

Moving the Dial of Stroke Care

The Sixth SSNAP
Annual Report

Stroke care received for patients admitted to hospital between
April 2018 to March 2019



A description of the front cover of this report

The watercolour front cover of this report was sketched whilst on an International Sketching Symposium held in Porto 2019.



Artist Mary Burke

Patient Experience: The Road to Recovery

My art recovery journey started five years previously following a subarachnoid haemorrhage whilst on a Charity bike ride in August 2012. Even though everything changed for me, my road to recovery was inspired by Albert Einstein's quote "Out of difficulties come opportunities".

Despite being unable to return to my previous role as a specialist liaison perinatal mental health nurse, I attended a specialist day centre that offered a range of physical and creative therapies. My stroke affected me physically, leaving me with poor balance, reduced coordination, poor memory, fatigue, difficulty in reading and writing. In addition, the head injury left me with continual pain and discomfort due to fractured internal facial bones.

Topographic amnesia made it difficult to find my way around while working as a community nurse. I had to retire on health grounds. Emotionally, my mood ranged from being over excited, perplexed, confused, angry and tearful. Early retirement meant I needed to refocus how I would spend my time.

Art therapy became a lifeline and gateway back to a fuller social and recreational life. I gradually progressed from a colouring book to joining art sessions and workshops. Through participating in groups I gained confidence and abilities which helped me to move onto a college art foundation diploma course. During this time I have participated and submitted my work to local exhibitions at Salford Art Gallery, Community Festivals and given presentations for The Stroke Association and UK Stroke Forum. I have also received commissions from people I have met in the course of my sketching. This year I have registered to do a part-time Masters Illustration course at Manchester Metropolitan University.

I have embraced support provided by local disability groups and carers. I hope this will be an inspiration to other Stroke Survivors starting out on their recovery journey.

Mary Burke

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Foreword

It is clear that stroke has come a long way over the last few years. Much of this is down to your tireless efforts and passionate commitment to improving outcomes, but also to the power of data in driving service improvement. This year's data shows some encouraging progress- more stroke survivors are getting brain scans within 1 hour of arrival at hospital, door-to-needle times for thrombolysis are improving, and Early Supported Discharge and life-enhancing interventions like thrombectomy are more widely available.

However, it is concerning to see rates of progress stalling in places. The first few hours after stroke are crucial, yet we're seeing a longer time period between stroke onset and arrival to hospital, and lagging numbers of stroke patients being directly admitted to a stroke unit quickly.

SSNAP's focus on improving standards of acute care has undoubtedly galvanised some of the advances we see today. Now, rehabilitation and post-acute care urgently need similar levels of commitment and attention. Only 32% of patients are benefitting from a six-month review after stroke, meaning thousands aren't having care needs identified and addressed. NHS England's current CQUIN must lead to a significant increase in six-month reviews in the coming years. We must improve the quality of data across the whole pathway, including for

community services. And we urgently need to address the increasingly pressing workforce challenges, with a greater focus on innovation, competencies and career development.

We know that improvement needs a system-wide approach with collaboration between agencies across the whole pathway. Only with integrated working and a networked delivery of services can we truly support stroke patients throughout their journey. That's why I'm so excited about stroke being a clinical priority again within England and determined that we capitalise on the opportunity of Integrated Stroke Delivery Networks to catalyse action at greater pace and scale. I look forward to seeing the National Assembly for Wales' Cross Party Group on Stroke's policy recommendations following their inquiry in Wales. And in Northern Ireland, the Department of Health's consultation into the regional reshaping of the stroke pathway must deliver tangible system change to meet the needs of stroke survivors.

I strongly hope renewed momentum behind stroke helps to raise the bar universally and deliver the transformation that thousands of stroke survivors deserve. By working together, I know that we can give people the best possible chance of surviving and rebuilding their lives after stroke.

Juliet Bouvierie, Chief Executive, Stroke Association and co-chair of the NHS England Stroke Delivery Programme Board



Introduction

A vital part of every stroke service should include continuous quality improvement at the heart of the organisation. We know that stroke management is a rapidly developing area of medicine and the core principles of stroke management require high quality acute care followed by timely expert preventative, rehabilitation, psychological and long-term social support. Stroke care is complex and sometimes even with the best care, patients may not survive or may survive disabled. By having a system of quality improvement integral to the organisation, we can ensure that as many patients as possible will receive the treatment most likely to result in having the best outcomes achievable, fewer people dying, less complications and less disability.

drugs (thrombolysis), how quickly they receive a brain scan or how much therapy is delivered in hospital and at home. Subsequent data is also collected at six months to record outcomes such as disability. By recording these data, we can begin to measure the effects of care delivered early in the patient's journey to longer term outcomes.

Purpose of this report

This is the 6th Annual SSNAP report. The report covers six years of data highlighting a variety of national trends over time, whereby patterns of stroke care have clearly improved, plateaued or even deteriorated. This will help highlight what processes need to be put into place in order to improve performance but also to celebrate examples of high-quality stroke care. Throughout the report, we have used examples of how regional and local hospital teams have used SSNAP data in quality improvement initiatives to improve services across the stroke pathway from acute care to longer term.

We have produced several data visualisations to illustrate aspects of the journey towards high-quality stroke care. The two main graphs that you will find on this report are 'Changes over time' and 'Polka dot' figures. The 'Changes over time' figures show how different aspects of stroke care have evolved in the past 6 years. In these graphs, you will see circled numbers 12 that indicate the proportions at 21 reporting periods. The dotted line running between the circles is the overarching trend when looking at the data as a whole. A shaded area shows the standard we are aiming for. On the upper part of these graphs, and written inside of squares 12, you will find the

Overview of SSNAP

The Sentinel Stroke National Audit Programme (SSNAP) is a healthcare quality improvement programme based at King's College London. SSNAP is commissioned by the Healthcare Quality Improvement Partnership (HQIP), as part of the National Clinical Audit and Patient Outcomes Programme (NCAPOP). Data from more than 85,000 patients were submitted to the audit last year, representing over 90% of all strokes in England, Wales and Northern Ireland. In total over 6 years, over half a million cases have been recorded to date.

SSNAP measures the process of care (clinical audit) referring to the interventions that a patient may be expected to receive measured against particular standards. This may include whether patients receive clot busting

corresponding percentage for each of the 6 financial years. All the numbers have been rounded to the nearest whole number. ‘Polka dot’ graphs help to illustrate the variation that exists within a given day and across the week. In these plots, blue hues ● ● ● represent periods of better performance.

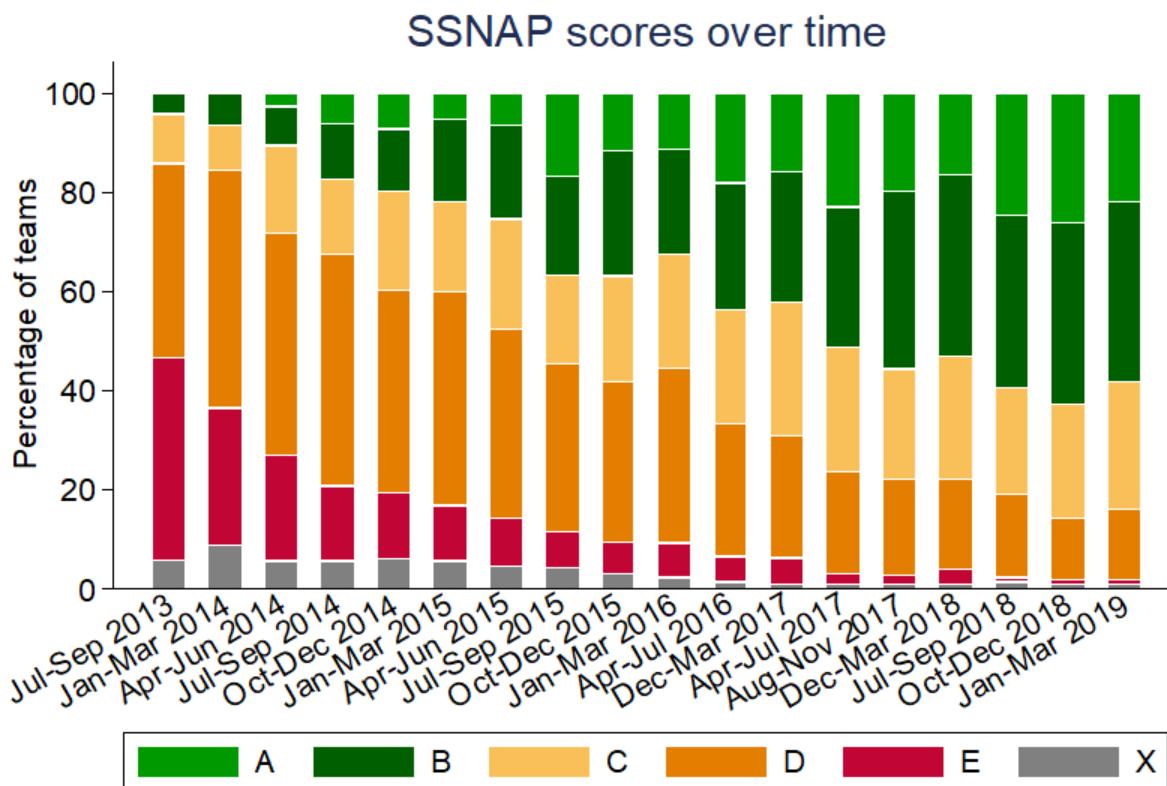
We highlight performance in a succinct, engaging way and to reinforce important messages. There are also sections covering key areas of the process of stroke care spanning acute care to life after stroke. There are also links, which will refer the reader to supplementary content relevant to each section of the report including research publications, quality improvement projects and additional SSNAP data relating to a specific topic area.

Whilst we use percentages throughout the report for ease of reading, all numbers on which these percentages are based can be found in the Annual Results Portfolio.

[https://www.strokeaudit.org/results/
Clinical-audit/National-Results.
aspx?viewmode=0](https://www.strokeaudit.org/results/Clinical-audit/National-Results.aspx?viewmode=0)

Executive Summary

Changes in SSNAP scores 2013-2019



Source: SSNAP 2019

Figure 1. This graph demonstrates continuous improvements in the quality of stroke services delivered between July 2013 and March 2019. Teams are rated A-E based on performance, X denotes teams with insufficient data.

44 key indicators have been chosen, grouped into 10 domains. Each domain is given a performance level A-E, and a total score is calculated based on the average of these 10 domains.

Teams are expected to achieve an A or B SSNAP rating. Such scores are indicative of **first class** quality of care and a good or excellent service in many aspects respectively. A SSNAP rating of a C or less would suggest that some or several areas of care require **improvement**, whilst a SSNAP rating of D or E would indicate that several areas require **significant improvement**.

Proportion of teams achieving an A rating

July – September 2013 (First Quarter): **0%**

January – March 2019 (Final Quarter): **22%**

Proportion of teams achieving an E rating

July – September 2013 (First Quarter): **43%**

January – March 2019 (Final Quarter): **1%**

Quality of stroke care

Apr 2018 - Mar 2019

Urgent Care

(% of patients)

55%

undergo a brain scan within 1 hour

58%

are directly admitted to a stroke unit within 4 hours of arrival at hospital

1200

patients received mechanical thrombectomy

Assessments & Rehabilitation

10%

percentage of applicable days on which patients received psychology

76%

of patients underwent a swallow screening assessment within 4 hours of arrival at hospital

96%

of applicable patients are assessed by a physiotherapist within 72 hours of arrival at hospital

Longer Term Care

(% of patients)

32%

have their care needs assessed six months after their stroke

39%

go to an Early Supported Discharge team after hospital

93%

receive mood and cognition screening before leaving hospital

Three Types of Trends

IMPROVING

	<u>2013</u>	<u>2019</u>	
❖ Compliance with Physiotherapy Target	53%	82%	↑ +29%
❖ Brain Imaging within 1 hour of arrival at hospital	42%	55%	↑ +13%
❖ Access to Early Supported Discharge team	25%	39%	↑ +14%
❖ Number of patients undergoing Thrombectomy (2016-2019)	602	1200	↑ +598
❖ Door to Needle time for Thrombolysis (in minutes)	59m	52m	↓ 7m faster
❖ Proportion of applicable patients receiving Six Month Assessments	20%	32%	↑ +12%

PLATEAUING

❖ Proportion of patients spending at least 90% of their stay on a Stroke Unit	83%	84%	→ +1%
❖ Proportion of patients receiving Thrombolysis	12%	12%	→ 0%
❖ Percentage of patients who are directly admitted to a Stroke Unit within 4 hours of arrival at hospital	58%	58%	→ 0%

DETERIORATING

	<u>2013</u>	<u>2019</u>	
❖ Median time between onset of symptoms and arrival at hospital (in hours and minutes)	2h25m	3h06m	↑ +41m

Outcomes after Stroke

It is important to measure what happens to patients after stroke to see how well treatments are working, and what needs to be improved.

Current Outlook

SSNAP reports on in-hospital mortality rates and they have remained consistent over the past 6 years. Owing to delays in receiving the required data it has not been possible to calculate adjusted 30 day mortality after stroke for 2017/2018 and 2018/19. SSNAP data suggests more

people are leaving hospital with moderate to severe disabilities after stroke and this is likely accounted for by increased numbers of patients being discharged with stroke specialist **Early Supported Discharge** teams (see later), where they will continue rehabilitation in the community.

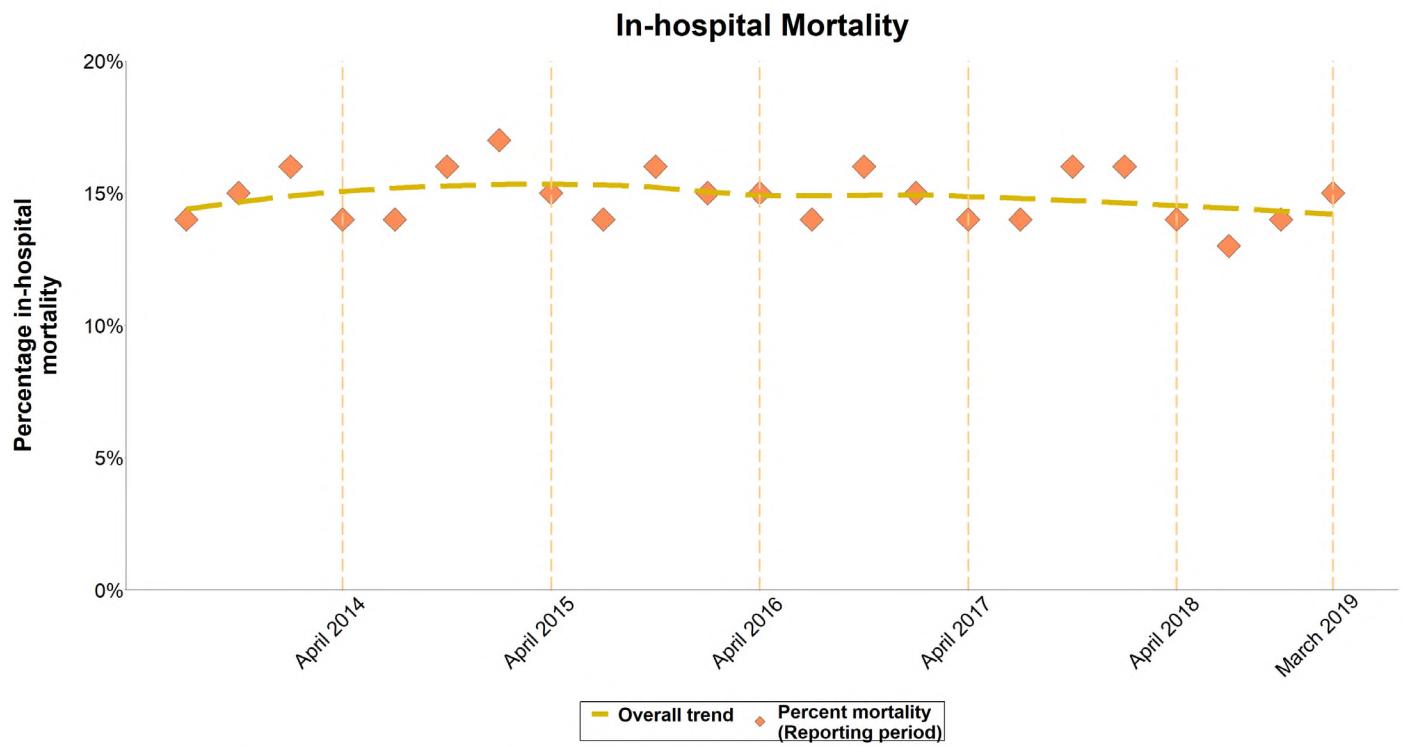
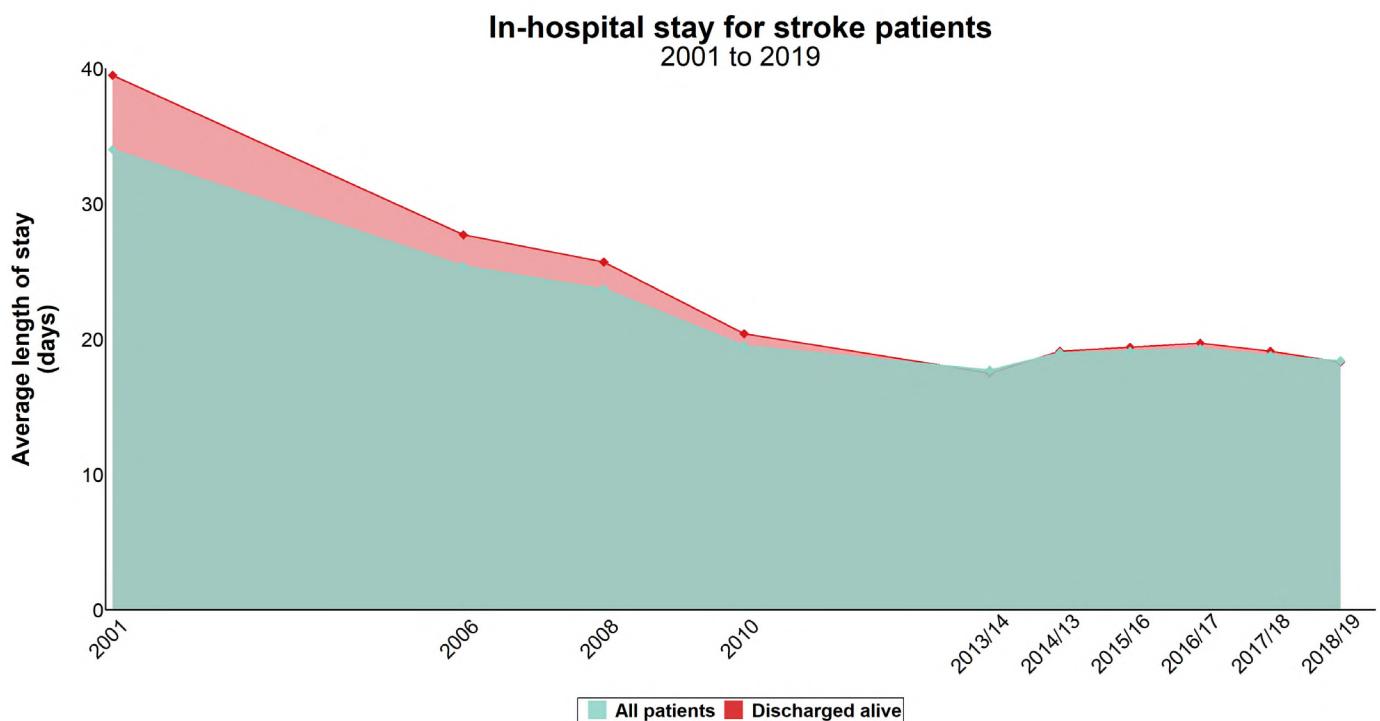


Figure 2. In-hospital Mortality.

Length of stay in hospital has reduced considerably since 2001. This is encouraging in that it makes additional stroke beds available for new patients. However, this also means that community services need to be effectively organised to ensure smooth transitions of patient care from the hospital to the community.



Source: Sentinel Stroke National Audit Programme (SSNAP)
Item Reference(for 2013 to 2019): J8.4

Figure 3. Average length of stay in hospital for stroke patients admitted to hospital 2001 to 2019.

Figure 3 demonstrates the reduction in the average number of days spent in hospital after stroke admission between 2001 and 2018/19 for all patients (green area), and for only those patients who are discharged alive (red area).

SECTION A: Getting to Hospital for Urgent Treatment

Urgent admission to hospital is vital to ensure that patients have the best possible chance of receiving **key** interventions to improve

survival and limit disability. The quicker these interventions are delivered, the **more chance** patients have of making a good recovery.

Standard

Patients with suspected acute stroke should be treated as an emergency requiring immediate transfer to a hyperacute stroke centre (2016 RCP Guidelines for Stroke).

What is happening now? For **seven out of ten** patients for whom the onset time is known, the onset to arrival times to hospital have **increased** over the 6-year period. This may be due to re-organisation of stroke services, loss of some stroke units and increasing pressure on ambulance services. However, what has been shown is that when

stroke care is centralised in larger units then the patients tend to be treated **more quickly and effectively** so what is lost in travel time can be more than made up by better process after arrival. Additional information will be available on pre-hospital timings with the reporting of linked ambulance data from 11 Ambulance Trusts in England.

Median time between onset of symptoms and arrival at hospital



2013/14: 2 hours 25 min



2018/19: 3 hours 06 min

Further Reading:

- 1) Ambulance data linkage project website: <https://ssnap.zendesk.com/hc/en-us/articles/360002656377-Ambulance-linkage-information-sheet>
- 2) Northumbria centralisation Future Healthc J. 2018 Oct;5(3):181-187. doi: 10.7861/future-hosp.5-3-181.The impact of acute stroke service centralisation: a time series evaluation. Elameer M1, Price C1, Flynn D2, Rodgers H1.

SECTION B: Urgent Scanning

Brain imaging is required to confirm the diagnosis of stroke relevant to the clinical presentation as well as ensuring there is no other medical cause for the patient's symptoms. The value of **urgent** CT brain imaging can

Over **95%** of CT brain imaging is undertaken within 12 hours of arrival at hospital and there has been a **continued improvement** of CT imaging within one hour of arrival at hospital over 6 years (41% to **55%**).

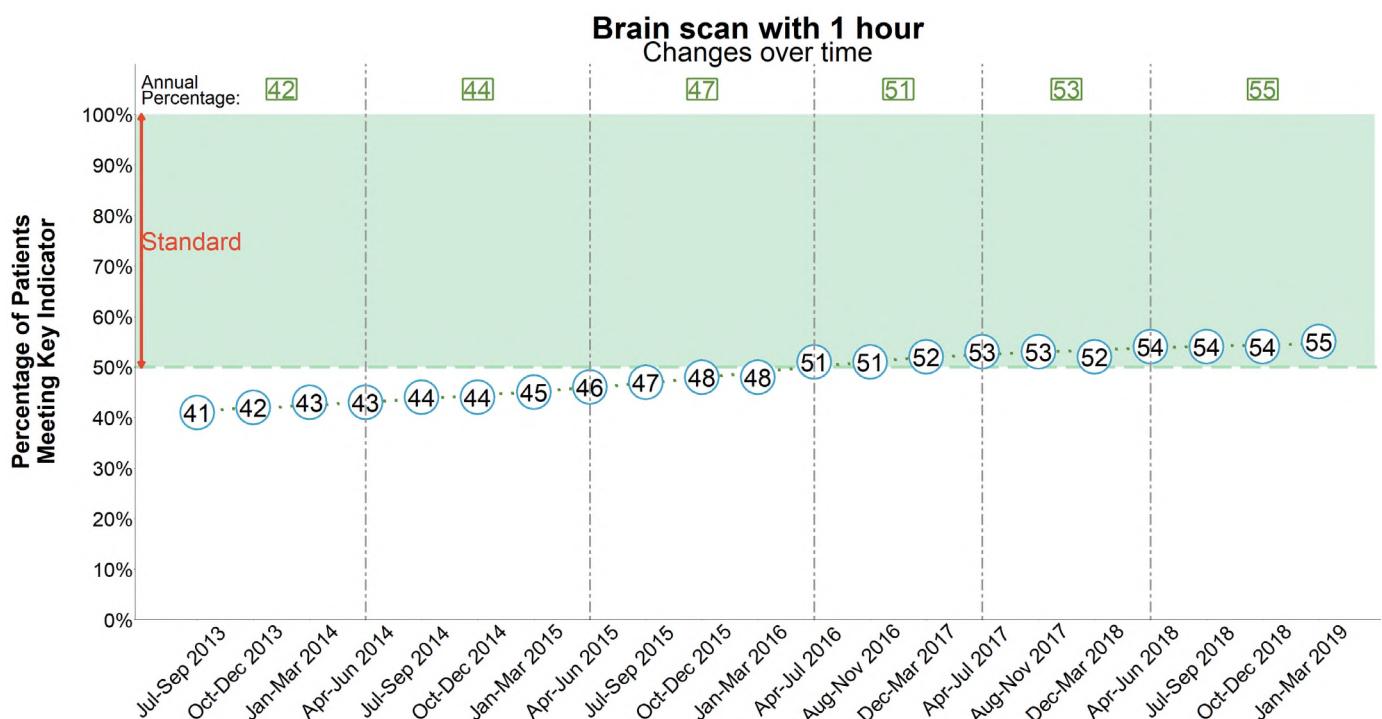
help to direct treatments such as thrombolysis (treatment with a clot busting drug) and thrombectomy (intervention for clot retrieval) for ischaemic stroke as well as blood pressure lowering and surgery for haemorrhagic stroke.

There are opportunities to improve access to brain imaging whatever the time or the day of the week patients present to hospital by organising specialist stroke services more **efficiently** with embedded protocols.

More than half CT brain imaging performed within one hour of arrival

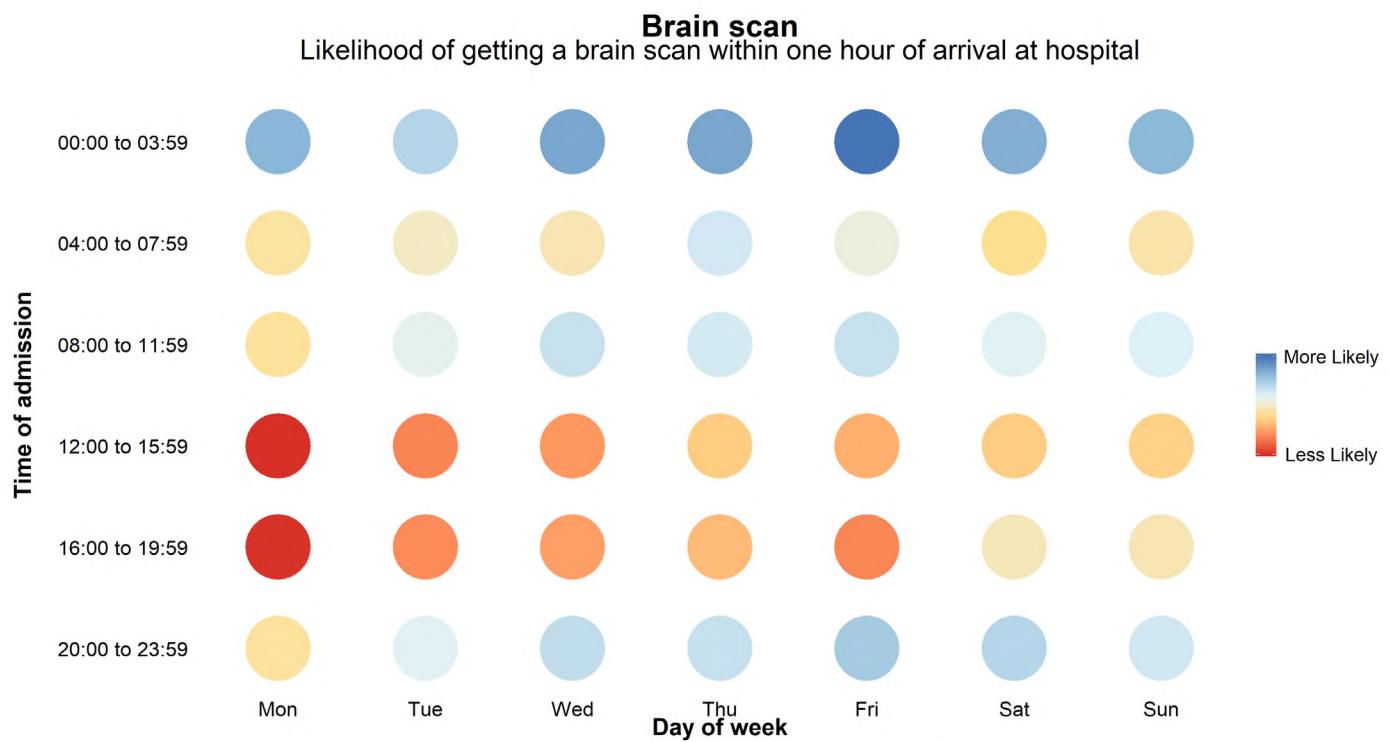
Standard

Patients with suspected acute stroke should receive brain imaging urgently and at most within one hour of arrival at hospital (2016 RCP Guidelines for Stroke).



Source: Sentinel Stroke National Audit Programme (SSNAP) July 2013 to March 2019 National Results
Item reference: G6.9

Figure 4. Percentage of patients scanned within one hour of arrival at hospital between 2013 and 2019.



Source: Sentinel Stroke National Audit Programme (SSNAP) July 2013 to March 2019 National Results

Figure 5. Daily and hourly variation in the likelihood of getting a brain scan within one hour of arrival at hospital.

| From noon to the early evening hours, patients are **less likely** to have a brain scan within an hour of admission.

Further Reading:

- 1) <https://www.strokeaudit.org/Annual-Report/2017/Full-Guideline/AcuteCare.aspx>

SECTION C: Stroke Unit Care

Stroke unit care is still the most effective intervention for stroke patients. **Direct admission** to a stroke unit is one of the key priorities to enable delivery of effective

multidisciplinary specialist assessments and treatments. The optimal standard for direct admission to a specialist stroke unit is within **4** hours of arrival at hospital.

Standard

People with stroke should be treated on a specialist stroke unit throughout their hospital stay unless their stroke is not the predominant clinical problem (2016 RCP Guidelines for Stroke).

What is happening now? The percentage of patients admitted to a stroke unit within 4 hours has not improved over time. This means that a **significant** proportion of patients will **not** be receiving all the relevant assessments and treatments in a timely fashion.

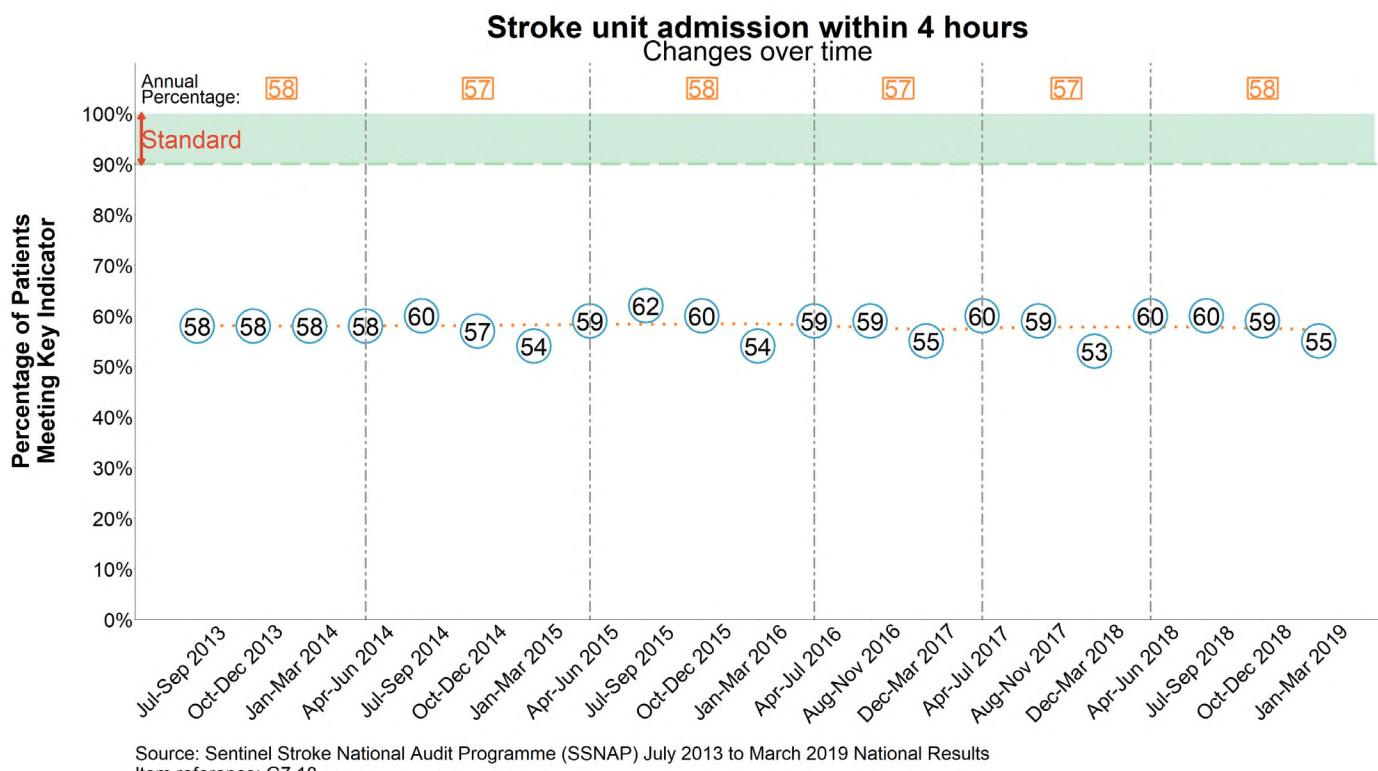


Figure 6. Percentage of patients admitted to a stroke unit within four hours of arrival at hospital between 2013 and 2019.

58% patients admitted within 4 hours **both in 2013/14 and 2018/19.**

Despite seasonal variation in the percentage of patients meeting this measure, the overall trend has remained unchanged across the years.

The vast majority of patients are managed on a stroke unit during their hospital admission. 13% of patients are admitted directly to a general medical ward or another ward such as a medical assessment unit rather than a stroke unit.

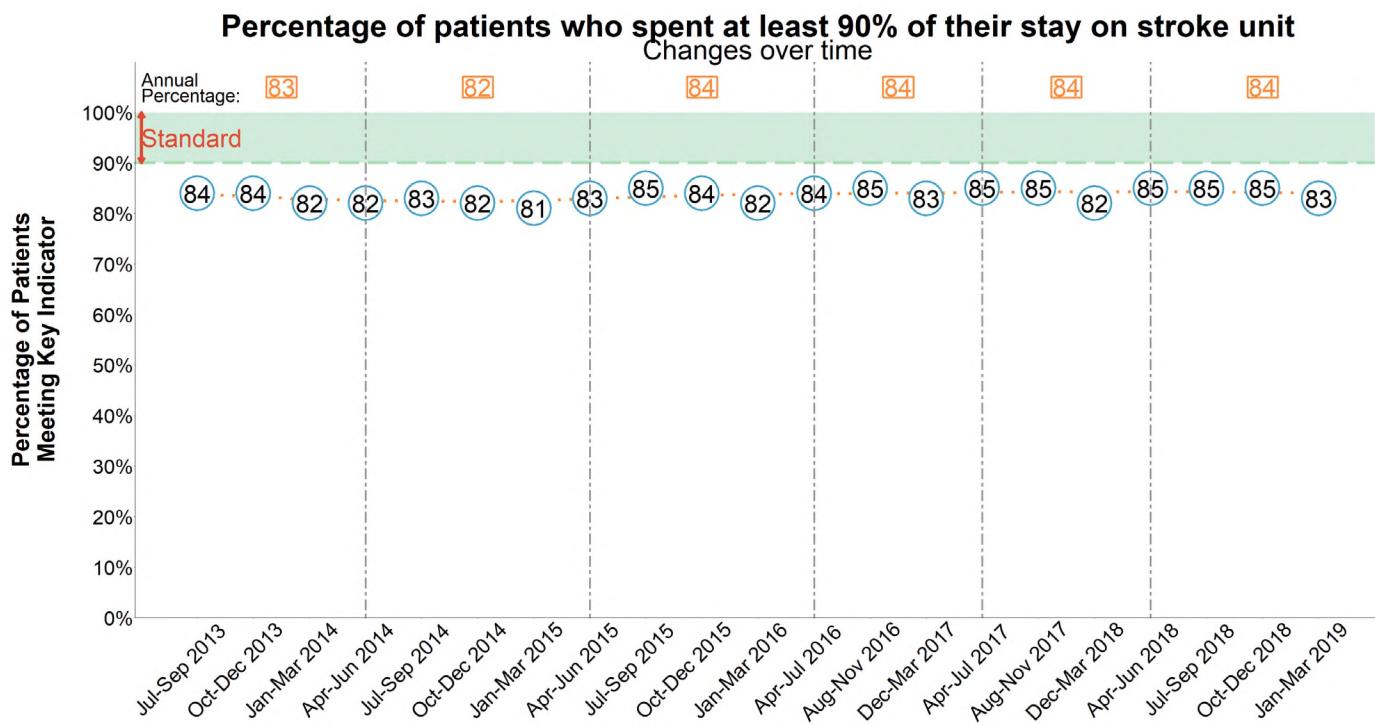


Figure 7. Percentage of patients who spent at least 90% of their stay on a stroke unit between 2013 and 2019.

**1%
change**

The percentage of patients spending 90% of their length of stay on a stroke unit has plateaued between 2013 (83%) and 2019 (84%).

Future Outlook: The NHS Long Term Plan is committed in ensuring that all of stroke patients are admitted and are managed in the most appropriate ward, which is a stroke unit for the vast majority. Organising an efficient stroke service across every region to ensure that patients have access to this evidence-based care is a key priority.

SECTION D: Thrombolysis

Thrombolysis (treatment with a clot busting drug) is a crucial intervention administered to stroke patients, which can dissolve and disperse a clot that is preventing adequate blood flow to the brain. **The quicker the treatment is delivered the more likely it is to be effective.**

The time taken from the onset of symptoms to the time of treatment (onset to needle time) and the time taken from arrival to hospital to the time of treatment (DTN - door to needle time) are both being monitored by SSNAP and influence patient outcomes after stroke.

Standard

Patients with acute ischaemic stroke, in whom treatment can be started within 4.5 hours of known onset should be considered for treatment with alteplase (thrombolysis). (2016 RCP Guidelines for Stroke and NICE Stroke Guidelines 2019).

What is happening now? The proportion of patients receiving thrombolysis has remained fairly constant at 12% across 6 years.

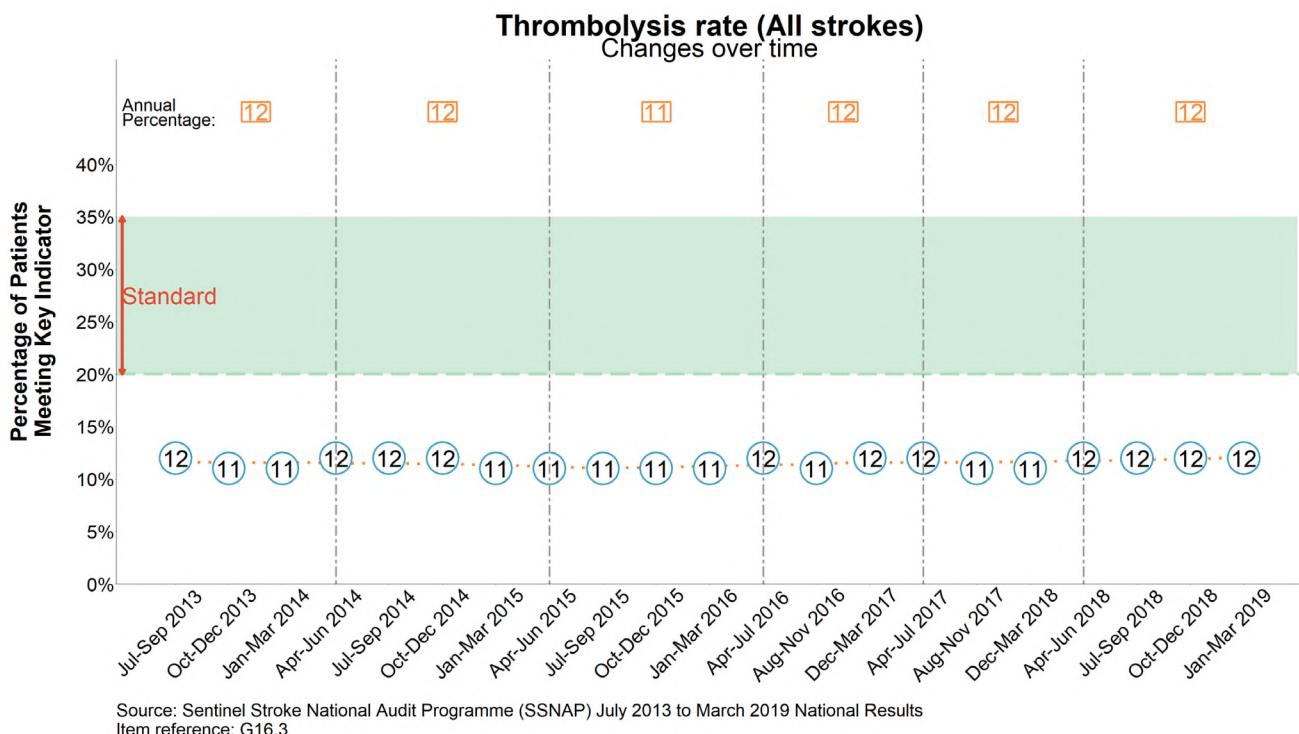


Figure 8. Percentage of patients who received Thrombolysis between 2013 and 2019.

Door to Needle times

2013/14

2018/19

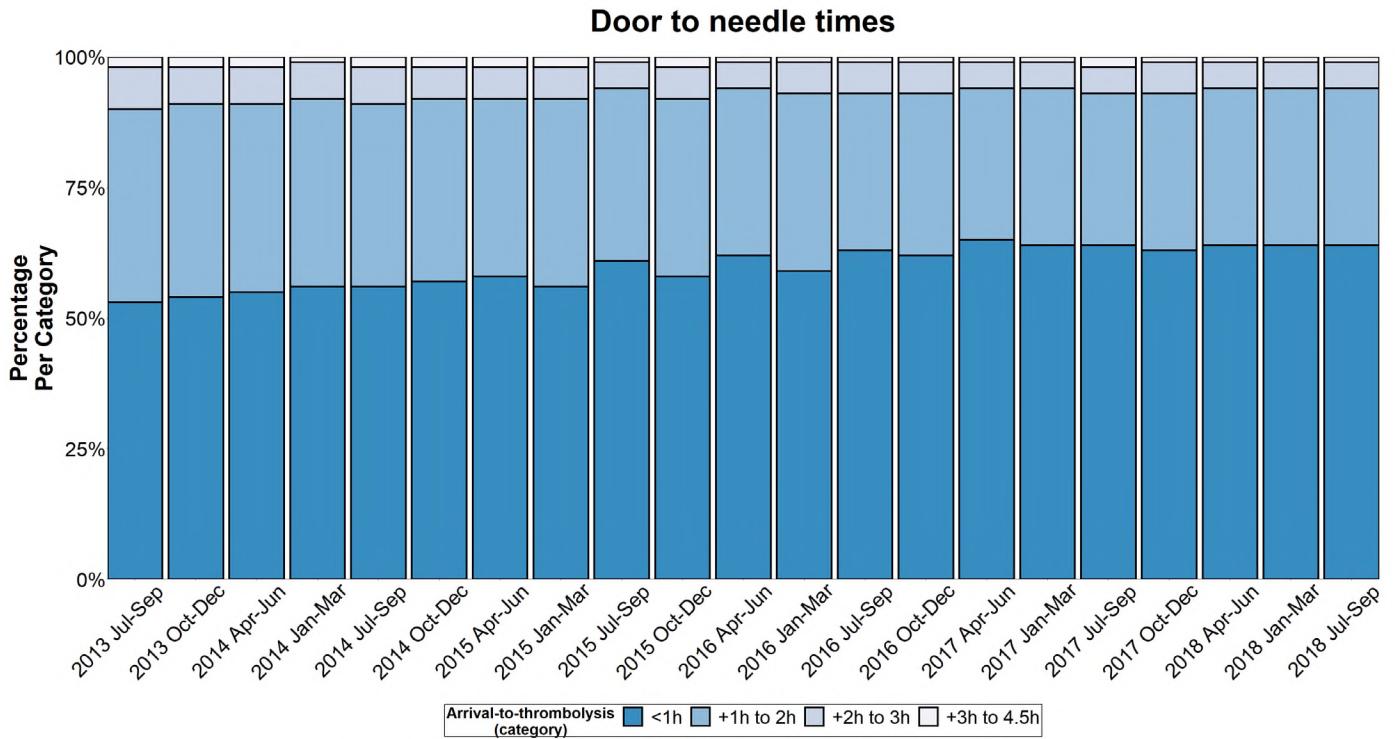


59min



52min

Door to needle times **have improved** over years, but it can improve further by making incremental changes within the **emergency stroke** hospital pathway.



Source: Sentinel Stroke National Audit Programme (SSNAP) July 2013 to March 2019 National Results

Figure 9. Door to needle times between 2013 and 2019.

Figure 9 illustrates the improvement in the number of patients receiving thrombolysis with door to needle times of less than one hour from 2013 to 2019.

Future Outlook: Improving the percentage of patients undergoing thrombolysis up to 20% is the target in the NHS Long Term Plan. By the creation of **stroke networks**, services could be reconfigured to ensure that all patients can receive this evidence based treatment in a timely fashion, wherever they live or at any time of the day of the week.

Further Reading:

- 1) Thrombolysis/ Thrombectomy Breakdown. Sentinel Stroke National Audit Programme (2013 - 2019). Available on <https://www.strokeaudit.org/Quality-Improvement/What-resources-can-I-use/SSNAP-Reports.aspx>
- 2) Thrombolysis tool. Sentinel Stroke National Audit Programme (2013 - 2019). Available on <https://www.strokeaudit.org/Quality-Improvement/What-resources-can-I-use/SSNAP-Tools.aspx>
- 3) Is intravenous thrombolysis getting any faster in the UK? McAulay A, McCurran V, Dunn G, Muruet W, Hoffman A, Wolfe, C, James M, Rudd, A; SSNAP Collaboration. Presented on the 5th European Stroke Organisation Conference; 2019 May 22 – 24; Milan, Italy, Eur Stroke J. Abstract nr AS05-025.
- 4) Bigger, faster? Associations between hospital thrombolysis volume and speed of thrombolysis administration in acute ischemic stroke. Bray BD1, Campbell J, Cloud GC, Hoffman A, Tyrrell PJ, Wolfe CD, Rudd AG; Intercollegiate Stroke Working Party Group. Stroke. 2013 Nov;44(11):3129-35. doi: 10.1161/STROKEAHA.113.001981. Epub 2013 Sep 19.
- 5) Stroke and transient ischaemic attack in over 16s: diagnosis and initial management. NICE guideline [NG128]. <https://www.nice.org.uk/guidance/ng128/resources/stroke-and-transient-ischaemic-attack-in-over-16s-diagnosis-and-initial-management-pdf-66141665603269>

Case Study: Maintaining fast thrombolysis door to needle times at Northwick Park Hospital

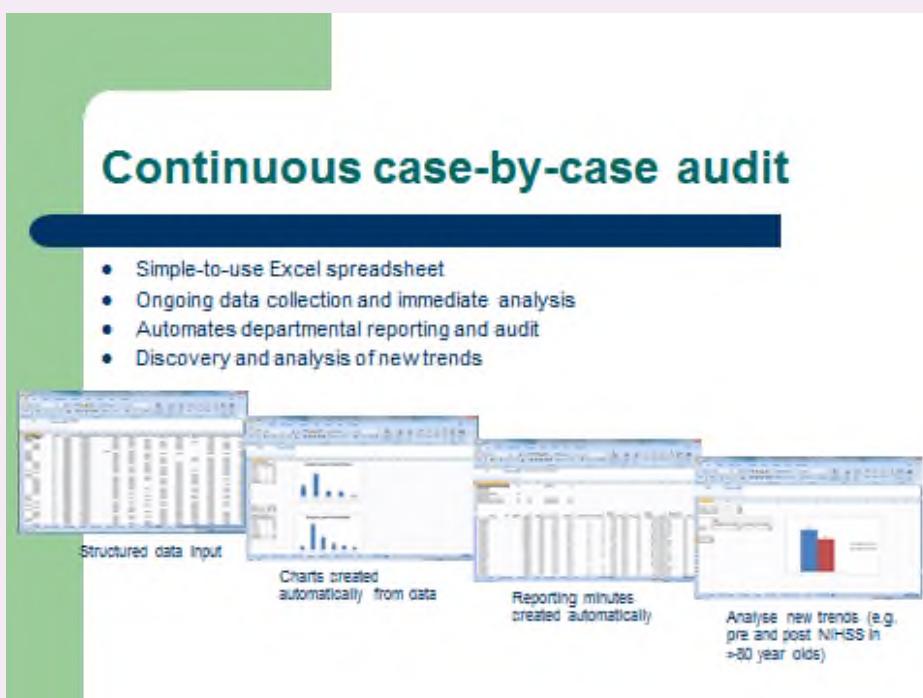
Clinical Challenge:

To ensure thrombolysis door to needle times are as low as possible and to maintain these times consistently to maximise clinical efficacy, while ensuring that safety is not compromised.

Solution:

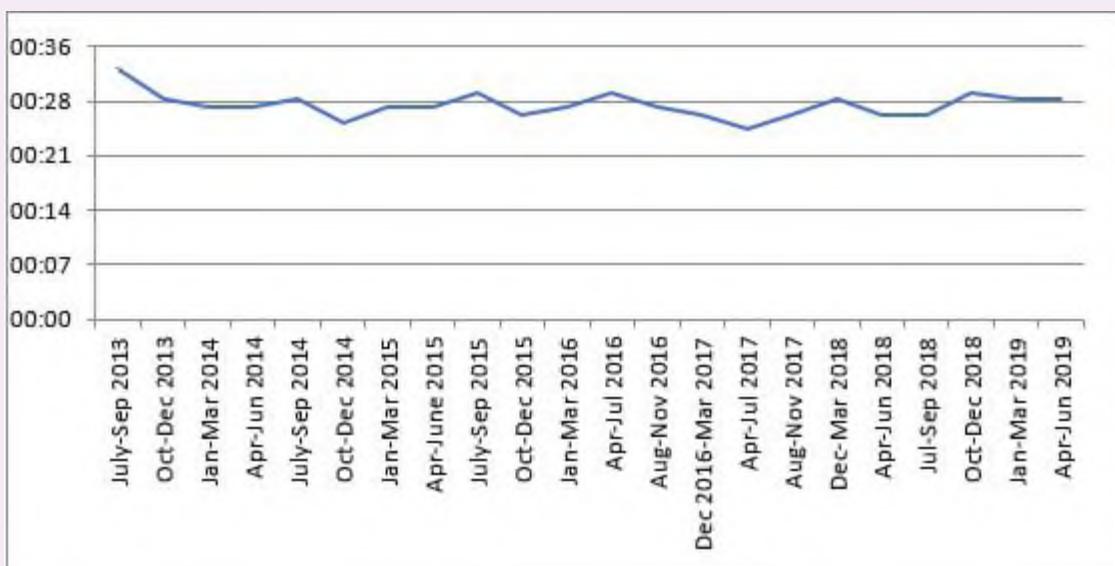
QI methods used for the project:

- Introduction in 2011 of an on-going audit looking at thrombolysis door-to-needle times.
- The process was broken down into its constituent parts:
 - Patient arrival time.
 - Time stroke nurse arrives.
 - Time of call to stroke doctor.
 - Time doctor arrives.
 - Time CT scan requested.
 - Time CT scan done.
 - Time CT scan reported.
 - Time of thrombolysis.
- Identification of “bottle necks” in the process.
- Every case analysed in a monthly audit meeting to address any delays and reflect on good practice.
- Any delay fed-back to individuals and all staff involved continually trained, including A&E staff and radiology registrars.
- Introduction of an Excel spreadsheet to continuously analyse steps in the process.
- Analysis of any complications to thrombolysis.



Impact:

DTNs were low, but improved further and have been consistent.



Median thrombolysis door-to-needle times in minutes for Northwick Park Hospital (SSNAP data).

Reflection:

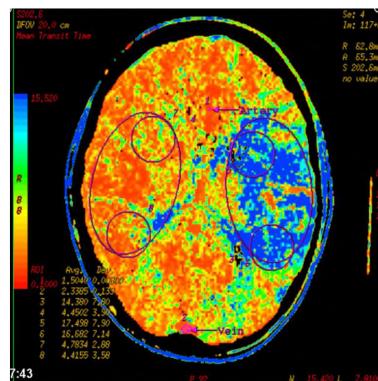
- The project was simple and effective, but labour-intensive and continual.
- Similar granular analysis of the process for patients referred for thrombectomy to be carried out to monitor and improve these times.

This case study was submitted by Dr Joe Devine FRCP, Consultant Stroke Physician; Christina Connolly, Stroke Unit Clinical Manager; and Sheena Patel, Data Analyst Manager at Northwick Park Hospital, Harrow.

SECTION E: Thrombectomy

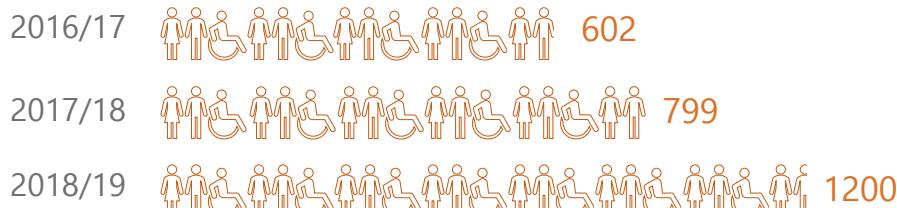
Thrombectomy (intervention for clot retrieval) has been a major development in acute stroke care in the last 4 years. It involves direct removal of clot in a blocked artery in the brain using a mechanical

device passed along with a guide wire. Once the clot has been removed this can restore blood flow to the brain if undertaken within a few hours, resulting in improved outcome in carefully selected patients.



Thrombectomy patient undergoing brain imaging to identify the blocked vessel: CT Perfusion (left) to identify if there is brain tissue salvageable; and CT Angiogram (right).

What is happening now? Thrombectomy is being delivered by 25 Neuroscience Centres with a median of 37 interventions per centre in 2018/19. Only two centres provide 24/7 coverage.



Number of patients who received intra-arterial interventions

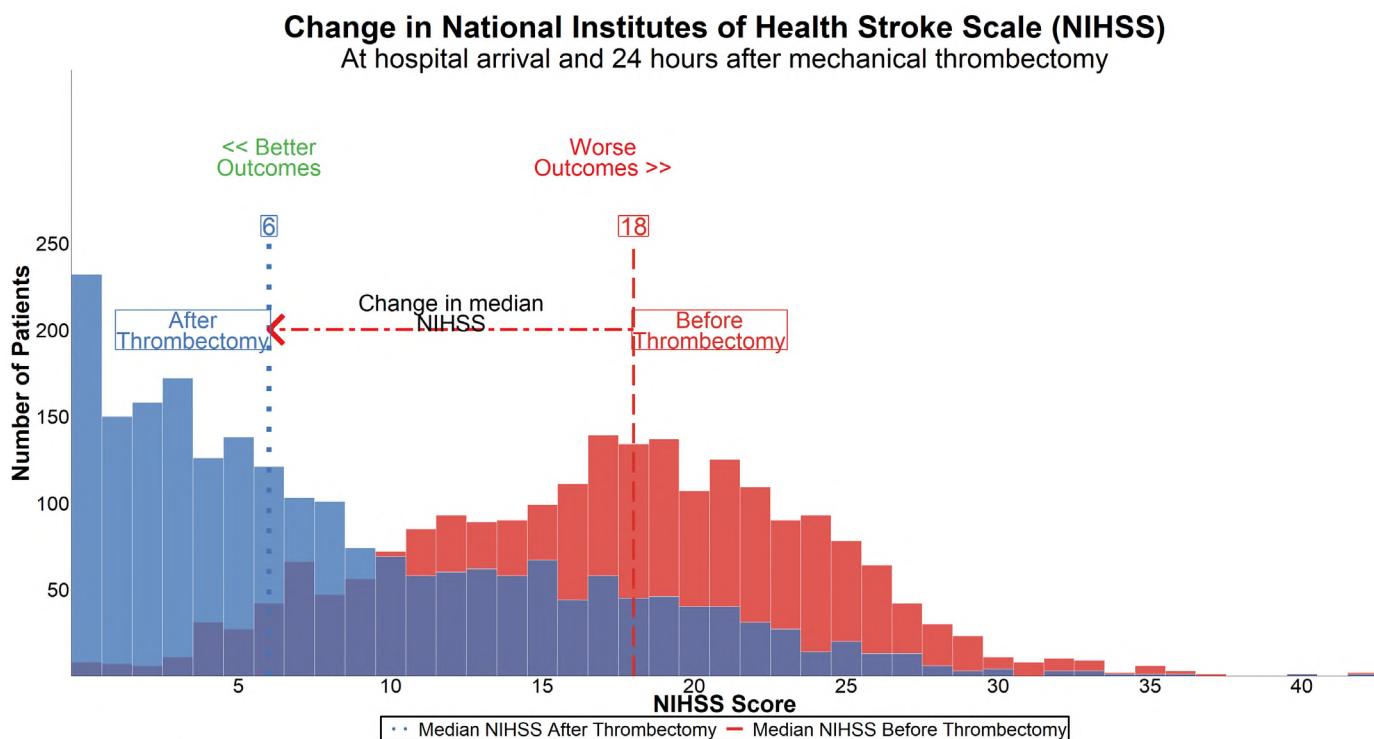
Although it has been increasing over 3 years, the number of interventions delivered only equates to **1.4%** of people with acute stroke. The aim is **10%** by 2022.

Number of thrombectomy procedures performed each year			
Region	2016/17	2017/18	2018/19
England			
East Midlands	4	15	53
East of England	32	33	64
Greater Manchester and Eastern Cheshire	4	40	32
London	180	247	373
North of England	27	38	24
North West Coast	36	35	82
South East	16	31	23
South West	74	95	144
Thames Valley	6	20	39
Wessex	16	29	54
West Midlands	87	98	117
Yorkshire and The Humber	29	42	66
Wales			
Wales	21	8	9
Northern Ireland			
Northern Ireland	70	68	120
Total	602	799	1200

Table 1. Regional variation in levels of thrombectomy provision in England, Wales and Northern Ireland between 2016 and 2019.

Standard

Offer thrombectomy as soon as possible and within 6 hours of symptom onset, together with thrombolysis if applicable (2016 RCP Guidelines for Stroke and NICE Stroke Guidelines 2019).



Source: Sentinel Stroke National Audit Programme (SSNAP) April 2016 to March 2019 National Results

Figure 10. Change in condition of patients after mechanical thrombectomy between 2016 and 2019. Patients with lower NIHSS scores have better outcomes.

Figure 10 illustrates that the majority of patients show signs of improvement after mechanical thrombectomy. This is real world evidence that echoes what has been shown in published research.

Future Outlook: Facilities for thrombectomy are not universally available across the country. There is a need to determine how many **specialist centres** will be required to ensure maximum geographical provision. There is also a shortage of trained **specialist staff** to deliver intervention. Currently this is undertaken by trained neuro-interventional radiologists (INR) with expert skills. However, currently there are only 87 INRs to ensure a 24/7 national coverage. Therefore, there are plans to **expand** the number of people who can deliver thrombectomy, like offering intensive training programmes for other specialists.

Further Reading:

- 1) How does real world thrombectomy data in England, Wales and Northern Ireland compare to RCTs? McCurran et al, 2017
<https://www.strokeaudit.org/SupportFiles/Documents/Research/Thrombectomy-real-world-data-compared-to-RCT.aspx>
- 2) Stroke and transient ischaemic attack in over 16s: diagnosis and initial management. NICE guideline [NG128]. <https://www.nice.org.uk/guidance/ng128/resources/stroke-and-transient-ischaemic-attack-in-over-16s-diagnosis-and-initial-management-pdf-66141665603269>

SECTION F: Improving Care for Haemorrhagic Stroke Patients

Most strokes are caused by a blood clot blocking blood flow to the brain. These are known as ischaemic strokes. 11% of strokes are caused by bleeding within the brain itself due to rupture of a blood vessel (**Intracerebral Haemorrhage: ICH**). For many years, ICH was viewed as a type of stroke for which there was no treatment, with death rates being higher than ischaemic stroke. SSNAP data confirms that the changes in survival after ICH are **lower** than after an ischaemic stroke.

However, there has been a welcome increase in stroke research in the last 5 years highlighting a more active approach in managing ICH resulting

in a culture change in acute management. There have been advances in lowering blood pressure acutely, reversing anticoagulants (blood thinners) which may be related to bleeding in the brain and examining the safety of restarting blood thinners such as aspirin after ICH. In 2018 SSNAP began collecting some of these additional data items for ICH stroke in order to measure how clinical teams are implementing these research findings.

The **challenge** now is to translate these evidence-based findings into routine clinical practice and to alter the cultural shift that ICH is type of stroke that can be actively treated.

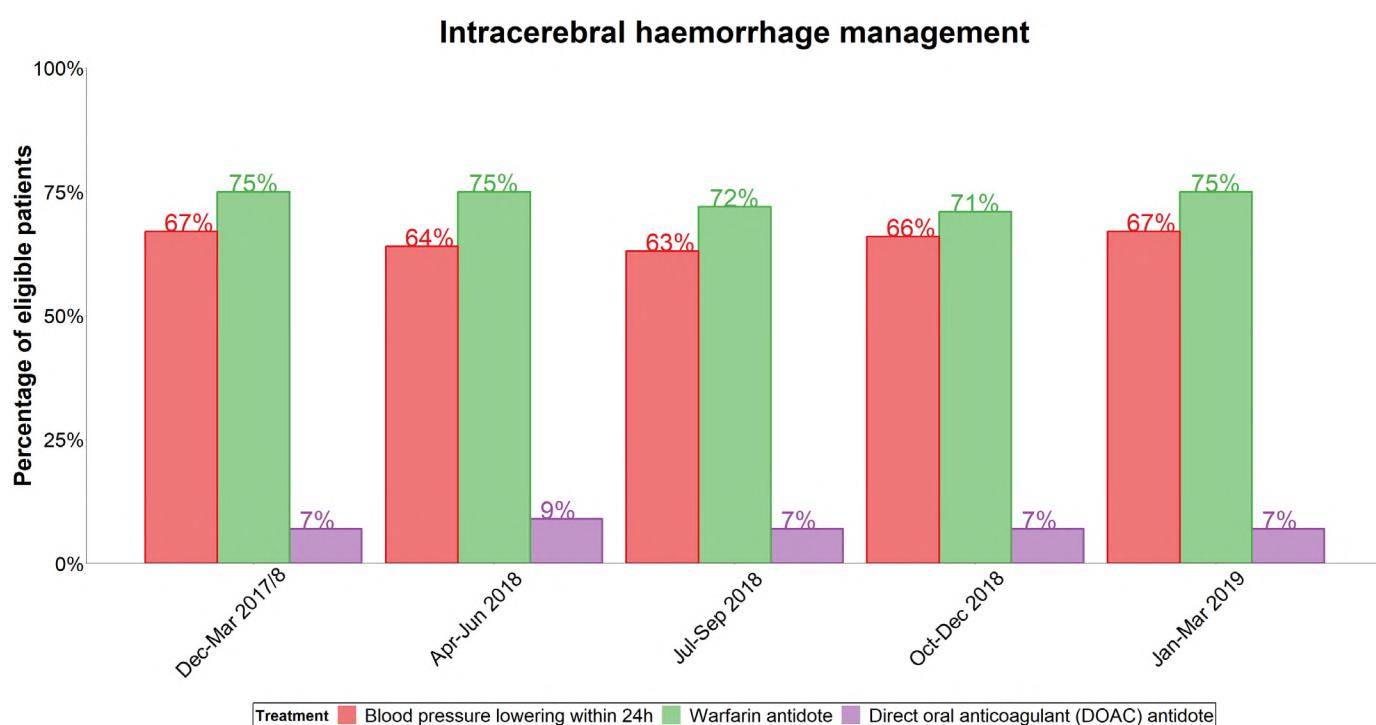


Figure 11. Initial trends observed in ICH management between 2017 and 2019.

Further Reading:

- 1) Putting evidence into practice - Developing a bundle of care to measure impact of ICH intervention. Sentinel Stroke National Audit Programme (2019). Available on <https://www.strokeaudit.org/Quality-Improvement/Case-Studies/Acute-Care-Case-Studies/Putting-evidence-into-practice-Developing-a-bundle.aspx>
- 2) An Intracerebral Haemorrhage Care Bundle Is Associated with Lower Case Fatality. Parry-Jones AR, Sammut-Powell C, Paroutoglou K, Birleson E, Rowland J, Lee S, Cecchini L, Massyn M, Emsley R, Bray B, Patel H. Ann Neurol. 2019 Oct;86(4):495-503. doi: 10.1002/ana.25546. Epub 2019 Aug 16.

SECTION G: Treatment for Irregular Heartbeats

Atrial fibrillation (AF) is a heart condition that causes an irregular heartbeat which can increase the risk of stroke. About 20% of strokes are associated with AF and this risk can be

reduced by two thirds through anticoagulation (blood thinners). Anticoagulation helps to prevent clots by interrupting the process involved in their formation.

Standard

For patients with ischaemic stroke and atrial fibrillation, anticoagulation should be the standard treatment. (RCP Guidelines Stroke 2016).

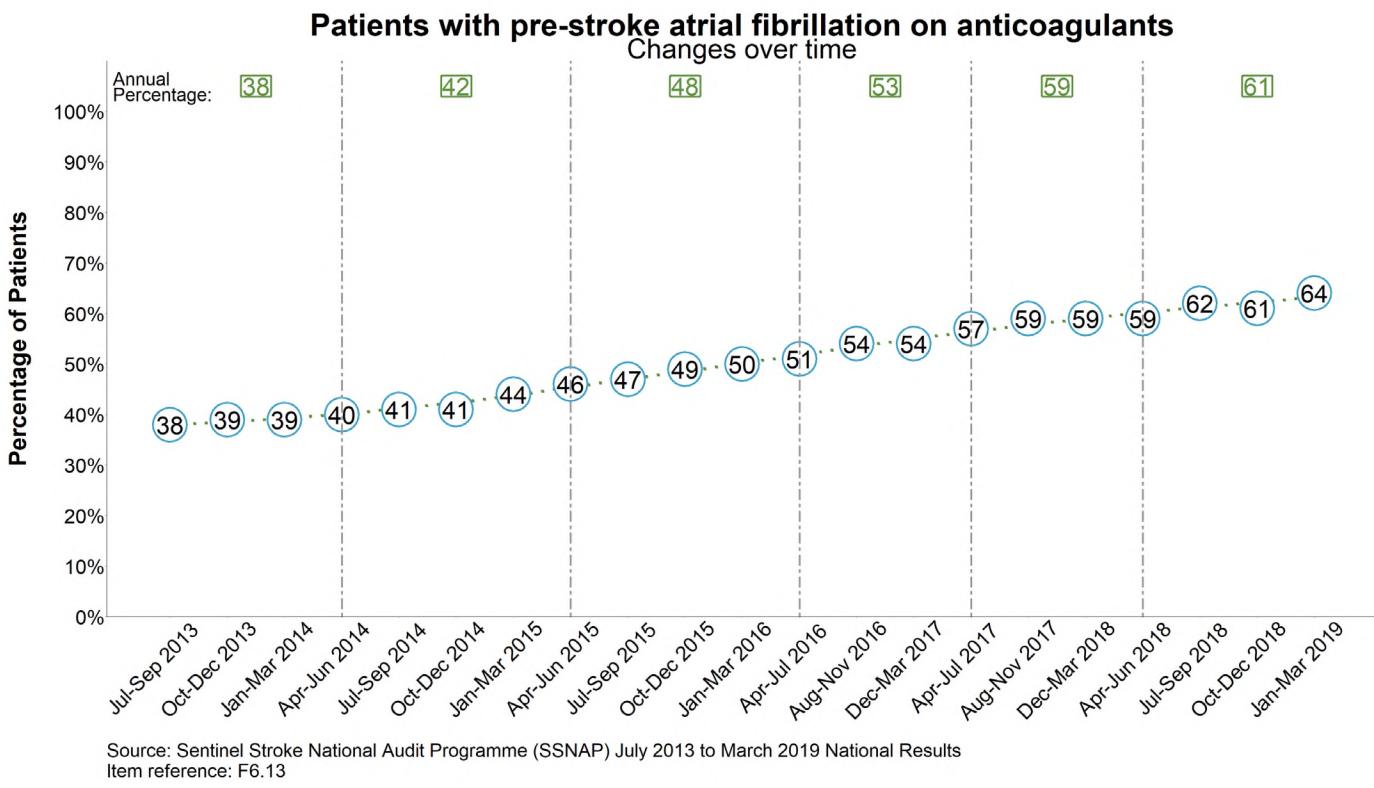
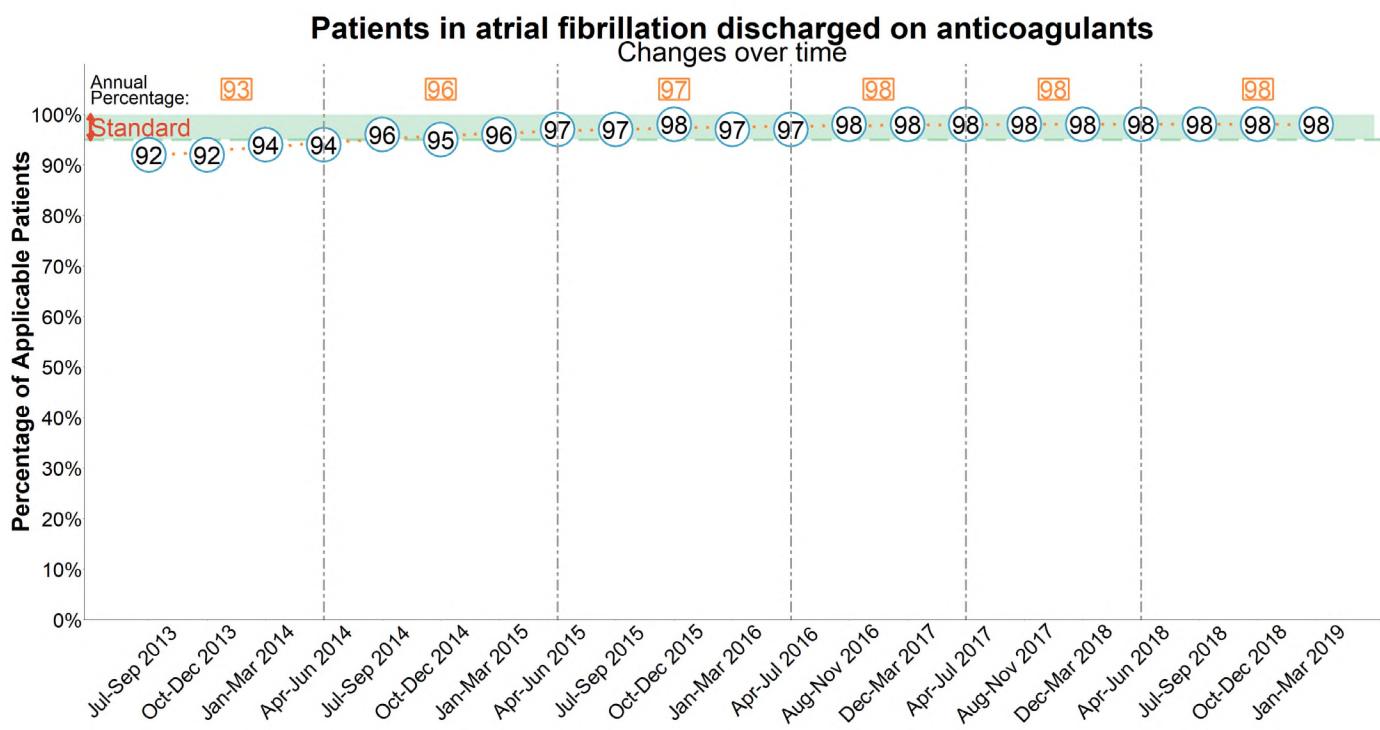


Figure 12. Percentage of patients with irregular heartbeats (Atrial Fibrillation) receiving anticoagulants before their stroke between 2013 and 2019.

38% → 61%
2013/14 2018/19
+23%

Even though the percentage of patients in AF prior to stroke who were on anticoagulants has improved, there remains a significant proportion of patients who need to receive adequate treatment.

What is happening now? Approximately 20% of patients have been reported as being in AF at discharge from hospital, which has been consistent across 6 years. The percentage of patients being prescribed anticoagulation has reassuringly improved over the 6 year period. The challenge to the health service now is to help identify as many patients as possible with AF through screening methods to help reduce the risk of subsequent stroke.



Source: Sentinel Stroke National Audit Programme (SSNAP) July 2013 to March 2019 National Results
Item Reference: J32.16

Figure 13. Percentage of patients with irregular heartbeats (Atrial Fibrillation) receiving anticoagulants at the time of their discharge from hospital between 2013 and 2019.

93% ➔ 98%
2013/14 2018/19

Percentage of patients in AF who are prescribed anticoagulants on discharge after stroke.

Case Study: Improving the identification of patients in atrial fibrillation at Lambeth and Southwark CCGs

Clinical challenge:

To reduce the incidence of AF-related stroke in Lambeth and Southwark CCGs through improved rates of anticoagulation for AF in general practice.

Solution:

- To utilise local pharmacists to undertake in-practice reviews of patients on the AF register who are not currently prescribed anticoagulants.
- To assess stroke and bleeding risk and, where appropriate ensure patients are prescribed anticoagulant therapy.
- 2 specialist anticoagulation pharmacists were commissioned to deliver 1 virtual clinic per practice alongside a GP, to review all patients identified as being on the AF register and not currently anticoagulated.
- Any patients identified at the virtual clinic were contacted by the GP practice and referred into local services for assessment and initiation of anticoagulation.

Impact:

Across 91 GP practices, 1574 patients with AF not receiving anticoagulation were reviewed in virtual clinics across Lambeth and Southwark over a 12-month period.

- 1292 additional patients anticoagulated

Using SSNAP data to look at the number of strokes in people with known AF across Lambeth and Southwark CCGs, it was possible to see a 22.5% reduction between 2013/14 – 2017/18, compared to 11.2% nationally over the same period.

Reflection:

- An updated and educated primary care workforce – myths and misconceptions addressed.
- Strengthened relationships between specialist anticoagulation services and primary care.
- Redesign of anticoagulant referral form across all three tertiary centres to ensure all necessary info on referral.
- Supported DOAC (direct oral anticoagulants) initiation in primary care for housebound and nursing home patients.
- In-depth data on untreated population to guide further service developments.
- The challenge is to sustain these changes.

This case study was submitted by Helen Williams, Clinical Director for AF; and Alex Lang, Project Manager at Health Innovation Network, South London.

SECTION H: Multidisciplinary Team Working

Standard

All stroke services should incorporate a coordinated multidisciplinary team, which meets regularly for exchange of information about in-patients with stroke. (2016 RCP Guidelines for Stroke).

Screening and assessments: There have been improvements in multidisciplinary care (team working of professionals specialising in stroke) over the last 6 years, which highlights excellent examples of team working with some evidence that this is happening both on **weekdays** and at **weekends**.

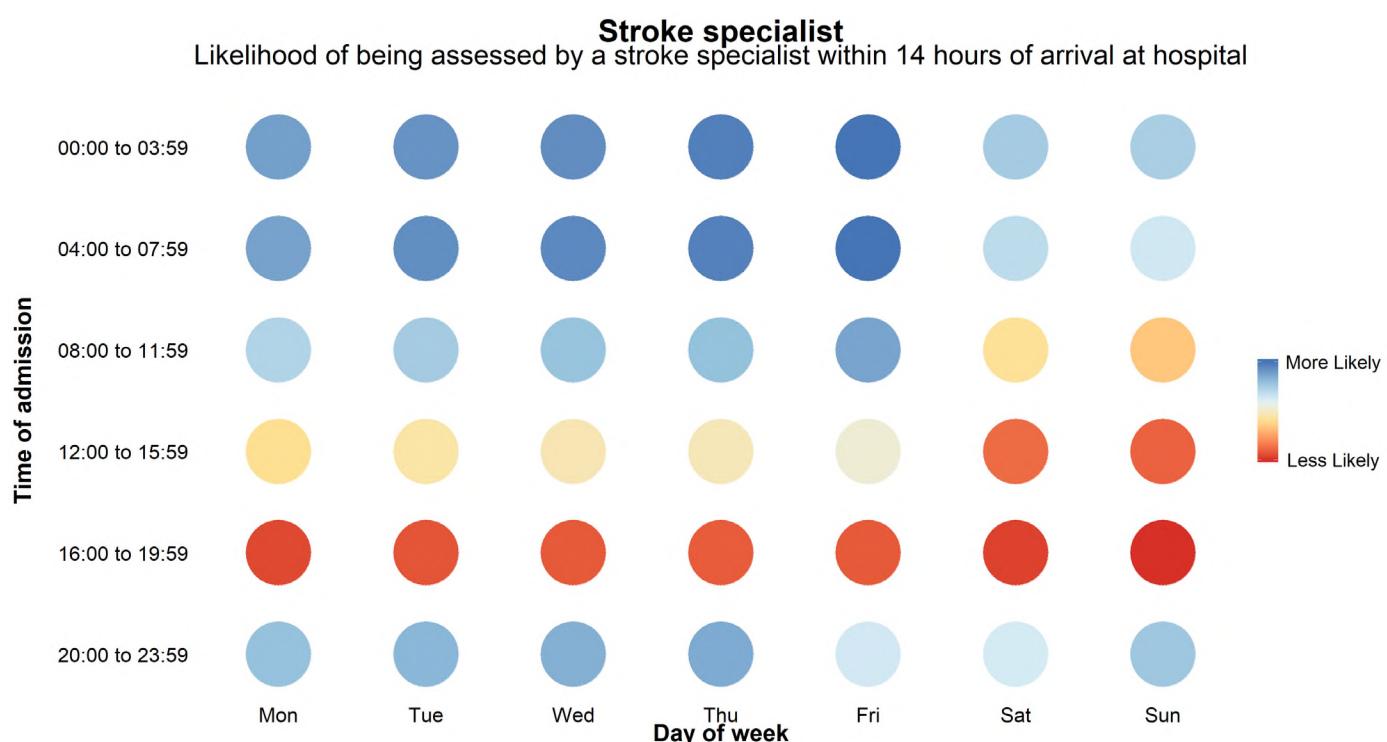


Figure 14. Daily and hourly variation in the likelihood of being assessed by a stroke specialist within 14 hours of arrival at hospital.

Figure 14 provides a breakdown of the likelihood of whether patients are reviewed by a stroke specialist physician within 14 hours according to the time and day of admission. Patients are least likely to be seen by stroke specialist within 14 hours of admission if they are admitted to hospital between 4pm and 8pm throughout the week.

Swallowing Screening: Through the SSNAP Collaboration, it is evident that **early** swallowing screening reduces the risk of stroke associated pneumonia which is one of the **leading causes** of death on stroke units. Currently, under **a quarter** of patients are still not being provided an urgent swallow assessment within 4 hours.

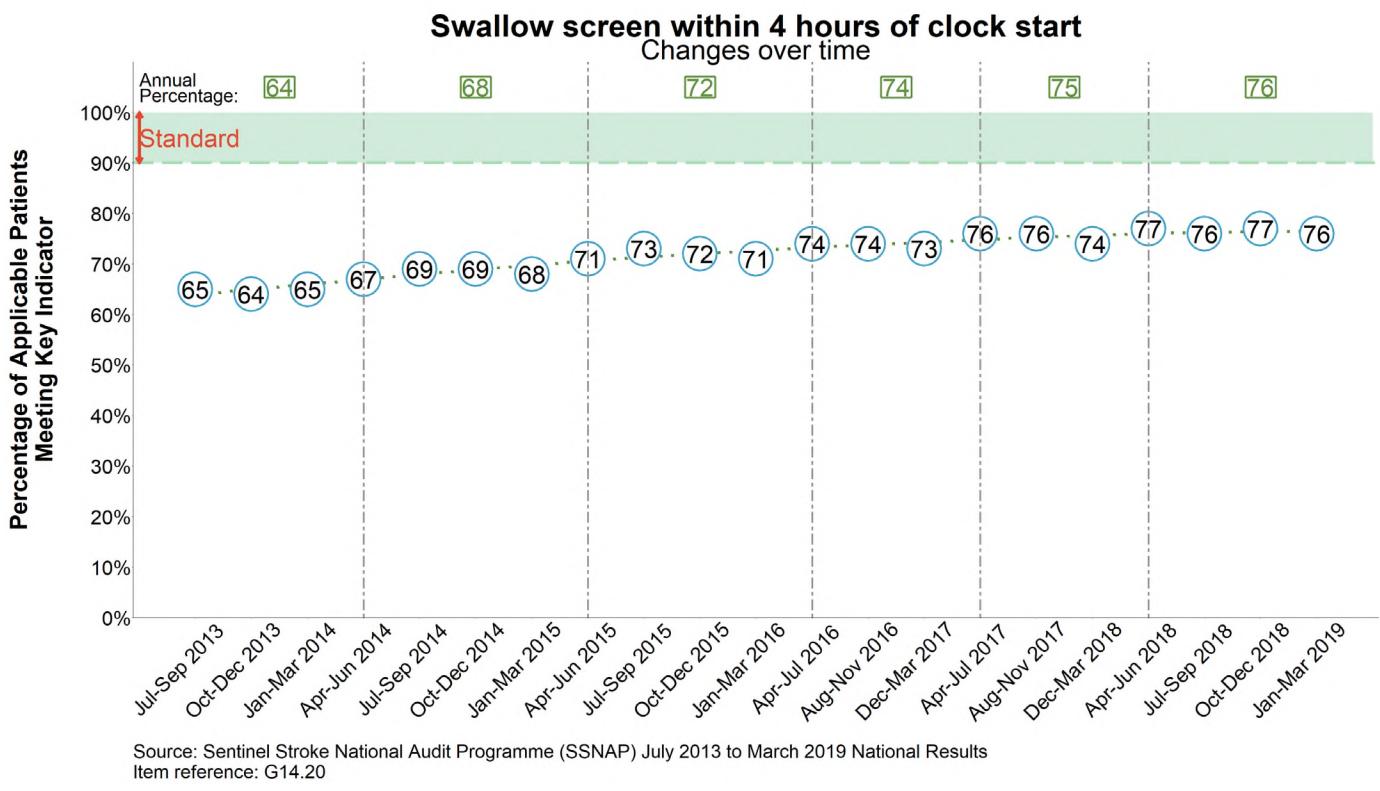


Figure 15. Percentage of patients given a swallow screening assessment within four hours of arrival at hospital between 2013 and 2019.

Figure 15 shows that the percentage of swallow screening assessments performed within 4 hours has increased over 6 years.

64% → **76%**
2013/14 2018/19

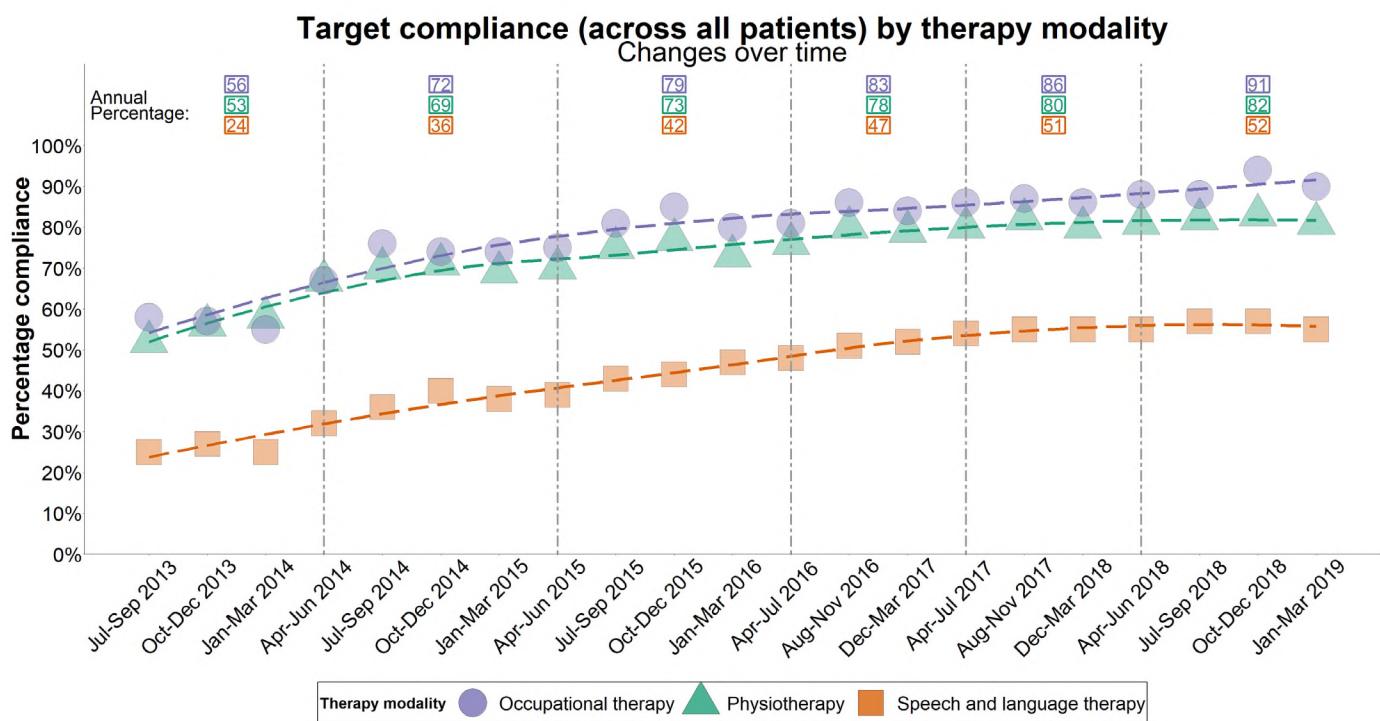
If applicable, percentage of patients who receive swallow screen within 4 hours.

Therapy provision in hospital: SSNAP reports on the percentage of patients who receive **at least 45 minutes** of each relevant therapy that they need **at least 5 days a week**. The percentage of patients receiving this standard has **increased** but there are still significant proportions of patients who **do not** receive the amount of therapy rehabilitation that they need.

These are major challenges for many stroke services but there are opportunities to work smarter and more efficiently by using therapy assistants, delivering therapy to patient groups (rather than to individuals) and using technology such as telemedicine.

Compliance against PT, OT and SALT targets:

	Physiotherapy (PT)	Occupational therapy (OT)	Speech and language therapy (SALT)
2013/14	53%	56%	24%
2018/19	82% +29%	91% +35%	52% +28%



Source: Sentinel Stroke National Audit Programme (SSNAP) July 2013 to March 2019 National Results
Items reference: J3.10, J4.10 and J5.10

Figure 16. Percentage compliance with therapy targets for the three modalities of therapy between 2013 and 2019.

Figure 16 shows the trend for continuous improvement in target compliance across occupational therapy, physiotherapy and speech and language therapy while in hospital from 2013 to 2019.

Further reading:

- 1) Associations Between 30-Day Mortality, Specialist Nursing, and Daily Physician Ward Rounds in a National Stroke Registry. Paley L, Williamson E, Bray BD, Hoffman A, James MA, Rudd AG; SSNAP Collaboration. *Stroke*. 2018 Sep;49(9):2155-2162. doi: 10.1161/STROKEAHA.118.021518
- 2) Physiotherapy provision to hospitalised stroke patients: Analysis from the UK Sentinel Stroke National Audit Programme. McGlinchey MP, Paley L, Hoffman A, Douiri A, Rudd AG. *Eur Stroke J*. 2019 Mar;4(1):75-84. doi: 10.1177/2396987318800543. Epub 2018 Sep 10
- 3) Why do stroke survivors not receive recommended amounts of active therapy? Findings from the ReACT study, a mixed-methods case-study evaluation in eight stroke units. Clarke DJ, Burton LJ, Tyson SF, Rodgers H, Drummond A, Palmer R, Hoffman A, Prescott M, Tyrrell P, Brkic L, Grenfell K, Forster A. *Clin Rehabil*. 2018 Aug;32(8):1119-1132. doi: 10.1177/0269215518765329. Epub 2018 Mar 27.
- 4) Are in-patients with stroke in the UK getting enough therapy? Data from the national stroke registry for England, Wales, and Northern Ireland
McCurran V, James M, Muruet W, Clark L, Wolfe C, Hoffman A, Rudd A; SSNAP Collaboration
Presented on the 5th European Stroke Organisation Conference; 2019 May 22 – 24; Milan, Italy, Eur Stroke J. Abstract nr AS08-046
- 5) Bray, B. D., Smith, C. J., Cloud, G. C., Enderby, P., James, M., Paley, L., ... SSNAP Collaboration (2017). The association between delays in screening for and assessing dysphagia after acute stroke, and the risk of stroke-associated pneumonia. *Journal of Neurology, Neurosurgery and Psychiatry*, 88, 25-30. <https://doi.org/10.1136/jnnp-2016-313356> Published in: *Journal of Neurology, Neurosurgery and Psychiatry*

Case study: Delivering weekend physiotherapy and occupational therapy at Guy's and St Thomas'

Clinical challenge:

In 2016 the average length of stay on the Acute Stroke Unit (ASU) was 32 days and Occupational therapy and Physiotherapy provided a 5-day therapy service only.

Solution:

The Seven Steps to Measurement for Improvement Model was used to guide the change from a 5-day to 7-day therapy service.

Data were collected 6 months pre- implementation and then post-implementation using SNNAP report data including:

- Median therapy length of stay.
- Median hospital length of stay.
- Median % of days as an inpatient on which therapy is received.
- Median time from admission to first therapy assessment.
- Patient and carer feedback: A structured questionnaire was used to obtain patient and carer feedback.
- Number of therapy sessions per week.

Impact:

Physiotherapy:

- Reductions in physiotherapy median length of stay (24.8 to 17.4 days).
- Median hospital length of stay: Reduction of total hospital length of stay (32 to 23.4 days).
- Median % of days as an inpatient on which therapy is received increased from 73.9% to 99.5% on SSNAP.
- Time from admission to first therapy assessment increased from 77% to 96%.
- Patient and carer feedback: Patients and carers preferred the 7-day service.

Occupational therapy:

In response to the positive results of the physiotherapy service, in July 2019 a seven-day Occupational therapy business case was approved including an uplift of staffing of 1.5 WTE OT and rostering one OT to work on a Saturday and Sunday. Building on the measures used for the Physiotherapy pre and post implementation data is being completed with the following additional measures:

- Frequency of different days of the week in which discharges occur.
- Number of access visits completed at weekends and carer satisfaction.

6-month data will be analysed January 2020

Reflection:

Whilst 7-day therapy can improve therapy intensity and reduce length of stay on an ASU, this is only possible with an adequately staffed service. Careful consideration has also needed to be taken to ensure there is high quality handover of patient care and where possible consistency of therapist treating patients.

This case study was submitted by Mark McGlinchey, Clinical Specialist Physiotherapist and Nicole Walmsley, Clinical Specialist Occupational Therapist, at Guy's and St Thomas' NHS Foundation Trust.

SECTION I: Psychology Provision and Mood Disturbance After Stroke

Standard

Adults who have had a stroke have access to a clinical psychologist with expertise in stroke rehabilitation who is part of the core multidisciplinary stroke rehabilitation team. (NICE Quality Standard for Stroke 2016).

5%

It is disappointing that only 5% of patients in hospital with stroke are deemed to be **applicable** for a review by a **psychologist** and this figure remains **unchanged across 6 years**. Psychological consequences include mood disturbance, memory, cognitive and perceptual difficulties as well as fatigue.

On average, patients who require psychological treatment in hospital are only receiving it on **10%** of the days that they are in hospital. Currently, there is only an equivalent of **one tenth** of a qualified psychologist devoted to stroke care in hospital nationally.



These data suggest that there is an overwhelming **lack** of psychological services for inpatients with stroke, which requires addressing **urgently**.

However, it is encouraging to see that the percentage of people whose **mood and cognition** (thinking and concentration skills) are assessed within 6 weeks of admission have significantly **improved**. People are much more likely to receive the support they need if they and the multidisciplinary team are aware of the problems.

78% ➔ **93%**

2013/14

2018/19

If applicable, the percentage of patients who receive mood and cognition screening before leaving hospital.

6% ➔ **10%**

2013/14

2018/19

Percentage of days in hospital on which psychology is received for patients who require it.

Further Reading:

- 1) Stroke and transient ischaemic attack in over 16s: diagnosis and initial management. NICE guideline [NG128]. <https://www.nice.org.uk/guidance/ng128/resources/stroke-and-transient-ischaemic-attack-in-over-16s-diagnosis-and-initial-management-pdf-66141665603269>

Case study: Identifying and supporting patients with mood through emotional pathway at Guy's and St Thomas'

Clinical challenge:

To aid timely and in-depth assessment and management of the mood, behaviour and cognition post stroke.

Solution:

- Established an 'emotion management pathway' to help patients get the right level of psychological support.
- Refined Mood Screening on the ward with earlier screening, multiple staff trained to administer, and use of stroke friendly measures.
- Trained staff on identification and management of mood issues.
- Staff are encouraged to consult on challenging cases with Psychology.
- Set up reflective practice sessions to explore challenging cases once discharged.

Impact:

- SSNAP: "% mood screens completed with required inpatients"
Apr-Jun 18 – 87.5% (pre mood pathway)
Jan-Mar 19 – **97.4%** (post mood pathway)
- SSNAP: "Applicability for patients to receive psychology during inpatient stay"
Dec 17-Mar 18 – 19% of cases seen (pre full time psychologist)
Jan 19-Mar 19 – **35%** of cases seen (post full time psychologist)
- SSNAP: "% of the patient's days at this team on which it is received by the patient"
Dec 17 – Mar 18 – 3.9% of days (pre full time psychologist)
Jan 19-Mar 19 – **15.2%** of days (post full time psychologist) (9.7% national average)
- Training outcomes indicated: staff's confidence in conducting mood screens and identifying and managing mood issues increased.

Reflection:

Example of feedback at 1 year review: "Introduction of full time psychologist has been fantastic and has raised the awareness and skills of the team in managing mood and cognitive impairment post stroke. As the awareness has improved, it has highlighted the need for more psychology for the Stroke Unit".

This case study was submitted by Hannah Mollitor (Clinical Psychologist) and Laura Smith (Consultant Clinical Neuropsychologist). Stroke Unit, Guy's and St Thomas' NHS Trust.

Top tips from St Thomas' Hospital regarding successfully integrating
a psychologist into the service

- A multidisciplinary team willing for a bit of difference and change.
- Publicise the role of the psychologist.
- The psychologist should be known and available to all disciplines and grades.
- The psychologist to review with the team what their priorities are for management and skills development.
- Plan for teaching once the role of psychology in stroke is more established.
- Rolling programmes of teaching, to keep psychological skills topped up and psychological needs on the agenda.
- All psychologist's skills to be used in this complex area: psychology work with patients and families, research, consultation with staff, supervision and training, education and training of all staff.
- Explain, explain, explain (psychologists are not from a medical model, and many medical models will clash slightly with the psychology ones – in order to not be too different, often our ways of thinking need to be explained, so as not to be rejected).

SECTION J: Longer Term Care

Stroke is a complex and devastating condition that can affect patients for the rest of their lives. Rehabilitation can continue after leaving hospital, but

the delivery can be **variable** and many patients have to live with long term disability regardless of the quality of care provided to them in their own home.

Early Supported Discharge (ESD)

Standard

Hospital in-patients with stroke who have mild to moderate disability should be offered early supported discharge, with treatment at home beginning within 24 hours of discharge. (2016 RCP Guidelines for Stroke).

ESD is a **specialist service**, which enables stroke patients to continue their rehabilitation at home at the **same intensity** as in hospital. This enables patients to return home **faster** than would

be possible otherwise. The premise of the service relies on a **coordinated specialist approach** consisting of Occupational therapists, Speech and language therapists, Physiotherapists, nurses and Psychologists.

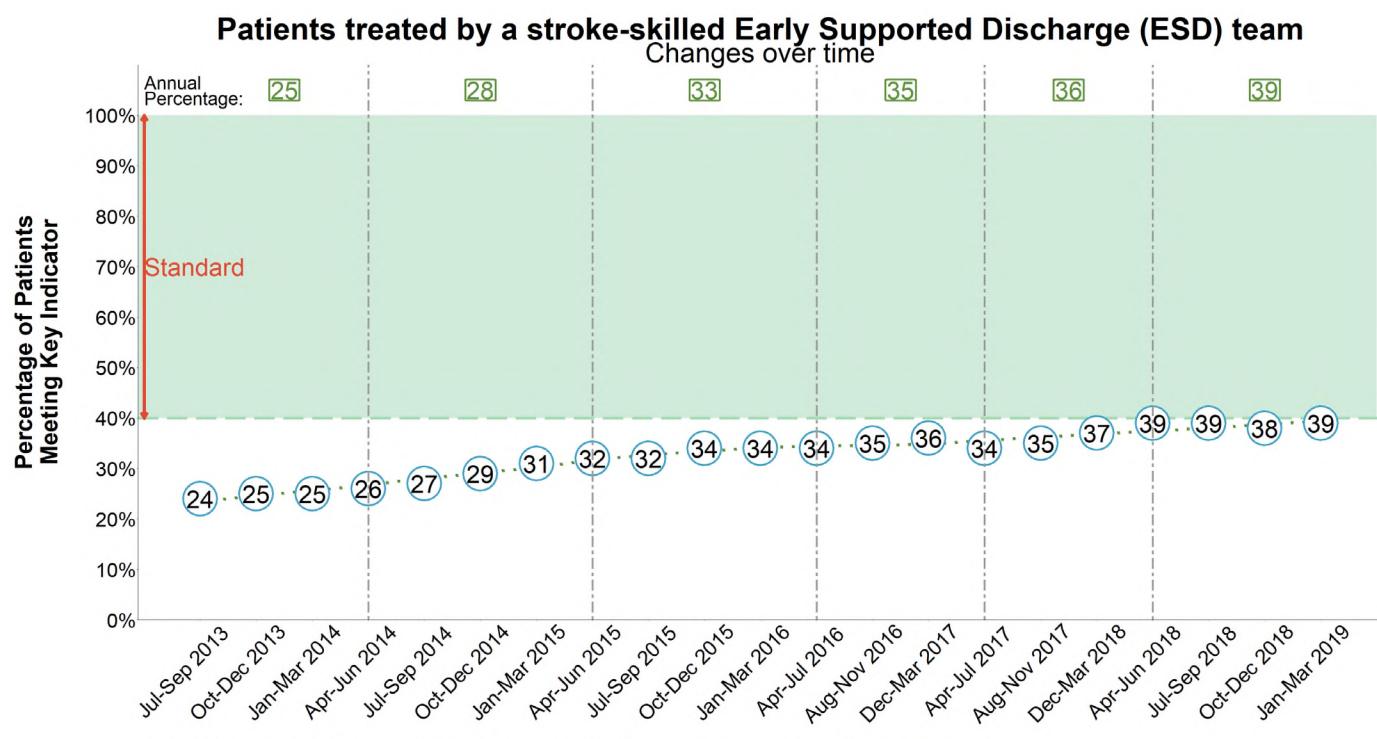


Figure 17. Percentage of patients treated by a stroke-skilled Early Supported Discharge team between 2013 and 2019.

25% → 39%
2013/14 2018/19

The percentage of patients discharged from hospital with an ESD service has improved steadily from 25% to 39%. The majority of patients are reviewed within **one day** after discharge and remain under the service for a median of **37 days**.

Six Month Assessments

Standard

Adults who have had a stroke have a structured health and social care review at 6 months and 1 year after stroke and then annually. (NICE Quality Standard for Stroke 2016).

Adults who have had a stroke should have a structured health and social care review six months and 1 year after stroke, and then annually, by a trained professional. This will help to assess how patients are recovering, whether they need to make lifestyle changes

and whether they need ongoing access to therapy. Some complications of stroke, such as depression and spasticity (stiffness), tend to develop later after stroke and can be under-detected by services solely focused on the early phase of recovery.

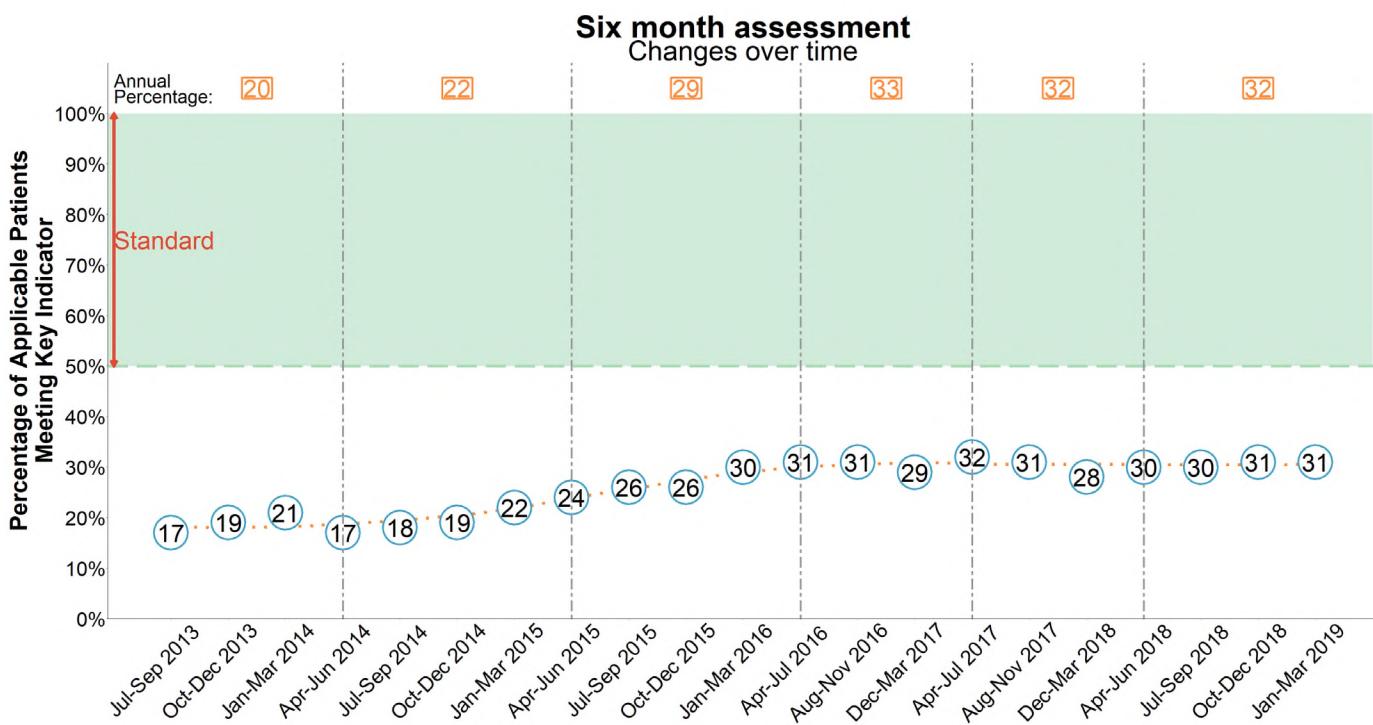


Figure 18. Percentage of patients receiving a six month assessment between 2013 and 2019.

20% → 32%
2013/14 2018/19
+12%

Although the rates of assessment at six months in eligible patients have improved over time, this tendency has plateaued. It is disappointing that a significant number of applicable 6 month assessments are not being carried out resulting in the later needs of patients and their carers not being addressed, and vital outcome data being omitted.

Further Reading:

- 1) Patient characteristics and predictors of six-month post-stroke reviews: A multi-centre prospective cohort study using information from the Sentinel Stroke National Audit Programme. Muruet W, Bhalla A, McCurran V, Flach C, Elstad M, Hoffman A, Douiri A, Wolfe C, Rudd A; SSNAP Collaboration. Presented on the 5th European Stroke Organisation Conference; 2019 May 22 – 24; Milan, Italy, Eur Stroke J. Abstract nr AS12-036.
- 2) Stroke and transient ischaemic attack in over 16s: diagnosis and initial management. NICE guideline [NG128]. <https://www.nice.org.uk/guidance/ng128/resources/stroke-and-transient-ischaemic-attack-in-over-16s-diagnosis-and-initial-management-pdf-66141665603269>

Case study: Providing six month assessments at Arrowe Park Hospital

Clinical challenge:

To increase the proportion of patients who receive a six month review.

Solution:

The stroke data co-ordinator compiles a database for all patients who are referred to the Stroke team, which can be cross-checked against SSNAP stroke patients. **On discharge**, all stroke patients receive 6 week follow-up appointment at the hospital with either a Stroke doctor or Stroke Specialist Nurse (SNS) and a further **6 months** post stroke appointment is made after this initial review.

In addition, the data co-ordinator reviews patients approaching **SSNAP's 8 month "breach"** for follow-up. Using the Trust's operating system (Cerner) and SSNAP's "Unlocked Records" report, she identifies patients with a forthcoming outpatient

appointment; those who are deceased or have moved out of the area; those who failed to attend appointments and any who have been transferred elsewhere are **requested back** to enable 6 month data to be entered.

The SNS's receive a monthly report and patients who are too unwell or frail to re-attend outpatients will be reviewed by **telephone** or by a **home-visit**. A recent development has been the SNS's telephone call time to be entered onto the Trust's electronic patient record (EPR) as clinical time and any correspondence resulting from this is on the EPR and a virtual review tariff is claimed.

Impact:

The result is **100%** completion of 6 month assessment ensuring that every stroke patient within the service has the opportunity to access on-going support from the stroke team and address any post discharge issues. Patients and families now have a choice in how they receive their review and this has been positively welcomed. A recent **post discharge patient and carer questionnaire** suggested a very high level of satisfaction with the care and post discharge support received.



| This case was submitted by Wirral University Teaching Hospital.

Concluding Thoughts

It is evident from our sixth Annual Report that there have been major improvements in stroke care in recent years in England, Wales and Northern Ireland with the national audit and the standards emanating from clinical guidelines playing a major role in supporting this improvement. The purpose of the audit is to provide clinicians, managers and commissioners with validated and credible comparative data to evaluate performance, verify where improvements are being made and identify where there is the need for further work to be done. Equally it is important to ensure the public is provided with transparent information on the quality of stroke care provided locally, regionally and nationally.

Stroke remains a national priority in all three participating UK nations and is much visible within the NHS Long Term Plan for England with an emphasis on delivering:

- world class hyperacute care with greater provision of thrombolysis and thrombectomy,
- improved access to stroke unit care, delivering a seven day comprehensive workforce,
- developing high intensity rehabilitation models in the community as well as focusing on life after stroke.

These key domains remain central to both the clinical and organisational audit in the setting of integrated care.

Over the last six years there have been major improvements in many areas of care but the SSNAP audit continues to identify wide variations in the quality of stroke care across the UK with many challenges still visible. Most concerningly, there are still examples of stroke care where little or no progress has been made since 2013. Prime amongst these is getting patients onto a specialist stroke unit within four hours of arrival at the hospital so that patients can receive expert multidisciplinary care as soon as possible. Stroke unit care remains the most widely applicable intervention that we have for reducing death and disability after stroke. Improving access to a stroke unit should be foremost in the minds of providers and planners. It is a reasonable objective for acute sites to achieve 90% of their patients spending 90% of their in-patient stay on a specialist stroke unit. There are plenty of examples of centres where this has been consistently achieved despite the many other pressures on hospital capacity – centres where it is not should be learning from those who can.

Another concerning area is the lengthening of arrival times to hospital. The new SSNAP Ambulance Linkage Project will help to shine some light on variation in practice, where delays are occurring in the pre-hospital phase of care and what needs to be improved. As regional reconfigurations and thrombectomy become increasingly important, so will the pre-hospital care of people with stroke. It is timely that this phase is now coming under scrutiny within the SSNAP audit. Over the last 6 years door to needle times for thrombolysis have slowly improved. This year is the first in which we have seen a slight increase in average door-to-needle times, and again there remains substantial variation between sites. This increase may well be attributable to the greater use of CT angiography and other advanced imaging in the selection of treatment for people with ischaemic stroke. It may also be attributable to busier Emergency Departments a

and competing pressures on acute imaging. Earlier and greater use of thrombolysis, and the reduction of variation in practice between sites still offers substantial benefits to many more patients. This must not be overlooked in the quest to increase the use of mechanical thrombectomy. It is a reasonable and achievable objective of hyperacute stroke care to consistently achieve a door to needle time below 40 minutes. Continued emphasis needs to be applied to ensure that incremental changes across the hyperacute pathway are maximised. Again, centres with low rates of treatment and slow door-to-needle times should be actively seeking to learn from similar centres that are delivering more benefit to their local population through the effective delivery of thrombolysis. Other centres with differences in their practice between office hours and out of hours also need to scrutinise their processes and practices to reduce delays and support quicker decision making. The SSNAP Thrombolysis tool provides a useful way to support the level of scrutiny.

We have seen a welcome improvement in the delivery of therapies across many of the domains,. Many patients are still left without specialist psychological support, which requires innovative thinking and investment to improve provision for people with stroke. A focus is required on assessments and outcomes six month after stroke to highlight the needs of patients and their families and carers over the longer term. It is vital that services take the opportunity presented by this year's CQUIN incentive in England to improve their provision of 6-month reviews, and to ensure that data from these reviews is recorded in SSNAP.

In addition to providing a national overview, the case studies embedded in the report highlight examples of services which have risen to the challenge of improving the quality of care using data from SSNAP as a powerful lever for change. It is particularly important to showcase exemplars of care where levels of stroke care appear to be struggling nationally. Excellent practice needs to be celebrated and there is no harm in stealing ideas! The SSNAP team are very happy to facilitate links between sites that are struggling to deliver aspects of quality care right along the pathway of recovery with those that have been able to deliver improvements. The King's Stroke Programme also continues its collaboration with the Royal College of Physicians of London in offering sites a multidisciplinary peer review of stroke services. Expert external advice will help to stimulate quality improvement – information about the peer review service is available on the SSNAP website and via the Helpdesk.

The future of stroke medicine is exciting and the next year will be an important one for SSNAP to ensure that data collected continues to support quality improvement across England, Wales and Northern Ireland and in line with the objectives of the NHS Long Term Plan. Thrombectomy will transform the lives of many and the NHS is committed to ensuring that it is delivered to as many patients as possible as quickly as possible in a safe and effective way underpinned by the evidence. This will undoubtedly involve reconfiguration of some hyperacute services and challenges to local services. SSNAP will continue to monitor the quality of care across the whole pathway from prehospital and hyperacute care out into the community as patients follow their journey of recovery.

We very much hope that this report provides readers with an informative insight to stroke care in 2018/19 and you are encouraged to use this resource to implement and leverage quality improvement for stroke services across England, Wales and Northern Ireland.



Professor Martin James MD FRCP
Clinical Director,
Sentinel Stroke National Audit Programme



Doctor Ajay Bhalla MSc MD FRCP
Associate Clinical Director,
Sentinel Stroke National Audit Programme

Glossary

Ambulance Linkage Project SSNAP has extended data collection of patients in England to include the time spent from the call to 999 services and times in between up until arrival at hospital. <https://ssnap.zendesk.com/hc/en-us/articles/360002656377-Ambulance-linkage-information-sheet> Data will be reported as part of the Ambulance Quality Indicators (AQI) <https://www.england.nhs.uk/statistics/statistical-work-areas/ambulance-quality-indicators/ambulance-quality-indicators-data-2019-20/>

Anticoagulant A type of drug that reduces blood clotting; examples include warfarin and DOAC (direct oral anticoagulants).

Atrial Fibrillation (AF) An abnormal heartbeat which can result in the formation of blood clots.

Blood pressure The pressure of circulating blood on the walls of blood vessels.

Clinical commissioning groups (CCGs) are NHS organisations set up by the Health and Social Care Act 2012 to organise the delivery of NHS services in England.

Clinical Audit A way to find out if healthcare is being provided in line with standards and lets care providers and patients know where their service is doing well, and where there could be improvements.

Clinician A professional delivering clinical care who has direct contact with patients rather than being involved solely in research and teaching.

Commissioning for Quality and Innovation (CQIN) This is a framework supporting improvements in the quality of services and the creation of new, improved patterns of care within the NHS in England. <https://www.england.nhs.uk/nhs-standard-contract/cquin/cquin-19-20/>

CT scan Computed Tomography scan. Detailed images of internal organs are obtained by this type of sophisticated X-ray device. Further types of imaging for stroke include **CT perfusion** which shows which areas of the brain are adequately supplied or perfused with blood, and provides detailed information on the delivery of blood to the brain; and **CT angiography** which uses a contrast injected into the blood vessels and can show narrowed or blocked blood vessels.

Door-to-needle time (DTN) Term that refers to the time from arrival at hospital or onset of stroke (for inpatient strokes) to the time a patient is thrombolysed. See Thrombolysis.

Early Supported Discharge (ESD) A system in which rehabilitation is provided to stroke patients at home instead of at hospital at the same intensity as inpatient care.

Hyperacute stroke unit (HASU) HASUs bring experts and equipment under one roof to provide world-class treatment 24 hours a day, for the first stage in the treatment of stroke (approximately the first 72 hours), reducing death rates and long-term disability.

In hospital mortality rate The proportion of patients who die during or shortly after admission to hospital. It is the proportion of people who are not discharged alive from inpatient care.

Integrated Stroke Delivery Network (ISDN) Integrated Stroke Delivery Networks (ISDNs) are described within the NHS Long Term Plan as "involving relevant agencies including ambulance services through to early supported discharge will ensure that all stroke units will, over the next five years, meet the NHS seven-day standards for stroke care and the National Clinical Guidelines for Stroke. <https://www.longtermplan.nhs.uk/online-version/chapter-3-further-progress-on-care-quality-and-outcomes/better-care-for-major-health-conditions/stroke-care/>

Intracerebral Haemorrhagic Stroke (ICH) A type of stroke caused when a blood vessel bursts, resulting in bleeding into the brain.

Ischaemic Stroke A type of stroke that happens when a clot blocks an artery that carries blood to the brain.

Long Term Plan The NHS long Term Plan was launched in January 2019. It sets out a plan for the NHS to improve patient care and health outcomes in the future. Stroke is one of the main areas covered. <https://www.longtermplan.nhs.uk/areas-of-work/stroke/>.

Median The median is the middle point of a data set; half of the values are below this point, and half are above this point.

Multidisciplinary team A team or service which is composed of staff from different healthcare professions with specialist skills and expertise. The members work together to ensure patients receive comprehensive, coordinated treatment.

Onset Time This is the date and time recorded by the acute hospital in SSNAP as the date and time the patient first reported symptoms of stroke.

The National Institutes Health Stroke Scale (NIHSS) The NIHSS is one of the most sensitive measures of stroke severity and is collected in SSNAP at various time points in patient care. Further information <https://ssnap.zendesk.com/hc/en-us/articles/360011852014-General-Breakdown-of-NIHSS-scoring>

Sentinel Stroke National Audit Programme (SSNAP) National Stroke Audit run by the Royal College of Physicians, London. In addition to the acute organisational audit reported on this document, SSNAP prospectively collects a minimum data set for every stroke patient covering acute care including rehabilitation and 6-month follow up.

SSNAP Thrombolysis Tool A quality improvement tool for hospitals to be able to review in further detail which patients who potentially could have received thrombolysis did not in order to identify issues to improve the quality of care of patients.

SSNAP Collaboration A group composed of the clinical leads at each hospital participating in SSNAP for the clinical audit, involved in coordinating the data collection for the audit. <https://www.strokeaudit.org/Research/SSNAP-Collaboration.aspx>

Thrombectomy Also referred to as intra-arterial therapy. The surgical removal of a blood clot. Thrombectomy is a very new treatment that is not available in many parts of the country.

Thrombolysis Treatment with a drug that breaks down blood clots.

Thanks

We would like to express our thanks to the following people and organisations for their invaluable contribution in producing this report:

Dr Ajay Bhalla, consultant stroke physician, who has written the clinical commentary.

Mary Burke, an artist and stroke survivor who provided us with the artwork featured on the front cover of this report.

The hospitals and community teams for continuing to participate in SSNAP, thus ensuring that such rich and robust data is available which can be used to improve stroke services. We want to particularly thank the many clinical teams and individuals who have taken the time out of their busy schedule to contribute case studies for this report. By sharing best practice, learning points, and recommendations, you are paving the way for others to learn from your example.

Our patient representatives on the Intercollegiate Stroke Working Party (ICSWP), for their continued support of the programme: Marney Williams, Robert Norbury and Stephen Simpson. We thank Juliet Bouverie (CEO) from the Stroke Association for her insightful foreword. Their valuable contribution keeps a patient voice at the heart of what we do as a programme.

This report was written, produced and designed by Kaili Stanley, Dr Ajay Bhalla, Professor Martin James, Dr Walter Mruet, and Nahuel A. Durante; supported by George Dunn, Ellie McMullen and Alex Hoffman.

Acknowledgements

The Sentinel Stroke National Audit Programme (SSNAP) is commissioned by the Healthcare Quality Improvement Partnership (HQIP) as part of the National Clinical Audit and Patient Outcomes Programme (NCAPOP).

HQIP is led by a consortium of the Academy of Medical Royal Colleges, the Royal College of Nursing, and National Voices. Its aim is to promote quality improvement in patient outcomes, and in particular, to increase the impact that clinical audit, outcome review programmes and registries have on healthcare quality in England and Wales. HQIP holds the contract to commission, manage, and develop the National Clinical Audit and Patient Outcomes Programme (NCAPOP), comprising around 40 projects covering care provided to people with a wide range of medical, surgical and mental health conditions.

The programme is funded by NHS England, the Welsh Government and, with some individual projects, other devolved administrations and crown dependencies.

www.hqip.org.uk/national-programmes.

