

Project Title

Reducing Door-to-Puncture Time for Endovascular Thrombectomy in Stroke

Project Lead and Members

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Organisation(s) Involved

Singapore General Hospital

Healthcare Family Group(s) Involved in this Project

Allied Health, Healthcare Administration, Medicine, Nursing

Applicable Specialty or Discipline

Process Transformation & Improvement, Diagnostic Radiology, Neurology, Emergency Medicine, Anaesthesiology, Radiography

Project Period

Start date: March 2021

Completed date: January 2023

Aims

To reduce the time taken to start EVT for acute stroke patients presenting at SGHED from a median of 130 minutes to 80 minutes within 2 years.

Project Attachment

See poster appended/ below

Background

See poster appended/ below

Methods

See poster appended/ below

Results

See poster appended/ below

Lesson Learnt

Structured QI methodology, iterative approaches, and close collaboration within a multidisciplinary team effectively reduced EVT door-to-puncture timings.

Tracking both quantitative and qualitative outcomes at each PDSA cycle facilitated quick refinements.

Sustaining interventions and results amid new junior doctor rotations posed challenges, mitigated by standardising and protocolising workflow, communication and documentation.

Reflecting on the project, we recognise that shorter time taken to test the interventions could accelerate improvements for patients.

Additional Information

National Healthcare Innovation & Productivity (NHIP) 2024 – Best Practice (Care Redesign category)

Conclusion

See poster appended/ below

Project Category

Care & Process Redesign

Access to Care, Waiting Time, Referral Rate

Keywords

Door-to-Puncture, EVT, Stroke

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Reducing Door-to-Puncture Time for Endovascular Thrombectomy in Stroke

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Background

Endovascular Thrombectomy (EVT) is a treatment involving the removal of blood clots to re-establish cerebral blood flow during an acute ischemic stroke. Early EVT can significantly improve the functional outcome of patients. For **every 60-minute delay to EVT**, patients have a **15-20% worse functional outcome at 90 days**, with **net monetary loss estimated at S\$26,255/hour¹**. More than 200 patients receive EVT treatment in SGH every year.

Baseline median time taken to start EVT for acute stroke patients presenting at SGH Emergency Department (ED) was **130 minutes** (door-to-puncture time). The long time taken may adversely impact patient outcomes.

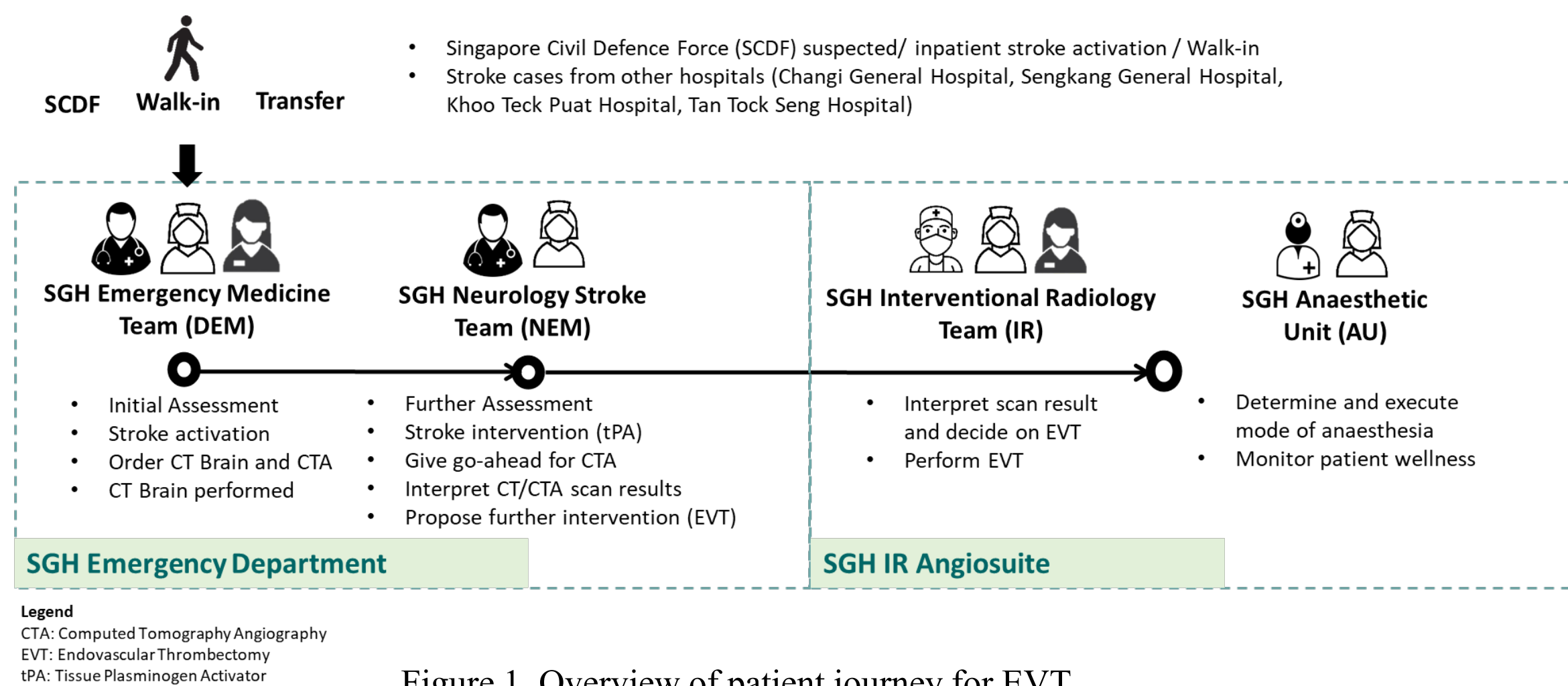


Figure 1. Overview of patient journey for EVT

A multidisciplinary team involving representatives from Emergency Medicine, Neurology, Diagnostic Radiology, Radiography, Anaesthesiology, and Process Transformation & Improvement, was formed.

Gemba walks, time motion studies and interviews with staff, were conducted to map out and analyse the detailed workflows of all relevant departments between patient arrival at ED to EVT.

Mission Statement

To reduce the time taken to start EVT for acute stroke patients presenting at SGH ED from a median of 130 minutes to 80 minutes within 2 years.

Interventions

ED Door to EVT Decision by IR Consultant Workflow

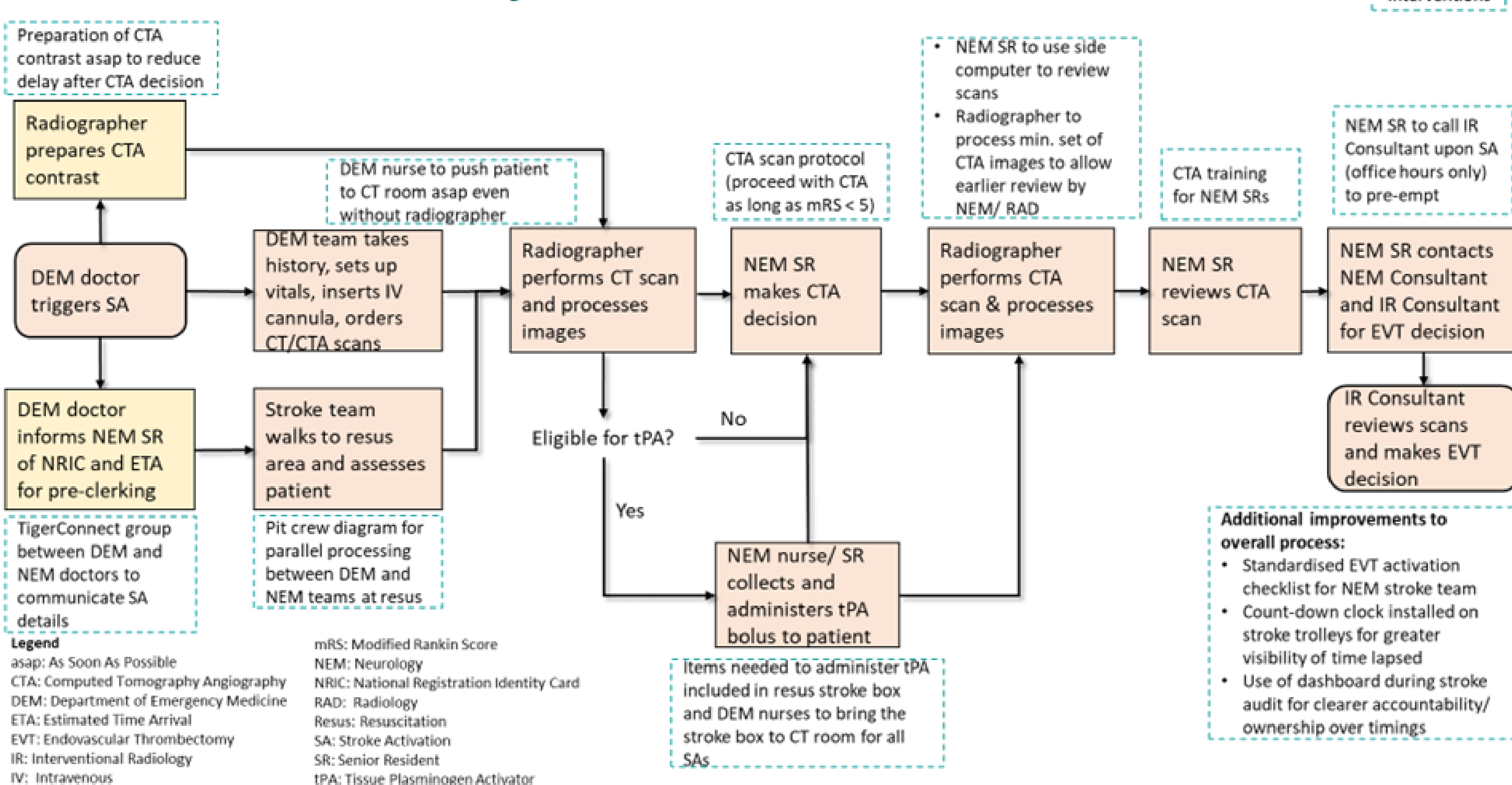
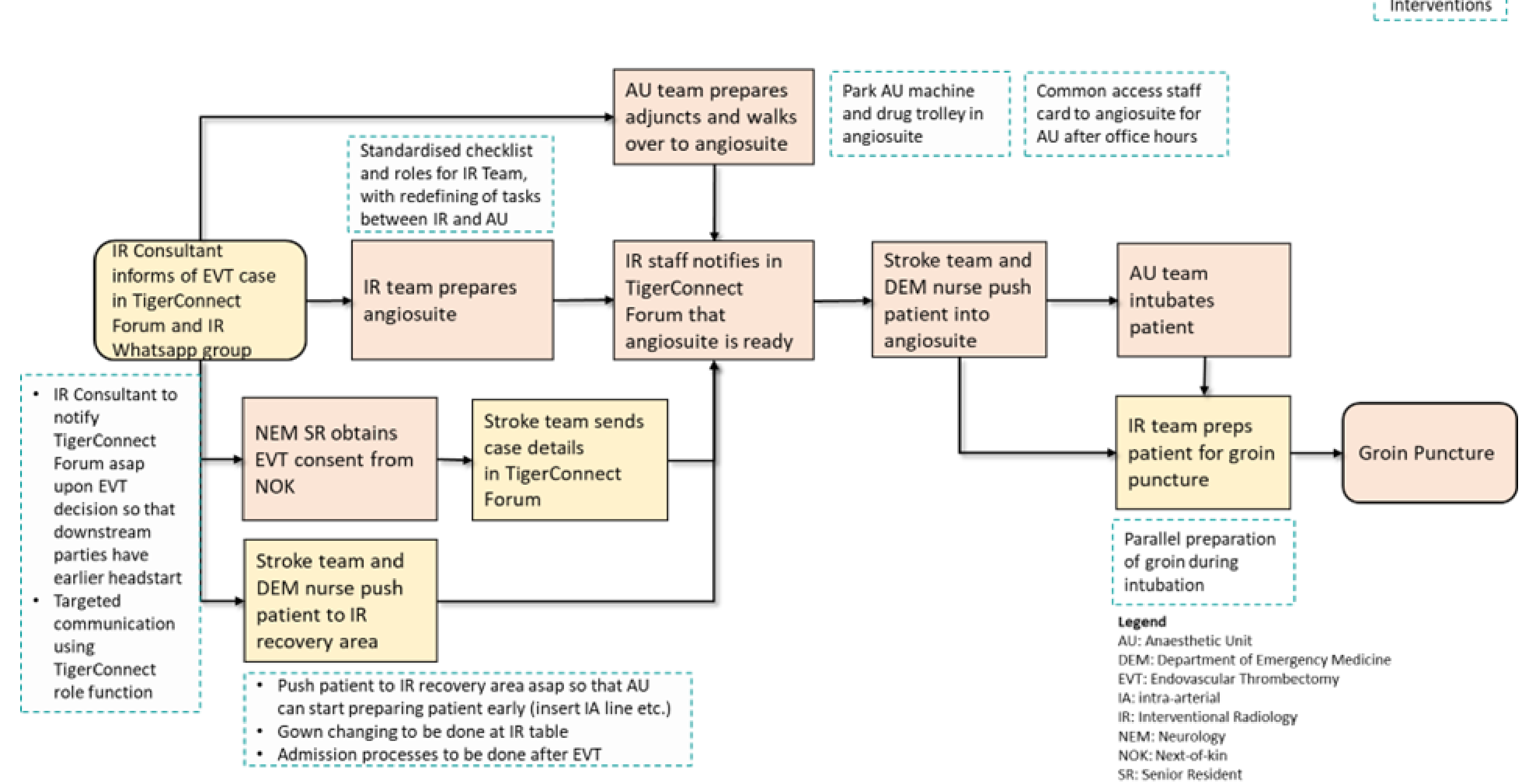


Figure 2. Post-intervention workflows between patient arrival at ED to groin puncture

Interventions

EVT Decision to Groin Puncture Workflow



Results

Median door-to-puncture timings **decreased by 37%** from a baseline of **130 minutes to 82 minutes** in PDSA 5, with a shift in the run chart as illustrated in Figure 3. The estimated **50 minutes** of reduction in time translates to **improved patient outcomes and reduced disability**.

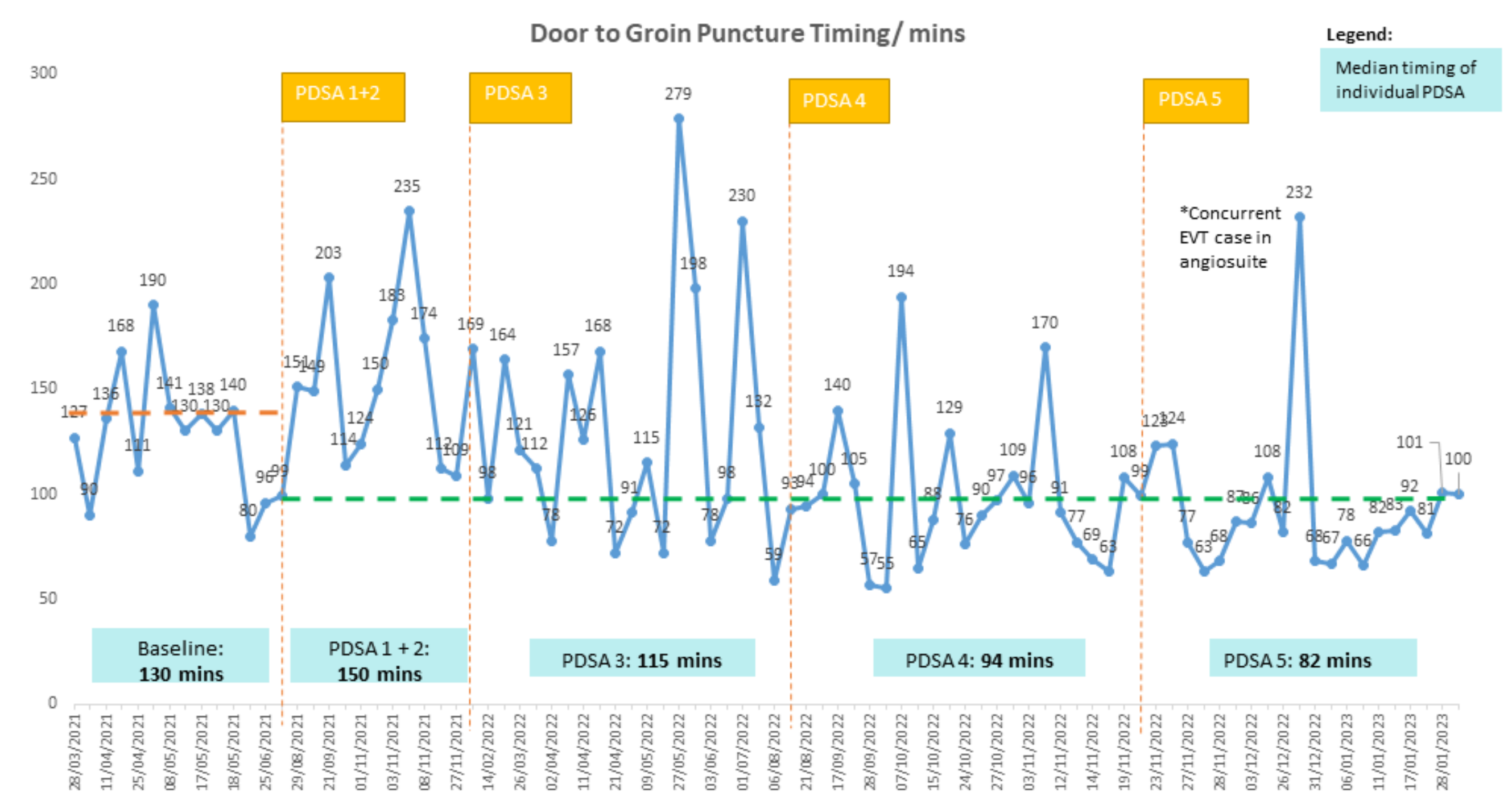


Figure 3. Run chart of door-to-puncture timings between March 2021 to January 2023

In addition to the cases from SGH ED, the **transfer cases** from CGH saw a reduction in time by **42%**, from **36 minutes to 21 minutes**, with the interventions piloted by the team.

It was challenging to sustain interventions and results when new junior doctors rotated into the departments. Standardisation and protocolisation of workflow, communication and documentation helped reduce these delays and variability.

Spread Plans

The team will share the best practices and processes with other EVT centres in Singapore so that this improvement can benefit all acute stroke patients receiving EVT treatment in Singapore.