

HENG WEI QUAN EMERGENCY DEPARTMENT

Mission Statement

To reduce median scan-to-needle¹ times in Emergency Department (ED) patients with oral anticoagulant (OAC)-related intracranial haemorrhage (ICH) from 90 minutes to less than 60 minutes within 6 months.

¹Time from neuroimaging to administration of 4-factor prothrombin complex concentrate (PCC)

Team Members

Name	Designation	Department
Heng Wei Quan	Senior Resident	Emergency
Dr. Charmain Heah Ya Ting	Senior Resident	Emergency
Dr. Wan Kai Rui	Senior Resident	Neurosurgery
Gan Chen Chen	Assistant Nurse Clinician	Emergency
Catherine Aliwarga	Senior Medical Technologist	Haematology
Siti Marinah Bte Adul	Staff Nurse	Emergency
Jeremy Kok Jin Kai	Health Attendant	Emergency
Dr. Tay Seow Yian	Head of Department	Emergency
Dr. Chong Chin Ted	Senior Consultant	Anaesthesia

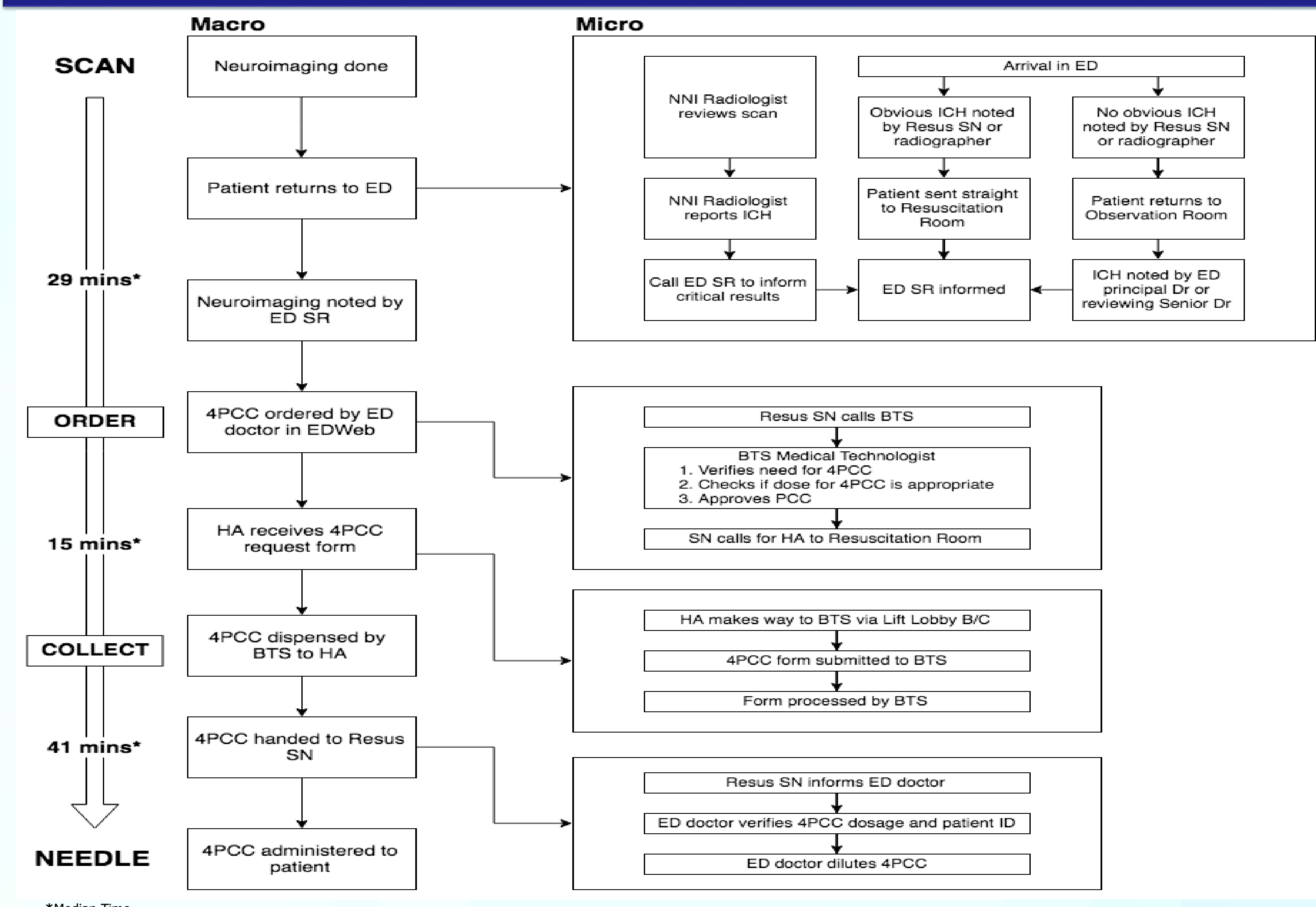
Evidence for a Problem Worth Solving

- ICH occurs 7 – 10 times more frequently in patients on OAC, with mortality as high as 67%.
- Urgent reversal of anticoagulation reduces haematoma expansion, limits tissue damage, and facilitates surgical intervention.

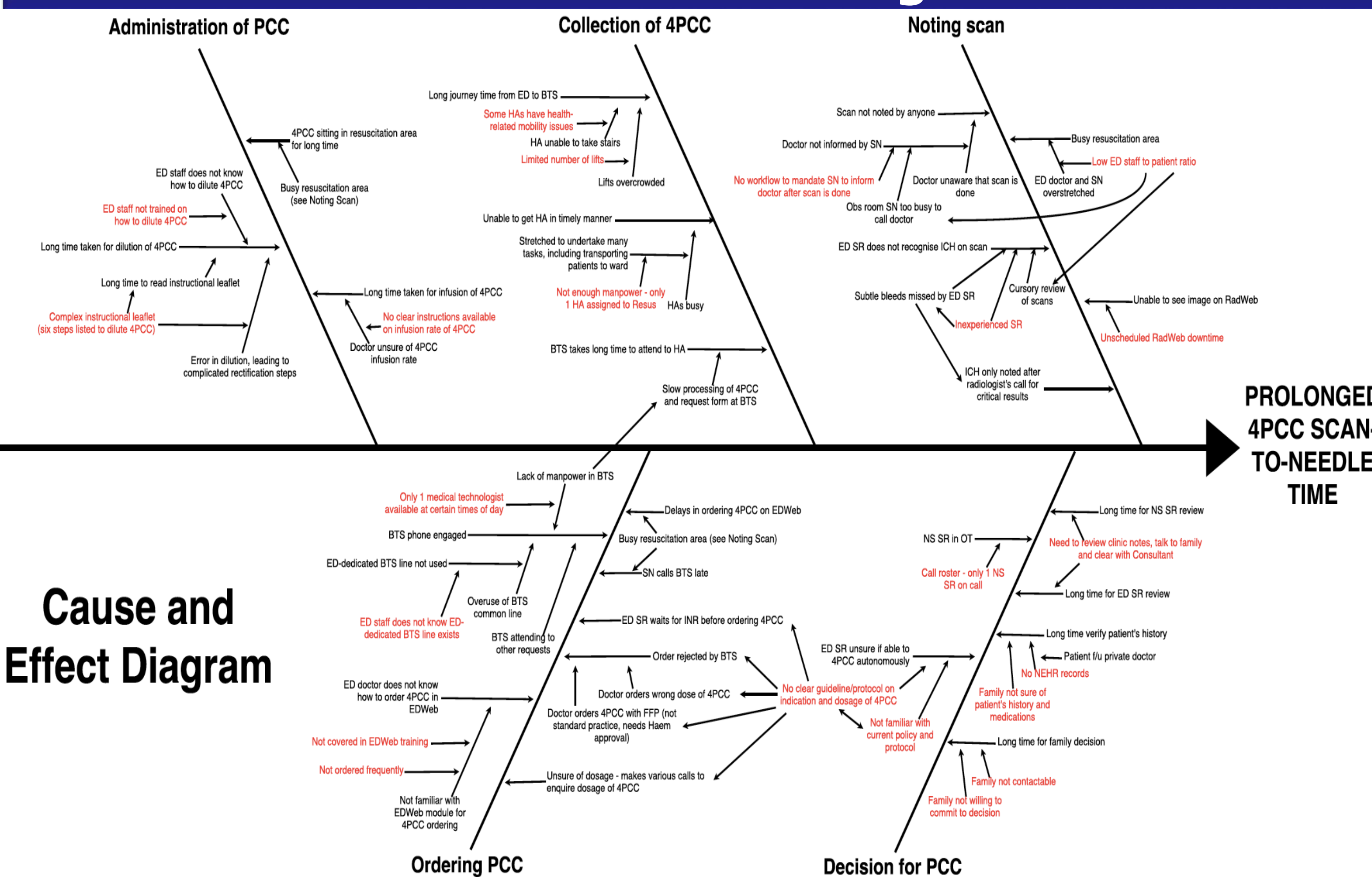
Current Performance of a Process

- In a retrospective review of 28 ICH cases in our ED from Oct 2016 to Jun 2017, the median scan-to-needle time was 90 minutes (interquartile range IQR 74 – 106).
- A UK stroke centre achieved a scan-to-needle time of 58 minutes (IQR 50 – 91) after quality improvement efforts.

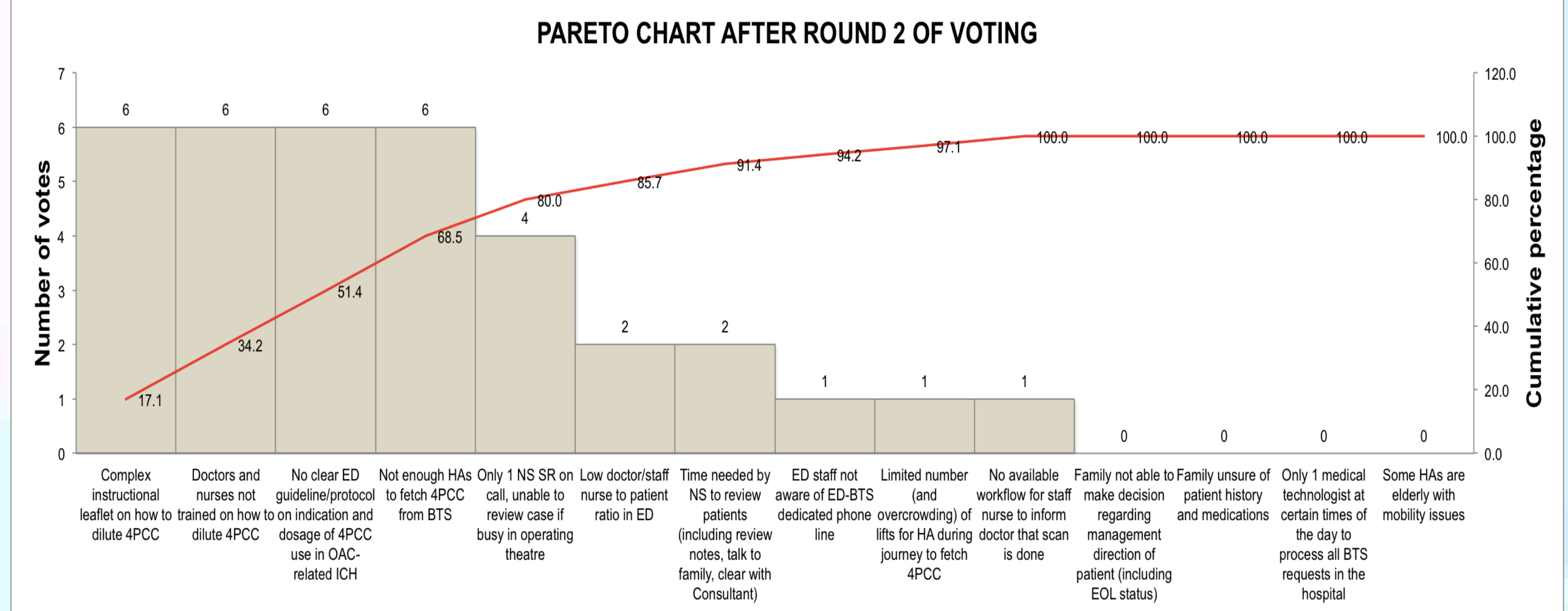
Flow Chart of Process



Cause and Effect Diagram



Pareto Chart



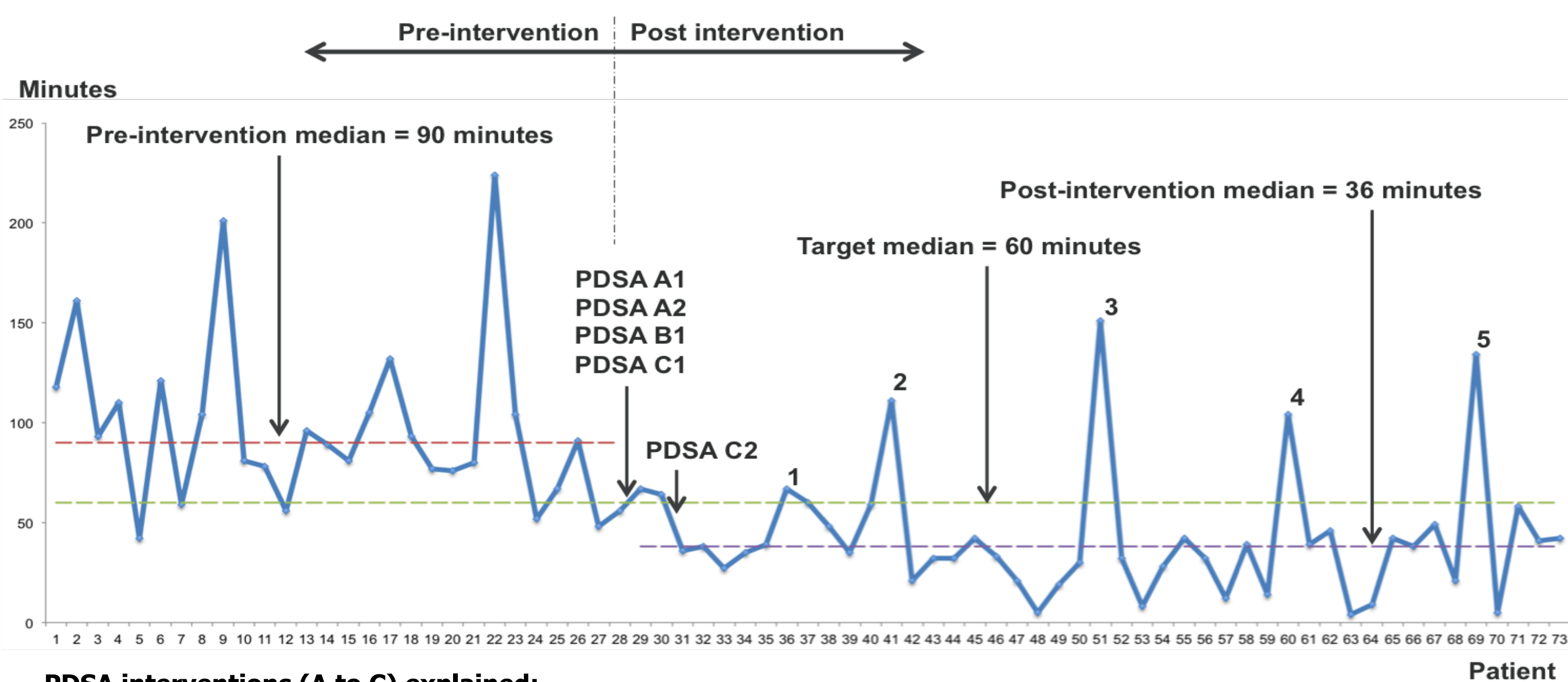
Implementation

CAUSE / PROBLEM	INTERVENTION	DATE OF IMPLEMENTATION
Not enough health attendants (HA) to fetch PCC from Blood Transfusion Services (BTS)	Stock PCC in ED	17 Jun 2017
Doctors and nurses not trained on PCC dilution + complex instructional leaflet on PCC dilution	Simplify PCC dilution steps with easy-to-remember visual cues	18 Jul 2017
No clear ED guidelines on indication and dosage of PCC use in OAC-related ICH	Development of new ED protocol on PCC use	20 Jun 2017

Results

RUN CHART FOR SCAN-TO-NEEDLE TIME

July 2017 to April 2018



PDSA interventions (A to C) explained:

- PDSA A: Stock PCC in ED
- PDSA B: Simplify PCC dilution steps
- PDSA C: Development of new ED protocol on PCC use

Special case variations (1-5) explained:

- [1] New nursing staff, lack of workflow awareness
- [2] Cardiology and Haematology consult, patient with aortic valve replacement
- [3] Small falcine SDH missed by ED doctor
- [4] Small left frontal SAH missed by ED doctor
- [5] Discussion of end-of-life matters

- Median times improved from 90 minutes (IQR 74 – 106) to 36 minutes (IQR 31– 59) at the end of 6 months.
- This result was sustained at the end of 10 months (median time 36 minutes, IQR 24 – 66).

Cost Savings

Resource Allocation

- HA no longer required to fetch PCC from BTS
- Can be re-allocated to other urgent tasks in Resuscitation Room
- 15 minutes saved per round trip to BTS = Approx. 48 hours / year

Reduced LOS in ICU

- Literature: ICU LOS longer by 4 days if there is haematoma expansion
- Postulated savings per patient = \$4,456
- Postulated savings per year (46 patients) = \$204,976

Lessons Learnt

- New ED protocol had minimal impact on scan-to-needle times.
- While it helped to facilitate clinical decision making, it had to be balanced with ethical considerations (e.g. ACP, EOL status) and thrombotic risks.

Strategies to Sustain

- Publicity:** Periodic sharing of scan-to-needle times to encourage buy-in and familiarity with new workflow.
- Training:** Introduction of workflow to resuscitation nurses in (Advanced Training in Emergency Nurses; ATEN) course