Yes</td>
<td>35</td>
<td>0</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>2,190</td>
<td>26.5</td>
<td>929</td>
<td></td>
</tr>
<tr>
<td>Belford Hospital</td>
<td>Yes</td>
<td>26</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>28.2</td>
<td>732</td>
<td></td>
</tr>
<tr>
<td>Caithness General Hospital</td>
<td>Yes</td>
<td>63</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>1,460</td>
<td>25.5</td>
<td>1,608</td>
<td></td>
</tr>
<tr>
<td>Hairmyres Hospital</td>
<td>Yes</td>
<td>275</td>
<td>0</td>
<td>24</td>
<td>0</td>
<td>0</td>
<td>8,760</td>
<td>19.2</td>
<td>5,268</td>
<td></td>
</tr>
<tr>
<td>Monklands Hospital</td>
<td>Yes</td>
<td>312</td>
<td>0</td>
<td>20</td>
<td>0</td>
<td>0</td>
<td>7,300</td>
<td>14.3</td>
<td>4,446</td>
<td></td>
</tr>
<tr>
<td>Wishaw General Hospital</td>
<td>Yes</td>
<td>325</td>
<td>0</td>
<td>25</td>
<td>0</td>
<td>0</td>
<td>9,125</td>
<td>19.4</td>
<td>6,317</td>
<td></td>
</tr>
<tr>
<td>Royal Infirmary of Edinburgh</td>
<td>Yes</td>
<td>466</td>
<td>22</td>
<td>0</td>
<td>0</td>
<td>41</td>
<td>22,995</td>
<td>33.1</td>
<td>15,436</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 the Royal Victoria Hospital and Roodlands Hospital for rehabilitation).</td>
</tr>
<tr>
<td>St John’s Hospital</td>
<td>Yes</td>
<td>183</td>
<td>0</td>
<td>22</td>
<td>0</td>
<td>0</td>
<td>8,030</td>
<td>33.8</td>
<td>6,183</td>
<td></td>
</tr>
<tr>
<td>Western General Hospital</td>
<td>Yes</td>
<td>448</td>
<td>16</td>
<td>0</td>
<td>0</td>
<td>26</td>
<td>15,330</td>
<td>30.6</td>
<td>13,688</td>
<td>All off site beds are located at Royal Victoria Hospital.</td>
</tr>
<tr>
<td>Orkney</td>
<td>Yes</td>
<td>37</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>40.5</td>
<td>1,499</td>
<td></td>
</tr>
<tr>
<td>Shetland</td>
<td>Yes</td>
<td>48</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>29.4</td>
<td>1,411</td>
<td></td>
</tr>
<tr>
<td>Ninewells Hospital</td>
<td>Yes</td>
<td>366</td>
<td>18</td>
<td>0</td>
<td>0</td>
<td>12</td>
<td>10,950</td>
<td>13.7</td>
<td>5,027</td>
<td>Off site beds – Angus stroke rehab beds are located at Stracathro Hospital (12) and Dundee generic rehab beds at Royal Victoria</td>
</tr>
<tr>
<td>Perth Royal Infirmary</td>
<td>Yes</td>
<td>203</td>
<td>0</td>
<td>26</td>
<td>0</td>
<td>0</td>
<td>9,490</td>
<td>31.5</td>
<td>6,394</td>
<td></td>
</tr>
<tr>
<td>Western Isles</td>
<td>Yes</td>
<td>29</td>
<td>0</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>2,190</td>
<td>47.6</td>
<td>1,379</td>
<td></td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td></td>
<td><strong>8,243</strong></td>
<td><strong>167</strong></td>
<td><strong>304</strong></td>
<td><strong>79</strong></td>
<td><strong>251</strong></td>
<td><strong>292,365</strong></td>
<td><strong>25.0</strong></td>
<td><strong>206,439</strong></td>
<td></td>
</tr>
</tbody>
</table>

* Forth Valley length of stay columns combine data for Stirling Royal Infirmary & Falkirk & District Royal Infirmary.
3.3 Hospital Data

**GREEN** Meet or exceed the current NHS QIS Standards.

**AMBER** Do not meet the current NHS QIS Standards but have remained the same or improved from 2009 to 2010. This also includes centres which have data for only 2010, as having data is an improvement over having no data.

**RED** Do not meet the current NHS QIS Standards and are performing worse in 2010 than in 2009 or failing to provide data (n/a).

To help the reader judge the precision of any estimate of performance we have presented, in the web tables for these standards, proportions with 95% confidence intervals, calculated using a method derived by Altman, although these are only indicative statistics. If one was to measure performance 100 times one’s confidence interval would be expected to include the true proportion 95 out of these 100 times.

The figures presented are data from 2010 with data from 2009 where available in brackets. Data now held centrally has been used to calculate the figures in Table 2. They may not match exactly those presented in previous reports.

Differences in performance may reflect real differences in the process of care but also differences in the way these data were collected between hospitals or over time. Although we have attempted to standardise the methods of case ascertainment, data extraction, definition of variables, data entry and analysis, inevitably individuals responsible for aspects of the audit were not always able to adhere strictly to the standards often for very practical reasons.

The data used to calculate the figures presented in Table 2 can be found in excel tables on the SSCA website (www.strokeaudit.scot.nhs.uk).

### Table 2: NHS QIS Standards and Summary Table

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Numbers of stroke patients admitted: 2010 (2009)</th>
<th>Inpatients</th>
<th>Outpatients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Admitted to SU on day of admission</td>
<td>Admitted to SU &lt;= 1 day %</td>
</tr>
<tr>
<td>NHS QIS Standard (from June 2009)</td>
<td>60</td>
<td>90</td>
<td>100</td>
</tr>
<tr>
<td>Scotland-wide</td>
<td>8459 (8111)</td>
<td>39 (37)</td>
<td>63 (61)</td>
</tr>
<tr>
<td>Ayrshire &amp; Arran</td>
<td>663 (672)</td>
<td>75 (60)</td>
<td>88 (76)</td>
</tr>
<tr>
<td>Ayr Hospital</td>
<td>311 (297)</td>
<td>74 (66)</td>
<td>90 (81)</td>
</tr>
<tr>
<td>Crosshouse Hospital</td>
<td>352 (375)</td>
<td>75 (55)</td>
<td>86 (71)</td>
</tr>
<tr>
<td>Borders General Hospital</td>
<td>242 (194)</td>
<td>31 (17)</td>
<td>60 (48)</td>
</tr>
</tbody>
</table>

The new standards above were introduced from June 2009.

A revision (R) was made to the column “Aspirin <= 1 day %” in August 2011 because of an error in the percentage figures in brackets for 2009. These included, incorrectly, patients with aspirin contraindications where aspirin would have been inappropriate. This increased the denominator and, therefore, reduced the percentages. As a result of this revision, RAG indicators for some hospitals and NHS boards (marked R) changed colour from amber to red. For further information refer to the Revisions Log at www.strokeaudit.scot.nhs.uk.
<table>
<thead>
<tr>
<th>Hospital</th>
<th>Inpatients</th>
<th>Outpatients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Numbers of stroke patients admitted: 2010 (2009)</td>
<td>Admitted to SU on day of admission %</td>
</tr>
<tr>
<td>Dumfries &amp; Galloway Royal Infirmary R</td>
<td>261 (260)</td>
<td>37 (40)</td>
</tr>
<tr>
<td>Galloway Community Hospital R</td>
<td>227 (241)</td>
<td>28 (39)</td>
</tr>
<tr>
<td>Forth Valley R</td>
<td>34 (19)</td>
<td>97 (58)</td>
</tr>
<tr>
<td>Fife</td>
<td>529 (507)</td>
<td>33 (33)</td>
</tr>
<tr>
<td>Queen Margaret Hospital</td>
<td>231 (188)</td>
<td>24 (25)</td>
</tr>
<tr>
<td>Victoria Hospital Kirkcaldy</td>
<td>298 (319)</td>
<td>39 (38)</td>
</tr>
<tr>
<td>Forth Valley R</td>
<td>564 (584)</td>
<td>15 (27)</td>
</tr>
<tr>
<td>Grampian</td>
<td>702 (625)</td>
<td>55 (56)</td>
</tr>
<tr>
<td>Aberdeen Royal Infirmary</td>
<td>617 (544)</td>
<td>59 (64)</td>
</tr>
<tr>
<td>Dr Gray's Hospital R</td>
<td>85 (81)</td>
<td>20 (1)</td>
</tr>
<tr>
<td>Greater Glasgow &amp; Clyde</td>
<td>2205 (2224)</td>
<td>41 (42)</td>
</tr>
<tr>
<td>Glasgow Royal Infirmary</td>
<td>321 (442)</td>
<td>27 (27)</td>
</tr>
<tr>
<td>Inverclyde Royal Hospital</td>
<td>221 (246)</td>
<td>13 (6)</td>
</tr>
<tr>
<td>Royal Alexandra Hospital</td>
<td>317 (255)</td>
<td>25 (27)</td>
</tr>
<tr>
<td>Southern General Hospital R</td>
<td>591 (602)</td>
<td>63 (73)</td>
</tr>
<tr>
<td>Stobhill Hospital</td>
<td>204 (212)</td>
<td>23 (18)</td>
</tr>
<tr>
<td>Vale of Leven Hospital</td>
<td>64 (55)</td>
<td>3 (11)</td>
</tr>
<tr>
<td>Western Infirmary Glasgow R</td>
<td>487 (412)</td>
<td>58 (61)</td>
</tr>
<tr>
<td>Highland</td>
<td>487 (422)</td>
<td>12 (17)</td>
</tr>
<tr>
<td>Belford Hospital R*.</td>
<td>23 (36)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Caithness Hospital R*.</td>
<td>60 (52)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Lorn &amp; Islands R</td>
<td>33 (28)</td>
<td>79 (64)</td>
</tr>
<tr>
<td>Raigmore Hospital</td>
<td>371 (306)</td>
<td>9 (17)</td>
</tr>
<tr>
<td>Lanarkshire</td>
<td>914 (926)</td>
<td>45 (41)</td>
</tr>
<tr>
<td>Hairmyres Hospital</td>
<td>277 (305)</td>
<td>50 (45)</td>
</tr>
<tr>
<td>Monklands Hospital</td>
<td>310 (310)</td>
<td>50 (43)</td>
</tr>
<tr>
<td>Wishaw General Hospital</td>
<td>327 (311)</td>
<td>36 (35)</td>
</tr>
<tr>
<td>Lothian R</td>
<td>1155 (1029)</td>
<td>32 (29)</td>
</tr>
<tr>
<td>Royal Infirmary Edinburgh R</td>
<td>513 (409)</td>
<td>26 (21)</td>
</tr>
<tr>
<td>St Johns Hospital R</td>
<td>188 (163)</td>
<td>28 (28)</td>
</tr>
<tr>
<td>Western General Hospital</td>
<td>454 (457)</td>
<td>40 (37)</td>
</tr>
<tr>
<td>Orkney R</td>
<td>40 (16)</td>
<td>30 (38)</td>
</tr>
<tr>
<td>Hospital</td>
<td>Numbers of stroke patients admitted: 2010 (2009)</td>
<td>Inpatients</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-------------------------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td></td>
<td>Admitted to SU on day of admission %</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Admitted to SU &lt;= 1 day %</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Swallow screen on day of admission %</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Brain scan day of admission %</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aspirin &lt;= 1 day %</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NV Clinic &lt;= 7 days %</td>
<td></td>
</tr>
</tbody>
</table>

Shetland* 49 (32) 2 (0) 2 (0) 78 (75) 22 (13) 97 (75) NR

Tayside 608 (580) 41 (19) 78 (45) 71 (69) 48 (38) 78 (60) 73 (70)

Ninewells Hospital 402 (348) 43 (29) 82 (70) 70 (68) 48 (31) 81 (61) NR

Perth Royal Infirmary 206 (232) 36 (3) 70 (7) 73 (70) 50 (47) 72 (58) 62 (53)

Stracathro Hospital NR* NR* NR* NR* NR* NR* 95 (91)

Western Islesa 40 (40) 63 (35) 78 (35) 73 (73) 68 (60) 76 (77) 89 (0)

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 Stroke Rehabilitation service only, recorded as part of the local acute hospital service.

* In 2010 these hospitals did 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 and have brain imaging within the required NHS QIS standards.

1 Stroke Unit admission percentages based on hospitals with Stroke Units. For 2009 & 2010 the total number of patients admitted to these hospitals was 8111 & 8459 respectively. Aspirin percentages based on denominator that excludes patients contraindicated for aspirin. For 2010 the total number of patients receiving aspirin was 7959 (chart 8).

2 Forth Valley combines information for Stirling Royal Infirmary & Falkirk & District Royal Infirmary.

3 Southern General Hospital data includes information for Victoria Infirmary.

4 Data for Belford, Caithness and Lorn & Islands Hospitals is incomplete for 2010 due to collection difficulties.

**Chart 4: Percentage of stroke patients admitted to Stroke Unit by number of days to Stroke Unit admission, 2010 data**

Horizontal lines reflect NHS QIS standards (2009) to admit 60% of stroke patients on day of admission and 90% by 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 5: Percentage of stroke patients with a swallow screening by number of days to swallow screening, 2010 data

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

Chart 6: Percentage of stroke patients with a brain scan by number of days to scanning, 2010 data

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

*NHS Orkney does not have a CT scanner. 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 7: Percentage of stroke patients with a brain scan by number of hours to scan compared to percentage scanned same day**, 2010 data

Horizontal line reflects NHS QIS standard (2009) of 80% of stroke patients to receive brain imaging on day of admission (Square marker (□) on chart indicates scans done on the day of admission)

* NHS Orkney does not have a CT scanner. Patients are airlifted to Aberdeen Royal Infirmary and a proportion arrive in sufficient time to have brain imaging within the required NHS QIS standard.

** Based on records where admission date, scan date and scan time are recorded. A proportion of records may be missing one or more of these data items.

Chart 8: Percentage of ischaemic patients given aspirin in hospital by number of days to receipt, 2010 data

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

Atrial fibrillation (AF) is one of the most common disorders of heart rhythm which increases in prevalence with age. People in AF have at least a five fold increased risk of stroke. Moreover, strokes associated with AF are on average more severe and lead to greater disability and loss of life, than those due to other causes.

Anticoagulation, usually with warfarin, reduces the risk of ischaemic stroke in patients with AF by about 60% and is far more effective than aspirin in this situation. However, warfarin is a complicated drug to give and requires careful monitoring of the international normalised ratio (INR) to ensure the blood is not too thick or thin. Newer anticoagulant drugs which are being introduced into clinical practice have some advantages over warfarin in that the doses are fixed and no monitoring of INR is required. However they are relatively expensive and also their effects, unlike warfarin, cannot easily be reversed quickly.

This year we have included data on the patients who are admitted to hospital, or who attend clinics, with stroke who are in AF. These data provide an insight into how often we are missing an opportunity to prevent stroke, by not anticoagulating patients who are in AF, and perhaps how often strokes occur because of inadequate control of anticoagulation with warfarin. For instance, patients in AF who are on warfarin may have an ischaemic stroke because their INR is too low, or a haemorrhagic stroke if their INR is too high.
Table 3: Ischaemic Stroke patients with current atrial fibrillation (AF) and anticoagulation on admission or discharge, 2010 data

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Number</th>
<th>Number also on anti-coagulation at admission</th>
<th>Percentage on anti-coagulation at admission</th>
<th>Number</th>
<th>Number also on anti-coagulation at discharge</th>
<th>Percentage on anti-coagulation at discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Ischaemic Stroke patients</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With current AF on Admission:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scottish</td>
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<td>Ninewells Hospital</td>
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<td>Stobhill Hospital</td>
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<td>29</td>
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<td>21</td>
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<td>Vale of Leven Hospital</td>
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<td>Ayr Hospital</td>
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<td>Crosshouse Hospital</td>
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<td></td>
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</tr>
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<td>Wishaw General Hospital*</td>
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<td></td>
<td>data not available</td>
<td></td>
</tr>
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<td>Forth Valley</td>
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<td>40</td>
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<td>43</td>
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<td>45</td>
<td>31</td>
<td>69</td>
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<td>2</td>
<td>67</td>
</tr>
<tr>
<td>Raigmore Hospital</td>
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<td>21</td>
<td>26</td>
<td>60</td>
<td>11</td>
<td>18</td>
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</tr>
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<td>Western Isles</td>
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<td>27</td>
<td>10</td>
<td>5</td>
<td>50</td>
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<td>8</td>
<td>44</td>
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<td>10</td>
<td>55</td>
<td>23</td>
<td>42</td>
</tr>
</tbody>
</table>

* Information only available for hospitals using SSCAS. NHS Lanarkshire omitted because SAIL extracts used for national report did not contain sufficient detail to examine this topic.
Table 4: Haemorrhagic Stroke patients with current atrial fibrillation (AF) and anticoagulation on admission or discharge, 2010 data

Note that some percentages are based on very small numbers of records.

<table>
<thead>
<tr>
<th>Hospital</th>
<th>All Haemorrhagic Stroke patients</th>
<th>Haemorrhagic Stroke patients discharged alive</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Number also on anticoagulation at admission</td>
</tr>
<tr>
<td>Aberdeen Royal Infirmary</td>
<td>13</td>
<td>7</td>
</tr>
<tr>
<td>Dr Gray’s Hospital</td>
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</tr>
<tr>
<td>Ninewells Hospital</td>
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<td>5</td>
</tr>
<tr>
<td>Perth Royal Infirmary</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Royal Infirmary of Edinburgh</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>St Johns Hospital</td>
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<td>0</td>
</tr>
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<td>Western General Hospital</td>
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<td>2</td>
</tr>
<tr>
<td>Royal Infirmary Glasgow</td>
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<td>2</td>
</tr>
<tr>
<td>Stobhill Hospital</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Western Infirmary Glasgow</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
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</tr>
<tr>
<td>Inverclyde Royal Hospital</td>
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<td>Royal Alexandra Hospital</td>
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</tr>
<tr>
<td>Vale of Leven Hospital</td>
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</tr>
<tr>
<td>Ayr Hospital</td>
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<td>Crosshouse Hospital</td>
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<td>Haimmyres Hospital*</td>
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<td>Monklands Hospital*</td>
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<td>Wishaw General Hospital*</td>
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<td>Forth Valley</td>
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<td>2</td>
</tr>
<tr>
<td>Borders General Hospital</td>
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<td>2</td>
</tr>
<tr>
<td>Dumfries &amp; Galloway Royal Infirmary</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Galloway Community Hospital</td>
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<td>0</td>
</tr>
<tr>
<td>Raigmore Hospital</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Lorn &amp; Islands Hospital</td>
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<td>Belford Hospital</td>
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<td>Shetland</td>
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<td>Western Isles</td>
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<td>Queen Margaret Hospital</td>
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<tr>
<td><strong>Scotland</strong></td>
<td><strong>114</strong></td>
<td><strong>61</strong></td>
</tr>
</tbody>
</table>

* Information only available for hospitals using SSCAS. NHS Lanarkshire omitted because SAIL extracts used for national report did not contain sufficient detail to examine this topic.
4 Outpatients

4.1 Summary and key findings relating to outpatient data

The number of hospitals collecting neurovascular clinic data has increased in 2010, though there are still a significant minority of hospitals offering this service that do not collect comprehensive data to reflect their performance. Data were collected on over 5000 patients with acute cerebrovascular disease seen in neurovascular clinics in 2010.

Access to early TIA/stroke clinics has improved again over the last year and now meets the national standards although there is still variation which means some health boards/hospitals need to reduce delays.

Since 2005 the proportion of patients seen in TIA clinics within a week of referral has risen from 30% to 83%. Increasingly, patients are being seen within a day or two of referral.

4.2 Hospital data

Chart 9: Percentage of patients with definite cerebrovascular diagnosis seen in neurovascular clinic with referral to examination time (days): same day and within 1, 3 and 7 days, 2010 data

* Greater Glasgow & Clyde (GG&C) hospitals did not collect routine outpatient data for the Scottish Stroke Care Audit during 2010 and their information is based on a 6 month period from July-Dec 2010 for the 7-day NHS QIS standard only. Their columns in the chart above are for <=7 days only.
We were asked to explore differences in the data between time from receipt of referral to first appointment in comparison to time from receipt of referral to attendance at clinic (examination) as there were concerns that appointments were being offered within 7 days but patients were not necessarily able to attend them and asked for a later appointment.

On review of this data we found:

4916 records with 2010 examination dates.

4869 of them had both dates present and ordered chronologically (examination date >= 1st appointment; a small % have them the other way).

4407 out of 4869 (91%) have the same dates for each.

462 out of 4869 (9%) have different dates for each.

Of the 462, the max difference is 84 days, with a mean of 9 days and median of 6 days.

The data would appear to indicate that this is not a significant issue.

Note: only data included in SSCAS was analysed in the above, data from Lanarkshire and Stracathro is excluded.

Chart 10: Percentage of total days from last event to examination showing components: event-to-referral, referral-to-referral-received, referral-received-to-appointment, appointment-to-examination, 2010 data*

* For those hospitals using SSCAS where all relevant dates (last event, referral, referral-received, appointment and examination) are present and ordered chronologically.

** Total column does not reflect Scotland-wide performance due to the omissions noted above.
4.3 Anticoagulation

As discussed in section 3.4 AF is one of the most common disorders of heart rhythm which increases in prevalence with age. Included in Table 5 are data on the patients who attended clinics, with stroke who are in AF. As above, these data provide an insight into how often we are missing an opportunity to prevent stroke, by not anticoagulating patients who are in AF.

Table 5: Patents with ischaemic diagnosis, seen in neurovascular clinics, with current atrial fibrillation (AF) and on anticoagulation, 2010 data

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Denominator</th>
<th>Patents with ischaemic diagnosis seen in neurovascular clinics during 2010</th>
<th>Patents with ischaemic diagnosis seen in neurovascular clinics during 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>With current AF</td>
<td>With current AF and on anticoagulation prior to assessment</td>
<td>Percentage on anticoagulation prior to assessment</td>
</tr>
<tr>
<td>Aberdeen Royal Infirmary</td>
<td>32</td>
<td>11</td>
<td>34</td>
</tr>
<tr>
<td>Dr Gray’s Hospital</td>
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<td>0</td>
</tr>
<tr>
<td>Perth Royal Infirmary</td>
<td>13</td>
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<td>62</td>
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<tr>
<td>Stracathro Hospital</td>
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<td>2</td>
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<tr>
<td>St Johns Hospital</td>
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</tbody>
</table>

* Information only available for hospitals using SSCAS. NHS Lanarkshire omitted because SAIL extracts used for national report did not contain sufficient detail to examine this topic. For other hospitals, data drawn from SSCAS.
5 Thrombolysis

“I was lucky I had people with me when I had my stroke. I got into hospital within the 3 hour window. The thrombolysis team were waiting for me in A&E and after a CT scan, I received thrombolysis. I have made a good recovery from my stroke and my message to everyone is, remember it is not just old people that get strokes, I was only 42. People should be made more aware not to ignore signs and symptoms but act FAST”

Wendy Kerr from Prestwick (patient in NHS A&A)

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 the SSCA prospectively since 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 an overview of the delivery of rtPA during 2009 and 2010.

Table 6: Thrombolysis - numbers thrombolysed and summary information about each hospital's thrombolysis service

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Number of patients receiving thrombolysis in 2010</th>
<th>Number of patients receiving thrombolysis in 2009</th>
<th>How is thrombolysis delivered in each hospital?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scotland summary</td>
<td>540</td>
<td>411</td>
<td>Not all centres were in a position to offer thrombolysis for the whole of 2010 therefore the numbers reflect varying months’ worth of data and are shown to illustrate the developing nature of this service.</td>
</tr>
<tr>
<td>Ayrshire &amp; Arran</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ayr Hospital</td>
<td>7</td>
<td>7</td>
<td>Thrombolysis commenced (9-5 Mon-Fri) in June 2009. Out of hours service is still provided by Glasgow though work is underway with telehealth for a regional service.</td>
</tr>
<tr>
<td>Crosshouse Hospital</td>
<td>4</td>
<td>0</td>
<td>Thrombolysis commenced in March 2010. Out of hours service is still provided by Glasgow though as above work is underway with telehealth for a regional service.</td>
</tr>
<tr>
<td>Borders</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Borders General Hospital</td>
<td>1</td>
<td>0</td>
<td>Thrombolysis commenced August 2009. Service provided 9-5 Mon-Fri locally. Out of hours and public holidays - NHS Borders joined the South Telestroke Network in March 2011.</td>
</tr>
<tr>
<td>Dumfries &amp; Galloway</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dumfries &amp; Galloway Royal Infirmary</td>
<td>17</td>
<td>3</td>
<td>Thrombolysis commenced in 2009 providing a 24/7 service.</td>
</tr>
<tr>
<td>Galloway Community Hospital</td>
<td>4</td>
<td>1</td>
<td>Thrombolysis commenced in 2009. Patients are thrombolysed using telehealth link to DGRI or NHS Lothian. The service is provided Mon-Fri 9-5 when they contact Ward 12 at DGRI, out of Hours they contact NHS Lothian.</td>
</tr>
<tr>
<td>Hospital</td>
<td>Number of patients receiving thrombolysis in 2010</td>
<td>Number of patients receiving thrombolysis in 2009</td>
<td>How is thrombolysis delivered in each hospital?</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>--------------------------------------------------</td>
<td>--------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Fife</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Queen Margaret Hospital</td>
<td>10</td>
<td>5</td>
<td>Thrombolysis commenced (9-5 Mon-Fri) in June 2009. Telehealth: Two acute sites linked by telehealth. Planned to become part of South Telestroke Network. The stroke consultants have a rota in place for thrombolysis but vacant consultant posts limit availability.</td>
</tr>
<tr>
<td>Victoria Hospital Kirkcaldy</td>
<td>8</td>
<td>3</td>
<td>Thrombolysis commenced (9-5 Mon-Fri) in June 2009. Service delivered as noted above.</td>
</tr>
<tr>
<td><strong>Forth Valley</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forth Valley (Stirling Royal &amp; Falkirk and District General Hospital)</td>
<td>10</td>
<td>13</td>
<td>Commenced thrombolysing in 2008. Now part of South Telestroke Network and provides a 24/7 thrombolysis service since March 2011.</td>
</tr>
<tr>
<td><strong>Grampian</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aberdeen Royal Infirmary</td>
<td>70</td>
<td>68</td>
<td>Thrombolysis commenced in 2003. Aberdeen Royal Infirmary is also linked to delivery of thrombolysis to NHS Shetland and Western Isles via telehealth link.</td>
</tr>
<tr>
<td>Dr Gray’s Hospital</td>
<td>4</td>
<td>9</td>
<td>Thrombolysis commenced in December 2008. Patients thrombolysed using telehealth link to Aberdeen Royal Infirmary.</td>
</tr>
<tr>
<td><strong>Greater Glasgow &amp; Clyde</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inverclyde Royal Hospital</td>
<td>0</td>
<td>0</td>
<td>24/7 service provided by transfer of appropriate patients to SGH. Discussions ongoing re provision of local service via telemedicine links.</td>
</tr>
<tr>
<td>Royal Alexandra Hospital</td>
<td>7</td>
<td>5</td>
<td>Some local provision by stroke consultants but 24/7 provision by transfers to SGH.</td>
</tr>
<tr>
<td>Royal Infirmary Glasgow</td>
<td>1</td>
<td>0</td>
<td>Patients thrombolysed at Western Infirmary, Glasgow.</td>
</tr>
<tr>
<td>Southern General Hospital</td>
<td>103</td>
<td>109</td>
<td>Thrombolysis commenced 1996. 24/7 service to South Glasgow, Clyde and other Health Boards.</td>
</tr>
<tr>
<td>Stobhill Hospital</td>
<td>0</td>
<td>0</td>
<td>Patients thrombolysed at Western Infirmary, Glasgow.</td>
</tr>
<tr>
<td>Vale of Leven Hospital</td>
<td>0</td>
<td>0</td>
<td>No acute stroke admissions. Patients from VoL geographical area who require thrombolysis go to the Western Infirmary and thereafter move to the RAH.</td>
</tr>
<tr>
<td>Western Infirmary Glasgow</td>
<td>100</td>
<td>79</td>
<td>Thrombolysis commenced in 1997. Deliver a 24/7 service.</td>
</tr>
<tr>
<td><strong>Highland</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belford Hospital</td>
<td>0</td>
<td>0</td>
<td>Thrombolysis commenced in May 2009 (There have been no suitable candidates to date). Deliver a 24/7 service, though does depend on medic availability at times.</td>
</tr>
<tr>
<td>Caithness Hospital</td>
<td>5</td>
<td>2</td>
<td>Thrombolysis commenced in May 2009. Deliver a 24/7 service, though does depend on medic availability at times.</td>
</tr>
<tr>
<td>Lorn &amp; Islands Hospital</td>
<td>0</td>
<td>0</td>
<td>Service not provided.</td>
</tr>
<tr>
<td>Raigmore Hospital</td>
<td>34</td>
<td>32</td>
<td>Thrombolysis commenced in 2007. Deliver a 24/7 service, though does depend on medic availability at times.</td>
</tr>
<tr>
<td>Hospital</td>
<td>Number of patients receiving thrombolysis in 2010</td>
<td>Number of patients receiving thrombolysis in 2009</td>
<td>How is thrombolysis delivered in each hospital?</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>--------------------------------------------------</td>
<td>--------------------------------------------------</td>
<td>------------------------------------------------</td>
</tr>
<tr>
<td>Lanarkshire</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hairmyres Hospital</td>
<td>0</td>
<td>0</td>
<td>Thrombolysis commenced in January 2011. Thrombolysis in Lanarkshire is only delivered by the stroke physicians. Provide service from 9am to 10pm. Out of hours (from 10pm to 9am) thrombolysis is provided by South Glasgow.</td>
</tr>
<tr>
<td>Monklands Hospital</td>
<td>16</td>
<td>0</td>
<td>Thrombolysis commenced in May 2010. Service delivered as noted above.</td>
</tr>
<tr>
<td>Wishaw General Hospital</td>
<td>25</td>
<td>13</td>
<td>Thrombolysis commenced September 2008. Service delivered as noted above.</td>
</tr>
<tr>
<td>Lothian</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Royal Infirmary of Edinburgh</td>
<td>32</td>
<td>16</td>
<td>Thrombolysis commenced in 2005. Telesstroke network now fully implemented and available 24/7 in Lothian with consultants available through telehealth links at home.</td>
</tr>
<tr>
<td>St Johns Hospital</td>
<td>16</td>
<td>4</td>
<td>Thrombolysis commenced in 2008. Now 24/7 service as noted above.</td>
</tr>
<tr>
<td>Western General Hospital</td>
<td>33</td>
<td>23</td>
<td>Thrombolysis commenced in 2004. Now 24/7 service as noted above.</td>
</tr>
<tr>
<td>Orkney</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orkney</td>
<td>1</td>
<td>0</td>
<td>Patients only thrombolysed if arrive at Aberdeen Royal Infirmary in time.</td>
</tr>
<tr>
<td>Shetland</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shetland</td>
<td>0</td>
<td>0</td>
<td>Thrombolysis commenced in January 2011. Deliver 9-5 service Mon-Fri, can be delivered out of hours but will depend on radiographer and medic availability.</td>
</tr>
<tr>
<td>Tayside</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ninewells Hospital</td>
<td>20</td>
<td>13</td>
<td>Thrombolysis commenced in 2009. Since Feb 2011 have provided a 24/7 service. Thrombolysis being delivered by A&amp;E consultants.</td>
</tr>
<tr>
<td>Perth Royal Infirmary</td>
<td>9</td>
<td>5</td>
<td>Thrombolysis commenced in 2009. Currently providing a 9-5 Mon/Fri service. Telehealth equipment has been purchased as a regional solution to provide Perth with 24/7 service linking with A&amp;E consultants in Ninewells.</td>
</tr>
<tr>
<td>Stracathro Hospital</td>
<td>0</td>
<td>0</td>
<td>Service not provided. Patients would be transferred to Ninewells Hospital.</td>
</tr>
<tr>
<td>Western Isles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Western Isles</td>
<td>3</td>
<td>1</td>
<td>Thrombolysis commenced in 2009. Patients thrombolysed using telehealth link to Aberdeen Royal Infirmary.</td>
</tr>
</tbody>
</table>
Table 7: Thrombolysis - numbers thrombolysed and crude rate per 100,000 by NHS board of residence of patient

<table>
<thead>
<tr>
<th>NHS Board of Residence*</th>
<th>Number of patients receiving thrombolysis in 2010</th>
<th>Mid-Year Population Estimate 2009</th>
<th>Crude Rate per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scotland</td>
<td>524</td>
<td>5 194 000</td>
<td>10.1</td>
</tr>
<tr>
<td>Ayrshire &amp; Arran</td>
<td>30</td>
<td>367 160</td>
<td>8.2</td>
</tr>
<tr>
<td>Borders</td>
<td>1</td>
<td>112 680</td>
<td>0.9</td>
</tr>
<tr>
<td>Dumfries &amp; Galloway</td>
<td>18</td>
<td>148 510</td>
<td>12.1</td>
</tr>
<tr>
<td>Fife</td>
<td>22</td>
<td>363 385</td>
<td>6.1</td>
</tr>
<tr>
<td>Forth Valley</td>
<td>11</td>
<td>291 383</td>
<td>3.8</td>
</tr>
<tr>
<td>Grampian</td>
<td>70</td>
<td>544 980</td>
<td>12.8</td>
</tr>
<tr>
<td>Greater Glasgow &amp; Clyde</td>
<td>160</td>
<td>1 199 026</td>
<td>13.3</td>
</tr>
<tr>
<td>Highland</td>
<td>41</td>
<td>310 530</td>
<td>13.2</td>
</tr>
<tr>
<td>Lanarkshire</td>
<td>67</td>
<td>562 215</td>
<td>11.9</td>
</tr>
<tr>
<td>Lothian</td>
<td>73</td>
<td>826 231</td>
<td>8.8</td>
</tr>
<tr>
<td>Orkney</td>
<td>2</td>
<td>19 960</td>
<td>10.0</td>
</tr>
<tr>
<td>Shetland</td>
<td>0</td>
<td>22 210</td>
<td>0.0</td>
</tr>
<tr>
<td>Tayside</td>
<td>26</td>
<td>399 550</td>
<td>6.5</td>
</tr>
<tr>
<td>Western Isles</td>
<td>3</td>
<td>26 180</td>
<td>11.5</td>
</tr>
</tbody>
</table>

*A small proportion of records could not be assigned to a NHS board because they were either for non-Scottish residents or there was insufficient information to allow their assignment to a NHS board (e.g. partial or incorrect postcode).

The numbers (percentage) of stroke patients being treated with rtPA is increasing every year as seen in Table 8 below.

Table 8: Thrombolysis - numbers thrombolysed as percentage of stroke patients, Scotland, 2008-2010

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of patients thrombolysed (numerator)</th>
<th>Number of stroke patients (denominator)</th>
<th>Percentage</th>
<th>Number of patients per 100,000 (target is 5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>260</td>
<td>8439</td>
<td>3%</td>
<td>5</td>
</tr>
<tr>
<td>2009</td>
<td>411</td>
<td>8012</td>
<td>5%</td>
<td>8</td>
</tr>
<tr>
<td>2010</td>
<td>540</td>
<td>8459</td>
<td>6%</td>
<td>10</td>
</tr>
</tbody>
</table>

This indicates that overall thrombolysis treatment rates are meeting the current target. However, these figures mask significant regional variations as demonstrated in Tables 6 and 7. 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.
Chart 11: Thrombolysis door-to-needle times, by admitting hospital, 2010 data

Horizontal lines reflect NHS QIS standard (2009) 80% of stroke patients thrombolysed within 1 hour of arrival at first hospital

Notes
1 Hospitals shown are those that provide a thrombolysis service. See Table 6 for further details. Records included must have date and time of arrival at first hospital and date and time of thrombolysis to permit the calculation of time to thrombolysis and a small proportion of records are missing these data items.
2 Some hospitals (e.g. Southern General Hospital) may receive a large proportion of transferred patients which will affect their door-to-needle time performance.
3 Some percentages are based on very small numbers and should be interpreted with caution.
6 Case Studies: Improving Access to Stroke Services

NHS Boards across Scotland are undertaking Lean, including Kaizen* or Rapid Improvement Events or using other improvement/change methodologies to examine the stroke pathways in their area, identifying areas where improvements could be made and instigating change processes.

This section presents case studies from three Scottish NHS Boards where these methodologies have been used and changes made to the delivery of stroke care or the stroke pathway in their local areas.

Moira McIntyre⁵ noted that Lean methodologies are recognised as a way of driving change quickly by reducing waste and improving quality.

What is the Lean methodology?

The term Lean is now used commonly to describe a production management system pioneered by the Japanese company Toyota. Lean methodology aims to streamline workflow and processes to improve performance, while adding value for patients and reducing waste. The techniques can help to:

- Analyse working processes, flow between processes and methods and timing of delivery;
- Increase efficiency of processes; and
- Reduce waste, resources, staff time and downtime.⁵

The benefit of using Lean methodologies within the health service is that it allows you to engage with all staff to identify areas of inefficiency. The process involves senior managers from the outset and therefore issues identified have the potential to be fixed quickly. It should also involve the whole departmental team and anyone who is involved at any time in the patient journey.⁶

*Kaizen – Japanese for “improvement” or “change for the better”. Refers to philosophy or practices that focus upon continuous improvement of processes. It has been applied in healthcare and many other industries. When using Lean methodology it is commonplace to hold up to week long Kaizen events involving everyone from senior management to front-line staff.⁷

6.1 NHS Lothian

In Lothian we were privileged to have the support of the Lean team for the year 2010-11 to work on stroke issues. There was a lot of discussion on the possible projects we could undertake that could be ‘leaned’, and it was agreed the NHS QIS standards for stroke care would be an appropriate project. The stroke MCN had already been involved in lots of work to improve our performance but the opportunity for a 3 day focused and well-led Kaizen was ideal.

The summary below details three aspects of the stroke pathway that were changed/modified following the Kaizen event.

Checklist:

Our previous Acute Stroke Integrated Care Pathway (ICP) was seen as too cumbersome by the clinical staff and was rarely completed – it was a double-sided sheet with a lot of information requested. We developed a concise single page checklist, with just nine directives to be considered at the front door. These promoted actions incorporating the NHS QIS standards, as
well as contacting a stroke specialist and maintaining communication channels so everyone was aware of what had been done. The reverse of the page contained the swallow screen documentation. It was agreed this checklist should be highly visible so pink paper is now used.

**Figure 1: Stroke Checklist**

![Stroke Checklist](image)

The checklist was introduced in February 2011, so we are anticipating that our data will show a marked improvement over the coming months. Each Friday we are conducting a quick audit of its use and then circulating the results to the relevant front door staff and management in order to embed the practice of using it.

**Chart 12: Number of stroke patients who have a checklist in notes and completed**

![Chart 12](image)
CT scanning:
It was recognised there were glitches in the ordering of CT scans, so a process map was completed to identify where there were issues. One of the major issues was the inadequate wording on the imaging requests which resulted in delays to urgent scans (or confusion on the urgency of the scans). This has now been clarified on the checklist, and training undertaken with relevant staff to improve this service and report back results appropriate to their urgency. It is expected that the impact of these changes in practice will:

- give clear outline of responsibility;
- reduce steps in process;
- provide better outcomes with reduced costs; and
- provide rapid access to most appropriate clinical management.

Dissemination of data:
The monthly audit data we receive from the SSCA are a valuable tool in driving changes to our processes, and although we circulate it to management it was recognised by the staff at the Lean event that perhaps a more focused distribution of relevant data to appropriate teams was necessary. We’ve taken the data and produced graphs similar to the one below (Chart 13), and these are circulated to relevant teams for their information. For example, these scanning data are circulated to front door teams, radiology, bed management and the Stroke Units, with the expectation that all staff are made aware of the targets and their local performance. Full details of dissemination of data can be seen in Appendix A in the NHS Lothian MCN submission.

Chart 13: CT scanning on day of admission

For further information relating to the work in NHS Lothian please contact morag.medwin@nhslothian.scot.nhs.uk.
6.2 NHS Borders

Establishing stroke as an emergency – FASTer diagnosis

**Introduction:**
In May 2010 NHS Borders Stroke Services went through the LEAN process with the main focus being to re-define the stroke patient journey.

One of the chosen pathway improvements which was highlighted as easily achievable and measurable was improving the time to brain scan. The main reason for this was to support stroke being treated as an emergency, timely diagnosis and prompt initiation of treatment.

**Methods:**
NHS Borders radiology department operates a 9am to 5pm service with out of hours emergency scanning (5pm – 9am). By analysing the Scottish Stroke Care Audit data we were able to demonstrate that only 12% of patients were scanned out of hours which was having an adverse effect on our performance against the NHS QIS standards for brain scan on day of admission and aspirin being prescribed within 1 day. Value stream mapping highlighted that there was no established stroke admission protocol in place.

**What changes were implemented?**
Following discussion with the radiologists one of the Department of Medicine for the Elderly (DME) registrars developed the junior doctors stroke admission protocol which emphasises the importance of timely brain scanning.

It was agreed that during normal working hours the medical registrar should request a CT scan with the duty radiologist and not wait until the consultant ward round. Between 5pm and 9pm the on call consultant makes the request if the medical registrar has seen the patient and the scan is performed if the radiographer is in for another scan but if time of onset of stroke is known and patient is to be considered for thrombolysis direct request by medical registrar to on-call radiology service is accepted.

After 9pm FAST positive patients, suspected stroke with no known time of onset, low GCS or suspected haemorrhage would be considered for emergency scanning.

**Monitoring change & benefits:**
When tracking the progress following implementation of the protocol we can see an average reduction of 108 minutes from admission time to brain scan and the number of patients scanned outwith the 9am to 5pm period has increased to 34%.

This simple change has been the main reason we have seen our brain scan on day of admission figures improve to 69% in 2010 compared to 54% in 2009 and continue to head in the right direction.

More timely scanning has also been a contributing factor to the 19% improvement in patients being prescribed aspirin within 1 day.

For further information relating to the work in NHS Borders please contact sandi.haines@borders.scot.nhs.uk.
6.3 NHS Ayrshire & Arran

Service redesign to improve the delivery of stroke care in Ayrshire & Arran:

Introduction:
In order to improve compliance with NHS QIS standards for stroke care on direct stroke admission, swallow screening, CT Scanning, Aspirin and the implementation of a local thrombolysis service, NHS Ayrshire & Arran implemented changes to the current stroke pathway in acute units in our two district hospitals.

Methods:
Local and SSCA data highlighted areas for improvement which were discussed with all acute unit staff, bed and clinical nurse managers, radiology and A&E staff. A three month pilot was undertaken in April 2009 on one site prior to the introduction of a weekday thrombolysis service with the final implementation on both sites in April 2010.

What was changed?

- A 6 bedded mixed sex Hyper Acute Stroke Unit (HASU) was created within the 30 bedded acute stroke and older persons ward by reconfiguring the existing stroke beds.
- Changes to nurse shift pattern ensured that the HASU was staffed 24/7 by one registered nurse and one Nursing Auxiliary 0700-1900hrs plus an additional registered nurse Mon - Fri 0830 -1630hrs.
- Introduction of a daily medical ward round.
- Intensive continuous monitoring of all patients including thrombolysis patients.
- Availability of at least one HASU bed 24/7 for a thrombolysis patient.
- Monitoring of occupancy with agreed protocol of transferring patients out of HASU.
- Additional training and education for nurses.

Benefits:

- Allows a comprehensive assessment of patients presenting with possible diagnosis of stroke/ TIA.
- Earlier detection of complications.
- Reduces length of stay in hospital.
- Prompt referral for investigations and reviewing of results.
- Safer environment for monitoring stroke patients including those receiving thrombolysis.
- Increased knowledge, skills and motivation of staff in the HASU and improved job satisfaction through focused stroke care.
- Facilitates implementation of NHS QIS standards for stroke care.
- All new stroke patients clearly identified in HASU.

Monitoring:
To evaluate the effectiveness of the HASU model and thrombolysis service we have utilised the SSCA data in conjunction with locally collected information comparing pre and post implementation. The data for Ayr Hospital were 18 months before and after (1st October 2007 – Sep 2010) and the data for Crosshouse Hospital were 12 months before and after (1st November
2008 to April 2010) and was based on final diagnosis of stroke. Aspirin data are based on definite TIA or ischaemic stroke.

**Results:**

Ayr Hospital - 346 stroke patients were admitted during the pre-HASU period and 419 patients during the post-HASU period. The figures do not include outlyers.

Crosshouse Hospital - 342 stroke patients were admitted during the pre-HASU period and 330 patients during the post-HASU period.

**Table 9: Performance against NHS QIS standards, comparison pre and post implementation of the Hyper Acute Stroke Unit (HASU).**

<table>
<thead>
<tr>
<th>Hospital</th>
<th>NHS QIS standards for stroke care</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Admitted to Stroke Unit</td>
</tr>
<tr>
<td></td>
<td>Pre</td>
</tr>
<tr>
<td>Ayr</td>
<td>62%</td>
</tr>
<tr>
<td>Crosshouse</td>
<td>53%</td>
</tr>
</tbody>
</table>

All results were significant p<0.05 except those with an asterisk*

**Conclusion:**

Our results show major improvements in stroke management and care, since development of HASU in both hospitals. This re-design was achieved from within existing resources and with the cooperation and motivation of the team throughout the pathway.

For further information relating to the work in NHS Ayrshire & Arran please contact denise.brown@aaaht.scot.nhs.uk.
7 Collaboration with other national projects

The Scottish Centre for Telehealth and Speakability were asked to submit a summary in their own words outlining their involvement in stroke services across Scotland.

7.1 Scottish Centre for Telehealth

In 2007 The Scottish Centre for Telehealth (SCT) began working with stroke teams across Scotland to explore the development of a ‘Telestroke’ network or networks, to provide equitable access to stroke thrombolysis where the necessary diagnostic imaging and high dependency care was already in place, thereby helping to improve the quality of acute stroke care across Scotland.

In Scotland a Telestroke network provides access to a stroke specialist at another site from the acute stroke patient, to both view the CT head image, via Picture Archiving and Communication System (PACS) and undertake an audio/visual patient consultation using video conferencing links.

The Telestroke Programme was involved in the development of the original SSCA audit tool for acute thrombolysis in Scotland, ensuring the inclusion of ‘thrombolysed following telestroke consultation’ to the audit. This now provides us with the percentage of patient’s thrombolysed via this model. This does not however, provide us with the number of patients who are assessed following a Telestroke consultation but this information is being collated through the Telestroke Programme.

Last year the SSCA Annual Report included a pictorial representation of the work achieved across the various projects within the Telestroke Programme by the end of 2009. These included:

- The provision of a hub and spoke service in the North of Scotland, providing 24/7 access to thrombolysis for patients in Dr Gray’s Hospital, Elgin and the Western Isles Hospital in Stornoway from Aberdeen Royal Infirmary - now a substantive service.
- The Lanarkshire pilot in Wishaw now rolled out to Monklands and Hairmyres Hospitals, providing a thrombolysis decision support service between the hours of 9am-10pm from the consultant’s office or home.
- In Fife the provision of an inter-hospital Telestroke link to provide in hours cover at both Queen Margaret Hospital, Dunfermline and Victoria Hospital, Kirkcaldy.
- In Lothian the development of an inter-hospital Telestroke link to provide out of hours cover for Western General Hospital, Royal Infirmary of Edinburgh and St John’s Hospital, Livingston.
- Preparatory work in Borders, Dumfries & Galloway, Fife and Forth Valley to allow the development of the South Telestroke Network, that would provide out of hours cover for these Boards from the Lothian stroke thrombolysis rota.
- Exploratory work to identify need for Telestroke services in Greater Glasgow and Clyde, Highland, Tayside and Shetland.
In April 2010 the SCT became part of NHS24 - a national organisation already successfully providing telehealth for general medical services to all citizens in Scotland. This provided an effective platform to drive the national Telestroke work forward. Throughout 2011, NHS24 is funding all further Telestroke developments and, where relevant, the evaluation of these.

From April 2010 until early 2011 further Telestroke developments include:

- Telestroke Workshop with South Telestroke Network planning group to agree options and preferred way forward for the South Telestroke Network.
- South Telestroke Network became fully operational (March 21 2011) providing out of hours access to thrombolysis across five Health Boards (Lothian, Fife, Forth Valley, Borders and Dumfries & Galloway).
- Telestroke workshop with West of Scotland planning group to identify best thrombolysis pathway for each Board within the West region.
- Agreement reached to extend the out of hours Telestroke cover in Lanarkshire to 24/7.
- Scoping work on a Telestroke link to provide Inverclyde Royal Hospital, Greenock with 24/7 access to thrombolysis from the Southern General Hospital, Glasgow.
- Provision of an Ayrshire & Arran inter hospital Telestroke link providing in hours consultant cover between Ayr Hospital and Crosshouse Hospital, Kilmarnock. Scoping of consultant home links to extend on call capabilities.
- Development of stroke consultant home links in Aberdeen, allowing sustainability of the Telestroke Service.
- Development of a Tayside inter-hospital Telestroke link initially, which may join to a larger Telestroke network in future.
- Scoping work to identify optimal Telestroke links for Lorn and Islands Hospital, Oban.
- Initial discussions with North of Scotland Planning Group around their provision of a Telestroke workshop to explore a regional model for North Scotland.

In summary, it is expected that by the end of 2011 there will be a Telestroke service in 12 out of the 14 territorial NHS Boards in Scotland. Once all is in place it is estimated that 85% of eligible patients (eligible = approximately 10% of ischaemic strokes) will receive thrombolysis across Scotland by both face-to-face and telestroke services. Only two Island Boards are not included; Shetland, who now deliver a face to face service during the times of CT availability and Orkney, who currently have no immediate access to CT imaging.

This work has only been possible because of the collaborative working across NHS Boards, regions and national organisations both NHS and voluntary. Particular mention goes to the National Advisory Committee for Stroke MCN sub-group, acute stroke teams in all NHS Boards, Chest, Heart and Stroke Scotland and the eHealth departments in each NHS Board, who have provided continuous ongoing support over the developments to date.

Contact details:

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**Scottish Centre for Telehealth**
NHS 24, Riverside House  
Riverside Drive  
Aberdeen, AB11 7LH  
website: www.sct.scot.nhs.uk
7.2 Speakability in Scotland

Aphasia is a communication problem following an event such as stroke or head injury. It affects reading, writing, speaking and understanding. It is a very frustrating condition and people who suffer from it can have great difficulty expressing themselves in everyday life.

Speakability is the national charity that supports people with Aphasia to overcome the barriers they face by:

- Supporting people with Aphasia and their carers through its Information Service, national network of Self-Help Groups and programme of activities;
- Influencing individuals, organisations and statutory bodies in order to improve services for people living with Aphasia; and
- Raising funds to support these aims.

At present, there are 4 active Self-Help Groups in Scotland: Aberdeen, Dundee (Tayside), Edinburgh and Glasgow. Each group provides mutual support with regular meetings, social activities and outings to raise awareness of the condition in this area.

Speakability is keen to engage in projects which may enhance the lives of those who suffer from this devastating condition. As an example of this the Edinburgh Group of Speakability was successful in 2009 in receiving a grant from the Long Term Conditions Alliance Scotland (LTCAS). This innovative user-led project (the Edinburgh Speakability Computer Course) was implemented for us by staff and students at Queen Margaret University, Musselburgh. The project was designed to encourage people living with long term conditions to learn more about the management of their condition, and to become active partners in their own care. Aphasia can prevent people from accessing a whole range of leisure activities and essential services, including the use of computers and access to the wider technological world. Thus assistance with and access to computers can help those suffering from aphasia to enjoy the same information, communication and leisure opportunities enjoyed by the rest of the population.

Contact details:

**Edinburgh Speakability Group**
contact: Graham McGuire [graham@mcguire.org.uk]
helpline: 080 8808 9572 (Mon-Fri 10am-4pm)
email: speakability@speakability.org.uk

**Speakability**
1 Royal Street
London SE1 7LL
website: www.speakability.org.uk
List of References


6. www.businesslinks.org.uk

Appendix A: Managed Clinical Networks

All NHS Board Stroke Managed Clinical Networks (MCNs) were asked to submit a summary in their own words detailing:

1a/ 1b. How they utilise the SSCA data within their Board to inform practice and inform change/ improvement.

2. The actions they plan to take in their local areas to improve performance against NHS QIS standards for stroke care and thereby improve the delivery of stroke care for their patients.

MCN key contacts for each NHS Board can be found in the Contacts section at the end of this report.

NHS AYRSHIRE AND ARRAN

1a. SSCA data

At a clinical level, the SSCA data reports are used to routinely monitor adherence to QIS standards on a month by month basis.

There are regular reports provided to the clinicians and discussed locally with other services such as imaging and speech and language therapy. Ad hoc requests are also utilised to provide more detailed information on process and gaps in the service along with other locally collected data. These have been used to inform the demography of patients including postcode, information which can be shared with the Scottish Ambulance Service to assist further development of thrombolysis services for the whole of Ayrshire & Arran.

1b. Examples of use of SSCA data to inform change/ improvement

Hyper Acute Stroke Unit (HASU): The data have been used to look at the pre and post implementation of the HASU areas at both Ayr and Crosshouse Hospitals. The HASU is a six bedded acute area where intense monitoring and expertise is provided within the Acute Stroke Unit itself. The data have shown an improved service with shorter length of stay, improved direct admissions to the unit with the consequent increase in the QIS standards of care (Section 6.3).

TIA Referral: Using the TIA data there have been changes to the TIA Clinic referral system and clinical format. Patient time to being seen is now well under 7 days and indeed reducing the time to 3-4 days in both hospitals, in line with evidence based practice. The local TIA Primary Care Referral Guidelines have been updated and visits to surgeries to promote these are being undertaken by the Lead Nurse. Data on inpatient TIAs have also been studied to inform improvements in the pathway.

Thrombolysis: Data regarding the age and sex of thrombolysis patients have been used to inform the future plans in relation to the aging population. Details of when thrombolysis cases come into hospital have also been used to map how services should be designed to prove most effective. Along with other data collected locally, reasons why patients are not suitable for thrombolysis have been studied and raised the importance of the FAST campaign for the public to realise the need for calling 999 for urgent attention.

We have also provided a breakdown of length of stay and destination on discharge from rehabilitation data to a Dietitian and looked at prescribing data for the pharmacy department e.g. Statins and Aspirin.

In summary: Routine collection and review of these data are of great value to the unit in reviewing performance at frequent intervals.
NHS BORDERS

1a. SSCA data
- A monthly report is issued to the Stroke Multi-disciplinary team and Stroke MCN via email circular.
- Data are displayed in staff areas in the Admissions Ward, Day Hospital and Stroke Unit.
- Verbal feedback on patterns are given to the relevant members of the team.
- Data are used by members of the management team, Stroke MCN and clinical staff as required for specific projects.
- Data have been exceedingly useful as a resource during a LEAN redesign project carried out in 2010 and continue to provide progress information in key areas.

The main areas of redesign have been:
- Patient admission pathways into hospital from the Scottish Ambulance Service (SAS).
- Patient admission pathways from medicine to the Stroke Unit.
- Patient pathways for appropriate use of community hospital and out-patient resources.
- Identification of good practice and care to encourage in education programmes, e.g. swallow assessment, CT referral guidelines.
- Key areas to ensure clear documentation, e.g. swallow assessment.

1b. Examples of use of SSCA data to inform change/improvement
- Patient admission pathway from SAS to Medical Admissions Unit (MAU).
- Guidelines for patient assessment in MAU before transfer to Stroke Unit.
- Patient pathway from MAU to Stroke Unit.
- Implementation of CT scanning protocol for evening and weekend scanning.
- Educational programmes established to maintain knowledge of standards and aim to improve care.

2. Actions to improve delivery of stroke care
Admission to Stroke Unit on day of or day following presentation at hospital (Day 0 and 1)
Continued implementation and adjustment of patient pathways and protocols (as above) established in 2010.

Planned restructuring of the ward and reconfiguration of the bed complement within the Stroke Unit.

Swallow Screen on day of admission
Continuing educational programme and feedback for the nursing staff and junior doctors in relevant areas.

Brain Scan on day of admission
Educational programme for medical staff on evening and weekend scanning availability.
Implementation of scanning from 9pm to 9am for thrombolysis patients being assessed by telemedicine.
Aspirin on day of admission or day following admission (Day 0 or 1)
Part of education programme for nursing and medical staff.

Thrombolysis (numbers seen, processes, door to needle times)
Continued medical education for Primary Care, SAS, Emergency Department, Medical and Nursing staff about current thrombolysis service.

Pilot of Telestroke Network for Out of Hours and weekends, started in March 2011.

Case review and feedback to staff after each individual case.

Carotid Intervention
Continue referral of appropriate patients to Vascular Surgery Services in Lothian.

In summary: During 2010 a large amount of work was carried out reviewing our admission and assessment process covering the patient pathway from the community and on to community discharge. Using the SSCA data, continued work is being carried out to adjust pathways to achieve the best care possible for stroke patients and achieve the QIS standards. Education programmes with new members of staff and to maintain awareness are pivotal to successful implementation.

Further work in 2011 is being carried out to review the bed complement and arrangement within the Stroke Unit to prompt admission, mindful of the standards and future targets.

NHS DUMFRIES AND GALLOWSY (D&G)

1a. SSCA data
Within NHS the D&G SSCA reports are disseminated by the stroke MCN to colleagues across the organisation working within stroke. The monthly reports are discussed at the stroke service group and sub group meetings. The acute stroke service group monitors the performance and identifies areas for improvement. If these are identified as a risk they are added to the risk register and clear actions identified to address the problem.

NHS D&G use these data to review and identify areas of improvement within the stroke service. The data are reported on a monthly basis across the Stroke MCN. These data are timely which allows us to act appropriately to changes and review our practice. It also allows the organisation to see how we are doing against the QIS standards.

1b. Examples of use of SSCA data to inform change/ improvement
Within D&G Royal Infirmary (DGRI) we identified an admission bed within the ASU to allow for direct admissions Monday to Friday during the hours of 9am -5pm. This was to allow us to have the capacity for direct admissions. In addition to this we also identify patients suitable for transfer to rehabilitation. This has improved overall admissions but we still face challenges around admitting on day of admission. In part this is due to MAU and medical staff working directives.

2. Actions to improve delivery of stroke care
The Stroke MCN acknowledge there are key areas for improvement and this informs the action plan for 2011. We are about to review swallow assessment and implement strategies to improve compliance. The acute stroke sub group will be engaging with colleagues to re-evaluate the admission bed in ASU and how we can use this more effectively.
Admission to Stroke Unit on day of or day following presentation at hospital (Day 0 and 1)

Although we have improved the overall admissions to the ASU we note that admissions on day of presentation are still below the current standard. Despite an identified admission bed within ASU there are often issues around bed occupancy rates within DGRI and it is often used for non stroke patients. This continues to be a key area for improvement for 2011.

Swallow Screen on day of admission

This continues to be a challenge for the stroke MCN. The speech and language therapists are providing training to nursing staff and junior medical staff within the ASU and MAU. There has also been a review of the documentation and we are about to repeat this for 2011.

Brain Scan on day of admission

Despite access to CT scan 24/7, in practice during out of hours if stroke patients are stable then CT will be requested the following day.

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

This is linked to CT scanning results and the whether there is a report available post CT. There is a medical staff handbook available which clearly outlines the management of acute stroke. However we need to look at strategies to improve this.

Thrombolysis (numbers seen, processes, door to needle times)

During 2010 we have established a thrombolysis service across the region. We are able to deliver this at two sites: DGRI and the Galloway Community Hospital. There are protocols in place and the SAS also pre-alert the A&E department when they have a potential patient. This service is developing and we are embarking on a 24/7 service with additional support from the South Telestroke Network project.

In summary: The Stroke MCN acknowledges that there continues to be challenges and also recognises the current work being undertaken around the redesign of DGRI and how this may impact on the stroke service. The stroke MCN remains committed to provide a high quality of service which is patient focussed across NHS Dumfries and Galloway.

NHS FIFE

1a. SSCA data

Data are sent monthly to a range of relevant people for their information on performance. The acute clinicians’ subgroup of the MCN is responsible for overseeing the action plan related to the audit, and monitoring monthly performance. Receiving data monthly means we can react quickly to any changes, and analysing the data in more depth informs us of performance.

The data have been used to:

- influence the development of a stroke outreach service;
- develop and pilot the use of a Stroke Care Bundle relating to QIS standards;
- scrutinise where there are delays in the system and come to an agreement with medical staff in A&E over prompt ordering of CT scans;
- initiate and audit time delays between admission to an Acute MAU (AMAU) and actual review by a doctor;
- initiate an audit of time of symptom onset and time of admission in relation to suitability for thrombolysis;
• assess differences in performance between two sites, investigate why and then learn from this;
• adapt stroke management proforma, audit its use, and expand to A&E; and
• pilot the use of a triage bed on the Acute Stroke Unit (due to bed crisis not been trialled yet, however new multidisciplinary screening and assessment tools have been developed).

1b. Examples of use of SSCA data to inform change/ improvement

The pilot of an outreach stroke service at the Victoria Hospital Kirkcaldy (VHK) site showed an improvement in performance. However this may be inconsistent and if there is not an outreach nurse available (for a number of reasons) then performance may drop. It was felt that the NHS QIS standards fitted particularly well with models of care for Scottish Patient Safety Programmes. Using a driver diagram and change package we developed an acute stroke care bundle, we hope to be able to identify percentage of stroke patients who achieve all elements of bundle as well as individual items of the bundle. This is currently being piloted, using Tests of Change and revision of documentation. Information is being gathered and analysed on an Excel spreadsheet with a view to entering it on the Institute for Healthcare Improvement extranet which will produce run charts.

2. Actions to improve delivery of stroke care

For each of these standards these actions apply:

• development of a Care Bundle which includes access to CT, Stroke Unit, Water Swallow Screening and Aspirin initiation;
• regular feedback to relevant staff on performance, change and re-audit;
• trial of a triage bed in VHK Stroke Unit planned;
• proforma indicating NHS QIS standards and management;
• development of outreach service, Senior Nursing Staff proactive and ‘pulling’ patients into Stroke Units from AMAU & A&E and ensuring appropriate management of strokes; and
• initiating incident forms if appropriate.

In addition:

Admission to Stroke Unit on day of or day following presentation at hospital (Day 0 and 1)

• Reviewing rehabilitation pathway & following earlier supported discharge options.
• Improving access to unit for patients aged under 65 years.
• Medical Directorate Manager and Local Development Planner lead for HEAT target on MCN subgroup.

Swallow Screen on day of admission

• MCN subgroup to address dysphagia management.
• Water Swallow Screening part of Practice Development training programme across both acute sites.
• The stroke specialist nurse has organised training within ward settings, A&E, AMAU’s and HDU at mutually convenient times. It is recognised that documentation is also an issue.
• A unique initiative has been to train band 3 health care assistants in Water Swallow Screening. We will monitor this carefully.
• Revamp of form and in triplicate.
• Awareness poster highlighting the “fit, fair and flat”.
Brain Scan on day of admission

- Agreement with A&E medical staff to order CT scans early.
- Increase awareness of availability of scanning.

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

- The use of Patient Group Directives for aspirin was investigated with pharmacy (this is something that is not used in Fife generally and is unlikely to be adopted).
- Encourage use of alternative routes for those with swallowing difficulties.
- Encourage use of stat doses as soon as result of CT is known.
- Getting CT result more quickly.

Thrombolysis (numbers seen, processes, door to needle times)

- At present we have availability 9am – 5pm Monday to Friday or if a stroke consultant is on call. Two acute sites linked by telehealth with an identified stroke consultant on call for the service. Development of a South Telestroke Network through the National Centre for Telehealth work is ongoing with SEAT and hope to have 24/7 availability via telehealth using a hub and spoke model.
- Local Fife FAST campaign launched in spring 2011 to raise public awareness.
- Need to work with A&E to ensure appropriate referrals for thrombolysis.
- Education; the MCN has also delivered training and this is ongoing for staff involved in delivery of thrombolysis.
- An audit of delays in patient journey ongoing.
- Regular feedback to relevant staff.

Access to TIA clinic

- Since 2009 the number of available clinics has increased from 2 in a week, to 4.
- An identified secretary is responsible for appointing, including phoning patients to first available clinic either VHK or Queen Margaret Hospital (QMH).
- Encouraged to fax referrals.
- A hotline for GPs to contact stroke physician is in place.
- Improve awareness of the service through GP road shows, attending Protected Learning Time in Community Health Partnerships.
- Update the TIA clinic referral form to indicate the extra clinics and hotline.
- Update the GP guidance document to reflect increase in clinics and hotline number.

NHS FORTH VALLEY (FV)

1a. SSCA data
The monthly SSCA data are reported to the unit Clinical Governance committee and hence upwards to the Board. Generally data are used to maintain a distinct profile and to highlight areas of concern affecting stroke services and to use in discussion with other elements of clinical services to inform change.

There is greater confidence in the reliability of the SSCA data than some other published datasets as the information is collected and validated by interested and informed specialist staff. These data have proved extremely useful in monitoring overall demand and activity, length of stay and highlighting areas of challenge. It is often used to inform discussions with other clinical groups and hospital management when seeking to change, support or protect stroke services.
1b. Examples of use of SSCA data to inform change/ improvement

All acute local hospital services are undergoing significant change as we plan for a move into the new Forth Valley Royal Hospital and community hospitals. We have used real patient outputs from the SSCA data to populate bed models and help redesign local inpatient provision.

Use of the SSCA data was instrumental in both achieving significant resource and change to meet neurovascular clinic waiting times and in providing early evidence of slippage against the target so that remedial action could be taken.

We have also utilised the information to start improvement work in our acute admission unit. We will shortly be commencing a stroke bundle targeting swallowing, aspirin and CT deliveries.

2. Actions to improve delivery of stroke care

Admission to Stroke Unit on day of or day following presentation at hospital (Day 0 and 1)

Review whole acute stroke pathway to streamline flow and maximise early access to specialist care. This will include working with Acute Physician and Emergency Department colleagues to agree assessment and decision protocols for stroke patients, including delivery of thrombolysis.

Continue to work towards protection/ ring fencing of acute stroke bed to support flow within the acute pathway.

Maintain movement through the system by streamlining rehabilitation processes, developing clear pathways based on milestones with identified criteria for progression through the system and supporting early/ earlier discharge where appropriate.

Swallow Screen on day of admission

Maximise admission to the Acute Stroke Unit within 24 hours of presentation.

Target training by speech and language therapists at specific groups such as Advanced Nurse Practitioners in front door areas to perform initial swallow screening supported by appropriate documentation.

Introduction of stroke bundle in acute admission unit.

Brain Scan on day of admission

The stroke service will work with radiology to deliver CT scanning at the time of admission using agreed criteria.

Introduction of stroke bundle in acute admission unit.

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

Maximise admission to the Acute Stroke Unit within 24 hours.

Expedite CT scanning (above).

Agree care protocols/ bundles with Acute Physicians (above).

Thrombolysis (numbers seen, processes, door to needle times)

Include thrombolysis in assessment and treatment protocols as part of revised pathways (above).

Continue to encourage and support non-stroke consultant staff to gain training in stroke thrombolysis.
Participate in Telestroke Network pilot supported by NHS Lothian.

Continue to refine local protocols for urgent transfer by the SAS of potentially suitable patients to hospital.

Continue to support campaigns (e.g. FAST) to enhance awareness of stroke symptoms and encourage early presentation.

**In summary**: Overall acute hospital capacity on the Stirling site continues to be a major challenge to early entry to Acute Stroke Unit. This is likely to continue into the first half of 2011 but we would expect the situation to ease when all acute hospital services move into Forth Valley Royal Hospital in July 2011.

The service continues to be affected by a consultant vacancy carried since February 2010, however review of services; delivery etc. should lead to overall improvements.

The SSCA report will continually be utilised to inform service delivery and targeted improvements.

**NHS GRAMPIAN**

1a. SSCA data

We do not use the reports on a monthly basis. We find it more valuable to review them quarterly. In the acute setting monthly data are used to look at the impact of changes in service organisation (such as reorganisation in clinic services). The monthly data can be difficult to interpret due to the large variations in number of patients admitted per month.

The Board would support the recommendations of the MCN but ultimately it is NHS Grampian’s decision to implement change.

1b. Examples of use of SSCA data to inform change/ improvement

It was apparent that our swallow screening was not being recorded properly which was reflected in the poor results in the SSCA. A protocol and recording proforma have been developed which we anticipate will improve this standard.

2. Actions to improve delivery of stroke care

**Admission to Stroke Unit on day of or day following presentation at hospital (Day 0 and 1)**

This is unlikely to be achieved in the next financial year but would hope to be achieved by April 2012.

**Swallow Screen on day of admission**

A protocol and proforma have been developed. We are looking at practical ways of delivering training across NHS Grampian to try and ensure implementation. We hope to do some joint working with the Scottish Patient Safety Programme to try and address these issues.

With the above target aiming to be met, i.e. admission to Stroke Unit, then the percentage of patients swallow screened will improve overtime.

**Brain Scan on day of admission**

Neuroradiology within Aberdeen Royal Infirmary (ARI) do not accept the evidence base on which the recommendations of SIGN and the QIS standards are based. Therefore they do not believe it necessary to scan patients on day of admission, unless there is a clear clinical indication, such as consideration for thrombolysis or patients on Warfarin therapy.
Aspirin on day of admission or day following admission (Day 0 or 1)
This is limited by access to the Stroke Unit and imaging delays.

Thrombolysis (numbers seen, processes, door to needle times)
There is a 24/7 on call service run by four consultants for NHS Grampian and NHS Western Isles, which provides telemedicine support for Dr Gray’s and Western Isles Hospital. Thrombolysis rates for ARI and Dr Gray’s surpass the QIS target.

There is ongoing work to improve the door to needle time by addressing issues in A&E and radiology (particularly out of hours delays). The new emergency care centre at ARI is likely to have onsite out of hours radiographer support.

Within Dr Gray’s Hospital they have an extremely responsive Radiology service and their door to needle time is usually excellent.

Carotid Intervention
The data on Carotid Intervention is difficult to collect due to the parallel national Royal College of Surgeons audit that is taking place.

In summary: We feel that going back to quarterly reporting would be more useful and would provide more accurate figures. However, monthly figures do allow us to assess the effect of holidays etc, and also to report the variation per month in total patient numbers.

NHS GREATER GLASGOW & CLYDE (GG&C)
1a. SSCA data
Data are circulated monthly to the senior managers group and to all stroke consultants. The data are used in monthly performance management including reports to Health Board level.

Where targets are not being met or performance has deteriorated local managers and clinicians are asked for reasons for this. SSCA data are used in planning service changes.

1b. Examples of use of SSCA data to inform change/ improvement
Imaging performance had deteriorated in Stobhill Hospital. Local review of systems showed changes in processing of radiology requests following re-location of the CT scanner. Receiving ward protocols were updated with subsequent improved performance.

2. Actions to improve delivery of stroke care
Admission to Stroke Unit on day of or day following presentation at hospital (Day 0 and 1)
The only significant problem area is in North East (NE) Glasgow: this should resolve following patient pathway changes when Stobhill Hospital’s acute beds move to Glasgow Royal Infirmary in March 2011.

Swallow Screen on day of admission
Work with nurses both on ensuring swallowing is assessed and ensuring this is recorded continues in all units and will be a major focus in 2011.

Brain Scan on day of admission
The new NE Glasgow protocols should ensure the majority of stroke patients are CT scanned on arrival. The West and South units already scan a large number on day of admission. The NE experience will inform possible changes in the South and West to increase immediate scanning.
Aspirin on day of admission or day following admission (Day 0 or 1)
Historically delays have largely reflected delays in scanning and we anticipate aspirin performance will improve as scanning improves.

Thrombolysis (numbers seen, processes, door to needle times)
Performance already exceeds national standards.

Carotid Intervention
The standard was being achieved in Glasgow for local patients. However the service has recently been centralised in one hospital so we await further audit data to ensure performance has been maintained.

In summary: The SSCA data have proved locally useful but ensuring timely collection of accurate data remains a challenge given our high levels of activity and numerous sites of service provision.

NHS HIGHLAND
1a. SSCA data are used
- To highlight areas for improvement to unit(s) and hospital in general.
- To monitor progress.
- To inform pathway and protocol development that support and improve the patient journey.
- To inform review process, particularly in Raigmore at present where a review of the Unit was initiated in September 2010.

1b. Examples of use of SSCA data to inform change/ improvement
- Review of assessment of new strokes admitted to the Stroke Unit (Raigmore).
- Audit capture form for swallow screen developed.

2. Actions to improve delivery of stroke care
Admission to Stroke Unit on day of or day following presentation at hospital (Day 0 and 1)
- Work with Medical Admissions Unit to improve communication and referral.
- Review of discharge planning.
- Work with community hospitals and local authority etc.

Swallow Screen on day of admission
- Outreach by stroke team.

Brain Scan on day of admission
- Review of current service arrangements underway with Radiology Department.

Aspirin on day of admission or day following admission (Day 0 or 1)
- Secondary prevention protocol under review in conjunction with Pharmacy Services.
- Linked to review of arrangements for CT Scanning.

Thrombolysis (numbers seen, processes, door to needle times)
Highland continues to increase numbers of patients being thrombolysed. This is as a result of a significant amount of work with our colleagues in A&E, SAS and NHS24.

Pathway is currently being developed that supports rapid access for imaging and secondary imaging.

**Carotid Intervention**

- Discussions taking place regarding increased access to theatres.

**Admission to a Stroke Unit in line with new Scottish Govt. HEAT Target**

It should be noted at this point that only Raigmore in Inverness and the Lorn & Isles in Oban have Stroke Units. The Rural General Hospitals in Wick and Fort William admit strokes to their general admissions units.

In Raigmore all admissions to the Medical Assessment Unit (MAU) are screened daily for patients with an initial diagnosis (confirmed or suspected diagnosis of stroke). A representative from the stroke team visits MAU at least daily to assess admissions for transfer to the Stroke Unit. The introduction of the Electronic Admissions System has helped identify admissions at an earlier stage and review by the stroke team takes place within 24 hours of admission.

As part of the assessment process approximately 16% of diagnosed stroke patients admitted to the Stroke Unit were considered and deemed inappropriate. There were a number of reasons for the decisions including other medical conditions requiring specialist and intensive care (this includes those thrombolysed) and palliative care needs. The stroke team continue to assess and be involved in the care of those patients as it is with any stroke patients listed and awaiting a bed on the Unit.

**In summary:** In 2010, with incomplete data NHS Highland is showing a significant increase in stroke diagnosis with 454 for the first 11 months of the year compared to 2009 where there were 421 admissions with a diagnosis of stroke to Highland Hospitals (Belford (Fort William), Caithness General (Wick), Lorn & Isles (Oban) and Raigmore (Inverness)). In May 2010 for example there were an unprecedented number of strokes admitted to Raigmore, an increase of 38% on the normal monthly admission rate.

**NHS LANARKSHIRE**

**1a. SSCA data**

MCN - the data are shared with the ward managers informally to give an update on performance in order that they can discuss during team meetings. It also, on a monthly basis forms the main body of the agenda for our Stroke Clinical Effectiveness meeting.

NHS Lanarkshire Board - the data forms part of our board monthly Clinical Governance Corporate Report and is shared with the boards Clinical Effectiveness Steering Group to monitor progress of the MCN workplan and highlight any areas of concern in relation to performance.

The MCN uses the data as described above, it informs all of our change processes in relation to the NHS QIS Standards. It acts as our outcome measure in relation to any changes to practice and informs staff of variation in performance. Over time we have built a relationship between staff and the data system to assist them in understanding that it is a measure of good patient care and not of obscure meaningless targets.
1b. Examples of use of SSCA data to inform change/ improvement

On one of our District General Hospital (DGH) sites where the Stroke Unit beds were remote from the main hospital we used the data in relation to ‘time to admission to Stroke Unit’, to influence the move of those beds onto the main hospital site as the performance was significantly worse than at the other two DGHs where the Stroke Unit was in the main hospital. As a consequence of this move the performance significantly improved.

On all three sites swallow screening was poor despite efforts to train staff in areas outwith the Stroke Units, i.e. A&E and medical receiving units. By sharing the data with the nursing staff on all three sites we were able to change practice and monitor the impact. The nursing staff from the Stroke Units now in-reach to A&E and medical receiving units and carry out the screening and the standard of care has improved. We are able to demonstrate this improvement to staff through feedback using the audit data.

2. Actions to improve delivery of stroke care

Admission to Stroke Unit on day of or day following presentation at hospital (Day 0 and 1)

We are currently examining in some detail the patient journey and for each patient identifying the reason why they have not reached the Stroke Unit within the appropriate time frame. This will help inform our action plan and steer our developments over the next 12 months.

Swallow Screen on day of admission

We continue to offer an in-reach service to our receiving units to ensure that patients are swallow screened as soon as possible. We also hope that through earlier diagnosis and admission to the Stroke Unit swallow screen rates will also improve. Ongoing education to A&E and emergency receiving unit staff should also assist in improving the number of patients receiving swallow screening at a more appropriate time.

Brain Scan on day of admission

We are working with Radiology teams to establish relationships where they contribute as part of the stroke team. We are currently working on protocols for immediate CT scanning, and access to CT scanning out of hours and the referral processes involved in this.

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

We continue to include the urgency of CT reporting and the prescription of aspirin in the nursing and junior medical staff education and induction programmes. We have recently re launched our ‘Time to Aspirin’ posters which we hope will encourage medical and nursing staff to ensure prompt prescription and administration.

Thrombolysis (numbers seen, processes, door to needle times)

We have now established our thrombolysis service on our three hospital sites and plan to move to a 24/7 service within this year. We have also established a governance structure to allow us to examine our processes and as a consequence make the necessary changes to improve our door to needle time.

In summary: The Stroke MCN in NHS Lanarkshire actively encourages the data to be used by clinical staff and be seen as an indicator of good patient care and not as a remote method of performance monitoring. We actively encourage our ward managers to use the data as part of ward meetings and reports to encourage wider participation in its use and to encourage staff to see quality and development as part of what they do on a daily basis.

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We regularly use the data when meeting with clinicians and use it as a focus for shaping developments, sharing good practice and to identify gaps and trends in service provision. This use of data has created a healthy competition between our team where ideas and examples of good practice are shared, explored and where appropriate duplicated.

**NHS LOTHIAN**

1a. **SSCA data**

SSCA data are circulated to management, consultants, bed managers, nursing and therapy staff – for data to be used at regular meetings to show improvement in performance and processes, and displayed in staff-only areas. The table below shows the dissemination of the SSCA data.

**Dissemination of data**

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<th>SU access</th>
<th>Scan</th>
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The SSCA data have been used as the basis for a Lean event to improve standards (Section 6.1).

1b. **Examples of use of SSCA data to inform change/improvement**

- Analysis of data relating to brain scanning to identify the causes of delays and allow us to improve our performance against the relevant NHS QIS standards.
  - These analyses showed counter to expectations that most delays were not in radiology, but rather were due to delays in clinical staff requesting the scan on the electronic ordering system or failing to inform the radiographers. It also highlighted the dilemma of when to perform scans on stroke patients who are admitted in the evening when only emergency scan can be done at additional costs.

- We have introduced a checklist for doctors and nurses to complete for each patient on admission which will prompt them to request scans earlier. It also should ensure that very urgent scans are done without delay.

For further information on the Lean in Lothian event and subsequent changes see section 6.

2. **Actions to improve delivery of stroke care**

Development of one page Stroke Checklist (see Section 6.1) - we have identified ‘champions/trouble shooting leads’ on each site to encourage its completion and to take forward other issues.

In addition the following strategies have been introduced:
Admission to Stroke Unit on day of or day following presentation at hospital (Day 0 and 1)

- Trial of direct admission to Stroke Unit, 9am–5pm.
- A bed in the Acute Stroke Unit will be protected for new stroke patients.
- Daily 'staff huddles' to ensure patients are moved on without delay and to allow Stroke Unit beds to become available each day.
- Robust system to ensure that stroke admissions are directed to the acute hospital with Stroke Unit beds available.

Swallow Screen on day of admission

- Swallow screen documentation printed on the reverse of the front door stroke checklist.
- Nursing staff at front doors trained in undertaking the assessment and recording it.
- Site leads nominated to take forward training plan, and agreed timescale for all staff to be trained.

Brain Scan on day of admission

- Clarification of wording used on electronic request that will prompt an immediate scan.
- Established system to ensure that result of scan is available immediately.
- Reviewing potential for radiographers to be onsite for greater parts of the night.
- Directing patients who need immediate scans to the hospital best able to deliver this out of hours.
- Develop training plan for radiology juniors and CT radiographers regarding need for early scanning in stroke.

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

- Stroke Checklist instructs staff to access scan results and prescribe a standard dose (oral or rectal) of aspirin if appropriate.
- Junior staff prompted to inform nursing staff when prescribed, so it can be given.

Thrombolysis (numbers seen, processes, door to needle times)

- Pre-hospital protocol agreed with the SAS. Paramedics can contact consultant stroke physician directly to discuss patients who may be suitable for hyperacute treatments.
- The Stroke Checklist prompts personnel at the front door to alert the stroke team (including a porter, nurse and radiographer) simultaneously once the paramedic has alerted the hospital of their impending arrival.
- We have established Morbidity & Mortality meetings to review delays and improve processes.
- Co-ordinate training of staff in using video conferencing equipment to hasten treatment time.

Carotid Intervention

By monitoring delays to carotid endarterectomy over the last 4 years we have dramatically reduced these delays and now often operate on patients within 14 days. We continue our efforts to reduce delays.

In summary: The SSCA data are an essential driver for service improvement.
NHS ORKNEY

1a. SSCA data
The Monthly Reports are distributed to the Acute Ward Medical Team and the MCN members. They have recently been requested by the Hospital Manager who will be responsible for the HEAT Target.

Reports are used to monitor progress against the QIS standards, following last years meeting and National Report work was been undertaken to improve awareness of stroke and the need to capture audit data at the ‘front door’ and acute areas within the hospital. This has resulted in significant improvement in some areas, e.g. swallow screening.

1b. Examples of use of SSCA data to inform change/ improvement
Communication with the Stroke Unit in NHS Grampian has improved with advice being sought as soon as possible when potential stroke patients are admitted.

The SSCA data in combination with locally collected data will form part of the business case and campaign for a CT scanner in NHS Orkney.

The establishment in 2010 of the Long Term Conditions MCN and Stroke MCN sub-group has resulted in increased awareness of the NHS QIS standards and performance against these. It has also helped progress work in various areas as outlined below.

2. Actions to improve delivery of stroke care

Admission to Stroke Unit on day of or day following presentation at hospital (Day 0 and 1)

Engaging with Acute Ward Medical Team to raise awareness of need for liaison for timely transfer of patients to NHS Grampian. Within NHS Orkney raising awareness of the need to arrange swift transfers has resulted on occasion the GPs alerting the air ambulance of a potential transfer before the patient has even arrived at the hospital.

Discussions are ongoing re the criteria to be met to determine if NHS Orkney has ‘designated stroke beds’ for patients admitted to Balfour Hospital that are unable to travel to Aberdeen and therefore meet the HEAT target.

New stroke pathway is being implemented.

Discussions ongoing regarding the acute medical team covering Assessment and Rehabilitation Ward to allow direct admission of acute stroke.

Recently commenced public FAST campaign.

Swallow Screen on day of admission

Awareness raising in acute areas and display of posters and swallow screen information as well as focussed ongoing training has resulted in improvements in swallow screening.

Brain Scan on day of admission

In the absence of a local CT scanner ongoing liaison with NHS Grampian and the SAS to ensure patients transferred in a timely manner for scanning.

Business case prepared and discussions/campaign are ongoing in relation to securing a CT scanner in NHS Orkney.
Aspirin on day of admission or day following admission (Day 0 or 1)
Protocol is in place agreeing that all patients with stroke should have aspirin pre CT scan. It is recognised that there is still a need to encourage peers to adhere to this. Also training nurses to remind doctors of the agreed pathway for the prescribing of aspirin in stroke patients are in place.

Thrombolysis (numbers seen, processes, door to needle times)
Difficult to achieve with no CT scanner, however due to increased awareness and improved retrieval processes we have successfully transferred two patients to Aberdeen for thrombolysis.

Carotid Intervention
These interventions are carried out in NHS Grampian and at present no feedback is given to the audit team. It is anticipated that transfer of information will improve with the development of the new eSSCA computer system.

In summary: Ongoing issues due to the lack of CT scanner and dedicated stroke beds combined with transport difficulties particularly due to winter weather issues.

NHS SHETLAND

1a. SSCA data
The data are used to check the clinical team’s compliance with the standards and SIGN Guidelines.

The data collection process for the SSCA helps to identify any omissions in treatment or gaps in the documentation of care provided.

1b. Examples of use of SSCA data to inform change/ improvement
We have formulated an admission checklist/ patient care pathway for use by the Junior Doctors in A&E and ward medical and nursing staff.

2. Actions to improve delivery of stroke care
Swallow Screen on day of admission
This is highlighted at the Medical Ward safety briefings and the need to document swallow screening on the bedside checklist is reinforced. Ongoing training is provided for staff through the STARS website.

Brain Scan on day of admission
We are looking to improve scanner availability and are in discussion with the Telehealth team.

Aspirin on day of admission or day following admission (Day 0 or 1)
We are looking at how to manage patients that we are not able to scan on day of admission in relation to their Aspirin therapy.

Thrombolysis (numbers seen, processes, door to needle times)
On checking our data, we have had no patients with a clinical diagnosis of stroke that have been eligible for thrombolysis during 2010.

In addition to the STARS online training already provided, Boehringer Ingelheim will be delivering further thrombolysis training in Shetland for medical and nursing staff in March 2011.
Carotid Intervention

Our local sonographer has recently retired, however another member of the team is currently undergoing further training to provide carotid scanning.

In summary: We have engaged in a dialogue with the SSCA representative in regard to the relevance of the standards in a remote and rural location, particularly relating to a dedicated Stroke Unit.

NHS TAYSIDE

1a. SSCA data

The stroke MCN actively encourages that the SSCA monthly reports are used to address improvement requirements and affect change with immediate effect. They are shared on a quarterly basis with the Tayside Stroke Improvement Board to influence and demonstrate continuous improvement performance.

On both acute hospital sites, the SSCA information is used to review quality of care on a weekly basis. The main 4 standards of acute stroke care are reviewed for all patients, and opportunities for improvement are investigated.

1b. Examples of use of SSCA data to inform change/ improvement

Opportunities to improve swallow screen assessment were identified through further education and training within Acute Medical Unit which receives all patients prior to transfer to speciality ward. Following discussion with clinical teams and service managers, all nursing staff in the acute admission ward completed the STARS core competencies, had swallow screen education, and thus improved the completion of swallow screening within hours of the early admission assessment.

2. Actions to improve delivery of stroke care

Admission to Stroke Unit on day of or day following presentation at hospital (Day 0 and 1)

In Ninewells Hospital the Acute Stroke Unit plan to continuously have one available ‘hot bed’ which will allow the urgent admission of a patient following thrombolysis, or with a query diagnosis of stroke. An admission pathway has been agreed with acute stroke physicians and acute admitting medical staff, and agreement that the Acute Stroke Unit has the capacity to admit 100% acute stroke patients. Patients who are confirmed as not having a diagnosis of stroke must then be transferred to the relevant ward.

In Perth Royal Infirmary, the successful appointment of an additional Acute Stroke Consultant will assist with the review of patients in the Acute Admission Ward and thus promote the timely transfer of patients to the Integrated Stroke Unit.

Swallow Screen on day of admission

In Ninewells Hospital the Acute Stroke Team continues to work with colleagues in Urgent Care to ensure the accurate documentation of a swallow screen as early as possible in the episode of care. Staff education has taken place, and a consistent verbal trigger tool approach from acute stroke clinicians re-enforces the need to screen all patients prior to their transfer to the Acute Stroke Unit.

Both acute sites investigate all instances of failure to document swallow screen
Brain Scan on day of admission

In Ninewells Hospital 24 hour imaging was introduced from Tuesday 1st February 2011. This will be protocol driven and a flow chart has been developed to inform medical and radiology staff of the requesting mechanism.

Perth Royal Infirmary continues to provide a Monday to Friday service within hours, and are considering other options regarding out of hours provision.

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

The Ninewells Hospital acute stroke team implemented a patient pathway advocating aspirin prescribing early in the patient journey.

Perth Royal Infirmary prescribes aspirin following the confirmation of a diagnosis of stroke using CT scanning.

Thrombolysis (numbers seen, processes, door to needle times)

Following agreement of the out of hours thrombolysis pathway, telehealth discussions are taking place to agree the IT infrastructure requirements and equipment for both acute hospitals was purchased prior to 31st March 2011.

NHS WESTERN ISLES

1a. SSCA data

The monthly reports are seen as a useful tool in providing a constant reminder of the requirement and benefits of ensuring that all stroke patients are given immediate treatment to help reduce morbidity and mortality and subsequently provide a better patient journey throughout the rest of their inpatient stay and beyond into the community.

The SSCA reports have become a standing item on the stroke MCN meeting agenda and consideration is being given to increasing the circulation of the contents of the SSCA reports to other relevant members of the healthcare team.

Through the MCN the Board ensures that the information contained in the SSCA is considered and acted on where necessary.

1b. Examples of use of SSCA data to inform change/ improvement

The disappointing results over the last few years of time of admission to the Stroke Unit resulted in a range of local awareness raising sessions for junior medical staff as well as staff in A&E and the other medical wards to improve the patient journey. This is already proving to be of benefit with staff alerting the Stroke Unit if a patient is inappropriately admitted to another ward area. This work is ongoing and a further cycle of audit review will occur to ensure the initial improvement is sustained.

2. Actions to improve delivery of stroke care

Admission to Stroke Unit on day of or day following presentation at hospital (Day 0 and 1)

Empower our front line Clinical Support Nursing staff to be able to facilitate direct patient admission to the Stroke Unit. Encouraging all ward managers to raise concerns if patients are inappropriately admitted to their clinical areas will further support this.
Swallow Screen on day of admission

Further developments are planned for the Integrated Care Pathway to raise the profile of the swallow screen.

Brain Scan on day of admission

Regular training sessions for junior medical staff to ensure compliance with access to CT scans seven days a week. This to be supported with the introduction of a new Stroke Unit admission policy which mandates that all patients are scanned before admission to the Stroke Unit.

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

The success of this step rests with the successful implementation of the CT scan measure and will be facilitated as noted for that standard.

Thrombolysis (numbers seen, processes, door to needle times)

This area has been very successfully implemented with an innovative telehealth solution with Aberdeen Royal Infirmary stroke service.

Carotid Intervention

The local GP and Nurse led TIA service has improved access to carotid scanning. The resultant timely assessments have already resulted in a patient receiving timely surgical intervention and this service is set to continue. The profile of this is also hoped to effect a similar improvement in access to carotid scanning for inpatients with stroke.

In summary: The SSCA has acted as a useful trigger to ensure that Western Isles Health Board continues to strive to improve the patient journey for all those presenting with symptoms consistent with stroke or TIA. This is in spite of the geographical and human resource difficulties experienced in the remote and rural area of the Western Isles.
Appendix B: Additional Information

Additional information is available on the SSCA website:

- Aims and methods of the audit.  
  http://www.strokeaudit.scot.nhs.uk/about.htm
- Audit documentation, e.g. data collection forms.  
  http://www.strokeaudit.scot.nhs.uk/Participants/main.html
- Core dataset definitions.  
  http://www.strokeaudit.scot.nhs.uk/Participants/main.html
- Current Steering Committee members.  
- Contact details of Project Team.  
  http://www.strokeaudit.scot.nhs.uk/contact.htm
- Previous Annual Reports.  
  http://www.strokeaudit.scot.nhs.uk/reports.html
- Information for Patients and Carers.  
  http://www.strokeaudit.scot.nhs.uk/Patients.html
Acknowledgements

This report could not have been written without the help of a great many people. This includes:

- 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.
- The SSCA Audit Team and ISD Publications Team as part of the Information Services Division of NHS Scotland who co-ordinate and collate the necessary information to produce the report and support the publication of the national report.
- Members of the Report Writing Sub-Group of the SSCA Steering Committee who have contributed to the writing of and commented on drafts of this report.
- The Scottish Government through the CHD & Stroke Strategy providing funding for the Scottish Stroke Care Audit.

This Annual National Report was prepared by Professor Martin Dennis, Hazel Dodds, Robin Flaig, David Murphy, Professor Peter Langhorne, Dr Christine McAlpine, Dr Mary-Joan Macleod and Diana Beard, with contributions from NHS Boards and partner organisations.

We would also like to thank Definitive Studio® Graphic Design and Communication for designing the new Scottish Stroke Care Audit logo as seen on the cover of this report.

Contact details: studio 01896 750867
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website: www.definitivestudio.co.uk

This report is also available as an Easy Access Public Summary, this version of the report can be found on the SSCA website (http://www.strokeaudit.scot.nhs.uk/reports.html).

We are grateful to Chest, Heart & Stroke Scotland, the Stroke Association, Speakability, patient/carer groups and health professionals that provided feedback on the 2010 Public Summary and the drafts of the 2011 Public Summary.
If you have any general questions about stroke care in your local area please contact your local Stroke Managed Clinical Network.

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<th>Contact Name</th>
<th>Phone Number</th>
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<tr>
<td>Ayrshire &amp; Arran</td>
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**Website**
http://www.strokeaudit.scot.nhs.uk
Contacts

Any questions about the SSCA should be referred to the Co-ordinating Centre. Please refer questions on:

- this report to Hazel Dodds, Robin Flaig or David Murphy;
- the SSCA computer system to Robin Flaig;

For general questions about the Audit please contact Hazel Dodds, National Clinical Coordinator for the SSCA.

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If you have general questions about stroke care in Scotland please contact Professor Martin Dennis, Chair of the Scottish Stroke Care Audit and the National Advisory Committee for Stroke.

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