Scottish Stroke Improvement Programme.

2016 report.

Contents

Foreword

High quality, responsive, patient-centred care for stroke remains a key priority for NHS Scotland, and the Scottish Government is committed to driving forward continuous improvements in this field. We greatly appreciate the insight provided by the Scottish Stroke Care Audit (SSCA) data, which we have found invaluable, both in gauging the success of our efforts and signposting areas for further consideration, in our on-going work to raise standards of stroke care throughout Scotland.

Through productive collaboration with the SSCA, we intend to use the data contained in this report to help fulfil our continued ambition to deliver integrated, safe and clinically effective health and social care – including providing support for longer-term treatment, care and recovery within patients' local communities.

It is extremely encouraging to see that this report shows further national progress towards delivering the level of care, which we aspire to provide to stroke patients throughout Scotland. The 'Stroke Care Bundle', which measures the provision of four key indicators that all patients should expect to receive, shows further year-on-year improvement in delivery – and now sits at 64% in 2015, which is an increase of 21% over the past 5 years.

Within the Scottish Government's overarching Stroke Improvement Plan, new initiatives such as the Scottish Ambulance Service Improvement Plan, which introduces a new 'pre-hospital' pathway and bundle designed to assist ambulance personnel in caring for stroke patients through the enhancement of skills and knowledge, will serve to effectively supplement and bolster overall levels of care even more.

These year-on-year improvements could not have happened without the dedication and passion of a large number of people, from frontline staff and carers to coordinators and analysts, whose hard work has produced such positive results. On behalf of the Scottish Government, I would like to offer my thanks and appreciation for all they have achieved. I am sure that through their commitment standards will continue to rise further in the coming years, and that the important data provided by the SSCA reports will continue to act as a vital tool in this process.

Dr Catherine Calderwood

Chief Medical Officer for Scotland

1   Scottish Stroke Improvement Programme

The NHS Scotland Quality Strategy[1] is the NHS Scotland Blueprint for improving the quality of care that patients and carers receive from the NHS across Scotland.

It sets out that an ambition for health care that is person centred, safe and effective, underpinned by the need to *"embed the mutual approach of shared rights and responsibilities into every interaction between patients, their families and those providing health services."* The Scottish Stroke Improvement Programme (SSIP) works with stroke Managed Clinical Networks (MCNs)/ Health Boards to focus on building capacity for all staff to ensure that they have the knowledge, skills and attitudes necessary to deliver high quality services.

Stroke remains the third biggest killer in Scotland and the leading cause of disability. Further reducing the number of deaths from stroke has been a clinical priority for NHS Scotland since the mid 1990s. Scotland continues to have exceptionally high levels of stroke related deaths compared to the rest of Western Europe.

The SSIP has set out ambitions to deliver world-leading stroke care which is consistently person-centred, clinically effective and safe. One of the key factors for success is that there is commitment to patient safety and, in particular, to avoiding infection and harm, using consistent and reliable improvement methods. One of the triple aims of the 2020 vision[2] is to further improve the quality of care provided, with one of the focuses being to improve the approach to supporting and treating people with stroke.

Structure of SSIP

National Advisory Committee for Stroke (NACS)

Scottish Government

Scottish Stroke Care Improvement Team

SSIP Lead

Clinical Priorities Team

SSCA Clinical Coordinator

Stroke MCNs

SSCA

Voluntary Sector

SSRN

SSNF

SSAHPF

Key:

SSCA (Scottish Stroke Care Audit)   **MCN**s (Managed Clinical Networks)

SSRN (Scottish Stroke Research Network) **SSNF** (Scottish Stroke Nurse Forum)

SSAHPF (Scottish Stroke Allied Health Professionals Forum)

To improve services effectively the SSIP recognises the need to set clear aims which have been established through the Scottish Stroke Care Standards (2013) and the priority actions from the Stroke Improvement Plan[3]. Through the Scottish Stroke Care Audit (SSCA) and the regular monitoring against the priority actions, performance is mapped and the Stroke MCNs develop action plans, test change and implement improvement methodologies.

The Stroke Improvement Programme Lead and SSCA National Clinical Coordinator work closely with the Health Boards to ensure the key priorities from the Improvement Plan and the Scottish Stroke Care Standards are implemented and monitored. However, it is ultimately the responsibility of each Health Boards Chief Executive to ensure that services improve. A brief response to the data contained in this report are shown in Appendix A.

The following table represents the self evaluated performance of Health Boards when benchmarking themselves against the Stroke Improvement Plan priorities, displayed in Red, Amber, Green (RAG), Blue or Black with further detailed information in Appendix C.

Generic key for RAG chart and RAG status pages 5, 7, 8, 10:

⬛ No process or pathway in place	🟩 Implemented but not delivered consistently
🟥 Available but not implemented	🟦 Complete and embedded in practice
🟧 Plan to implement or partially implemented	

	Ayrshire & Arran	Borders	Dumfries and Galloway	Fife	Forth Valley	Grampian	Greater Glasgow and Clyde	Highland	Lanarkshire	Lothian	Orkney	Shetland	Tayside	Western Isles
1.1 Public FAST	Green	Green	Green	Blue	Blue	Blue	Green	Green	Blue	Green	Green	Blue	Green	Blue
1.2 Early identification of stroke	Amber	Green	Green	Green	Amber	Green	Green	Green	Blue	Amber	Amber	Green	Green	Green
2.1 SAS	Amber	Green	Green	Amber	Amber	Amber	Amber	Amber	Amber	Amber	Amber	Green	Amber	Amber
2.3 Thrombolysis Process & Pathway	Amber	Amber	Amber	Green	Amber	Green	Amber	Amber	Green	Green	Green	Amber	Amber	Green
3.3 Intermittent Pneumatic Compression	Green	Black	Green	Amber	Green	Green	Green	Green	Green	Green	Black	Green	Amber	Green
4.1 Education Template & Training	Amber	Green	Amber	Green	Amber	Green	Green	Green	Blue	Amber	Amber	Amber	Amber	Green
5.1 TIA Access	Amber	Amber	Green	Amber	Amber	Blue	Amber	Green	Amber	Green	Blue	Blue	Amber	Blue
5.2 TIA Imaging	Green	Blue	Green	Amber	Green	Amber	Red	Red	Amber	Blue	Green	Amber	Amber	Amber
6.1 Anticoagulation for AF	Amber	Green	Blue	Green	Amber	Amber	Blue	Amber	Amber	Amber	Amber	Blue	Green	Amber
7.1.1 Access to Stroke Therapy	Green	Blue	Blue	Green	Green	Blue	Green	Amber	Blue	Green	Amber	Amber	Green	Green
7.1.2 Access to Stroke Rehabilitation Services	Amber	Amber	Amber	Green	Green	Amber	Green	Amber	Green	Amber	Green	Amber	Amber	Amber
7.2 Goal Setting	Amber	Green	Amber	Green	Green	Amber	Green	Green	Amber	Blue	Blue	Blue	Amber	Green
7.3.1 Specialist Visual Assessment and Rehabilitation	Blue	Green	Green	Amber	Red	Green	Green	Green	Green	Red	Blue	Red	Green	Red
7.3.2 Access to Specialist Clinical Neuro- psychological Services	Amber	Black	Green	Red	Red	Amber	Blue	Amber	Green	Green	Blue	Red	Green	Red
7.3.3 Specialist Driving Assessment	Green	Green	Amber	Amber	Amber	Green	Amber	Blue	Blue	Blue	Blue	Amber	Green	Red
8.1 Self Management support after discharge	Green	Amber	Amber	Green	Amber	Green	Amber	Blue	Blue	Green	Blue	Green	Green	Red
8.2 Access to Exercise support after discharge	Green	Amber	Amber	Blue	Green	Amber	Blue	Amber	Blue	Green	Green	Blue	Green	Red
8.3 Access to vocational rehabilitation	Amber	Amber	Amber	Blue	Amber	Amber	Amber	Amber	Blue	Green	Blue	Green	Amber	Amber

Clearly there is variability across the country and Health Boards should strive to improve access to high quality services to ensure the best treatment and support is available to people living with stroke. Sections 1.1 -1.4 provide detail of some of the local and national work currently being undertaken.

1.1   Scottish Ambulance Service Stroke Improvement Plan

Stroke Improvement Plan, Priority 1, Action 2

Improve early identification of stroke and Transient Ischaemic Attack (TIA) by Scottish Ambulance Service (SAS)/NHS24, primary care and hospital Emergency Departments.

Stroke Improvement Plan, Priority 2, Action 1

Pre-alert by SAS – The SAS should pre-alert Emergency Departments of the arrival of stroke patients who might potentially benefit from thrombolysis.

The SAS in collaboration with the Stroke MCNs across NHS Scotland and the National Advisory Committee for Stroke, have developed a standard Pre-hospital Stroke Pathway and Pre-hospital Stroke Bundle.

By adopting the Pathway and Bundle, the Service aims to ensure that the care Ambulance Clinicians deliver is consistent and reflects evidenced based best practice.

Through the collaboration with the MCNs in developing the Pathway and Bundle and also in creating and delivering an 'ambulance specific' Stroke curriculum, the Service have aimed to improve and enhance the skills and knowledge of Ambulance Clinicians resulting in improved recognition and care of Stroke patients. To supplement the education programme within the Service, Health Boards provide places on their 'Stroke and TIA Assessment Training' (STAT) courses for Ambulance Clinicians. There are some Health Boards that have also run STAT courses specifically for the SAS which has resulted in record numbers of staff being trained.

SAS data indicates there has been a considerable improvement in the execution and recording of FAST (see below) and in the crucial 'pre-alert' for hyper acute stroke patients in the pre-hospital setting.

Facial weakness – can the person smile? Has their mouth or eye drooped?

Arm weakness – can the person raise both arms?

Speech problems – can the person speak clearly and understand what you say?

Time to call 999 – If a person has failed any of these tests it is crucial to call 999.

"The percentage of patients receiving thrombolysis within 60 minutes of arrival at our hospital has risen from 28% in 2013 to 84% in the first four months of 2016. This would not have been possible without the support of the Scottish Ambulance Service as the Pre-alert to the Emergency Department is key."

Dr Easterford, Royal Infirmary of Edinburgh

Continued collaboration with the SAS is vital to ensure we attain our goals of delivering world leading Stroke care.

SAS Stroke Improvement Plan priorities

⬛	No process or pathway in place	🟩	Implemented but not delivered consistently
🟥	Available but not implemented	🟦	Complete and embedded in practice
🟧	Plan to implement or partially implemented		

Borders

Dumfries & Galloway

Fife

Grampian

Greater Glasgow & Clyde

Highland

Shetland

Tayside

Western Isles

Lanarkshire

Ayrshire & Arran

Lothian

Orkney

Forth Valley

RAG Status for Priority 1, Action 2
Early identification of stroke

RAG Status for Priority 2, Action 1
Scottish Ambulance Service

Borders

Dumfries & Galloway

Shetland

Ayrshire & Arran

Fife

Forth Valley

Grampian

Greater Glasgow & Clyde

Highland

Lanarkshire

Lothian

Orkney

Tayside

Western Isles
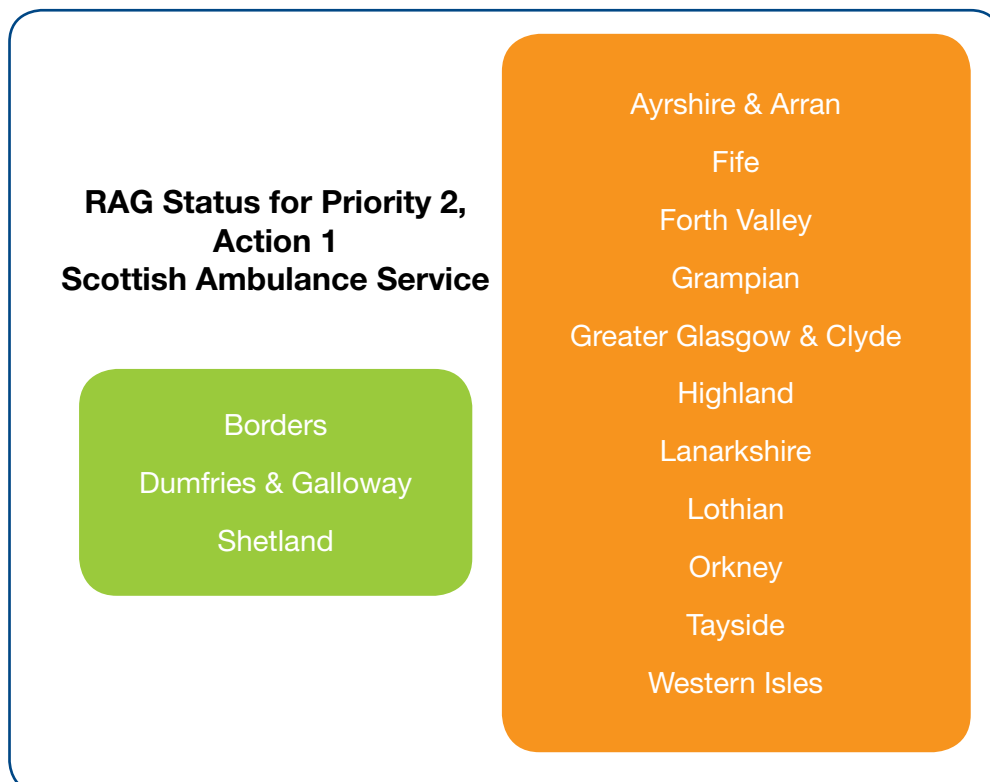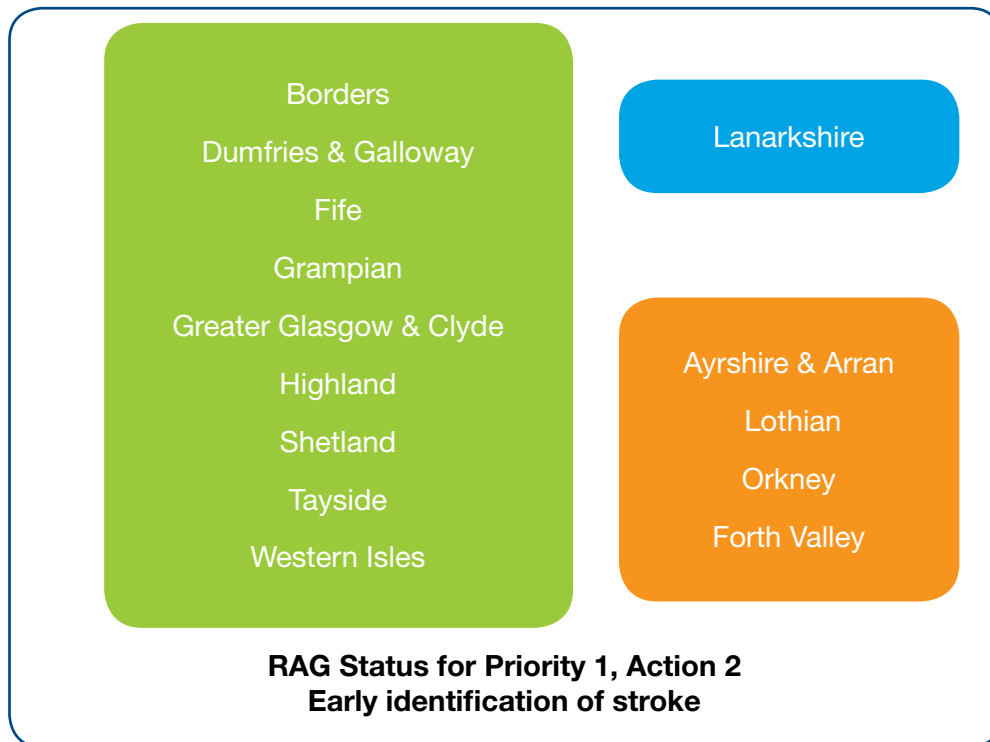
1.2 Intermittent Pneumatic Compression (IPC)

Stroke Improvement Plan, Priority 3, Action 3

Ensure that protocols are in place and effectively implemented to guide the appropriate use of Intermittent Pneumatic Compression (IPC) for venous thromboembolism prophylaxis in patients who are immobile after a stroke.

Patients admitted to hospital with stroke and who are unable to walk independently are at high risk of deep vein thrombosis (DVT) and pulmonary emboli (PE). These can be fatal. A recent large randomised trial[4,5] has shown that IPC reduces the risk of DVT and improves patients' chances of survival. SIGN, NICE and European guidelines now recommend that IPC should be considered in patients who are immobile after a stroke.

SSCA has been collecting information on the use of IPC in Stroke Units to monitor the extent to which this effective treatment is being implemented. Table 1b on page 14 shows the total number of patients admitted to hospital in each Health Board who were unable to walk at the time of admission in 2014 and 2015.

Since 31st January 2014 SSCA collected data on whether IPC was offered and documented in the medical records within one week of admission. In 2014, only 23% of immobile patients were offered IPC. This rose in 2015 to 32%. There are huge differences between Health Boards in their success in implementing this effective form of prophylaxis. At least now, all hospitals report that they can obtain the IPC devices although there is clearly great scope for further improving implementation.

Percentage of immobile stroke patients offered IPC in Scotland - Feb 2014-Dec 2015p
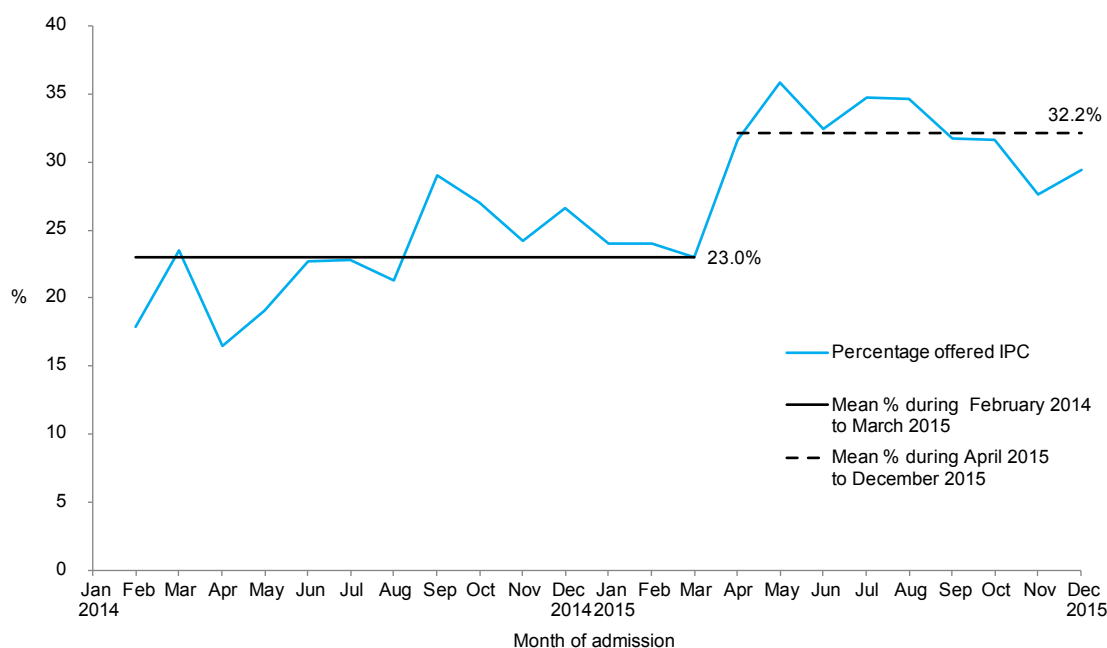
(p) Data for 2015 are provisional and subject to change as a result of routine data processing

Barriers to achieving high levels of implementation of IPC include:

- lack of awareness of the problem of DVT/PE and of the effectiveness of IPC amongst nursing and medical staff; and
- lack of training in the sizing, fitting and monitoring of its use.

An online training module (www.stroketraining.org), has been available since the autumn of 2014 and training workshops, funded by the Scottish Government, started in April 2015.

⬛	No process or pathway in place	🟩	Implemented but not delivered consistently
🟥	Available but not implemented	🟦	Complete and embedded in practice
🟧	Plan to implement or partially implemented		

RAG status for Priority 3, Action 3

Ayrshire & Arran

Dumfries & Galloway

Forth Valley

Grampian

Greater Glasgow & Clyde

Highland

Lanarkshire

Lothian

Shetland

Western Isles

Fife

Tayside

Borders

Orkney

Intermittent Pneumatic Compression

1.3   Scottish Stroke Education Pathway

Stroke Improvement Plan, Priority 4 Action 1

Health and social care staff in hospital and community settings are trained to an appropriate level depending on whether their contact with people affected by stroke is: occasional (stroke awareness), regular (core competencies) or in the context of specialist services (specialist competencies).

There is robust evidence that treatment on a stroke ward improves outcomes, including survival, being independent, and living at home one year after a stroke compared to treatment on general wards[6]. Stroke unit care has also been proven to be both clinically and cost effective[7]. This relates to the specialist skills, knowledge and expertise of staff on stroke units compared to those without specialist skills on general wards. The main distinctions of stroke units are in education and training, as nurses in stroke units are required to undertake stroke specific education, e.g. swallow screening. Stroke education is fundamental to delivering specialist care and thus the improved outcomes in stroke units.

The Stroke Education Pathway provides a consistent approach to education and training for healthcare staff within Stroke Units in NHS Scotland. It has been developed by the SSIP, Chest Heart & Stroke Scotland (CHSS), Scottish Stroke Nurses Forum (SSNF), and Scottish Stroke Allied Health Professionals Forum (SSAHPF) and supported by the National Advisory Committee for Stroke (NACS) and the Scottish Government.

1.3.1   The Stroke Education Pathway & National Education Facilitator

In February 2015, the Scottish Government funded a national stroke education facilitator post to support Health Boards across Scotland, their stroke MCNs and education groups in relation to priorities around education.

Key education priorities were identified in each Health Board by collation of local and national data sets around the agreed education components. From this local and national training priorities were identified for the nursing staff in each acute/integrated stroke unit. Support and facilitated training have been provided, particularly in those Health Boards without a local stroke education facilitator. See Appendix D for further information on the education template.

In March 2016 all territorial Health Boards in Scotland were reviewed in relation to the stroke education pathway and the results from this are illustrated below and on Page 3 under Priority 4, Action 1.

Legend:

- ■ (black) No process or pathway in place
- ■ (red) Available but not implemented
- ■ (orange) Plan to implement or partially implemented
- ■ (green) Implemented but not delivered consistently
- ■ (blue) Complete and embedded in practice

RAG Status for Priority 4 Action 1 Education Template and Training

Complete and embedded in practice:
- Lanarkshire

Implemented but not delivered consistently:
- Borders
- Fife
- Grampian
- Greater Glasgow & Clyde
- Highland
- Western Isles

Plan to implement or partially implemented:
- Ayrshire & Arran
- Dumfries & Galloway
- Forth Valley
- Lothian
- Orkney
- Shetland
- Tayside

It should be noted that there are rolling education programmes in place and a Health Board's RAG status may change due to turnover of staff.

Some Health Boards also have their own locally developed stroke education programmes and training sessions in place.

1.4 Exercise after Stroke

Stroke Improvement Plan, Priority 8 Action 2

Stroke patients being discharged home from hospital should have access to appropriately resourced, evidence-based exercise after stroke services; and patients with stroke are given advice about increasing their physical activity levels where appropriate.

Specific exercise after stroke (EAS) interventions has been shown to improve cardiovascular fitness and walking ability, and to reduce disability in general[8]. For these reasons, the SSIP states that people being discharged home following stroke should have access to EAS services and be given advice about increasing their physical activity levels where appropriate. The 14 Scottish territorial Health Boards self reported their provision of EAS against the benchmark criteria in the SSIP.

Of the 14 Health Boards, 10 achieved 'Blue' or 'Green' status, indicating they either had an established system to ensure advice regarding increasing physical activity was delivered and a clear process of referral into an EAS pathway was evident across their entire MCN area; or that advice regarding increasing physical activity was available and that EAS services were available across their MCN area.

Three Health Boards reported being "Amber" in that advice regarding increasing physical activity was available, along with limited EAS services across some parts of their MCN area. NHS Western Isles, was

in the "Red" category where advice regarding increasing physical activity was available, but an EAS service was not. No Health Boards were reported as being in the "Black" category where no advice or services relating to EAS were in place.

■ (black)	No process or pathway in place	■ (green)	Implemented but not delivered consistently
■ (red)	Available but not implemented	■ (blue)	Complete and embedded in practice
■ (orange)	Plan to implement or partially implemented		

Complete and embedded in practice (blue)

Fife

Greater Glasgow & Clyde

Lanarkshire

Shetland

Implemented but not delivered consistently (green)

Ayrshire & Arran

Forth Valley

Highland

Lothian

Orkney

Tayside

Plan to implement or partially implemented (orange)

Borders

Dumfries & Galloway

Grampian

Available but not implemented (red)

Western Isles

**RAG status for Priority 8, Action 2
Access to Exercise Support after Discharge**
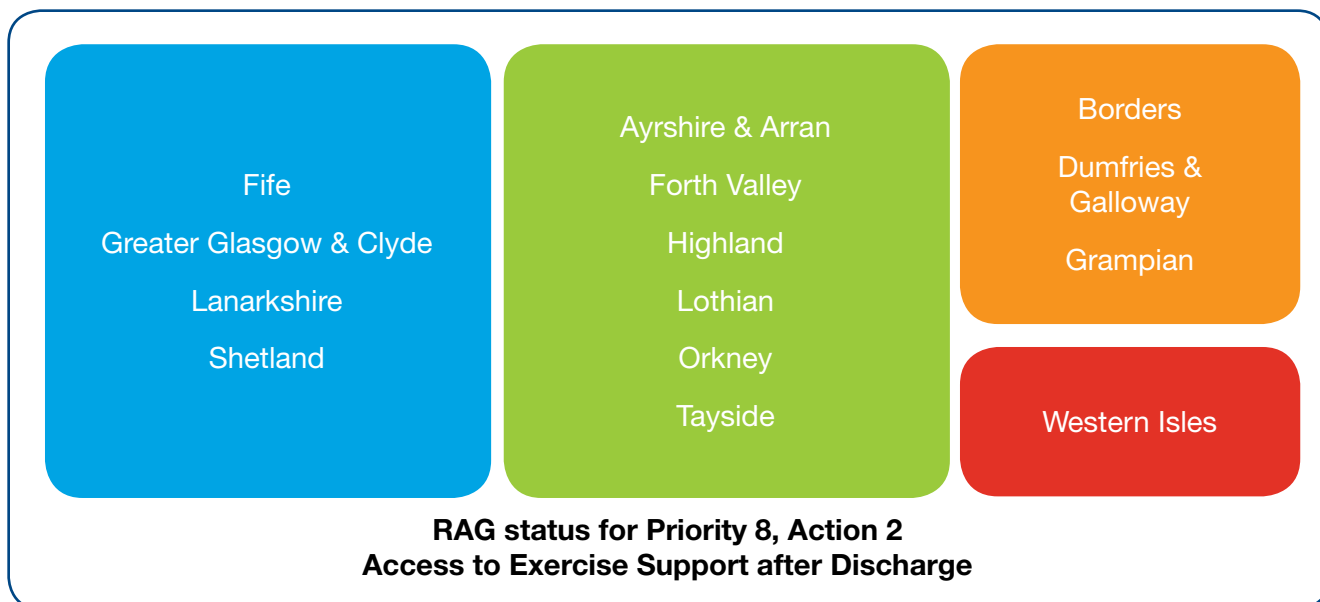
Overall, this suggests that all Health Boards are providing advice to patients about being more physically active after stroke and that most had some provision of EAS services. The recommended route to training therapists and exercise professionals to become expert in EAS remains the Register of Exercise Professionals Level 4 Stroke Course delivered by Later Life Training and validated by Skills Active: http://www.laterlifetraining.co.uk/courses/exercise-for-stroke-instructor/

Physical activity as part of long term condition self-management is becoming increasingly generic in nature. The aim as part of stroke service improvement is to provide evidence that Health Boards can refer into services which are appropriately equipped to manage the various impairments and disabilities that occur after a stroke.

2 Scottish Stroke Care Audit

Map of Scotland showing all hospitals in Health Boards contributing to the Scottish Stroke Care Audit
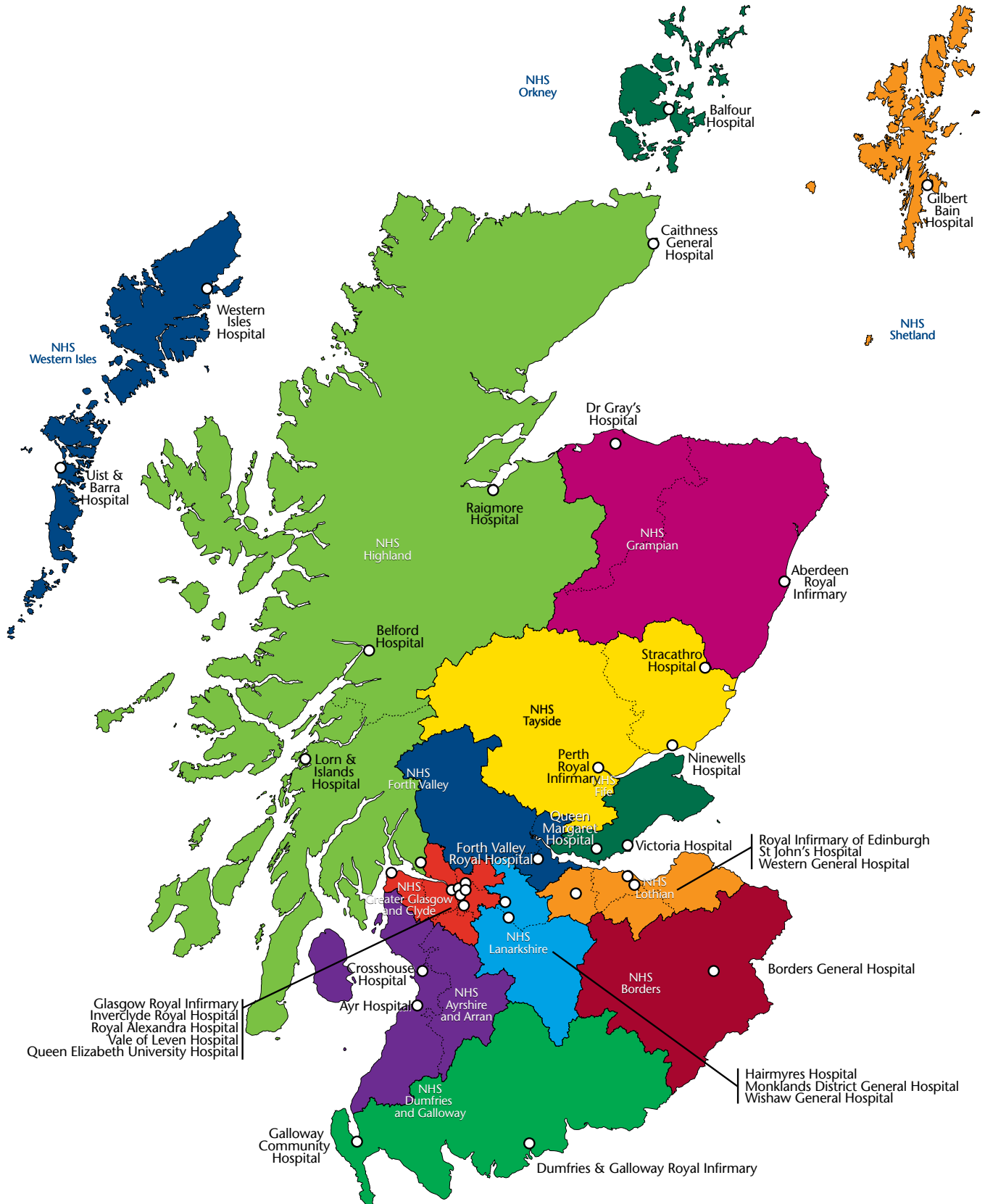
2.1 This report

This section summarises data collected via a bespoke electronic database (eSSCA) in each individual hospital in Scotland managing acute stroke patients. The data presented in this report, unless otherwise stated, are based on final diagnosis of stroke and not initial diagnosis as in the Monthly Reports distributed to Health Boards for management information and quality assurance purposes.

Throughout 2015 the SSCA team continued to review the analysis of the data collected and modified definitions when necessary, therefore calculations in this year's 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).

Scottish Stroke Care Standards (January 2013)

Topic	Scottish Stroke Care Standards, Jan 2013
Access to Stroke Unit	90% within 1 day of admission (Day 0 and 1).
Brain imaging	90% within 24 hours of admission.
Swallow screen	90% on day of admission (Day 0).
Aspirin administration	95%* of ischaemic strokes within 1 day of admission (Days 0 and 1).
Delay from receipt of referral to specialist stroke/TIA clinic	80% are assessed within 4 days of receipt of referral (Day 0 being day of receipt of referral).
Thrombolysis	80% receive the bolus within one hour of arrival at hospital.
Carotid Intervention	80% undergoing carotid endarterectomy for symptomatic carotid stenosis have the operation within 14 days of the event that first led them to seek medical assistance.

* Patients who have received thrombolysis are excluded from the standard.

These standards continue to focus on those parameters which have the best evidence for having an effect on patient outcomes. This report presents hospitals' performance against the Scottish Stroke Care Standards (2013).

Comparisons between 2015 and 2016 reports:

Scottish Stroke Care Standard/ clinical area	2014 data	2015 data
Percentage admitted to a Stroke Unit within 1 day of admission.	80%	78%
Percentage with swallow screen on day of admission.	77%	80%
Percentage with brain scan within 24 hours.	90%	91%
Percentage of ischaemic stroke given aspirin within 1 day of admission.	88%	90%
Percentage seen at specialist stroke/TIA clinic within 4 days of receipt of referral.	83%	83%
Percentage thrombolysed within one hour of arrival at hospital.	43%	51%
Percentage receiving carotid intervention within 14 days of the event.	37%	41%

These comparisons are based on the up to date analysis of the available data.

An overview of initial and final diagnosis of stroke is included in the web tables from the SSCA data. In summary, of the 10 420 patients admitted during 2015 with a diagnosis of stroke (initial or final), 7 538 (72.3%) of these had an initial diagnosis of stroke which was then confirmed. 1 394 (13.4%) were admitted with an initial diagnosis of stroke which was not confirmed; 1 488 (14.3%) were not initially diagnosed as a stroke but had a final diagnosis of stroke.

More than 9000 stroke patients were discharged from Scottish hospitals in 2015. Stroke has a significant impact on NHS resources, accounting for approximately 5% of total NHS costs[9]. Societal costs are even higher. The economic cost of stroke to Scotland in terms of lost employment and the cost of support in the community are significant, whilst the impact on family members or friends who care for stroke survivors is massive.

There are interesting variations in the patients presenting with stroke depending on Health Board of residence (Tables 1a to 1c). For instance, in Greater Glasgow & Clyde, Ayrshire & Arran and Lanarkshire the majority of stroke admissions live in areas of higher deprivation. This is a different pattern from much of the rest of Scotland. Glasgow and Lanarkshire also have a younger stroke population with a higher proportion of patients under the age of 60. These factors may represent particular social challenges and indicate a greater need in these areas. Table 1b also includes details on case mix. Case mix describes factors which may influence the chances of a stroke patient recovering well or surviving after their stroke. The raw data here may not be easy to interpret, but these figures can potentially be used to help compare patient outcomes (eg survival, recovery) between different Health Boards or even countries.
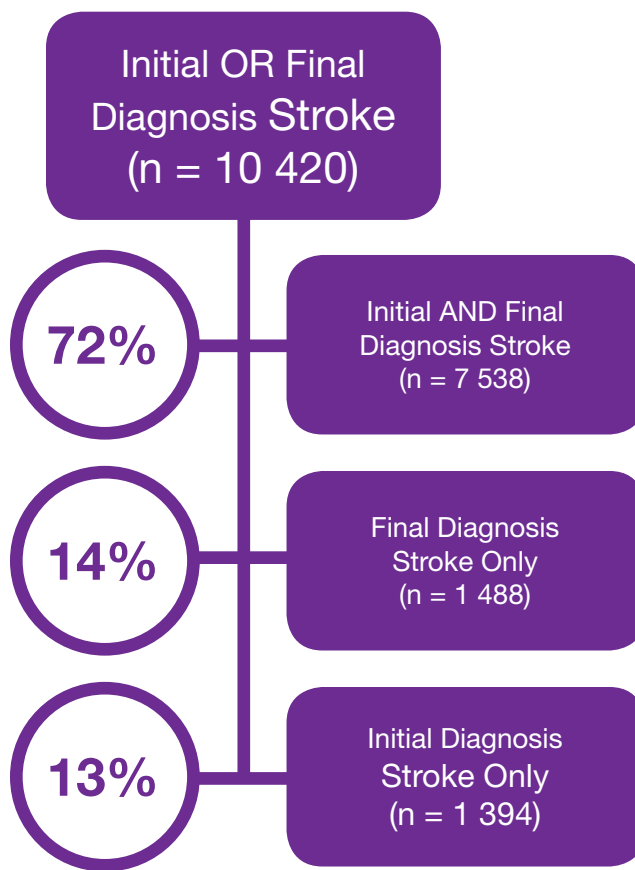
Initial OR Final Diagnosis Stroke (n = 10 420)

72% — Initial AND Final Diagnosis Stroke (n = 7 538)

14% — Final Diagnosis Stroke Only (n = 1 488)

13% — Initial Diagnosis Stroke Only (n = 1 394)

Table 1a: Numbers and percentage of confirmed stroke patients by NHS Board of Residence, age and sex , 2015 data (final diagnosis).

NHS Board of Residence	Confirmed Strokes admitted during 2015	Crude rate per 100,000 residents	Mean Age Males (years)	Mean Age Females (years)	Males (%)	Ischaemic Strokes (%)
Total	9 026	*169*	71	76	*50*	*86*
Ayrshire & Arran	670	*181*	71	75	49	83
Borders	219	*192*	74	78	54	83
Dumfries & Galloway	275	*183*	72	77	51	87
Fife	685	*187*	73	75	48	88
Forth Valley	527	*175*	70	78	50	87
Grampian	787	*135*	72	77	51	84
Greater Glasgow & Clyde	1 935	*169*	69	75	51	86
Highland	580	*181*	72	75	47	85
Lanarkshire	1 047	*160*	69	76	52	89
Lothian	1 360	*158*	72	77	51	86
Orkney	41	*190*	65	78	39	76
Shetland	36	*155*	69	79	58	86
Tayside	572	*138*	72	75	50	87
Western Isles	33	*121*	70	78	42	82
Other	259	-	68	75	51	86

Table 1b: Percentage of confirmed stroke patients by NHS Board of Residence and case mix indicators, 2015 data (final diagnosis).

NHS Board of Residence	Case Mix					
	Independent in Activities of Daily Living prior to the stroke?	Lived alone at normal place of residence?	Can talk at first assessment?	Oriented to time, place and person at first assessment?	Can lift both arms off the bed at first assessment?	Can walk without help from another person at first assessment?
Total	*81*	*39*	*71*	*63*	*62*	*47*
Ayrshire & Arran	83	38	77	65	66	40
Borders	81	37	76	63	70	55
Dumfries & Galloway	87	41	67	59	52	20
Fife	79	43	79	60	62	39
Forth Valley	75	41	72	62	58	40
Grampian	85	36	58	55	58	40
Greater Glasgow & Clyde	82	39	69	67	71	71
Highland	82	39	76	66	58	44
Lanarkshire	82	36	70	64	56	49
Lothian	81	41	76	58	64	34
Orkney	90	32	61	61	46	51
Shetland	78	44	72	58	75	28
Tayside	74	34	71	68	45	43
Western Isles	85	39	52	36	36	12
Other	90	36	74	66	61	47

Table 1c: Percentage of confirmed stroke patients by NHS Board of Residence and deprivation category, 2015 data (final diagnosis).

NHS Board of Residence	Scottish Index of Multiple Deprivation (SIMD)				
	SIMD 1 (Most deprived)	SIMD 2	SIMD 3	SIMD 4	SIMD 5 (Least deprived)
Total	**23**	**22**	**19**	**17**	**16**
Ayrshire & Arran	27	30	15	13	15
Borders	7	17	32	37	7
Dumfries & Galloway	8	29	32	25	7
Fife	22	25	19	18	16
Forth Valley	20	25	20	22	13
Grampian	8	15	24	24	29
Greater Glasgow & Clyde	44	18	12	11	15
Highland	10	20	34	25	11
Lanarkshire	30	30	21	11	8
Lothian	15	23	17	18	27
Orkney	0	39	20	41	0
Shetland	0	6	50	44	0
Tayside	18	17	20	27	18
Western Isles	0	55	45	0	0
Other	-	-	-	-	-

2.2 Scottish Stroke Care Bundle

Key Findings:

Nationally, performance against the Scottish Stroke Care Bundle, for patients admitted with a final diagnosis of stroke, has risen significantly from **62%** in 2014 to **64%** in 2015.

The SSCA has moved its focus more towards service improvement and safety over the last few years. As improvements in performance against most of the Scottish Stroke Care Standards have occurred across Scotland, the focus has moved towards measuring stroke care 'bundles'. Instead of measuring how an individual fairs against any one stroke standard, bundles measure how that individual fairs against all relevant Scottish Stroke Care Standards. Achieving this care bundle is associated with reduced mortality and increased likelihood of discharge to usual residence after Stroke[10].

The current Scottish Stroke Care Bundle consists of timely Stroke Unit admission, swallow screen, brain scan and aspirin. The number of individuals, admitted with a confirmed diagnosis of stroke, receiving the appropriate bundle continues to increase, with a rise from 62% to 64% between 2014 and 2015. The variation in performance between Health Boards suggests that there is still lots of potential for improvements in 'bundle performance'.

Why use the 'bundle' approach to improve care?

A 'bundle' involves a group of specific interventions/ processes of care that significantly improve patient outcome if done together rather than separately and improves the consistency with which patients are managed. It is sometimes referred to as the 'all or none' measurement.

The Scottish Stroke Care Bundle involves four components. Not all patients are eligible for all four components. An aspirin allergy, for example, would preclude the prescribing of aspirin, so the term 'appropriate' refers to patients receiving the components for which they were eligible. Figure 1 illustrates the different categories of bundle depending on patients' eligibility.

For the specific components, exclusions are as follows: (1) Stroke Unit admission excludes patients with in-hospital strokes, patients transferred in from another acute hospital or patients discharged within 1 day of admission to hospital (2) aspirin excludes patients with valid contraindications to aspirin, those receiving a 'non-stroke' final diagnosis who are discharged within 1 day of admission to hospital, and also those receiving thrombolysis where the aspirin may be delayed.

In measuring the proportion of patients receiving an 'appropriate' bundle, patients ineligible for, and therefore not receiving, specific components of the bundle are counted as having received their appropriate bundle provided they received the remaining components for which they were eligible.
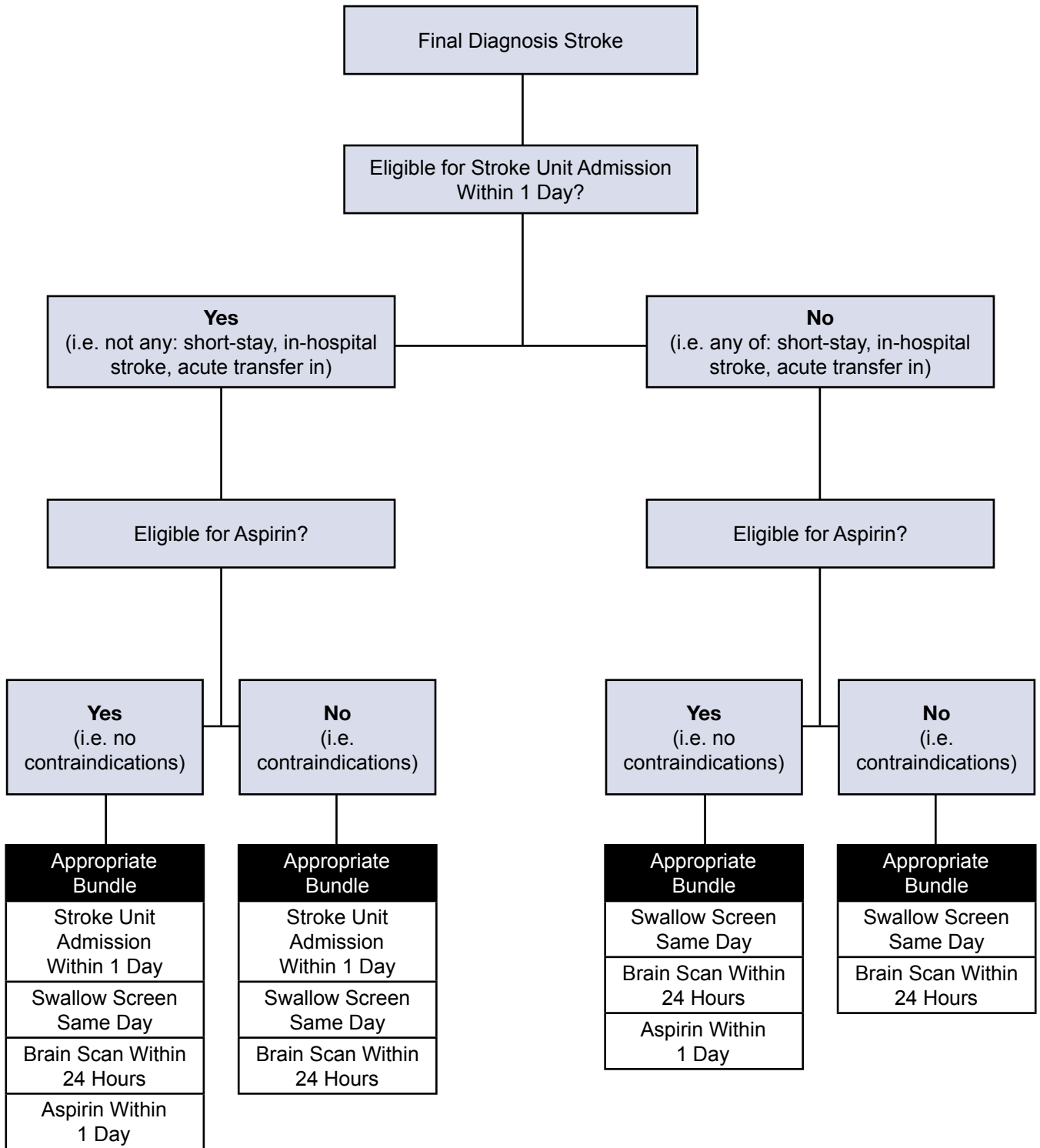
Figure 1 : Scottish Stroke Care Bundle flowchart

```
                         Final Diagnosis Stroke


                    Eligible for Stroke Unit Admission
                              Within 1 Day?


        Yes                                         No
(i.e. not any: short-stay, in-hospital   (i.e. any of: short-stay, in-hospital
   stroke, acute transfer in)               stroke, acute transfer in)


   Eligible for Aspirin?                      Eligible for Aspirin?


   Yes              No                        Yes              No
(i.e. no         (i.e.                     (i.e. no         (i.e.
contraindications)  contraindications)     contraindications)  contraindications)
```

Appropriate Bundle	Appropriate Bundle	Appropriate Bundle	Appropriate Bundle
Stroke Unit Admission Within 1 Day	Stroke Unit Admission Within 1 Day	Swallow Screen Same Day	Swallow Screen Same Day
Swallow Screen Same Day	Swallow Screen Same Day	Brain Scan Within 24 Hours	Brain Scan Within 24 Hours
Brain Scan Within 24 Hours	Brain Scan Within 24 Hours	Aspirin Within 1 Day	
Aspirin Within 1 Day			

Chart 1a : **Trend in percentage of stroke patients receiving an 'appropriate' Stroke Care Bundle (i.e. Stroke Unit admission, swallow screen, brain scan and aspirin), by Health Board, 2011 - 2015 data (based on final diagnosis).**

For bracketed abbreviations in chart legend :

'+' means an increasing trend and '-' means a decreasing trend; 's' means a statistically significant change over time (otherwise no 's').
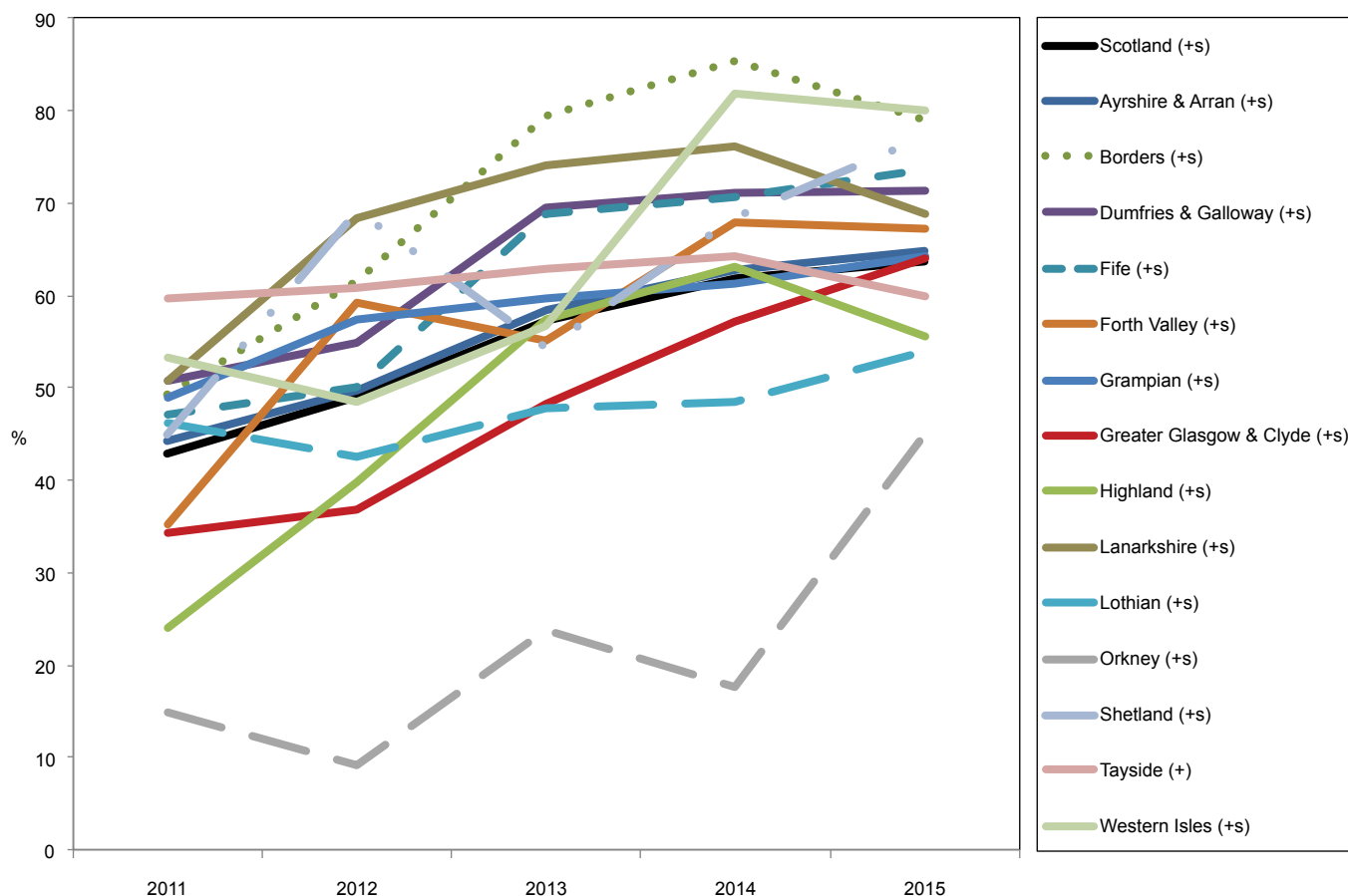
| Health Board percentages	2011	2012	2013	2014	2015
Scotland (+s)	43	49	57	62	64
Ayrshire & Arran (+s)	44	50	58	63	65
Borders (+s)	49	62	80	85	79
Dumfries & Galloway (+s)	51	55	70	71	71
Fife (+s)	47	50	69	71	74
Forth Valley (+s)	35	59	55	68	67
Grampian (+s)	49	57	60	61	64
Greater Glasgow & Clyde (+s)	34	37	48	57	64
Highland (+s)	24	40	57	63	56
Lanarkshire (+s)	51	68	74	76	69
Lothian (+s)	46	43	48	49	54
Orkney (+s)	15	9	24	18	45
Shetland (+s)	45	69	54	69	77
Tayside (+)	60	61	63	64	60
Western Isles (+s)	53	48	57	82	80

Chart 1a and accompanying table show the improvements achieved in delivery of the Scottish Stroke Care Bundle from 2011 to 2015. Over the past 5 years all Health Boards have demonstrated improvements which are statistically significant (+s) wherever the numbers of patients admitted is large enough to determine this. Clearly some Health Boards have made much greater improvements than others.

Charts 1b (Health Board) and 1c (Hospital) show the changes in performance between 2014 and 2015.

Health Board performance will continue to be monitored in the SSCA Monthly Reports circulated to Stroke MCNs and will also be monitored in quarterly Health Board Reports submitted to the Scottish Government.

Chart 1b : (Health Board) Percentage of stroke patients receiving an 'appropriate' Stroke Care Bundle (i.e. Stroke Unit admission, swallow screen, brain scan and aspirin) – 2015 data (based on *final* diagnosis).

The Scotland columns in the chart are coloured light green and dark green simply to differentiate them from the hospital columns and the colours are not indicative of performance. Light green corresponds to '2014' and dark green corresponds to '2015'.
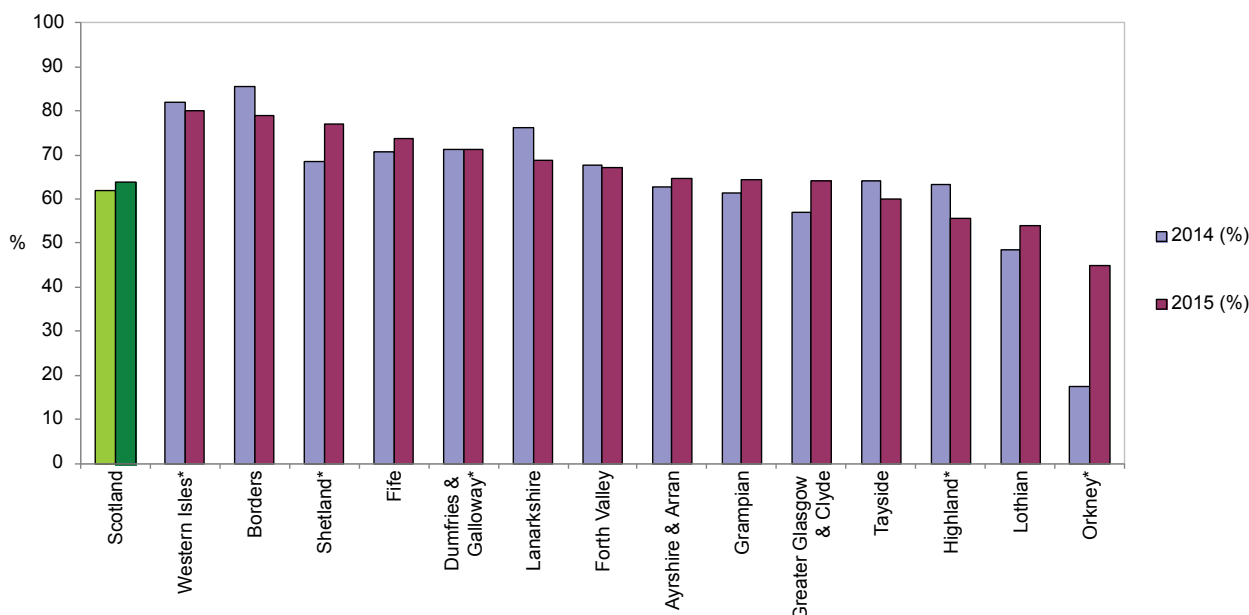
Notes regarding Chart 1b:
1. Due to the number of beds within some hospitals in the Health Boards indicated (*) and the small numbers of stroke admissions to these hospitals **it is not practical to have a defined Stroke Unit**. We have confirmed however that a defined stroke pathway is in place in these hospitals and that the Scottish Stroke Care Standard criteria are established within that pathway.
2. Balfour Hospital, NHS Orkney, implemented a CT scanning service during 2015. Prior to the introduction of this service, patients were airlifted to Aberdeen Royal Infirmary and a proportion may have arrived in sufficient time to have brain imaging within 24 hours of admission.
3. **Uist & Barra Hospital, NHS Western Isles does not have a CT scanner** but patients are airlifted to Western Isles Hospital and a proportion may arrive in sufficient time to have brain imaging within 24 hours of admission.

Chart 1c : (Hospital) Percentage of stroke patients receiving an 'appropriate' Stroke Care Bundle (i.e. Stroke Unit admission, swallow screen, brain scan and aspirin) – 2015 data (based on *final* diagnosis).
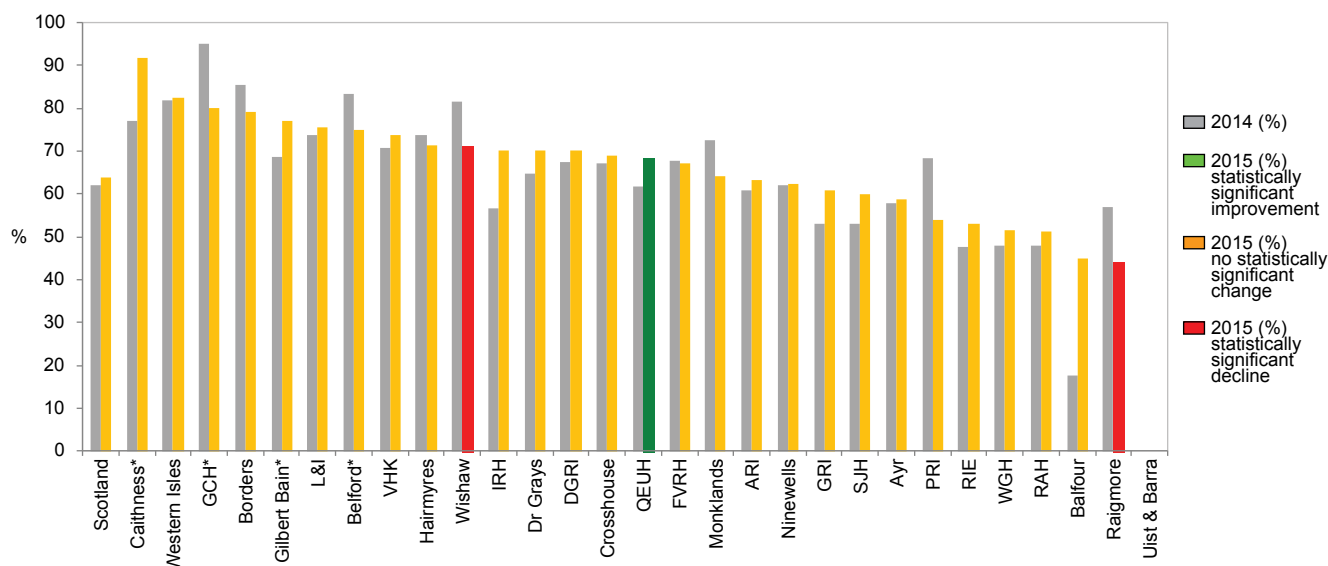
Notes regarding Chart 1c:
1. Due to the number of beds within some hospitals indicated (*) and the small numbers of stroke admissions to these hospitals **it is not practical to have a defined Stroke Unit**. We have confirmed however that a defined stroke pathway is in place in these hospitals and that the Scottish Stroke Care Standard criteria are established within that pathway.
2. Balfour Hospital, NHS Orkney, implemented a CT scanning service during 2015. Prior to the introduction of this service, patients were airlifted to Aberdeen Royal Infirmary and a proportion may have arrived in sufficient time to have brain imaging within 24 hours of admission.
3. **Uist & Barra Hospital, NHS Western Isles does not have a CT scanner** but patients are airlifted to Western Isles Hospital and a proportion may arrive in sufficient time to have brain imaging within 24 hours of admission.

The cumulative proportions of patients managed in accordance with all four standards which comprise the Stroke Care Bundle have risen from 62% in 2014 to 64% in 2015. This improvement would be expected to translate into better outcomes for stroke patients.

Performance varied considerably between Health Boards (Chart 1b).

The Stroke Care Bundle approach builds on the improvement and re-design work already started by Health Boards supported by the Stroke MCNs and the Scottish Stroke Improvement Programme.

For 2015/16, the Scottish Stroke Improvement Programme asked each Health Board to identify and set out their improvement aims and trajectory - and the priority actions to achieve these - in order to improve the effective delivery of the Stroke Care Bundle. These improvement aims are underpinned by a more detailed local improvement plan which also includes how improvement will be delivered and progress assessed. All patients should expect to experience the same service regardless of where in Scotland they live or receive treatment.

3   Inpatients

> Key Findings:
>
> **9026** patients with a confirmed (final) diagnosis of stroke were admitted to hospital.
>
> **Seven of the 29** hospitals met the Stroke Unit standard of 90%.
>
> The proportion of patients in Scotland having a swallow screen on the day of admission continues to rise, from **77%** in 2014 to **80%** in 2015.
>
> Overall, the standard for brain scanning has been achieved. In 2015, **91%** of patients had a brain scan within 24 hours.
>
> **90%** of patients with ischaemic stroke, and no well defined contraindication, received aspirin on the day of admission or the day after, compared with **88%** in 2014.
>
> There is considerable variation in performance against the individual Scottish Stroke Care Standards between hospitals. There is scope for improving performance and the SSCA continue to work with local teams to achieve this.

During 2015 more than 9000 patients were admitted to hospital with a confirmed (final) diagnosis of stroke and entered into the SSCA – a similar number to 2014 (Table 1a). The characteristics of the patients admitted to hospital with a confirmed stroke are shown in Table 1a. About 86% of patients had ischaemic strokes, 12% had haemorrhagic strokes and the remainder were of uncertain type. There were similar numbers of men and women and the mean age of patient was about 71 years for men and 76 years for women although this varied across Health Boards. Although based on small numbers it is interesting that in the Island Health Boards the average age of the men having strokes were the lowest in Scotland whilst the average age of women was the highest. Some of the variation in case-mix reflects the different populations and admission rates but some may reflect variation in data collection. The latter is being addressed with further training of audit staff.

3.1   Summary and key findings relating to inpatient data

The most important indicator of the performance of stroke services within a Health Board or hospital is their performance against the Stroke Care Bundle as described in Section 2.2.

Western Isles performed best with 80% and Orkney worst at 45%. However, the performance in Orkney has improved greatly since a CT scanner was installed. The NHS Boards including our major cities, Glasgow, Edinburgh, Aberdeen and Dundee struggle to achieve the bundle. However, some of the large teaching hospitals in these Health Boards saw the greatest improvements in delivering the care bundle between 2014 and 2015. Each Health Board set its own target for improvement (i.e. trajectory), to be achieved by end of March 2016, but only 9 of 14 achieved this. However, to continue to drive improvements and attain more equitable quality, in 2016 these individual trajectories have been replaced by a national standard of 80%, which was only met by NHS Western Isles in 2015.

The proportion of patients across Scotland accessing a Stroke Unit on the day of admission, or the day after (78%), was similar to that in 2014 (80%) and remains below the standard of 90%. Only seven of the 29 hospitals admitting patients with acute stroke met the Scottish Stroke Care standard of 90% (Chart 2a). Most hospitals demonstrated similar performance to the previous year, although Queen Elizabeth University Hospital, Glasgow improved their performance significantly (81% to 88%). Unfortunately, performance fell significantly in Wishaw General Hospital, Lanarkshire (from 90% to 77%) and Raigmore Hospital, Highlands (from 64% to 44%). The hospitals in Lothian continue to struggle to offer early access to Stroke Unit care compared with other areas.

Small hospitals perform well against this standard because their only medical ward fulfills our definition of a Stroke Unit. For larger hospitals the standard is more challenging because stroke patients may be boarded and Stroke Unit beds may be filled with non stroke patients during periods of high bed demand. The number of Stroke Unit beds will be an important determinant of performance but it is clear that there is considerable variation in how well hospitals manage their stroke beds. It is evident that the priority attached to achieving this important standard varies.

After the diagnosis of stroke has been made, a swallow assessment should be done early to allow the patient to receive oral medication, and to take food and fluids safely. The result of this assessment needs to be clearly recorded to ensure that patients who cannot swallow safely are not put at risk of aspiration with potentially fatal consequences. The proportion of patients in Scotland having a swallow screen on the day of admission continues to rise, from 77% in 2014 to 80% in 2015 (Chart 2b). The standard of 90% is challenging and was met by several smaller hospitals, Belford hospital (100%), Caithness General Hospital (96%), Gilbert Bain Hospital (94%), Borders General Hospital (94%), Western Isles Hospital (91%), Lorn & Islands Hospital (91%), and Wishaw General Hospital (91%). Inverclyde Royal Infirmary, Queen Elizabeth University Hospital and Royal Infirmary of Edinburgh achieved significant improvements since 2014. Early identification of stroke patients and having nurses trained to initiate a swallow screen and to record the result clearly in the notes in the Emergency Department (ED), medical assessment and Stroke Units is key to improving performance.

An early brain scan is required to exclude alternative causes of stroke symptoms, for example, brain tumours, and to distinguish strokes due to bleeding into the brain from those due to blocked arteries. This is important to allow thrombolysis, anticoagulants and antiplatelet drugs to be given. The standard for brain scanning is 90% within 24 hours. In 2015, 91% of patients had a brain scan within 24 hours compared with 90% in 2014 (Chart 2c). Sixteen of the 31 hospitals met the national standard of ≥90%. Royal Alexandra Hospital and Balfour Hospital improved significantly since 2014. The proportion being scanned within 4 hours of arrival rose from 54% in 2014 to 56% in 2015 (Chart 4). Increases in the very early scanning of stroke patients will hopefully increase the numbers of patients who can benefit from thrombolysis, and also reduce the delays to treatment (see Section 5).

Once a brain scan has excluded a bleed into the brain, patients should receive aspirin as soon as possible since this has been shown to improve outcomes. Exceptions are those who have been given thrombolysis, are taking an anticoagulant or an alternative antiplatelet drug or those who are allergic to aspirin. In 2015, 90% of patients with ischaemic stroke, and no well defined contraindication received aspirin on the day of admission or the day after, compared with 88% in 2014 (Chart 2d). The standard is that 95% of patients without contraindications should receive aspirin on the day of admission, or the day after. Few hospitals, Borders General Hospital (98%), St John's Hospital (96%), Caithness General Hospital (95%) and Western Isles Hospital (95%) met this standard in 2015.

There is considerable variation in performance against the individual Scottish Stroke Care Standard between hospitals. There is clearly scope for improving performance and SSCA continues to work with local teams to achieve this.

3.2   Stroke Unit Information

Table 2:   Stroke Unit Information.

Hospital Name	Number of acute strokes discharged in 2015	Hyper Acute Stroke Unit (HASU) beds	Acute Stroke Unit (ASU) beds	Integrated Stroke Unit (ISU) beds	Stroke Rehabilitation Unit (SRU) beds on acute site	SRU beds off acute site
Ayr Hospital	266	0	9	0	15	0
Crosshouse Hospital, Kilmarnock	384	12	15	0	0	20
Borders General Hospital, Melrose	216	0	0	12	0	0
Dumfries & Galloway Royal Infirmary (DGRI)	247	0	0	9	0	0
Galloway Community Hospital (GCH)	39	0	0	1	0	0
Victoria Hospital, Kirkcaldy (VHK)	627	0	0	24	0	38
Forth Valley Royal Hospital, Larbert (FVRH)	549	0	30	0	0	10
Aberdeen Royal Infirmary (ARI)	704	0	16	0	0	40
Dr Gray's Hospital, Elgin	131	0	0	8	0	0
Glasgow Royal Infirmary (GRI)	519	5	38	0	0	24
Inverclyde Royal Hospital, Greenock (IRH)	216	0	0	17	0	0
Queen Elizabeth University Hospital (QEUH), Glasgow	1 142	0	26	60	0	0
Royal Alexandra Hospital, Paisley (RAH)	339	0	0	30	0	0
Belford Hospital, Fort William	30	0	0	0	0	0
Caithness General Hospital, Wick	73	0	0	0	0	0
Lorn & Islands Hospital, Oban	44	0	0	6	0	0
Raigmore Hospital, Inverness	352	0	0	22	0	0
Hairmyres Hospital, East Kilbride	301	0	0	24	0	0
Monklands Hospital, Airdrie	325	0	0	20	0	0
Wishaw General Hospital	335	0	0	25	0	0
Royal Infirmary of Edinburgh at Little France (RIE)	939	0	0	44	0	17
St John's Hospital, Livingston (SJH)	246	0	0	22	0	0
Western General Hospital, Edinburgh (WGH)	264	0	0	40	0	0
Balfour Hospital, Orkney	43	0	0	0	0	0
Gilbert Bain Hospital, Shetland	36	0	0	0	0	0
Ninewells Hospital, Dundee	457	0	14	0	0	10
Perth Royal Infirmary (PRI)	185	0	0	22	0	0
Uist & Barra Hospital, Benbecula	0	0	0	0	0	0
Western Isles Hospital (WIH)	35	0	0	6	0	0
TOTALS	9 044	17	148	392	15	159

Note regarding Table 2:
1. The column "Number of acute strokes discharged in 2015" is based on inpatients with a final diagnosis of stroke discharged during Jan-Dec 2015 and this cohort of patients differs slightly from the inpatient cohort reported upon elsewhere in this National Report. For inpatients, the report focuses principally on those patients with a final diagnosis of stroke admitted during Jan-Dec 2015. Some patients discharged in 2015 may have been admitted in 2014. Some patients admitted in 2015 may have been discharged in 2016.
2. For details of changes to bed numbers in 2015 and location of off site beds and generic rehabilitation beds used for stroke patients in some areas please refer to this table on our website http://www.strokeaudit.scot.nhs.uk/Reports/Reports.html.

3.3   Hospital Data

This section presents performance of hospitals against the Scottish Stroke Care Standards in a Red, Amber, Green (RAG) or traffic light chart format.

Performance (decline, no change or improvement against the previous year), is measured as a **statistically significant difference** between the latest year's performance and the previous year's performance at the 95% confidence level.

Charts illustrating performance across the Scottish Stroke Care Standards for admission to Stroke Unit, swallow screening, brain scanning and aspirin in 2014 and 2015, grouped by hospital, are given below.

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 the charts below can be found in Excel tables on the SSCA website (www.strokeaudit.scot.nhs.uk).

Key to Charts 2a-d and 6:

2014 results

2015 results : statistically significant improvement since 2014

2015 results : no statistically significant change since 2014

2015 results : statistically significant decline in performance since 2014
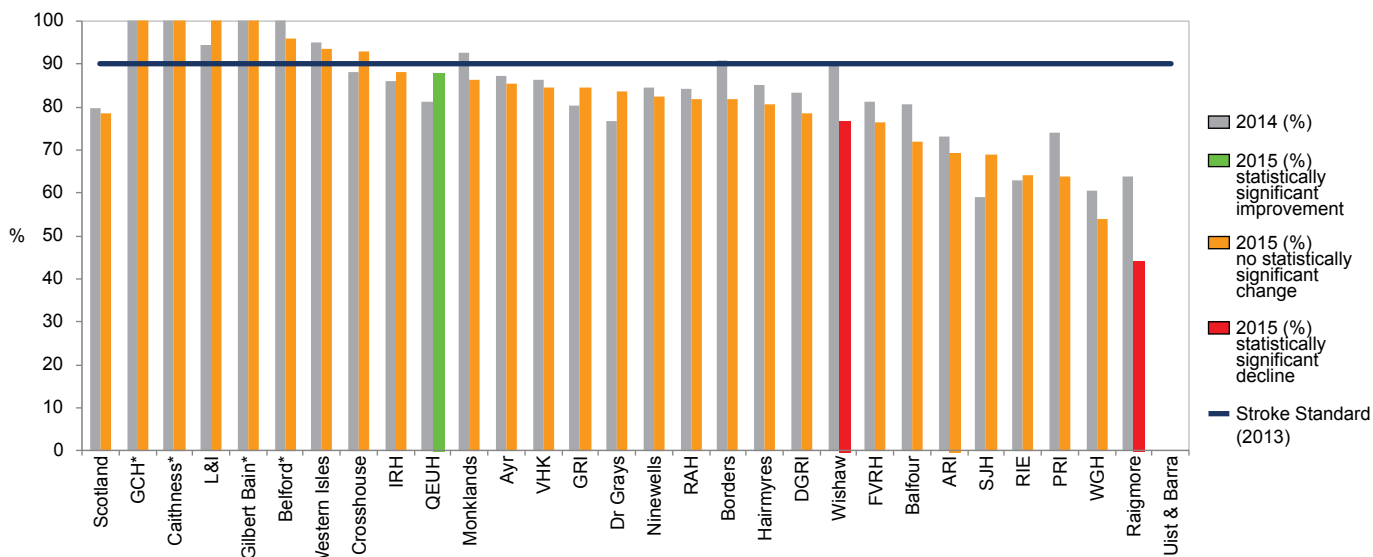
Notes regarding Charts 2a-d:
1.   The **data** included in Charts 2a-d:
     -   were **extracted** from eSSCA on the **28th March 2016**. Changes/ updates to the data following this date will therefore not feature in these analyses;
     -   relate to patients with **final** diagnosis of stroke; and
     -   are for **calendar years 2014 and 2015** (i.e. 1 January – 31 December).
2.   In some instances, data entered into eSSCA are assigned to admitting hospitals other than the main acute hospitals participating in the Scottish Stroke Care Audit. Data for these hospitals are combined with data for their respective main acute hospitals.

Charts 2a – 2d: **Performance against Scottish Stroke Care Standards (2013) standards for admission to Stroke Unit, swallow screening, brain scanning and aspirin, by hospital, comparing 2014 and 2015 data (based on *final* diagnosis).**

2a. Percentage of stroke patients admitted to a Stroke Unit within 1 day of admission to hospital, 2014 and 2015 data (based on *final* diagnosis).

Horizontal line reflects Scottish Stroke Care Standard (2013) of 90% of stroke patients admitted to a Stroke Unit within 1 day of admission.


Notes regarding Chart 2a:
1. **The denominator for the admission to Stroke Unit excludes:** in-hospital strokes, patients discharged within 1 day and transfers in from another hospital.
2. Due to the number of beds within some of the hospitals indicated (*) and the small numbers of stroke admissions to these hospitals **it is not practical to have a defined Stroke Unit**. We have confirmed however that a defined stroke pathway is in place in these hospitals and that the Scottish Stroke Care Standards criteria are established within that pathway.

2b. Percentage of stroke patients with a swallow screening on day of admission, 2014 and 2015 data (based on *final* diagnosis).

Horizontal line reflects Scottish Stroke Care Standard (2013) of 90% of stroke patients swallow screened on day of admission.
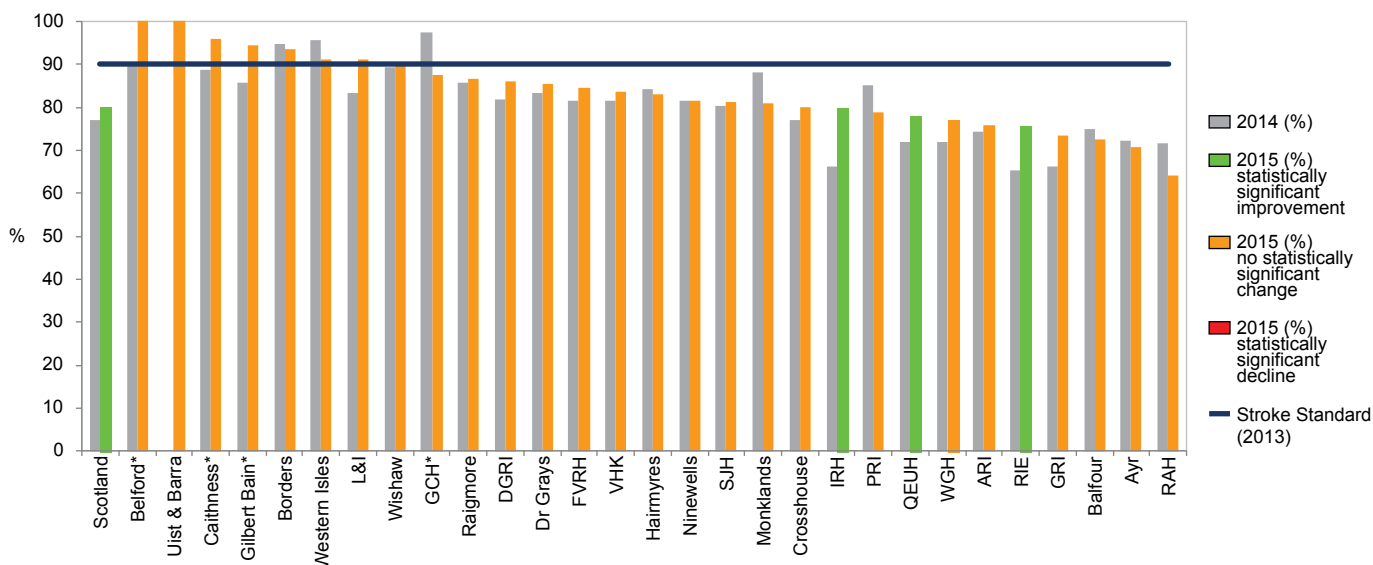
2c. Percentage of stroke patients with a brain scan within 24 hours of admission, 2014 and 2015 data (based on *final* diagnosis).

Horizontal line reflects Scottish Stroke Care Standard (2013) of 90% of stroke patients to receive a brain scan within 24 hours of admission.
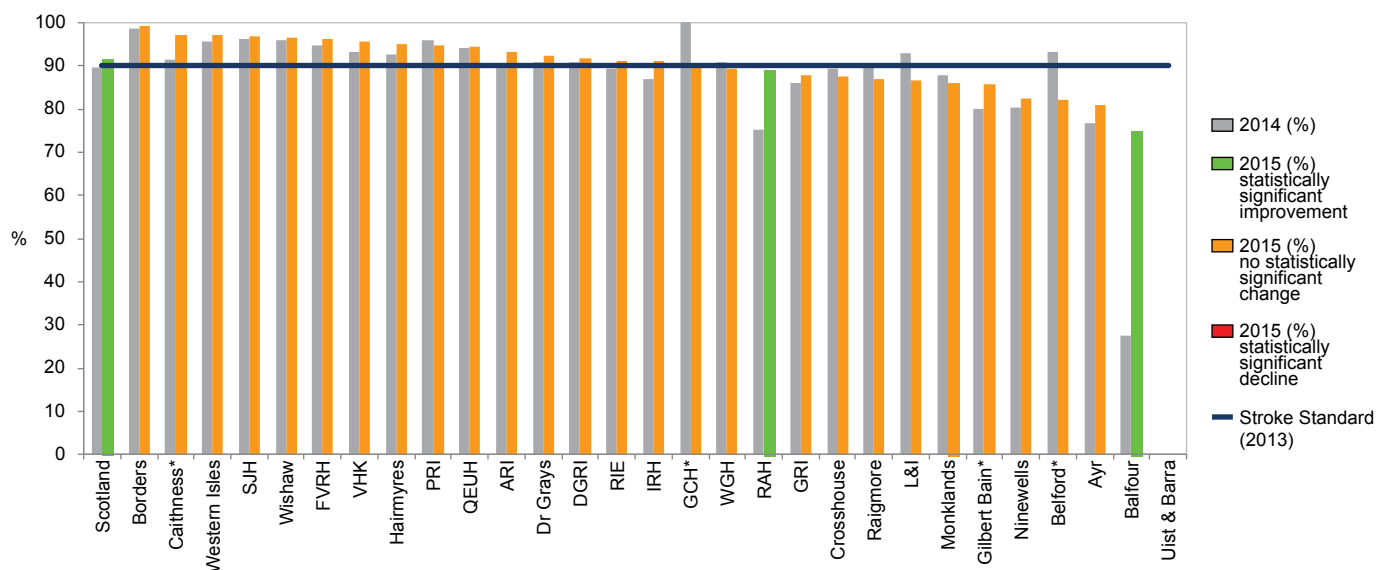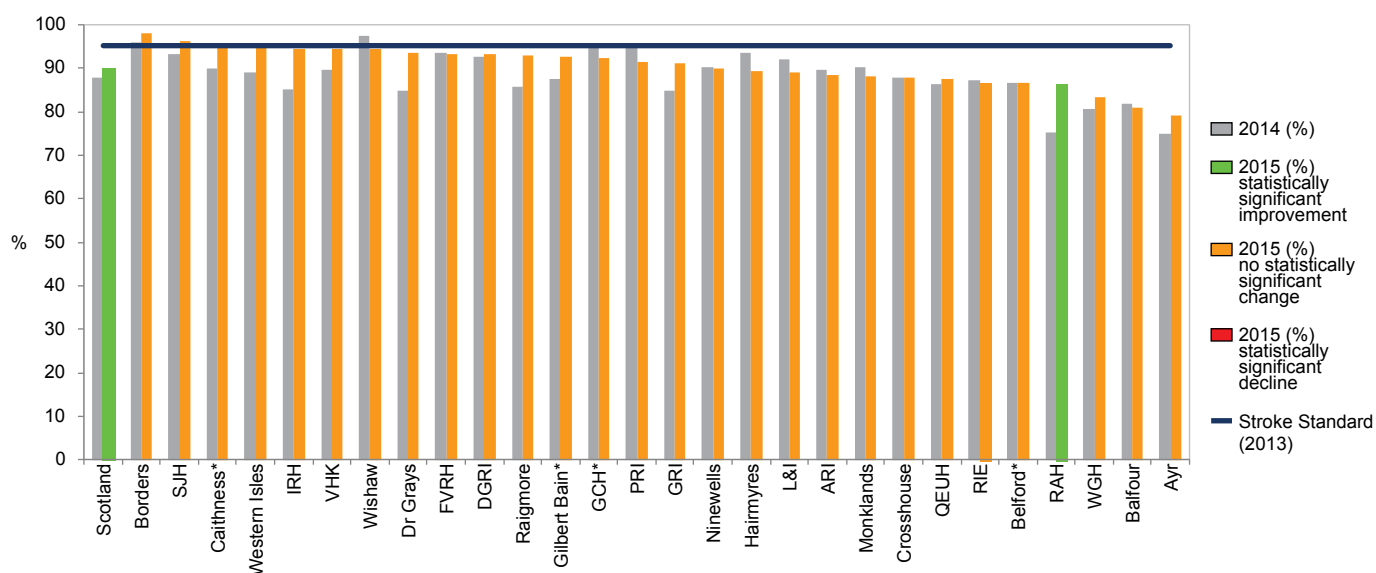

Notes regarding Chart 2c:
1. Balfour Hospital, NHS Orkney, implemented a CT scanning service during 2015. Prior to the introduction of this service, patients were airlifted to Aberdeen Royal Infirmary and a proportion may have arrived in sufficient time to have brain imaging within 24 hours of admission. This should be borne in mind when comparing brain imaging performance for NHS Orkney between 2014 and 2015.
2. **Uist & Barra Hospital, NHS Western Isles does not have a CT scanner** but patients are airlifted to Western Isles Hospital and a proportion may arrive in sufficient time to have brain imaging within 24 hours of admission.

2d. Percentage of acute ischaemic stroke patients given aspirin in hospital within 1 day of admission, 2014 and 2015 data (based on *final* diagnosis).

Horizontal line reflects Scottish Stroke Care Standard (2013) of 95% of stroke patients to receive aspirin within 1 day of admission.
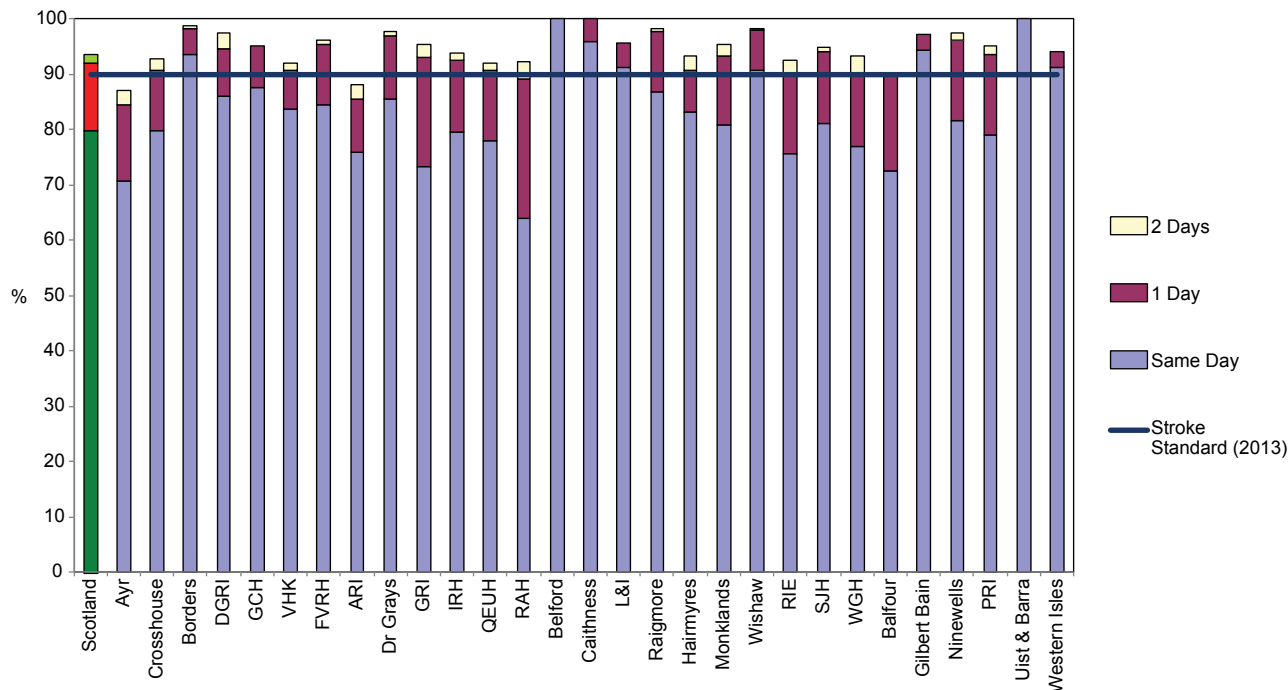

Note regarding Chart 2d:
1. The denominator for the **percentages excludes patients with valid reasons not to give aspirin**.

Chart 3: Percentage of stroke patients with a swallow screening by number of days to swallow screening, 2015 data (based on *final* diagnosis).

Horizontal line reflects Scottish Stroke Care Standard (2013) of 90% of stroke patients swallow screen within 1 day of admission.

Note that the Scotland column in the chart is coloured green and red simply to differentiate it from the hospital columns and the colours are not indicative of performance. Light green corresponds to '2 Days', red corresponds to '1 Day' and dark green corresponds to 'Same Day'.
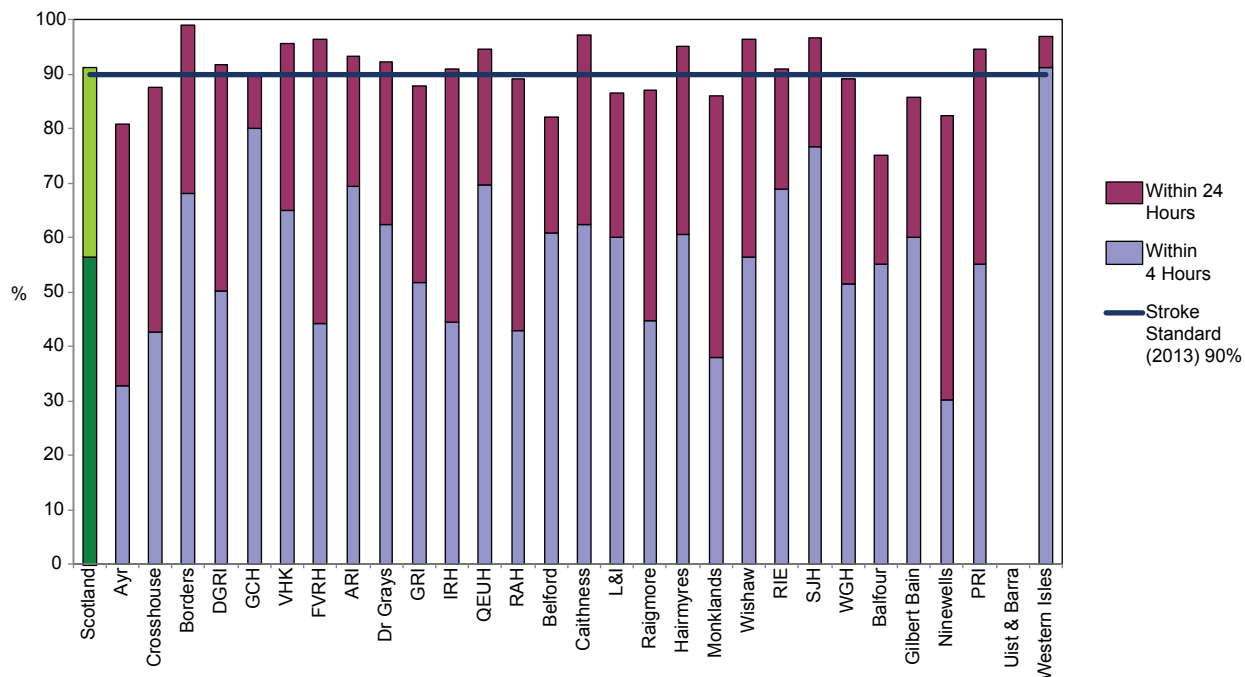

Note regarding Chart 3:

1. In some instances, **data entered into eSSCA are assigned to admitting hospitals other than the main acute hospitals** participating in the Scottish Stroke Care Audit. Data for these hospitals are combined with data for their respective main acute hospitals.

Chart 4: Percentage of stroke patients with a brain scan by number of hours to scan, 2015 data (based on *final* diagnosis).

Horizontal solid line reflects Scottish Stroke Care Standard (2013) of 90% of stroke patients to receive brain imaging within 24 hours of admission.

Note that the Scotland column in the chart is coloured light green and dark green simply to differentiate it from the hospital columns and the colours are not indicative of performance. Light green corresponds to 'Within 24 Hours' and dark green corresponds to 'Within 4 Hours'.

Notes regarding Chart 4:
1. Balfour Hospital, NHS Orkney, implemented a CT scanning service during 2015. Prior to the introduction of this service, patients were airlifted to Aberdeen Royal Infirmary and a proportion may have arrived in sufficient time to have brain imaging within 24 hours of admission. This should be borne in mind when comparing brain imaging performance for NHS Orkney between 2014 and 2015.
2. In some instances, **data entered into eSSCA are assigned to admitting hospitals other than the main acute hospitals** participating in the Scottish Stroke Care Audit. Data for these hospitals are combined with data for their respective main acute hospitals.

Chart 5: Percentage of acute ischaemic stroke patients given aspirin in hospital by number of days to receipt, 2015 data (based on *final* diagnosis).

Horizontal line reflects Scottish Stroke Care Standard (2013) of 95% of acute ischaemic stroke patients to receive aspirin within 1 day of admission.

Note that the Scotland column in the chart is coloured green and red simply to differentiate it from the hospital columns and the colours are not indicative of performance. Light green corresponds to '2 Days', red corresponds to '1 Day' and dark green corresponds to 'Same Day'.
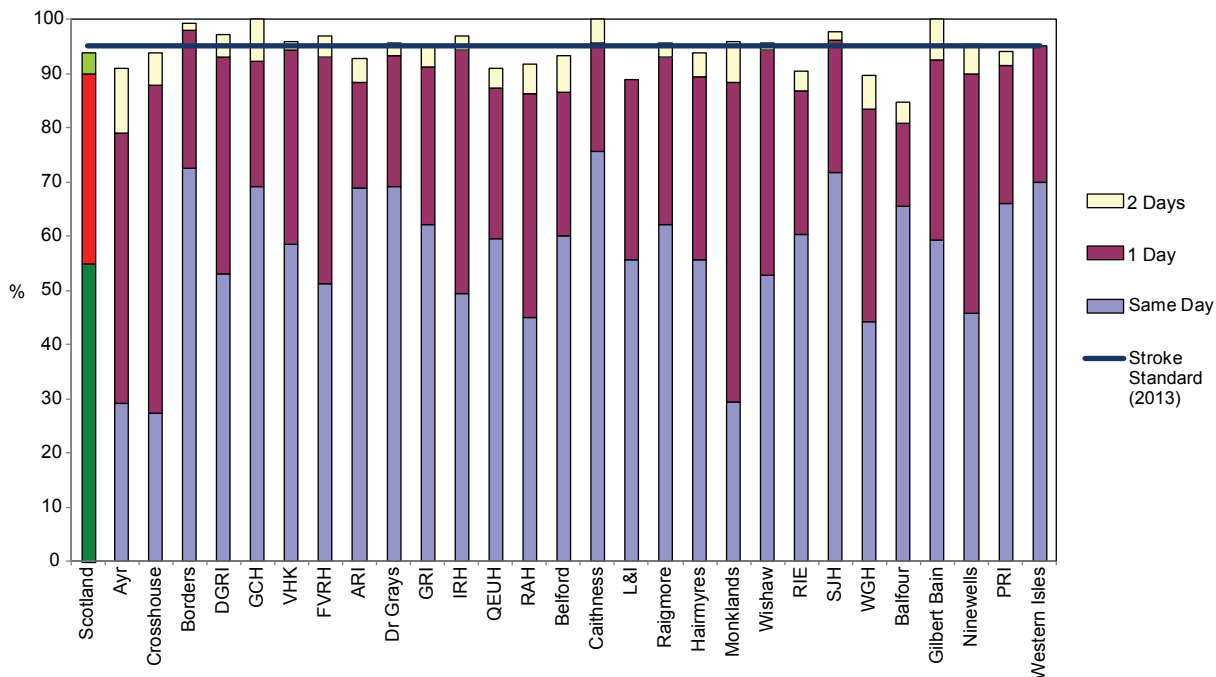
Notes regarding Chart 5:

1. In some instances, **data entered into eSSCA are assigned to admitting hospitals other than the main acute hospitals** participating in the Scottish Stroke Care Audit. Data for these hospitals are combined with data for their respective main acute hospitals.
2. The denominator for the percentages excludes patients with valid reasons not to give aspirin.

3.4   Rehabilitation Sprint Audit

The rehabilitation sprint audit ran in all acute and integrated stroke units from 1st November 2015 to January 31st 2016.

Research shows that rapid access to rehabilitation improves outcomes for people who have had a stroke[11]. Rehabilitation should be provided in a stroke unit by a multidisciplinary team, with clear goals set by the team with the patient, and communicated to the patient and their family. Acute stroke can lead to a range of functional impairments, most of which can be improved or adapted to with rehabilitation. Research has shown that outcomes improve if rehabilitation is provided as soon as possible after the stroke and there is good evidence for multidisciplinary working in achieving the best outcomes. Person centred care involves people and services working in a collaborative way in partnership, focusing on personal goals and personal outcomes.

Questions were asked to establish the following criteria:

1. Whether people admitted to hospital due to an acute stroke were assessed by more than one Allied Health Professional (AHP) by the fourth day of their hospital admission (ie Day of admission = Day 0);

2. Whether multidisciplinary discussion about the person's rehabilitation needs had occurred by the fourth day of their hospital admission;

3. Whether the multidisciplinary discussion had been recorded in a paper or electronic format, accessible to all health professionals involved in the person's care; and

4. Whether there was documented evidence that the rehabilitation plan had been agreed in discussion with the patient and/or their next of kin.

Short stay patients (ie with a hospital length of stay of less than two days) and patients where an end of life care pathway was deemed the most appropriate, were excluded from this audit.

Of the 2164 inpatient events included in the sprint audit, 56% were assessed by more than one AHP by their fourth day in hospital.

We have asked units to comment on their performance and how it might be improved (where required). All AHPs working in stroke services have been asked to complete a brief on-line questionnaire regarding the sprint audit in its current format and their views on how to improve the process going forward.

4   Outpatients

4.1   Summary and key findings relating to outpatient data

> Key Findings:
>
> **83%** of patients in participating clinics achieved this standard in 2015. The Scottish Stroke Care Audit Standard states that at least 80% should be seen within 4 days of receipt of referral.
>
> Greater Glasgow & Clyde do not contribute data to the SSCA outpatient dataset and as such a national perspective cannot be provided.

Nineteen hospitals were collecting TIA clinic data in SSCA during 2015 (Chart 6). Unfortunately, the hospitals in Greater Glasgow & Clyde were still unable to contribute comprehensive outpatient data to allow them to benchmark their performance against other Health Boards and to provide a national perspective. However, they do produce internal data to monitor their performance (see below).

SSCA data were collected on 3869 patients with acute cerebrovascular disease seen in the TIA clinics contributing data in 2015, compared with 3,808 in 2014.

The Scottish Stroke Care Standard states that >= 80% should be seen within 4 days of receipt of referral. Across the participating clinics the proportion meeting this was 83% in 2014 and 2015. Most clinics maintained their performance although unfortunately the clinic at Raigmore reported significantly longer delays than in 2014. Chart 7 shows the proportion of patients seen on the day of referral, the following day, day 2-4 and 5-7. Across Scotland 37% of patients are seen on the day of referral, or the following day.

In Greater Glasgow & Clyde the MCN collects data on the total number of referrals to their clinics, the number which are triaged by consultants to an early appointment (i.e. fast track, and the proportion of these which are seen within 4 days of receipt of referral). Their data are shown in the table below. Data on the patients' diagnosis is not collected, therefore performance relating to those with a final diagnosis of stroke or TIA, which is directly comparable with those clinics participating in SSCA, cannot be produced. It is also unclear how long the delays are for patients who aren't fast tracked and how many of those actually had a stroke or TIA. Whilst clinics in Inverclyde, Royal Alexandra/Vale of Leven, Glasgow Royal Infirmary and Stobhill meet the national standard, those in QEUH, Victoria and Western Infirmary clearly do not.

| Location/Site	Number of Referrals to Stroke/TIA Clinics	Number of Fast Track referrals	No. of Fast Track patients from date received to date seen within 4 days	% of Fast Track patients from date received to date seen within 4 days of receipt of referral
Inverclyde	349	166	165	99
RAH/VoL	735	541	427	79
GRI/Stobhill	931	667	535	80
QEUH	426	335	18	5
Victoria	684	527	181	34
WIG	404	365	165	45
Overall total	3529	2601	1491	57

*Source GG&C MCN

Of course it is not only important to be able to rapidly assess the patients with TIA and minor stroke but also to complete their investigations quickly so that antiplatelet drugs, anticoagulants and carotid

endarterectomy can be started as soon as possible in appropriate cases. This will minimise the risk of stroke. Chart 8 illustrates the median number of days from the stroke/TIA event which lead to the referral, to the receipt of referral, first appointment offered, attendance and completion of imaging in 2014 and 2015. The median delay from last event to referral to a clinic was about 2 days in 2014 and 2015 but there is marked variation between hospitals. The delays to receipt of referral and first assessment have also reduced slightly. However there are still delays to completing imaging reflecting the fact that not all clinics offer same day access to brain scanning and imaging of carotid arteries. On average it still takes 12 or 13 days from the patient's event to complete their investigations. Plenty of scope for improvement!

4.2   Hospital data

Chart 6:   Percentage of patients with definite cerebrovascular diagnosis seen in specialist stroke/TIA clinic with referral to examination time within 4 days, 2014 and 2015 data.

Horizontal line reflects Scottish Stroke Care Standard (2013) of 80% of TIA patients being seen in specialist stroke/TIA clinic within 4 days of receipt of referral.
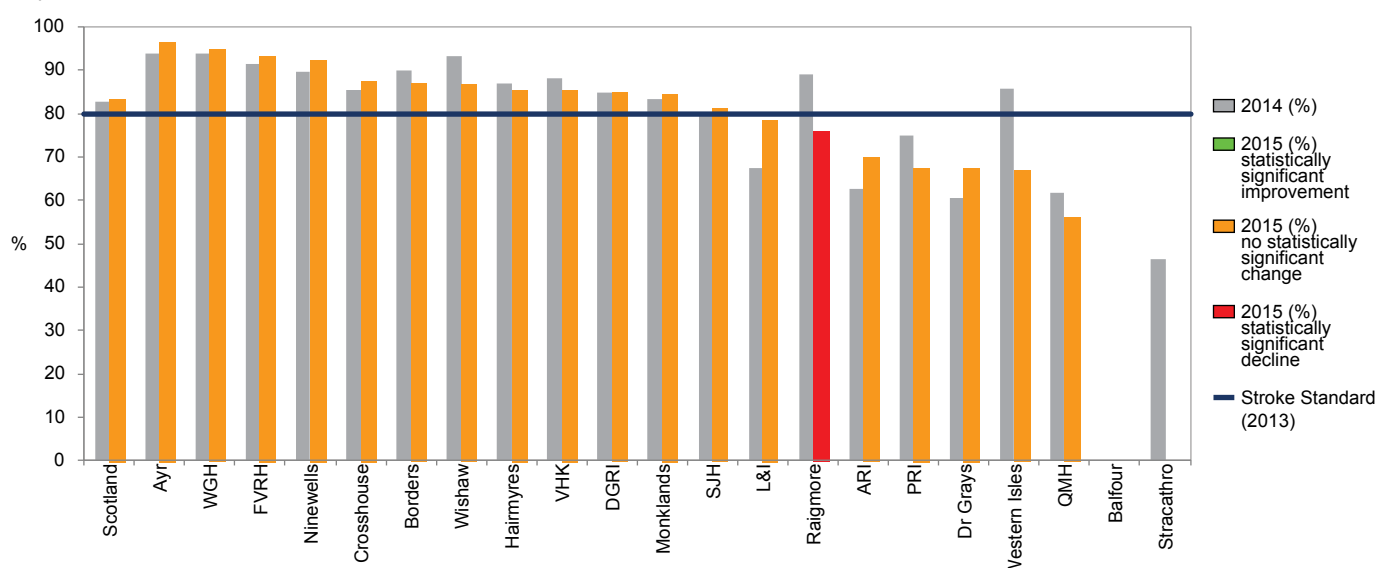
Notes regarding Chart 6:
1. **Data presented are for hospitals using eSSCA where all relevant dates** (last event, referral, referral-received, appointment and examination) **are present and ordered chronologically**.
2. The following **hospitals either do not hold specialist stroke/TIA clinics or do not collect and submit data to SSCA** – Caithness, QEUH, WIG, GCH, Belford, GRI, IRH, VI Glasgow, RAH, RIE, Balfour, Gilbert Bain and Uist & Barra. The **omission of these data may affect the estimate of national performance** based on those hospitals contributing to SSCA.
3. For NHS Fife, the outpatient service for patients with suspected cerebrovascular conditions functions as a single service delivered across two sites, Queen Margaret Hospital and Victoria Hospital Kirkcaldy. Chart 6 separates the performance for these hospitals but they should be considered as a single NHS Fife service. The combined performance for 2014 and 2015 shows 77% and 74% respectively, a decline of 3% between the two years.

Chart 7: Percentage of patients with definite cerebrovascular diagnosis seen in specialist stroke/TIA clinic with referral to examination time (days): same day and within 1, 2-4 and 5-7 days, 2015 data.

Horizontal line reflects Scottish Stroke Care Standard (2013) of 80% of TIA patients being seen in a specialist stroke/TIA clinic within 4 days of receipt of referral.
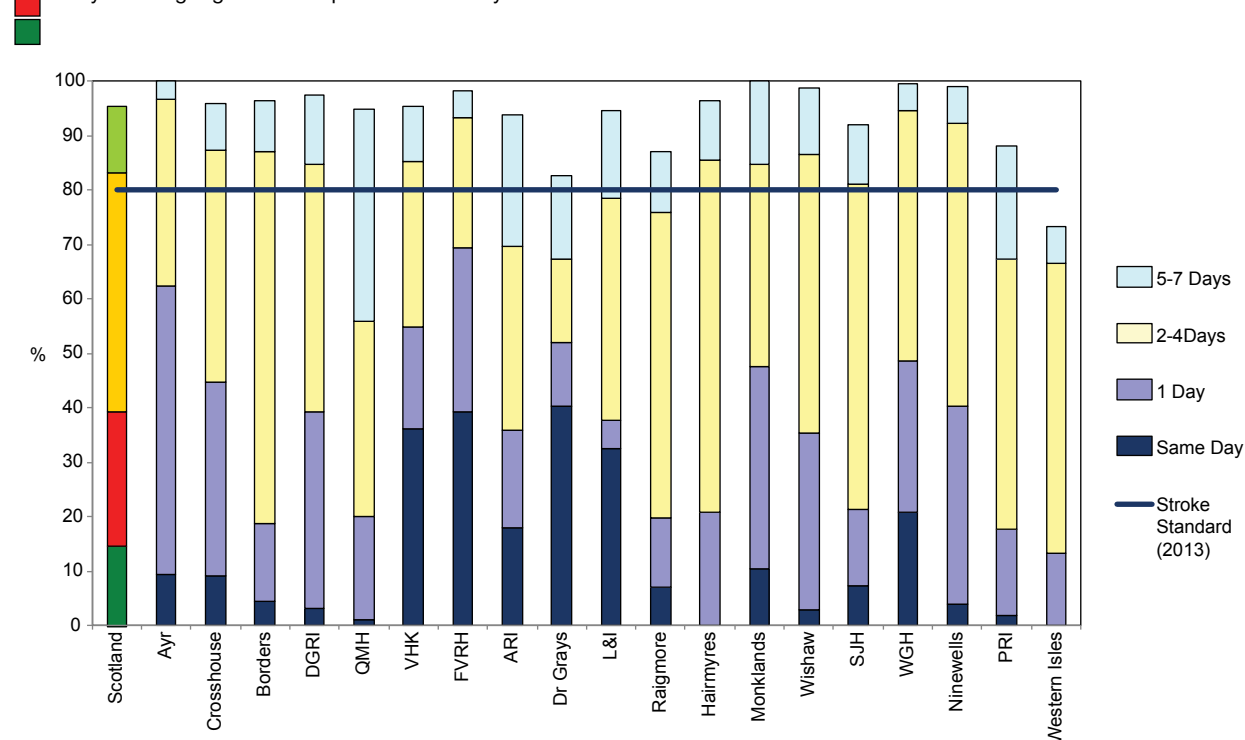
Note that the Scotland column in the chart is coloured green, amber and red simply to differentiate it from the hospital columns and the colours are not indicative of performance. Dark green corresponds to 'Same Day', red corresponds to '1 Day', amber corresponds to '2-4 Days' and light green corresponds to '5-7 Days'.

Notes regarding Chart 7:
1. In some instances, data entered into eSSCA are assigned to admitting hospitals other than the main acute hospitals participating in the Scottish Stroke Care Audit. Data for these hospitals are combined with data for their respective main acute hospitals.
2. The following hospitals either do not hold specialist stroke/TIA clinics or do not collect and submit data to SSCA – Caithness, QEUH, WIG, GCH, Belford, GRI, IRH, VI Glasgow, RAH, RIE, Balfour, Gilbert Bain and Uist & Barra. The omission of these data may affect the estimate of national performance based on those hospitals contributing to SSCA.
3. For those hospitals using eSSCA where all relevant dates (last event, referral, referral-received, appointment and examination) are present and ordered chronologically.

Chart 8: Distribution of median time between stroke event and outpatient imaging, 2014 and 2015 data.

There are instances where elements of the outpatient timeline share the same or similar data point and might not be visible. In these instances the most recent part of the timeline sits on top indicating that the elements have been delivered closely together.
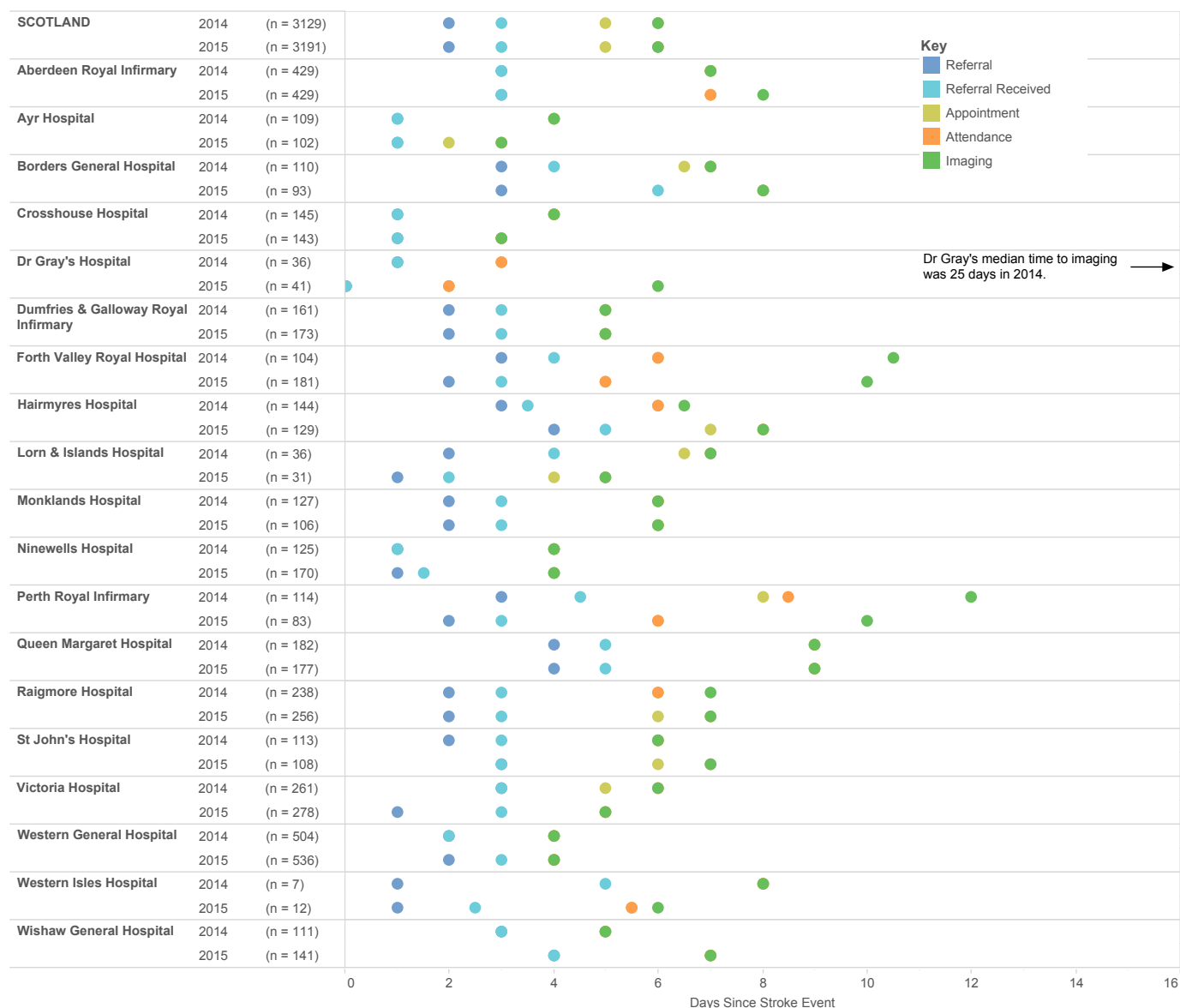

Notes regarding Chart 8:
1. In some instances, data entered into eSSCA are assigned to hospitals other than the main acute hospitals participating in the Scottish Stroke Care Audit. Data for these hospitals are combined with data for their respective main acute hospitals.
2. The following hospitals either do not hold specialist stroke/TIA clinics or do not collect and submit data to SSCA – Caithness, QEUH, WIG, GCH, Belford, GRI, IRH, VI Glasgow, RAH, RIE, Balfour, Gilbert Bain and Uist & Barra. The omission of these data may affect the estimate of national performance based on those hospitals contributing to SSCA.
3. For those hospitals using eSSCA where all relevant dates (last event, event to referral, referral received, appointment, attendance and imaging) are present and ordered chronologically.
4. Two records were excluded from the analysis as they are considered to be data anomalies requiring further investigation.

5   Thrombolysis

5.1   Summary and key findings relating to thrombolysis

Key Findings:

The total number of patients receiving recombinant tissue plasminogen activator (rtPA) increased from **869** in 2014 to **946** in 2015.

In 2015, **51%** of patients were treated within one hour (**43%** in 2014).

The standard of **80%** has not been achieved by any hospital.

Median door to needle times vary between hospitals.

Treatment within four and a half hours of ischaemic stroke with the clot-dissolving treatment rtPA is effective for selected patients with acute ischaemic stroke. Based on pooled study data of this treatment, it is estimated that between 5 and 10 extra people per 100 treated with thrombolysis will be independent 3-6 months later. The earlier the medication can be administered, the more likely the patient is to have a good outcome.

Data on all patients thrombolysed in Scotland have been entered into the SSCA prospectively since January 2010, with retrospective data collected for 2009.

This section includes an overview of the delivery of rtPA in 2014 & 2015.

Table 3:   **Thrombolysis - numbers thrombolysed, 2014 & 2015 data.**

Hospital	Number of patients receiving thrombolysis in 2014	Number of patients receiving thrombolysis in 2015
Scotland summary	**869**	**946**
Ayrshire & Arran	**49**	**42**
Ayr Hospital	19	11
Crosshouse Hospital, Kilmarnock	30	31
Borders	**10**	**10**
Borders General Hospital, Melrose	10	10
Dumfries & Galloway	**46**	**40**
Dumfries & Galloway Royal Infirmary (DGRI)	35	32
Galloway Community Hospital (GCH)	11	8
Fife	**44**	**60**
Victoria Hospital, Kirkcaldy (VHK)	44	60
Forth Valley	**35**	**40**
Forth Valley Royal Hospital, Larbert (FVRH)	35	40
Grampian	**145**	**164**
Aberdeen Royal Infirmary (ARI)	133	156
Dr Gray's Hospital, Elgin	12	8
Greater Glasgow & Clyde	**203**	**229**
Glasgow Royal Infirmary (GRI)	1	1
Inverclyde Royal Hospital, Greenock (IRH)	0	0
Queen Elizabeth University Hospital, Glasgow (QEUH)	202	226

Hospital	Number of patients receiving thrombolysis in 2014	Number of patients receiving thrombolysis in 2015
Royal Alexandra Hospital, Paisley (RAH)	0	2
Highland	**41**	**40**
Belford Hospital, Fort William	3	3
Caithness General Hospital, Wick	3	11
Lorn & Islands Hospital, Oban	8	3
Raigmore Hospital, Inverness	27	23
Lanarkshire	**67**	**112**
Hairmyres Hospital, East Kilbride	14	26
Monklands Hospital, Airdrie	26	39
Wishaw General Hospital	27	47
Lothian	**150**	**122**
Royal Infirmary of Edinburgh at Little France (RIE)	100	85
St John's Hospital, Livingston (SJH)	35	26
Western General Hospital, Edinburgh (WGH)	15	11
Orkney	**1**	**2**
Balfour Hospital, Orkney	1	2
Shetland	**1**	**2**
Gilbert Bain Hospital, Shetland	1	2
Tayside	**71**	**75**
Ninewells Hospital, Dundee	49	52
Perth Royal Infirmary (PRI)	22	23
Western Isles	**6**	**8**
Uist & Barra Hospital, Benbecula	0	0
Western Isles Hospital (WIH)	6	8

Notes regarding Table 3:
1. Note that this table is not directly comparable with Table 4 because it is based on hospital/ NHS board of treatment rather than Health Board of residence, upon which Table 6 is based. Health Boards may treat patients from outside their board area or may treat non-Scottish residents.
2. Records are included if a thrombolysis date is present; a small proportion of these records will not have an associated thrombolysis time recorded. This table also includes a small proportion of patients who were thrombolysed for a non-index event. This differs slightly from Chart 9 where measurement of the 60 minute thrombolysis door-to-needle time standard focuses on patients thrombolysed for index events only.
3. Data for this table are derived from the 'admission hospital' field (inpatient dataset).

There is a steady increase in the numbers receiving rtPA. The total number of patients receiving rtPA increased from 869 in 2014 to 946 in 2015. In some Health Boards there has been an increase in thrombolysis activity since 2014, probably reflecting a combination of an increase in stroke numbers, service reorganisation and more robust data collection, while in other areas activity has plateaued (Table 3). In order to view these data in the context of the local demand (in particular population size and likely clinical need) we have expressed these results in terms of the population in each region (Table 4). The original annual standard of 5 thrombolysis treatments per 100,000 population was exceeded in 2009, and has continued to increase with the crude rate now standing at 17 for Scotland (Table 4). The equivalent estimate for the percentage of patients receiving thrombolysis is shown in Table 5.

Table 4: Thrombolysis – numbers thrombolysed and crude rate per 100,000 by Health Board of residence of patient, 2015 data.

Health Board of Residence[1]	Number of patients receiving thrombolysis in 2015	Mid-Year Population Estimate[2] 2014	Crude Rate per 100,000	Confidence Interval†		
Scotland	**908**	**5 347 600**	**17.0**	**15.9**	**-**	**18.1**
Ayrshire & Arran	48	371 110	12.9	9.5	-	17.1
Borders	9	114 030	7.9	3.6	-	15.0
Dumfries & Galloway	38	149 940	25.3	17.9	-	34.8
Fife	68	367 260	18.5	14.4	-	23.5
Forth Valley	40	300 410	13.3	9.5	-	18.1
Grampian	154	584 240	26.4	22.4	-	30.9
Greater Glasgow & Clyde	194	1 142 580	17.0	14.7	-	19.5
Highland	38	320 760	11.8	8.4	-	16.3
Lanarkshire	129	653 310	19.7	16.5	-	23.5
Lothian	114	858 090	13.3	11.0	-	16.0
Orkney	3	21 590	13.9	2.9	-	40.6
Shetland	2	23 230	8.6	1.0	-	31.1
Tayside	66	413 800	15.9	12.3	-	20.3
Western Isles	5	27 250	18.3	6.0	-	42.8
Outside Scotland/ Not Known/ Other	38	-	-	-		

Notes regarding Table 4:
1. Note that this table is not directly comparable with Table 3 because it is based on Health Board of residence rather than hospital/ NHS board of treatment , upon which Table 3 is based. Health Board residents may travel for treatment at hospitals outside their immediate Health Board area. Also, some patients may be non-Scottish residents.
2. A small proportion of records could not be assigned to a Health Board because they were either for non-Scottish residents or there was insufficient information to allow their assignment to a Health Board (e.g. partial or incorrect postcode).
3. At the time of preparing the table the population estimates used were the latest available from National Records of Scotland (formerly General Register Office for Scotland, which merged with National Archives of Scotland from 1st April 2011). Health Board boundary changes occurred from April 2014. SSCA data and mid-year population estimates use the revised Health Board boundaries. The issue primarily affects NHS Greater Glasgow & Clyde and NHS Lanarkshire.

† Confidence intervals calculated using method described in: WOODWARD (2005) Epidemiology: study design and data analysis 2nd edition chapter 3 pp 152-154. ISBN 1584884150.
For events where N>=100, formula 3.29 (p153) is used to calculate lower/upper 95% confidence limits for the number of events. For events where n<100, the lower/upper 95% confidence limits are taken from a table (http://www.doh.wa.gov/Portals/1/Documents/5500/ConfIntGuide.pdf) showing exact 95% confidence limits from the Poisson distribution. These figures are then used in conjunction with the mid-year population estimates to calculate the lower/upper confidence limits for the crude rates.

Over the past three years regional variation has reduced, reflecting service expansion, increased use of telemedicine and increasing clinician confidence. However, service provision is not yet equitable across Scotland. Ongoing initiatives including a local pre-alert policy for the Scottish Ambulance Service, public awareness campaigns and Stroke and TIA Assessment Training (STAT) should help address this.

Table 5: Thrombolysis - numbers thrombolysed as percentage of stroke patients, and as a rate per 100,000 total population, Scotland, 2008-2015.

| Year	Number of patients thrombolysed (numerator)	Number of stroke patients (denominator)	Percentage	Number of patients per 100,000 (target is 5)	Mid-year population estimates[1] (Scotland)
2008	260	8 439	*3%*	5	5 202 900
2009	411	8 012	*5%*	8	5 231 900
2010	543	8 439	*6%*	10	5 262 200
2011	648	8 233	*8%*	12	5 299 900
2012	669	8 063	*8%*	13	5 313 600
2013	803	8 753	*9%*	15	5 327 700
2014	869	8 739	*10%*	16	5 347 600
2015	946	9 026	*10%*	18	5 347 600

Note regarding Table 5:
1. Latest available population estimates from National Records of Scotland (formerly General Register Office for Scotland, which merged with National Archives of Scotland from 1st April 2011).

Across Scotland, in 2015 only 51% of patients were treated with rtPA within one hour of arrival at hospital (Chart 9), with a modest improvement from 2014 (43%). No hospital is achieving the standard of 80% treated within one hour of admission and average door to needle times vary considerably between hospitals (Chart 10). As patients have a better outcome with earlier delivery of treatment, this is an area which will require ongoing attention nationally, with review of service delivery pathways.

Chart 9: Percentage of patients with door-to-needle times for thrombolysis within 1 hour, 2014 and 2015 data.

Horizontal line reflects Scottish Stroke Care Standard (2013) of 80% of stroke patients thrombolysed within 1 hour of arrival at first hospital.
Note that the Scotland columns in the chart are coloured light green and dark green simply to differentiate them from the hospital columns and the colours are not indicative of performance. Light green corresponds to '2014' and dark green corresponds to '2015'.
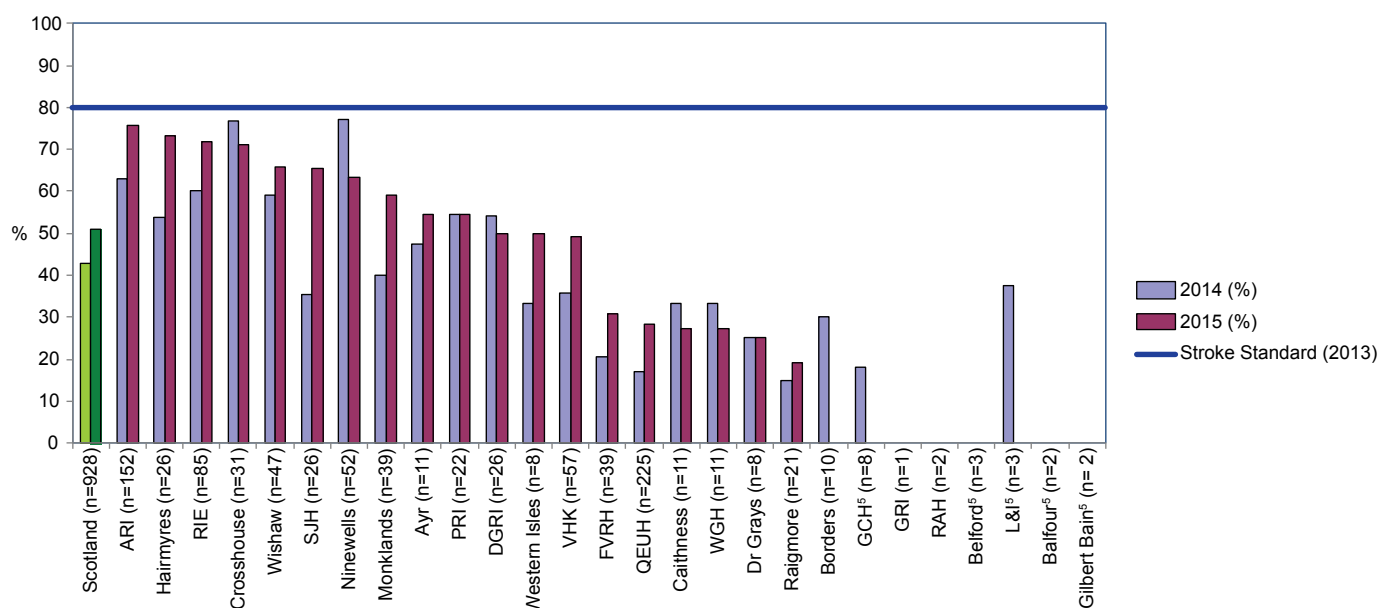
For notes regarding Chart 9 please see notes regarding Chart 10.

Chart 10: Percentage of patients receiving thrombolysis within 30, 60 & 75 minutes of arrival at first hospital, 2015 data.
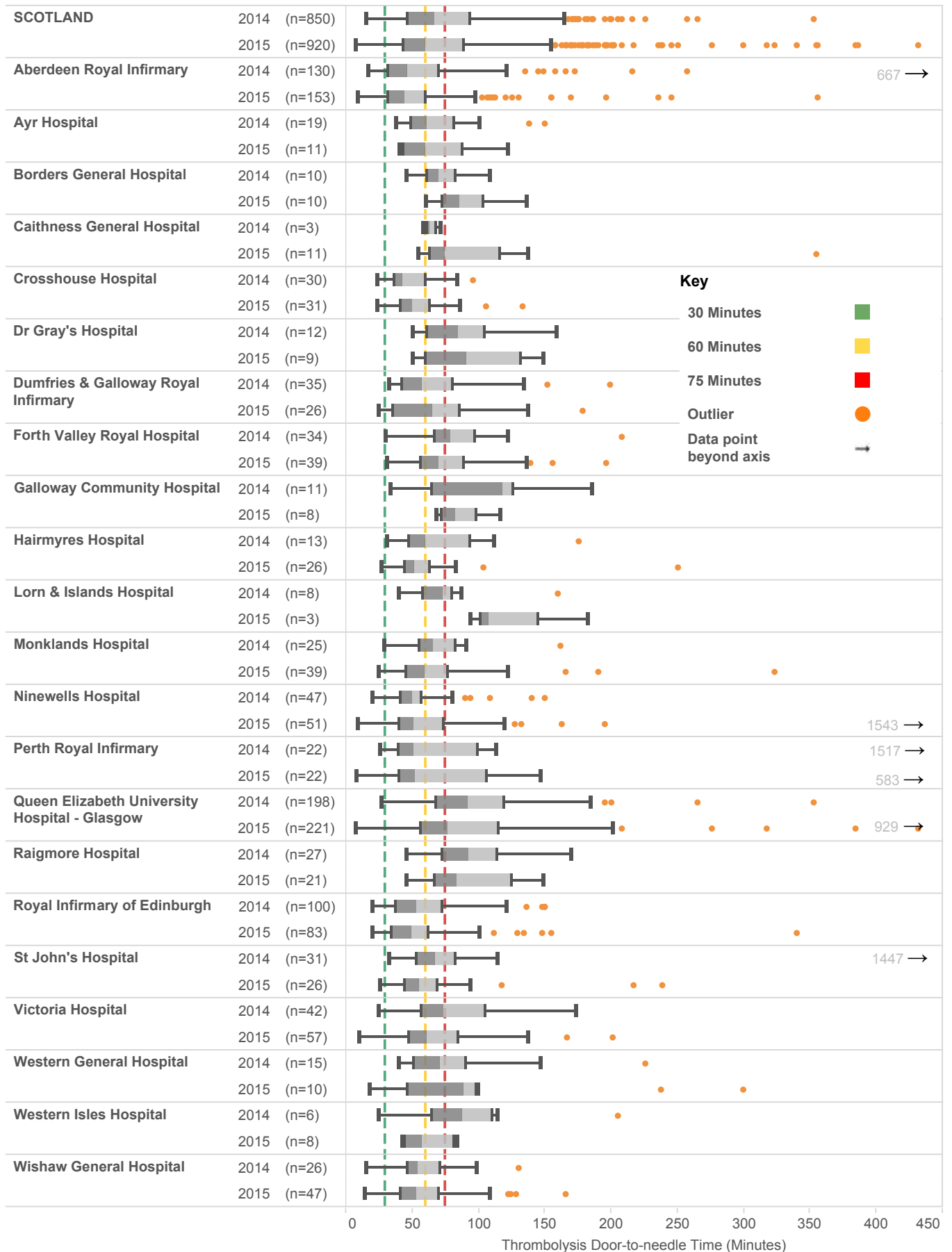
Note that the Scotland column in the chart is coloured green and red simply to differentiate it from the hospital columns and the colours are not indicative of performance. Light green corresponds to '>60<=75 mins', red corresponds to '>30<=60 mins' and dark green corresponds to 'Within 30 mins'.
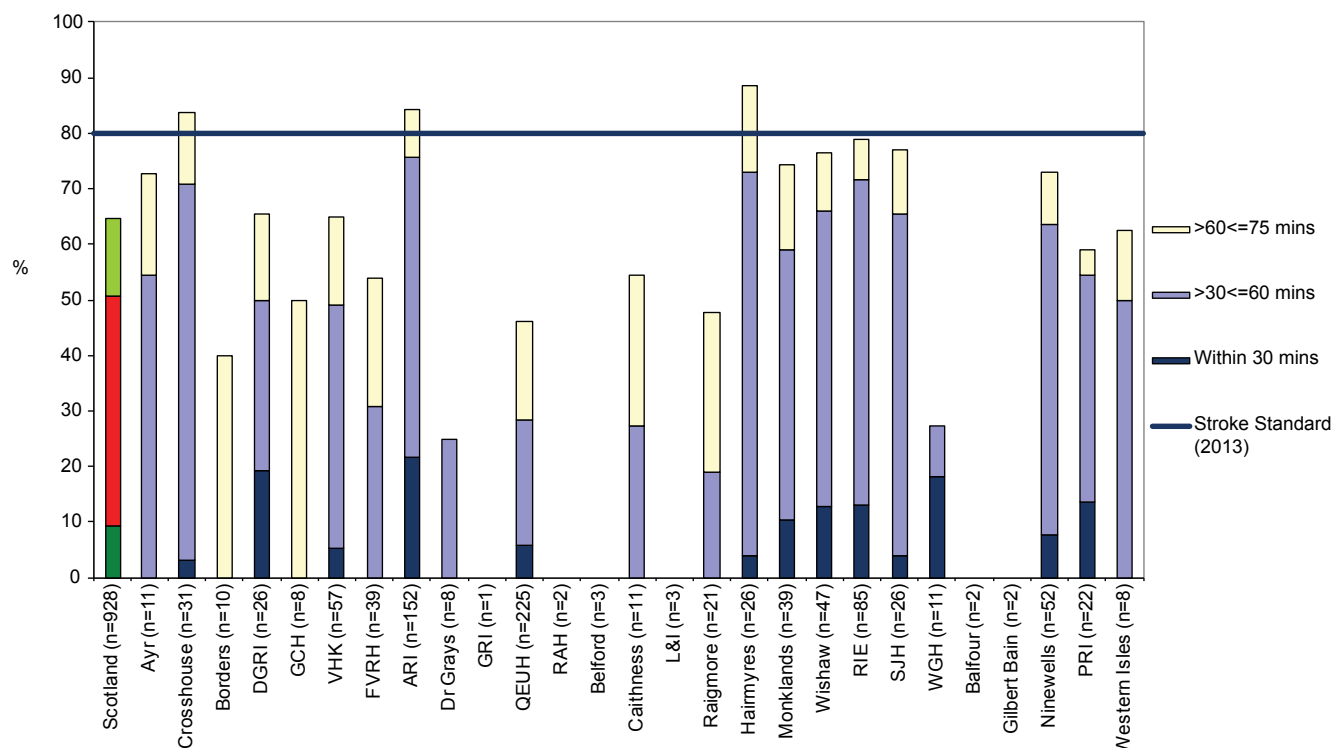
Notes regarding Charts 9 and 10:

1. **Hospitals shown are those that provide a thrombolysis service.** See Table 3 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 percentages are based on very small numbers (see numbers in brackets on axis) and **should be interpreted with caution.**

3. Some hospitals (e.g. QEUH) receive a **small number of patients transferred from neighbouring Health Boards** which may affect their onset-to-needle time performance.

4. In some instances, **data entered into eSSCA are assigned to admitting hospitals other than the main acute hospitals** participating in the Scottish Stroke Care Audit. Data for these hospitals are combined with data for their respective main acute hospitals.

5. **Some hospitals admitted ischaemic stroke patients for thrombolysis but did not thrombolyse any patients within the time spans included in this chart.** These hospitals are included in the chart denominator but show as zero percent with regard to the time spans analysed.

6. A small proportion of records have thrombolysis date recorded but no thrombolysis time. These records are included in the denominator because the presence of a date indicates thrombolysis occurred. The absence of a thrombolysis time, however, prevents the calculation of door-to-needle time so these cases cannot be measured against the 60 minute standard and cannot be confirmed as having achieved it and are assumed not to have done so. This is a slightly different approach from Chart 11 where inclusion in the chart requires both a thrombolysis date and thrombolysis time. As a result, the Chart 9 and Chart 10 denominators, for individual hospitals, may be slightly higher than those in Chart 11.

7. A small proportion of records may involve admission dates at the end of one year and thrombolysis dates at the beginning of the next year.

8. A small proportion of records may involve clot retrieval as well as thrombolysis.

Chart 11: Thrombolysis door-to-needle time distributions (minutes) by hospital, 2014 and 2015 data.

Key

30 Minutes	■ (green)
60 Minutes	■ (yellow)
75 Minutes	■ (red)
Outlier	● (orange)
Data point beyond axis	→

Thrombolysis Door-to-needle Time (Minutes)

Notes regarding Chart 11:

1. Hospitals shown are those that provide a thrombolysis service. 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. These records have been excluded from Chart 11. This is a slightly different approach from the denominators used in Chart 9 and Chart 10 where records with a thrombolysis date but no thrombolysis time may be included. As a result, the Chart 11 denominators, for individual hospitals, may be slightly lower than those in either Chart 9 or Chart 10.

2. Four hospitals (Balfour Hospital, Gilbert Bain Hospital, Glasgow Royal Infirmary and Royal Alexandra Hospital) did not thrombolyse a sufficient number of patients to be displayed meaningfully as a box plot.

3. In some instances, **data entered into eSSCA are assigned to admitting hospitals other than the main acute hospitals** participating in the Scottish Stroke Care Audit. Data for these hospitals are combined with data for their respective main acute hospitals.

4. Some hospitals (e.g. Queen Elizabeth University Hospital) receive **a small number of patients transferred from neighbouring Health Boards** which may affect their onset-to-needle time performance.

5. The central boxes display the middle 50% of the data which is any data point within the 2nd and 3rd quartiles. The meeting point of the the two boxes is the median. Data outside this is included in the whisker unless the data point is greater than 1.5x the interquartile range (the two grey boxes). These data points are deemed to be outliers and are reported as a point separate from the box and whisker plot.

When exploring the door to needle times in more detail we can see that across Scotland the number (%) receiving thrombolysis is 472 (51%) within 60 minutes of arrival at hospital, 508 (59%) within 75 minutes and 601 (65%) within 90 minutes. This leaves further scope for improvement and emphasises the need for systems, such as thrombolysis pre-alerts, to reduce delays in hospital[12]. Data from the audit and exception reporting allow each centre to reflect on individual performance, and identify any specific issues causing delay.

Thrombectomy

Thrombectomy is a treatment which can, in some cases, provide additional benefit over thrombolysis alone. It is most effective when given as early as possible after the stroke event. If this treatment is to be successfully implemented in Scotland, our service, amongst other things, must strive to minimise their door to needle times. With this in mind, a challenging new standard of '50% of thrombolysis patients to receive their treatment within 30 minutes of arrival at hospital' has been introduced in 2016.

6 Carotid Intervention

6.1 Background

Carotid endarterectomy is a surgical procedure which aims to reduce the risk of stroke. The audit standard remains that 80% of patients to undergo stroke prevention surgery within 14 days of the ischaemic event. There are good clinical reasons to perform carotid endarterectomy as soon as possible. Primarily, the risk of further, perhaps more serious ischaemic event, is greatest during this period and therefore a greater number of strokes will be prevented by earlier intervention. The risk of the surgery maybe a little higher at this time, but the net gain is greater.

A well-attended service improvement event was held in the autumn of 2015. Speakers of international standing set the scene. Representatives from all the centres in Scotland took the opportunity to meet and discuss the changes that might lead to improvements in the time to surgery.

6.2 Summary and key findings relating to carotid intervention

Key Findings:

There is a modest improvement from **37** to **41%** of procedures meeting the two-week target.

The SSCA commenced collecting carotid intervention data in July 2012. The data are entered by participating hospitals into eSSCA.

The data for 2015 see little change on the previous year. Overall there is a modest improvement from 37 to 41% of procedures meeting the two-week target (Chart 12). At the same time number of procedures also fell slightly from 409 to 392.

The 2015 performance will be largely unaffected by the improvement event late in the year. However, next year any impact should be apparent. Local audit teams can break down the delays from last ischemic event to surgery into those due to delays in patients seeking help, delays in accessing a TIA service and completing investigations and finally those due to the referral process and the carrying out of surgery. To reduce delays may require action on all or any of these steps and it is likely to vary from place to place.

Table 6: Carotid Endarterectomy - number of patients receiving a carotid endarterectomy in acute hospitals in Scotland during Jan-Dec 2015.

| NHS board of hospital	Hospital providing carotid intervention service	Total	Residents	Non-residents	Non-resident NHS Boards (ranked on number of events, high-to-low)
Ayrshire & Arran	Ayr Hospital	23	23	0	
Dumfries & Galloway	Dumfries & Galloway Royal Infirmary	27	27	0	
Fife	Victoria Hospital, Kirkcaldy	9	9	0	
Forth Valley	Forth Valley Royal Hospital (Larbert)	31	30	1	Lanarkshire
Grampian	Aberdeen Royal Infirmary	30	28	2	Orkney; Outside Scotland/ Not Known/ Other
Greater Glasgow & Clyde	Queen Elizabeth University Hospital, Glasgow	102	86	16	Highland; Lanarkshire; Outside Scotland/ Not Known/ Other; Ayrshire & Arran
Highland	Raigmore Hospital, Inverness	25	22	3	Outside Scotland/ Not Known/ Other; Western Isles
Lanarkshire	Hairmyres Hospital, East Kilbride	63	59	4	Greater Glasgow & Clyde; Outside Scotland/ Not Known/ Other
Lothian	Royal Infirmary of Edinburgh at Little France	54	46	8	Borders; Outside Scotland/ Not Known/ Other
Tayside	Ninewells Hospital, Dundee	27	23	4	Fife; Outside Scotland/ Not Known/ Other
Scotland	**Scotland**	**391**	**353**	**38**	

Notes regarding Table 6:
1. Hospitals shown are those that provide a carotid intervention service and have submitted data to eSSCA for 2015.
2. Carotid intervention procedures in Greater Glasgow and Clyde are carried out by a single team of surgeons at the Queen Elizabeth University Hospital.
3. A small proportion of records could not be assigned to a Health Board of residence because they were either for non-Scottish residents or there was insufficient information to allow their assignment to a Health Board (e.g. partial or incorrect postcode).
4. Health Board boundary changes occurred from April 2014. SSCA data use the revised Health Board boundaries. The issue primarily affects NHS Greater Glasgow & Clyde and NHS Lanarkshire.

The SMR01 estimates for carotid endarterectomy indicate some variation in the number of procedures performed per 100,000 population. However these need some consideration before interpreting them. Some Health Boards do not offer carotid endarterectomy and therefore their cases will appear in another Health Boards' figures.

Chart 12: Percentage of patients undergoing a carotid intervention within 14 days of the event that led the patient to first seek medical assistance, 2014 and 2015 data.

Horizontal line reflects Scottish Stroke Care Standard (2013) of 80% of patients undergoing carotid endarterectomy for symptomatic carotid stenosis have the operation within 14 days of the stroke event.

Note that the Scotland columns in the chart are coloured light green and dark green simply to differentiate them from the hospital columns and the colours are not indicative of performance. Light green corresponds to '2014' and dark green corresponds to '2015'.
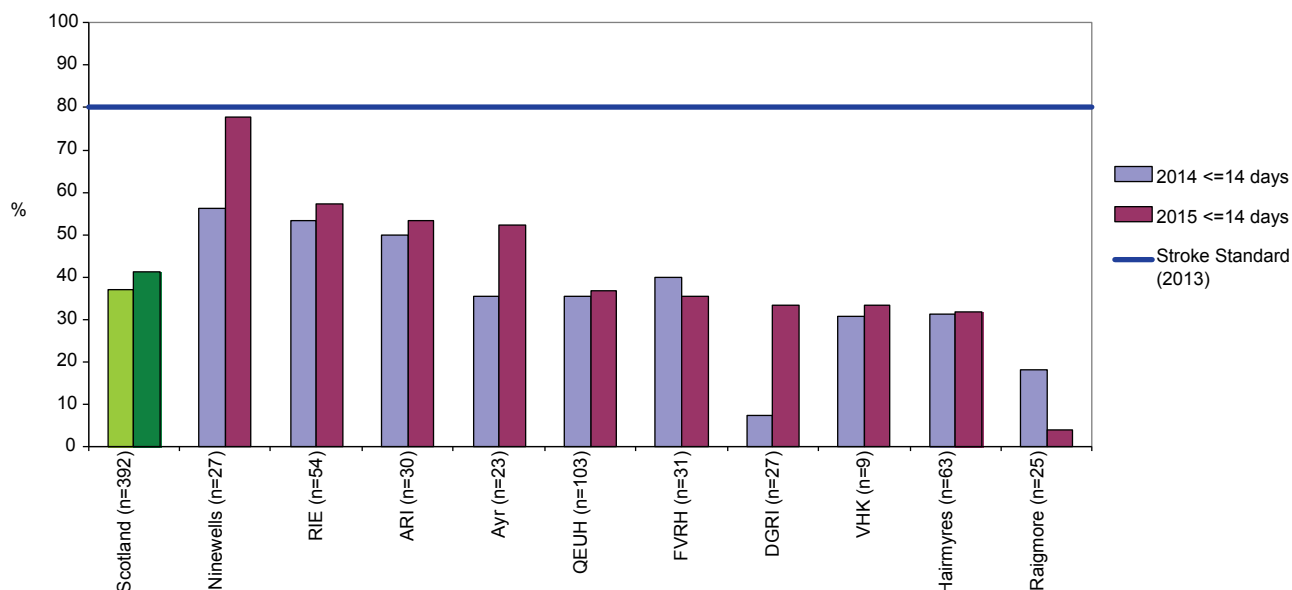
Notes regarding Chart 12:

Bracketed number on chart x-axis indicates number of patients in denominator for 2015.

1. **Hospitals shown are those that provide a carotid intervention service and have submitted data to eSSCA for 2014**.
2. Patients in Borders, Orkney, Shetland & Western Isles are treated in other Health Boards as part of their respective carotid intervention pathways.
3. A small proportion of records have a carotid intervention date but no date recorded for the event that led to the first medical assessment. These records are included in the denominator because the presence of an intervention date indicates that a carotid intervention was performed. The absence of a date for the event that led to the first medical assessment, however, prevents the calculation of days to carotid intervention so these cases cannot be measured against the 14 day standard and cannot be confirmed as having achieved it and are assumed not to have done so. This is a slightly different approach from Chart 16b where inclusion in the chart requires both a carotid intervention date and date recorded for the event that led to the first medical assessment. As a result, the Chart 12 denominators, for individual hospitals, may be slightly higher than those in Chart 16b.

6.3   Future work

The reporting of the process audit data relating to the delay to surgery will continue. This is a valid, clinically important measure. Case linkages may allow an examination of length of stay post-operatively and the re-admission and death rates following carotid intervention.

7 Use of SSCA data in research

The Research Subgroup of the SSCA Steering Committee continues to oversee the use of SSCA data in research. The datasets are primarily available for researchers based in Scotland who have contributed to the audit, but open to other researchers also.

This section of the report briefly outlines work undertaken by Chest Heart & Stroke Scotland (CHSS) Research Fellow Dr Melanie Turner to date using the SSCA dataset.

Information about the SSCA Research Subgroup and forms for requesting data are available on the SSCA website (http://www.strokeaudit.scot.nhs.uk/Research.html).

7.1 CHSS funded research: Using routine data to answer important questions about the optimal care of stroke and TIA patients in Scotland.

Funding from CHSS has facilitated on-going analysis of an updated SSCA dataset, which has been linked to include SMR01 and National Records of Scotland mortality data.

Data have been published on the agreement between SMR01 and SSCA data in identifying stroke in the Scottish population and concludes that SSCA most accurately represents the number of strokes occurring in Scotland.[13]

In addition, we have published data which shows that while there is a modest increase in mortality in patients admitted out of hours or at weekends; most of this can be ameliorated by early access to a stroke unit [14]. We have also examined the Stroke Unit organisational audit for Scotland to determine whether stroke service characteristics may impact case mix adjusted outcomes, and this is being prepared for publication (which will be made available on the SSCA website).

The INTERSTROKE study is an international case control study recruiting over 13,000 acute stroke patients from 100 hospitals across 32 countries[15]. We have compared service characteristics in the Scottish dataset with those from other settings with the aim of establishing which service characteristics best explain outcome variations across countries. This is also being prepared for publication. An updated list of publications is available on the SSCA website, and an update will also be provided at the SSCA national meeting.

Further funding has been obtained from CHSS to link the stroke dataset to hospital events, mortality and also dispensing datasets held within ISD. This will allow us to look at the interactions between stroke events and treatment.

Dr Melanie Turner has recently obtained a postdoctoral fellowship from the Stroke Association to investigate the relationship between co-morbidity and stroke management and outcomes and to develop a prediction model for stroke outcome. This work will start in November 2016.

Additional projects include a linkage to the PACS dataset to assess outcomes in patients with intracerebral haemorrhage (PI: Professor Rustam Salman Al-Shahi, University of Edinburgh), linkage to the SCI-DC Diabetes dataset to look at the impact of diabetes on stroke and outcomes (PI: Professor Sarah Wild, University of Edinburgh), and a linkage between SSCA and the Scottish Renal Registry (PI: Mark Findlay, University of Glasgow). Further information on how to gain access to the SSCA dataset for research purposes is available on the SSCA website

For further information relating to any of this work please contact m.e.turner@abdn.ac.uk.

8   Where Next?

8.1   What is planned for 2016-17?

Review of the Scottish Stroke Care Standards:

It is essential that the Scottish Stroke Care Standards remain current to provide healthcare professionals in Scotland with advice and guidance to support the provision of high quality care for patients with stroke and transient ischaemic attack (TIA). Moreover, as performance improves, it is necessary to set a standard which is closer to the 'ideal' or 'optimal' performance to continue to encourage service to strive for improvement. In 2015, the SSCA Steering Committee reviewed the content of the stroke standards and current evidence and following a period of consultation made the following changes effective from 1st April 2016. More information on the reason for these changes can be found on the SSCA website http://www.strokeaudit.scot.nhs.uk/Quality/Scottish_Stroke_Care_Standards.html

Topic	Scottish Stroke Care Standards, April 2016
Stroke Care Bundle	80% of all patients admitted to hospital with a diagnosis of stroke should receive the appropriate elements of the stroke care bundle.
Access to Stroke Unit	90% within 1 day of admission (Day 0 and 1).
Brain imaging	95% within 24 hours of admission.
Swallow screen	100% within 4 hours of admission.
Aspirin administration	95% of ischaemic strokes within 1 day of admission (Days 0 and 1).
Delay from receipt of referral to specialist stroke/TIA clinic	80% are assessed within 4 days of receipt of referral (Day 0 being day of receipt of referral).
Thrombolysis	80% receive the bolus within one hour of arrival at hospital. 50% receive the bolus within 30 minutes of arrival at hospital.
Carotid Intervention	80% undergoing carotid endarterectomy for symptomatic carotid stenosis have the operation within 14 days of the event that first led them to seek medical assistance.

Routine reporting:

Distribution of Monthly Reports to Stroke MCNs reflecting activity for the previous month/ quarter and performance against Scottish Stroke Care Standards continues with the inclusion of the bundle analysis. They are based on *initial* diagnosis of stroke.

Distribution of Quarterly Reports to Stroke MCNs and colleagues at the Scottish Government reflecting activity for the previous quarter relating to performance against the Stroke Care Bundle based on *initial* diagnosis of stroke.

Distribution of the Annual Report Cumulative Summary Reports commenced in January 2014. These reports provide Stroke MCNs with an indicative view of the data that will appear in the next Annual National Report. They are based on *final* diagnosis of stroke as is the Annual National Report.

The reports continue to be modified to maximise reliability and usefulness to the clinical teams.

The SSCA National Meeting:

The 2016 SSCA Annual National Meeting will be held on **Tuesday 23rd August 2016** at the Royal College of Physicians, Queen Street, Edinburgh. Further information can be found on the SSCA website (http://www.strokeaudit.scot.nhs.uk/Meetings/main.htm).

Organisational Audit/Service Descriptor:

The 2015-16 template has been completed by Stroke MCNs.

There has been interest in the use of these data from a variety of sources. Requests for information from the Organisational Audit will be considered using the already established Information Request process.

Quality assurance (QA) of SSCA data:

A high standard of data quality is essential to ensure the SSCA database is accurate, consistent and comparable across time, and between hospitals. This will ensure decisions to improve quality of care and service provision at hospital, Health Board and national level are based on correct information. Without quality, it would be impossible to interpret results with any accuracy or conviction.

The data quality processes undertaken by SSCA will be incorporated into the following:

At point of data entry;

Central validation; and

Case note validation.

At point of data entry:

eSSCA, the stroke audit data collection tool, currently carries out robust data Quality Assurance processes at point of entry.

Central Validation:

Central validation processes are being further developed to ensure that records with a high proportion of responses marked as 'unknown' or 'not recorded' are identified and queried locally. Duplicate records, unlinked records and events that remain open for longer than three months will also be flagged and validation queries generated.

Case note validation:

An agreed process is now in place and case note validation has commenced. This will allow confirmation of the accuracy of the SSCA data. Findings of case note validation will be shared with the Audit Coordinators and Stroke MCNs.

Case Ascertainment:

Services have increasingly cross checked their SSCA data with routine coding of the Scottish Morbidity Record (SMR01) based on International Classification of Disease 10th revision (ICD10) codes I61, I63 and I64. Any increase in the number of strokes entered into SSCA may reflect improvement in case ascertainment rather than increasing numbers of hospital discharges with stroke. Hopefully, this process will not only lead to more robust case ascertainment in SSCA but greater accuracy of routine coding in the future

Pre-hospital care:

Development of a Pre-Hospital Dataset is ongoing. Work continues to marry data flows in the pre-hospital setting, i.e. Scottish Ambulance Service and NHS24. The proposal is to have a joined dataset held by ISD that can be linked to the SSCA data for further analysis of the patients' pre-hospital journeys. This work has been delayed due to competing priorities.

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 colleagues within Health Boards across Scotland. In Appendix A we present comments from Health Board Chief Executives in relation to delivery of stroke care in their local areas

Each Health Board has a Stroke Managed Clinical Network (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 voluntary organisation representation on the SSCA Steering Committee and feedback from service users is very welcome.

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Appendix A: Responses from Chief Executives

During the preparation of this report the Health Board Chief Executives were asked to provide some feedback on their performance against specific Scottish Stroke Care Standards or Improvement Priorities where there had been a decline in performance or actions are required to improve access to services.

The Chief Executives responses are noted (by Health Board) below:

NHS Ayrshire & Arran

NHS Ayrshire and Arran has improved performance on delivery of the Stroke Care Bundle.

During 2015 there was a shortage of stroke consultants and from 30 November 2015, as an interim measure to ensure safe, effective hyperacute stroke care, all stroke patients receive their first 48 hours of care at the Hyper Acute Stroke Unit (HASU) at University Hospital Crosshouse (UHC). After this time, and where clinically appropriate, patients from South Ayrshire transfer to University Hospital Ayr (UHA) to continue their care in the acute stroke unit. The situation will be reviewed as we recruit to the consultant vacancies. It was envisaged that with the interim arrangements all patients would go to the HASU at UHC. A few patients still receive all of their acute stroke inpatient care at UHA and this is being monitored and reviewed in relation to achieving the Scottish Stroke Care Standards.

The standard for patients being admitted to a Stroke Unit within one day of admission was achieved at UHC during 2015.

With the interim arrangements, a focus has been placed on improving compliance with the Scottish Stroke Care Standards and in particular swallow screening, brain imaging and aspirin.

Regarding swallow screening, an on-line Learn-Pro module for swallow assessment, in conjunction with ward based competency assessment, has been embedded for nursing staff. HASU nursing staff are also now pre-alerted by the Emergency Department staff of any patients presenting with stroke symptoms and HASU nurses attend the Emergency Department (ED) to undertake swallow screening.

To improve performance in relation to brain scans, an 'acute stroke' option is available when ordering scans to highlight that stroke scans are to be prioritised.

In addition, medical staff are requested to enter the time of admission to the ED.

The HASU nurse and radiology department now liaise every morning to identify patients requiring brain scans that day.

A training programme for medical staff is ongoing and training is in place to increase the number of radiographers with CT scanning skills to improve scanning capacity.

In relation to the aspirin standard, nursing staff are able to prescribe orally under the Patient Group Directive if there are no contraindications and this facilitates early administration of STAT dose aspirin. A number of potential areas for improvement have been identified, including the timescale from CT scan to prescription of aspirin, and a short life working group will be established to progress this work.

During 2015, a local 24/7 thrombolysis service was implemented in partnership with NHS Lanarkshire. In addition, University Hospital Ayr was the best performing hospital for the specialist stroke/TIA clinic standard.

A stroke education training programme is established, linking with health, social care and Scottish Ambulance Service colleagues

NHS Borders

The NHS Borders Stroke Team has continued to work effectively with a variety of services and departments to maintain high standards for in patient stroke care, in particular the components of the

Stroke Care Bundle. The variation in the Stroke Care Bundle from 2014 to 2015 in part reflects patient flow difficulties into the Stroke Unit but principally reflects the number of patients not thought to be appropriate to move acutely to the stroke unit due to concurrent medical issues, for example, requiring additional monitoring. The locally set target of 90% of stroke patients completing the Stroke Bundle has not been achieved. Despite NHS Borders having the highest rates for bundle completion, 90% is challenging.

The continued use of the initial swallow assessment in the Emergency Department and Medical Admissions Unit, CT scanning protocols and aspirin administration reminders maintain high standards for the remainder of the bundle.

The Neurovascular Clinic continues to achieve the standards for assessment within 4 days. This year, the Day Hospital has audited the process of referral before assessment and has made a number of improvements to this. This has been reinforced with educational sessions with the Emergency Department and Primary Care. NHS Borders does not have individual endarterectomy data but we have been pleased with our referral pathway review, particularly radiology provision and Vascular Surgical support.

Our door to needle time for stroke thrombolysis has continued to be a difficult issue to resolve. This has been due to a small staff pool with expertise and junior doctor turn over. The team have been working on a number of measures to address this:

- Pre-alert audit and liaison with Scottish Ambulance Service
- Case note review and exception reporting
- Regular teaching and STAT training for staff throughout the stroke pathway
- Emergency Department, SAS and radiology feedback
- Review of investigation planning

Intermittent Pneumatic Compression treatment has not yet been started but staff training is complete. The administration related to the implementation of this new treatment is near completion. We expect to have the treatment available within the next few months.

The NHS Borders Stroke Service independently does not generate sufficient work load to run a stand alone neuropsychology service. We use specialist services for in-patient rehabilitation at Astley Ainslie Hospital in Edinburgh. We would like to explore other options to provide a service locally. These may include a joint service with other neurological specialities or areas.

The Stroke Team have been pleased to build on our previous good work, with the support of the many departments and staff involved in the care of stroke patients within NHS Borders and the Scottish Ambulance Service.

NHS Dumfries & Galloway

Despite a difficult year NHS Dumfries & Galloway has at 81% exceeded the local 'initial diagnosis' Stroke Care Bundle target of 78% agreed for 2015, which represents a 7% improvement from 2014 and ranks us 3rd in Scotland. The figures based on final stroke diagnosis are as expected lower in both years reflecting the later inclusion of patients, typically with multiple co-morbidities including dementia, admitted initially with a non-stroke diagnosis. We also continued to exceed the standards for CT scanning and Neurovascular clinic assessment at 92% and 85% respectively. At 86% we narrowly missed the swallow assessment target reflecting the expected lower performance produced by using final rather than initial stroke diagnosis figures.

Notwithstanding the sterling efforts of many people in the organisation, admitting stroke patients promptly to the acute stroke ward at Dumfries remains a serious challenge and, even allowing for the final diagnosis effect, the reduction from 83% to 78% is a poor result. However the multiple causes continuing escalation in the numbers of 'emergency' medical admissions [particularly those with dementia], increasing discharge delays 'waiting for care', local excessive reliance on community hospital beds and resultant overfull hospitals – are not within the capacity of the stroke team to alter. The stroke

service, in partnership with local GPs, have in fact been remarkably successful reducing both acute stroke incidence and resultant hospital admissions the latter falling from 320 in 2000 to 283 in 2015, a 12% reduction, despite the adverse demographic trend of a 34% rise in the absolute numbers of 75+ year olds over the same period.

Thrombolysis door to needle times also remain an issue for Dumfries and Galloway with overall 1 hour performance broadly similar to last year at 50%. As a single Consultant service operating from two sites 70 miles apart there is no choice but to use the emergency admitting teams at these locations to provide a 24/7 service. Unfortunately the current national shortage of senior doctors with stroke, acute medicine and CofE skills impacts particularly on small and rural hospitals which are then reliant on short term locums. The continuing failure of the West of Scotland Deanery to ensure an equitable allocation of 'senior' medical trainees to Dumfries and Galloway only exacerbates these recruitment and treatment issues. Action at national level is urgently needed to ensure adequate training numbers and to remove the financial and other disincentives discouraging applicants from moving to rural areas.

With new scanning and communication procedures 33% of patients achieved the carotid intervention target compared with 7% in 2014. Competing targets and priorities as well as limited staff and theatre resources remain unresolved issues. We continue to use exception reporting to justify change.

For 2016 our stroke training coordinator has introduced a variety of training opportunities to accommodate the changing workforce needs in preparation for the move to our new hospital in 2017.

The Stroke MCN wishes to acknowledge the wider support received from medical, surgical, emergency and radiology teams as well as the Lothian Hub

NHS Fife

The improvement of stroke care performance against the Scottish Stroke Care Standards and Stroke Improvement Plan remains a priority for stroke healthcare providers and NHS Fife.

Swallow Assessment: Whilst our performance has improved we are still falling below the standard. Our focus for training had been with A & E nurses who have performed well. We noted that patients directly admitted by a GP into the Acute Medical Assessment Unit were those patients who continued to fail the standards. We have now targeted our training in this area. There have been many staffing changes and shortages across acute services with more experienced nurses moving on, so a further focus for training is newly qualified staff.

The Stroke MCN continues to strive to improve performance against all standards through staff training and awareness and collaboration with staff in key stroke areas. Key to this is regular (weekly) formal communication and feedback using exception reporting of performance, to ensure ownership from each stroke area involved.

Outpatients: NHS Fife offers a one stop rapid access TIA clinic which is run as first available appointment and performance should be measured against Fife as a whole and not two separate sites. The difference noted between the two sites is thought to be down to days of the week that these clinics run. We have increased the number of slots early in the week and are reviewing the use of our Friday clinic. We will also exception report on those failing to gain a clearer picture. Our performance is self evaluated as red: we are able to offer a service that provides rapid assessment but we are unable to meet the standard consistently. Performance measured across Fife rather than individual hospitals is 74% in 2015. We have noted that approximately 50% of those seen in TIA clinics will not have a final stroke or TIA diagnosis. We will evaluate the effect of increase in the appointments earlier in the week. We do have a further improvement plan that involves changing days of the week offered across the two sites.

Access to specialist neuro psychological services: We have self evaluated our performance as red. We currently plan to draft a document developing the referral process and pathway for neuro psychological services for stroke patients. In 2015 we developed An Acquired Brain Injury (ABI) pathway with plans to roll out in 2016.

There is a substantive amount of excellent work ongoing in Fife. The dedicated stroke workforce is committed to improving all aspects of stroke care. Some examples include: post stroke cognition clinic set up earlier this year; a secondary prevention medication group; the roll out of vision assessment and training and an ongoing commitment to staff development and training. Our delivery of the STAT training for the Ambulance Service has been very successful. Commitments from local stroke staff extend beyond NHS Fife and continue with members of Fife Stroke MCN involvement in a number of initiatives and pieces of work at a National Level.

NHS Forth Valley

In respect of timely admission to the stroke unit, this was Forth Valley's most significant constraint in achieving the stroke bundle standard. There were challenges around inpatient flow at FVRH which impacted on timely admission to the stroke unit during the first 5 months of 2015. In response, Forth Valley implemented a policy to protect one bed in the acute stroke unit where possible. A daily "stroke huddle" was also introduced in July 2015. Since then, timely access to the stroke unit has improved significantly. Since admission to the stroke unit has been improved significantly (especially since December 2015), Forth Valley exceeded the national standard for the stroke bundle during quarter 1 of 2016.

Forth Valley will enhance the local stroke training programme for the early recognition of Stroke and TIA during 2016. Forth Valley will offer MedStat training to medical staff from the FVRH Emergency Department and STAT training to SAS crews and nursing staff from the FVRH Emergency Department during 2016/17. This training will be delivered on an ongoing basis. Forth Valley will also look to offer FAST awareness training to local SAS crews and primary care staff during 2016/17.

Although performance for swallow screen and aspirin administration was good during 2015, the recent change in the targets for both aspects of the bundle will see further local efforts to meet the new higher standard. Forth Valley has continued to exceed the national standards for early access to brain imaging and timely access to TIA clinics.

A number of activities were initiated to improve our thrombolysis pathways towards the end of 2015. We have established a weekly thrombolysis governance meeting and we are working with other NHS areas to identify further opportunities to streamline the pathway and improve door to needle times. We are now starting to see some improvement in thrombolysis performance during the last twelve months. Improving the thrombolysis pathway will continue to be a key area for Forth Valley during 2016.

Local teams have also been working to improve the pathway for visual services. A new local pathway for people with visual problems following stroke has been agreed. We plan to have a regular dedicated visual stroke clinic at FVRH later in 2016 and offer visual screening on the stroke ward at FVRH for patients that are immobile.

 2015 has seen some significant improvements in local stroke services. This said, Forth Valley will continue to plan, implement and review our activities in order to continually improve performance and the experience of our patients.

NHS Grampian

NHS Grampian acknowledges that there have been areas of improvement in the provision of stroke care, but recognise that there are also areas which require further attention. Despite the reduction in Consultant numbers in August last year, with the help of the Emergency Department and the SAS, NHS Grampian has continued to deliver a relatively rapid and comprehensive thrombolysis service although Dr Gray's Hospital, Elgin have lower numbers treated. The weekly exception report meetings are held by the multi-disciplinary team to identify areas for improvement and action.

The challenges remain regarding the limitations of access to the Acute Stroke Unit until the relocation to a refurbished accommodation which will provide an additional six acute stroke beds in August 2016. Although it is recognised that a continually improving target is a positive aim, the service has two

Consultant gaps due to retirals, which are yet to be appointed to. The service will continue to strive towards providing the best care for patients and accept that the National targets are part of this process.

Access to stroke unit

Although performance declined in Aberdeen Royal Infirmary in 2015 this is due to issues with patient flow, with no clear pathway for patients waiting for nursing home/ home care packages, and delays in transfer to rehabilitation. Increasing stroke beds should help to address this in the short to medium term, and the Integrated Joint Boards (IJB's) will hopefully have some impact.

Swallow Screening

Many of the issues are around patients being admitted in the evening, or else patients who do not access the stroke unit. If stroke unit access is achieved, we should see a corresponding improvement in swallow screen. There is ongoing work between the acute unit, Emergency Department and medical admissions unit to increase awareness of the new four hour target.

Access to specialist stroke/TIA clinic

Consultant vacancies have meant it has not been possible to run a daily TIA clinic. Achieving the standard is dependent on recruiting replacement consultant staff in Summer 2016.

TIA Imaging – service to provide early access to confirmatory clinical assessment – self evaluated as amber.

This relates to the variable service performance across the Health Board area and we recognise this is an area we are required to improve upon.

Access to specialist clinical/neuro psychological services - self evaluated as amber.

For improvement we need consistent referral and psychological services as well as neuropsychology available as required.

NHS Greater Glasgow & Clyde

The national stroke care standards:

Swallow screen: we recognise that while our performance is better than in 2014 the standards are not being achieved and quality improvement work continues. The RAH has had particular challenges for staffing reasons and these are now improving. The Board has nominated a sector Chief of Nursing to participate in the Stroke Managed Clinical Network from May 2016 and a key goal for this role will be an overview of progress towards achieving the swallow standard across GG&C. Senior nurses on all sites are aware of the need for improvement in performance.

Thrombolysis: the Queen Elizabeth University Hospital (QEUH) in South Glasgow provided all GG&C stroke thrombolysis in 2015 after its opening in May. There have been some challenges with the pathway which was designed for thrombolysis in the new QEUH department and these are being addressed. In May 2016 Glasgow Royal Infirmary commenced a weekday daytime stroke thrombolysis service which should improve door-to-needle times for NE Glasgow patients and reduce daytime pressures on the QEUH. Clyde sector patients who come to the QEUH for thrombolysis are timed from their arrival at the door of the Royal Alexandra Hospital (RAH) or Inverclyde Royal Hospital (IRH) which makes a door-to needle time of under one hour difficult to achieve. The Board is currently examining possible ways to reduce delays for referrals to the QEUH from the IRH catchment area.

Outpatients: we collect data on numbers of fast track and non fast track outpatient referrals to GG&C stroke clinics and the speed with which they are seen. The large volume of work in GG&C makes the collection of the whole Scottish Stroke Care Audit outpatient dataset impossible without extra investment in administrative staff.

Stroke Improvement Plan priorities

Specialist service to deliver immediate advice: we are 'amber' on this because to pass it requires that 'Stroke services should provide GPs, Emergency Departments and other services, where patients with TIA/stroke may present, with immediate access to advice from a stroke specialist' which we do not provide in all GG&C hospitals at present. There is 24/7, seven days/week cover for potential thrombolysis referrals or for major stroke issues such as possible basilar thrombosis or major intracerebral haemorrhages, but not for advice on TIA or minor stroke management in all hospitals. Out of hours stroke cover for the Clyde hospitals is a specific problem which the Board is currently discussing.

TIA imaging – service to provide early access to confirmatory clinical assessment: we have variable service performance across the Board area in the speed with which patients are seen at clinics following referral and the speed of access to imaging. Access to same day imaging has improved but we acknowledge that considerable work on clinic capacity and management is required to enable us to achieve this priority, particularly in the QEUH and its associated hospitals.

NHS Highland

It is the aim of NHS Highland to deliver safe, effective and person centred services. Specifically within stroke the aim is to improve the journey by meeting the Scottish standards for the care of stroke and TIA patients. In general there is training for staff, across all highland hospitals, to increase the awareness of the Scottish Stroke Care Standards.

Timely admission of stroke patients to stroke units remains a key aim for NHS Highland. This target is being met in Belford, Caithness General and Lorn & Islands; however work is required to meet the target at Raigmore. The team recognise that flow into dedicated stroke beds has been an issue and they are working with colleagues across the hospital to improve. As per the patient pathway all admissions are initially to the hospitals acute medical assessment unit (AMAU). All patients with an initial or suspected diagnosis of stroke are reviewed daily by a member of the stroke team and a plan is put in place for their stroke care including transfer to the stroke unit.

To support improvements in patient flow the stroke unit team are working closely with community colleagues to develop new pathways which will support more timely discharge and transfer from the unit.

Processes for improvement using small test of change, which if successful are rolled out to the wider service are at present being focused on the thrombolysis, outpatient and carotid service. In particular the focus recently has been on door to needle time for thrombolysis, consistency in achieving the outpatient target and improving data capture in the carotid service.

The thrombolysis pathway has been reviewed and updated. Its implementation is being led by a consultant in acute medicine (stroke trained); working in conjunction with the stroke team, the ED and AMAU. Early notification of potential thrombolysis patients to the hospital and the team is key to meeting and improving the door to needle time standard. Towards that aim the Scottish Ambulance Service (SAS) pre-alert pathway will be active from June 2016.

As part of its FAST campaign Highland has been highlighting the need for people who have experienced signs and symptoms of a TIA to attend their GP promptly with a view to onward referral to the TIA outpatients' service. As a result it was recognised that a review of the clinic and its operating procedures were required. This work has now been undertaken. Clinic spaces are available Monday to Friday with same day imaging also available. The medical rota for the clinics has also been reviewed.

Similarly a review of the carotid service was implemented in 2015 and has continued into 2016. In addition it was also agreed to review the system for capturing data. This is to ensure that all patients are captured and that the national audits for both stroke and carotid are reflective of the actual activity. This new data capture system was implemented in January of 2016 and this should be reflected in our figures in future

NHS Lanarkshire

Stroke Unit admission

Performance in this area has been challenging over the last 12 months and to some extent reflects challenges in hospital flows, where we saw unprecedented demand through 2015. It is reassuring that there has been no statistically significant fall in performance in the Monklands and Hairmyres Hospital sites despite these demands and that performance remains higher than the rest of Scotland. At Wishaw we saw similar front door pressures which led to challenges. The real challenge here though was an exceptionally high number of stroke patients in the Autumn/Winter months meaning that we physically had more stroke inpatients than we had beds for prolonged periods of time. This is a very rare situation and we wouldn't wish to expand stroke unit beds and potentially dilute quality of care in expectation of future such unusual sequences of events. We should note that for the patients who during this time did not access the stroke unit on time, they were all managed by the stroke consultants and met all the other elements of the stroke bundle. We continue to monitor this situation closely with exception report and all 'breaches' being identified to the Stroke MCN Manager as they happen.

A specialist service to deliver immediate specialist advice suspected for TIA and stroke patients:

We do have immediate access to specialist advice during weekdays but not at weekends. Our hospitals only have two or three stroke specialists who already contribute to other rotas and would struggle to provide this kind of an out of hours service in the absence of any convincing evidence base that it improves outcomes. Instead, we have focussed on providing early access to specialist stroke clinics and guidelines (encouraging appropriate early secondary prevention) and pathways for non-specialists. These work well in ED, Medical Receiving Units and Primary Care. There have been issues with pathway adherence from ophthalmology service. We have, however, launched a new Stroke Visual Pathway in Lanarkshire (November 2015) and hope that this, and ongoing education, will help.

Service to provide early access to confirmatory clinical assessment:

Of our three hospitals, Wishaw is able to offer same day imaging. The Monklands Hospital Stroke Clinic has historically been run in a Community Hospital which is distant from the main hospital site and imaging. There are competing pressures for access to clinic space on the main Monklands' site but Director of Planning is exploring ways to bring the clinic onsite. This may require more imaginative solutions to be considered. On our Hairmyres Hospital site same day CT brain imaging is possible (although not currently offered). The radiology team there are looking at ways to provide same day carotid ultrasound imaging. This may be challenging.

NHS Lothian

Stroke care has been identified as a priority within NHS Lothian's Clinical Quality Programme during 2016 and will focus on improving access to stroke unit care across Lothian. This will ensure patients are identified early and follow an appropriate care pathway with timeous discussion with patients and families around rehabilitation goals as well as supported discharge from a stroke unit. Our Stroke inpatient services have undergone considerable redesign since August 2015 with the closure of downstream rehabilitation beds and the increase in capacity at RIE to 44 integrated stroke unit (ISU) beds. This will improve delays associated with transferring from acute to rehabilitation sites.

In December 2015 the stroke service introduced a consultant led 7 day service to see all referrals in the Acute Medical Unit at RIE with a suspected TIA or stroke. This has led to improvements in diagnosis, earlier assessment and fewer non-stroke admissions to the stroke units. Feedback for this enhanced service has been very positive. There is much closer collaboration between the outreach services on each site with a daily 9.30am teleconference call to discuss bed availability and capacity for new admissions.

There is improvement across all sites for swallow screening, and the introduction of monitoring forms for each patient enables front door and stroke teams to focus on appropriate treatment for them. It remains a challenge for the ISU staff to visit the front door to do this procedure and training of front door staff is ongoing.

Training for early identification of stroke and TIA has improved and our STAT (stroke and TIA assessment training) programme is now well established and accessed by emergency departments and SAS during 2015. There has also been good uptake for our Stroke Awareness Days from a wide range of community-based staff.

NHS Lothian is currently co-developing means of integrating health and social care in its four local authority health and social care partnership areas. The exact nature and configuration of community rehabilitation services for patients with stroke when they leave hospital is yet to become fully clear. However, we have worked hard to equip generic integrated community services pan Lothian to manage stroke patients well within their services as soon as is possible, so as to have a positive impact on hospital length of stay and to repatriate stroke survivors closer to their own homes and communities by providing stroke-specific community rehabilitation. This is being addressed through training and education, and tests of change through our Quality Improvement Academy.

Specialist stroke occupational therapists have been carrying out visual screening – but not consistently and with no single protocol. Following discussion with a core group of occupational therapists across acute, rehabilitation and community services, and looking at the Best Practice Statement it was agreed that specialist training was required to build up skills and knowledge to screen more effectively. There is now an agreed referral pathway to an Orthoptist and work has been completed to identify appropriate training for occupational therapists to effectively assess visual impairment.

NHS Orkney

Stroke Unit Admission: This figure has reduced in the past year. All Stroke admissions have been re-audited with the Lead Clinician. This has allowed us to confirm that all patients have been admitted to the appropriate area required for their clinical care. Local access to a CT scanner has resulted in an increase of patients been admitted to HDU for Thrombolysis treatment or for necessary stroke care. Stable patients have either been transferred to the Stroke Rehabilitation Unit or discharged with support from the Rehabilitation therapists in the community.

Swallow Screen: We have failed to meet the target for this but are working with the Nursing Staff to ensure increased awareness and training. The new 4 hourly target will require that we monitor this very closely and we have introduced stickers to go in all patients notes with the 4 targets of the Stroke Care Bundle. NHS Orkney has made significant progress with the Stroke Care Bundle improving our figure from 18% in 2014 to 45% in 2015.

Intermittent Pneumatic Compression: We are in the process of discussing a loan agreement with Covidien for 2 units and sleeves. Training will be provided once this has been signed and agreed.

Access to specialist neuro-psychological services: Complete – Patients/families are able to be referred to Clinical Neuro Psychology in Aberdeen. There can be a long wait for therapy and reports with many patients having to travel to Aberdeen for this. We have identified that some areas can be done via video link which will reduce the length of time of therapy in Aberdeen.

Self management post discharge support: Complete – Individual self management is encouraged by the MDT. We also have plans to look at starting Mystrokeplan (CHSS).

Vocational Rehabilitation services: Complete – There is no clear pathway as we don't necessarily have to 'refer on'. We see the patients when they are admitted and continue the intervention on into the community to help them back to work. Patients are assessed regarding their individual needs. There are various services throughout Orkney i.e. VAO, Employability Orkney, support employment, Job Centre Plus (Disability Worker) who we work closely with.

Stroke Care in NHS Orkney has substantially changed with the implementation of a local CT scanner. Our performance against this standard has improved from 28% to 75% during 2015 and we are now consistently achieving 100% CT scans within 24 hours. We have introduced a new Stroke Care Pathway including Thrombolysis and to date we have thrombolysed 5 patients. We have not met the 60 minute timescale for door to needle time but as the pathway becomes more familiar we anticipate being able to achieve this.

In January 2016 we set up a Telemedicine TIA Clinic with NHS Grampian. This has proved successful with 21 patients having used the clinic to date. To enable this service to be more effective we additionally now have access to Carotid Doppler Scanning. This has resulted in patients requiring Carotid Intervention being investigated earlier which allows investigations to take place locally with any surgical intervention still taking place in Grampian.

NHS Shetland

Stroke services in Shetland continue to improve when measured against the National standards. The Stroke MCN continues to meet regularly to discuss and monitor stroke services, and the data collected for SSCA is reviewed by the Lead Consultant for Stroke along with the Stroke Liaison Nurse to identify areas for improvement.

NHS Shetland worked with the local Stroke Support Group in 2015 to provide a FAST campaign involving local newspapers and radio stations, and this included interviews with stroke patients detailing their positive experiences of stroke care and rehabilitation.

All NHS Shetland CT Radiographers are now trained to perform CT head scans so this service is now available OOH. However for patients presenting out of hours who would not be eligible for thrombolysis the CT scan is performed at the next available routine slot to avoid unnecessary call outs of staff.

The ward stroke pathway has been updated and information updates are regularly given to staff on performance which has improved the documentation of stroke care, in particular for swallow screening.

The Stroke Liaison Nurse and one of the Senior Staff Nurses have attended STAT training in GRAMPIAN with a view to providing this training for NHS Shetland staff using the Mobile Skills Unit.

NHS Tayside

Scottish Stroke Care Standards:

- Stroke Unit Admission
- Swallow Screen

Improving Stroke care and performance against the Scottish Care Standards is a priority for NHS Tayside. There has been a particular focus in improving the inpatient pathway at Ninewells Hospital with the Acute Stroke team working closely with colleagues in the Acute Assessment Admission Unit and Radiology. Whilst this has resulted in improvements to the patient pathway, over the last 12 months Ninewells Hospital has not consistently met performance against the standards for admission to the Acute Stroke unit or Swallow screening. In response to this the service has taken forward a focused piece of improvement work to change the service model whereby patients with a suspected stroke will be "pulled" through the system by the Acute Stroke Specialist team. This will ensure key interventions are initiated early with timely admission to the stroke unit.

The development of this standardised integrated care pathway will reduce variation and waste and improve outcomes for patients presenting with an Acute Stroke. Application of Improvement methodology through the use of PDSA tests of change commenced on 16 May 2016.

In addition, since October 2015 a further four beds have been temporally created within the Acute Stroke Unit at Ninewells. This increase was to support the emergency demand during the winter period and has supported improved performance in timely admission of patients to the Stroke Unit. The service has put forward a case for the increased capacity on a recurring basis.

Scottish Stroke Improvement Plan Priorities:

- Priority 3, Action 3. Intermittent Pneumatic Compression

Ninewells Hospital has now progressed with the procurement of Intermittent Pneumatic Compression (IPC) equipment, with training and education planned for implementation. This will ensure that all patients

who are immobile following a stroke are offered this therapy as part of venous thromboembolism prophylaxis.

- Priority 4, Action 1. Education Template & Training

Ongoing investment in education and development of the Acute Stroke Unit Multidisciplinary team is fundamental to achieving and sustaining improvements to enhance patients' outcomes following stroke. The Acute Stroke Unit at Ninewells Hospital has recently employed a number of new registered nurses. There is a training plan in place for these nurses over the coming months which incorporates core stroke competencies and SCoT online training. Training dates are scheduled to deliver the Stroke and TIA Assessment (STAT) training over the next 12 months. The Acute Stroke Unit is on course with its trajectory to ensure all staff are appropriately educated and trained to deliver high quality stroke care.

- Priority 5, Action 2 Service to provide early access to confirmatory clinical assessment

Ninewells has excellent performance in providing rapid access to neurovascular clinics with same day carotid imaging delivered within the clinic. With the exception of MRI scans, the acute stroke team works closely with radiology colleagues to ensure that patients who require brain imaging have this performed on the same day.

NHS Western Isles

2015 was a year of steady progress in the Stroke Service for NHS Western Isles (NHSWI) as is reflected in the consistent performance of the Standards visible in this document.

There are a number of areas however which we continue to work on to aim to increase the efficiency of the patient journey to improve outcomes as follows:

- The Rapid Access TIA clinic performance on the face of it looks as if we are less successful at achieving review within 4 days of referral. This has been largely due to the changes in the Commercial Air Services between the Southern islands and Stornoway. This has limited access to the clinic and the Stroke Service is adapting to this by building in as much flexibility as possible in the way patients are seen. This work is challenging as the clinic is provided via videoconferencing with NHS Grampian and availability of a consultant for this is challenging without a set clinic date and time. NHSWI is currently looking at new options to ensure patients are seen by using a combination of local clinicians as well as the expertise of the NHS Grampian Stroke Consultant Team.
- Exercise after stroke is an issue that has been discussed at the MCN at length over the last year. Currently we are working with the local Council to develop generic activity trainers for a range of Long Term Conditions including Stroke. Once established, these posts will allow patients to have access to a functionally tailored programme ensuring lifelong supported activity. This work is likely to result in patients being able to access the new service from Summer 2016.
- Access to neuro-psychological services is always a challenge for a small island Health Board. The MCN in conjunction with the Public Health directorate have been working on a number of local solutions to the problems of access to psychological therapies. This is likely to include a range of local training opportunities to ensure all patients with Long Term Health Problems have access to locally trained clinicians able to deliver a range of psychological therapies.
- Whilst NHSWI does not have a specialist local service for visual problems after stroke we have a well established visiting ophthalmology service from NHS Highland. This allows any patients with visual problems to be assessed and if need be referred to mainland centres for more specialist work to be undertaken.

Thus, NHSWI are pleased with the progress of the SSCA reporting outcomes for 2014/15. We will continue to work to improve those areas in which it is seen that progress can be made.

Health Board reviews

Following publication of the 2015 SSCA National Report Moranne MacGillivray (SSCA National Clinical Coordinator and Katrina Brennan (Scottish Stroke Improvement Plan Lead, Scottish Government)visited all Health Boards in Scotland to meet with stroke clinical teams, stroke MCNs, radiologists, senior managers/ executives, planners and other relevant personnel with input to stroke care locally. The meetings were held between October 2015 and May 2016.

The meetings were well attended in all Health Boards. There was evidence of improvements in practice in some areas and many actions were being taken forward to further improve the delivery of stroke care locally. However, in some areas there was still significant work required to ensure that hospitals in Scotland continue to improve performance against the Scottish Stroke Care Standards. Moranne and Katrina will continue to work with Health Boards throughout 2016/17 to improve delivery of stroke care across Scotland

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Note

The list of tables and charts above excludes additional content that is only available from the Excel file which supplements this report. The Excel file is available from the Scottish Stroke Care Audit web site at http://www.strokeaudit.scot.nhs.uk. The additional content provides extra detail and covers the topics: length of stay for stroke patients, comparison of initial diagnosis and final diagnosis, the proportion of thrombolysed patients receiving repeat scans, the distribution of time between stroke event and carotid intervention and trends in the annual performance of Health Boards for the main inpatient stroke standards.

Appendix C: Stroke Improvement Plan Priorities & Actions RAG

Action		Aim	NAC Lead	Benchmark Criteria	
Priority 1. Early recognition of Transient Ischaemic Attack (TIA) and stroke by the general public, Scottish Ambulance Service (SAS), NHS 24, primary care hospital front door services and social care staff.					
1	**Public campaign to raise awareness of stroke symptoms [(Face Arm Speech Time (to call 999) (FAST)]**	Deliver public education to increase awareness of common symptoms of stroke and TIA, and the need to seek emergency medical care.	Mark O'Donnell	BLACK	No evidence of a FAST campaign
				RED	No plan for an annual FAST campaign.
				AMBER	MCN has considered a further campaign using the available funding but as yet has no delivery plan.
				GREEN	MCN has run a further campaign using the available funding.
				COMPLETE	MCN delivers annual campaigns which are evaluated
2	**Improve early identification of stroke and TIA by engagement with SAS, primary care and hospital emergency departments.**	Establish links to the MCN with all of these staff groups, SAS, primary care and hospital emergency departments and develop a mechanism to deliver education.	Katrina Brennan / SAS	BLACK	No FAST training delivered with any of these staff groups
				RED	Adhoc training delivered to some of these staff groups,
				AMBER	Adhoc training delivered to most of these staff groups,
				GREEN	Established training programme underway with some of these staff groups.
				COMPLETE	Established training programmes with all staff groups and evidence of a rolling programme of education which is evaluated.
Priority 2. Appropriate pre-hospital protocols to ensure rapid admission, early diagnosis and treatment.					
1	**Pre-alert by SAS**	The SAS should pre alert Emergency Departments of the arrival of FAST positive stroke patients with an onset time of < 4 ½ hours or an unknown onset time. *This element will be monitored using pre alert data soon to be available from SAS.*	Katrina Brennan/ SAS	BLACK	No pre-alerts made from SAS to Emergency Departments
				RED	Inconsistent pre-alerts made from SAS to Emergency Departments
				AMBER	Pre-alerts normally made but no record of consistency.
				GREEN	Pre-alert consistently made.
				COMPLETE	Audit data evidences consistent pre-alert.
2	**Early imaging**	Imaging services should work with stroke services, Emergency Departments, and other services where patients with stroke/TIA may present, to provide rapid access to CT or MR brain imaging (as appropriate) for all patients with suspected stroke, and those patients with TIA in whom brain imaging is clinically indicated; timely access to carotid imaging for patients with TIA and minor stroke should also be provided.	Joanna Wardlaw	**This Element measured by SSCA Data**	

	Action	Aim	NAC Lead	Benchmark Criteria	
3	**Thrombolysis Process and pathway**	Develop effective processes and pathways to ensure that the national Scottish Stroke Care Standard for thrombolysis is met. *Validation of this element will be supported using thrombolysis data from SSCA.*	Peter Lang-horne	BLACK	No process or pathway in place
				RED	Emergency Department or Stroke team process or pathway available for potential thrombolysis patient but not utilised.
				AMBER	Emergency Department or Stroke team process or pathway available for potential thrombolysis patient but utilised only on an ad hoc basis.
				GREEN	Emergency Department or Stroke team process or pathway available for potential thrombolysis patients and used consistently in some departments and the SSCA thrombolysis standard is being achieved. This element will be validated using SSCA data.
				COMPLETE	Emergency Department or Stroke team process or pathway available for potential thrombolysis patients and used consistently in all departments across the Board Area and the SSCA thrombolysis standard is being consistently achieved. This element will be validated using SSCA data.
Priority 3. Delivery of Stroke Bundle – (The fourth element of the Stroke Care Bundle (CT scan) is listed under Priority 2, Action 2.)					
1	**Ensure early access to stroke unit**	Acute stroke patients will be admitted rapidly to a stroke unit and remain in that care setting for as long as is clinically necessary.	Peter Lang-horne	**This element measured by SSCA data**	
2	**Swallow screen**	• Stroke services should ensure swallow screening is part of the stroke admission protocol and provide a programme of education to support delivery. • Swallow screening is a pass/fail procedure to rapidly identify patients who require referral for comprehensive swallowing assessment to inform appropriate management; • Keeping patients nil by mouth for extended periods pending screening reduces patient satisfaction and may present other health risks such as missed medications; and • The swallow screening procedure requires close observation of both non-swallowing and swallowing behaviours that require sound clinical judgement and competence to practice.	Sheena Borthwick	**This element measured by SSCA data**	

	Action	Aim	NAC Lead	Benchmark Criteria	
3	**Evidence based interventions: Intermittent Pneumatic Compression (IPC)**	• Ensure that protocols are in place and effectively implemented to guide the appropriate use of:**Intermittent Pneumatic Compression (IPC)** for venous thromboembolism prophylaxis offering sequential compression in patients who are immobile after a stroke. *Validation of this element will be supported using IPC (User Defined Field) data from SSCA.*	Martin Dennis	BLACK	IPC not available in any stroke unit
				RED	IPC only available in some stroke units.
				AMBER	IPC available in all stroke units
				GREEN	IPC available in all stroke units but not consistently offered as a treatment This element will be validated using SSCA data
				COMPLETE	IPC available in all stroke units and are consistently offered as a treatment This element will be validated using SSCA data
		• Thrombolysis		**This element measured by SSCA data**	
		• Aspirin		**This element measured by SSCA data**	
Priority 4. Developing a skilled and knowledgeable workforce					
1	Health and social care staff in hospital and community settings are trained to an appropriate level.	• Utilise the education training template to accurately record training requirements and delivery and demonstrate appropriate levels of training; and NHS Boards use the information collated from the education template to identify and address training needs at all levels.	To be confirmed	BLACK	The 'Stroke Unit Education template' not utilised
				RED	The 'Stroke Unit Education template' utilised but not accurately completed or reviewed on an ongoing basis.
				AMBER	The 'Stroke Unit Education template' is accurately completed; however unable to consistently meet the essential training requirements identified
				GREEN	The 'Stroke Unit Education template' accurately completed. Able to consistently meet the essential training requirements identified; however unable to consistently meet the desirable training requirements identified.
				COMPLETE	The 'Stroke Unit Education template' accurately completed. Able to consistently meet the essential and desirable training requirements identified.
Priority 5. Early diagnosis & treatment for non-admitted patients					
1	**A specialist service to deliver immediate specialist advice suspected for TIA and stroke patients.**	Stroke services should provide GPs, Emergency Departments and other services, where patients with TIA/stroke may present, with immediate access to advice from a stroke specialist	Martin Dennis	BLACK	No plan to provide same day access to advice from specialist and no TIA pathway for Primary Care in place
				RED	Plan to provide access to advice from specialist on day of request and / or shared protocols for appropriate interventions.
				AMBER	Specialist advice only available on some days and pathways not consistently adhered to.
				GREEN	7 day / week but daytime only access to stroke specialist service
				COMPLETE	24/7 access to stroke specialist service for advice

	Action	Aim	NAC Lead	Benchmark Criteria	
2	**Service to provide early access to confirmatory clinical assessment**	A specialist service should be available to confirm the diagnosis of TIA/stroke, to differentiate these from mimics and to provide early access to brain and vascular imaging. *Validation of this element will be supported using outpatient data from SSCA.*	Martin Dennis	BLACK	No service providing rapid assessment of patients with possible TIAs and minor strokes
				RED	A service which provides rapid assessment but does not exceed the national standard for access
				AMBER	A service which provides rapid assessment which exceeds the national standard for access but cannot demonstrate that it offers same day brain or carotid imaging
				GREEN	A service which provides rapid assessment which exceeds the national standard for access and can demonstrate that it provides same day brain or carotid imaging
				COMPLETE	A service which provides rapid assessment which exceeds the national standard for access and can demonstrate that it provides same day brain and carotid imaging
Priority 6: Appropriate Secondary Prevention					
1	**Anti-coagulation for patients in AF**	To develop and implement a local protocol to: • Identify persistent and paroxysmal AF in patients with ischaemic stroke and TIA; and • Identify people with atrial fibrillation and assess their risk of ischaemic stroke and bleeding to determine whether they would benefit from anti-coagulation; • Ensure that stroke/TIA patients' risks of recurrent ischaemic stroke/TIA and bleeding on anti-coagulants are assessed to maximise the number of appropriate patients with AF receiving anti-coagulants.	Christine McAlpine	BLACK	No protocol in place
				RED	Basic ECG detection screening but no other investigation or risk assessment protocol in place
				AMBER	Ad hoc availability of prolonged ECG and delay in commencing Warfarin or new anticoagulant
				GREEN	Protocol for ECG / Prolonged ECG in place. Has-Bled/ CHADS VASc score used, however delay in commencing Warfarin or new anticoagulant.
				COMPLETE	Protocol for ECG / prolonged ECG in place. Has-Bled / CHADS VASc score routinely used. Commencement of Warfarin or new anticoagulant in a timely manner.
2	**Carotid endarterectomy for patients with recently symptomatic carotid stenosis**	To modify the patient pathway to ensure that at least 80% of patients undergoing carotid endarterectomy for symptomatic carotid stenosis have the procedure within 14 days of their index TIA/stroke event (see details of Scottish Stroke Care Standards in Annex 2).	Martin Dennis	**This element measured by SSCA data**	

	Action	Aim	NAC Lead	Benchmark Criteria	
Priority 7. Transition to the community					
1.1	**Access to stroke therapy services.**	Acute therapy assessment is provided by stroke specialists by day 3 of admission following a stroke. *Once available, data from the SSCA Rehab sprint audit will be used to support this benchmarking.*	Thérèse Jackson / Mark Smith	BLACK	No acute therapy assessment is available or plan to develop services
				RED	Plan in place to develop stroke specialist acute therapy assessment provision by day 3 following admission.
				AMBER	Acute therapy assessment is carried out by generic staff but not routinely by day 3.
				GREEN	Acute therapy assessment is carried out by stroke specialists but not routinely by day 3 following admission.
				COMPLETE	Acute therapy assessment is carried out by stroke specialists and by day 3 of admission following a stroke.
1.2	**Access to Stroke Rehabilitation Services**	Stroke rehabilitation services including In-patient stroke rehabilitation unit (SRU), early supported discharge (ESD) teams and community rehabilitation (CR) teams should be available in each health board.	Thérèse Jackson / Mark Smith	BLACK	No In-patient SRU, ESD or Community Rehabilitation available.
				RED	Plan to develop SRU, ESD & Community Rehabilitation is in place and implementation plan agreed by MCN
				AMBER	SRU, ESD & Community Rehabilitation available but not consistently across MCN area and is often generic in nature.
				GREEN	SRU, ESD and Community Rehabilitation is available across MCN area but levels of input are insufficient to provide daily input (Mon-Fri) on the SRU and according to patient need for ESD & CR
				COMPLETE	SRU, ESD or Community Rehabilitation are available across the MCN area on a needs led basis (i.e., daily for SRU and according to patient need for ESD and CR)
2	**Person-centred approach**	Stroke services should implement a person-centred approach including goal setting in hospital and community services to ensure an individualised approach.	Thérèse Jackson / Mark Smith	BLACK	No goal setting in place, or plan to establish goal setting process.
				RED	Plan to develop goal setting process in hospital stroke services and community rehabilitation services
				AMBER	Goal setting process is used in some hospital stroke services & community settings, but approaches are inconsistent.
				GREEN	Goal setting is used across MCN area, but process is not multidisciplinary.
				COMPLETE	Goal setting is established across the MCN area and is available in a multidisciplinary format in SRU, ESD and community rehabilitation services.

	Action	Aim	NAC Lead	Benchmark Criteria	
3.1	**Specialist visual assessment and rehabilitation**	Specialist visual assessment and rehabilitation services are available to all people with visual impairment following stroke across the MCN area.	Thérèse Jackson	BLACK	No referral process or documented pathway is available, or plan to develop one for people with visual problems following stroke.
				RED	Plan to develop referral process & pathway for people with visual problems following stroke.
				AMBER	Documented referral process and pathway for specialised visual assessment services but availability limited and referral is ad hoc across MCN area.
				GREEN	Documented referral process and pathway with provision and availability of specialised visual services in selected MCN areas.
				COMPLETE	All those across the MCN area with identified visual problems after stroke have access to specialised visual assessment and rehabilitation services as required.
3.2	**Access to specialist clinical/neuro psychological services**	Clinical/Neuro Psychological services are available to all patients across the MCN area who require specialised psychological assessment and intervention for the emotional and cognitive consequences of stroke.	To be confirmed	BLACK	No specialised neuro psychological services are available for people who have had a stroke or plan to establish them
				RED	Plan to develop referral process & pathway for neuro psychological services for people who have had a stroke
				AMBER	Documented referral process and pathway for specialised neuro psychological services but availability limited and referral is ad hoc across MCN areas
				GREEN	Documented referral process and pathway with provision and availability of specialised neuro psychological services and consistent referral in selected MCN areas
				COMPLETE	All individuals (patients and family/carers) with identified emotional and/or cognitive problems after stroke have access to specialised neuro psychological assessment and intervention as required across all MCN areas (prevention, acute, post acute rehabilitation and community)

		Action	Aim	NAC Lead	Benchmark Criteria	
3.3		**Specialist Driving Assessment**	Specialist advice with regards to return to driving following stroke is available to all patients across the MCN area.	Thérèse Jackson	**BLACK**	No local protocol or access to specialised advice is available, for return to driving following stroke.
					RED	Plan to develop local protocol & access to specialised advice regarding the referral process & pathway for return to driving following stroke .
					AMBER	Local protocol for return to driving assessment & access to specialised advice is available but not documented, and referral for assessment at a specialised driving assessment service is ad hoc across the MCN area.
					GREEN	There is a documented referral process and pathway available, with provision of specialist advice for return to driving in some MCN areas.
					COMPLETE	Clear, documented protocol for accessing specialist advice and referral to driving assessment at an accredited driving assessment service is evident across MCN area.
Priority 8. Living with stroke						
1		**Self management post discharge support**	Multidisciplinary stroke teams provide a range of supported self management approaches including individual, group, written and online resources and can evidence the use of these.	Thérèse Jackson	**BLACK**	No self management approaches or resources are available
					RED	Plan in place to develop self management approaches
					AMBER	Only written and online self management resources are available and are used locally and evidence of their use available.
					GREEN	Individual or group self management options (as well as written and online) are available to some patients across the MCN area and evidence of their use available.
					COMPLETE	Facilitated individual or group self management options (as well as written and online) are available to all patients across the MCN area and evidence of their use available.

	Action	Aim	NAC Lead	Benchmark Criteria	
2	**Exercise**	People being discharged home following stroke should have access to exercise after stroke services and given advice about increasing their physical activity levels where appropriate.	Mark Smith	BLACK	Exercise after stroke services or advice regarding increasing physical activity are not available
				RED	Advice regarding increasing physical activity is available but an exercise after stroke service is not available
				AMBER	Advice regarding increasing physical activity is available and limited exercise after stroke services are available across some parts of the MCN area
				GREEN	Advice regarding increasing physical activity is available and exercise after stroke services are available across the MCN area
				COMPLETE	An established system to ensure advice regarding increasing physical activity is delivered and a clear process of referral into an exercise after stroke pathway is evident across the entire MCN area
3	**Living with stroke – vocational rehabilitation**	Vocational rehabilitation services are available to people who wish to return to paid, unpaid or voluntary work.	Thérèse Jackson	BLACK	No vocational rehabilitation services available for people who have had a stroke or plan to establish them
				RED	Plan to develop referral process & pathway for vocational rehabilitation services for people who have had a stroke
				AMBER	Vocational rehabilitation services exist for people who have had a stroke, however availability and referral is ad hoc across the MCN area
				GREEN	There is a documented referral process and vocational rehabilitation pathway available, with provision of specialist services in some MCN areas
				COMPLETE	All those across the MCN area with identified vocational rehabilitation needs after a stroke have access to specialised assessment and intervention services as required.

Appendix D: Stroke Education Template

A national stroke education template has been developed which lists the skills/training requirements for staff working with stroke patients. This includes:

- Swallow screening;
- Stroke core competencies - via stroke courses or STARS* online (Stroke Training Awareness Resource) and STARS advancing;
- Scot** online core and specialising; and
- Thrombolysis, STAT training or equivalent

*STARS (Stroke Training Awareness Resource) is an e-learning resource/learning tool available to health and social care staff to enable them to become more knowledgeable in stroke care. The resource is based on the Stroke Core Competencies which were published by NHS Education Scotland (NES) in 2005. The STARs website is a nationally recognised stroke training resource. Attaining the website's Core Competency Test Certificate will provide evidence of a minimum standard of training as set out in the draft NHSQIS standards. http://www.strokecorecompetencies.org/node.asp?id=home

**SCoT, the Stroke Competency Toolkit (SCoT) is a free Continuing Professional Development (CPD) resource, specific to stroke care and is based on the NES Stroke Core Competencies (2005). It provides a format which enables health and social care staff to evidence their learning and demonstrate their knowledge of the stroke core competencies through reflective practice; and then progress to the relevant specialising competencies as appropriate. The electronic version was launched in 2012. http://www.scotonline.org/

Thrombolysis/Stroke and TIA Assessment Training (STAT) is aimed at staff who are involved in clinical decision making around thrombolysis treatment/management. It covers all aspects of assessment, delivery and monitoring.

Appendix E: Organisational Structure of SSCA

The Scottish Stroke Care Audit is a national audit within the Scottish Healthcare Audits of the National Information & Intelligence Department (NI&I) at the Information Services Division (ISD) of NHS National Services Scotland (NSS).The audit has its own Steering Committee reporting directly to the National Advisory Committee for Stroke (NACS) at the Scottish Government and providing strategic direction and clinical input to the audit team, optimising 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/ Lead Clinician
Moranne MacGillivray	National Clinical Co-ordinator
David Murphy	Senior Information Analyst
Iain McDermid	Information Analyst
Martin O'Neill	Principal Analyst
Gillian Gillespie	Data Support Officer

Neil Perkins (Information Analyst) left the SSCA during 2015 to take up a new position within ISD. The SSCA team would like to take this opportunity to thank Neil for his contribution and wish him well in his new venture.

Funding of £167k for the central coordination of the SSCA for 2015/16 was provided by NACS. Funding for the SSCA data collection has been included in each Health Board's general allocation. Each Health Board is expected to continue to collect the audit data. Auditors are employed in each Health Board and are supported by their Stroke MCN. Staffing levels vary widely between hospitals. Auditors' responsibilities include case ascertainment, data collection, completion of forms and data entry. Since June 2012 all Health Boards have entered data into eSSCA. Prior to this all Health Boards data were entered into the Scottish Stroke Care Audit System (SSCAS) other than NHS Lanarkshire. In NHS Lanarkshire a locally developed system (Stroke Audit In Lanarkshire (SAIL)) was used to collect inpatient and outpatient data. Data from SAIL (up to June 2012) were 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 and centrally during analysis.

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

Appendix F: Additional Information

Additional information is available on the SSCA website:

- Aims, objectives and methods of the audit.
  http://www.strokeaudit.scot.nhs.uk/about.htm

- Core dataset definitions.
  http://www.strokeaudit.scot.nhs.uk/about/Resources.html

- Current Steering Group members.
  http://www.strokeaudit.scot.nhs.uk/about/SSCA_Steering_Committee_Members_2015.pdf

- Contact details of Project Team.
  http://www.strokeaudit.scot.nhs.uk/contact.htm

- Previous Annual National Reports.
  http://www.strokeaudit.scot.nhs.uk/Reports/Reports.html

- Information on requesting SSCA data for research purposes.
  http://www.strokeaudit.scot.nhs.uk/Research.html

- Information on Quality Improvement and the Scottish Stroke Care Standards.
  http://www.strokeaudit.scot.nhs.uk/Quality.html

- Information for patients and carers.
  http://www.strokeaudit.scot.nhs.uk/Patients.html

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