Public Health Scotland

Scottish Stroke Improvement Programme

2020 National Report

Publication date: 01 Sept 2020

A Management Information release for Scotland

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Introduction

Stroke is a key health issue for the people of Scotland and the Scottish NHS. It is the third commonest cause of death in Scotland and the most common cause of severe physical disability amongst adults. Stroke has a significant impact on NHS resources, accounting for approximately 5% of total NHS costs. 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 (The Scottish Government, 2020 Vision. Edinburgh, Scotland: 2011 http://www.gov.scot/Topics/ Health/Policy/2020-Vision). For these reasons it is important that all NHS boards across Scotland deliver high quality and equitable stroke care. The Scottish Stroke Care Audit (SSCA) has been collecting information about stroke care since 2002. Since its inception, the SSCA has helped to drive evidence-based improvements in stroke care which have contributed to falling mortality rates and improved outcomes for Scottish stroke patients.

As seen in later sections of this report, there have been important gains in performance against the Stroke Care Bundle. Achieving this care bundle is associated with reduced mortality and increased likelihood of discharge to usual residence after stroke. Across Scotland Stroke Bundle compliance has improved from 59% in 2018 to 64% in 2019. This is the first year that we have incorporated the new 12-hour brain imaging standard within the bundle. Through later sections you will see commentaries and results for the Stroke Improvement Priorities and Actions, time to various inpatient measures including thrombolysis, TIA services and anticoagulation.

The COVID-19 Pandemic has had a major impact on Stroke services, just as it has had on other parts of the NHS. Many audit workers were redirected to clinical areas and much of stroke data collection ceased or reduced from early April 2020. This will have an impact on the figures that we present in next year's report. The 2020 report however is based on complete figures from 2019. Due to staff being redirected to respond to the COVID-19 pandemic in Spring and early Summer 2020, this year's report is being produced much later than the planned release date at the end of June. Given the limited time available for report writing, this year's chapters are subsequently slimmed down. There had already been, however, a plan to reduce the word count of the 2020 report to fit with the new, and much more interactive, dashboard style of presentation that we are delivering. This is a format already used by some other Scottish National Audit Programmes and one which we plan to expand and refine over coming years.

Main Points

- 9,751 stroke patients were admitted to Scottish hospitals in 2019.
- Stroke Care Bundle compliance was 64% across Scotland, an improvement from 59% in 2018. Bundle compliance is measured for the first time incorporating the new 12-hour brain imaging standard. The Stroke Care Bundle is important because achieving it is associated with a reduced risk of dying and an increased likelihood of getting back home. However, overall compliance remains short of the 80% standard and more work is required to improve performance against this standard.
- The total number of patients who received thrombolysis across Scotland in 2019 was 980 (10.1% of all stroke admissions) which is similar to previous years (1,037 (10.7%) in 2018). However, there were consistently large variations in the proportion of stroke patients treated between NHS boards.
- In 2019 the average door to needle time across Scotland was 52.7 minutes, a decrease from 55.7 minutes in 2018.

Scottish Stroke Improvement Plan

To improve services effectively the Scottish Stroke Improvement Programme recognises the need to set clear aims which have been established through the Scottish Stroke Care Standards (2016) and the priority actions from the Stroke Improvement Plan.

Through the Scottish Stroke Care Audit (SSCA) and the regular monitoring against the priority actions, performance is mapped and the Stroke Managed Clinical Networks (MCNs) develop action plans, test change and implement improvement methodologies.

The Stroke Improvement Programme Lead and SSCA National Clinical Coordinator work closely with the NHS 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 NHS board's Chief Executive to ensure that services improve.

The following table represents the self-evaluated performance of NHS boards when benchmarking themselves against the Stroke Improvement Plan priorities, displayed in Red, Amber, Green (RAG), Blue or Black.

Each NHS board will be available here: https://www.strokeaudit.scot.nhs.uk/index.html

Performance against standards: Inpatients

Nearly 10,000 stroke patients were admitted to Scottish hospitals in 2019. The Demographic Tables tell us a little bit more about them (Tables 2 and 3) . Overall, 86% were ischaemic strokes. The average age was 76 years old for women and 71 years old for men. There is variation between NHS boards, with NHS Greater Glasgow and Clyde and NHS Lanarkshire in particular seeing a younger stroke population. These are also the boards with higher numbers of patients in the two most deprived Scottish Index of Multiple Deprivation (SIMD) categories, with around 60% of stroke cases within SIMD categories 1 and 2.

Of these 10,000, 11.7% were haemorrhagic strokes. The RAG (SSCA Standards, Figure 1) shows the cumulative proportions of patients with a final diagnosis of stroke who were managed in accordance with all four standards which comprise the Care Bundle (stroke unit admission, brain scan, swallow screen and aspirin) and the Stroke Care Bundle itself. Bundle compliance was 64% across Scotland, an improvement on 59% in 2018. This measure is an important one because achieving the Stroke Care Bundle is associated with a reduced risk of dying and an increased risk of getting back home. These numbers may seem lower than the figures published in last year's report, but the more difficult to achieve 12-hour brain scanning standard is now incorporated in reporting of bundle compliance. Dumfries and Galloway Royal Infirmary, Queen Elizabeth University Hospital, Ninewells, Crosshouse and Raigmore Hospitals have all made statistically significant improvements against bundle performance, although none yet reach the 80% standard.

The proportion of patients across Scotland with a final diagnosis of stroke who accessed a stroke unit on the day of admission or the day after remained stable at 82%. NHS Lanarkshire was similar to the national average, but with a statistically significant fall in performance in stroke unit admission in two of its three hospitals. Inverclyde Royal Hospital also saw a fall in stroke unit admission performance but Raigmore Hospital and Royal Infirmary of Edinburgh saw a statistically significant improvement, albeit remaining below the Scottish average. It should be noted that small hospitals such as those on the Islands and in rural NHS boards perform well against this standard because their general admissions ward fulfil the agreed definition of a stroke unit. It should also be noted that in some areas patients can be admitted to the stroke unit quickly but later boarded out and not spend all their time there. Reporting on this will be an important metric in NHS board Stroke Reviews and SSCA reports. A stroke often affects the patient's ability to swallow food, fluids and medication safely, so if a patient is identified as having a possible stroke a swallow assessment should be done as soon as possible.

Previous research has suggested that the greater the delay to swallow screen the higher the risk of stroke-associated pneumonia. Important measures to improve swallow screen performance include early identification of stroke patients and ensuring nurses are trained to

undertake a swallow screen promptly recording the result clearly in the admission notes. Against the swallow screen standard overall Scottish performance improved from 79% to 81% with particular local improvements in NHS Dumfries and Galloway. The new brain imaging standard of 12 hours has been influential in increasing access to earlier scanning post-stroke. Earlier scanning allows interventions which have been shown to improve outcomes, such as the use of antiplatelet agents (aspirin and/or clopidogrel). Many areas have seen improvements in performance and across Scotland performance has risen from 78% to 84%, however, this still falls short of the 90% target. The final element of the bundle is aspirin initiation by the day after hospital admission, which remains static at 92%.

Table 1: Numbers of confirmed stroke patients by NHS board of residence, showing percentage by stroke type (2019)

	Indicator					
	All Confirmed Strokes		Haemorrhagic Strokes		Ischaemic Strokes	
Health Board Residence	Number of cases	Percentage/ Average/ Rate	Number of cases	Percentage/ Average/ Rate	Number of cases	Percentage/ Average/ Rate
Ayrshire & Arran	889	100.0	75	8.4	800	90.0
Borders	247	100.0	25	10.1	219	88.7
Dumfries & Galloway	291	100.0	39	13.4	248	85.2
Fife	856	100.0	101	11.8	744	86.9
Forth Valley	510	100.0	72	14.1	435	85.3
Grampian	792	100.0	108	13.6	670	84.6
Greater Glasgow & Clyde	2,017	100.0	236	11.7	1,761	87.3
Highland	526	100.0	77	14.6	444	84.4
Lanarkshire	1,088	100.0	116	10.7	956	87.9
Lothian	1,353	100.0	163	12.0	1,160	85.7
Orkney	42	100.0	3	7.1	38	90.5
Shetland	33	100.0	7	21.2	25	75.8
Tayside	787	100.0	88	11.2	649	82.5
Western Isles	41	100.0	3	7.3	37	90.2
Outside Scotland/ Not Known/ Other	279	100.0	27	9.7	246	88.2
Total	9,751	100.0	1,140	11.7	8,432	86.5

Please note that the column percentage/average/rate is a percentage only, but has been extracted from tableau, where additional options are available.

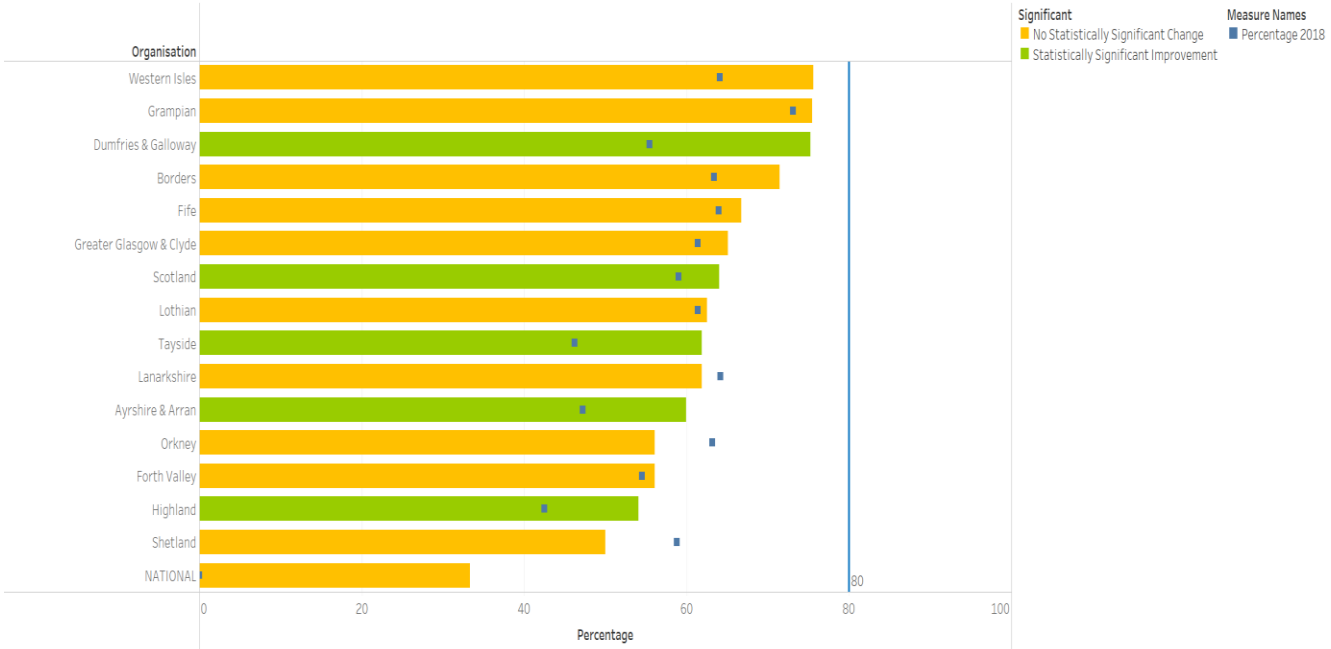
Table 2: Numbers of confirmed stroke patients by NHS board of residence, showing percentage by average age and sex (2019)

	Indicator			
	Mean Age (Years) (Female)		Mean Age (Years) (Male)	
Health Board Residence	Number of cases	Percentage/ Average/ Rate	Number of cases	Percentage/ Average/ Rate
Ayrshire & Arran	433	74.7	456	70.6
Borders	118	79.6	129	73.6
Dumfries & Galloway	128	77.0	163	75.9
Fife	431	75.7	425	70.5
Forth Valley	262	77.2	248	71.0
Grampian	385	76.6	407	72.2
Greater Glasgow & Clyde	951	74.5	1,066	68.8
Highland	239	76.5	287	72.6
Lanarkshire	520	74.2	568	69.1
Lothian	669	77.2	684	70.4
Orkney	21	78.5	21	72.5
Shetland	15	77.3	18	71.7
Tayside	361	76.4	426	71.2
Western Isles	18	80.9	23	70.7
Outside Scotland/ Not Known/ Other	125	73.5	154	68.4
Total	4,676	75.8	5,075	70.5
Scotland	4,551	75.8	4,921	70.6

Table 3: Numbers of confirmed stroke patients by NHS board of residence, showing percentage by deprivation (2019)

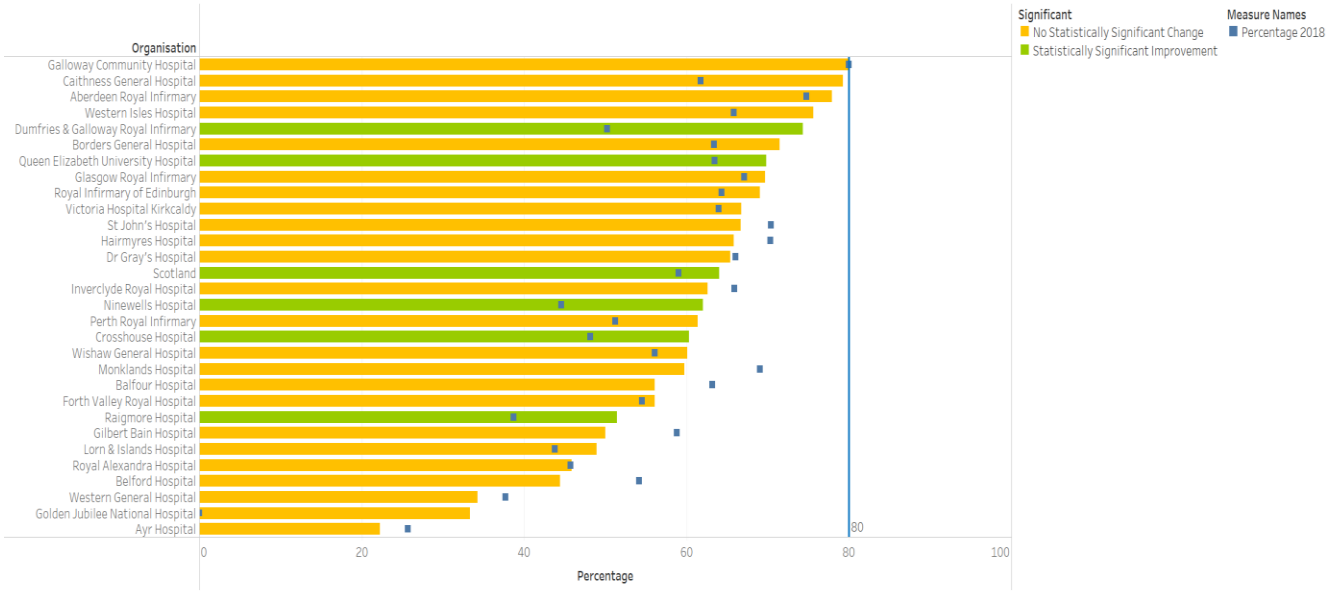
	Indicator									
	SIMD 1 (Most deprived)		SIMD 2		SIMD 3		SIMD 4		SIMD 5 (Least deprived)	
Health Board Residence	Number of cases	Percentage/ Average/ Rate	Number of cases	Percentage/ Average/ Rate	Number of cases	Percentage/ Average/ Rate	Number of cases	Percentage/ Average/ Rate	Number of cases	Percentage/ Average/ Rate
Ayrshire & Arran	284	31.9	203	22.8	177	19.9	131	14.7	94	10.6
Borders	15	6.1	52	21.1	64	25.9	103	41.7	13	5.3
Dumfries & Galloway	20	6.9	72	24.7	122	41.9	58	19.9	19	6.5
Fife	199	23.2	199	23.2	189	22.1	139	16.2	130	15.2
Forth Valley	94	18.4	138	27.1	89	17.5	103	20.2	86	16.9
Grampian	32	4.0	132	16.7	166	21.0	218	27.5	244	30.8
Greater Glasgow & Clyde	852	42.2	365	18.1	255	12.6	243	12.0	302	15.0
Highland	40	7.6	104	19.8	181	34.4	162	30.8	39	7.4
Lanarkshire	317	29.1	322	29.6	218	20.0	135	12.4	96	8.8
Lothian	226	16.7	295	21.8	247	18.3	234	17.3	351	25.9
Orkney	0	0.0	9	21.4	17	40.5	15	35.7	1	2.4
Shetland	0	0.0	1	3.0	11	33.3	21	63.6	0	0.0
Tayside	144	18.3	133	16.9	183	23.3	196	24.9	131	16.6
Western Isles	0	0.0	7	17.1	30	73.2	4	9.8	0	0.0
Scotland	2,223	23.5	2,032	21.5	1,949	20.6	1,762	18.6	1,506	15.9

Figure 1: (NHS board) Percentage of stroke patients receiving an 'appropriate' Stroke Care Bundle (i.e. stroke unit admission, swallow screen, brain scan and aspirin), 2018 and 2019 (based on final diagnosis).



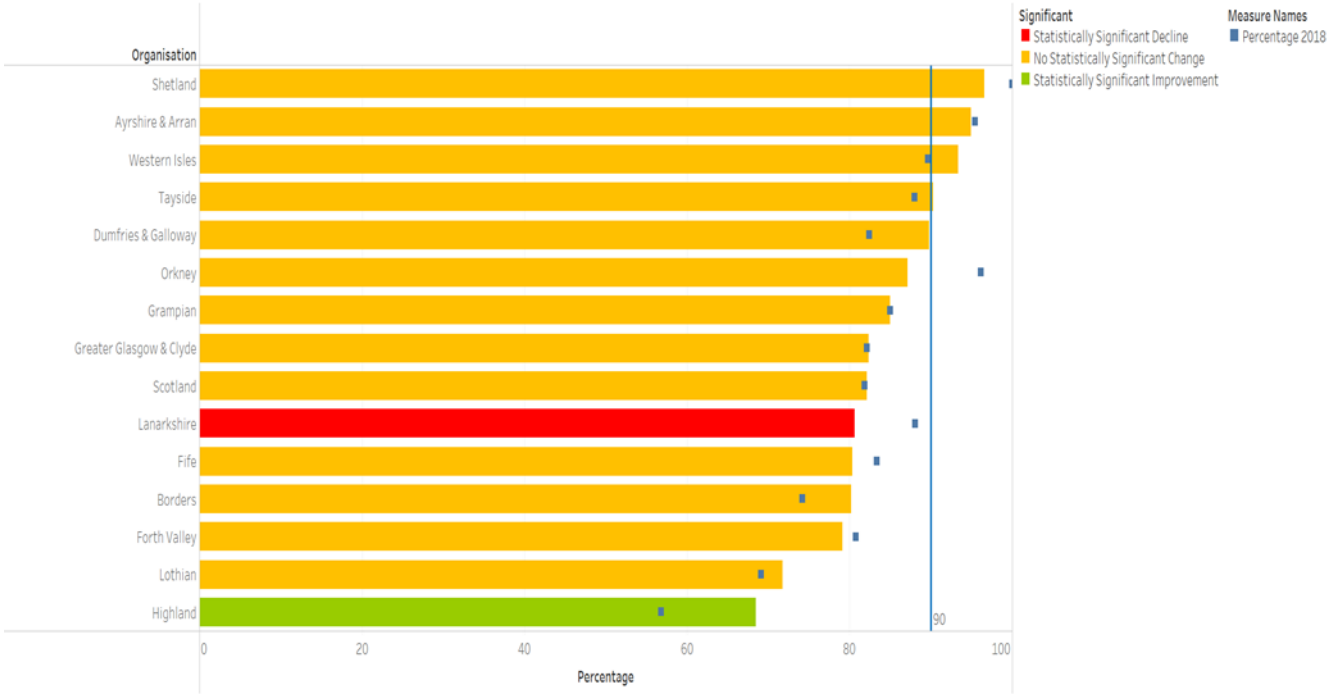
Sum of Percentage 2019 and Percentage 2018 for each Organisation. For pane Sum of Percentage 2018: Color shows details about Percentage 2018. Details are shown for Comments. For pane Sum of Percentage 2019: Color shows details about Significant. The data is filtered on Indicator and Report Level. The Indicator filter keeps Inpatient Bundle. The Report Level filter keeps NHS Board and Scotland.

Figure 2: (Hospital) Percentage of stroke patients receiving an 'appropriate' Stroke Care Bundle (i.e. stroke unit admission, swallow screen, brain scan and aspirin), 2018 and 2019 data (based on final diagnosis).



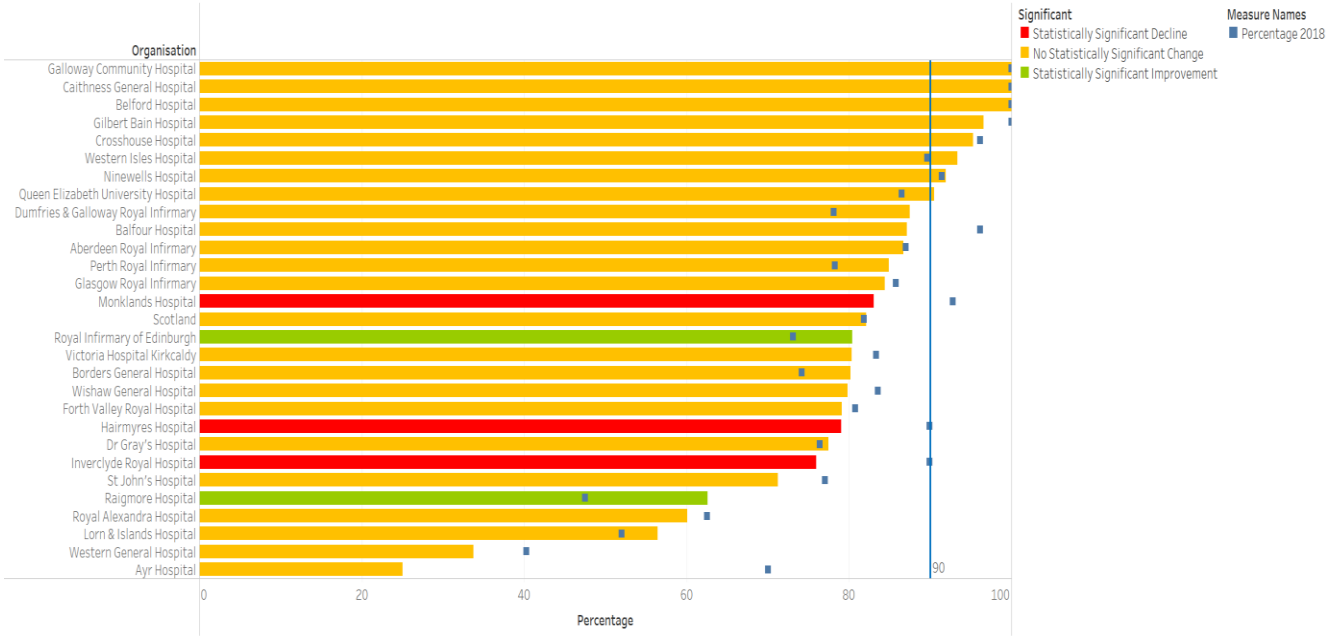
Sum of Percentage 2019 and Percentage 2018 for each Organisation. For pane Sum of Percentage 2018: Color shows details about Percentage 2018. Details are shown for Comments. For pane Sum of Percentage 2019: Color shows details about Significant. The data is filtered on Indicator and Report Level. The Indicator filter keeps Inpatient Bundle. The Report Level filter keeps Hospital and Scotland.

Figure 3: (NHS board) Percentage of stroke patients admitted to a stroke unit within 1 day of admission to hospital, 2018 and 2019 data (based on final diagnosis).



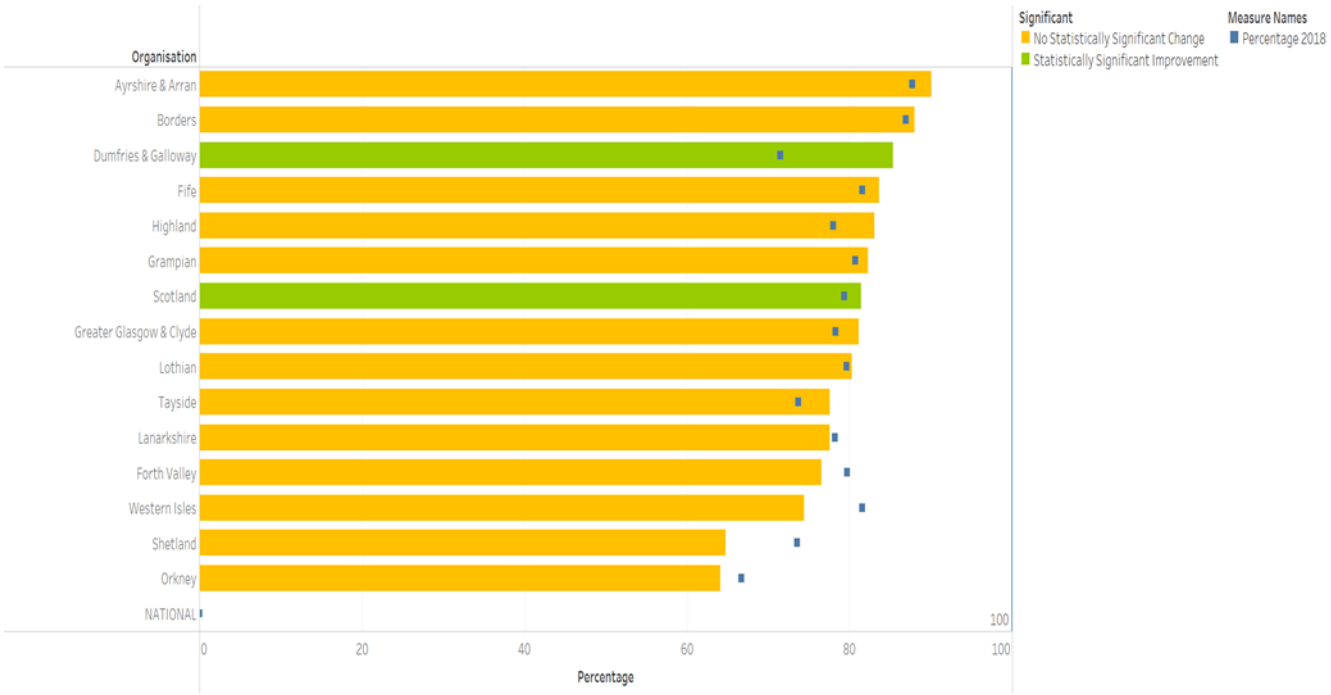
Sum of Percentage 2019 and Percentage 2018 for each Organisation. For pane Sum of Percentage 2018: Color shows details about Percentage 2018. Details are shown for Comments. For pane Sum of Percentage 2019: Color shows details about Significant. The data is filtered on Indicator and Report Level. The Indicator filter keeps Stroke Unit. The Report Level filter keeps NHS Board and Scotland.

Figure 4: (Hospital) Percentage of stroke patients admitted to a stroke unit within 1 day of admission to hospital, 2018 and 2019 data (based on final diagnosis).



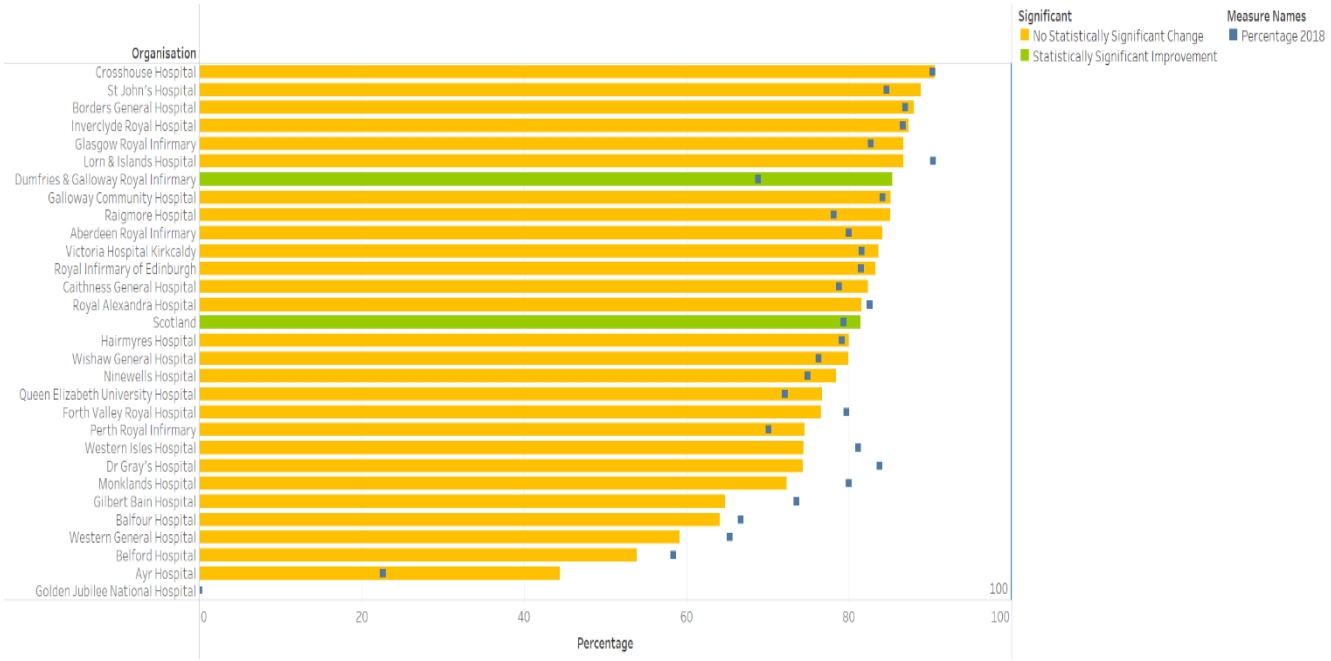
Sum of Percentage 2019 and Percentage 2018 for each Organisation. For pane Sum of Percentage 2018: Color shows details about Percentage 2018. Details are shown for Comments. For pane Sum of Percentage 2019: Color shows details about Significant. The data is filtered on Indicator and Report Level. The Indicator filter keeps Stroke Unit. The Report Level filter keeps Hospital and Scotland.

Figure 5: (NHS board) Percentage of stroke patients with a swallow screening within 4 hours of admission, 2018 and 2019 data (based on final diagnosis).



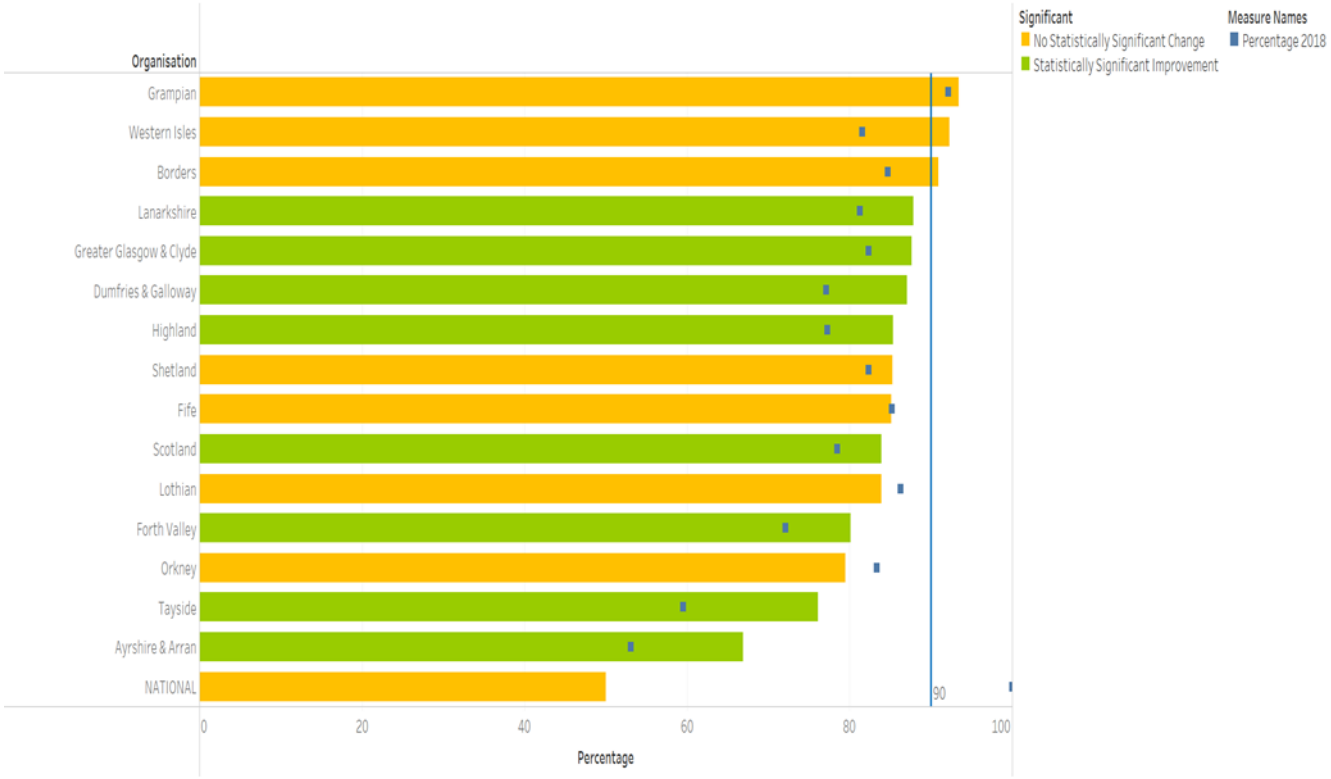
Sum of Percentage 2019 and Percentage 2018 for each Organisation. For pane Sum of Percentage 2018: Color shows details about Percentage 2018. Details are shown for Comments. For pane Sum of Percentage 2019: Color shows details about Significant. The data is filtered on Indicator and Report Level. The Indicator filter keeps Swallow Screen. The Report Level filter keeps NHS Board and Scotland.

Figure 6: (Hospital) Percentage of stroke patients with a swallow screening within 4 hours of admission, 2018 and 2019 data (based on final diagnosis).



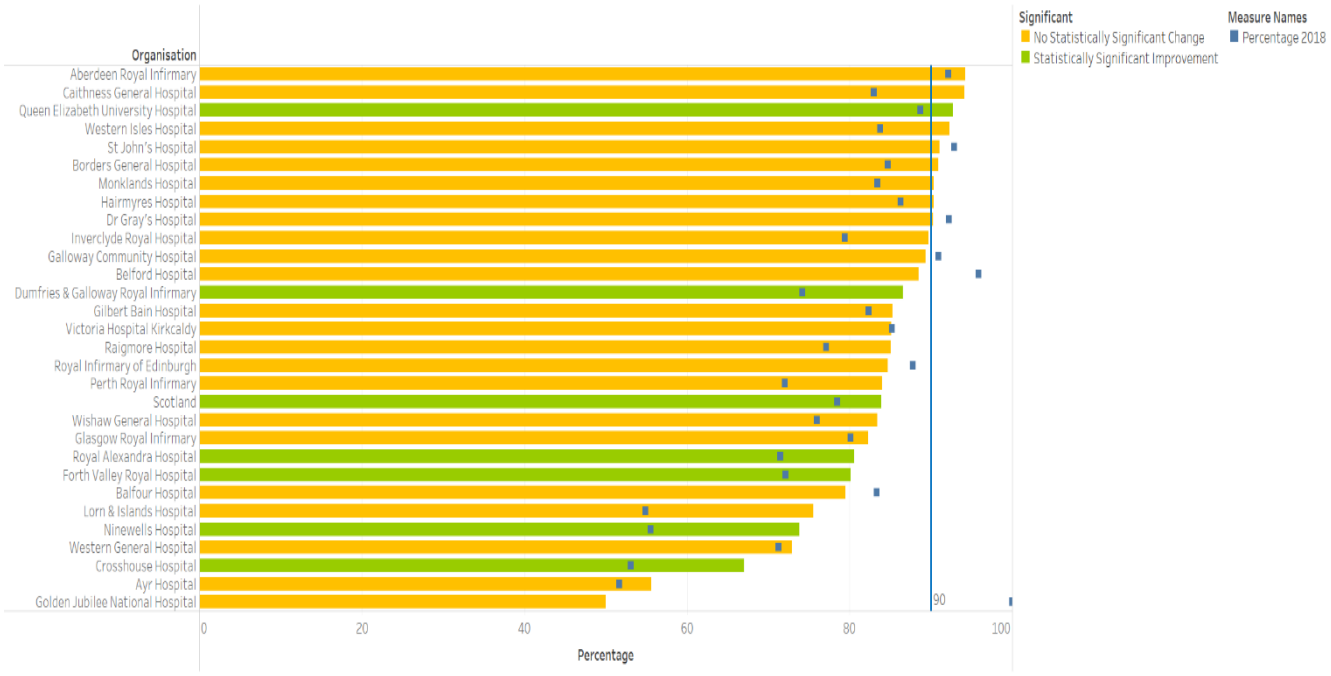
Sum of Percentage 2019 and Percentage 2018 for each Organisation. For pane Sum of Percentage 2018: Color shows details about Percentage 2018. Details are shown for Comments. For pane Sum of Percentage 2019: Color shows details about Significant. The data is filtered on Indicator and Report Level. The Indicator filter keeps Swallow Screen. The Report Level filter keeps Hospital and Scotland.

Figure 7: (NHS board) Percentage of stroke patients with a brain scan within 12 hours of admission, 2018 and 2019 data (based on final diagnosis).



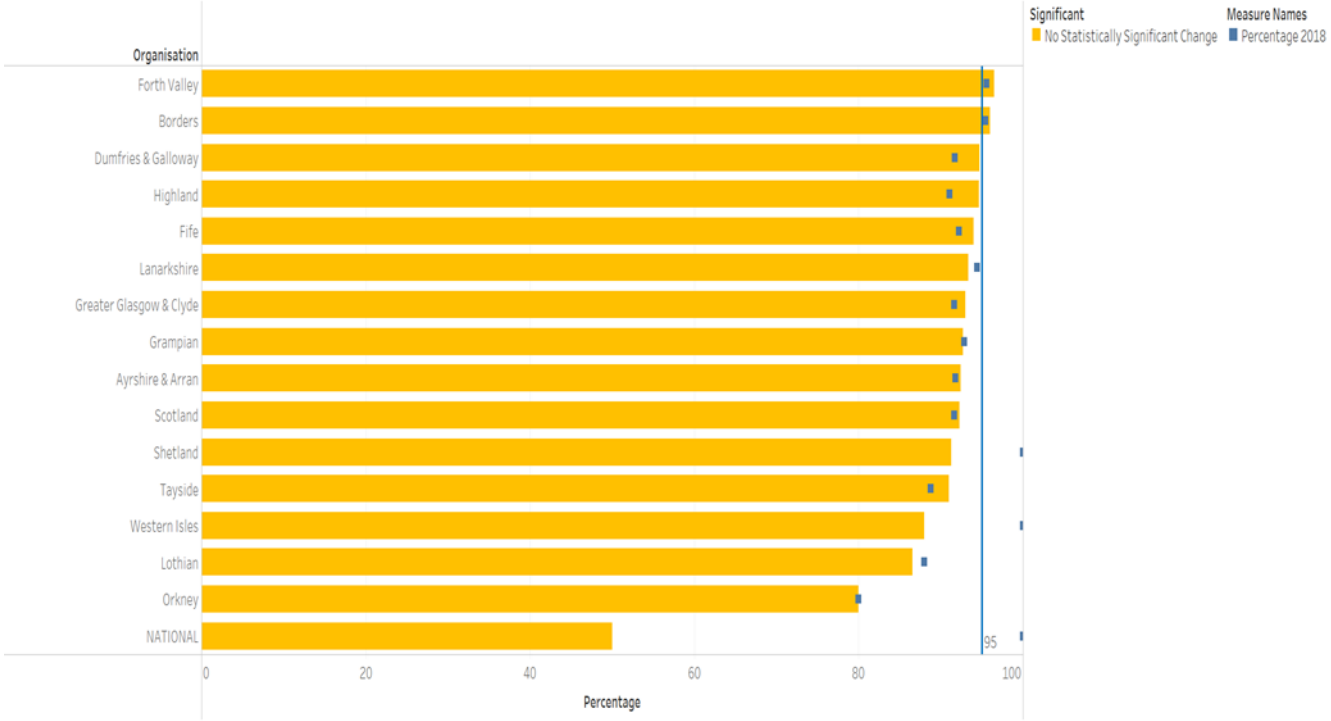
Sum of Percentage 2019 and Percentage 2018 for each Organisation. For pane Sum of Percentage 2018: Color shows details about Percentage 2018. Details are shown for Comments. For pane Sum of Percentage 2019: Color shows details about Significant. The data is filtered on Indicator and Report Level. The Indicator filter keeps Brain Imaging. The Report Level filter keeps NHS Board and Scotland.

Figure 8: (Hospital) Percentage of stroke patients with a brain scan within 12 hours of admission, 2018 and 2019 data (based on final diagnosis).



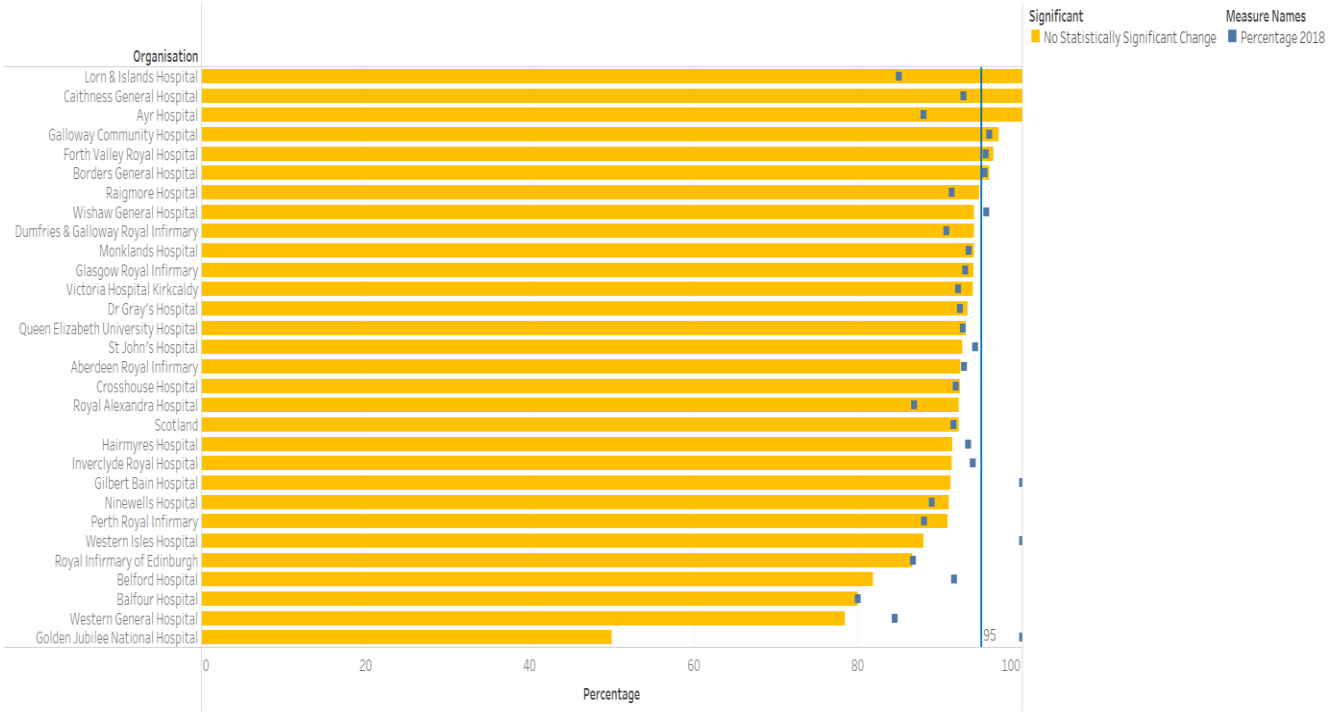
Sum of Percentage 2019 and Percentage 2018 for each Organisation. For pane Sum of Percentage 2018: Color shows details about Percentage 2018. Details are shown for Comments. For pane Sum of Percentage 2019: Color shows details about Significant. The data is filtered on Indicator and Report Level. The Indicator filter keeps Brain Imaging. The Report Level filter keeps Hospital and Scotland.

Figure 9: (NHS board) Percentage of acute ischaemic stroke patients given aspirin in hospital within 1 day of admission, 2018 and 2019 data (based on final diagnosis).



Sum of Percentage 2019 and Percentage 2018 for each Organisation. For pane Sum of Percentage 2018: Color shows details about Percentage 2018. Details are shown for Comments. For pane Sum of Percentage 2019: Color shows details about Significant. The data is filtered on Indicator and Report Level. The Indicator filter keeps Aspirin. The Report Level filter keeps NHS Board and Scotland.

Figure 10: (Hospital) Percentage of acute ischaemic stroke patients given aspirin in hospital within 1 day of admission, 2018 and 2019 data (based on final diagnosis).



Sum of Percentage 2019 and Percentage 2018 for each Organisation. For pane Sum of Percentage 2018: Color shows details about Percentage 2018. Details are shown for Comments. For pane Sum of Percentage 2019: Color shows details about Significant. The data is filtered on Indicator and Report Level. The Indicator filter keeps Aspirin. The Report Level filter keeps Hospital and Scotland.

Comparison of Initial and Final Diagnosis

This section looks at stroke diagnosis. Whilst perhaps not immediately apparent, this information can help stroke services identify issues with achieving certain stroke standards and to help to find ways to improve processes.

In an ideal world, the correct diagnosis of stroke will be made as soon as a patient is admitted to hospital and will remain until discharge (i.e. the same initial and final diagnosis of stroke).

However, in some cases this does not happen. Some cases have an initial diagnosis of stroke but later, following specialist review and investigation, turn out not to be stroke (for instance, stroke mimics a diagnosis of migraine). This would be classed as an initial only diagnosis of stroke. In other situations, the diagnosis of stroke may not be apparent at presentation but becomes apparent after specialist review and investigations (for instance a patient presenting with delirium and not recognised as dysphasic). This is classed as a final only diagnosis of stroke.

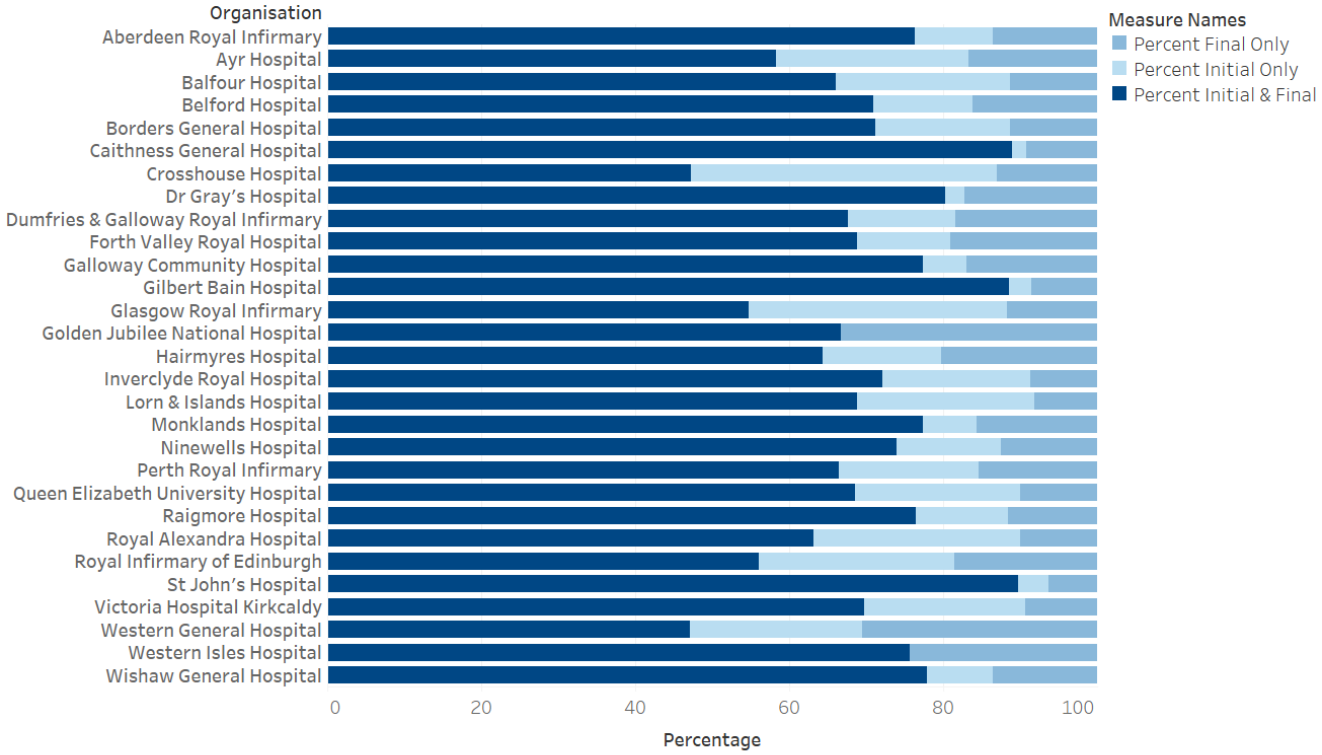
Some hospitals in this year's report have a more than 30% rate of cases with initial but not final diagnosis of stroke. Glasgow Royal Infirmary and University Hospital Crosshouse are examples. Whilst there is nothing wrong with an initial only diagnosis of stroke it can potentially put pressure on radiology services (asking for early stroke brain imaging for non-stroke patients) and Stroke Unit beds (patient at that time appears to require admission to the Stroke Unit). It might even mean that patients are pushed out of the Stroke Unit who do have a confirmed stroke to make space for someone who may end up not having a final diagnosis

of stroke. If these issues cause problems, then a solution might be earlier stroke nurse or specialist review and imaging at the front door of the hospital.

Some hospitals in 2019 reported higher than 20% of strokes only having a final diagnoses of stroke. This may mean that patients have missed important aspects of stroke care according the agreed national standards by the time the diagnosis is made. The Western General and Golden Jubilee National Hospitals are not typical admitting stroke hospitals and Western Isles Hospital is very small. However, University Hospital Hairmyres does have a relatively high final only diagnosis of stroke at 20% (an increase from 11% in 2018). This may explain in part some of the statistically significant deterioration in Stroke Unit admission performance between the two years. Again, more specialist stroke input and education near the front door is likely to improve performance against this standard.

We will continue to review and report on this measure in future years.

Figure 11: Comparison of initial and final diagnosis of stroke by hospital (2019)



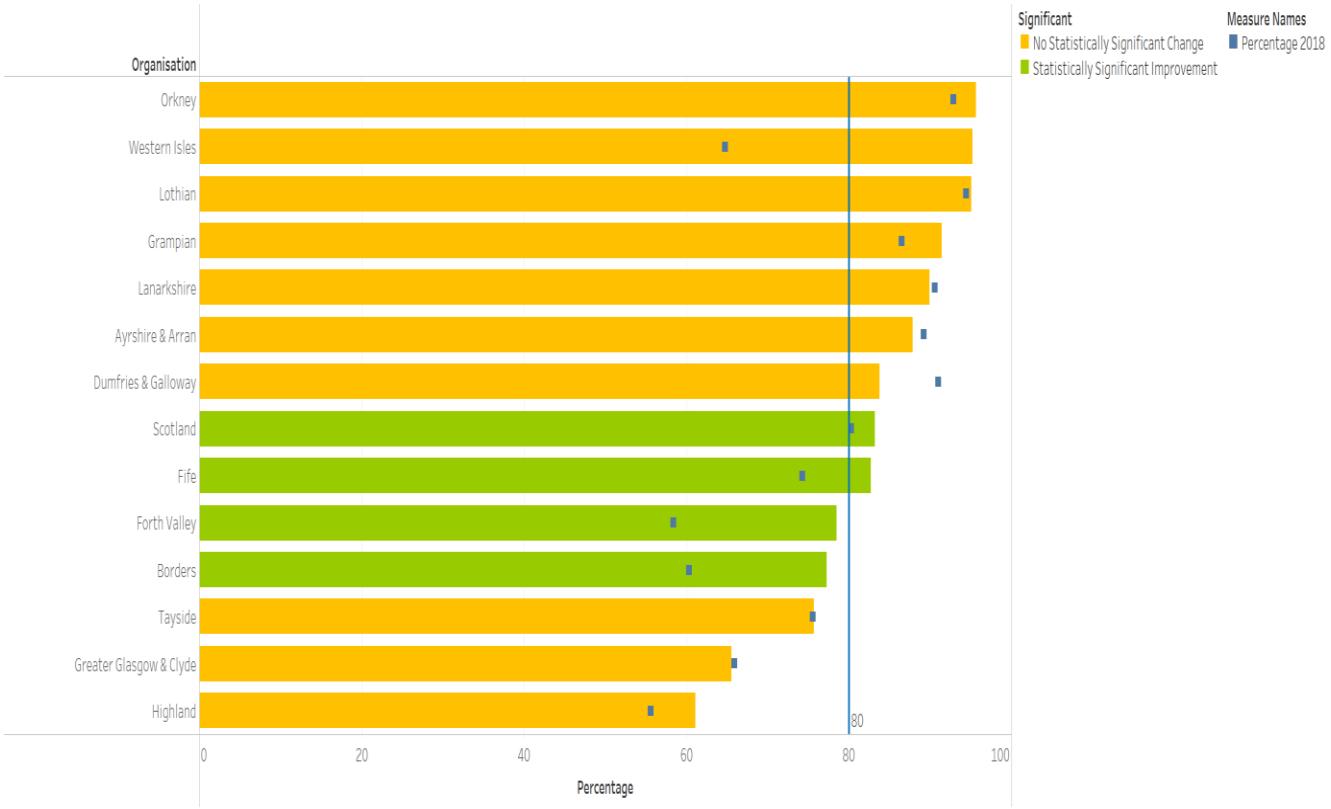
Percent Final Only, Percent Initial Only and Percent Initial & Final for each Organisation. Color shows details about Percent Final Only, Percent Initial Only and Percent Initial & Final. Details are shown for Percent Final Only, Percent Initial Only and Percent Initial & Final. The data is filtered on Level, NHS Board and Year. The Level filter keeps Hospital. The NHS Board filter keeps 16 of 16 members. The Year filter keeps 2019.

Performance Against Standards: Outpatients

Data were collected on 4,238 outpatients in 2019, compared with 3,930 in 2018.

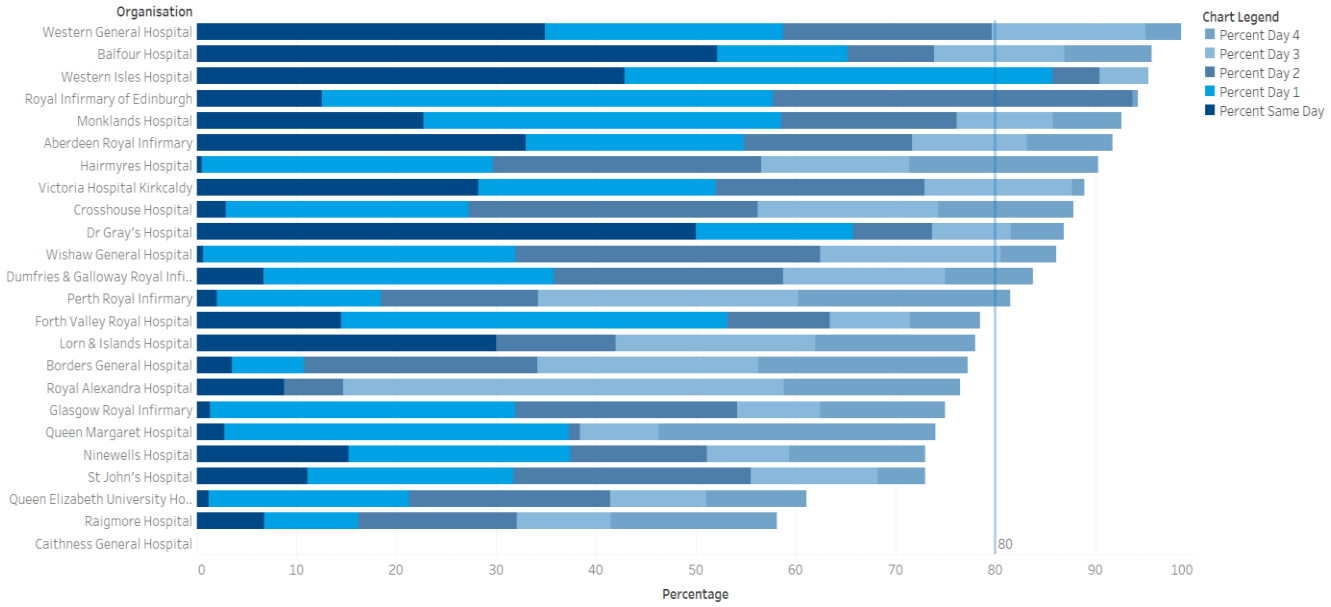
The overall message is that performance in many areas is very good with 8 NHS boards achieving or exceeding that standard (Figure 12), but there is still considerable variability across Scotland. There has been significant improvement in NHS Fife, NHS Forth Valley and NHS Borders, which has contributed to the overall improvement across NHS Scotland. All boards are actively working on improvement where it is required.

Figure 12: Percentage of patients with definite cerebrovascular diagnosis seen in specialist stroke/ TIA clinic with referral to examination time within 4 days, 2018 and 2019 data.



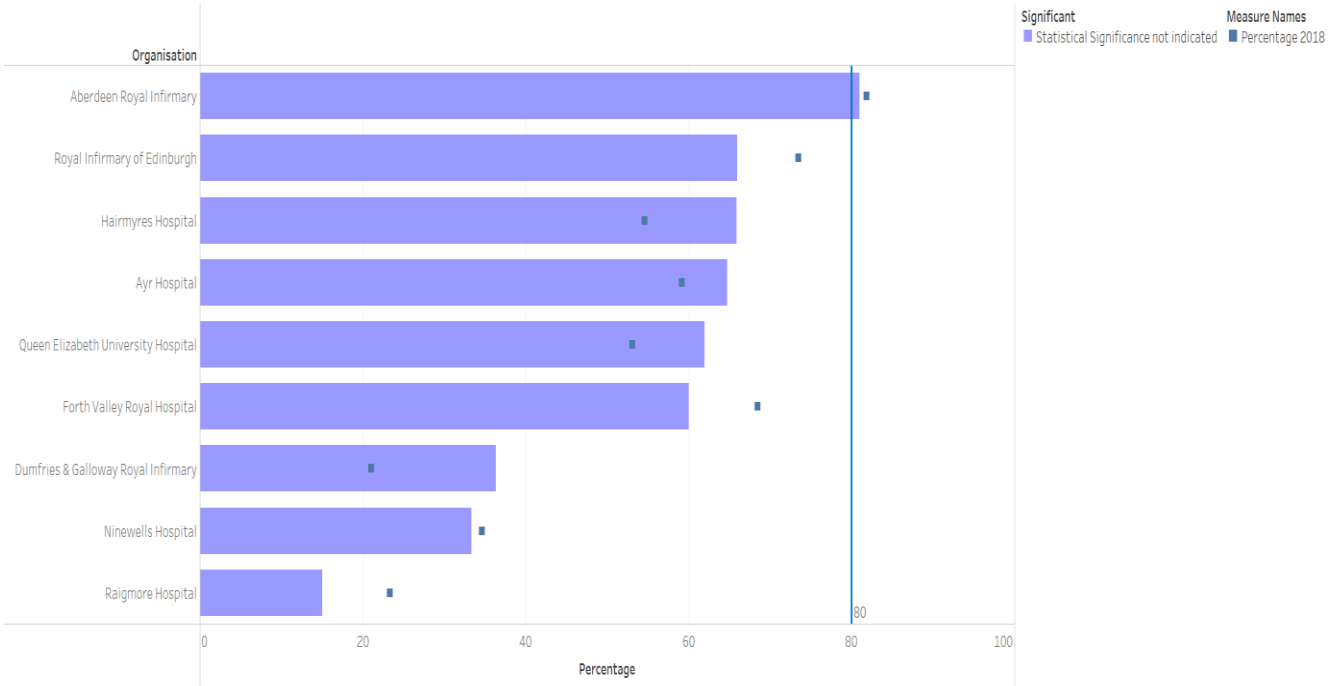
Sum of Percentage 2019 and Percentage 2018 for each Organisation. For pane Sum of Percentage 2018: Color shows details about Percentage 2018. Details are shown for Comments. For pane Sum of Percentage 2019: Color shows details about Significant. The data is filtered on Indicator and Report Level. The Indicator filter keeps Specialist Stroke/ TIA Clinic. The Report Level filter keeps NHS Board and Scotland.

Figure 13: 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, 3 & 4 days, 2019 data.



Percent Day 4, Percent Day 3, Percent Day 2, Percent Day 1 and Percent Same Day for each Organisation. Color shows details about Percent Day 4, Percent Day 3, Percent Day 2, Percent Day 1 and Percent Same Day. Details are shown for Percent Day 4, Percent Day 3, Percent Day 2, Percent Day 1 and Percent Same Day. The data is filtered on Level and Year. The Level filter keeps Hospital. The Year filter keeps 2019.

Figure 14: Percentage of patients undergoing a carotid intervention within 14 days of the event that led the patient to first seek medical assistance, 2018 and 2019 data.



Sum of Percentage 2019 and Percentage 2018 for each Organisation. For pane Sum of Percentage 2018: Color shows details about Percentage 2018. Details are shown for Comments. For pane Sum of Percentage 2019: Color shows details about Significant. The data is filtered on Indicator and Report Level. The Indicator filter keeps Carotid Intervention (from event). The Report Level filter keeps Hospital.

Thrombolysis

The total number of patients receiving thrombolysis across Scotland in 2019 was 980 (10.1% of all stroke admissions) which is similar to previous years (1037 (10.7%) in 2018). However, there are consistently large variations in the proportion of stroke patients treated between NHS boards – varying from 6.4% in NHS Forth Valley up to 18.1% in NHS Grampian (excluding the small NHS boards where wide variation is expected because of very small numbers of patients) (Table 4). Whilst higher rates of thrombolysis may not necessarily improve the outcomes for patients, it does suggest that there may be scope to increase the proportion treated overall. The variation may reflect differences in clinicians' assessment regarding the balance of benefits and risks for the patients they see.

Of course the interval between stroke onset and treatment is the greatest determinant of the likely benefit. Therefore, clinicians who see patients earlier, or who can deliver thrombolysis quicker, with a lower door to needle (DTN) time, are likely to treat a higher proportion of their patients.

In 2018 the average (geometric mean) DTN time across Scotland was 55.7 mins, and was lower (49.2 mins) between 9-5 on weekdays than at other times (61.1 mins). In 2019 the average DTN time had reduced to 52.7 mins, 45.2 mins during 9-5 on weekdays and 59.0 mins at other times (Table 5). In some hospitals, for example, Aberdeen Royal Infirmary (ARI) (2 mins) and Queen Elizabeth University Hospital (QEUH) (3 mins) there was far less difference between the DTN time in and out of hours (Table 5). One likely explanation is that these hospitals have dedicated members of the stroke team present 24/7 (a stroke consultant in ARI, and a stroke consultant or trainee in QEUH). The need to support the Emergency Department (ED) staff with a member of the stroke team has been acknowledged as important, and will hopefully be far more widely available as we prepare to deliver thrombectomy in Scotland. In NHS Lanarkshire the differences in DTN time between 9-5 weekdays and other times is relatively small 6-12 minutes, and this can probably be attributed to the 24/7 availability of stroke nurses to support the pathways.

Some of the longest DTN times result from patients being taken to an acute hospital (Glasgow Royal Infirmary (GRI), Royal Alexandra Hospital (RAH), Vale of Leven (VoL), and Inverclyde Royal Hospital (IRH)) which can carry out a brain scan acutely but are not able to provide thrombolysis 24/7. This has meant that patients have had to have a secondary inter hospital transfer to a thrombolysis unit. Stroke pathways are currently being altered so that no patients are taken acutely to a hospital which cannot support on-site thrombolysis. New telemedicine (telestroke) services are being established to help achieve this aim.

These initiatives should lead to a significant reduction in DTN times, which should improve patients' outcomes and also facilitate the delivery of thrombectomy once that is available.

Table 4: Number of stroke patients thrombolysed by hospital (2019)

Admitting Hospital	Received thrombolysis	Confirmed strokes	Percentage thrombolysed
Aberdeen Royal Infirmary (ARI)	132	655	20.2%
Ayr Hospital	1	9	11.1%
Balfour Hospital, Orkney	4	41	9.8%
Belford Hospital, Fort William	1	27	3.7%
Borders General Hospital, Melrose	26	249	10.4%
Caithness General Hospital, Wick	8	53	15.1%
Crosshouse Hospital, Kilmarnock	75	864	8.7%
Dr Gray's Hospital, Elgin	14	153	9.2%
Dumfries & Galloway Royal Infirmary (DGRI)	24	253	9.5%
Forth Valley Royal Hospital, Larbert (FVRH)	33	517	6.4%
Galloway Community Hospital (GCH)	4	50	8.0%
Gilbert Bain Hospital, Shetland	1	34	2.9%
Glasgow Royal Infirmary (GRI)	18	626	2.9%
Golden Jubilee National Hospital	0	3	0.0%
Hairmyres Hospital, East Kilbride	30	322	9.3%
Inverclyde Royal Hospital, Greenock (IRH)	0	214	0.0%
Lorn & Islands Hospital, Oban	5	47	10.6%
Monklands Hospital, Airdrie	32	308	10.4%
Ninewells Hospital, Dundee	50	698	7.2%
Perth Royal Infirmary (PRI)	21	202	10.4%
Queen Elizabeth University Hospital, Glasg..	186	1,117	16.7%
Raigmore Hospital, Inverness	36	313	11.5%
Royal Alexandra Hospital, Paisley (RAH)	0	395	0.0%
Royal Infirmary of Edinburgh at Little Franc..	128	945	13.5%
St John's Hospital, Livingston (SJH)	24	273	8.8%
Victoria Hospital, Kirkcaldy (VHK)	76	742	10.2%
Western General Hospital, Edinburgh (WGH)	2	257	0.8%
Western Isles Hospital (WIH)	8	41	19.5%
Wishaw General Hospital	41	343	12.0%
SCOTLAND	980	9,751	10.1%

Received thrombolysis, Confirmed strokes and Percentage thrombolysed broken down by Admitting Hospital. The data is filtered on Report Level, NHS Board List and Year. The Report Level filter keeps Hospital. The NHS Board List filter keeps 16 of 16 members. The Year filter keeps 2019.

Figure 15: Geometric mean door to needle time by first hospital 2019

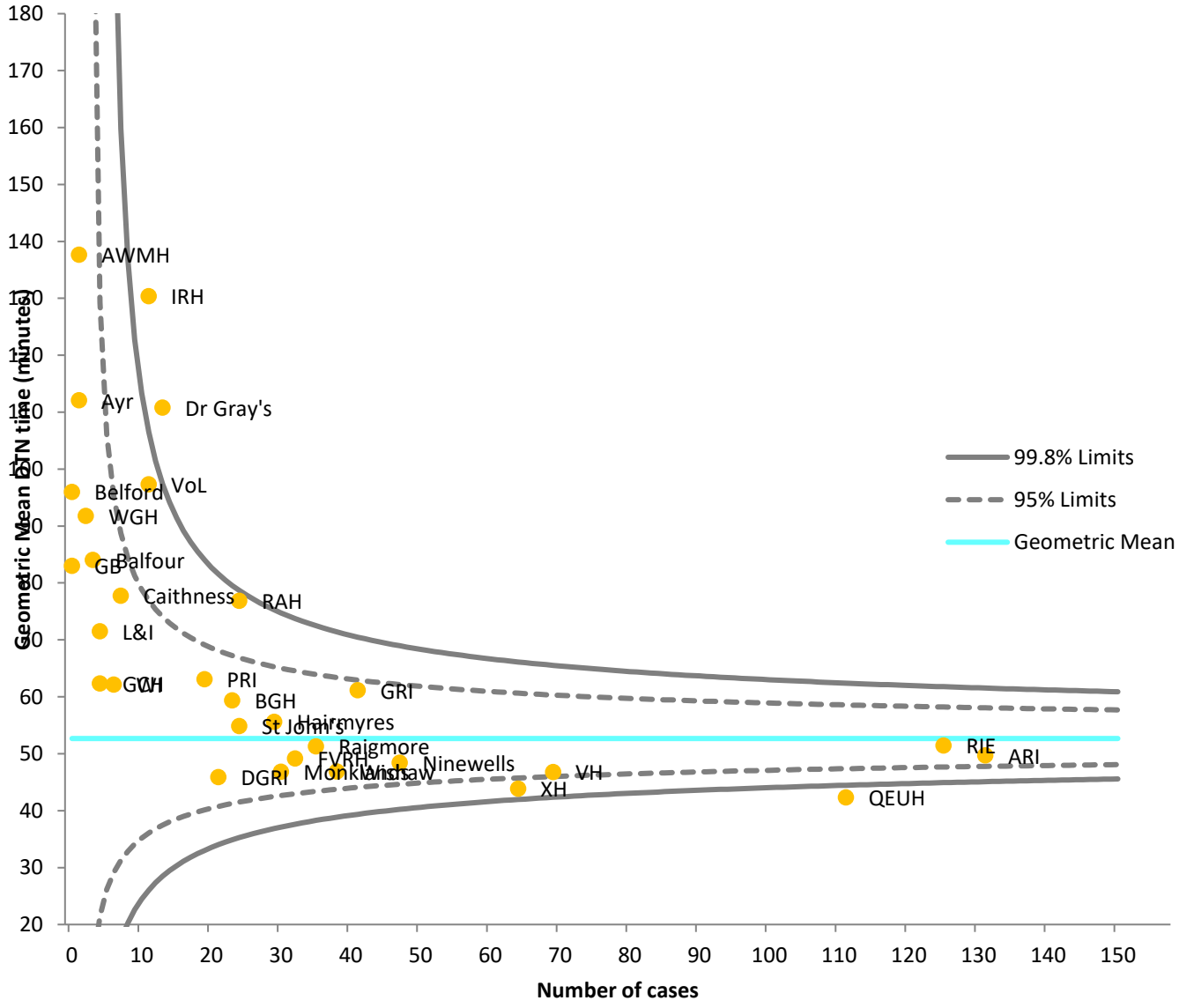


Figure 16: Geometric mean door to needle time by NHS board (2019)

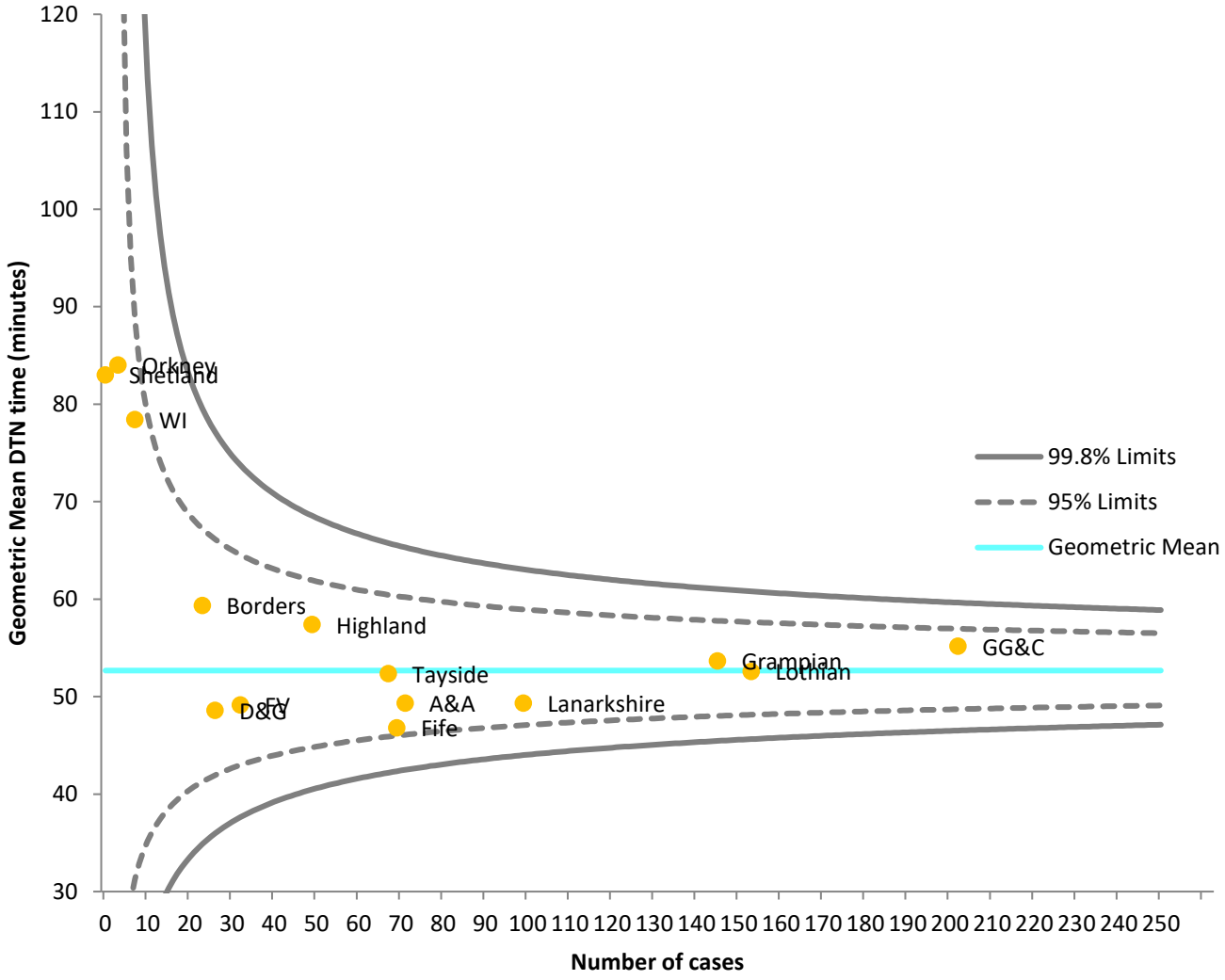


Table 5: Thromboylsis mean door to needle (DTN) time (minutes) for Mon-Fri 9-5 compared with all other times.

First Hospital	DTN Mon-Fri 9am-5pm	DTN Other times	Absolute Difference
Aberdeen Royal Infirmary	50.8	48.8	1.9
Ayr Hospital	91.0	138.0	47.0
Balfour Hospital	88.3	79.9	8.4
Borders General Hospital	42.6	78.6	36.1
Caithness General Hospital	61.1	89.8	28.7
Crosshouse Hospital	40.1	48.5	8.4
Dr Gray'S Hospital	102.4	113.2	10.9
Dumfries & Galloway Royal Infirmary	41.8	59.0	17.3
Forth Valley Royal Hospital	33.5	67.6	34.0
Galloway Community Hospital	41.5	81.8	40.3
Glasgow Royal Infirmary	38.9	85.8	46.9
Hairmyres Hospital	58.6	53.4	5.2
Inverclyde Royal Hospital	153.2	104.0	49.2
Lorn & Islands Hospital	67.4	78.0	10.6
Monklands Hospital	43.2	49.3	6.1
Ninewells Hospital	44.2	50.3	6.0
Perth Royal Infirmary	44.2	73.4	29.2
Queen Elizabeth University Hospital	40.3	43.1	2.8
Raigmore Hospital	39.3	74.5	35.2
Royal Alexandra Hospital	62.4	86.4	24.0
Royal Infirmary Of Edinburgh	40.9	60.8	19.8
St John'S Hospital	52.5	57.5	5.0
Vale Of Leven General Hospital	108.4	90.1	18.2
Victoria Hospital	32.4	66.3	33.9
Western General Hospital	66.5	175.0	108.5
Western Isles Hospital	49.6	73.5	23.9
Wishaw General Hospital	40.1	52.2	12.1

DTN Mon-Fri 9am-5pm, DTN Other times and Absolute Difference broken down by First Hospital. The data is filtered on Year, which keeps 2019.

Governance

The Scottish National Audit Programme (SNAP) governance process provides a framework for identifying where patient outcomes and performance may be significantly different in individual hospitals and mandates investigation to better understand why this may be the case. These responses (for hospitals appearing >3 standard deviations from the Scottish mean) would have normally been included in this publication, however, because of the extraordinary circumstances that the country has faced over the past few months, the usual timelines for these formal responses have been disrupted and are therefore not included in this report. In order to avoid further delay these will instead be available on the SSCA website by early November 2020.

For more information regarding the SNAP Governance Policy please email the SNAP mailbox - phs.snap@nhs.net

Thrombectomy

No thrombectomies were performed in Scotland for anterior circulation ischaemic stroke due to large artery occlusion in 2019, and the first half of 2020. However, the thrombectomy advisory group on behalf of the National Planning Board has continued planning and preparation for starting a service in 2020 which is ultimately expected to carry out about 800 thrombectomies each year across Scotland. There will be the introduction of a hub and spoke model for the delivery of this service with three thrombectomy hubs based at QEUH in Glasgow, Royal Infirmary of Edinburgh (RIE) and Ninewells Hospital in Dundee with some cooperation between these to deliver a national 24/7 service. Patients will usually be taken to their closest acute hospital (a spoke) which is able to carry out a CT brain scan (to exclude a bleed or non-stroke cause of symptoms) and a CT angiogram to identify whether the stroke is due to a large artery block which might be treatable with thrombectomy. Suitable patients will then be transferred to their nearest operational thrombectomy hub. They will remain in the hub until they are fit enough to be repatriated back to their local hospital. Additional funding is being made available in response to business cases to increase staffing and expand facilities across Scotland. We expect this to:

a. increase the support from local stroke services to their ED, probably in the form of stroke nurses who can support the hyperacute pathway, and also be available to accompany patients on any emergency inter-hospital transfer;
b. facilitate the additional imaging required to identify patients suitable for thrombectomy;
c. support the Scottish Ambulance Service to move patients between hospitals as an emergency, and for repatriation; and
d. provide the staffing and facilities to enable the thrombectomy hub to assess, perform a thrombectomy and provide post procedure care in an Hyperacute Stroke Unit (HASU) environment.

Training for all health professionals who will be involved in the patient pathway is being developed and rolled out across Scotland. This includes:

1. free on line training about hyperacute stroke treatments including thrombolysis and thrombectomy https://www.chsselearning.org.uk/advancing-modules/01-hyperacute-stroke-treatments-including-thrombolysis-and-thrombectomy/ ;
2. free on line training in the interpretation of CT and CT angiography in hyperacute stroke https://www.ed.ac.uk/clinical-sciences/edinburgh-imaging/education-teaching/short-courses/training-tools/acute-cta-for-thrombectomy-in-stroke-actats ;
3. Stroke and Transient Ischaemic Attack (TIA) Assessment Training (STAT) and STAT plus training courses which will be coordinated by a training coordinator employed by Chest Heart and Stroke Scotland (CHSS); and
4. An updated Stroke Training and Awareness Resources (STARS) masterclass which allows clinicians to practice their decision making in hyperacute stroke and compare their decisions with other experienced stroke physicians.

Rehabilitation

Ensuring the delivery of appropriate rehabilitation for stroke survivors is a key priority within the Scottish Stroke Improvement Programme (SSIP). This means having specialist stroke rehabilitation available for everyone who needs it, delivered intensively enough to be effective and allowing patients to maximise their recovery and reach their goals.

In 2019, we updated the SSIP performance targets to reflect access to rehabilitation in inpatient settings, intensity of provision in Stroke Units and access to stroke specialist Early Supported Discharge and community teams.

There are now four criteria:

7.1 Access to Acute Therapy Assessment (as per the sprint audit);

7.2 Access to Inpatient Stroke Therapy (reflecting intensity);

7.3 Access to Community Stroke Therapy (reflecting availability of specialist versus generic services); and

7.4 Availability by days per week of community therapy input (again reflecting intensity).

The criteria should allow a more quantifiable approach, including reporting of actual numbers of patients receiving these interventions.

In March 2020, the Covid-19 pandemic prevented the ultimate delivery of this work stream. It is anticipated that this will be relaunched later in 2020.

Stroke is a clinical priority in Scotland and the Programme for Government will set out its aims to improve outcomes for patients across the stroke pathway. The National Advisory Committee for Stroke (NACS) oversees the implementation of the SSIP and the Programme for Government aims, and has several sub-groups which focus on priority areas of work.

The SSCA Rehabilitation Sub-Group aims to:

- focus on improving the delivery of inpatient and community rehabilitation; and
- build on existing work to develop performance measures.

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Further Information

Further information and data for this publication are available from the publication page on our website (https://www.strokeaudit.scot.nhs.uk/index.html).

The next release of this publication will be June 2021.

Open data

Data from this publication are available to download from the Scottish Health and Social Care Open Data Portal.

Rate this publication

Let us know what you think about this publication via. the link at the bottom of this publication page on the PHS website.

Appendices

Appendix 1 – Background information

The SSCA monitors the quality of care provided by the hospitals in all NHS boards by collating data collected by the stroke Managed Clinical Networks (MCNs). Appropriate care is measured using the Stroke Care Bundle, which comprises four key components: admission to a stroke unit, swallow screen, brain scan and aspirin. Not all patients are eligible for all four components. These data are used by the Scottish Government to monitor progress against the Scottish Stroke Care Standards (2016) and the Scottish Stroke Improvement Plan (2014). The Stroke Care Bundle is important because achieving it is associated with a reduced risk of dying and an increased likelihood of getting back home. NHS boards are expected to identify aspects of their stroke services which do not meet the Scottish Standards and to work with their stroke MCNs to improve their standards of care locally.

Further information will be available on the day of publication with additional Tableau dashboards.

Appendix 2 – Early access details

Pre-Release Access

Under terms of the "Pre-Release Access to Official Statistics (Scotland) Order 2008", Public Health Scotland (PHS) is obliged to publish information on those receiving Pre-Release Access ("Pre-Release Access" refers to statistics in their final form prior to publication). The standard maximum Pre-Release Access is five working days. Shown below are details of those receiving standard Pre-Release Access.

Standard Pre-Release Access:

Scottish Government Health Department

NHS Board Chief Executives

NHS Board Communication leads

Early Access for Management Information

These statistics will also have been made available to those who needed access to ‘management information’, i.e. as part of the delivery of health and care:

National Advisory Committee for Stroke

Scottish Stroke Care Audit Steering Group

Stroke Managed Clinical Networks

Early Access for Quality Assurance

These statistics will also have been made available to those who needed access to help quality assure the publication.

Stroke Managed Clinical Networks and those associated with these.

Appendix 3 – PHS and Official Statistics

About Public Health Scotland (PHS)

PHS is a knowledge-based and intelligence driven organisation with a critical reliance on data and information to enable it to be an independent voice for the public's health, leading collaboratively and effectively across the Scottish public health system, accountable at local and national levels, and providing leadership and focus for achieving better health and wellbeing outcomes for the population. Our statistics comply with the Code of Practice for Statistics in terms of trustworthiness, high quality and public value. This also means that we keep data secure at all stages, through collection, processing, analysis and output production, and adhere to the 'five safes'.