



# Implementation of the National Optimal Stroke Imaging Pathway (NOSIP) is feasible and deliverable in an Acute Stroke Service (ASC) in England; Improving access to life changing stroke interventions, reducing death and disability.

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## Introduction

Speeding up access to imaging for people suspected of stroke and ensuring more stroke patients receive treatment to reduce the chance of life changing disability are among the key measures outlined by GIRFT (Getting It Right First Time).

The GIRFT national report highlighted reduced and delayed access to stroke acute imaging, with duplicated CT and then MRI imaging across the 120 acutely admitting English stroke units in 2019. In April 2021 the NOSIP was published including use of CT AI, aiming to improve volume and speed of access to recanalisation therapy, reducing inefficiencies and inpatient bed occupancy.

How deliverable the NOSIP is and what impact it may have on patient outcomes is unknown. We report the results of introducing the NOSIP in a non-neuroscience centre in England.

## Methodology

The benefits of reorganisation (System optimisation) of stroke services to create sustainable, high-quality larger units are well known. In April of 2020 EKHUFT (East Kent Hospitals University Foundation Trust) introduced elements of the NOSIP into routine clinical practice to bring significant changes to stroke care.

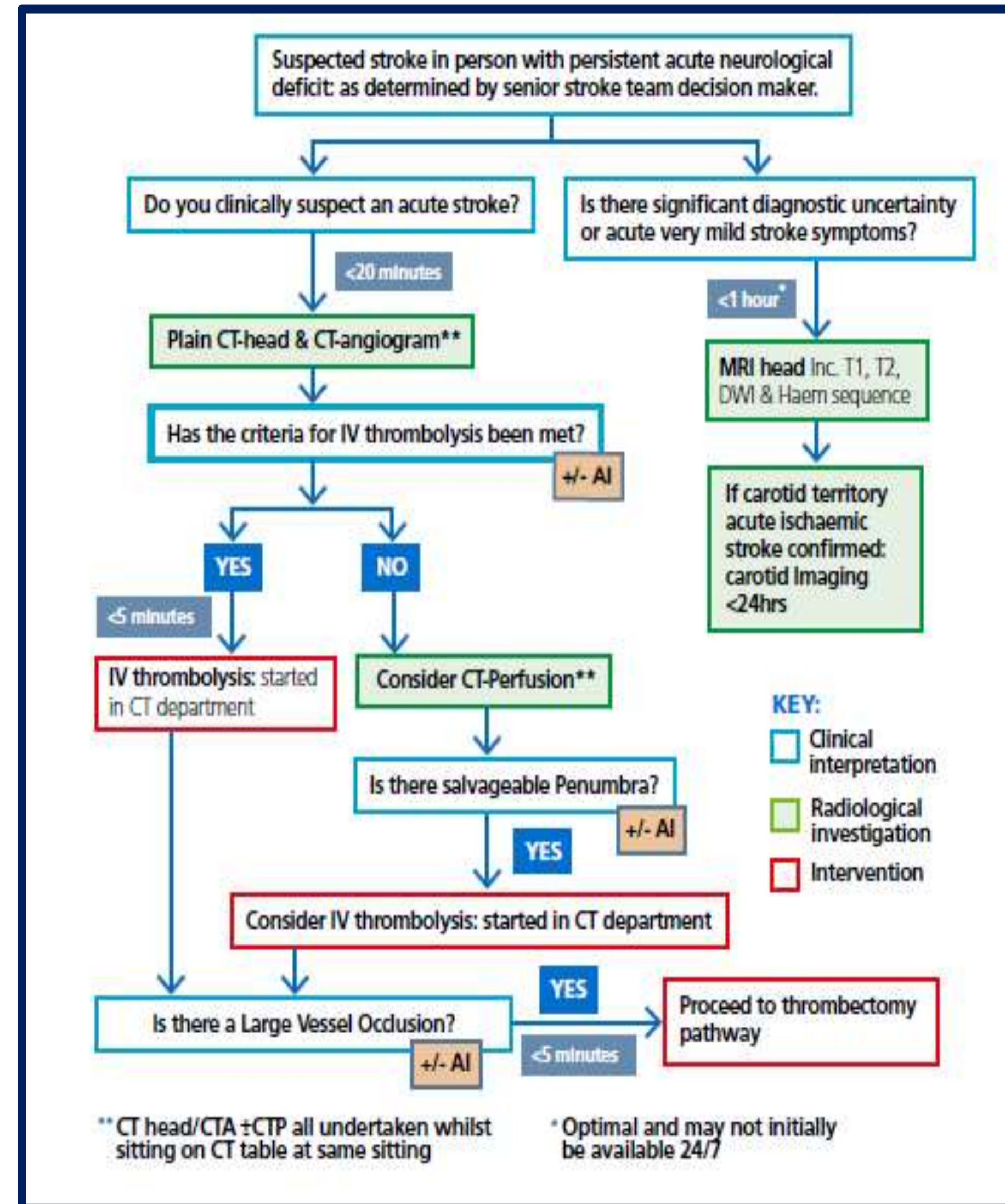
2 smaller acute stroke units Queen Elizabeth Queen Mother (QEQM) and William Harvey Hospital (WHH) managing 600 confirmed strokes each year were co-located to a non acute site over 10days, adherence to NOSIP: 24/7 access to CTA, CTP with AI support and 12hrs access to MRI, Introduction of pre hospital tele triage improving sensitivity and specificity and Standardised 9\* step process to reduce door in door out times



**Map of East Kent Hospitals** - Kent and Canterbury Hospital was the chosen site

A retrospective quantitative assessment of access to imaging was undertaken with time series evaluation of IV thrombolysis rates, MT referral rates, mortality and length of stay.

## NOSIP



## Conclusion

Introduction of NOSIP is feasible in a non-neuroscience centre in England with the aim to improve stroke care and reduce multitudinous imaging. Significant improvement in access to CT Head, Angiogram and Perfusion and first line MRI is reported.

Since co-locating and implementing elements of NOSIP our SSNAP scores has upgraded from C-D to A with significant and sustained improvement across all 10 domains of stroke care with increased thrombolysis and thrombectomy rates and statistically significant relative mortality risk of 59.6% (**65 lives saved**) and 38% reduction in length of stay (17 to 11 days).

## Result 1

Significant reduction in door to scan times. Nationally only 58.7% of patients are scanned within an hour, compared to 90% at EKHUFT, with 56% of being scanned within the suggested 20 minute NOSIP target. Chronological association with increased thrombolysis rates >16%, thrombectomy referral rates >8%, statistically significant relative mortality risk of 59.6% (65 lives saved/yr) and 38% reduction in length of stay.

Within 3months of moving to a single site patients scanned within one hour improved from 58.9% and 54.7% at QEQM and WHH respectively to 77.9% with thrombolysis rates increasing from 25% and 37.5% at QEQM and WHH to 48%. These figures have continued to improve with time.

## Result 2

GIRFT and NOSIP tries to ensure the right test is carried out first time which in turn can reduce unnecessary admissions and improve rapid access to therapies such as thrombolysis and thrombectomy.

In 2022, 155 patients admitted to Kent and Canterbury Hospital as stroke priority had both CT and MRI head without receiving any reperfusion therapy suggesting duplication of imaging and diagnostic uncertainty after CT head. Of the 155 patients, 115 had NIHSS ≤4.

NOSIP suggest for mild and in cases of diagnostic uncertainty MRI head would be the preferred choice of imaging and in the same year we have carried out 85 (74 the previous year) MRI brain scans on the front door with 53 confirming diagnosis and 15 managed solely based on MRI head findings.

## \*9 Step process to reduce door in door out times

Notification	Early and detailed notification of potential thrombectomy patient to ASC by ambulance clinicians, enhanced through pre-hospital telemedicine
ASC Preparation	Comprising ordering imaging, pre-alert for CT/Emergency reviewers, checking previous records, liaise with next of kin. CSC pre-alert for impending alert during patient transit.
Meet Patient	Met by Stroke team as close to imaging department at ASC as possible with 'pit-stop' to confirm likely diagnosis and safety for immediate imaging
Patient Image	Ambulance crew asked to wait while patient is imaged.
NOSIP Adherence	Adherence to a patient centred optimal imaging pathway with all image acquisitions taken at same sitting.
Image Interpretation	Immediate brain scan interpretation: conducted by treating Stroke physician with AI support tools available
Thrombolysis Decision	IV Thrombolysis commenced in imaging department if indicated
Image Transfer	Real time transmission of images to CSC (MT capable centre) and formal referral.
Patient Transfer	Transfer from imaging department (if medically stable) to original ambulance for onward conveyance to CSC