TASC Vignette

Thrombolysis in Acute Stroke Collaborative

Site Name: Norfolk and Norwich University Hospital (NNUH)

The TASC Principle: Using measurement and structured quality improvement methodology to understand and reduce variation in the acute stroke pathway, strengthen multidisciplinary working, increase thrombolysis rates and reduce delays in diagnosis and treatment.

The Challenge

At the outset of the TASC programme, NNUH had a long-established stroke service with good access to CT and CTA imaging and experienced clinical teams. Despite this, thrombolysis performance remained stubbornly low, with historic rates around 12% and door-to-needle times frequently exceeding 60 minutes.

Variation across the thrombolysis pathway was a key challenge. Processes differed depending on which consultant, registrar or nurse was working, and there was no single, standardised approach to assessing, imaging and treating patients. New staff often struggled to understand roles and expectations, contributing to inefficiency, delay and increased anxiety.

Imaging processes also created friction. CT teams were not routinely pre-alerted to incoming stroke patients, CTA requests required registrar vetting, and CT perfusion (CTP) was limited to weekday daytime hours. Decision-making for wake-up strokes and patients near the treatment window was therefore constrained, particularly out of hours. Thrombolysis was agreed to be delivered in CT, but in practice this varied, often influenced by bed availability rather than pathway design.

Crucially, although staff recognised delays and frustration, there was limited shared visibility of where time was being lost. Without consistent time-series data, it was difficult to understand whether variation reflected case mix, decision-making, or system constraints or to know where improvement effort would have the greatest impact.

What they did (the process)

Through the TASC programme, NNUH focused first on understanding the pathway as a system, before attempting to change it.

The team articulated clear problem statements describing the lack of standardisation, imaging constraints, variation in thrombolysis location, and delays in stroke recognition both pre-hospital and in-hospital. These were supported by baseline data and mapped against a shared vision: ensuring that every acute stroke patient reaches CT and HASU rapidly, and that door-to-needle time is reliably within 60 minutes, as well as increase their thrombolysis rate.

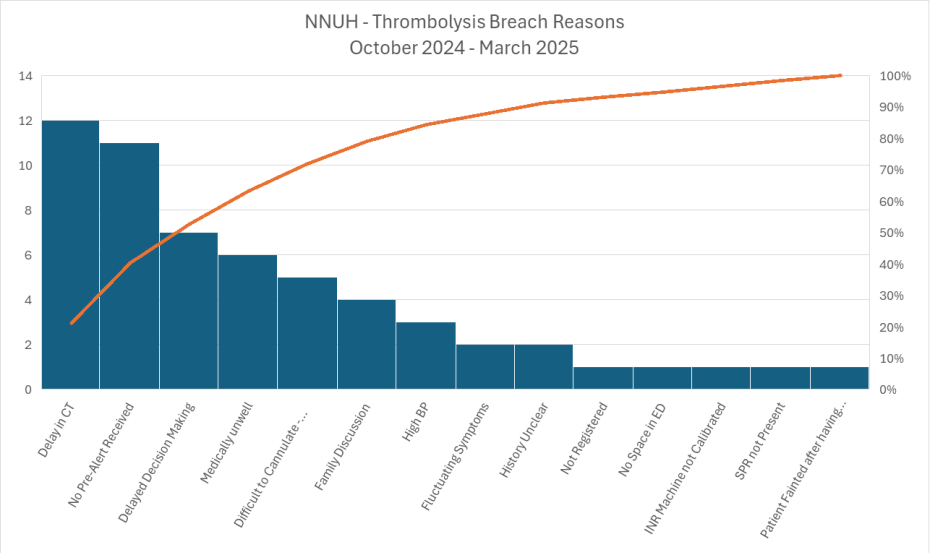

Figure 1: Pareto chart of thrombolysis breach reason themes.

Using quality improvement tools, the team mapped the functional stroke pathway, undertook root cause analysis, and identified opportunities via

pareto charts which shows key themes that influenced thrombolysis decision making and that affected patients
being treated within the thrombolysis window (*Figure 1*). This highlighted the importance of front-door processes, radiology coordination, shared decision-making and workforce design.

A central theme of the work was improving communication and parallel working. Sequential, phone-based alerts were replaced with a single ALERTIVE stroke emergency message that simultaneously notified stroke consultants, middle grade doctors, nursing teams, radiology (including CT administration), HASU, ED leads and ambulance colleagues. This ensured that everyone involved had the same information at the same time, including anticipated arrival and imaging requirements, enabling teams to prepare and coordinate activity in advance.

Building on this, the team ran a focused PDSA cycle to test a redesigned front-door stroke flow (*Figure 2*) supported by simultaneous ALERTIVE messaging during in-hours activity (08:00–21:00). The test aimed to reduce variation in communication at the front door by ensuring all stroke, ED and CT staff received and acknowledged the same urgent alert at the same time, and then followed a standardised pathway flow chart. The test promoted parallel working before and after arrival, with pre-arrival preparation by stroke and nursing teams, early CT/CTA requesting, defined role allocation on arrival, and thrombolysis delivered in the scanner using Tenecteplase where appropriate. The test ran between 2 and 22 July 2025 across ED and CT.

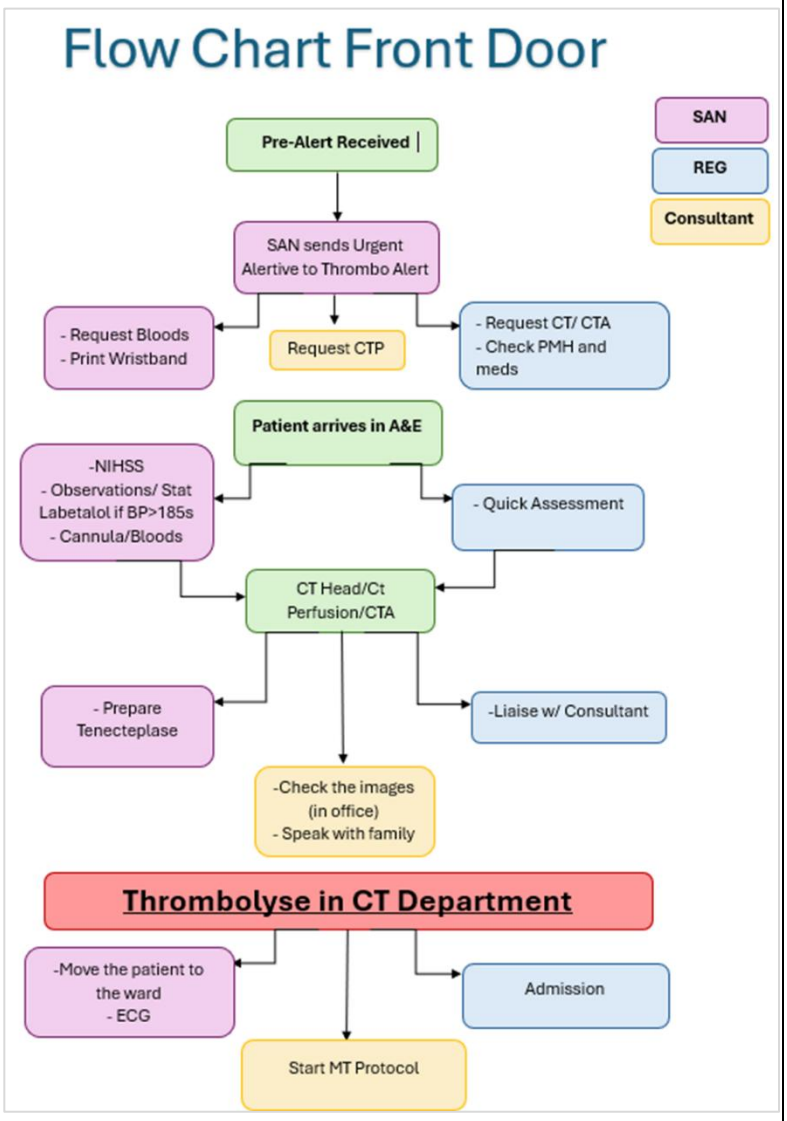

Figure 2: Front door stroke flow map which was PDSA tested

The team strengthened multidisciplinary decision-making through regular case discussion meetings involving consultants, registrars and nurses, often using the SAMueL (machine learning tool) to see which thrombolysis decisions other benchmark Trusts would do with case patients. These forums enabled structured discussion of thrombolysed and non-thrombolysed patients, including those with low NIHSS scores, where hesitancy had previously been common. Rather than seeking a single "correct" answer, discussions focused on evidence, nuance and guideline applicability, reinforcing shared ownership of decisions, and most importantly, shared learning. To support timely decision-making in practice, consultants used informal senior-to-senior communication channels to discuss complex or uncertain cases, enabling rapid input from available colleagues and, where helpful, small group discussions.

Imaging processes were redesigned. Nurse-led CTA requesting was introduced, reducing reliance on radiology vetting, and CT perfusion access was extended to a 24/7 service, with initial interpretation by stroke consultants. Education sessions supported radiology colleagues in adapting practice, including testing the delivery of thrombolysis on the CT table. The introduction of Tenecteplase further simplified delivery.

Measurement and data capability were developed in parallel. Time-series data was used to examine weekly thrombolysis rates, arrival-to-scan times, scan-to-needle times and overall door-to-needle performance. This made previously "invisible" variation visible, revealed data quality issues, and supported more accurate interpretation of performance and improvement work. A new clinical stroke clerking proforma was introduced to strengthen assessment, documentation and capturing of data.

What was achieved (the outcomes/data)

Over the course of the programme, NNUH achieved meaningful improvements in both performance and understanding of the thrombolysis pathway.

Weekly thrombolysis rates increased to **18.5%,** exceeding earlier SAMueL modelling assumptions (machine learning from national stroke data) of 14%, and reflecting greater confidence in decision-making, including for patients with lower NIHSS scores.

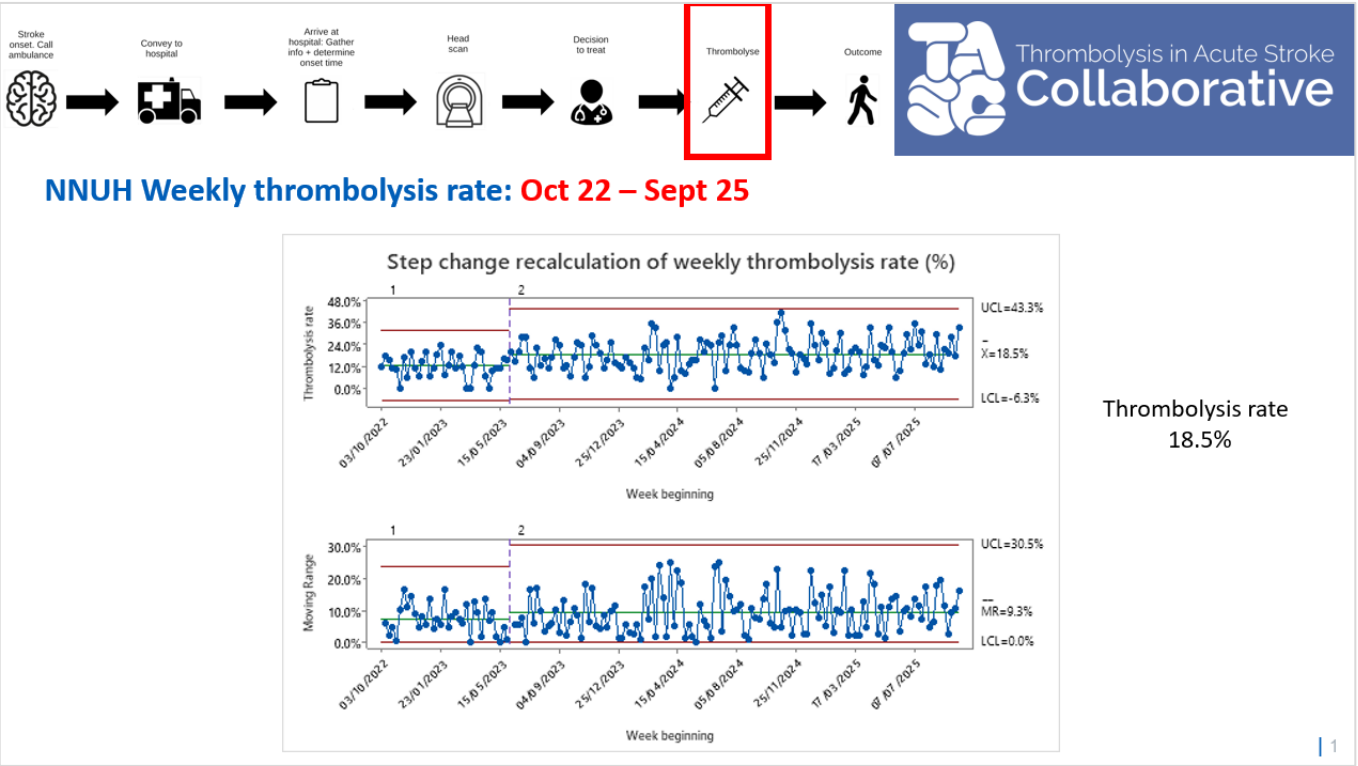

Figure 3: SPC chart showing step change improvement in thrombolysis rate.

Analysis of door-to-needle times showed clearer insight into where delay occurred. Door-to-scan accounted for approximately **42%** of total DTN time, with scan-to-needle accounting for **58%**, enabling the team to focus improvement effort appropriately. Separate in-hours and out-of-hours analysis demonstrated differing patterns of delay, supporting more targeted testing.

Operational changes improved flow to CT. Earlier and clearer alerting enabled radiology teams to plan scanner availability and prioritise stroke patients appropriately. Parallel working between consultants,

specialist nurses, ED and radiology increased, decision-making was more timely, and thrombolysis delivery in CT became more consistent. Learning from the in-hours PDSA testing informed refinement of the front-door pathway and reinforced the value of simultaneous alerting, clear role allocation and parallel working in reducing unwarranted variation and improving team readiness to receive and manage acute stroke patients.

Equally important were the less tangible but critical system effects. Multidisciplinary working strengthened, silos reduced, and expectations across roles became clearer and more consistent. Nurses, doctors and radiology staff developed shared confidence in the pathway, supported by regular review and discussion of real cases.

Improved data quality allowed performance to be reflected more accurately. Clinicians reported greater trust in the data and used it actively to interrogate performance, identify themes and inform further improvement. What had previously "not felt right" could now be explored with evidence rather than assumption.

Testimonials from a wide range of staff groups and patients

"After many years of stroke service developments and QIP's I found TASC to be the most useful to support change. Cross team interaction (doctor / nurse / ops management), the importance or data to measure change, educational opportunities consequential in TASC process all came to the fore. The skill set in the friendly TASC Team is a great resource to have. Thank you!"

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Key system contacts

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