

# A Year Like No Other

# The Eighth SSNAP Annual Report

Stroke care received for patients admitted to hospital  
between April 2020 to March 2021







## A description of the front cover of this report

The art on the front of this report was produced by Ken Tooby. Ken has had four strokes, with his first occurring back in 2011. After his first stroke, the road to recovery was a steep one, needing extensive physiotherapy to learn to walk again, and speech therapy to regain his ability to swallow and to help him to learn to talk again. But with lots of hope, determination and support, Ken has managed to build a really positive life after stroke.



Ken stumbled across his amazing artistic talent almost by accident. While attending a rehab session with his stroke group, a lady running an arts and craft session asked whether anyone was interested in painting using watercolors. Within minutes of putting himself forward and picking up the paintbrush, it was clear to everyone that Ken had a gift for it. While not being able to write his own name, due to his stroke, it was clear that Ken's artwork was something special. And he hasn't looked back since. Painting has also made a huge difference to Ken's recovery, being both calming and therapeutic. As well as being involved with his local stroke group, Ken has also previously been a befriending volunteer with the Stroke Association. He found this role extremely rewarding, knowing that he was using his own experience to make a difference for other people.

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# Foreword

We have faced many challenges over the past two years. The COVID-19 pandemic has impacted all of us in a profound way, throwing both our strengths and frailties into stark relief. Against such a difficult background, it is hugely inspiring to see the dedication of hard-working staff across the stroke pathway and the wider NHS illustrated by some of the data in this latest SSNAP annual report. Faced with mounting pressures and stretched resources, you have done your utmost to provide high levels of care. On behalf of people affected by stroke, thank you.

The pandemic made it easy to overlook improvements that are worth celebrating. Continued decreases in in-hospital mortality, increased access to thrombectomy, and increased Early Supported Discharge all speak to the advances being made across the stroke pathway and the corresponding improvement in outcomes as a result. SSNAP champions these successes and shows other parts of the system what can be achieved when we work together and learn from each other.

However, SSNAP also highlights where progress has stalled or even gone backwards. The data shows a worrying lack of progress to improve some fundamental key standards across the stroke pathway. This threatens the recovery of stroke survivors whom we're here to support.

Onset of stroke to hospital arrival times have increased, placing additional pressures on hospital teams to ensure stroke survivors get the right treatments in the right timeframes. During the pandemic, thrombolysis rates fell for the first time in years and are now below 11% for the first time since records began, well below the national ambition of 20%. Progress in rolling out the game-changing treatment of thrombectomy continues more slowly than planned, risking the achievement of the NHS's ambition to increase thrombectomies ten-fold by 2022. Whilst there is a welcome increase in Early Supported Discharge, fewer people – just 40.2% – are receiving a six-month review, reducing the opportunities to ensure their needs are being met, a priority that is hugely important to patients. This lack of follow-up is concerning when stroke is the leading cause of adult disability in the UK and many stroke survivors have complex ongoing needs relating to their mental and physical health.

So how can we deliver consistent improvements across the pathway for every stroke survivor? SSNAP shows the power of data to focus on progress, and on pathways that require improvements such as door to needle time, imaging and access to therapies and psychological support. The data also suggests that strong systems leadership and laser-like focus are needed if we are to meet the national clinical standards of care that all stroke survivors deserve.

As Integrated Stroke Delivery Networks and other models of integration in England take shape, we know that stroke survivors will want to see stroke prevention prioritised, access to thrombolysis and thrombectomy expanded, and most vitally universal access to high quality rehabilitation and life after stroke services. Stroke survivors and their carers continue to tell us that they feel abandoned when they leave hospital and the COVID-19 pandemic has only made this worse. ISDNs present a real opportunity to address this. In Wales the new Quality Statement shows that national level policy can also help to focus minds and drive change, and in Northern Ireland we urgently need similar commitments and tangible progress on stroke service transformation.

I would encourage stroke clinical teams to keep using the SSNAP data to drive quality improvement, to keep learning from each other, and to work with colleagues in taking a whole system approach to the stroke pathway. This will lead to efficiencies and improve outcomes. We must evaluate our performance, learn lessons from the past two years, and share and adopt best practice.

For system leaders and commissioners, the moral, financial, and quality of life evidence for investment in stroke is compelling. What we've learnt from the last 18 months and the findings in this annual report is the need for a renewed focus on delivering those NHS priorities, on addressing health inequalities, and on prioritising investment in stroke prevention, treatment, and care. Now is the time to act. The Stroke Association stands ready to work in partnership with you all as system leaders, commissioners and stroke networks to realise this significant opportunity to reduce stroke mortality and disability and ensure that all people affected by stroke get the help they need to live the best life they can.



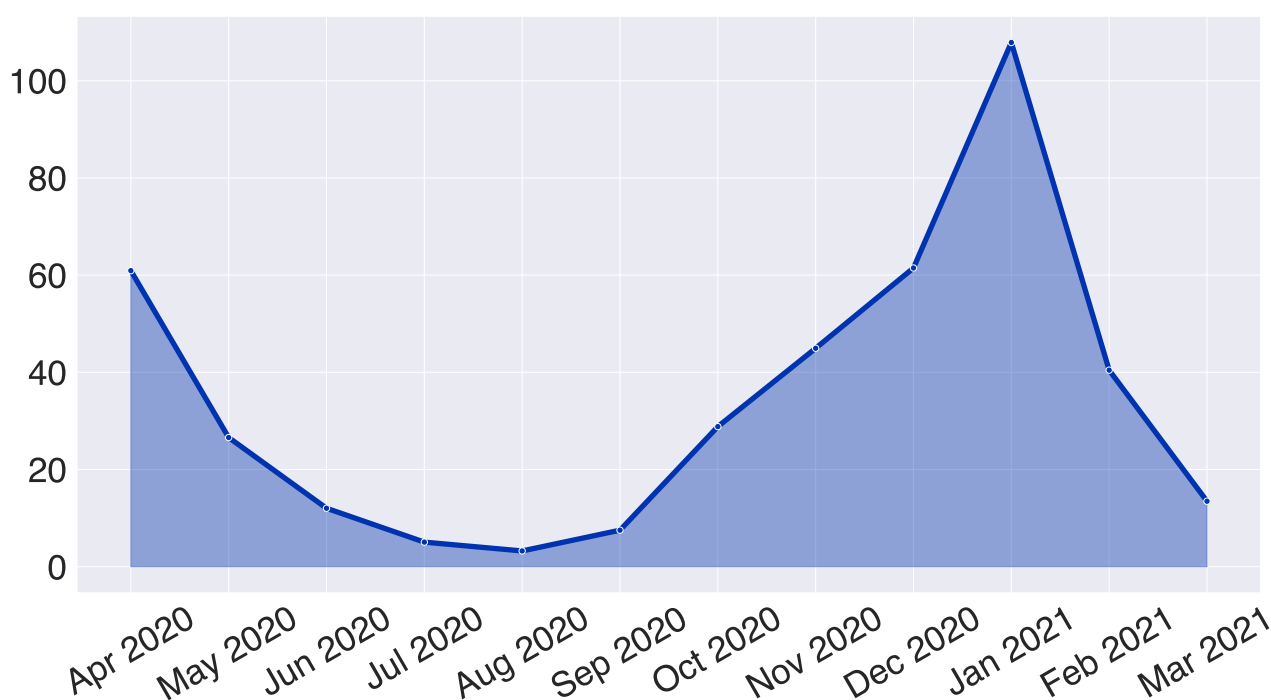
Juliet Bouverie OBE  
Chief Executive – Stroke Association

## Executive summary

The 2020-21 financial year to which this report relates was dominated by the Coronavirus disease 2019 (COVID-19) pandemic, which resulted in huge and unprecedented challenges to many healthcare systems globally including the NHS. The rapid evolution of the pandemic placed unprecedented pressure on hospitals and community services with waves of emergency COVID-19 admissions, and called for a remarkable response from the whole workforce, including stroke services, to adapt to these sudden and severe pressures.

### Patients admitted to hospital with COVID-19 between April 2020 and March 2021 in England, Wales and Northern Ireland

Number of patients (in thousands)



Data obtained from: <https://coronavirus.data.gov.uk/details/healthcare>, accessed August 2021.

At such times of rapid change, it was as vital as ever to ensure that evidence-based practice for stroke was maintained through access to high quality acute care, rehabilitation and longer term support across the clinical pathway. Stroke management is a rapidly developing area of medicine and it is important that services can adapt during the pandemic so that alternative new models of practice can be implemented to sustain high quality stroke care. In order to facilitate and maintain data-driven quality improvement right across the pathway during the pandemic, it has been vital for national audits to continue their work of measuring and reporting performance against key evidence based standards.

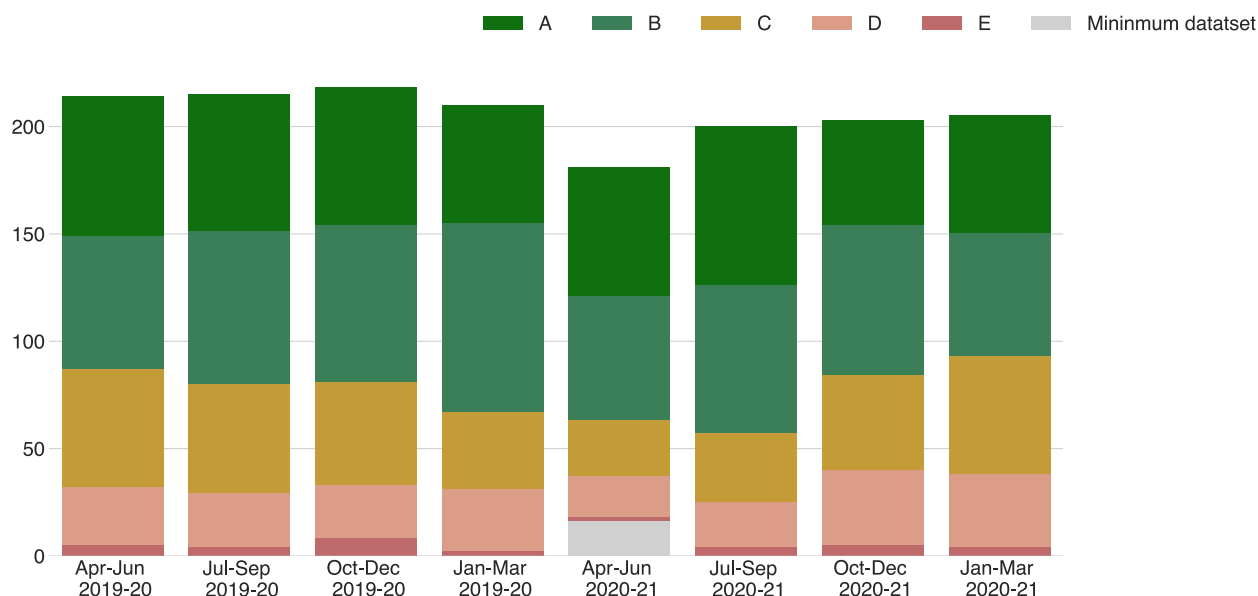
By capturing data on the quality of care processes and outcomes, we can identify which aspects of stroke care need to be improved and how these beneficial changes can enhance outcomes for patients and families during this challenging period. This is very much a priority as we return to normal working during the restoration and recovery phase of the pandemic.

## Yearly snapshot

Since its inception in 2013, the results of SSNAP have been available to the general public at [www.strokeaudit.org.uk](http://www.strokeaudit.org.uk) along with guidance regarding what people can expect to receive from high quality stroke services.

### Distribution of SSNAP scores over time comparing quarterly results from 2019-20 and 2020-21

Number of teams



**Figure 1:** This graph demonstrates the number of teams achieving an A rating. It peaked in July-September 2020 and was higher in 2020-21 than in 2019-20. The grey bar for April-June 2020 shows the number of teams that entered data onto the minimum dataset and received a report but did not receive a score for that period.

At the inception of SSNAP, teams were expected to achieve the ambition of an overall A or B SSNAP rating. Such scores are reflective of high quality services and good services in several domains of care. A SSNAP rating of C reflects areas which require attention for improvement, whilst ratings of D or E indicate domains which require significant attention and need for improvement. During the first quarter (April-June 2020), there was a reduction in the proportion of teams participating in SSNAP, with 7% of routinely admitting sites submitting less than 10% of expected cases in the April-June 2020 quarter.

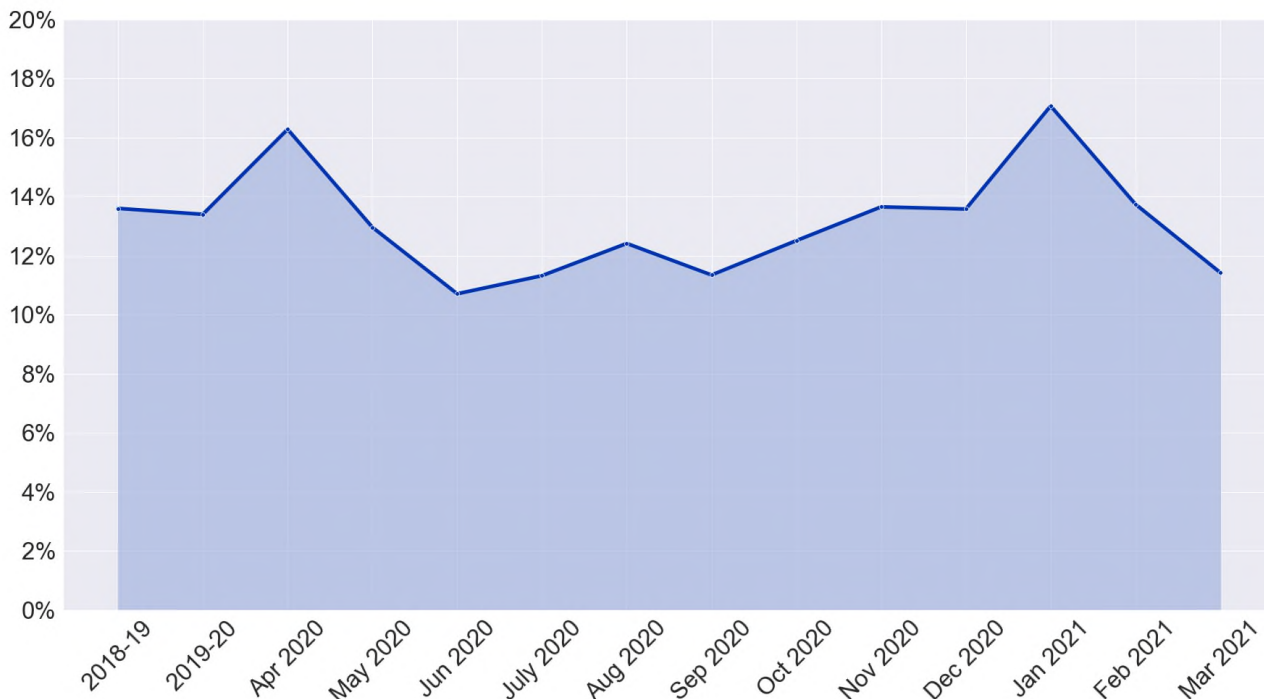
During the pandemic year of 2020-21, teams achieving A ratings peaked during the second quarter of July-September (37%) and then subsequently declined. Higher rates of A ratings were observed in 2020-21 than the corresponding months in 2019-20. This indicates that even during the COVID-19 pandemic year, many teams were still able to improve the quality of care through the implementation of evidence-based interventions. However, there is an ongoing need to ensure that such improvements are sustained over the longer term in line with the NHS Long Term Plan.



## Mortality

### Reduction of crude in-hospital mortality rate from 13.6% (2018-19) to 13.4% (2019-20) and 13.2% (2020-21)

Percentage of patients



**Figure 2:** Trend of crude in-hospital mortality rate, comparing 2018-19 and 2019-20 annual data with 2020-21 monthly data. Note the two relative peaks in April 2020 and January 2021 corresponding with peaks in hospital COVID admissions.

The crude in-hospital mortality rate for 2020-21 is 13.2%. SSNAP also reports on 30-day mortality adjusted for a variety of case mix factors that predict mortality, such as age, stroke subtype, atrial fibrillation and stroke severity. Mortality is reported annually: the 2019-20 report was available to teams in autumn 2021 and the 2020-21 results are expected to be available in early 2022 ([www.strokeaudit.org.uk](http://www.strokeaudit.org.uk)).

Although in-hospital mortality had declined over the last 3 years, there were relative peaks of in-hospital mortality during the pandemic: in April 2020 (first wave) at 16.3% and January 2021 (second wave) at 17.1%. This coincides with the peak of COVID-19 admissions to hospital and reflects in part the association between COVID-19 and higher mortality in a relatively small number of patients with stroke. The SSNAP Collaboration has already reported on the 41% increased risk of 7-day fatality for patients with confirmed or suspected COVID-19 and stroke (<https://www.ahajournals.org/doi/epub/10.1161/STROKEAHA.120.032253>).

## Trends in stroke care from 2019/20 to 2020/21

It is important to measure specific evidence-based processes in order to understand how well stroke interventions are working and to what extent the quality of care has been preserved during the pandemic.

### Improved quality standards

	<u>2019-20</u>	<u>2020-21</u>	<u>Apr-Jun 20</u>	<u>Jan-Mar 21</u>
◆ Patients undergoing thrombectomy (%)	1.8	2.0	1.8	2.2
◆ Time from arrival at hospital to specialist nursing assessment (mins)	56	50	51	48
◆ Access to specialist Early Supported Discharge team (%)	41	46	45	47
◆ Compliance with physiotherapy target (%)	34	39	43	36

### Maintained quality standards

◆ Brain imaging within 1 hour of arrival at hospital (%)	55	55	56	55
◆ Thrombolysis within 1 hour of arrival at hospital (%)	61	60	60	61
◆ Swallow screening within 4 hours of arrival at hospital	75	75	78	75

### Deteriorated quality standards

◆ Time from onset to hospital arrival (hours: mins)	3:15	3:25	3:17	3:30
◆ Proportion of patients spending at least 90% of stay on a stroke unit (%)	84	82	86	79
◆ Patients receiving thrombolysis (%)	11.7	10.7	11.2	10.7
◆ Door to needle time for thrombolysis (mins)	52	54	54	54
◆ Six-month assessment received if applicable (%)	43	40	39	40

2019-20 2020-21 Apr-Jun 20 Jan-Mar 21

## Quality of stroke care (Apr 2020-Mar 2021)

### High Quality Specialist Stroke Care

**82%**

of patients spent at least 90% of hospital stay on a specialist stroke unit.

Item reference: K32.11

**91%**

of patients received stroke specialist nursing assessment in less than 24 hours after admission.

Item reference: H8.3

**75%**

of applicable patients received swallow screening in less than 4 hours after admission.

Item reference: H14.20

### Seven Day Priority Clinical Standards of Stroke Care

**55%**

of patients directly admitted to a stroke unit in less than 4 hours after admission.

Item reference: H7.18.1

**58%**

of patients assessed by a stroke specialist (in person or via telemedicine) within 14 hours after admission.

Item reference: H9.19

**55%**

of patients received brain imaging in less than 1 hour after admission.

Item reference: H6.9

### Reperfusion Treatment

**54 minutes**

median time from arrival at hospital to thrombolysis treatment.

Item reference: H16.42

**10.7%**

of all stroke patients were given thrombolysis.

Item reference: H16.3

**2.0%**

of all stroke patients underwent a thrombectomy.

Item reference: H20.3

### Models of Rehabilitation

% of applicable patients received the equivalent of 45 minutes of therapy per day 5 days a week.

**39%**

Physiotherapy.

Item reference: K35.18

**40%**

Occupational Therapy.

Item reference: K34.18

**21%**

Speech & Language Therapy.

Item reference: K36.18

### Longer Term Outcome

**40%**

of applicable patients received a 6 month follow-up.

Item reference: M4.6

**85%**

of patients with atrial fibrillation at six months taking anti-coagulants.

Item reference: M9.12

**2%**

of patients had a recurrent stroke at six months recorded.

Item reference: M17.3

Item references refer to the annual results portfolio: <https://www.strokeaudit.org/results/Clinical-audit/National-Results.aspx>

## Purpose of this report

This is the eighth annual SSNAP report. The purpose of this report is to provide information on the quality of stroke care provided between 1 April 2020 and 31 March 2021 covering the significant waves of the COVID-19 pandemic. This is particularly pertinent as it substantially coincides with the introduction of the first 'national lockdown' officially commencing on 23 March 2020.

This year's report concentrates on the impact of the pandemic on a number of key domains of the stroke pathway. These include stroke admissions and changes in case mix; the pre-hospital pathway including ambulance arrival times; reperfusion therapies; access to high quality specialist stroke care; inpatient rehabilitation; and access to community services.

The report comments on the quality of care against evidence based standards across each quarter but particularly focusing on the first wave of the pandemic (April-June 2020) and the subsequent second wave, which encompassed the two quarters of October-December 2020 and January-March 2021. Where applicable, comparisons are made with patients admitted during the equivalent periods in 2019-20. Presentation of such comprehensive national data enables critical aspects of acute and longer term stroke care to be examined, so that evidence based processes can be delivered safely and effectively in future years. This is critical for future learning not only for the recovery and restoration phase after the COVID-19 pandemic, but also for preparation for any future resurgence of the disease.

The visualisations in this report are designed to improve the accessibility of the data. As much as possible we have adopted a colour scheme which is suitable for deuteranomaly (colour blindness). Some graphs transition from the annual results from the previous year to quarterly results from 2020-21. This has been done where pandemic waves affected key indicators.

The quarterly and annual data presented in this report are publicly available and can be accessed on the SSNAP website (<https://www.strokeaudit.org/results.aspx>) so that anyone can appreciate how stroke care is being implemented regionally and nationally both in hospital and in the community. It is hoped that this data is used constructively to help health care providers in stroke improve outcomes and the quality of care delivered to patients.

# Overview of SSNAP

The Sentinel Stroke National Audit Programme (SSNAP) is a national healthcare quality improvement programme based in the School of Population Health and Environmental Sciences at King's College London. SSNAP is commissioned by the Healthcare Quality Improvement Partnership (HQIP) on behalf of the NHS in England and Wales, as part of the National Clinical Audit and Patient Outcomes Programme (NCAPOP).

Data from more than 87,000 patients admitted to hospitals between April 2020 and March 2021 were submitted to the audit, representing over 90% of all admitted strokes in England, Wales and Northern Ireland. In total over the last 8 years since 2013, almost 700,000 cases have been recorded to date.

SSNAP's clinical audit measures the process of care against particular standards, referring to the interventions that all patients may be expected to receive. These standards refer to the Royal College of Physicians National Clinical Guideline for Stroke (2016) and the NICE Clinical Guideline on Acute Stroke and TIA (NG128, 2019). These standards include whether patients receive a range of acute treatments including clot busting drugs (thrombolysis) and interventions for clot retrieval (mechanical thrombectomy), along with other quality indicators such as treatment on a specialist stroke unit and goal-oriented rehabilitation, including how much therapy is delivered in hospital and at home.

Subsequent data is also collected, including disability outcomes at discharge and at six months, using validated and standardised assessment tools and 30-day mortality. By recording this data, we can measure the impact of acute treatments and hospital care on the needs of patients as they continue their recovery from their stroke as well as longer term outcomes.

SSNAP also measures the infrastructure of rehabilitation services that are provided to stroke survivors after their stay in hospital (therapy and nursing staffing levels, access to specialist community services, seven day working and information to patients and carers) against evidence based standards using the post acute organisational audit. The most recent round of this organisational audit was in April 2021. It reflects the quality of rehabilitation services provided to stroke survivors after discharge from hospital. The audit report is due to be published in early 2022.

At the onset of the first wave of the pandemic (April 2020), the NHS announced via HQIP that all national audits and registries including SSNAP would be suspended so that efforts could be focused entirely on the clinical crisis at hand. Although many hospitals continued to complete the entire SSNAP dataset, a minimum emergency dataset was also constructed to encourage as many hospitals as possible to continue to provide important data focusing on acute stroke care until discharge from hospital, as well as the patient's COVID-19 status. This emergency dataset was operational until August 2020 and at its peak was being used by 31 teams, after which the full dataset was formally reintroduced. Over the year, 91% of routinely admitting sites qualified to receive all four quarterly reports through uploading a sufficient number of cases, returning to 100% for the January-March 2021 quarter, reflecting the commitment of stroke professionals to continue to engage in quality improvement even at times of peak acute hospital pressures.



However, during this period the public reporting of hospital/teams' performance was suspended, and some of the familiar SSNAP outputs such as our colour-coded national and regional A-E ratings were not produced. These were reintroduced for the April-June 2021 quarter, leaving a full year gap in these nationwide public ratings.

By using comprehensive data at a patient and a service level, SSNAP provides a powerful tool for clinicians, managers, health boards, commissioners and the public to evaluate performance in stroke care during the COVID-19 pandemic and to identify further need and drive the process of continuous quality improvement.

# Patient stories

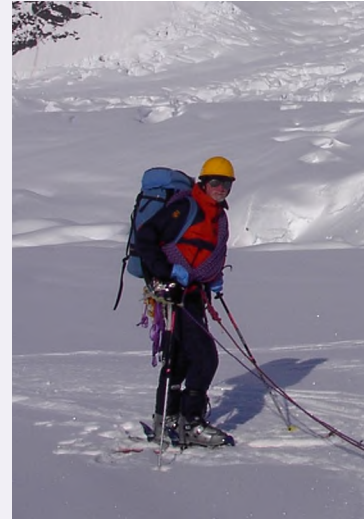
## Colyn

Colyn, 76, a former teacher and professional mountaineering instructor, had a stroke when away in the Scottish Highlands in October 2019, spending three weeks in hospital in Inverness before being transferred closer to home, and then returning home in December 2019.

"I didn't have my first physiotherapy session until the end of January [2020]. The Physiotherapist then went off sick, so it wasn't until February that I started properly with two brilliant physiotherapy sessions. I asked to use the gym equipment and managed to use the rowing machine, static bike and the cross trainer. I'm a hard task master for myself and was determined to get better. Then everything was cancelled due to COVID-19 and lockdown. It all fell apart.

I think lockdown has made a massive impact on my recovery. I started with physiotherapy at the end of February officially. However, if it had started in December when it should have, I'd have been a lot more advanced by now (September 2020).

I live in the middle of the Lake District, the nearest swimming pool is Kendal and I don't drive at the moment, which means I have to get a bus which takes hours there and back."



## Baz

Baz, 48, was admitted to hospital in October 2020 after testing positive for COVID-19, spending three weeks in hospital. After being discharged, Baz noticed visual disturbances in his left eye and headaches, and after returning to hospital an MRI and CT scan revealed Baz had had a stroke. Baz was shocked to learn from doctors that contracting COVID-19 had contributed to his stroke.

"Being South Asian I definitely feel more at risk. I was shocked that having COVID caused my stroke. Doctors said that it had thickened up my blood and pushed my blood pressure through the roof and that I had no other markers or risk of stroke."

Baz has seen first-hand the amazing work of staff on the stroke ward and how important ongoing research is.

"The nurses and consultants on the stroke ward were fantastic, I am so grateful for the support I received both at the time and during my recovery."

"Research is vitally important. Without pioneering techniques there will be a lot more people with stroke and a lot more deaths - I wouldn't be alive without it. If the research into stroke isn't there that we can benefit from, then I think the amount of strokes will just go up, especially with Coronavirus, which isn't going away anytime soon."



## Adam

*Adam, 39, a firefighter, started to exhibit COVID-19 symptoms in March 2020 and was admitted to hospital in April. After two days, Adam had his first stroke and a few hours later, a second stroke.*

“The doctors took a CT scan of my chest, my brain and my heart. They concluded that the first stroke had been caused by a clot from my calf that had travelled up to my brain. They reckoned the second stroke was caused by a clot possibly travelling from my heart to my brain. I was only 39, was healthy, a non-smoker and didn’t drink to excess.

After discharge from the hospital, I was taking Apixaban (blood thinning medicine) for 6 months, I had many visits in hospital and further scans of these blood clots. The doctors wanted to verify where the blood clots are coming from. After many procedures, which excluded a hole in my heart, they later confirmed that my stroke had been caused by COVID-19.”



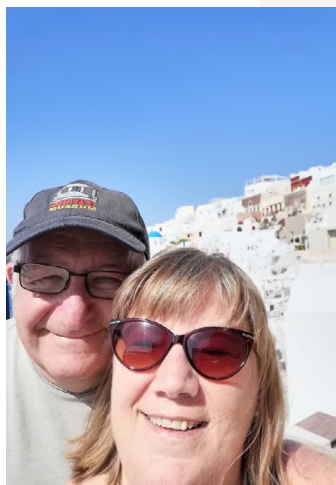
## David

*David, 64, developed COVID-19 symptoms in March 2020 when in Santorini with his wife, Catherine, celebrating their Ruby wedding anniversary. David and Catherine flew to Belgium where David was placed on a ventilator in intensive care. David suffered a stroke after coming out of intensive care and was repatriated to his local hospital in the UK and placed on a temporary ward as the stroke ward was being used for COVID patients.*

Catherine: “We don’t feel David received the level of care he should have. He should have had tests done on his eyes as his vision was affected, but none of it was done. However, the physiotherapists were outstanding and couldn’t have done more.”

“The hospital wanted to discharge David to a care home on 07 May [2020] but he couldn’t even lift his head at this point. After discussions and seeing the benefits of his physiotherapy, he stayed in hospital until 30 May. He underwent another couple of weeks of intense physiotherapy, every day.”

David: “I could do very little when I first got home, it was pretty scary. We needed an extra banister and within three days the Community Stroke Team had arranged for it to be fitted. They were outstanding. I can’t fault them at all! Every single person has been phenomenal. They’ve always gone the extra mile. Morale wise it was really good to get home and it was much better for me mentally.”



# Impact of COVID-19 on stroke

## Stroke admissions to hospital during COVID-19

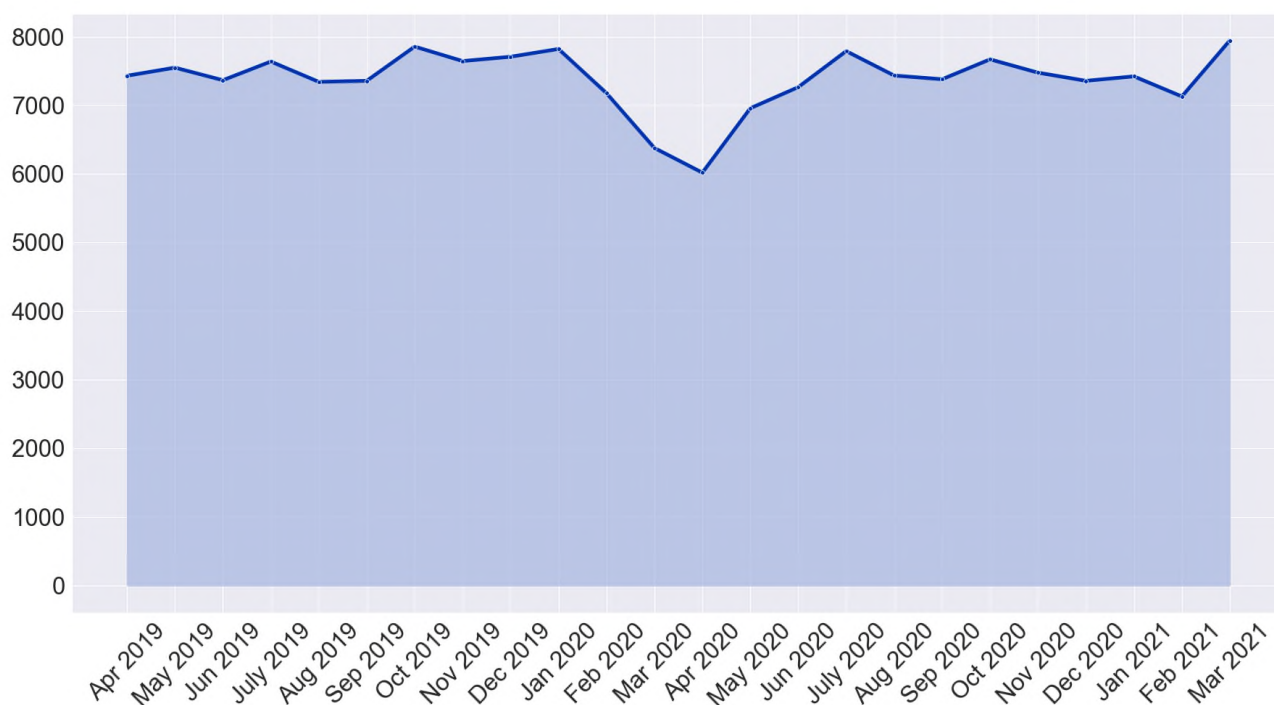
The immediate impact of the COVID-19 pandemic was a fall in the number of people presenting to hospital with stroke, in parallel with the reports of increasing numbers of patients hospitalised with COVID-19 infections. There was an 11% decrease in acute stroke admissions in April-June 2020 compared to April-June 2019. However the decline was evident as early as February 2020, before the imposition of the population-level lockdown measures.

The reduction in stroke admissions may have been driven by the reluctance of emergency services or primary care to refer patients to hospital in an attempt to reduce the burden on the health service, or because patients were reluctant to alert emergency services themselves or decided against referral through fear of infection.

The initial decline in stroke admissions during the first quarter (April-June 2020) was transient as the number of admissions returned to baseline levels at the beginning of the second quarter (July-September 2020). This was evident despite national restrictions remaining in place at a time when COVID-19 infections were much lower. No similar reductions in acute admissions were seen during the autumn-winter wave of 2020-21, at a time when COVID-19 admissions once again peaked – producing unique pressures on the timeliness and quality of acute stroke care that we shall consider later in this report.

### Decline in number of stroke admissions during March-May 2020 compared with 2019-20

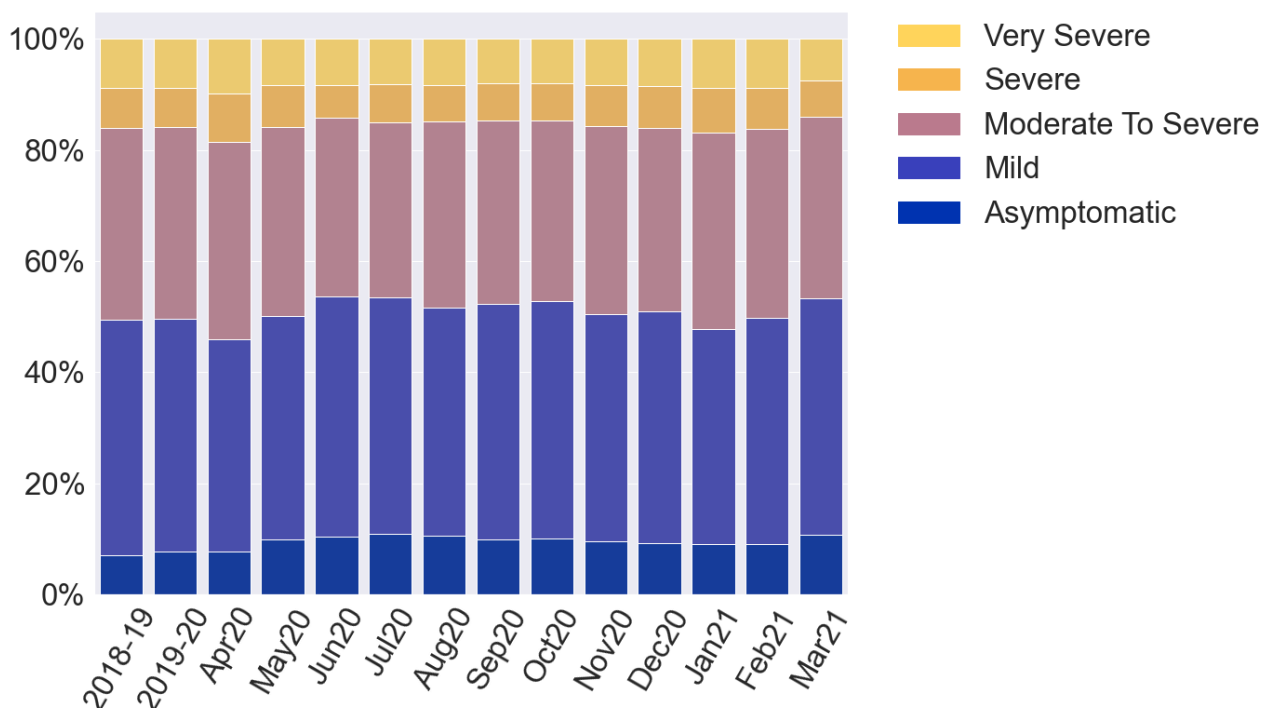
Number of stroke admissions per month



**Figure 3:** Pattern of stroke admissions to hospital in 2020-21 compared with 2019-20.

## Decline in proportion of patients with mild stroke in April 2020 and January 2021 compared with 2019

Proportion of patients by stroke severity



**Figure 4:** Stroke admissions to hospital according to stroke severity, comparing 2018-19 and 2019-20 annual data with 2020-21 monthly data.

The reduction in stroke admissions was most evident for those patients with mild stroke, where the proportion of mild strokes fell by 10.3% during April 2020 compared to the same period in 2019. It seems likely that patients with the mildest strokes decided not to be assessed in hospital and remain at home due to the fear of contracting COVID-19 in hospital, or alternatively were directed away from severely stretched emergency services.

The consequence of not gaining access to inpatient specialist stroke care is the potential greater risk of recurrent stroke in this particular group of patients with mild stroke. It is therefore vital that access to specialist neurovascular clinics continues in an effective manner so that patients with mild or no measurable deficits are not disadvantaged and are able to gain access to secondary prevention measures. There were no similar changes observed in patients presenting with moderate to severe stroke, implying that despite the fear of infection with COVID-19, hospital admission still remained a priority for this group.

As the pandemic evolved, the reduction in admission rates observed in patients with mild stroke was no longer seen in subsequent months and in particular during the second wave (October 2020-March 2021). This coincides with the public health messaging that patients with stroke-like symptoms, regardless of severity, should seek hospital assessment and call an ambulance immediately. Nonetheless a smaller reduction in admission rates for mild stroke was once again observed in January 2021.



### **What needs to happen next?**

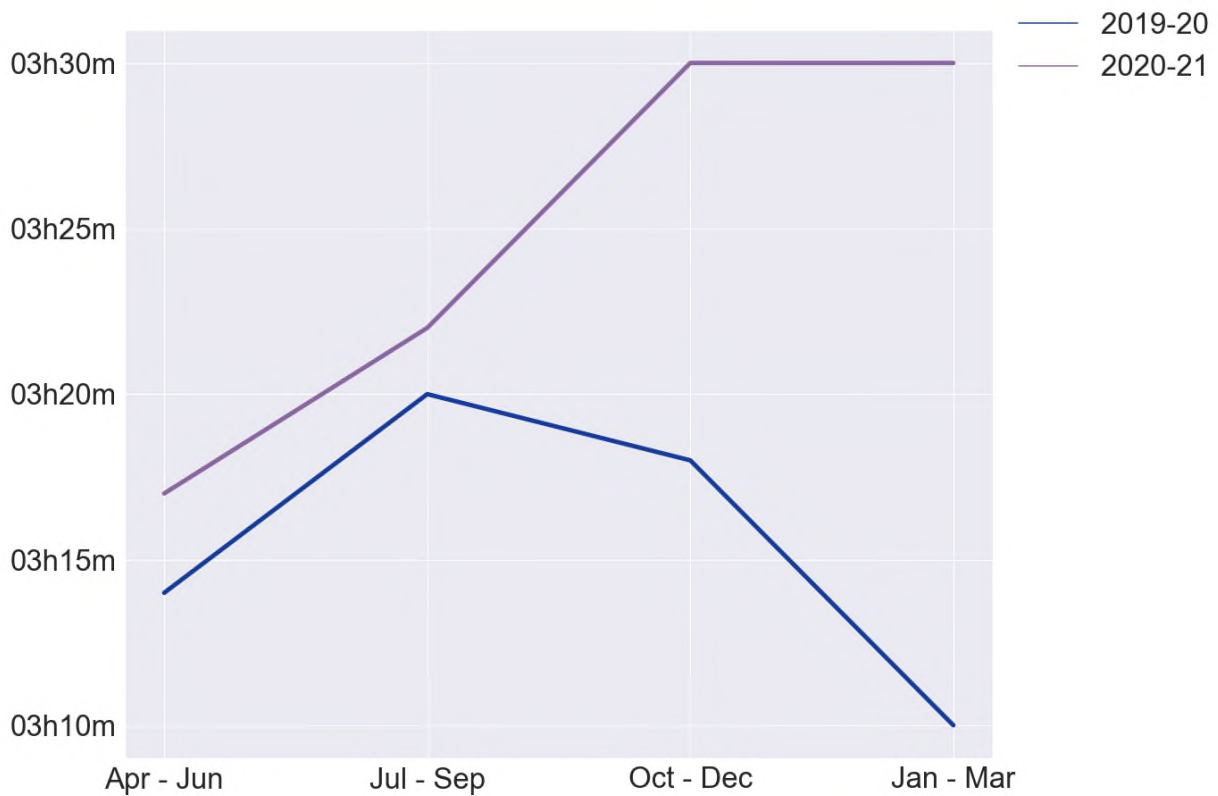
The extent to which the public avoided hospital care for significant emergency conditions including stroke in the spring 2020 wave of COVID-19 took the health system by surprise and required urgent corrective action to avoid a repeat during the autumn-winter second wave. Whilst there seems little doubt that such widespread behaviour mitigated the worst of the acute hospital pressures from COVID-19 during that initial wave, should further population-level control measures be required for this or future pandemics, it will be necessary to focus specific efforts on preventing 'hospital avoidance' for patients with other treatable medical emergencies.

# Ambulance activity during the pandemic

## Onset to arrival time

### Significant delay in time from stroke onset to arrival at hospital

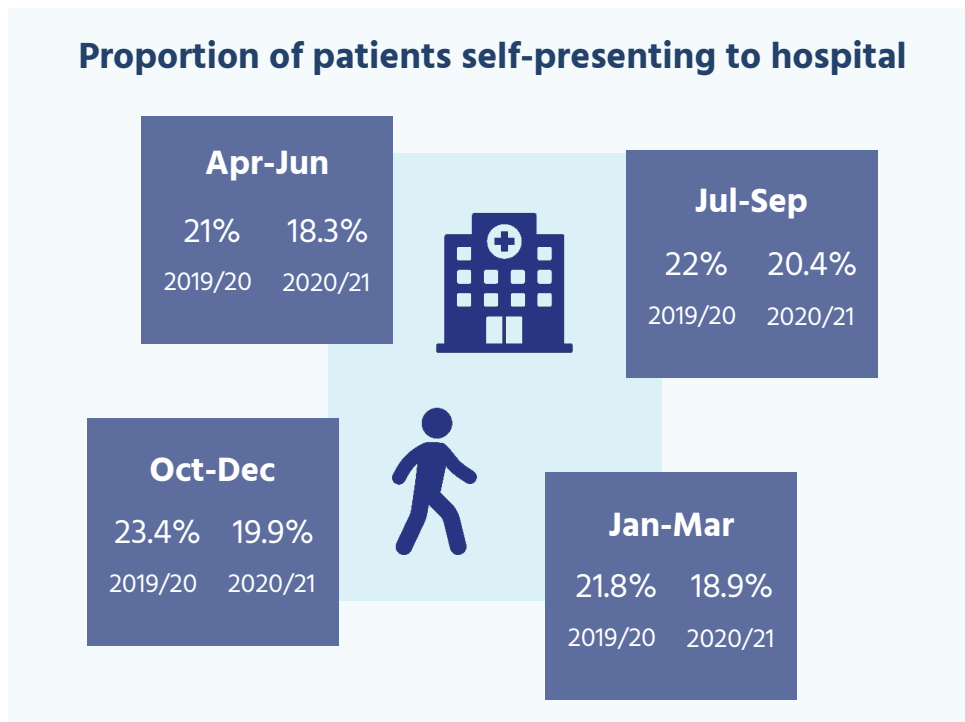
Median time between onset and arrival



**Figure 5:** Median time from known stroke onset to arrival at hospital (hours: minutes) comparing quarterly data from 2020-21 with 2019-20.

The delay from stroke onset to hospital arrival was significantly longer during the COVID-19 pandemic year (2020-21) compared to 2019-20. The median delay from stroke onset to hospital arrival was 3 hours and 17 minutes during April to June 2020, increasing to 3 hours and 30 minutes during January to March 2021. Patients were more likely during the pandemic to use ambulance services for conveyance rather than self-present to hospital compared to the previous year.

## Proportion of patients self-presenting to hospital



There are a number of circumstances contributing to the delays in arrival at hospital during the COVID-19 pandemic. These include public behaviour in avoiding medical attention due to fear of infection; pre-hospital emergency services being pressurised with patients with COVID-19 infection; delays in recognising stroke symptoms at the outset; and some reconfigurations of acute stroke services resulting in longer travel times to hospital. Delays may have also been amplified by disinfection procedures applied between patients and ambulance staff. Given the key role of rapid hospital conveyance in achieving reductions in onset to treatment times for reperfusion, this increase (which is far greater than the modest reductions in door-to-needle time seen over the corresponding period – see below) is a cause for significant concern, particularly as it would be unrealistic to expect any great reductions in pressures on pre-hospital services in the foreseeable future.

### What needs to happen next?

As the concept of ‘time is brain’ is important to confer eligibility for reperfusion strategies in acute stroke, it is vital that patients are not compromised or denied evidence based interventions as a result of these delays. Public education about symptom recognition for stroke should be continually reinforced and people reminded of stroke symptoms using the Face Arm Speech Time (FAST) test. In England, Integrated Stroke Delivery Networks (ISDNs) will need to work with their ambulance providers to understand the conflicting pressures on their services for all emergencies, and develop plans and mitigations to prevent stroke patients being disadvantaged by pre-hospital delays.

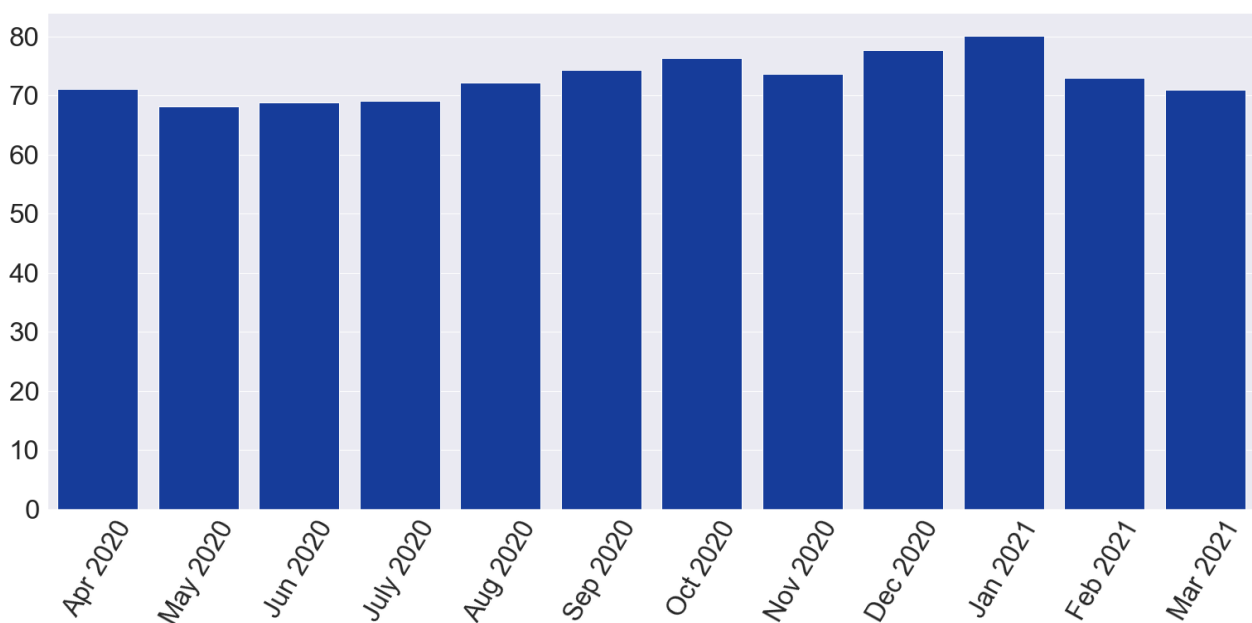
## Call to arrival time

As first responders at the onset of stroke, paramedics play an important role in the assessment of patients with stroke and their urgent transfer to hospital. The pandemic has placed huge additional demands for pre-hospital emergency services for a number of competing conditions other than stroke which require urgent assessment in hospital.

During the pandemic year (2020-21), there was a progressive increase in the time taken between the patient's call to the ambulance service and arrival at hospital (April 2020: 1 hour and 11 minutes; January 2021: 1 hour 20 minutes). Whereas hospital avoidance was the predominant feature of the first wave in spring 2020, the absence of any similar fall in admissions in the second wave may well have added to the significant COVID-19 pressures on pre-hospital services at that time.

### Significant increase in time from call to arrival at hospital

Median time between call and arrival (minutes)



**Figure 6:** Median time between call to arrival at hospital (minutes) between April 2020 and March 2021.

### What needs to happen next?

The introduction of linked ambulance records into SSNAP is beginning to help us to understand what changes are required to improve response times for patients as well as subsequent transfer to hospital and treatment. Responding rapidly, appropriately and efficiently with hospital pre-notification will not only reduce delays but will give patients the best chance to receive acute stroke care in a timely fashion.

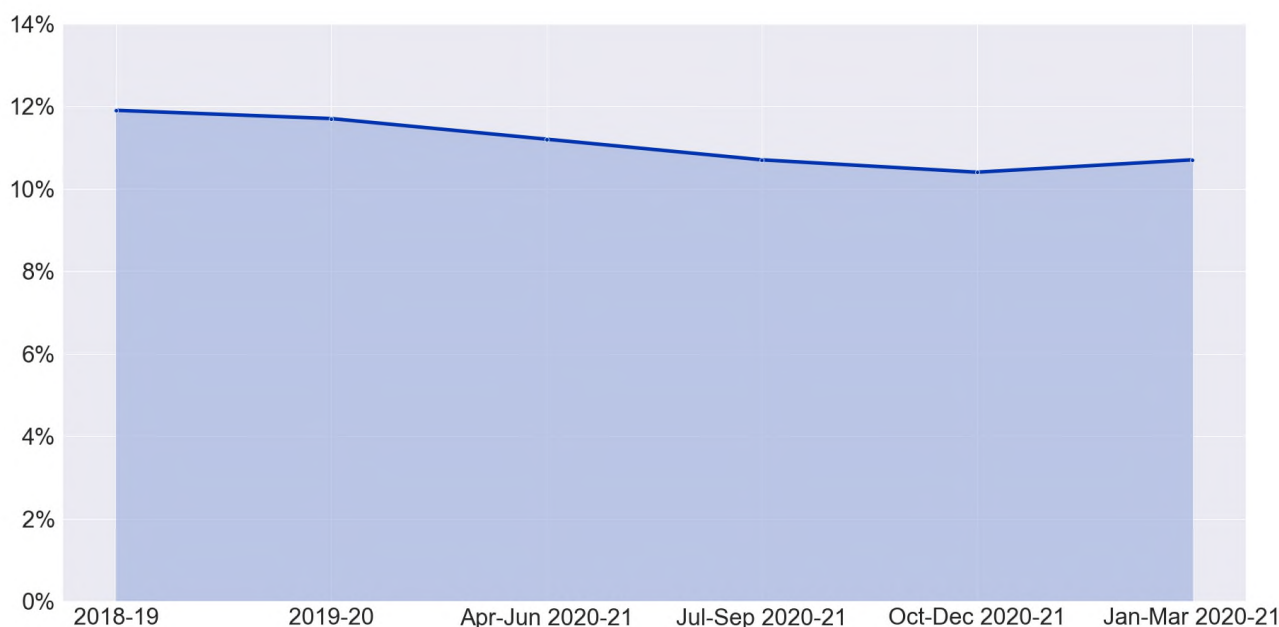
Pre-hospital communication between paramedics and clinicians in hospital, aided by telemedicine or video, can help facilitate rapid assessment and appropriate conveyance of patients to hospital, and is being piloted in several areas of the UK.

# Reperfusion treatment

## Thrombolysis

### Decline in proportion of patients receiving thrombolysis during 2020-21

Percentage of patients receiving thrombolysis



**Figure 7:** Percentage of all stroke patients who received thrombolysis, comparing 2018-19 and 2019-20 annual data with 2020-21 quarterly data.

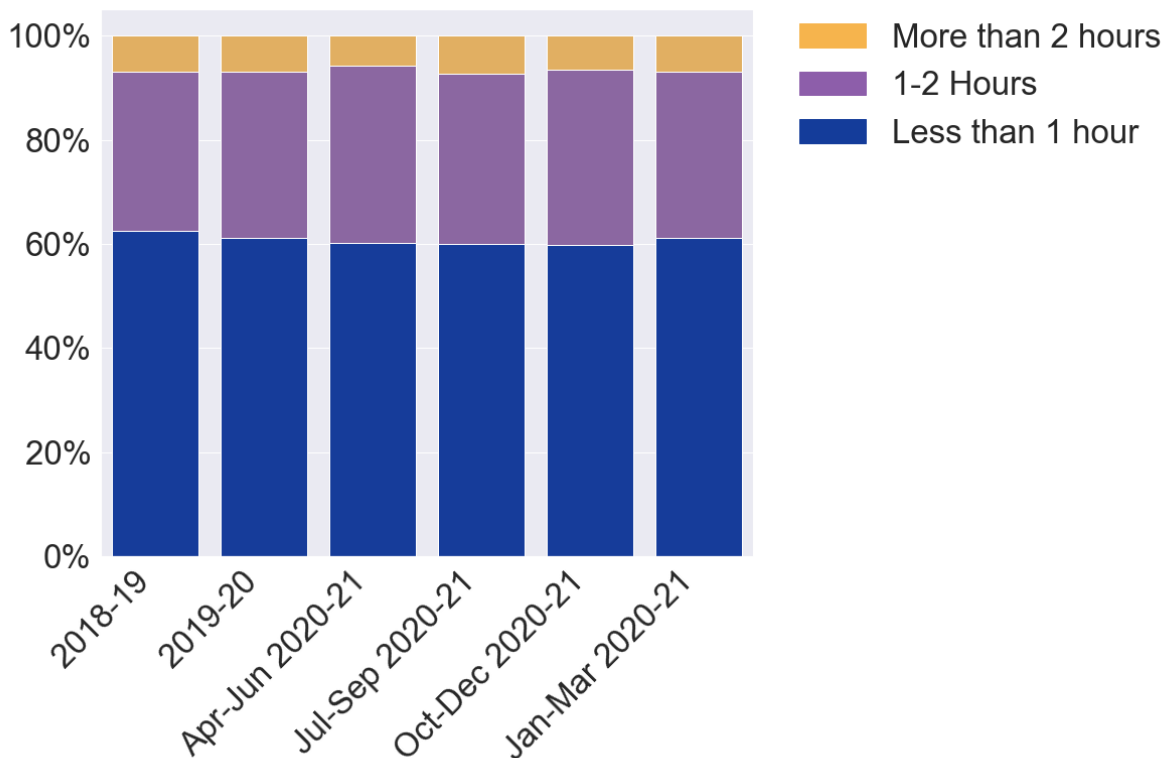
The proportion of patients receiving thrombolysis declined from 11.2% (April-June 2020) to 10.7% (January-March 2021) with the lowest level at 10.4% (October-December 2020). This is the first time for a decade that thrombolysis rates have consistently been lower than 11% through the year. The door to needle time once again lengthened slightly in 2020-21, by two minutes to 54 minutes compared with 52 minutes in 2019-20. This may be as a result of the greater use of advanced imaging prior to thrombolysis as the identification of patients eligible for thrombectomy takes greater priority.

There may be a number of reasons why thrombolysis rates have declined in 2020-21, including delayed admissions for potentially eligible patients; challenges and delays in stroke assessment in the pre-hospital setting; disruption of in-hospital pathways complicated by the need for stringent infection control policies; and hospitals being under greater pressure with increased admissions of COVID-19 patients during the autumn-winter second wave. The unremitting organisational focus on quality improvement for stroke teams and emergency departments that is required to make gains in the speed and extent of thrombolysis was, unsurprisingly, missing over the pandemic year. This focus will need to be restored if the further gains in treatment rates envisaged in the NHS Long Term Plan are to be realised.



### Fewer patients receiving thrombolysis within an hour during first wave

Distribution of time from hospital arrival to receiving thrombolysis ('door to needle' time)

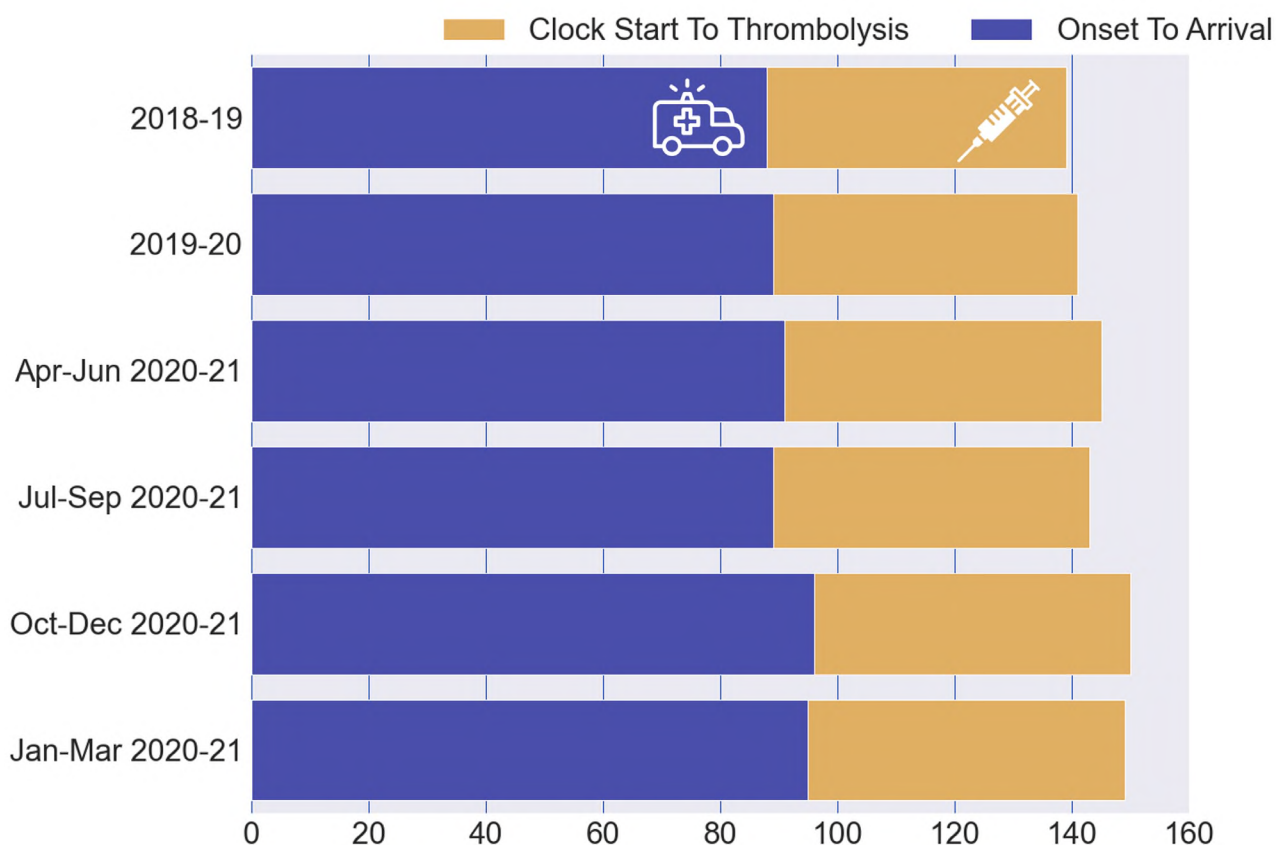


**Figure 8:** Distribution of door to needle times, comparing 2018-19 and 2019-20 annual data with 2020-21 quarterly data.

The proportion of patients who receive thrombolysis within one hour of arrival was 59.9% in April-June 2020 and slowly improved to 61.2% in January-March 2021, demonstrating some recovery. Such delays may have been driven by workforce shortages at times of peak infection, stroke assessments being slowed by additional imaging requirements, and infection control measures.

## Deteriorating onset to arrival times offsetting gains in door to needle time

Median time from stroke onset to thrombolysis (minutes)



**Figure 9:** Median times (minutes) from onset to arrival and from arrival to thrombolysis for thrombolysed patients, comparing 2018-19 and 2019-2020 annual data with 2020-21 quarterly data.

The onset to arrival time for patients undergoing thrombolysis deteriorated slightly from 1 hour and 31 minutes (April-June 2020) to 1 hour and 35 minutes (January-March 2021). Once again this year we observed that any reductions in door to needle times was offset by increasing delays incurred from the time of stroke to arrival at hospital. Coupled with reduced rates of thrombolysis, this will further diminish the overall benefit of this intervention for the population.

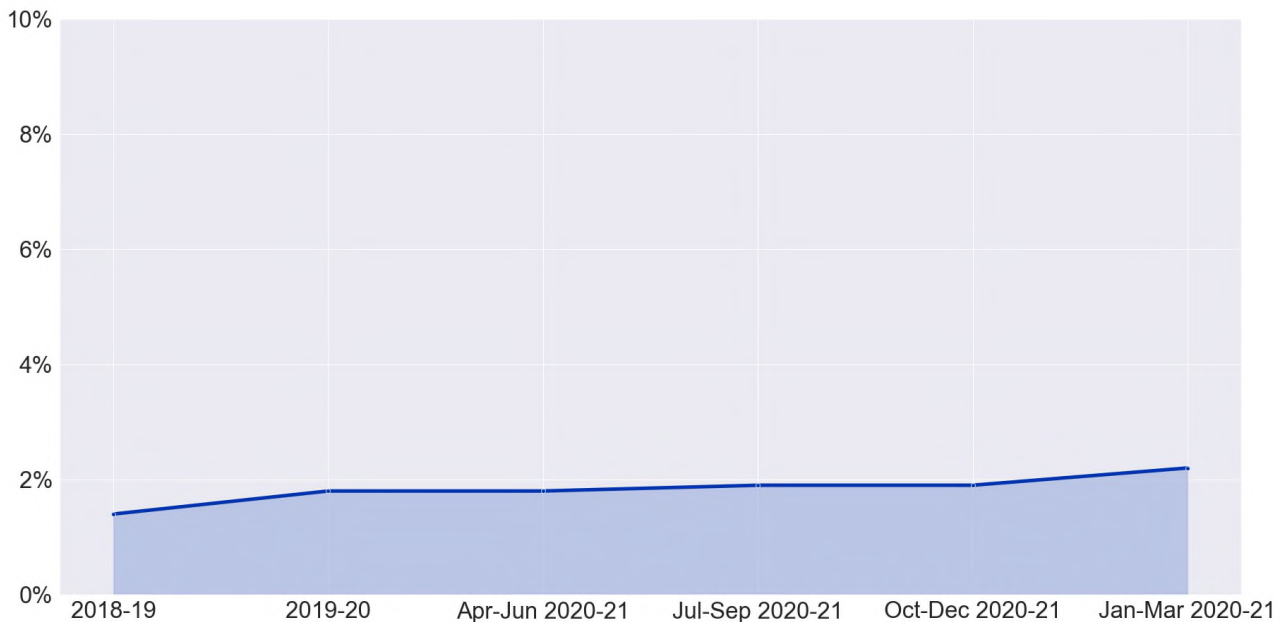
### What needs to happen next?

A renewed emphasis on progress in thrombolysis is now needed. Thrombolysis should be delivered as quickly as possible to all eligible patients irrespective of their COVID-19 status. In addition, closer collaboration between ambulance services and hospitals is required. Efforts should balance the avoidance of COVID-19 infection exposure to staff members involved in the hyper-acute pathway with the delivery of thrombolysis as quickly as possible. Sites should continue to evaluate their protocols and pathways to identify where potential delays occur. These include acquiring the time of stroke onset, pre-notification from pre-hospital emergency services, reducing time to imaging, and delivery of the first thrombolysis bolus. There is now a very strong evidence base that incremental changes to each facet of the pathway can expedite the delivery of thrombolysis through data-driven quality improvement.

## Mechanical Thrombectomy

### Continued increase in proportion of patients receiving mechanical thrombectomy during 2020-21

Percentage of all stroke patients receiving mechanical thrombectomy

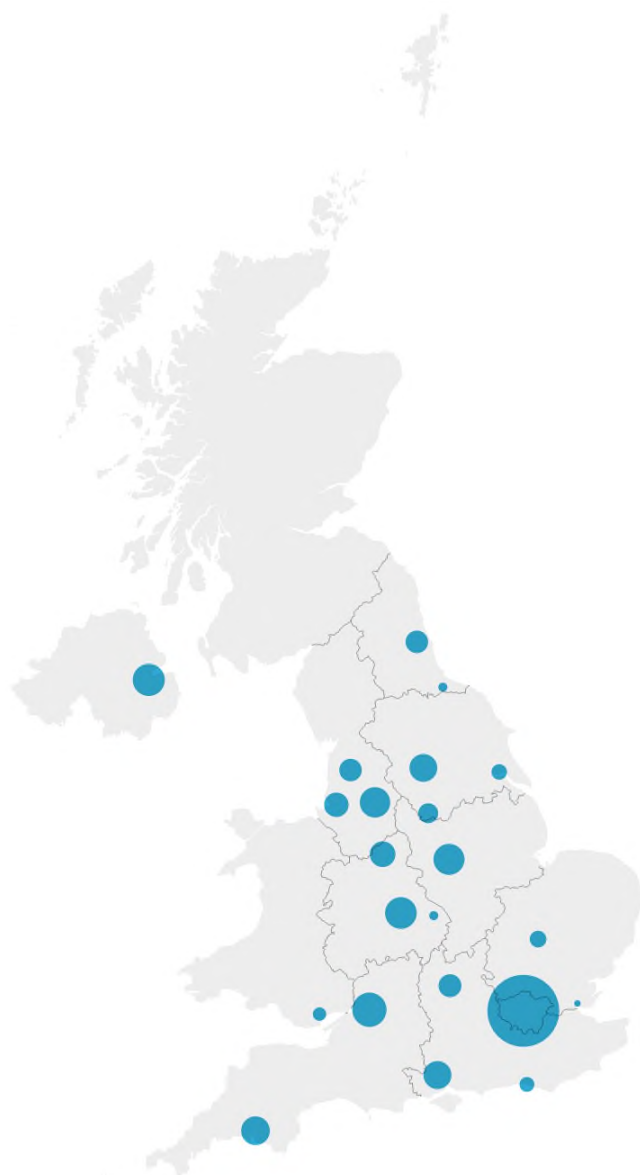


**Figure 10:** Percentage of patients who received mechanical thrombectomy, comparing 2018-19 and 2019-20 annual data with 2020-21 quarterly data.

The percentage of all stroke patients receiving mechanical thrombectomy increased from 1.8% (April-June 2020) to 2.2% (January-March 2021). The incremental increase is consistent with previous yearly comparisons from 1.4% (2018-19) to 1.8% (2019-20). However, activity growth remained slow. Despite sites being severely pressured by COVID-19 admissions, thrombectomy rates still continued to climb modestly but not at the rates required to reach the aspirational target of 10% by 2022.

## Regional variation of thrombectomy cases delivered in Comprehensive Stroke Centres across England, Northern Ireland and Wales

Number of thrombectomies per centre.



Thrombectomy centre	2019/20	2020/21
Addenbrooke's Hospital	27	23
Derriford Hospital	46	83
Hull Royal Infirmary	16	19
James Cook University Hospital	3	4
John Radcliffe Hospital	35	49
Leeds General Infirmary	39	77
Charing Cross Hospital	201	220
St George's Hospital	131	90
Royal London Hospital	89	121
University College Hospital	59	45
King's College Hospital	24	38
Queens Hospital Romford	45	100
North Bristol Hospital	124	124
Queen Elizabeth Hospital Edgbaston	65	104
Queen's Medical Centre - Nottingham	93	99
Royal Hallamshire Hospital	36	35
Royal Preston Hospital	70	47
Royal Stoke University Hospital	96	64
Royal Sussex County Hospital	28	17
Royal Victoria Hospital Belfast	115	107
Royal Victoria Infirmary	50	47
Salford Royal Hospital	83	95
Southampton General Hospital	53	78
Southend Hospital	5	1
The Walton Centre	63	57
University Hospital Coventry	-	4
University Hospital Wales	10	13

**Figure 11:** Number of thrombectomies performed per centre across England, Northern Ireland and Wales. Circles show location of thrombectomy centres with their size proportional to activity.

The increase in thrombectomy activity during the pandemic is welcome, although there is considerable variation in how that growth is distributed between centres. It is likely that interventional neuro-radiology (INR) staff were not redeployed during the pandemic with elective procedures being cancelled, and this may have helped the delivery and responsiveness of thrombectomy interventions.

### **What needs to happen next?**

Thrombectomy should continue to be delivered to all eligible patients irrespective of their COVID-19 status. There is an ongoing need to strengthen the collaboration between comprehensive stroke centres delivering thrombectomy and acute stroke centres (referring sites), particularly with a view to increasing the proportion of procedures that originate from referring sites but also to reduce onset to procedure times. This will be achieved through the development and implementation of robust thrombectomy protocols and pathways, which will need to be developed through collaborative networks and maintained through any further potential COVID-19 disruption. The deployment of advanced imaging to select patients for thrombectomy in extended time windows will also need to be implemented rapidly, as will the use of artificial intelligence (AI) to expedite decision making and image transfer. Expanding the thrombectomy workforce and the hours of service of most centres not presently working 24/7 remain the two most pressing priorities.



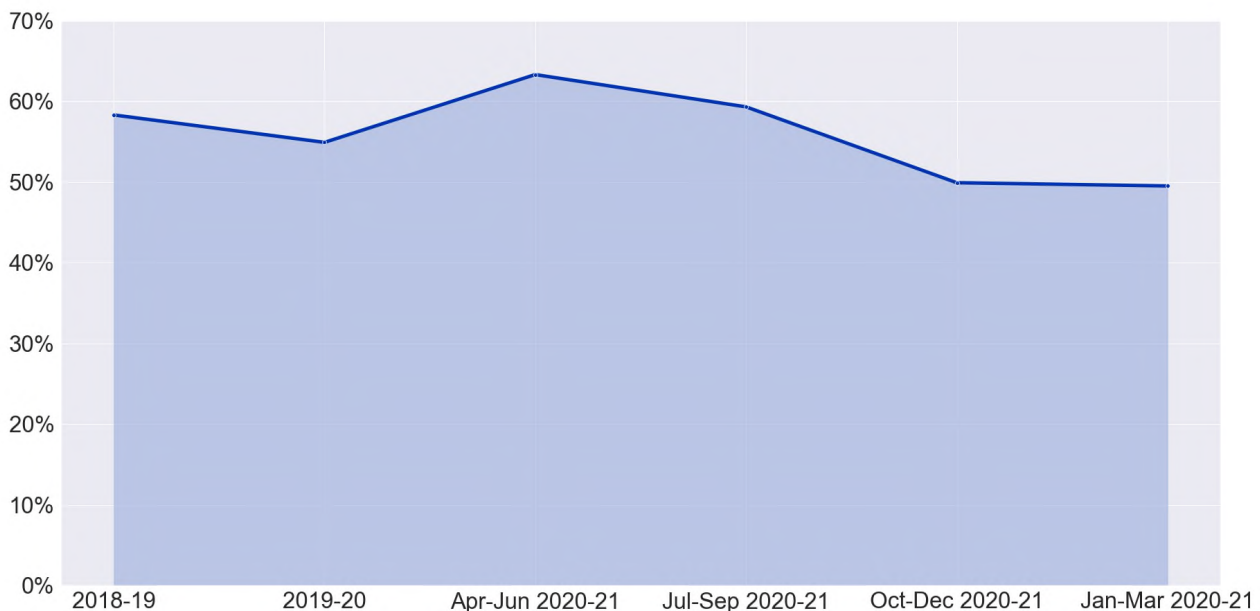
# Access to specialist stroke care

## Stroke units

Rapid admission to a stroke unit is critical to ensure that timely interventions and management of complications can be delivered effectively to optimise outcomes and reduce mortality. Care on a stroke unit ensures that the delivery of key multidisciplinary assessments that include specialist nursing and swallowing screening can occur throughout the patient's hospital stay.

### Changes in proportion of patients admitted to specialist stroke unit within 4 hours of arrival in 2020-21

Percentage of patients



**Figure 12:** Percentage of patients admitted to a stroke unit within 4 hours of arrival at hospital, comparing 2018-19 and 2019-20 annual data with 2020-21 quarterly data.

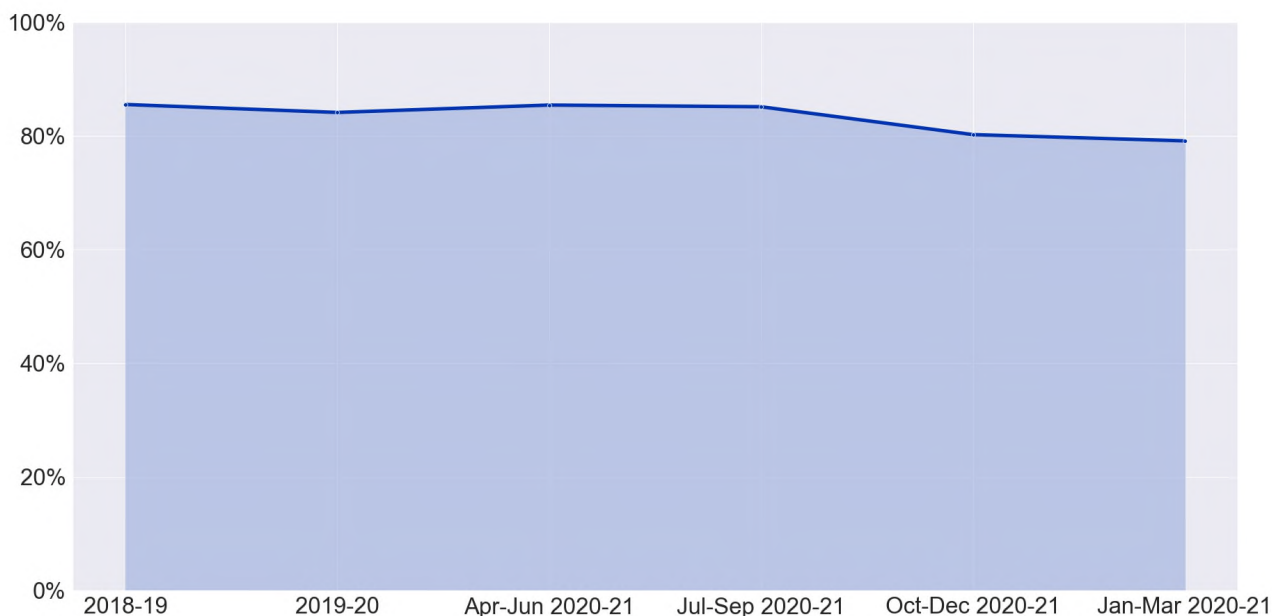
This year witnessed a significant decline in the proportion of patients admitted to a specialist stroke unit within 4 hours of admission, with 63.3% patients admitted in April-June 2020 falling to 49.5% in January-March 2021 – the lowest ever since the inception of SSNAP.

The proportion of patients accessing a stroke unit within 4 hours actually rose during the first COVID-19 wave (April-June 2020). The reasons for this are multifactorial and likely to be the result of an increase in the number of available beds coinciding with a reduction in stroke admissions, as well as increased bed capacity due to the suspension of elective and planned care in hospitals experiencing high numbers of COVID-19 patients.

However, increasing admissions of patients with COVID-19 and demands on emergency admissions for non-stroke patients during the second wave led to some substantial challenges in maintaining timely flow and bed availability on acute stroke units.

## Decline in proportion of patients spending at least 90% of stay on stroke unit in 2020-21

Percentage of patients



**Figure 13:** Percentage of patients who spent 90% of their stay on a stroke unit, comparing 2018-19 and 2019-20 annual data with 2020-21 quarterly data.

The percentage of patients spending 90% of their stay on a stroke unit fell, with 85.4% achieving this in April to June (2020) compared with 79.1% in January to March (2021). This is the first time this has fallen below 80%.

These data clearly reflect some major challenges for stroke units during the autumn-winter second wave, both with bed availability being affected by overspill of non-stroke patients, and the transfer out of patients with or exposed to COVID-19. As we have consistently seen over the years, the 90% stay indicator is a sensitive indicator of the way that hospital overcrowding affects the quality of care for people with stroke.

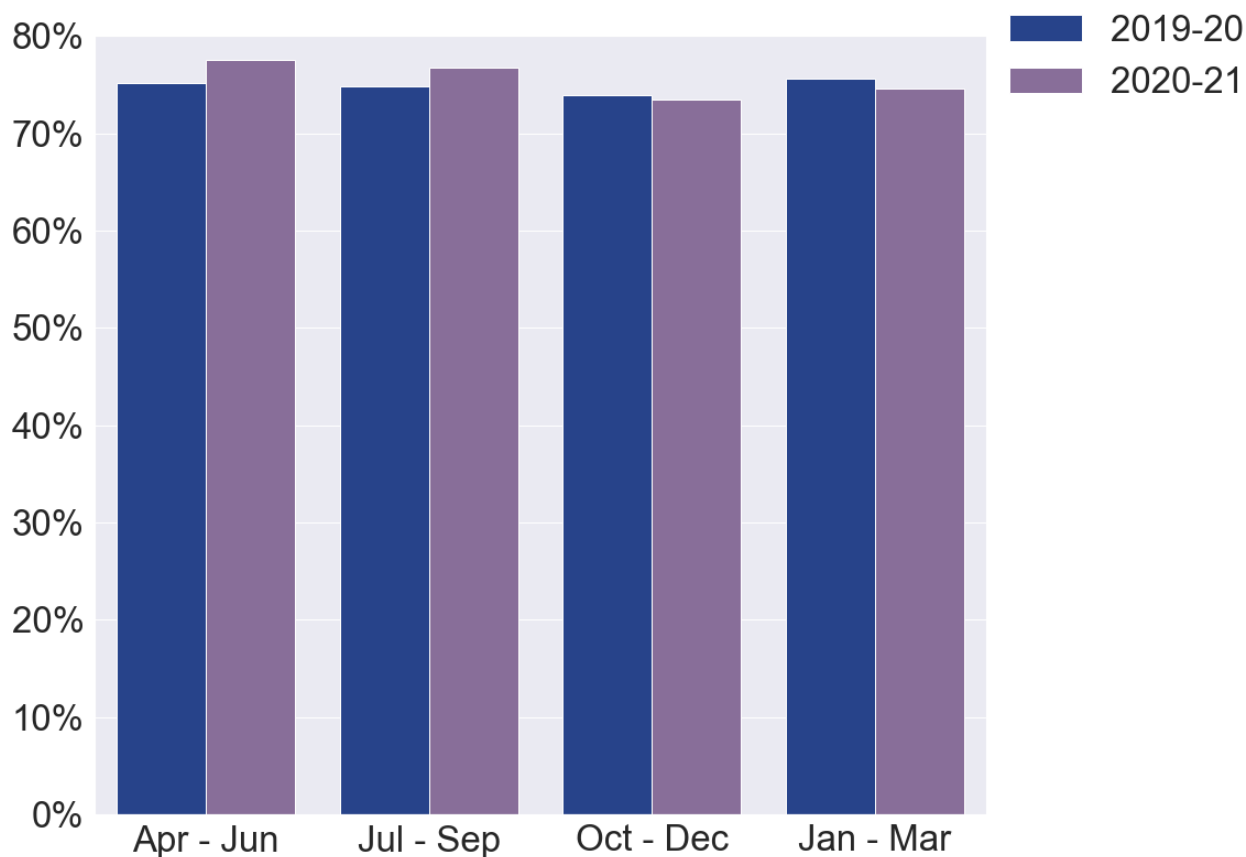
### What needs to happen next?

In order to improve timely access to acute stroke units, there needs to be a whole systems approach to ensure that flow improves from the front door to the stroke unit and on to discharge, maintaining the emphasis on reducing cross infection across areas. Such approaches need to be flexible and adaptable, focusing also on the ability to safely discharge patients at weekends to create additional stroke unit capacity. For the small minority of patients with stroke for whom specialist care on another unit is clinically justified, it is vital that these outlying wards are appropriately supported by the stroke multidisciplinary team, with patients moved to the stroke unit as soon as clinically appropriate.

## Swallowing screening

### Fall in proportion of patients receiving swallowing screening within 4 hours during 2020-21

Percentage of patients



**Figure 14:** Percentage of patients receiving a swallow screening assessment within 4 hours of arrival at hospital, comparing quarterly 2019-20 and 2020-21 data.

Although the overall percentage of swallowing screening within 4 hours remained stable when comparing 2019-20 (74.7%) and 2020-21 (75.3%), during the 2020-21 year this proportion fell from 77.5% in April-June 2020 to 74.6% in January-March 2021.

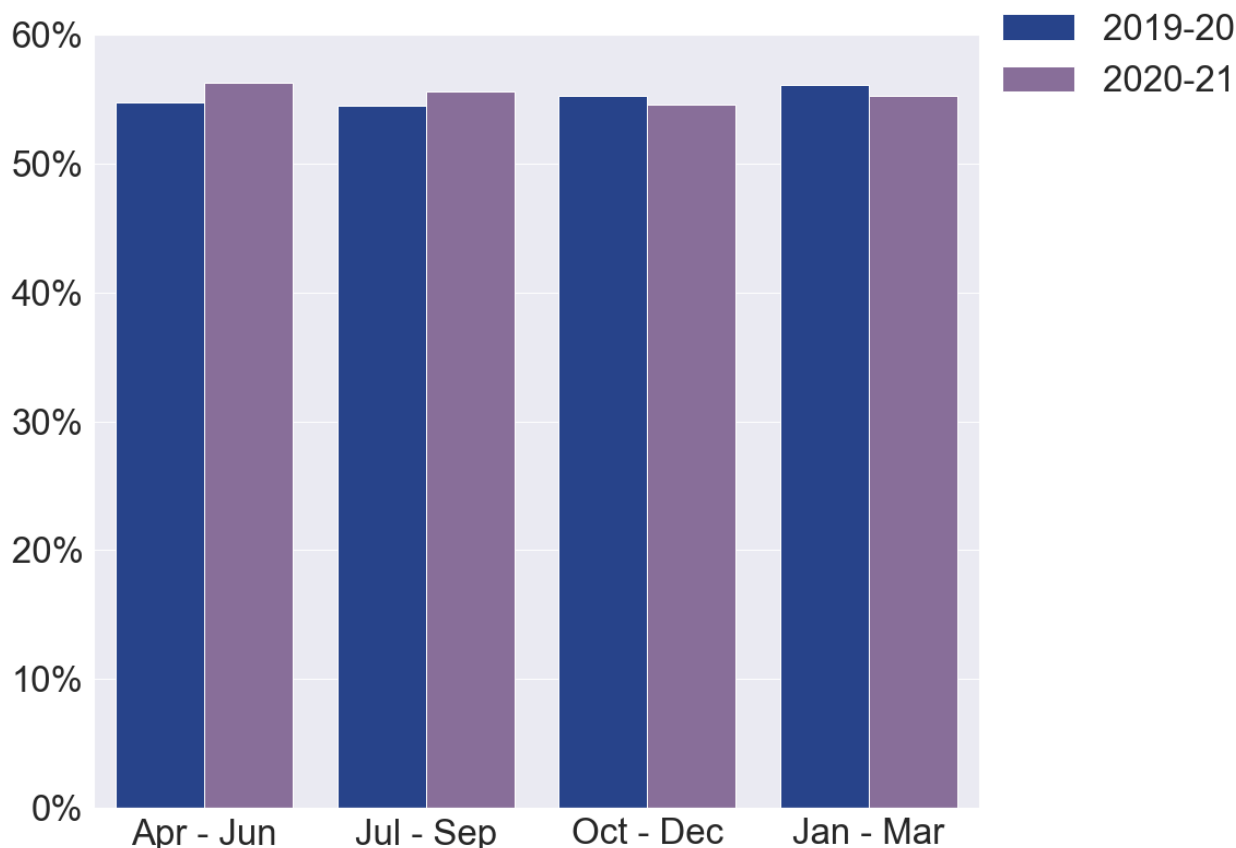
#### What needs to happen next?

There are challenges around the assessment of patients who may be infectious with COVID-19 and the provision of personal protective equipment to ensure that swallow screening is carried out safely in a timely manner, but there is room for improvement. Early swallow screening and assessment has been shown to reduce the risk of stroke-associated pneumonia, which is a leading preventable cause of death and so it is important that these assessments are carried out urgently to ensure that patients are adequately hydrated and nourished.

## Urgent brain imaging

### Steady national performance for patients receiving brain imaging within 1 hour of hospital arrival

Percentage of patients



**Figure 15:** Percentage of patients scanned within one hour of hospital arrival, comparing 2019-20 and 2020-21 quarterly data.

The proportion of patients scanned within one hour remained stable at 56.3% in April-June 2020 compared with 55.3% in January-March 2021. Delays in some individual sites may have been caused by COVID-19 screening and infection prevention measures but it is reassuring that overall brain imaging rates have been maintained during the pandemic.

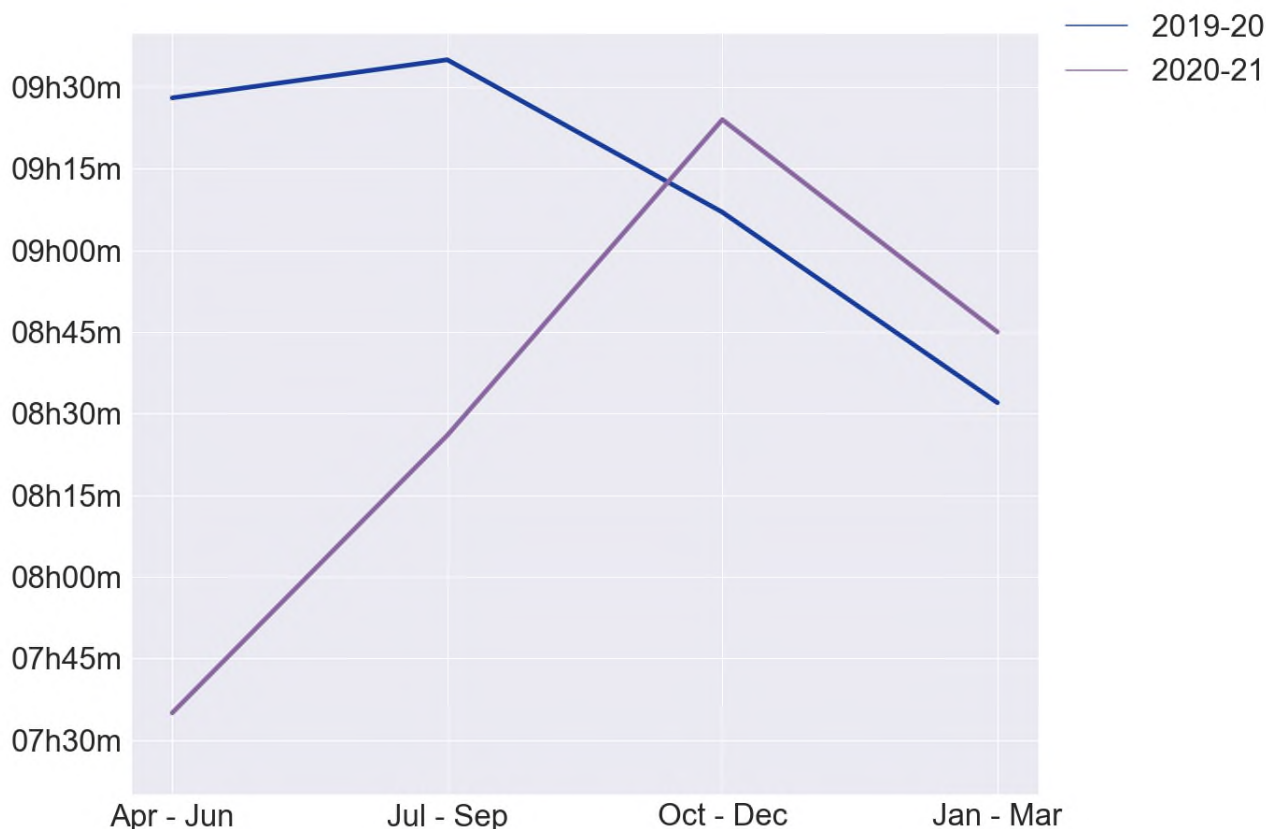
#### What needs to happen next?

Better organised stroke services with shared and agreed protocols for immediate brain imaging are a key cost effective intervention for continuous quality improvements. The need for rapid advanced brain imaging is increasingly important, both for clot busting treatments and for screening patients for large vessel occlusions who may be eligible for mechanical thrombectomy. These priorities are clearly emphasised in the new National Optimal Stroke Imaging Pathway, recently adopted by NHS England (<https://www.england.nhs.uk/wp-content/uploads/2021/05/national-stroke-service-model-integrated-stroke-delivery-networks-may-2021.pdf>), which should be a priority for implementation.

## Specialist assessment

### More timely stroke specialist assessment in first two quarters and then declining, comparing 2019-20 and 2020-21

Median time from arrival to assessment





**Figure 16:** Median time of arrival to first stroke specialist assessment in person or via telemedicine (hours: minutes) comparing 2019-20 and 2020-21 quarterly data.

Assessments by a stroke specialist were carried out more quickly in the first two quarters of 2020-21 than in 2019-20: April-June 2020: 7 hours 35 minutes vs 2019: 9 hours 28 minutes; and July-September 2020: 8 hours 26 minutes vs 2019: 9 hours 35 minutes). However these improvements were not maintained in the October-December 2020 and January-March 2021 cohorts.

At the onset of the pandemic, many sites drafted additional clinical staff to work in acute care which may have improved timely assessments. During the second wave however, with an increase in emergency admissions of COVID-19 as well as in self-isolation of the workforce, appears to have made face to face assessments more challenging.

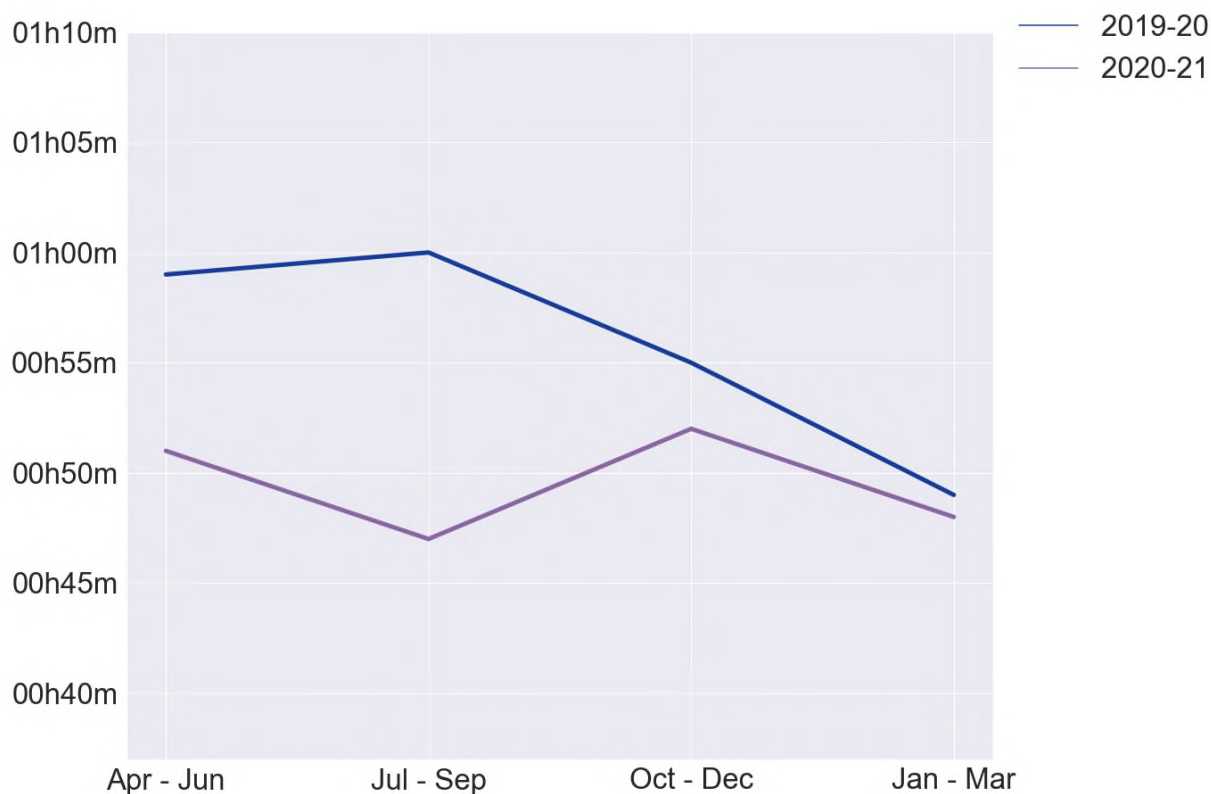
The ambitions in NHS services – open seven days a week (2018; <https://www.england.nhs.uk/seven-day-hospital-services/>) stipulate that patients should be assessed by a suitable stroke skilled consultant within 14 hours of admission. There are opportunities to ensure senior assessments are more efficient and organised by carrying out two hyper-acute ward rounds per day (morning and late afternoon). Other modalities such as telemedicine and other IT platforms in collaboration with junior staff were used slightly more frequently during the pandemic.

## Method of assessment for first contact with stroke consultant

	Apr-Jun		Jul-Sep		Oct-Dec		Jan-Mar	
	2019/20	2020/21	2019/20	2020/21	2019/20	2020/21	2019/20	2020/21
<b>Telemedicine</b> 	2.8%	3.3%	2.8%	3.2%	3.2%	3.4%	3.6%	4.0%
<b>Telephone</b> 	16.2%	17.9%	15.9%	16.5%	15.7%	17.0%	15.0%	16.8%

## Improved time to stroke specialist nurse assessment in 2020-21

Median time from arrival to assessment



**Figure 17:** Median time to stroke specialist nurse assessment comparing 2019-20 and 2020-21 quarterly data (hours: minutes).

The timing of initial stroke nursing assessments improved in 2020-21 compared with 2019-20. During 2020-21, median assessment time improved slightly from 51 minutes in April-June 2020 to 48 minutes in January-March 2021. The mismatch we saw this year, between reduced time to initial nursing assessment but increased time to the stroke unit, suggests that infection control measures resulted in a greater degree of outreach by stroke unit teams into other admission areas while COVID-19 test results were awaited.



### **What needs to happen next?**

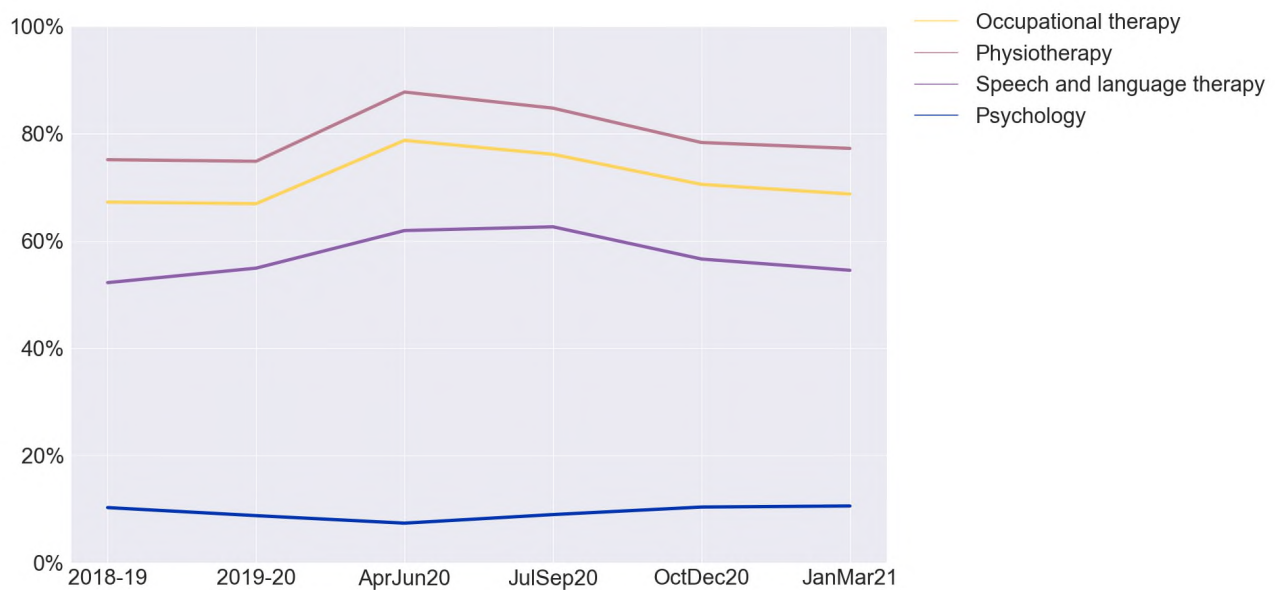
Better organised and efficient stroke services with clear protocols evident for swallowing screening, accessing brain imaging and specialist assessments are required to maximise recovery. These interventions should be consistently available over 7 days. Solutions for addressing these improvements need to be flexible and sustainable and be able to cope with fluctuations in demand. Opportunities to deliver more efficient stroke specialist assessments may include increasing the use of telemedicine.

# Inpatient rehabilitation

Many patients report that they do not feel they receive enough therapy during their inpatient hospital stay, particularly at weekends. One of the key findings to emerge from the Stroke Association's 2020 Recoveries at Risk report (<https://www.stroke.org.uk/stroke-recoveries-at-risk-report>) during the COVID-19 pandemic was that access to therapy had reduced, particularly after discharge from hospital.

## Significant initial increase in therapy delivery (percentage of inpatient days on which each therapy was received) during first wave

Median percentage of inpatient days on which therapy was received



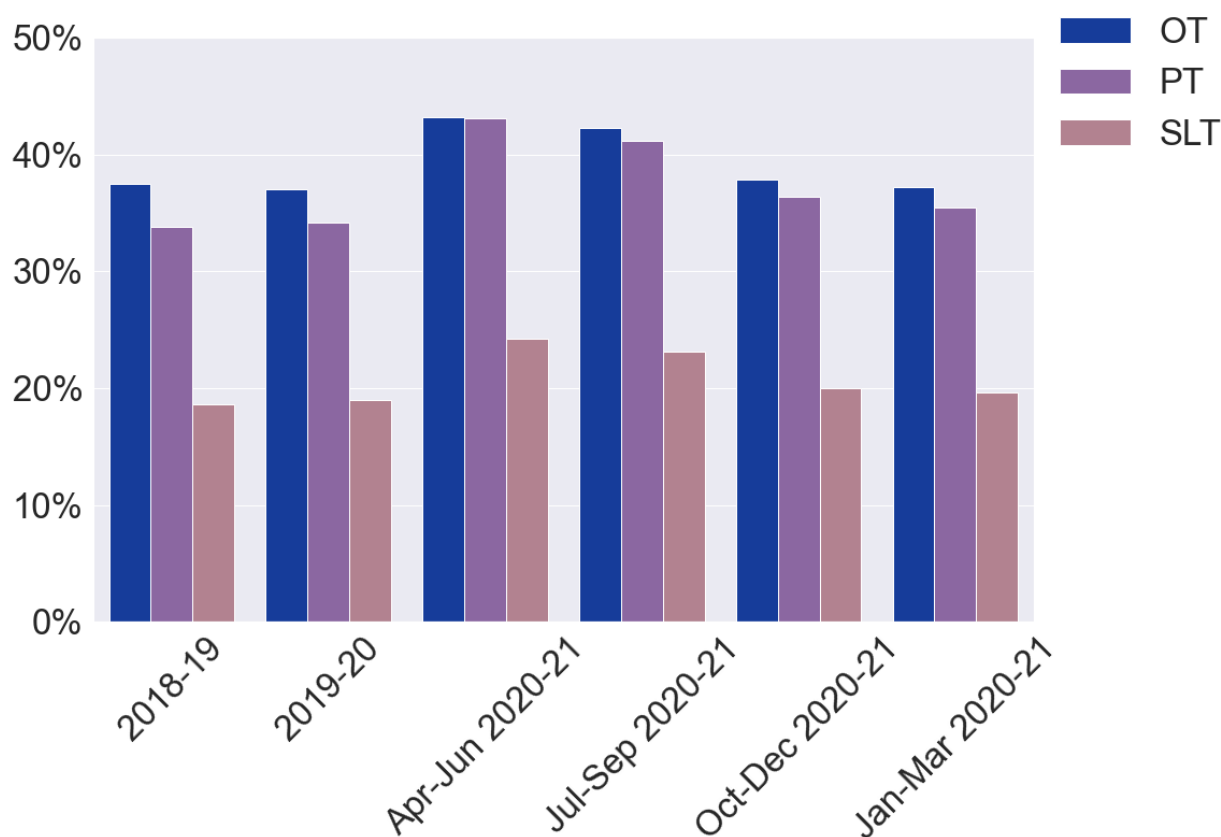
**Figure 18:** Median percentage of inpatient days on which physiotherapy, occupational therapy, speech and language therapy and psychology were received, comparing 2018-19 and 2019-20 annual data with 2020-21 quarterly data.

The highest percentage of inpatient days on which therapy was received in hospital occurred during the first wave of the pandemic in April-June 2020, in particular for physiotherapy (87.7%), occupational therapy (78.7%) and speech and language therapy (61.9%). These figures surpassed the figures from any previous year, at a time when the proportion of patients for whom these therapies were appropriate ('applicability') remained approximately constant. However there was a decline after that quarter.

It is likely that the increase in the first quarter was caused by the fall in stroke admissions, thereby maximising therapy capacity and availability. During the autumn-winter second wave (October 2020-March 2021), at a time of peak pressures from admissions (COVID-19 and non COVID-19) and the redeployment of staff, therapy delivery fell back to historical levels. Of interest is that, although still low, the proportion of inpatient days on which psychology was received improved from 7.4% (April-June 2020) to 10.6% (January-March 2020-21). We hope that this represents a greater availability of clinical psychology support, something that has been recommended in national guidelines for multidisciplinary rehabilitation over many years.

### Highest target compliance (across all patients) by therapy modality during pandemic first wave (April-June 2020)

Percentage of patients



**Figure 19:** Percentage compliance with therapy targets for the three modalities across the 4 quarters of 2020-21 compared with 2018-19 and 2019-20 (45 minutes for at least 5 days per week).

SSNAP reports on the percentage of patients who receive at least 45 minutes of each therapy that they need 5 days a week. From October 2020, SSNAP reported the percentage of patients who received 45 minutes of therapy 7 days a week. However, for the purposes of comparison with previous years, 5 days a week therapy standards are presented here.

The proportion of patients receiving therapy to this standard rose significantly during the first wave of the pandemic: physiotherapy (43.1%), occupational therapy (43.2%) and speech and language therapy (24.2%). This subsequently declined over the course of the pandemic. There are still significant proportions of patients who do not receive the amount of rehabilitation recommended in national guidelines.

### **What needs to happen next?**

There is a need to maximise the opportunities to deliver a therapy service over 7 days. Such services provide a greater number of therapy minutes across the week compared with 5 day services [[https://www.strokeaudit.org/getattachment/Research/Posters/Therapy/Does-7-day-therapy-working-deliver-more-therapy-ov/UKSF-poster-SSNAP-5v7-day-therapy-\(1\).pdf.aspx?lang=en-GB](https://www.strokeaudit.org/getattachment/Research/Posters/Therapy/Does-7-day-therapy-working-deliver-more-therapy-ov/UKSF-poster-SSNAP-5v7-day-therapy-(1).pdf.aspx?lang=en-GB)]. Use of organised timetabling, therapy assistants, group therapy, delivering therapy in divided sessions and video technology (as witnessed during the pandemic) may provide further avenues to deliver more efficient therapy time for patients. In future, SSNAP will also report on the number of therapy minutes provided by therapy assistants in hospital and at home.

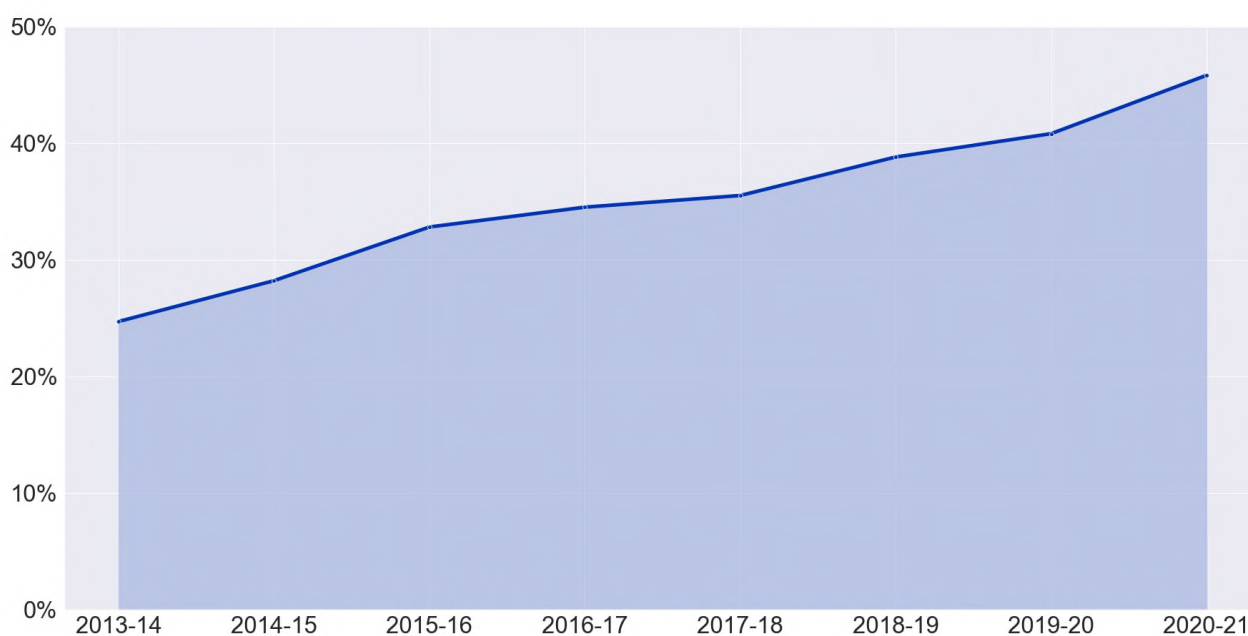
# Rehabilitation at home

## Early Supported Discharge (ESD)

ESD is a specialist multidisciplinary service, which enables stroke patients to continue their rehabilitation in their own home at a similar intensity to that which is provided in hospital, based on clinical need. This service facilitates stroke patients returning home quicker than would be feasible otherwise and leads to improved outcomes. COVID-19 has brought about its own challenges in the provision of community therapy services.

### Proportion of patients discharged to the care of a skilled Early Supported Discharge (ESD) team has increased

Percentage of patients



**Figure 20:** Percentage of patients treated by an ESD team between 2013-14 and 2020-21.

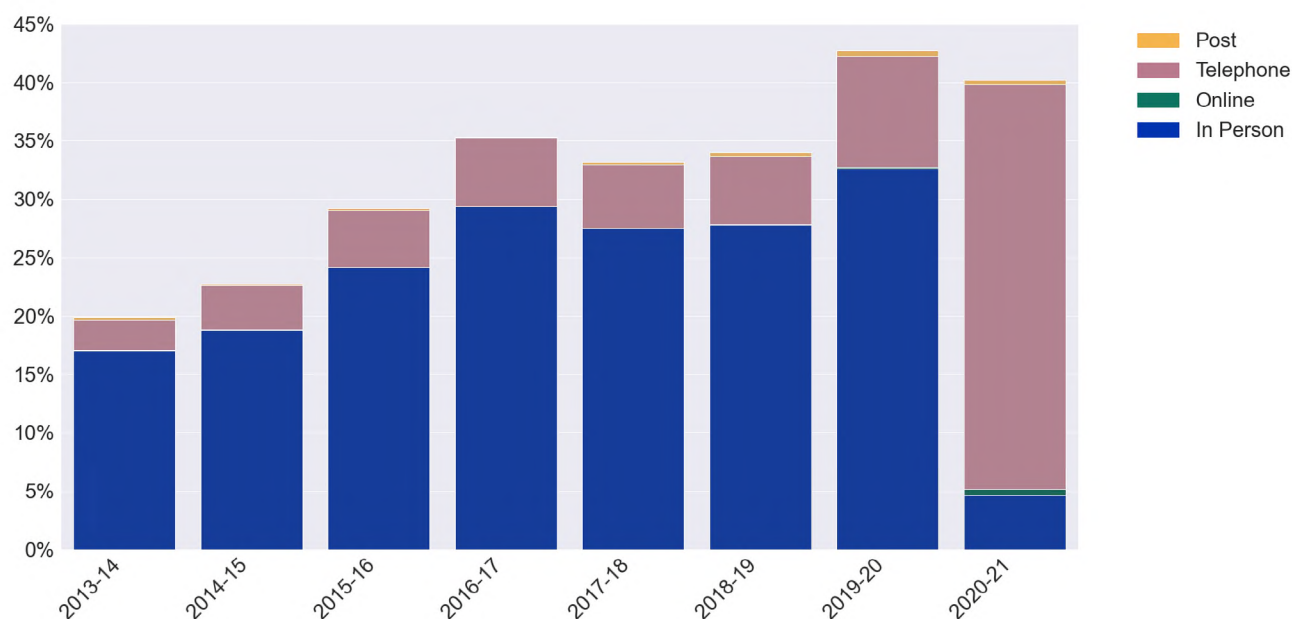
The percentage of patients discharged from hospital with an ESD service increased sharply from 38.8% (2018-19) and 40.8% (2019-20) to 45.8% this year. During the first wave of the pandemic, there was an appropriate priority to expedite early discharge from hospital to avoid nosocomial infection, with a focus on identifying eligible patients as soon as possible. Services became more versatile to manage the balance between providing intensity of therapy and avoiding infection using appropriate precautions. Planning visits with the same therapists for individual stroke patients for example helped to reduce the risk of infection.

## Six month assessments

Adults who have had a stroke should have a structured review at six months and then annually after stroke by an appropriate trained professional. This is important to assess how the individual is recovering, to ensure that ongoing lifestyle needs are being addressed and that opportunities for further access to specialist services are available when required.

### Slight decline in proportion of patients receiving six month assessment between 2019-20 and 2020-21

Percentage of patients receiving six month review, by assessment method



**Figure 21:** Percentage of patients receiving a six month assessment between 2013-14 and 2020-21.

Although the proportion of patients receiving an assessment at six months has increased slowly over time, this year saw a reduction from 42.7% (2019-20) to 40.2% (2020-21). During the pandemic, there was a huge reduction in face to face assessments from 76.5% (2019-20) to 11.5% (2020-21). There was a corresponding increase in the use of telephone assessments from 22.2% (2019-20) to 86.1% (2020-21). More flexible working arrangements are possible with remote approaches, and telephone follow-up may be more suitable for certain patients such as those with transport difficulties. However, assessments were still not carried out for more than half of stroke survivors, and these tend to be those more severely affected by their stroke and those in hard to reach groups (<https://www.strokeaudit.org/SupportFiles/Documents/Research/Six-Months-post-stroke-reviews.aspx>). Incomplete follow-up of people disabled by stroke results in the medium term needs of patients and families not being addressed, when the available evidence from the NIHR-funded EXTRAS randomised trial indicates that such ongoing contact with stroke survivors is a cost effective way to reduce demand on primary and community care (Rodgers, Howel et al 2019; <https://www.ahajournals.org/doi/10.1161/STROKEAHA.119.024876>).



## What needs to happen next?

It is important to ensure that Early Supported Discharge services deliver the required intensity of rehabilitation to eligible patients discharged home. Furthermore, these services should aspire to the new Integrated Community Stroke Service Rehabilitation Model (<https://www.england.nhs.uk/publication/national-stroke-service-model-integrated-stroke-delivery-networks/>), particularly in relation to a needs-based rather than time-based model of eligibility. During the COVID-19 pandemic, there have been examples of expansion of community stroke services from 5 days to 7 days with uptake of remote support and telerehabilitation for appropriate patients. With an ever increasing workload for community stroke teams, it is important to ensure teams can work flexibly and adapt according to demand as well as maintain workforce resilience.

Improving access to six month assessments is a key priority and further collaboration is required to ensure that inequalities in longer term support for patients and families are addressed. New additions to the six month assessment domain in SSNAP introduced in 2021 will provide a greater understanding of the impact of stroke rehabilitation on community participation and other outcomes. These include employment status, health related quality of life (EQ-5D-5L) and days spent at home in the first four months following hospital admission.

## Concluding Thoughts

Delivering high quality care for all stroke patients remains a national priority, as recently reiterated in the English NHS Long Term Plan and the corresponding policy statements from the Welsh and NI administrations. SSNAP's eighth annual report describes the current performance through measuring the structure, process and outcomes of stroke care in the 2020-21 financial year. Once again, understanding and using this valuable knowledge will allow services to identify the further changes needed to deliver high quality care in hospital and in the community in order to deliver the long-term ambitions for stroke patients in the NHS.

When implementing quality improvement for stroke care, it is not unusual to be faced with transient challenges which can sometimes impede the delivery of high quality stroke care. However, the COVID-19 pandemic which reached the UK just before this 2020-21 year has presented a huge number of far reaching challenges which have altered the trajectory for the delivery of high quality stroke care over a sustained period of time. Our report this year really does describe 'A Year Like No Other' in the sudden and unprecedented pressures on all services, in hospital and in the community, which led to some significant innovations in practice and to sustained pressure on the multidisciplinary workforce. We join with many in the UK in appreciating more than ever the commitment of the NHS workforce, and especially those working with stroke patients, in maintaining the best possible quality of care whilst under severe and sustained clinical pressure. It is commendable that the vast majority of acute and community services were still able to contribute to the SSNAP audit during the first wave of the pandemic - a time when there was a moratorium on the National Clinical Audit and Patient Outcomes Programme (NCAPOP) from April 2020 onwards. The observations we make in this year's report regarding adverse impacts on some indicators of quality of care are in no way intended to detract from that appreciation.

An immediate impact of the first wave of the pandemic was a significant reduction in stroke admissions during March-May 2020, reflecting a reluctance in contacting primary and emergency care services and a fear of admission and infection – a phenomenon replicated in many other countries around the world. In the end, this downturn in hospital activity from March 2020 onwards proved relatively brief and by the following quarter (Jul-Sept 2020) case-mix and activity were back to historical levels. However, this makes it likely that there was a significant number of patients in the UK who did not receive acute hospital care for their stroke as a direct result of hospital avoidance during the first COVID-19 wave.

The observed delayed onset to arrival and ambulance call to arrival times emphasises the continued need to scrutinise those elements of the pre-hospital pathway that need to be improved. These changes occurred in the wider context of well-publicised severe pressures on ambulance trusts that continued throughout the year. Innovations such as video consultations between ambulance services and stroke specialists have been trialled for remote triage to ensure that patients are conveyed to the correct stroke centre in a timely fashion, with potentially permanent impacts on pre-hospital clinical practice.

During the first wave in spring 2020 many of the key quality measures for stroke care were maintained and improved in some cases, where there was sufficient capacity in the workforce coupled with a reduction in stroke admissions. However, some of these improvements proved

to be short-lived. For the first time ever, the 90% of patient stay on stroke unit indicator fell below 80% during the second COVID wave. Sustaining these quality measures involves a whole systems approach focussing on rapid admission, maintaining bed flow and expediting early discharge in order to maintain stroke unit capacity. Restoring these headline indicators to pre-pandemic levels will be even more pressing when preparing for future surges when hospital admissions with COVID-19 and/or other respiratory infections potentially rise and must be a priority for services and networks.

An important observation in our report is the reduction in thrombolysis rates over the year to below 11%. This occurred as a gradual effect over the course of the year, at its lowest in early autumn. The modest gains we saw over the year in thrombectomy activity are insufficient to solely account for the decline in the thrombolysis rate, and the majority of thrombectomy patients continued to receive 'bridging' thrombolysis. We need to better understand what influences are at play here if we are to reverse the trend and renew progress towards the ambition of 20% thrombolysis in acute stroke. We would once again encourage centres with low thrombolysis rates to work with high performing centres to benefit from shared learning and kick start progress towards that national ambition. Collaborating within a networked approach is essential in ensuring that stroke care is delivered in an integrated manner. The ISDNs will provide the vehicle to enable this to occur in England and similar collaborations are proposed in Wales.

It is evident that the overall ambition of a 10% rate for thrombectomy in 2021-2022 will not be achieved, but there are significant examples of good practice that, as with thrombolysis, could do with disseminating nationally. Although there remain some prominent pockets of very low activity, as an increasing number of CSCs extend their service hours and move towards 24/7 services we must hope for increased collaboration between referring and receiving centres within networks. Facilitated by the wider use of image-sharing artificial intelligence (AI) actively supported this year by the NHSX AI Lab initiative (<https://www.nhsx.nhs.uk/ai-lab/>), this should increase the proportion of patients who receive thrombectomy under a drip-and-ship arrangement and broaden geographical access.

During the pandemic, we saw a number of innovative approaches deployed, such as increasing 7 day services and greater use of therapy assistants. As acute hospitals shifted rehabilitation into the community during the pandemic, there was a welcome increase in access to ESD services to their highest-ever level this year. The new Integrated Community Stroke Service (ICSS) Model (<https://www.england.nhs.uk/publication/national-stroke-service-model-integrated-stroke-delivery-networks/>) will provide more detail on how such services should be commissioned and expanded. Further innovative case studies were highlighted in the joint Oxford AHSN/GIRFT publication from 2020: [Restoration and recovery of stroke services during COVID-19 Pandemic](#). The three large pilot schemes of enhanced community-based rehabilitation in England have been launched this year and we will watch with interest.

Measuring the impact of stroke over the longer term is vital to identify the important needs of both patients and their families but also highlighting which interventions are the most effective. Six month assessments have been maintained during the pandemic with a large-scale switch towards telephone assessments. Further work is still needed to ensure that all eligible patients receive a full assessment. The big gains in participation seen in 2019-20, stimulated in part by

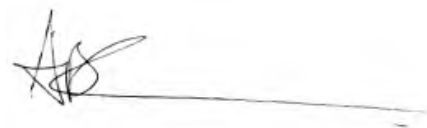
the one-year Commissioning for Quality and Innovation (CQUIN) incentive scheme, appear to have fallen back slightly this year following its withdrawal. The extension of SSNAP outcome measures in July 2021 to include a patient-reported outcome measure (PROM) that describes health related quality of life along with employment status will help to measure and understand the longer term personal and societal impacts of stroke in greater detail. We aim to further shift the focus of quality improvement towards the outcomes that are most important to people with stroke.

We very much hope that this report enables clinicians, commissioners, managers, people with stroke and the wider public to appreciate the unique context of maintaining and improving the quality of multidisciplinary stroke services in the midst of the COVID-19 pandemic. SSNAP remains committed to providing the scrutiny and disseminating the knowledge that underpins better care, and supporting the clinical community in quality improvement. To provide high quality evidence based care in 'interesting times' remains a perennial challenge, perhaps this year more than in any previous year since the origin of the NHS. Once again, we pay tribute to the energy and enthusiasm of the stroke workforce in hospitals and in the community to provide the best possible care for their patients – guided as it always should be by high quality data and knowledge from comprehensive national comparative audit.



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# Glossary

**Ambulance Linkage Project** SSNAP has extended data collection of patients in England to include the time spent from the call to 999 services and times in between, up until arrival at hospital. <https://ssnap.zendesk.com/hc/en-us/articles/360002656377-Ambulance-linkage-information-sheet> Data is reported as part of the Ambulance Quality Indicators (AQI) <https://www.england.nhs.uk/statistics/statistical-work-areas/ambulance-quality-indicators/ambulance-quality-indicators-data-2020-21/>

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

**Bed capacity** The number of beds available for patients.

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

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

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

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

**Comprehensive Stroke Centres (CSCs)** A stroke unit offering hyper-acute, acute and inpatient rehabilitation including thrombectomy and neurosurgery. An acute stroke centre (ASC) offers hyper-acute, acute and inpatient rehabilitation but excluding thrombectomy and neurosurgery. A stroke recovery unit (SRU) offers acute and inpatient rehabilitation only. <https://www.england.nhs.uk/ourwork/clinical-policy/stroke/national-stroke-service-model/>

**COVID-19** is an infectious disease caused by a newly discovered coronavirus. [https://www.who.int/health-topics/coronavirus#tab=tab\\_1](https://www.who.int/health-topics/coronavirus#tab=tab_1)

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

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

**Drip-and-ship** The process of quickly administering thrombolysis to a patient at the first hospital they are admitted to, before they are immediately transported to a comprehensive stroke centre for further treatment.

**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/what-is-stroke/what-are-the-symptoms-of-stroke>

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

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

**Integrated Stroke Delivery Network (ISDN)** In NHS England's National Stroke Service Model ISDNs "bring services together to design optimal stroke pathways, from pre-hospital to early supported discharge (ESD), community specialist stroke-skilled rehabilitation and life after stroke support." <https://www.england.nhs.uk/ourwork/clinical-policy/stroke/national-stroke-service-model/>

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

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

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

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

**Post-acute organisational audit** Snapshot audit first run in 2015 and repeated in 2021, covering the quality of stroke service organisation in post-acute settings.

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

**Telemedicine** The remote diagnosis and treatment of patients by means of telecommunications technology.

**Telerehabilitation** The delivery of rehabilitation services by means of telecommunications technology.

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

**Thrombolysis** Treatment with a drug that breaks down blood clots.

**Transient ischaemic attack (TIA)** Causes sudden symptoms similar to a stroke but does not last as long as a stroke, often fully resolving within 24 hours. Often called a "mini stroke". <https://www.nhs.uk/conditions/transient-ischaemic-attack-tia/>



## Further Reading

Stroke recoveries at risk report, Stroke Association. <https://www.stroke.org.uk/stroke-recoveries-at-risk-report>

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Rodgers, H., Howel, D., Bhattarai, N., Cant, R., Drummond, A., Ford, G.A., Forster, A., Francis, R., Hills, K., Laverty, A.M. and McKeivitt, C., 2019. Evaluation of an Extended Stroke Rehabilitation Service (EXTRAS) A Randomized Controlled Trial and Economic Analysis. *Stroke*, 50(12), pp.3561-3568. <https://www.ahajournals.org/doi/10.1161/STROKEAHA.119.024876>

Restoration and recovery of stroke services during the COVID-19 pandemic, GIRFT. <https://www.oxfordahsn.org/wp-content/uploads/2020/07/Restoration-and-recovery-of-stroke-services-during-the-COVID-19-pandemic-July-2020-3.pdf>

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

National Clinical Guideline for Stroke. Royal College of Physicians, 2016. <https://www.strokeaudit.org/Guideline/Guideline-Home.aspx>

Ambulance linkage project. <https://ssnap.zendesk.com/hc/en-us/articles/360002656377-%20Ambulance-linkage-information-sheet>

Does 7-day therapy working deliver more therapy overall? Data from the national stroke audit for England, Wales and Northern Ireland (SSNAP) [https://www.strokeaudit.org/getattachment/Research/Posters/Therapy/Does-7-day-therapy-working-deliver-more-therapy-ov/UKSF-poster-SSNAP-5v7-day-therapy-\(1\).pdf.aspx?lang=en-GB](https://www.strokeaudit.org/getattachment/Research/Posters/Therapy/Does-7-day-therapy-working-deliver-more-therapy-ov/UKSF-poster-SSNAP-5v7-day-therapy-(1).pdf.aspx?lang=en-GB)

National Stroke Service Model. <https://www.england.nhs.uk/publication/national-stroke-service-model-integrated-stroke-delivery-networks/>

NHS Services, Seven Days a week, 2018. <https://www.england.nhs.uk/seven-day-hospital-services/>

The NHSX AI Lab. <https://www.nhsx.nhs.uk/ai-lab/>

Six Months post-stroke reviews: A nationwide study using the Sentinel Stroke National Audit Programme to describe trends, patients' characteristics, and use of Artificial Intelligence to investigate regional differences. <https://www.strokeaudit.org/SupportFiles/Documents/Research/Six-Months-post-stroke-reviews.aspx>

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

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<http://www.hqip.org.uk/national-programmes>

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