Rising to the Challenge

The Fourth SSNAP Annual Report

Stroke care received between April 2016 to March 2017

Royal College of Physicians | Sentinel Stroke National Audit Programme (SSNAP)

HQIP
Healthcare Quality Improvement Partnership

A description of the front cover of this report

The front cover of this report was designed by Brian Murphy, an artist and stroke survivor from Liverpool, England. The piece is called 'Flight'.

Artist Brian Murphy and family

Patient Experience: The Road to Recovery

I am 68 years old. I had a stroke last September which was caused by a large bleed on the left side of my brain. The stroke affected the right side of my body, including my arm, leg and also my speech. I had always been a keen artist from being a child, I also played the guitar from a young age, even being in a group in the 60s.

Being a right handed person I thought that both of these hobbies had been lost to me forever! I tried drawing within a few weeks of suffering the stroke, which at first was just a scribble. My wife photographed these attempts in order to keep a record of any improvement.

On my return home, I exercised my arm, hand, leg and speech with my physiotherapist who came to my home everyday. I gradually started to improve. My physiotherapist asked me to try drawing and playing my guitar just to see how I got on. The next 8 weeks were extremely hard, but I slowly started to improve at both of these things. By the time my physiotherapists visits had come to an end she was amazed at my progress.

Since last Christmas I have returned to my art group, and have also joined a number of other groups including ukulele, creative writing and poetry. I joined these to try and help to keep my brain as active as I possibly could. I have also designed the front cover of our creative writing book which will be out later this year.

The picture on the front cover of this report was painted a few months ago. I feel that the title for this painting 'Flight' may have been chosen on a subconscious level as an expression of the movement and energy that I hope to attain again someday.

Brian Murphy

Table of Contents

Foreword

At an early age, I learned how stroke can be sudden, unexpected, and devastating. My wonderful Grandmother was suddenly "Taken Poorly", and after a home visit, admitted by her GP to the local cottage hospital where she stayed a while. A different woman came back; the formidable force of nature I'd known was replaced by an almost unrecognisable soul, frustrated beyond belief by her inability to communicate, and only able to cope with the support of wonderful neighbours. There was no formal support. No speech, physio or occupational therapy, no emotional or psychological support, no Stroke Association to help her rebuild her life. She, and we, were on our own. Her, and our lives, were transformed. I learned stroke was cruel, shocking and can cause untold misery.

So, many years later, you can imagine how pleased I am to read about the transformation in stroke since national auditing of stroke services commenced 20 years ago. It is evident that even in the 4 short years since the Sentinel Stroke National Audit Programme (SSNAP) began collecting data more progress has been made across the stroke pathway. I thank all of you for bravely submitting your data, good and not so good, for using the array of SSNAP reports available to help pinpoint areas for improvement in your local performance; and for getting on with implementing the necessary changes to practice. I know how hard it can be making time for the vital improvement work in the face of all the competing demands when working in our modern NHS. But it is possible; the step-by-step improvements evidenced here by our colleagues each make a significant difference to someone's life; reducing someone's risk of death and disability. So, thanks to each of you who participated for your commitment and efforts towards improvement. We hope that the fantastic work described in this report in addition to the content available on the SSNAP website www.strokeaudit.org will inspire others to take on similar quality improvement initiatives to improve patient care.

But we all know there is so much more to do to ensure all patients receive high quality care regardless of where they live or when they have their stroke, particularly in the community. Why do we have such poor SSNAP data completion on longer term outcomes at 6 months which we know helps inform clinical and rehabilitation practice? A follow up assessment at 6 months is also essential for enabling people to get back on their feet after stroke. We will also need more robust data from primary and community services in the years ahead as we move more care and support into the community, and integrate health and social care. In the era of "Big Data" helping deliver personalised service, we can't go back to having people lost from view like my Grandmother was; and we need this big picture to help target support.

The data and case studies included in this report are a big incentive for each of us to improve the areas we are responsible for, and an even bigger incentive for colleagues in England to work together locally in NHS RightCare (www.england.nhs.uk/rightcare) programmes to improve local area performance right across the stroke pathway. So I ask everyone with an interest in stroke care to engage with SSNAP audits and work together to use and improve the SSNAP data across the wider prevention, rehabilitation and support pathways so that we can build a complete picture of stroke services supporting us and our families. We need a full picture of how we are working together to reduce the untold misery caused by stroke if we are to be confident we are doing all we can.

Meanwhile I am heartened that the outlook for me and my family is significantly better than it was for my grandmother. My GP makes sure my blood pressure is monitored and controlled, so hopefully I will not have a stroke. But because of the ACT FAST campaign, if I am unlucky enough to have a stroke, people around me are more likely to recognise the symptoms and call for appropriate swift help. From my work in the local NHS, I know the local ambulance service is primed to take me to the regional hyper-acute stroke unit rather than my local accident and emergency district general hospital where I can be given clot busting drugs (if appropriate). Whatever day or time I'd then likely be seen by a specialist team, have a brain scan in short order and have whatever treatment is needed. If I am lucky I will leave for home quite quickly with an "early supported discharge package" of help from physiotherapists, occupational

therapists, speech therapists and psychologists, a stroke nurse and a social worker all co-ordinated via my local GP practice. If I am really lucky the Stroke Association will have been commissioned to support me getting back on my feet practically and emotionally so I can get back on with my life.

I look forward to reading in future years about how the spread of mechanical thrombectomy has further improved clinical outcomes, how community care has been transformed to provide a safe and integrated service, and how this report has helped colleagues to work together to improve local services everywhere right across the stroke pathway, so wherever I live I'll get the best possible support and care.

Together we can conquer stroke.

Stephen King
Chair, Stroke Association
www.stroke.org.uk

About Stephen King

Stephen was appointed chair of the Stroke Association on 1st August 2017. After an early career in business, he has spent the last 20+ years working to improve health and social care systems in the UK and internationally. He is deputy chair of NHS West Essex CCG, a long serving Trustee of Sightsavers International, who work to improve eye health services in Africa and Asia, and previously lead work to improve UK eye health services as director for eye health at the Royal National Institute of Blind People (RNIB).

Introduction

People with stroke need urgent access to high quality acute care followed by expert preventative care, rehabilitation, psychological and long term social support. Urgent care needs to be provided in the right place: in an acute stroke unit with the right facilities and well trained staff available around the clock. Prevention of further strokes (secondary prevention), rehabilitation and other forms of support generally start in hospital and continue at home. Stroke care is complex and sometimes even with the best care patients may not survive or survive disabled. However, we do know that better care results in better outcomes (e.g. fewer people dying, fewer complications such as pneumonia, less disability). By studying the quality of care that everyone with acute stroke in the NHS receives in great detail, we can help stroke teams understand where they are doing well and how they can improve. Poor stroke care is bad for people with stroke and their families and very expensive for public services, so there's a real incentive to make care as good as it can be.

Overview of SSNAP

The Sentinel Stroke National Audit Programme (SSNAP) measures the quality and organisation of stroke care in the NHS. 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 webtool last year, representing over 90% of all strokes in England, Wales and Northern Ireland.

SSNAP collects information about the processes of care received by people with stroke and this is recorded electronically on the SSNAP webtool. This includes acute interventions, such as clot busting treatments or thrombectomy; the timings of key measures of care, for example how soon someone had a brain scan after arriving at hospital or how quickly a person with stroke was reviewed by a stroke consultant; and the different types of therapy treatments received. Information is also collected on the length of time patients stay in hospital, and the amount of therapy received in a home setting after leaving hospital.

The stroke care pathway recorded on SSNAP ends with the entry of 6 month assessment information which records care needs and outcomes 6 months after stroke. Provision of a 6 month assessment is recommended in 2016 RCP Guideline for Stroke www.strokeaudit.org/guideline. All this data is publically available on the SSNAP website (www.strokeaudit.org) and anyone can look at how well stroke care is delivered nationally, regionally, or at the level of their own hospital and community service. Details of previous stroke audits, run before the launch of SSNAP in 2013, are provided in a later section of the report.

Purpose of this report

This is our 4th Annual SSNAP report. In previous years we have concentrated on SSNAP performance at a national level, what improvements we can celebrate and where changes need to be made in service provision to improve care. This year, as pressures on the NHS increase, we are focussing part of our report on how regional and local hospital teams are using SSNAP data in quality improvement (QI) initiatives to improve services across the patient journey from acute care into rehabilitation and beyond. Written in collaboration with stroke clinicians, researchers and patient representatives, we have included examples of this QI work in case study form throughout the report to highlight just how stroke teams have made these changes happen. We have also developed a hosting website for this year's report which contains the full text of these case studies in addition to many more which were submitted to SSNAP in recent months: www.strokeaudit.org/annualreport We hope that in the months and years ahead that they will be used by other healthcare providers as examples of how they too can make an impact on patient care, experience, and outcomes after stroke.

What is QI?

Quality improvement (QI) in healthcare is generally defined as a series of systematic approaches which use clear processes to promote good clinical practice (i.e. clinical care that is safe, timely, effective, efficient, patient-centred, and equitable).

The QI process involves:

1. using theory and data to develop a way to solve a problem and improve clinical care
2. using a systematic process to test and implement that change
3. measuring the size of the improvement/ change

A key component throughout the QI process is measurement – using data to inform what needs to be improved and to support measuring for improvement in clinical care. SSNAP, which provides data on stroke care against the evidence based standards, can be a very useful tool to measure the effectiveness of QI projects and the magnitude of improvement over time.

SSNAP has recently developed a QI area which is available at www.strokeaudit.org/QI. Here are numberous QI tools and resources, case studies, recommendations and patient information available for clinical teams which will help when initiating local QI projects.

A journey through time

Twenty years ago, when the first stroke units were being set up in the NHS, stroke care was very different. Patients were often looked after at home by GPs without any specific treatment, and only admitted to hospital when they could no longer be cared for at home. In hospital, people with stroke were seen as being of low priority because there was little that could be done to help them, and they were often lodged in non-specialist wards where staff did not have the expertise to manage them well. Length of stay in hospital was many weeks or months, with little in the way of community services. Complication rates, for example pneumonia and urinary tract infections, were much higher than they are now. Many more people with stroke died, and those who did survive were more disabled, with a much higher rate of admission to care homes.

The first research to demonstrate an improvement in outcomes after stroke was the effect of admission to a stroke unit rather than to a general ward. Not surprisingly, people with stroke do much better if they are looked after by a specialist team. This research eventually led to our current standard of care, which is that everyone with acute stroke should be directly admitted to a stroke unit within 4 hours of arrival in hospital. Over the intervening years, research has demonstrated the importance of many other interventions including early swallowing assessment to reduce the likelihood of developing pneumonia, early aspirin after ischaemic (blood clot) stroke, the value of thrombolysis ("clot busting treatment") and thrombectomy (direct clot removal) for selected patients and the importance of blood pressure management after brain haemorrhage.

Research findings are regularly reviewed and distilled into guidelines to advise clinicians how best to treat their patients to get the best outcomes. The 2016 RCP Guideline for Stroke contains the evidence based standards that SSNAP measures performance against. It is available on the SSNAP website: www.strokeaudit.org/guideline.

We know from national stroke audit data that there have been dramatic improvements in patient care over the past 20 years and recent SSNAP data have shown that this trend has continued since 2013. A summary report highlighting the changes in SSNAP results across 4 years of data collection is available here: www.strokeaudit.org/annualreport. This is a tribute to the dedication of stroke teams across the NHS, social services and the voluntary sector who have worked so hard to improve the care received by people with stroke and their families.

In this report we look at how clinical teams have changed practice to improve care. How have we shifted the quality of care to this point? What are clinical teams doing differently compared to previously? How is success measured? What are the "top tips" that others can follow? This report investigates.

History of stroke audit in the UK

Timeline of Stroke Audits

- **1997:** Department of Health commissioned Round 1 of the national stroke audit.
- **1998-2010:** 7 rounds of National Sentinel Stroke Audits (NSSA) were carried out.
- **1998-2016:** 11 acute organisational audits (AOA) were carried out, which collected information on how stroke services were structured.
- **2010-2012:** Stroke Improvement National Audit Programme (SINAP) undertaken.
- **2013-present:** Sentinel Stroke National Audit Programme (SSNAP) launched.
- **2015:** First ever post-acute organisational audit was delivered which reported on the structure of stroke care in community settings.

NSSA: Each clinical audit round used 'snapshot' audit methodologies meaning patient care was measured across a specific period of time, usually 3 months. Stroke care processes for more than 64,500 patients were reported on in this time.

SINAP: The first continuous stroke audit which collected information on all patients for the first 72 hours of care. More than 120,000 patients were reported on.

SSNAP: Current, continuous stroke audit which measures processes and outcomes of care from onset of stroke to six months after stroke. More than 300,000 patient records have been reported on to date.

For more detailed information on the history of stroke audit in the UK please read 'National Sentinel Stroke Audit 1998–2011' which is available via the following link:
http://www.clinmed.rcpjournal.org/content/13/5/444.full

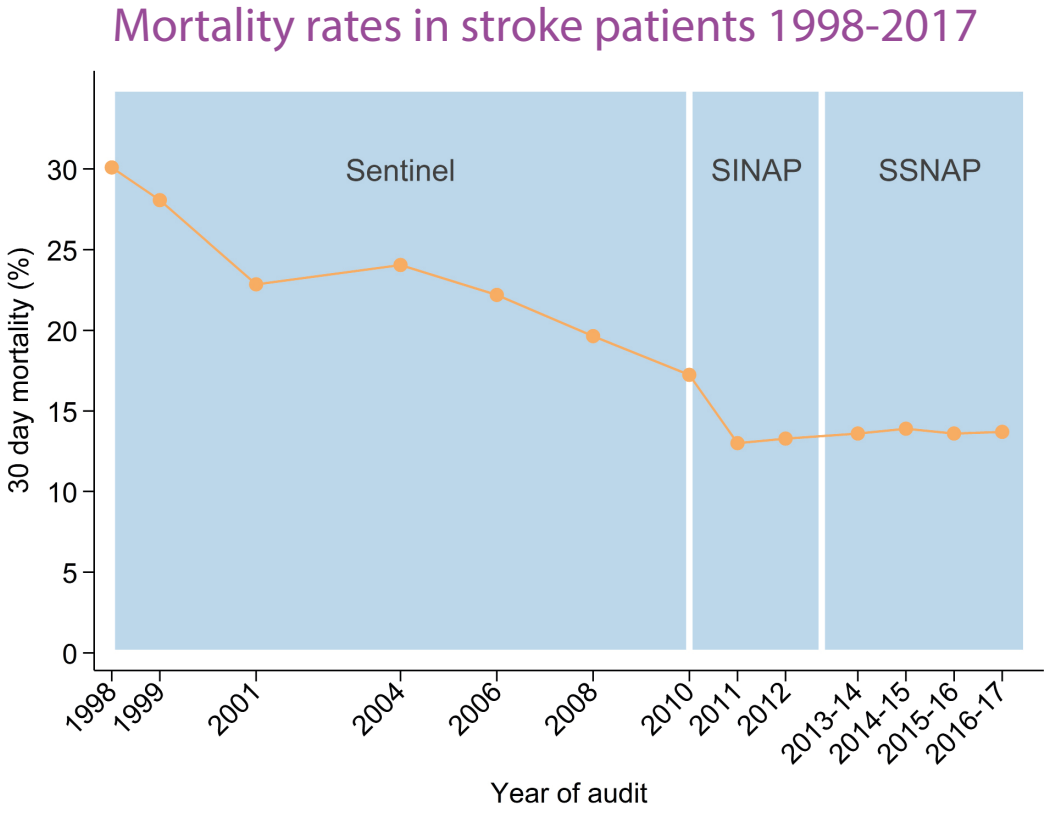


Figure 1: This graph demonstrates the vast reduction in the percentage of people who die within 30 days of stroke between 1998 and 2017.

Average length of stay in hospital for stroke patients admitted to hospital 2001-2017

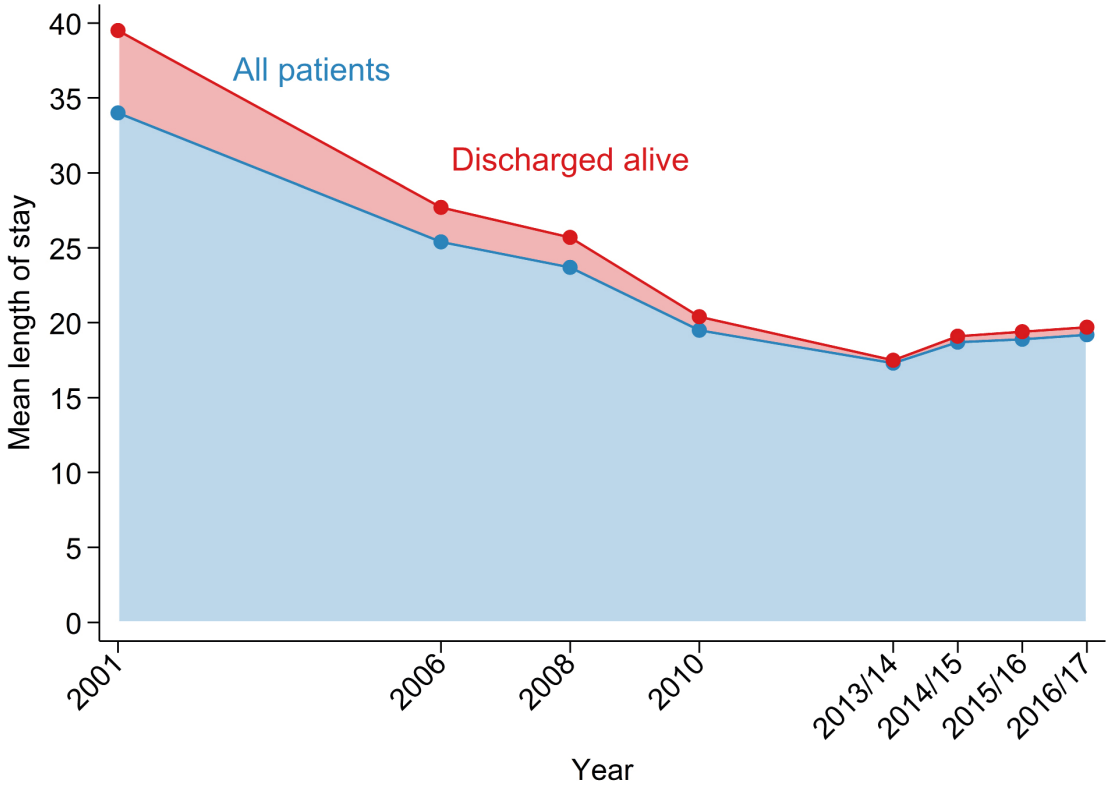
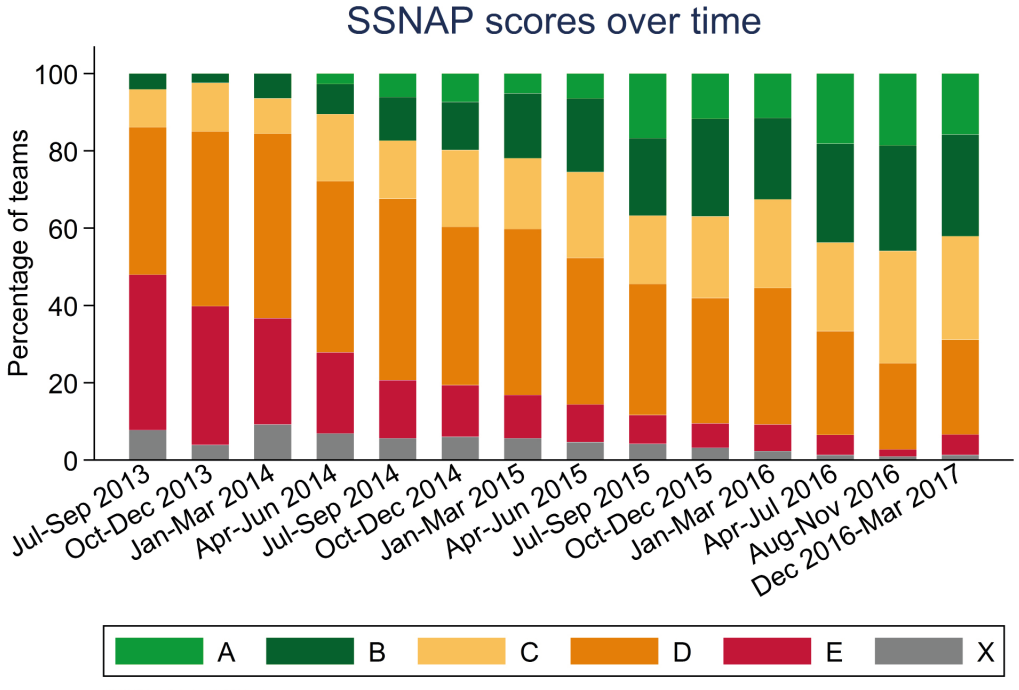


Figure 2: This graph demonstrates the reduction in the average number of days spent in hospital after stroke admission between 2001 and 2016/17 for all patients (blue area), and for only those patients who are discharged alive (red area).

Distribution of SSNAP scores 2013-2017



Source: SSNAP 2017

Figure 3: This graph demonstrates the continued improvements achieved by stroke services between July 2013, when SSNAP (A-E) scoring was introduced, and March 2017.

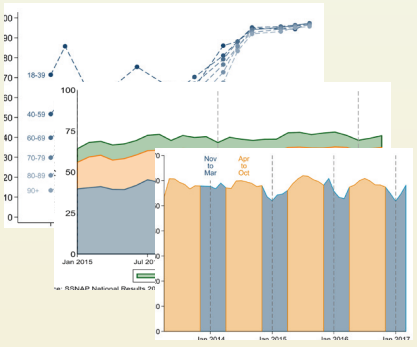
4th SSNAP Annual Report 2016/2017

Rising to the Challenge

Care received between 1 April 2016 - 31 March 2017

85,122
patient records included

National Results Over Time



QI Case Studies

- Finding and addressing problems
- Putting evidence into practice
- Tips and learning points
- Celebrating success

Patient Experiences

- Impact of thrombectomy
- Psychological support after stroke
- Preventing deep vein thrombosis

Quality of stroke care in 2016/17

Urgent Care

51% of patients are brain scanned within 1 hour of arrival at hospital.

57% of patients are directly admitted to a stroke unit within 4 hours of arriving at hospital.

537 patients received intra-arterial intervention (thrombectomy) after stroke.

Assessments & Rehab

21% of patients have intermittent pneumatic compression (IPC) applied while in hospital.

87% of patients receive a formal swallow assessment within 3 days of arriving at hospital if required.

95% of patients receive physiotherapy assessment within 3 days of arriving at hospital if required.

Longer term care

83% of patients are screened for malnutrition and seen by a dietitian before leaving hospital if required.

91% of patients receive mood and cognition screening before leaving hospital if required.

32% of applicable patients receive a six month assessment after stroke to assess care needs.

Section A: Brain Scanning

Brain scans are essential to diagnose the type of stroke and to make sure that there isn't some other cause for the patient's symptoms. In the past some patients would wait days after admission to have a CT scan but there has been a very significant change, with nearly all patients now being scanned within 24 hours and an increasing percentage being scanned within one hour of arrival at hospital. The 2016 RCP Guideline for Stroke recommends one hour scans for all stroke patients so it is encouraging to see continued improvements over time.

One of the main drivers for faster scanning in recent years has been the availability of thrombolysis for acute stroke, where every minute counts, but there is increasing recognition now that early acute management is important for everyone presenting with acute stroke. There is no medical reason to delay a brain scan after admission with acute stroke, and research shows that it is most cost effective to scan immediately.

Percentage of patients scanned within 1 hour of arrival at hospital:

2013/2014: 41.9%

2016/2017: 51.3%

Does age discrimination exist in stroke care?

In recent years, inequalities of acute stroke care on the basis of patient age have been vastly reduced. Twenty years ago it was commonplace for older patients to wait days for their brain scan and some did not have one at all. Thankfully things have changed significantly in the intervening years and now almost all patients are brain scanned within one day of arriving at hospital, as the graph below demonstrates.

Percentage of stroke patients brain scanned within 24 hours - breakdown by age group

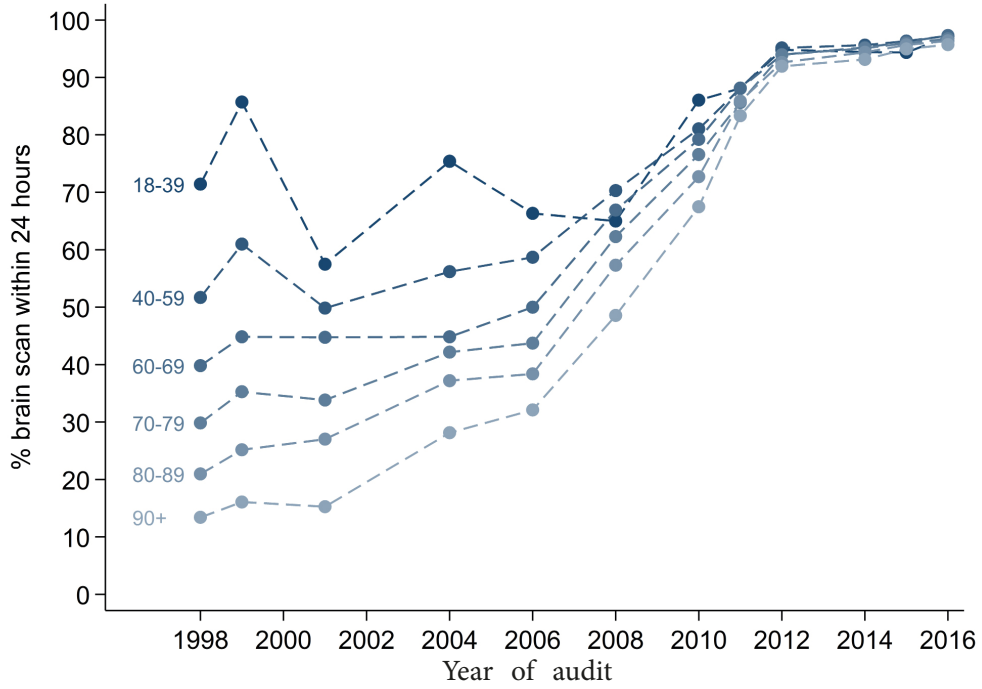


Figure 4: This graph shows the percentage of patients who had a brain scan within 24 hours from 1998 to 2016, broken down by age group.

Average arrival to scan times 2013-2017 (in minutes)

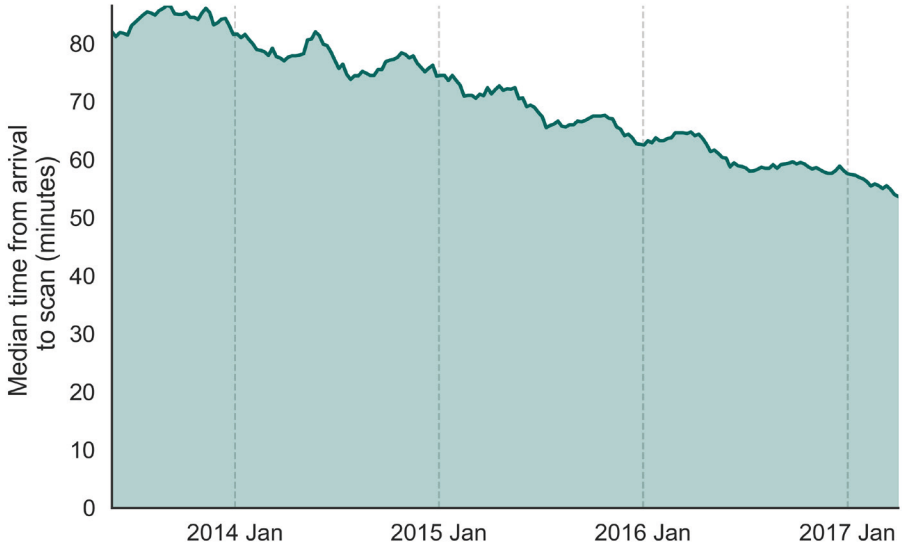


Figure 5: This graph demonstrates the reduction in hospital arrival to scanning times between 2013 and 2017

The radiography team at Fairfield General Hospital

Patient being scanned at Fairfield General Hospital

"Top Tips" from Fairfield General Hospital: Making process improvements for urgent scanning of stroke patients

Communication:
Ensure there are clear aims for rapid imaging so all staff know what is expected. This is fundamental for an effective, efficient service, providing best patient care and optimising door-to-needle time.

Simplify:
Make the pathway clear and simple (remove barriers), especially when involving a large group of staff with a wide range of experience. e.g. dedicated protocols and pathways.

Rapid Reporting:
Ensure pathway in place to prioritise reporting of domain 1 imaging (first scan) 24/7.

Inclusivity:
Make all staff feel involved and take ownership of the service by giving good feedback, and giving access to and encouragement for study days and courses.

Andrea Maxwell, CT lead radiographer, and Michele Mayes, department manager, at Fairfield General Hospital, Pennine Acute Hospitals NHS Trust.

Case Study: Providing timely brain scans for stroke patients at Fairfield General Hospital

Challenge:
To provide increased access to rapid CT scanning for stroke patient admissions.

From the inception of the stroke service, immediate access to CT scan was available by dedicated CT radiographers from 8am to 8pm, Monday to Friday. However as Fairfield's stroke service expanded, it became apparent in order to extend this level of service, a more efficient and cost effective approach was necessary.

Solution:

- Develop training programmes for general radiographers who were already on site working a 24/7 shift rota to ensure all staff were competent in performing CT scans;
- Include radiographers within stroke team to help them to understand about the importance and impact of rapid scanning in stroke;
- Introduce a number of process improvements to streamline patient flow; e.g. redesigned CT forms to include time of onset and arrival; requests for CT scan sent ahead of the patient's arrival to speed up processes; and
- Promote teamwork, and a culture of openness to change/improvement.

Impact:
By improving access and timeliness to urgent brain scanning, we have set the stage for better care early on in the stroke care pathway and this will ultimately improve patient outcomes.

Improvements in SSNAP performance at Fairfield General Hospital:

Percentage of patients scanned within 1 hour:
In 2013/2014: 36.4%
In 2016/2017: 80.6%

Median time from arrival to scan:
In 2013/2014: 99 minutes
In 2016/2017: 18 minutes

Patient Quote
"When I arrived at the A&E department at Fairfield General there were around 30 people waiting. However I was triaged and seen by the stroke team immediately. After being assessed by a doctor I was transferred for a CT scan, all within about 10 minutes. Everything flowed really quickly from A&E to being admitted to Ward 5, the dedicated stroke unit, where an excellent service was provided" - Gerald, 81, stroke patient at Fairfield General Hospital.

Reflection:
The secret to our success has been the close working relationship between the radiographers and the stroke team which fostered excellent communication and co-operation between the two teams. The improvement in stroke imaging established a culture of pride in the part we play within the service, and ensured continued dedication to maintain our high quality service. The fact that these improvements were reflected in SSNAP results reinforced our belief that this project was having a real impact on many stroke patients under our care.

This case study was submitted by Andrea Maxwell CT lead radiographer and Michele Mayes department manager at Fairfield General Hospital, Pennine Acute Hospitals NHS Trust.

Section B: Stroke Unit Care

One of the key characteristics of a good stroke service is one where people presenting with acute stroke can be diagnosed, scanned and have urgent treatment when it is needed in A&E, and then be directly admitted to a specialist stroke unit within 4 hours of arriving at hospital.

Why is early admission to a stroke unit important?

Early admission to a stroke unit ensures that patients have the best possible chance of receiving all the correct assessments and treatments to prevent complications, such as swallowing assessments to reduce the likelihood of pneumonia and intermittent compression stockings to prevent blood clots in the legs. Early stroke unit admission also ensures that patients are looked after at the earliest opportunity by a specialist ward team of nurses, doctors and therapists. This means that it is much more likely that important stroke standards will be achieved.

What is the challenge?

A priority for stroke teams is to admit patients to a stroke unit as soon as possible which is a marker of high quality care. Getting to a stroke unit depends on many things, such as waiting times in A&E and bed availability. As you can see from the graph on the following page, these pressures are especially high at certain times of the year.

What's happening now?

The percentage of people admitted to a stroke unit within 4 hours has not improved over the last 4 years. It is not entirely clear why this improvement has stalled, but is likely due to increasing problems with bed availability for all conditions.

Percentage of patients directly admitted to a stroke unit within 4 hours of arrival at hospital:

2013/2014: 58.0%

2016/2017: 57.4%

Median time between arrival at hospital and arrival on stroke unit:

2013/2014: 3h 36 mins

2016/2017: 3h 40 mins

"Top Tip" from Yeovil District Hospital: Motivate your team to do better every time by celebrating "Star Cases"

Every month the SSNAP data clerk at Yeovil District Hospital chooses a "Star Case" to celebrate the positive effect that improved cross departmental working is having on stroke patient care. This star case is circulated to the Emergency Department (ED), radiology, ward clerks, ward team and all other departments involved in treating the patient. By crediting all individuals involved in the stroke care pathway, this practice promotes good sharing of tasks and encourages team learning. The hospital staff have reported that they really appreciate this encouraging feedback. The short turnaround times means staff are able to recall the patient in question. A 'Star' patient poster is also created and placed in the staff areas so staff of all grades are able to identify best practice and celebrate success as a team.

Caroline Smith, stroke nurse consultant at Yeovil District Hospital NHS Foundation Trust

Is there a seasonal variation in SU admission timings?

Winter is a time when the NHS is under increased pressure, as more people become unwell with winter related illnesses such as flu. SSNAP data shows most aspects of stroke care are similar across the year. One area of care that does however appear to change is the time it takes for patients to be admitted to a stroke unit. This graph shows that more patients experience delays of more than 4 hours being admitted to a stroke unit over the winter. This is likely to be the result of pressures across the health system, such as busy accident and emergency units, and hospitals having fewer empty beds to admit patients to.

Percentage of stroke patients directly admitted to a stroke unit within 4 hours

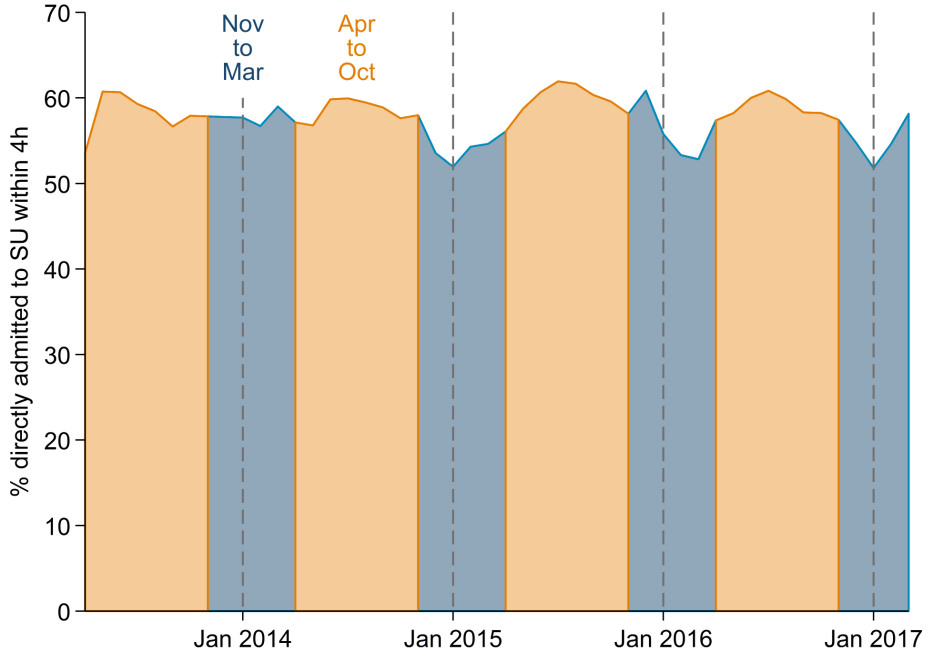


Figure 6: This graph highlights the variation in the percentage of patients being admitted quickly to a stroke unit depending on the time of the year.

Breakdown of the time it takes to get to a stroke unit after admission

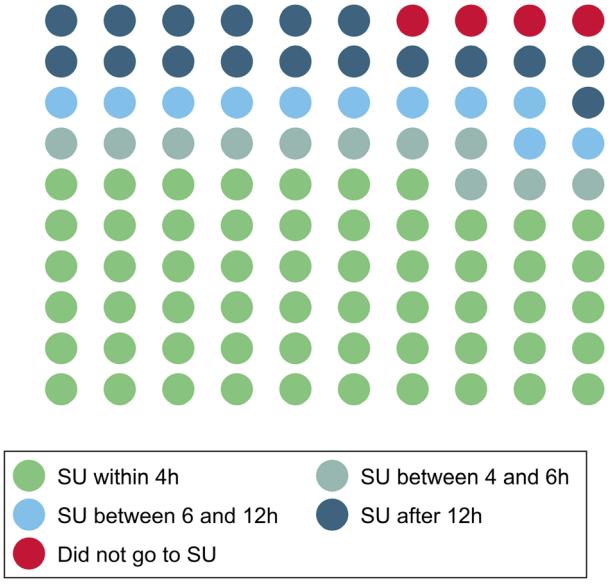


Figure 7: This graph provides a breakdown of the percentage of patients admitted to a stroke unit within 4 hours of arrival, between 4-6 hours, between 6-12 hours, and after 12 hours, as well as the percentage of patients who were never admitted to a stroke unit.

Most patients are admitted to a stroke unit within 4 hours, but a substantial minority wait more than 12 hours.

Case Study: Using SSNAP data to improve flow at Whiston Hospital

Challenge:
To minimise delays to hyper-acute stroke unit (HASU) admission for all stroke patients.

Solution:
We developed a system for checking and reviewing data. This governance process aims to help team members understand why there may be delays in getting patients to the stroke unit.

For each measure, during data input or at the review process, we identify each patient who did not achieve the measure. We then categorise each measure according to common reasons for failure.

For example, delays admitting to the HASU can be divided into:

- Delays in identifying the stroke
- Delays in referral to our team
- Delays in scanning
- Delays in assessment by our team
- Difficult diagnoses (other neurological illnesses similar to stroke making identification difficult)
- Lack of available beds
- The patient is too unwell with another serious illness to transfer to HASU

We can therefore identify the themes or common cause behind each measure. We also report qualitatively on what the delays were: for example it is important to understand the reasons that a stroke patient was not transferred to the stroke unit, or if a non-stroke patient was put into a stroke bed in the HASU, and what had been done about it.

Impact:
Many more patients are now being treated in a specialist stroke unit where they can receive specialist care by a multidisciplinary team. Similarly patients are being admitted to a stroke unit (SU) faster than in previous years ensuring acute care processes are delivered as soon as possible. This ensures that patients have the best possible chance of surviving and making a full recovery after their stroke.

Hospital arrival to SU admission:
2013/2014: 3h 26 minutes
2016/2017: 2h 33 minutes

Percentage of patients directly admitted to SU in 4 hours:
2013/2014: 55.7%
2016/2017: 73.6%

Reflection:
This feedback helps to plan how the team will respond when faced with difficult or unusual circumstances; e.g. using other CT scanners if the primary scanner is occupied. It may stimulate cross team learning about how to differentiate complex stroke patients, or reinforce HASU planning of the best use of available beds, or in putting a case forward for more beds (capacity planning). Some cases will remain clinically appropriate or unavoidable decisions – this methodology provides assurances to those unfamiliar with stroke care that the right decisions were made to deliver best care wherever possible.

This case study was submitted by Dr Andrew Hill, stroke specialist physician at St Helen's and Knowsley NHS Trust.

Section C: Multidisciplinary Team Working

What is a Multidisciplinary Team (MDT)?

A MDT team is a team of professionals who specialise in stroke care. Nurses, speech and language therapists, physiotherapists, occupational therapists, psychologists, dietitians, pharmacists and doctors make up the MDT team. The MDT team works alongside patients and their families to try to achieve the best levels of recovery before they are discharged home.

Screening and Assessments

There have been some heartening improvements in multidisciplinary care over the last 4 years which is testament to the dedication and resourcefulness of many stroke teams. One key indicator which demonstrates good team working between nurses and therapists both at weekdays and weekends is whether a patient is seen by a stroke nurse and one therapist within 24 hours, and all other relevant therapists within 72 hours. This percentage has increased steadily over the last 4 years and probably reflects greater therapy weekend working. However, a significant percentage of patients are still not receiving a timely multidisciplinary review.

Swallow Screening

The number of people receiving an initial swallow screen, to check whether they can swallow safely, has increased significantly over the last 4 years, but still a quarter of applicable patients do not have early swallow screening. The initial screen is normally carried out by swallow trained nurses, and it's very important that stroke service providers ensure that their nurses are appropriately trained in swallow screening and that there is always a nurse available on the ward capable of performing the screening assessment.

Those people who have difficulty swallowing on initial assessment need a formal swallow assessment within 72 hours of arrival by a speech and language therapist. The percentage of patients receiving this assessment has increased. It is vitally important that swallow screening and assessments are performed in a timely way, because our research has shown that delayed swallow screening and assessment is associated with an increased likelihood of developing pneumonia. See https://www.strokeaudit.org/Annual-Report/2016/Case-Studies/Early-assessments.aspx.

Nutritional Assessments

Many people with stroke are at risk of malnutrition because of swallowing and feeding difficulties, or nutritional problems prior to stroke. We know that malnutrition reduces the chance of survival after stroke and can cause additional complications such as pneumonia, so timely recognition and intervention for those at risk is really important.

It is encouraging to report that there has been a very significant improvement in the number of people receiving a formal nutrition screening and assessment by a dietitian if needed before leaving hospital, which means they are much more likely to receive the nutritional support they need.

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

2013/2014: 63.6%

2016/2017: 73.8%

If applicable, percentage of patients who receive a swallow assessment within 72 hours:

2013/2014: 78.3%

2016/2017: 87.0%

If applicable, percentage of patients screened for malnutrition and seen by a dietitian before leaving hospital:

2013/2014: 65.5%

2016/2017: 82.6%

Case Study: Providing an excellent dietetic service to stroke patients at St Thomas' Hospital

Challenge:
To reduce rates of dehydration and malnutrition after stroke.

Solution:
Process Changes

- Patients are weighed on admission and then weekly thereafter with members of the nursing and therapy team actively involved with this.
- Patients who are unable to obtain adequate nutrition and hydration by mouth are quickly considered for tube feeding with the dietitian trained to support the nursing staff with timing the insertions.
- Mealtimes revised to give the best possible support with eating and drinking – patients receive traffic light coloured trays to help identify feeding requirements and adapted cutlery to maximise independence.
- A mealtime coordinator ensures that patients safely receive their meals and document special requirements centrally on the ward.
- Nasal bridles (an effective and safe way to secure a patient's nasal tube) are used as routine for patients who are unable to tolerate tube feeding and experience frequent tube dislodgement.

Team working and Organisational changes

- Ensure a specialist dietitian is available to advise staff at ward meeting about individual patients;
- Ensure a specialist dietitian educates the wider MDT team on risk of malnutrition as outlined in the 2016 RCP guideline for stroke, troubleshooting and joined up multidisciplinary working; and
- Maintain strong links with dietitians working in the community to ensure that those patients discharged from hospital who require nutritional support continue to receive the care they need in a home environment.

Education to embed good practice

- Maintain regular education and training opportunities for staff; and
- Embed into nursing culture the importance of completing nutrition screening tool on admission and then weekly thereafter with timely dietitian referral and input for those at risk. Nutrition and hydration is everyone's business.

Impact:
The risk of malnutrition after stroke has been minimised by changing practice, structure and education across the multidisciplinary team (MDT) caring for patients. Changes to our service have enabled the unit to consistently identify and provide support for people at risk of malnutrition. This has been demonstrated by achieving the SSNAP standard of 100% of patients being screened for risk of malnutrition and 100% of those identified at risk being referred to and seen by a dietitian prior to discharge.

This case study was submitted by Alex Lang, Stroke and Elderly Care Dietitian at Guy's and St Thomas' NHS Foundation Trust. The team that lead this QI hospital included Marion Kagka, Angela Roots, Dr Jonathan Birns, Nicky Green, Daniela Torcoli, and Dr Ajay Bhalla.

The MDT team at St Thomas' Hospital

Therapy provision in hospital

It is very common for people with stroke to feel that they did not receive enough therapy to help them recover as well they could do, whether in hospital or in a home environment. 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. This is in accordance with the NICE quality standard for stroke https://www.nice.org.uk/guidance/qs2/uptake.

The percentage of people receiving this standard of physiotherapy and occupational therapy has improved over the last 4 years, but there are still many patients who do not receive the amount of therapy rehabilitation that they need. SSNAP data continues to suggest that therapists are struggling to provide adequate intensity levels of therapy on the wards and in the community.

Compliance against OT, PT, SALT targets:

Physiotherapy (PT)

2013/2014: 54.4%

2016/2017: 79.5%

Occupational therapy (OT)

2013/2014: 54.9%

2016/2017: 83.8%

Speech and language therapy (SALT)

2013/2014: 25.2%

2016/2017: 49.2%

Percentage of patients assessed by physiotherapist, occupational therapist, and speech and language therapist within 72 hours

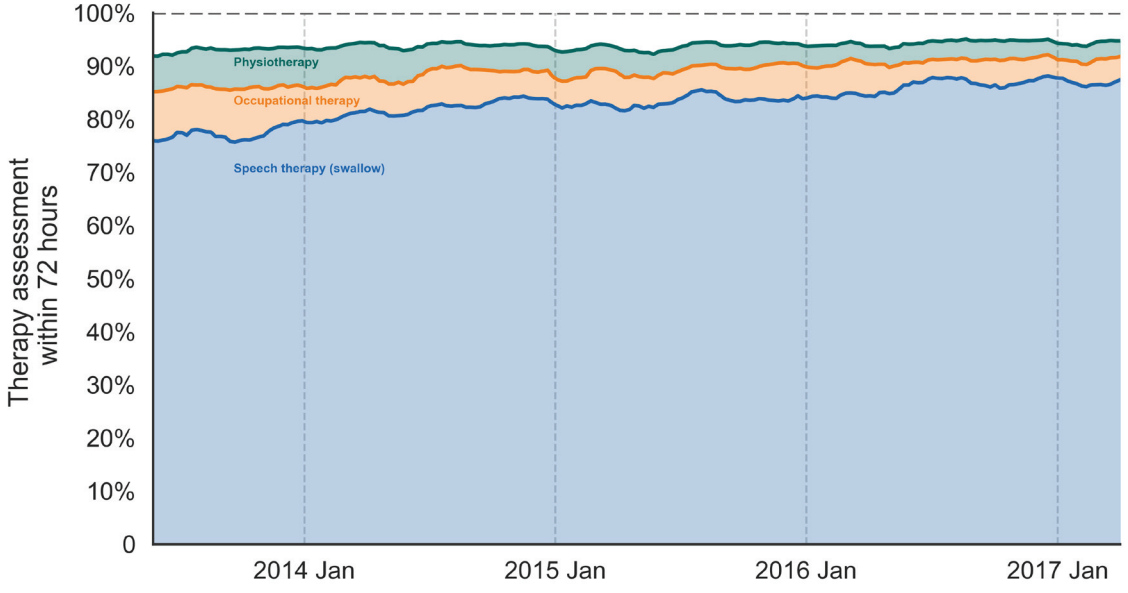
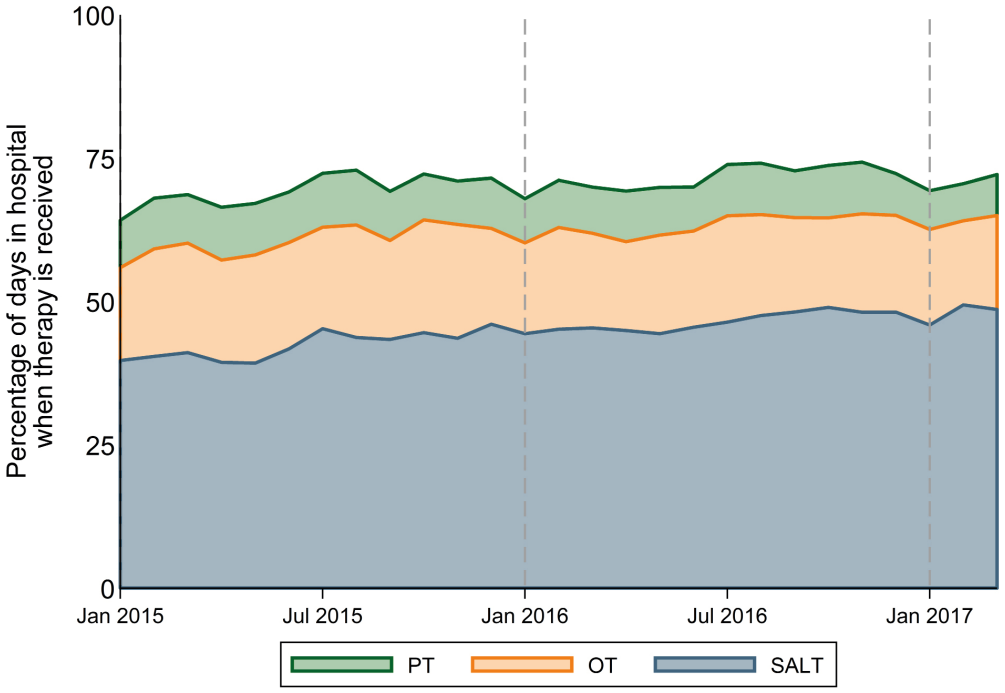


Figure 8: This graph shows the increasing percentage of patients assessed within 72 hours by a physiotherapist, occupational therapist, and speech and language therapist between 2013 and 2017.

Percentage of days in hospital when therapy is received



Source: SSNAP National Results 2015-2017

Figure 9: This graph shows the average percentage of days on which patients receive some occupational therapy, physiotherapy and speech and language therapy while in hospital from January 2015 to March 2017.

"Top Tips" from Cwm Taf University Health Board: Providing a high quality speech and language therapy (SALT) service

Find and maintain leaders: An experienced associate practitioner who can carry out therapy plans is critical to the provision of a high quality SALT service.

Follow a targeted and consistent approach based on international stroke standards: Introduce effective tools such as Therapy Outcome Measure (TOM) to ensure a robust approach to establishing patient status across the ICF framework (a classification system for measuring health and disability), and for focusing therapists on the purpose and type of intervention they should provide.

Therapy packs: Develop therapy packs to target specific standards (International Classification Framework based outcomes) to ensure consistency of therapy across the team and improve communication.

Nurse involvement: Stroke competent therapy nurses who can further support therapy plans ensures therapy is carried over to weekends and bank holidays.

Measure impact and repeat: SSNAP results are assessed to measure effect of changes and guide future work plans.

Seek and respond to feedback: *"I like having something to keep me busy"* - Stroke patient

"Training has provided increased knowledge which has been key in providing a better service, this has enabled us to provide a better continuity of care for the patient." - Stroke nurse

Kathryn Head, clinical lead speech and language therapist, at Cwm Taf University Health Board.

Case Study: Improving occupational therapy provision at St Thomas' hospital

Challenge:
To increase access to and quality of therapy provided at an acute rehabilitation stroke unit.

In 2014/15 the unit did not achieve 45 minutes daily occupational therapy (OT) and only half of patients were accessing occupational therapy.

Solution:
Maximised use of resources

- Developed an assessment tool for families to complete home assessments themselves to reduce the need for occupational therapists to travel to patients' homes, and thereby increase therapy time delivered to patients as a result;
- Divided up therapy time during the day to incorporate 45 minute therapy target for those individuals who may not be able to tolerate a single session; and
- Embedded daily rehabilitation timetabling across the whole in-patient pathway embedded within 'team timetabling'. This ensured capacity and priorities were managed across whole team.

Organisational change

- Piloted a research project to demonstrate feasibility of home environment assessment using information technology (iPads);
- Prioritised new admissions within 24 hours to establish rehabilitation plans and increase the number of days which patents are treated by OT;
- Developed creative group therapy sessions to ensure daily intensive rehabilitation through "Brunch and Lunch" groups thereby ensuring therapeutic and social interactive benefits.

Improved team working

- Collaborative joint working between social services and OT resulting in a seamless referral process avoiding bureaucratic processes; and
- Monthly 'working group' led by OT, ensuring service delivery and quality improvement projects are highlighted, prioritised and enacted.

Impact:
The stroke unit at St Thomas' has consistently achieved a SSNAP score of A for OT since these changes have been made. The project also provided a blue print template for the Trust to have achieved an overall SSNAP score of A consistently across 2015-17 (one of very few A scoring stand-alone non HASU stroke services in London). The hospital has achieved the lowest quartile median length of stay in London. There are approximately 1% referral rates to tertiary neuro-rehabilittaion inpatient beds due to efficiency working between in-patient and stroke community services lead by OT.

This case study was submitted by Dr Ajay Bhalla, consultant stroke physician, and Nicole Walmsley, occupational therapist, at Guys and St Thomas' NHS Foundation Trust.

Members of the stroke team at St Thomas' Hospital

Section D: Improving care for patients with intracerebral haemorrhage (ICH)

Most strokes are caused by a blood clot blocking an artery supplying oxygen to the brain, called an infarction. However between 10% and 12% are caused by intracerebral haemorrhage (ICH), due to bleeding within the brain itself, due to a rupture of a blood vessel. Brain haemorrhage has for many years been seen as the type of stroke for which there was no treatment, and indeed death rates are higher for people with haemorrhage, and they have not changed significantly in 30 years. Recent SSNAP data confirms that the changes in survival after ICH stroke are lower than ischaemic stroke.

However, there has been a growing interest in ICH in the stroke research community and findings from recent studies suggest that a more active approach to ICH management is needed. Research has shown some benefits in the lowering of blood pressure acutely, and with an increasing number of people being diagnosed with atrial fibrillation and anticoagulated (receiving blood thinning treatment), a focus on acute reversal of anticoagulation where possible (restoring blood clotting to normal after a haemorrhage). There are also some ongoing research studies of minimally invasive surgical treatments in haemorrhage which is an exciting development in stroke. The challenge now is to ensure these findings are put into practice. A cultural shift is required as people with ICH were historically thought unlikely to survive. Stroke teams now need to be aware of the evidence for acute interventions.

"Top Tips" from Salford Royal Hospital: How to run an effective QI project

1. Set a clear, measurable, time-constrained target for your project. Make sure it's something to inspire the team to get 'buy-in'.
2. Set up rapid collection of data so you can continuously monitor performance, tapping in to existing data collection through SSNAP as far as possible. Don't be tempted to collect additional data unless you really need it. Data collection can become very time consuming if you overdo it, but it's essential for quickly working towards your goals. It's important to get this balance right.
3. Publicise your project as widely as possible and make sure you get key local leaders on your side (senior managers and clinicians). They can help remove barriers that you will encounter.
4. Celebrate success with the wider team. Let them know when things are going well as positive feedback can be very encouraging. Likewise, involve others in the project.

Dr Adrian Parry-Jones; NIHR clinician scientist & honorary consultant neurologist; University of Manchester & Salford Royal NHS Foundation Trust

Survival rates after ischaemic and ICH stroke

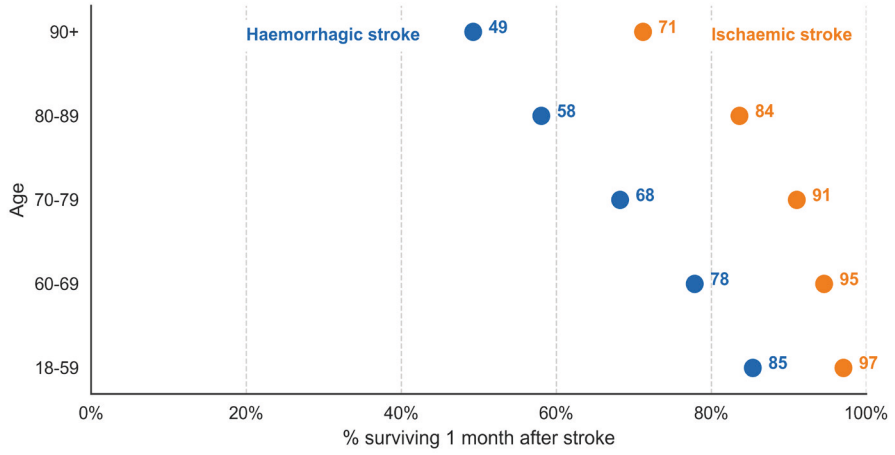


Figure 10: This graph shows the percentage of people who are still alive 30 days after ischaemic and haemorrhagic stroke broken down by age. It is clear that likelihood of surviving ICH is lower than for ischaemic stroke for all age groups.

Case Study: Putting evidence into practice - Developing a bundle of care to measure impact of intracerebral haemorrhage intervention at Salford Royal Hospital

Challenge:
To transform an established culture of nihilism to a 'can do', proactive approach in treating intracerebral haemorrhage (ICH) patients which is embraced by clinicians

(Details on the research trial on which this QI case study is based is available here https://www.strokeaudit.org/AnnualReport/Case-Studies/Treating-Intracerebral.aspx)

Solution:
Applied the evidence in a simple, structured way
Developed an accessible, realistic bundle of care processes called the "ABC care bundle", which combined a number of evidence based treatments for ICH patients.

Adopted a standardised, measurable approach which established process targets for:
1. Anticoagulant (blood thinning drugs) reversal
2. Blood pressure (BP) lowering
3. Agreed care pathway to ensure rapid and timely referral to neurosurgery for those likely to benefit

Established a quick and steady flow of key data
Collected just enough data to understand key processes.

Tested changes, measured impact, implemented findings
Performed 'Plan-Do-Study-Act' cycles to test changes and met regularly to discuss findings. For example, after reviewing records of cases, we quickly realised that the need for a doctor to administer the first line drug (labetalol) for BP lowering was delaying treatment. Therefore, we predicted that using another type of BP lowering drug (GTN) instead would allow the nursing team to take ownership of the dosing. We tested this change, which led to a dramatic reduction in the time to reach target BP. We thus implemented this change with long-term benefit.

Impact:
- Improvements in the speed of blood pressure lowering (median needle-to-target time reduced to 65 min after vs. 371 min before)
- Increased number of patients undergoing neurosurgery for ICH from 2 per month to 4 per month.
- An increase in supportive care, with more patients going to critical care (29.2% after vs. 18.4% before) and a reduction in early (<24 h) do-not-resuscitate orders (22.8% after vs. 33.7% before).
- The project was associated with a 31% reduction in 30-day mortality for patients admitted to our centre.

Next Steps:
We are currently scaling this work up across the centralised stroke pathway in Greater Manchester and assessing the impact on both recovery and survival by collecting modified Rankin scale scores at 6 months.

This case study was submitted by Dr Adrian Parry-Jones; NIHR clinician scientist & honorary consultant neurologist; University of Manchester & Salford Royal NHS Foundation Trust.

Dr Adrian Parry Jones, lead author of research paper "Care -limiting decisions in acute stroke and assocation with survival"

Section E: Preventing Deep Vein Thrombosis

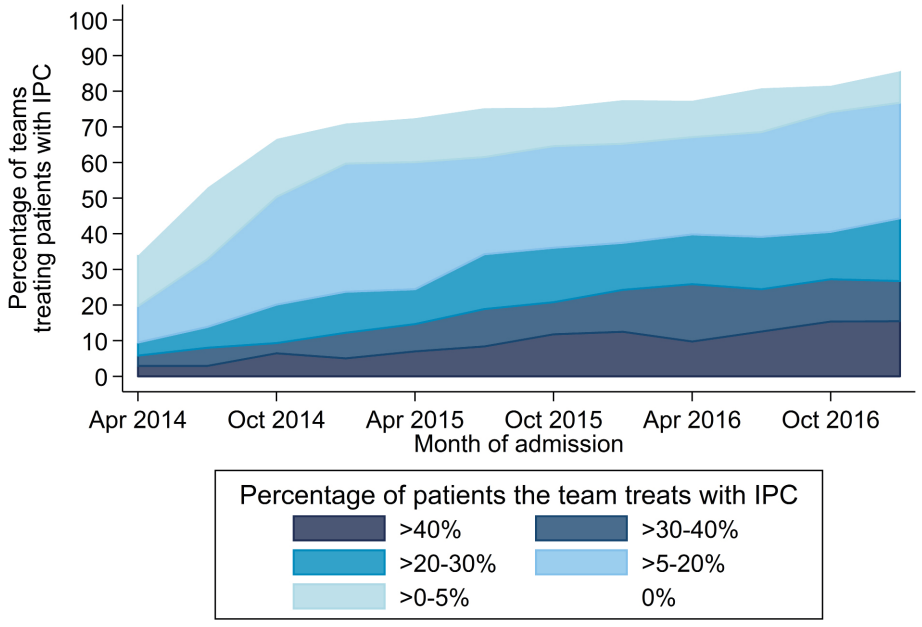
It is common for people with stroke to be immobile, or at least less mobile than usual, which makes them at higher risk of blood clots in the legs, or deep vein thrombosis (DVT). DVT can cause pulmonary embolus and its prevention is seen as a priority in hospital. The usual preventative treatment for non-stroke patients is low dose heparin, but this is not suitable for people with stroke who may be at increased risk of bleeding into the brain. Research has shown that IPC (intermittent pneumatic compression) devices, which are soft plastic sleeves worn around the legs whilst the patient is immobile, can safely reduce the likelihood of DVT. Given that around 60% of patients are immobile and can't walk independently after their stroke, the percentage of services that use IPC for stroke patients remains low, which means that a significant percentage of people are exposed to unnecessary risk of DVT.

Patients who have intermittent pneumatic compression applied at any point in hospital:

2014/2015: 8.6%

2016/2017: 20.8%

Uptake of Intermittent Pneumatic Compression



Source: SSNAP Apr 2014-Mar 2017

Figure 11: This graph illustrates the uptake of IPC by acute teams from April 2014 – March 2017. It shows that more teams are now treating at least some patients with IPC, but most teams are still treating fewer patients than expected

"Top Tips" from Royal Cornwall Hospitals NHS Trust: Effectively implementing IPC guidelines

1. Engage clinicians: Not only doctors but all nurses, healthcare assistants, and therapists. Use posters on ward to remind staff when setting up service.
2. Train staff: Ensure all staff trained using the STARS (Stroke Training and Awareness Resources) VTE module.
3. Spread good news: When audit shows good performance let staff know, we use ward newsletter.
4. Educate patients and carers: Use an information leaflet – we incorporate this into our generic stroke info pack which all ward patients are given.

Francis Harrington, stroke specialist consultant at Royal Cornwall Hospitals NHS Trust.

Patient Experience: IPC application after stroke

I was admitted to Phoenix ward after having a stroke affecting my left side. Not long after admission to the ward a nurse approached me to discuss having 'pumps' applied to my legs. The nurse explained to me that these were to prevent me from getting a blood clot. I was more than happy to have them applied and once I had adjusted to the feeling of them pumping up and down, I found them quite comfortable. As soon as I was able to get up and mobilise I no longer required them so they were removed. In total I think I had them on for about 6-7 days and would have no problem having them on again if needed.

This piece was written by Adrian, 59, stroke patient at Royal Cornwall Hospital.

Patient having IPC applied at Royal Cornwall Hospital

Case Study: Effective Intermittent Pneumatic Compression (IPC) management at Worthing Hospital

Challenge:
Putting Research into practice – Establishing agreed protocols for administering IPC.

Solution:
Cultural Changes

- Results from research trials were further analysed and best practices were established. Guidance on IPC application was agreed at local level with consultants and these protocols were shared with the wider team.
- Mini teaching sessions for nurses and the wider MDT team were held. Clear communication channels were established with the pharmacy team to ensure that IPCs could be electronically prescribed.

Process changes

- Guidelines were created which are clearly displayed on the ward.
- IPCs were added to nurses' daily bedside checklist (2x per day).
- IPC stickers were put in the medical notes alerting the doctor and consultant if IPCs were no longer in use, the reason a decision was made to remove them, and whether alternative treatment should be considered.

Measure and repeat

- The impact of process changes such as introduction of bedside checklist to measure effect were audited.
- The audit will be repeated in six months' time to measure changes over time.

Impact:
Patients applied with IPC at Worthing Hospital
2014/2015: 39.7%
2016/2017: 55.6%

This case study was submitted by Johanne Midgley, ward sister at Western Sussex Hospitals NHS Trust.

Section F: Psychology provision and mood disturbance after stroke

SSNAP records the numbers of patients who need a psychologist during their inpatient stay. It is concerning that only one patient in 20 is documented as needing a review by a psychologist, when some of the main concerns of people with stroke relate to its psychological consequences, for example, mood disturbance, and memory and concentration difficulties. On average patients who require psychological treatment in hospital are only receiving it on 10% of the days that they are in hospital. These data suggest that there is a striking inadequacy in psychological services for inpatients with stroke.

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 has significantly improved. Since people are much more likely to receive the support they need if they and their therapists are aware of problems.

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

2013/2014: 78.6%

2016/2017: 91.3%

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

2013/2014: 5.8%

2016/2017: 10.2%

The stroke team at Imperial College Hospital.

"Top Tips" from Charing Cross Hospital: Providing high quality psychological service to patients after stroke

- Communicate updates to the wider MDT team and involve them;
- Think about who are your key members of the team;
- Involve your local communications team; and
- Share your project with others and celebrate them. There are so many great things that healthcare professionals do every day but we don't talk about them. Instead we tend to focus on what's not good enough.

Ismalia De Sousa, clinical stroke nurse specialist at Imperial Healthcare NHS Trust.

Case Study: Identifying and supporting patients with mood disturbance after stroke at Charing Cross Hospital

Challenge:
To provide high quality emotional support to patients after their stroke.

Solution:

- Held monthly team meeting to review and interpret SSNAP data and understand the current level of service being provided to patients with mood and cognition problems;
- Adopted a 'bottom to top' approach where members of the multidisciplinary team (MDT) formed QI groups who worked autonomously on a specific area of care which needed improving searching for solutions independently;
- Ensured the QI projects were driven by patient experience- 'How are you feeling?';
- Developed a patient leaflet on emotional issues after stroke which is available to all patients;
- Wrote a piece on psychological issues after stroke for the trust magazine to spread awareness;
- Carried out staff training about the importance of understanding a patient's emotional state after stroke so the team are better equipped to handle problems related to mood and cognition;
- Invited a stroke survivor to talk about the psychological impact of stroke to ensure all members of the MDT appreciated the complexities of the conditions; and
- Incorporated mood assessments on electronic documentation.

Impact:
This team is now much more aware of emotional problems after stroke and understands the importance of asking the 'How are you feeling?' question. The number of referrals to psychology have increased and there are more cross team collaborations, whereby other members of staff such as nurses and doctors contact the psychologist to discuss a patient needs.

If applicable, screened for mood by discharge from inpatient care (Charing Cross HASU):
2013/2014: 54.5%
2016/2017: 81.3%

Patient Quotes:
"I'm only 40 years old, yet the threat of having another stroke is constant. I have made a lot of progress but I still need regular cognitive behavioural therapy. If my state of mind hadn't been picked up by Ismalia and I hadn't been referred to Graham, I dread to think what emotional state I'd be in today."
- Stroke patient at Charing Cross Hospital

"A form of relief came the day Ismalia, a clinical nurse specialist in stroke, asked me: 'How are you feeling?' I burst into tears. With this simple question and the time given for me to explain, I told Ismalia about my anxious state of mind. She referred me to Dr Graham Jensch, the clinical psychologist for stroke patients."
- Stroke patient at Charing Cross Hospital

This case study was submitted by Ismalia De Sousa, clinical stroke nurse specialist at Imperial College Healthcare NHS Trust.

Patient Experience: Highlighting the need for long term psychological support after stroke

I had a major stroke in 2004, aged 18, after being involved in a car accident. I had sideways whiplash and it caused a clot which grew over 6 weeks and led to a carotid artery dissection. I could not talk, walk, write or control my bladder, my dominant right side felt like a sack of potatoes and I had terrible memory and fatigue. After the first two days in Macclesfield Hospital, I spent the next 9 weeks in Salford Royal and I was discharged and went home. The last time I had physically walked through the front door, I was a free and easy able-bodied girl. This time I was disabled and in a wheelchair. I was unable to take my place at university and all my friends were leaving home and becoming independent.

I had speech therapy a few times but they did not get very far. Occupational therapists (OTs) initially came to our house, and I had weekly neuro-physiotherapy appointments, but the psychological support was nonexistent.

I realised after a few months that I would not get the use of my dominant hand back and I would permanently have to wear a clumpy foot-splint to counter-act my drop-foot to walk, and to top it off, I was unable to talk about it so I was internalising very intense emotions. Charlotte had instantly disappeared. I lost my identity; all my expectations and aspirations had gone. I was grieving for the life I had lost and I actually did not appreciate that at the time because the suddenness of it was so overwhelming.

I did not want to face the new life before me and I desperately tried to hide my disabilities. A year later I developed depression in the form of anorexia, a complex mental illness, because of this. I was in complete denial and I felt mental horror of my new body and life ahead.

Not long after, I was sectioned under the Mental Health Act because my weight was critically low and I stayed at the Eating Disorder Clinic in Macclesfield for three months. I saw lots of eating disorder counsellors who were nice but they certainly were not helping me. I was then put on a waiting list that was over one year long but my parents put pressure on the clinic to help me and they found a counsellor who specialised in bereavement of loss of limb – or loss of use of limb in my case - and I slowly got better over the next few years.

Living with disabilities and the effects of stroke have been very hard to cope with and over the years I have had blips of depression. I relapsed with anorexia two years ago and I had to seek a private emotional counsellor again because I needed professional help in processing my emotions relating to the stroke at a different stage in my life. Only now (thirteen years later), I have eventually accepted my new life and I feel adequately equipped to deal with my future life although I realise that I will probably need some emotional support in the future.

I strongly believe when a very young person has a major stroke it is a truly catastrophic and life-long changing event. He or she does not have the life experience and tools to cope so physical and emotional support is critically important. It really is a long and winding road to recovery. The knowledge of stroke, particularly in younger people, was sadly lacking at that time in my local hospital due to the absence of a dedicated stroke unit and a MRI scanner for quick diagnosis. Thankfully I was transferred to Salford Royal Hospital into the wonderful care of Professor Pippa Tyrrell. The aftercare was a terrible problem too with absolutely no psychological counselling or support and a severe lack of neuro-physiotherapy. My parents kept being told in Salford that I was "out of area" so

I was not entitled to support!
My personal story exposes the high cost in human-terms of neglecting to give psychological support to young stroke survivors. The very substantial subsequent costs to the NHS could and should have been mitigated by offering much better immediate medical care followed by the necessary psychological support and if I had this, I do not believe I would have developed life-threatening anorexia.

I have ongoing neuro-physiotherapy to prevent my body deteriorating and I am fortunate to be able to get private treatment as there is lack of NHS resources in this vital area. Similarly, there are long waiting lists for psychological counselling and these delays can have tragic consequences for young stroke survivors as well as leading to very high costs for the NHS.

I want to do all in my power for future young stroke survivors to get the care they need and hence my willingness to assist Stroke Association in highlighting this most important issue.

This piece was written by Charlotte Covey, 32.

Section G: Organising effective stroke care

Importance of specialist stroke centres

Stroke services always used to be provided in local hospitals, so on average a hospital might admit 1-2 patients with stroke each day. As stroke care has become increasingly complex it has become obvious that specialist stroke teams are vital to provide high quality stroke care, and that they need to be available 24 hours a day, 7 days a week. A number of regions have reviewed the way that they provide services, and have worked together across an area to assess how resources can used most effectively. Although many people understandably feel concerned if all services are not available at their local hospital, there is a balance to be struck between the benefits of local availability or having to travel to a hyperacute stroke unit (HASU) that is set up and ready for people with acute stroke whatever the time of day or day of the week. This is particularly important for specialist treatments such as thrombolysis or thrombectomy, and for better treatment of brain haemorrhage. However people in Hyperacute Stroke Units (HASUs) are also more likely to receive all the other elements of care that they need, such as swallow assessment, in a timely fashion.

What is thrombolysis?

Thrombolysis (clot busting drugs) is a treatment administered to stroke patients which can break down and disperse a clot that is preventing blood from reaching the brain. Breaking down a blood clot can restore blood flow to the brain, saving brain cells from damage and reducing disability after stroke. This intervention has had a profound effect on how stroke patients are treated in recent years. Up to 20% of stroke patients are eligible for thrombolysis, but this depends on whether patients can get to a hospital that offers thrombolysis fast enough. Clot busting drugs are more effective the quicker they are given so it is important for ambulance services and admitting hospitals across the country to be organised in a way that ensures patients who could benefit from this treatment are able to receive it as soon as possible. Both the time it takes for a patient to be taken to hospital after stroke (onset to arrival time), and the time from arriving at hospital to being thrombolysed (door to needle time), are therefore vitally important measures to focus on in order to improve patient outcomes after stroke. When every minute counts, even marginal gains along the pathway can can have a big impact to patients.

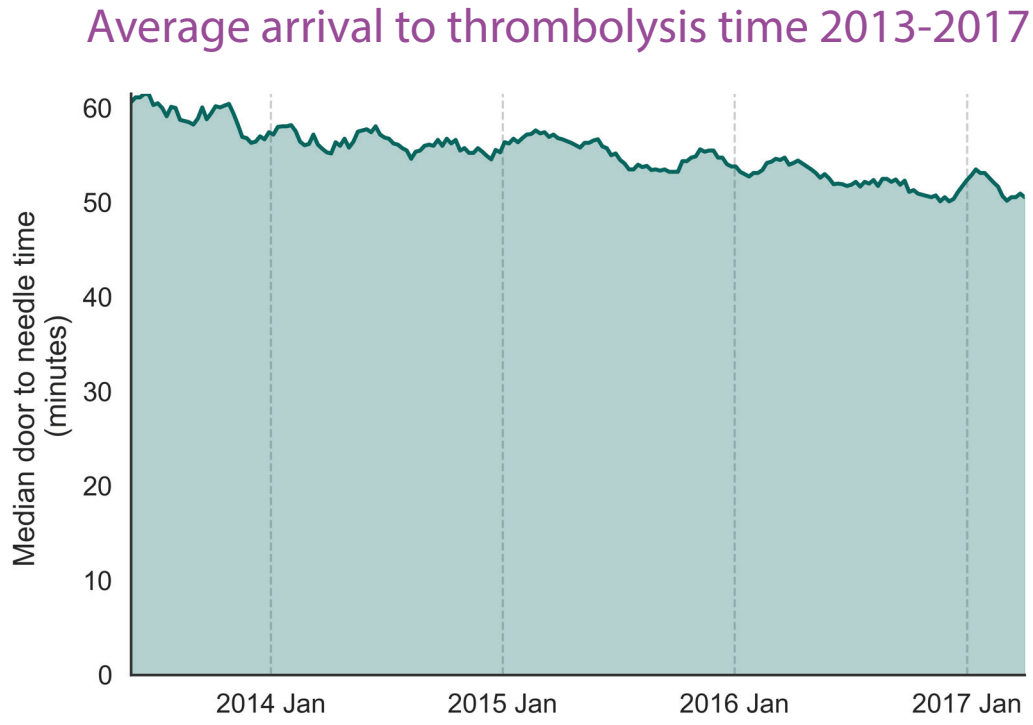


Figure 12: This graph demonstrates the reduction in hospital arrival to thrombolysis times (door to needle time) from January 2013 to March 2017.

Case Study: Promoting quality improvement using data modelling techniques in the South West

Challenge:
How to organise stroke services in a way which ensures that thrombolysis is provided as quickly as possible to those stroke patients who could benefit from it.

Solution:
Collaboration formed between SSNAP and the operational modellers at the South West Peninsula Collaboration for Leadership in Applied Health Research and Care (PenCLAHRC).

- Evaluated current state of play: Compared individual site performance with national norms to highlight variations in thrombolysis provision.
- Established important performance measures: 3 parameters identified which focused on what would clinically benefit people with stroke if rates were improved; increasing the proportion of patients with a known onset time; shortening the door-to-needle time; increasing the proportion of patients that are treated having been scanned with 30 minutes remaining in the licence period for alteplase (the clot busting drug used to administer thrombolysis).
- Highlighted potential gains from improving processes: The modelling team used SSNAP data from 7 acute stroke sites in the South West to model a potential three-fold increase in the number of stroke patients successfully thrombolysed and left with minimal disability compared to current practice.
- Used results to gain clinical buy in and build momentum.

This modelling work helped to foster a region wide acceptance of the improved patient outcomes that were possible by incrementally improving each metric, and acted as the stimulus to deliver a treatment rate that may not previously have been considered achievable.

Impact:
Targeted quality improvement activity in several of these sites in response to the thrombolysis modelling work is already delivering improved treatment rates and door-to-needle times: for example, at Derriford Hospital, Plymouth, they have increased their thrombolysis rate by a third (from 8.0% to 11.7%) over the last two years, with a corresponding fall in door-to-needle times of 16 mins (from 69 minutes to 53 minutes). There is a growing acceptance now that relatively modest amendments to clinical practice and expectations can yield significant improvements in thrombolysis rates.

Next Steps:
We intend to apply this same modelling analysis and quality improvement methodology to the increasing numbers of patients receiving mechanical thrombectomy– modelling processes and outcomes in the comprehensive stroke centres delivering the treatment as well as the new quality measure of 'door-in door-out' time at referring primary stroke centres.

Reflection:
Quality improvement driven by national comparative audit offers the prospect of accelerating the implementation of a paradigm shift in the treatment of acute ischaemic stroke, and reaching the point where nearly 1,500 people with severe stroke annually are spared major disability with its enormous personal, health and social care costs.

This case study was submitted by Dr Martin James, consultant stroke physician at Royal Devon and Exeter NHS Foundation Trust.

A Turning Point for Stroke Services in Greater Manchester

In 2004, just after our Acute Stroke Unit in Salford Royal had opened, I was in the hospital early on a Saturday, seeing patients on the wards and acute stroke admissions in the A&E department. We had recently started thrombolysing, so we had set up our systems to ensure we could offer urgent brain scanning for all stroke patients.

Late that afternoon I had a phone call from another hospital, not far away. An 18 year old girl had been admitted after collapsing at work at 9am that morning. Her colleagues had dialled 999, the paramedics arrived rapidly and took her, as they were supposed to, to the nearest A&E department although it would have been almost the same distance to bring her to Salford. Her symptoms were not initially recognised in the other hospital as a stroke, and she spent the entire day in A&E until late that afternoon someone thought perhaps she might have had a stroke. I was phoned and asked if it was too late for thrombolysis. It was of course. I did arrange for her to be transferred to our hospital but I always wondered what would have happened if instead of turning one way from her place of work, the ambulance had turned the other and brought her to our hospital where we were set up and waiting to manage acute stroke patients.

This experience made me realise that while we were improving services for our local population, there were other people, not far away, who did not have access to the specialist stroke treatments we could provide. As a result, we started discussions with commissioners of services across Greater Manchester to see how we could all work together to ensure everyone with acute stroke could access the same high quality services.

This piece was written by Professor Pippa Tyrrell, consultant stroke physician at Salford Royal Hospital.

What is the data showing?

Between 2004 and the present thrombolysis rates have increased as services have developed to 7 days per week and regions have taken a coordinated approach, providing services operating in partnership between a number of hospitals. Of patients who received thrombolysis in 2016/2017, the average time between arriving at hospital and receiving thrombolysis was 52 minutes, which represents a reduction of 6 minutes since 2013/2014 which is encouraging as the faster it is given the greater the effect.

Percentage of all patients who receive thrombolysis:

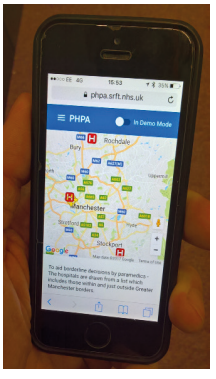
2004: 1%

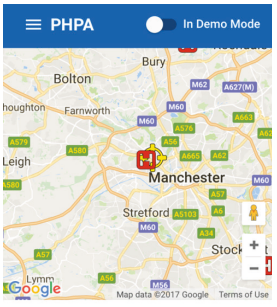
2008: 1.8%

2013/2014: 11.6%

2016/2017: 11.6%

Chris Ashton, Greater Manchester Stroke Network Coordinator and founder of the ambulance app described on the following page.





To aid borderline decisions by paramedics - The hospitals are drawn from a list which includes those within and just outside Greater Manchester borders.

Screenshots from ambulance app developed in Greater Manchester.

Case Study: Developing a mobile app for ambulances in the Greater Manchester area

Challenge:
To improve stroke diagnosis and subsequent transfer of suspected stroke patients to appropriate hospital.

Solution:
Develop an 'ambulance app' to support decision making and help clinicians make the right choice of hospital more rapidly by:

- Ensuring more patients are correctly identified as a stroke mimic through appropriate use of assessments;
- Ensuring pathway exclusions are followed and inappropriate patients are taken to their local/nearest hospital as required by the protocol.
- Co-designing the app with end users, so that it is accessible to a diverse population and focuses on delivering the most significant benefit in terms of outcomes and cost savings.

Impact:

- Reduced the % of stroke mimics attending the Hyper Acute Stroke Units (HASUs). This saves clinician time and creates health benefits for other stroke patients.
- Increased the % of 'pathway exclusion patients' (people who are deemed to be too sick to make an extended journey to a HASU) being quickly transferred to nearest accepting hospital.
- Reduced uncertainly for ambulance staff, particularly when they are working in areas where they have poor geographical knowledge.
- Improved patient experience.

It will result in cost savings at four levels:

a) HASU: Reduction in less poorly 'out of area' medical patients being admitted to the medical or general wards.
b) HASU: In terms of increased assessment time availability due to a reduction in presentations.
c) Ambulance service: Reduction in the number of repatriations back to the patient's local hospital (double ambulance journeys).
d) Wider NHS: Additional availability of ambulances for responding to other 999 calls due to efficiency gains in ambulances stroke service response times.

Feedback:
"The app comes across as a brilliant, simple and effective idea that reduces the need for paramedics to carry around pieces of paper and allows them to instantly decide on the most appropriate place of care based on the symptoms they may be presenting with. Having experienced a stroke myself, I vividly remember the paramedic on that day trying to work out and discuss where he should take me. This app would have made that decision clearer and faster for him on that occasion."
- Ann Bamford, stroke patient and chair of the Greater Manchester Stroke Operational Delivery Network (GMSODN) patient and carer group.

Next Steps:
The app is currently on trial with more than 70 paramedics/technicians across the region and we will be looking to rollout to all GM and bordering staff after the first few months of phase 1 are complete. Currently, analytical usage is being recorded within the app and feedback from users being gathered. Once sufficient data is obtained (projected 2 months), we will then roll out the innovation to the whole Greater Manchester pre hospital workforce at phase 2 of the project, with the support of the North West Ambulance Service.

This case study was submitted by Chris Ashton, Greater Manchester Stroke Network coordinator & HCPC registered paramedic.

Section H: Rolling out thrombectomy services

What is thrombectomy?

Thrombectomy (intra-arterial intervention) is an exciting new development in ischaemic stroke which involves direct removal of clot using a device passed up into the blocked artery usually from the femoral artery in the groin. This procedure has been tested in research trials and shown to improve outcome in carefully selected patients, if it is performed within a few hours of stroke. It involves more detailed brain imaging at the time of presentation (usually a CT angiogram done just after the CT brain scan) and specialist management by a neuroradiologist.

What is the challenge?

Facilities for thrombectomy are only available in a relatively small number of centres, and there is a shortage of trained staff to perform the procedure. The Stroke Association and NHS England have been at the forefront in championing this new treatment, and thinking through the practical and logistical issues necessary to eventually be able to offer this procedure to everyone who needs it.

What is the data showing?

Between April 2016 and March 2017, it was reported that thrombectomy was started in 580 patients out of 74216 ischaemic stroke patients in England, Wales and Northern Ireland. The device was deployed in 537 of these interventions.

Number of patients who received intra-arterial intervention

2016/2017: 537 patients

Number of stroke centres providing intra-arterial intervention

2016/2017: 25 centres

Where can I find more information?

SSNAP have produced a full thrombectomy report which highlights national level and hospital level results for patients who had intra-arterial intervention information recorded on SSNAP. See https://www.strokeaudit.org/results/Clinical-audit/National-Results.aspx.

Change in condition for patients who received thrombectomy

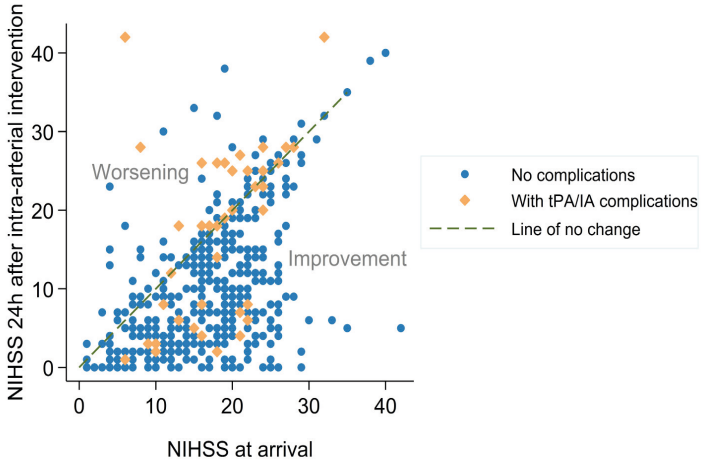
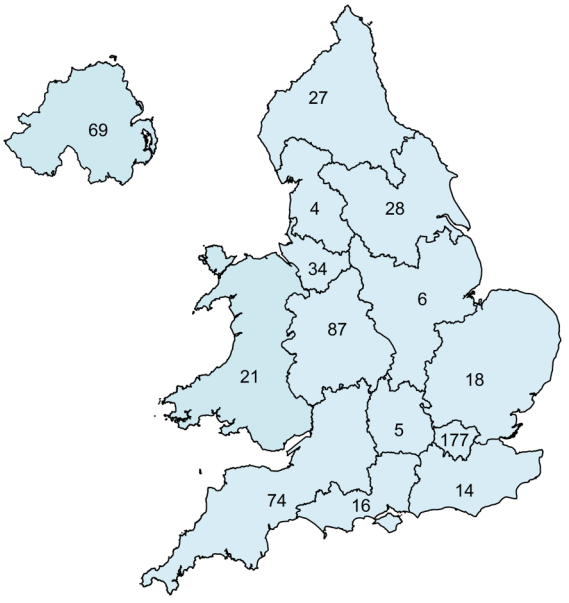


Figure 13: This graph shows the change in patients' condition after intra-arterial intervention. Those dots below the grey line represent patients whose condition improved after thrombectomy. Those dots positioned above the grey line represent patients whose condition got worse after thrombectomy. The further away from the line, the greater the degree of change.

Number of patients treated with thrombectomy in each region



Source: SSNAP Apr 2016-Mar 2017

Figure 14: This map highlights the regional variation in levels of thrombectomy provision in England, Wales, and Northern Ireland between April 2016 and March 2017 as reported by SSNAP.

Case Study: Thrombectomy Services in Northern Ireland "A Game Changer"

Challenge:
To develop services that support the delivery of intra-arterial treatment (thrombectomy) across Northern Ireland.

Solution:
Network and staff commitment
Our service evolved on the back of the enthusiasm and good will of clinicians and neuroradiologists who were keen to provide thrombectomy services. We also had good connections with hospitals throughout Northern Ireland and a network for thrombectomy referrals was already starting to emerge. While more planning and investment was required for full 24/7 service, we committed to service provision within working hours.

Development of regional guidance
In 2015, regional referral guidelines as part of the Northern Ireland Stroke Network were developed.

Key characteristics of this guidance included:

- Involvement of all of the trusts, including the ambulance service, ensured a comprehensive pathway.
- Guidance covered all steps of the process from front door of local hospital to repatriation after thrombectomy.
- Agreement to provide imaging (without delay) to patients potentially eligible.
- Support from Belfast-based neuroradiologists to other trusts in network and clear, established lines of communication to discuss potential cases.
- Transfer by blue-light ambulance directly to the RVH radiology department was agreed, with 5 minute alert to Belfast stroke team to ensure immediate processing on arrival.
- Adoption of "parallel processing" – stroke and neuroradiology teams working in parallel to ensure the patient goes to imaging as soon as possible.

Impact:
Recently we undertook an analysis of outcomes in almost 150 patients treated over the last 3 years. We compared rates of functional independence at 3 months in those who presented directly to Belfast versus those transferred from elsewhere. Although patients coming via another hospital took longer to reach Belfast, they were processed more rapidly on arrival (median door to groin puncture 37 min). Around 50% regained functional independence in both groups.

Obviously anything less than a 24/7 thrombectomy service is unsatisfactory. However, even with our limited service to date, many real patients have benefited. One of my delights at our stroke review clinic is seeing patients and their families who have been rescued from the devastating consequences of stroke due to large vessel occlusion.

Reflection and next steps:
Within Belfast, provision of 24/7 thrombectomy will require expansion of bed numbers, stroke unit staff (both medical and non-medical) and additional neuroradiologists. The service will also have implications for other specialties such as emergency medicine, neurology anaesthetics and ICU.

In our favour, enthusiasm, team working and good will have brought us a long way to date. Until now a "can do" attitude has prevailed. However we have reached a point where significant investment and reorganisation of services is required to take us where we need to go.

This piece was written by Dr Ivan Wiggam, consultant stroke physician and lead clinician for stroke at Belfast Health & Social Care Trust.

Patient Experience : The impact of intra-arterial intervention

On the 1st April 2015 at the age of 44 I awoke and found myself not being able to turn off my alarm. I felt numb down the right-hand side of my body. I tried to get out of bed but couldn't. My daughter who was then 14 came into my bedroom and immediately knew something was wrong as my face was drooped and my words were slurred. She immediately rang for help. After this everything is a blank to me….

The paramedics worked with me on the way to Antrim Area Hospital and then following an assessment they administered a clot busting drug. I was then transferred to Royal Victoria Hospital. They immediately took me to theatre, carried out a thrombectomy and placed a stent in my neck. They advised my family of the seriousness of my condition. Following this I was transferred to the High Dependency Unit (HDU).

The following morning, I could raise my right arm, my speech was still slurred and I could remember nothing of the previous day! Two days later I could stand unaided and my speech was almost back to normal but I still had difficulty in remembering a few words. I was able to walk out of the Royal Victoria Hospital 8 days later and returned to work 5 months later on a part-time basis. Now 2 ½ years later my family and I are so thankful to Royal Victoria for the expert care and attention they provided.

This piece was written by Barbara, 46, stroke patient at Royal Victoria Hospital.

"Top tips" from Belfast Health and Social Care Trust: Developing a thrombectomy service across a region

- Work closely with your neuroradiology team in delivering stroke services – a thrombectomy service can only be developed when good working relationships already exist across teams.
- Expect hands on involvement at consultant level, before during and after procedures.
- Develop protocols in collaboration with all stakeholders, including other trusts and ambulance service.
- Monitor treatment times and outcomes, with regular meetings to review to continuously improve performance.
- Enthusiasm and a "can do" attitude are essential to get started but do not make a sustainable service. Re-organisation, investment and staff will be required at some stage.

Dr Ivan Wiggam, consultant stroke physician and lead clinician for stroke at Belfast Health & Social Care Trust.

The stroke team at Belfast Health and Social Care Trust

Section I: Life after stroke

Stroke is a complex and devastating condition. Rehabilitation time can be varied and often continues long after leaving hospital, ideally in a person's own home. For some people it can take months or even years to make a full recovery, while others have to live the rest of their lives with disability regardless of the quality of care provided.

Early Supported Discharge (ESD)?

ESD is a system in which rehabilitation is provided to stroke patients at home instead of at hospital at the same intensity as inpatient care. This means that patients can return home quicker than they would otherwise be able to. An ESD team is usually made up of different healthcare professionals such as occupational therapists, speech and language therapists, and physiotherapists who are often stroke specialists. The team will usually provide intensive treatment at first which will gradually reduce in intensity as the patient recovers. ESD is a cost effective service which is highly valued by patients but it is not available to everyone upon leaving hospital.

Percentage of patients discharged from hospital with stroke/neurology specific early supported discharge (ESD) team:

2013/2014: 24.7%

2016/2017: 34.6%

"Top Tips" from Hampshire Hospitals NHS Foundation Trust: Developing an ESD service

- Start with all members of the team – they are the ones who live the service and have great ideas!
- Communicate with senior management and keep all relevant parties up to date on progress.
- Gut instinct is helpful – use it to help gain ideas for service development and then back that up with strong evidence to support your theories.
- Use the model for improvement to formulate your ideas.
- Have a clear aim/vision for what you want to achieve.
- Communication is the key to delivering a successful project!
- Make sure the project lead has time to focus on the project – it is very easy for these things to get lost in everyday work! Patient feedback really helps to shape the service – use it!

Louise Darragh, ESD team lead at Hampshire Hospitals NHS Foundation Trust.

Hampshire Hospitals ESD team

Case Study: Developing a high quality ESD service in Hampshire

Challenge:
To develop, maintain and continuously improve a specialist ESD service for Hampshire Hospitals.

Solution:
Organisational Changes

- Improved integration within the stroke pathway and joint working with other clinical teams along the pathway. The ESD office is based on the stroke unit, making it easy for staff from the ward to discuss patients and share advice. The ESD staff rotate onto the stroke unit allowing greater flexibility in staffing and improved cross-team communication.
- Established a team lead role responsible for coordinating the day to day management and leadership of the ESD service; managing the finances and funding; supporting team members; managing staffing and scheduling.

Cultural Changes

- Embedded a clinical psychology service within the ESD team
- Facilitated a trusting and compassionate team culture
- A wide age range of team members brought different life experiences into the roles.
- Included ESD in the stroke strategy forum.
- Ensured team was highly trained with the ability to remain calm in a crisis.

Patient Centred Approach

- Adapted a holistic and individual approach to all patients. From assessment through to discharge the patient's needs and wishes are always at the centre of our treatment, especially when setting goals and looking at carer strain and acceptance of diagnosis.
- Learned from feedback from patients and carers and by reflecting on case study reviews.

Impact:
Since 2012 we have successfully grown the service and it now provides a comprehensive service to 230 patients each year, 40% of Hampshire Hospitals Trust patient cohort.

Patient Quotes:
"Without their amazing help and support Mr P would never have made his progress and we cannot thank them enough. We feel very privileged to have been offered this opportunity from such dedicated staff." -Carer

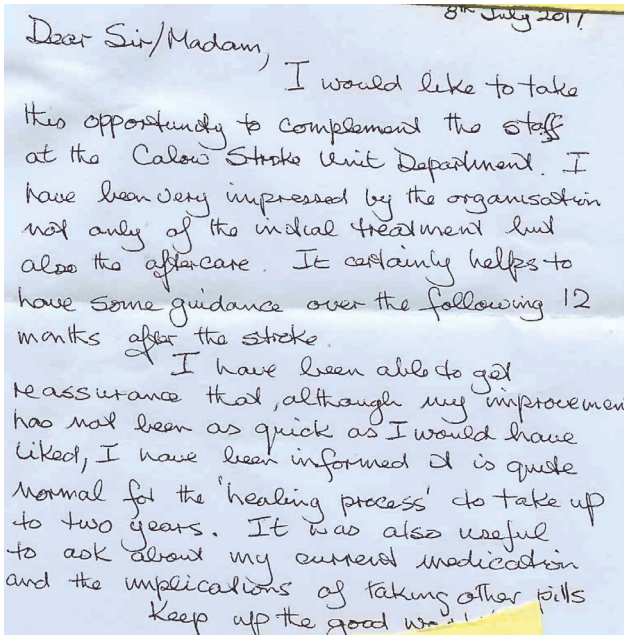
"The ESD team are amazing! They have brought me to a much better condition compared to when I was discharged. If I was not under the ESD team I would not have such improved mobility. When I was discharged from hospital I could barely walk unaided and relied totally on a wheelchair. The team took me back to basics and taught me how to walk with the use of just a cane. My balance is stronger and my confidence has grown so much. If it was not for the team I would not be this more mobile and confident person that I am today. Thank you ESD team you are brilliant. -Stroke patient at Hampshire ESD team.

Next Steps:
There are many exciting developments on the horizon including operating over longer hours and over a 7 day period (rather than 6 at present). The team is looking into offering integrated care as part of the ESD time frame (currently provided by CRT/social services). Other wider strategic ideas are being looked into including taking on more complex stroke patients (rather than the traditional mild to moderate group) and for longer periods of time (currently 6 weeks). The future remains challenging but exciting!

This case study was submitted by Louise Darragh, ESD team lead at Hampshire Hospitals NHS Foundation Trust.

Six month assessments after stroke

A six month assessment allows a person with stroke to review with a trained professional how they are recovering, whether they need to make changes to lifestyle or whether further therapy is needed. An assessment at six months also allows patient outcome data to be reported on which demonstrates the impact that treatment has had on patients. Measuring patient outcomes over time is an important tool for improving stroke services. Everyone should have an assessment of their needs at six months after stroke, but there is enormous variation in whether people are offered one. This year only 32% of patients who needed one were reported by SSNAP as being assessed at six months, and while this is an improvement on previous years, it shows much work is still to be done before six month assessments are provided to all patients.



8th July 2017

Dear Sir/Madam,

I would like to take this opportunity to compliment the staff at the Calow Stroke Unit Department. I have been very impressed by the organisation not only of the initial treatment but also the aftercare. It certainly helps to have some guidance over the following 12 months after the stroke.

I have been able to get reassurance that, although my improvement has not been as quick as I would have liked, I have been informed it is quite normal for the 'healing process' to take up to two years. It was also useful to ask about my current medication and the implications of taking other pills

Keep up the good wo

Patient letter to staff at Chesterfield Royal Hospital

Percentage of patients who receive a six month assessment:

2013/2014: 16.5%

2016/2017: 32.1%

"Top Tips" from Chesterfield Royal Hospital: Ensuring all stroke patients are assessed as six months

- Hold regular updates to share information with whole MDT team.
- Regular reviews/monitoring of patients appointments to ensure compliance / appropriate use of clinic slots.
- Close MDT working to ensure timely reviews of patients to comply with SSNAP data.
- Keep senior management teams updated and involved with service provision.

Tina Potter, stroke services matron, and Donna Evans, stroke services sister, at Chesterfield Royal Hospital NHS Foundation Trust.

Patient receiving their follow up assessment at six months.

Case Study: Providing comprehensive six month assessment service to patients at Chesterfield Royal Hospital

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

Solution:
- Provided a nurse led service, integrated with Early Supported Discharge service.
- Kept a diary of people discharged into home care or alternative care.
- Completed six month reviews as home visits if patients found it difficult to attend an outpatient clinic.
- Offered reviews over the telephone.
- Arranged phone call reminders and follow up calls for patients who do not attend their scheduled review.
- Ensured close working with SSNAP audit coordinator to identify patients who are due a review.
- Stroke consultants gave reminders to patients at the stroke clinic to encourage patients to attend their six month review.

Impact:
Since the start of our ESD service the 6 month clinic reviews are better attended. All of the above processes help us at Chesterfield Royal achieve the best outcome for our 6 month follow up of stroke patients.

Over 98% of Chesterfield Royal's patients deemed applicable for a six month assessment received one as reported by SSNAP from April 2016 to March 2017.

Patient Quote:
"The stroke pathway at Chesterfield Royal is outstanding. I wouldn't be where I am today without all the therapy and follow up assessment I have received. The amount of enthusiasm shown by the team really spurs you on. The team of familiar faces and the continuation of care throughout the stroke pathway at Chesterfield Royal Hospital is what makes it the wonderful, seamless service it is. The staff understand the length and breadth of the stroke journey, and their expertise and support is second to none."
- Stroke patient at Chesterfield Royal Hospital.

This case study was submitted by Tina Potter, stroke services matron, and Donna Evans, stroke services sister, at Chesterfield Royal Hospital NHS Foundation Trust.

Members of the stroke team at Chesterfield Royal Hospital.

Concluding thoughts

It is clear from the preceding content that stroke care has improved dramatically in the past 20 years since we started national auditing of stroke services and producing clinical guidelines.

There is now widespread recognition of the need to ACT-FAST when stroke symptoms strike, and paramedics and A&E departments are ready to assess and manage patients quickly, and pass them on without delay to the acute stroke teams that 20 years ago did not exist. CT scanning occurs very rapidly now, and more patients are eligible for, and receive, clot busting treatments. There is much better access to the specialist stroke units that provide the care we know saves lives, and specialist stroke nurses, therapists and doctors are available throughout the day and night. Many more people are surviving and living their lives after stroke with less disability.

Since the inception of the Sentinel Stroke National Audit Programme (SSNAP) in 2013, we have continued to see sustained improvements in stroke care. The rich data submitted to SSNAP gives us a near complete picture of stroke care across England, Wales, and Northern Ireland meaning clinicians, managers, healthcare professionals, commissioners, and the wider public can understand where improvements are being made and where there is still work to be done. These national level improvements are highlighted throughout the report, and include acute care, rehabilitation, and care in the community.

In addition to providing a national context, the QI case studies included in this report offer insight into how local stroke services have risen to the challenge of improving care for patients, using SSNAP data and simple QI methodology to support continuous and effective clinical change. The projects included in this report in addition to those available on our website www.strokeaudit.org/annualreport should inspire others working in stroke care to pursue similar QI projects in the future. The efforts made by clinical teams to pursue such ambitious QI work in addition to already extremely busy work schedules is hugely encouraging and should be celebrated.

Yet we know that there are challenges ahead. Recent SSNAP data continues to reveal wide variations in levels of stroke care across the country as some hospitals struggle to provide the standard of service expected. Similarly, community care is fragmented with many patients not receiving sufficient rehabilitation in a home environment and only a minority of people having their needs assessed at six months. We understand that resources are stretched but commissioners and planners of services need to be aware that the cost of not providing good care, both in human and financial terms, can be very significant. Many of the case studies referenced in the report offer solutions and practical recommendations which do not require significant financial investment to implement. Furthermore, changes on a national level, such as rolling out thrombectomy services and the continued reconfiguration of hyper-acute services will inevitably pose challenges to local stroke services. However the enthusiasm, dedication, and innovation of clinical stroke teams in improving care for patients, as demonstrated in this report should give us confidence that these challenges are indeed surmountable.

We hope that this report has given readers an interesting and lasting insight into stroke and that it will be used in combination with our other available reports as a resource to help campaign for better stroke services in the months and years ahead.

Glossary

Anticoagulant
A type of drug that reduces blood clotting; examples include warfarin.

Aspiration pneumonia
An infection in the lungs partly caused by stomach contents inhaled into the lungs, usually because of dysphagia.

Atrial fibrillation (AF)
An abnormal heart beat which can result in the formation of blood clots.

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

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

CT scan
Computed tomography scan. Detailed images of internal organs are obtained by this type of sophisticated X-ray device.

Deep vein thrombosis (DVT)
A blood clot that develops in the large veins usually in the leg.

Dietitian
An expert in dietetics; that is, human nutrition and the regulation of diet.

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

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.

Face Arm Speech Test (FAST)
A test used to screen for the diagnosis of stroke or TIA.
https://www.stroke.org.uk/take-action/recognise-signs-stroke

Haemorrhagic stroke
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.

Malnutrition
A condition that develops when the body does not get the right amount of the vitamins, minerals, and other nutrients it needs.

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.

Mortality rate
The number of deaths in a given area or period, or from a particular cause.

Multidisciplinary team
Refers to several types of health professionals working together (physiotherapists, occupational therapists, speech and language therapists, nurses and doctors).

Neuroradiology
Radiology of the nervous system.

Pulmonary embolism (PE)
A blood clot that develops in the lungs.

Social care costs
Costs associated with the provision of services such as social work, personal care, protection or social support services.

Statin
A type of drug used to lower cholesterol levels.

Stroke mimic
Nonvascular disease that presents with stroke-like symptoms, often indistinguishable from an actual stroke.

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

Thrombolysis
Treatment with a drug that breaks down blood clots.

Urinary tract infection (UTI)
An infection of the kidney, ureter, bladder, or urethra.

Further Information and Resources

4th SSNAP Annual Report Online Version

This report is available to access online. By following the link below you will find the full report and many other useful resources. This includes a 4 years national summary report and numerous additional QI case studies submitted by clinical teams. Go to www.strokeaudit.org/annualreport

Easy Access Version Reports (EAVs)

SSNAP produces regional easy access version (EAV) reports every four months for stroke survivors, carers, and people with aphasia. These reports enables readers to ascertain the level of stroke services provided by hospitals in their area in specific aspects of stroke care, and monitor how the levels of care provided to patients are changing over time. Go to:www.strokeaudit.org/results/regional

Patient Version of the RCP Guideline for Stroke 2016

SSNAP also produce a patient version of the 'National Clinical Guideline for Stroke' (2016). This version is written for stroke survivors and their carers but is also useful for anyone who has an interest in stroke care and management. It gives information and advice on the care and treatment of adults after a stroke or TIA (mini stroke). It also has listings of organisations and support groups who can help stroke patients and their families or carers. Go to: https://www.strokeaudit.org/Guideline/Patient-Guideline.aspx

Thanks

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

Professor Pippa Tyrrell, consultant stroke physician, who has written the clinical commentary for all four SSNAP Annual Reports with prose that is always engaging, informed and accessible.

Brian Murphy, 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 QI case studies for this report. By sharing best practices, learning points, and recommendations you are paving the way for others to initiative similar QI work of their own.

Our patient representatives on the Intercollegiate Stroke Working Party (ICSWP) for their continued support of the programme: Marney Williams, Robert Norbury and Stephen Simpson. Their invaluable contribution keeps a patient voice at the heart of what we do as a programme.

Acknowledgements

SSNAP is funded by the Healthcare Quality Improvement Partnership (HQIP) as part of the National Clinical Audit and Patient Outcomes Programme (NCAPOP). Go to www.hqip.org.uk

This report was written, produced, and designed by Mark Kavanagh, Kaili Stanley, and Professor Pippa Tyrrell, supported by Lizz Paley, Dr Ben Bray, Victoria McCurran, and Tom Arnold, and guided by Alex Hoffman and Professor Tony Rudd.

Thank you for reading.
The RCP Stroke Programme

This report was published on 29 November 2017.

11 St Andrews Place
Regent's Park
London
NW1 4LE

www.strokeaudit.org

Royal College of Physicians

Sentinel Stroke National Audit Programme (SSNAP)

ISSN 2399-6587