



CaptureStroke

Better Information
Better Outcomes



CaptureStroke

Economic Case Studies White Paper

“

“CaptureStroke is the UK’s leading clinical Stroke pathway software”

CaptureStroke is the UK’s leading clinical Stroke pathway software which improves stroke care and outcomes by supporting stroke units to achieve the recommendations of the *National Clinical Guideline for Stroke*¹.

The software helps NHS Trusts to meet targets for the achievement of the best practice tariff (BPT)² (where payable) for stroke and improves the efficiency of stroke case management. These elements support the economic case for using CaptureStroke.

York Health Economics Consortium (YHEC) was commissioned by Silverlink Software to carry out an independent evaluation of the economic impact of CaptureStroke. This YHEC paper³ outlines the approach taken to undertake the evaluation and the results from the YHEC study in the form of two case studies of NHS Trusts in England.



¹ Royal College of Physicians. National clinical guideline for stroke. 5th edition 2016. Intercollegiate Stroke Working Party.

² A Best Practice Tariff (BPT) is a national price paid to providers that is designed to incentivise high quality and cost-effective care. The aim is to reduce unexplained variation in clinical quality and to encourage best practice. http://commissioningguidance.tvscn.nhs.uk/wp-content/uploads/2016/09/ADD_1210_Stroke-NHS-toolkit_c1_final.pdf

³ <http://capturestroke.com/YHEC%20White%20Paper%20April%202019.pdf>

Methodology

YHEC reviewed the potential economic benefits of CaptureStroke with Silverlink Software at the outset of the project and followed this up by holding interviews with NHS Trusts using the software and a pragmatic review of the *National Clinical Guideline for Stroke*. The national guideline was primarily used as the source material for the clinical effectiveness evidence that was used to develop an economic model. The key metrics included in the model were input costs relating to the use of CaptureStroke, the effectiveness and cost benefits relating to improvements in stroke case management and efficiency using CaptureStroke.

The key intervention benefit metrics included in the model were:

Intervention	Effectiveness data source
Patients with acute ischaemic stroke, regardless of age or stroke severity, in whom treatment can be started within 3 hours of known onset should be considered for treatment with alteplase.	NICE, <i>Alteplase for treating acute ischaemic stroke</i> , Technology Appraisal Guidance (TA264), September 2012.
Patients with acute ischaemic stroke treated with thrombolysis should be started on an antiplatelet agent after 24 hours unless contraindicated, once significant haemorrhage has been excluded.	NICE, <i>Clopidogrel and modified-release dipyridamole for the prevention of occlusive vascular events</i> , Technology Appraisal Guidance (TA210), December 2010
Patients with acute stroke should have their swallowing screened, using a validated screening tool, by a trained healthcare professional within 4 hours of arrival at hospital and before being given any oral food, fluid or medication.	Ingeman A et al. <i>In-hospital medical complications, length of stay, and mortality among stroke unit patients</i> . Stroke 2011. Nov 42(11) 3214-8.
Patients with acute ischaemic stroke should be considered for combination intravenous thrombolysis and intra-arterial clot extraction (using stent retriever and/or aspiration techniques) if they have a proximal intracranial large vessel occlusion causing a neurological deficit and the procedure can begin within 5 hours of known onset.	Goyal et al. <i>Endovascular thrombectomy after large-vessel ischaemic stroke: a meta-analysis of individual patient data from five randomised trials</i> . Lancet, 2016. 387(10029) 1723-1731.
Patients with immobility after acute stroke should be offered intermittent pneumatic compression within 3 days of admission to hospital for the prevention of deep vein thrombosis. Treatment should be continuous for 30 days or until the patient is mobile or discharged, whichever is sooner.	Dennis et al. <i>The Clots in Legs Or sTockings after Stroke (CLOTS) 3 trial: a randomised controlled trial to determine whether or not intermittent pneumatic compression reduces the risk of post-stroke deep vein thrombosis and to estimate its cost-effectiveness</i> . Health Technol Assess. 2015 Sep;19(76):1-90

The economic model developed by YHEC can be used to enable NHS Trusts to estimate the extent to which CaptureStroke can help them to improve their performance in these key metrics, as well as achieving greater efficiency in administration of stroke cases. The model results calculate the additional costs of achieving greater compliance with targets for these measures and the economic benefits of achieving them compared to current performance.

Case studies

Two of the NHS Trusts who introduced CaptureStroke in 2013 have been able to demonstrate economic benefits through using CaptureStroke. They have given their permission for us to outline their return on investment estimates.

1) Norfolk and Norwich University Hospitals NHS Foundation Trust

Financial return on investment

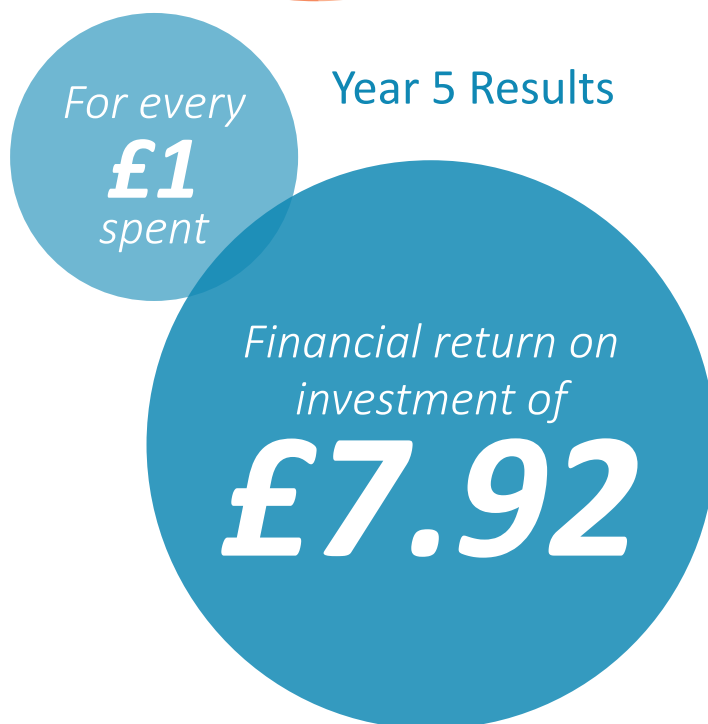
The use of CaptureStroke has generated financial savings through savings on administration and additional income through the achievement of the best practice tariff (BPT) for thrombolysis. For Norfolk and Norwich, the realisable administrative savings are based on an estimate of a reduction in:

- The need for data administrator time of 56%⁴
- Paper consumption and document storage (£1.30 per patient)

Realisable financial savings are those where a tangible reduction in cost is possible. SSNAP⁵ data shows that in the twelve months to the end of June 2018, the estimated number of strokes treated by the Trust was 1,161. The realisable administrative saving generated on this basis for 1,161 patients is estimated at £46,412.

The net additional Best Practice Tarriff⁶ (BPT) income from achieving the thrombolysis target for the additional patients included since the introduction of CaptureStroke is £6,102. This is based on the BPT of £840 per patient less the additional cost of the administration of alteplase of £586 per patient.

The financial benefit of CaptureStroke using these assumptions is, therefore, £46,412 + £6,102 = £52,514. If the cost of CaptureStroke (£21,600) is subtracted then the net benefit is £30,914, representing a financial return on investment of 2.43 or £2.43 for every £1 spent.



⁴ Based on observed reduction in administrative time for the Royal Cornwall Hospitals NHS Trust.

⁵ The **Sentinel Stroke National Audit Programme** (SSNAP) is the single source of stroke data in England, Wales and Northern Ireland. <https://www.strokeaudit.org/>

⁶ https://improvement.nhs.uk/documents/1047/Annex_F_guidance_on_best_practice_tariffs.pdf

Economic return on investment

As well as realisable administrative savings, CaptureStroke also generates opportunity cost administrative savings. These are time cost savings for staff who can be potentially deployed on other duties. There may be no financial saving but economic benefit⁷ generated through the opportunity to carry out other tasks involved in treating patients.

The opportunity cost administrative savings for CaptureStroke are based on:

- Reduced administrative time for clinical staff (1 minute per day for Consultant, Registrar, Band 6 nurse and Band 8a nurse)
- Reduced administrative time for MDT staff (3 minutes per patient for Consultant, Registrar, Band 8a nurse and Band 8a therapist)

The opportunity cost administrative saving generated for 1,161 patients is estimated at £20,442.

When the Trust introduced CaptureStroke in 2013, the percentage of eligible patients with acute ischaemic stroke being considered for treatment with Alteplase⁸ was less than 75%. The Trust is now consistently reporting that 100% of eligible patients are being treated with alteplase.

Of the 1,161 stroke patients in the year to the end of June 2018, there were 89 applicable patients for whom thrombolysis was used within 4 hours of arrival at hospital, representing 100% compliance.

If we compare this with the performance prior to the introduction of CaptureStroke (73.1%), then the additional cost of introducing alteplase to the additional patients would be £14,029 but the benefit after one year would be £76,647 after 1 year, rising to £87,403 after 3 years and £98,158 after 5 years. This is based on estimated cost reductions to the NHS of £4,100 over 5 years per eligible patient provided with alteplase within 4 hours, plus a lifetime quality adjusted life year (QALY) gain of 0.333 per patient. The additional cost of providing alteplase is £586 per patient.

The overall economic return on investment is calculated by combining the realisable and opportunity cost administrative savings, the additional BPT income and the healthcare savings estimated through additional use of alteplase. This is divided by the cost of CaptureStroke.

The economic return on investment for Norfolk and Norwich is estimated as follows:

	1 year	3 year	5 year
Administration savings (realisable)	£46,412	£46,412	£46,412
Administration savings (opportunity cost)	£20,442	£20,442	£20,442
Additional BPT income	£6,102	£6,102	£6,102
Healthcare savings (alteplase)	£76,647	£87,403	£98,158
Overall economic benefit	£149,603	£160,359	£171,114
Cost of CaptureStroke	£21,600	£21,600	£21,600
Return on investment	6.93 : 1	7.42 : 1	7.92 : 1

⁷ Economic benefit is described as quantifiable in terms of money, such as revenue net cash flow or net income.

⁸ **Alteplase** is recommended for the treatment of acute ischaemic stroke in adults in accordance with its licensed indication if: treatment is started as early as possible within 4.5 hours of onset of stroke symptoms, and intracranial haemorrhage has been excluded by appropriate imaging techniques. www.nice.org.uk/TA264

After 5 years, the economic return on investment for the use of CaptureStroke at Norfolk and Norwich Trust would be £7.92 for every £1 spent.



2) Royal Cornwall Hospitals NHS Trust

Financial return on investment

The use of CaptureStroke generates financial savings through savings on administration. For Royal Cornwall Hospitals, the realisable administrative savings are based on an estimate of a reduction in:

- The need for data administrator time of 56%⁹
- Paper consumption and document storage (£1.30 per patient)

Realisable financial savings are those where a tangible reduction in cost is possible. SSNAP data shows that in the twelve months to the end of June 2018, the estimated number of strokes treated by the Trust was 881. The realisable administrative saving generated on this basis for 881 patients is estimated at £46,048.

The trend for thrombolysis performance has not changed since the introduction of CaptureStroke, remaining at around 80% since 2013, so no additional BPT income is included.

The financial benefit of CaptureStroke is, therefore, £46,048. If the cost of CaptureStroke (£20,000) is subtracted then the net benefit is £26,048, representing a financial return on investment of 2.30 or £2.30 for every £1 spent.

For every
£1
spent

Year 1 Results

Financial return on investment of
£2.30

⁹ Based on observed reduction in administrative time for the Royal Cornwall Hospitals NHS Trust.

Economic return on investment

As well as realisable administrative savings, CaptureStroke also generates opportunity cost administrative savings. These are time cost savings for staff who can be potentially deployed on other duties. There may be no financial saving but an economic benefit is generated through the opportunity to carry out other tasks involved in treating patients. The opportunity cost administrative savings for CaptureStroke are based on:

- Reduced administrative time for clinical staff (1 minute per day for Consultant, Registrar, Band 6 nurse and Band 8a nurse)
- Reduced administrative time for MDT staff (3 minutes per patient for Consultant, Registrar, Band 8a nurse and Band 8a therapist)

The opportunity cost¹⁰ administrative saving generated for 881 patients is estimated at £16,634.

When the Trust introduced CaptureStroke in 2013, the percentage of eligible patients with acute ischaemic stroke receiving a swallow screen within 4 hours was around 65%. The Trust is now consistently reporting performance around 80%.

Of the 881 stroke patients in the year to the end of June 2018, there was 79.7% compliance with the target for 759 eligible patients receiving a swallow screen within 4 hours of arrival at hospital. If we compare this with the performance prior to the introduction of CaptureStroke (65.2%), then the incremental cost of introducing swallow screening to the additional patients would be £1,135 but the incremental benefit each year would be £4,332. This is based on estimated cost reductions to the NHS of £39.53 per patient relating to a reduction in average length of stay for patients receiving the swallow screen of 0.15 days. The additional cost of providing the swallow test is estimated at £10.33 per patient based on 10 minutes of Band 8a nurse time.

The overall economic return on investment is calculated by combining the net financial benefit with the opportunity cost administrative savings and the net health care cost savings, divided by the cost of CaptureStroke. The annual economic return on investment for Royal Cornwall Hospitals is estimated as follows:

	1 year
Administration savings (realisable)	£46,048
Administration savings (opportunity cost)	£16,634
Healthcare savings (swallow screen)	£4,332
Overall economic benefit	£67,014
Cost of additional swallow screening	£1,135
Net economic benefit	£65,879
Cost of CaptureStroke	£20,000
Return on investment	3.29 : 1

Overall
economic return on
investment of
£3.29

For every
£1
spent

The economic return on investment for the use of CaptureStroke at the Royal Cornwall Hospitals Trust would be £3.29 for every £1 spent.

¹⁰ Opportunity cost, or alternative cost, of making a particular choice is the value of the most valuable choice out of those that were not taken. In other words, opportunity will require sacrifices.

Conclusions

The case studies demonstrate that CaptureStroke has contributed to financial and economic improvements in two NHS hospital trusts. The examples given are simple but demonstrate that there is scope for realisable financial savings as well as other benefits such as increased efficiency, increased clinical and administration capacity. Access to real time clinical data is associated with significant clinical benefit capacity¹¹ and the economic model allows for Trusts to consider their current performance against targets and to consider the potential return on investment over a five year contractual period.

The examples focus on administrative efficiencies and improvements in rates of thrombolysis and swallow screening tests. There are other benefits that can also be modelled, such as improvements in:

- The numbers of suitable people for whom antiplatelets are provided at discharge.
- The numbers of eligible people receiving mechanical thromboectomy within 5 hours.
- The numbers of eligible people starting intermittent pneumatic compression at an appropriate time.

Footnote

York Health Economics Consortium (YHEC)¹² is a health economics consulting company owned by the University of York. It provides a range of services, including economic modelling, literature searching, systematic reviews, network meta-analyses, patient-reported outcomes, service reviews and applied research and training to the NHS and the pharmaceutical and health care industries. YHEC also carries out work for a range of clients outside the health sector, including Local Authorities and the voluntary sector. Current clients include; NHS England, the National Institute for Health and Care Excellence (NICE), a range of local NHS trusts and several large multi-national pharmaceutical, device and nutrition companies.

¹¹ <https://www.nursingtimes.net/clinical-archive/patient-safety/how-real-time-data-can-improve-patient-care/5090501.article>

¹² <https://www.yhec.co.uk/>

Contact York Health Economics Consortium Ltd



www.yhec.co.uk



yhec@york.ac.uk



+44 (0)190 432 3620

Contact CaptureStroke



www.capturestroke.com



info@capturestroke.com



+44 (0) 191 280 4655



CaptureStroke
www.capturestroke.com