

Mission Statement

To improve the percentage of DTE time among patients who required an ECG to be done within 15mins* in ED Triage from 24% to 80% in Tan Tock Seng Hospital, Emergency Department over 6 months.

- Our target of DTE time is within *15 minutes instead of 10 minutes (deviated from AHA and ACC guideline) because our inclusion criteria for ECG at triage is much broader compared to AHA/ACC guideline suggested. Patient can present to us with STEMI/NSTEMI without chest pain nor SOB.
- 10 mins can be our stretch goal in future.
- Exclusion criteria: P1 patient, ECG ordered by physician after consultation, ECG ordered by inpatient team, scheduled repeat ECG (Chest pain protocol).

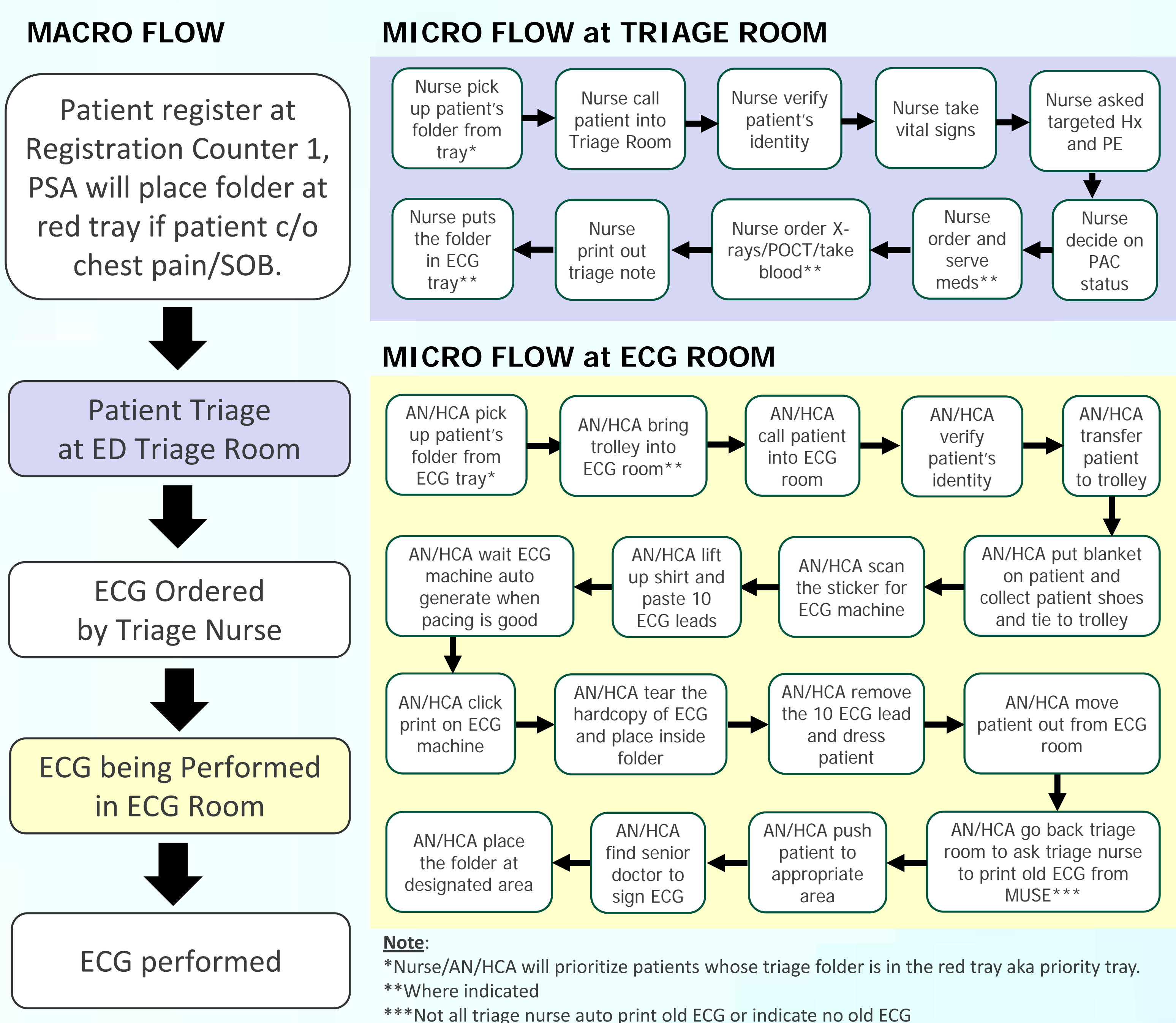
Team Members

	Name	Designation	Department
Team Leaders	Dr Lai Yin Wen	Associate Consultant	Emergency Medicine
	Melany Besa Cartagena	Nurse Manager	Emergency Medicine
Team Members	Dr Mathew Eshani Nastassia	Senior Resident	Emergency Medicine
	Dr Amos Nadan Mun En	Resident Physician	Emergency Medicine
	Jenessa Lum Yue Xuan	Assistant Nurse Clinician	Emergency Medicine
	Keshvaran Karnaneedi	Senior Staff Nurse	Emergency Medicine
	Divinagracia Noravie Quidato	Nurse Clinician	Emergency Medicine
	Pajarillo Apple Suzanne Meniano	Care Support Associate Executive	Emergency Medicine
Sponsor	Adj Asst Prof Ang Hou (Head of Department, Emergency Medicine)		

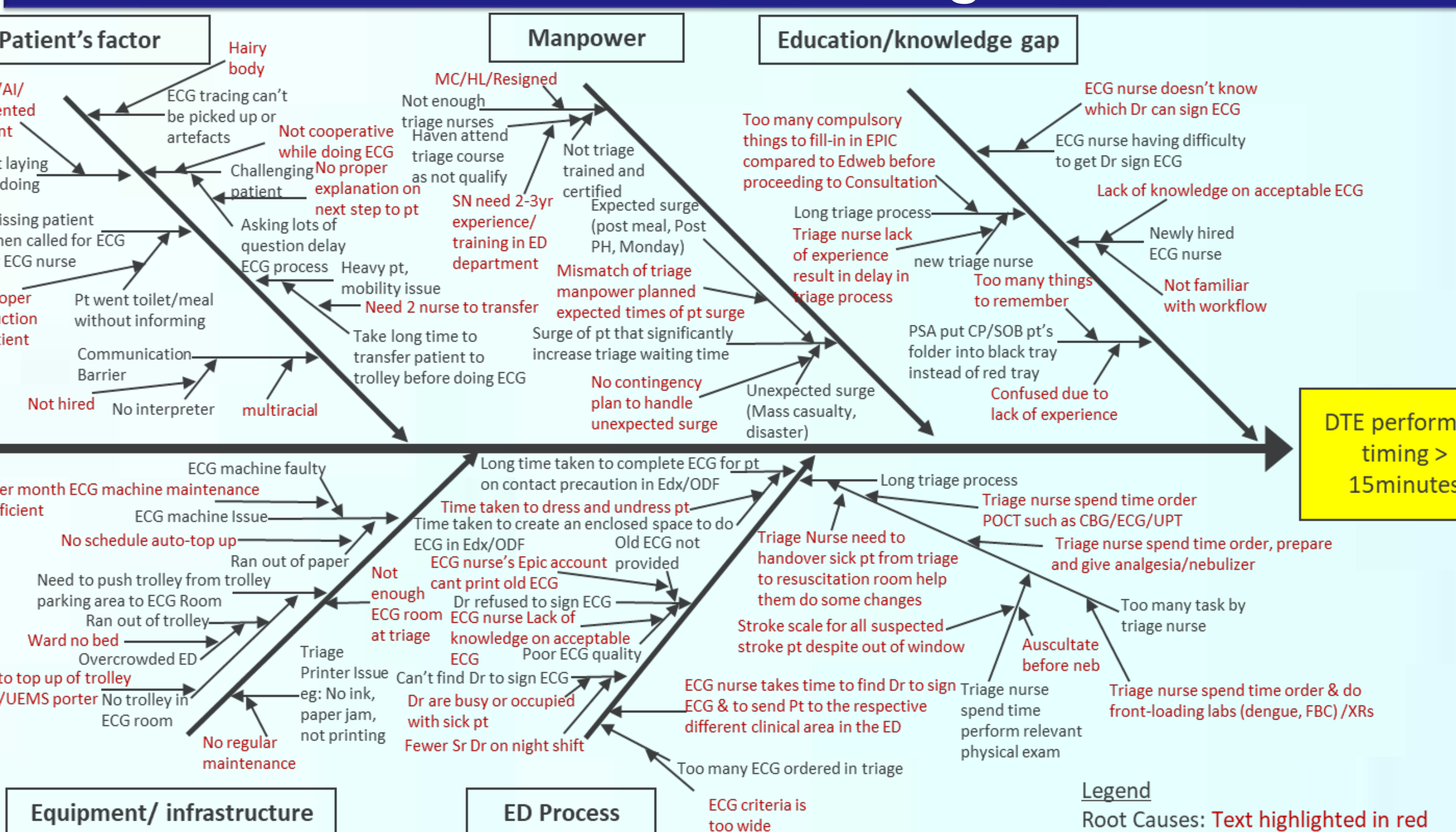
Evidence for a Problem Worth Solving

- Epic data from January to March 2023 showed that our Emergency Department (ED) median DTE time is **33 minutes**. DTE time that performed within 10 minutes is only 6.5% and within 15 minutes is 24% of total patient required ECG at triage.
- What are the Issues?
 - Current DTE time of 33mins is 3 times that of international AHA/ACC recommended guidelines.
 - Even though 80% of TTSH's Door-To-Balloon for STEMI is within 90mins (average 68.9mins), we can do BETTER, time = muscle!
 - Improve access to doctor consult in non-chest pain cases which can potentially be life-threatening eg. arrhythmias

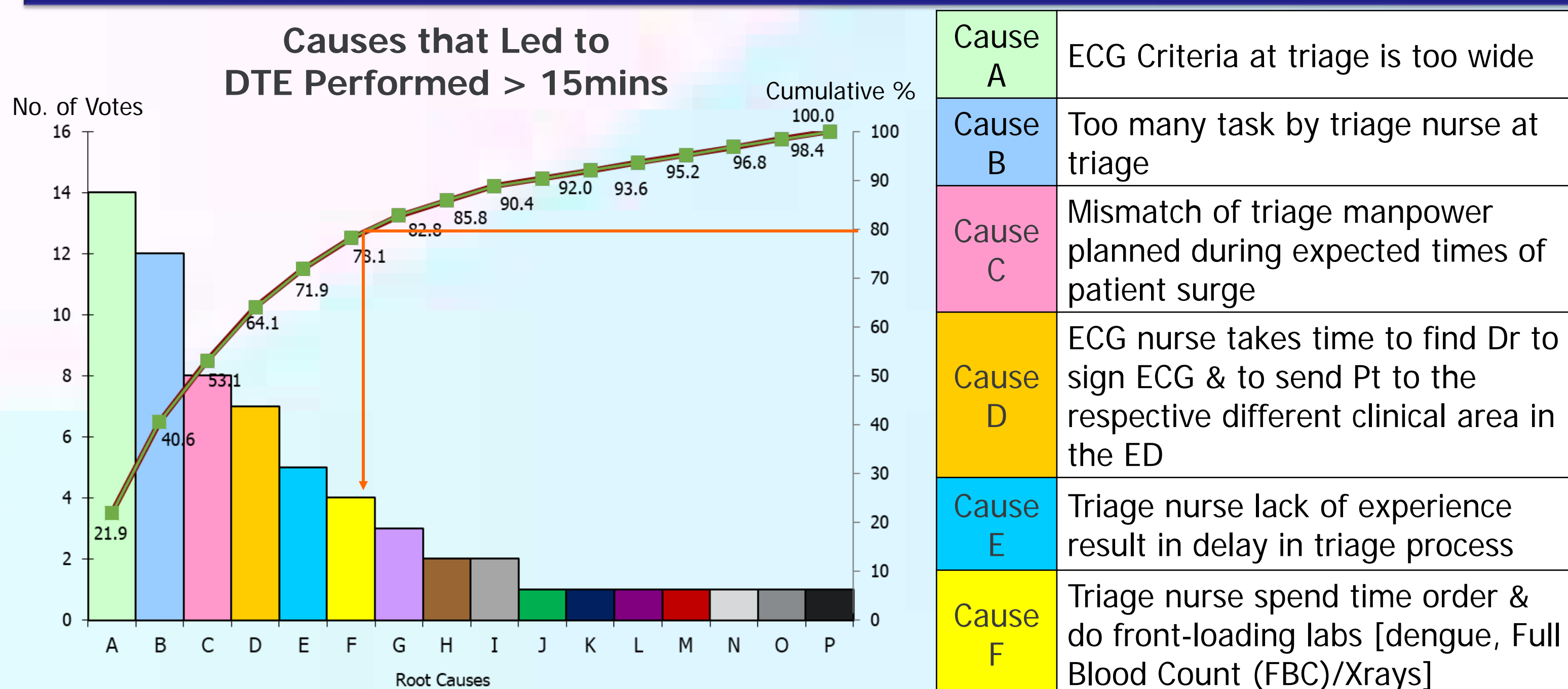
Flow Chart of Walk in Non COVID-19 Cases



Cause and Effect Diagram



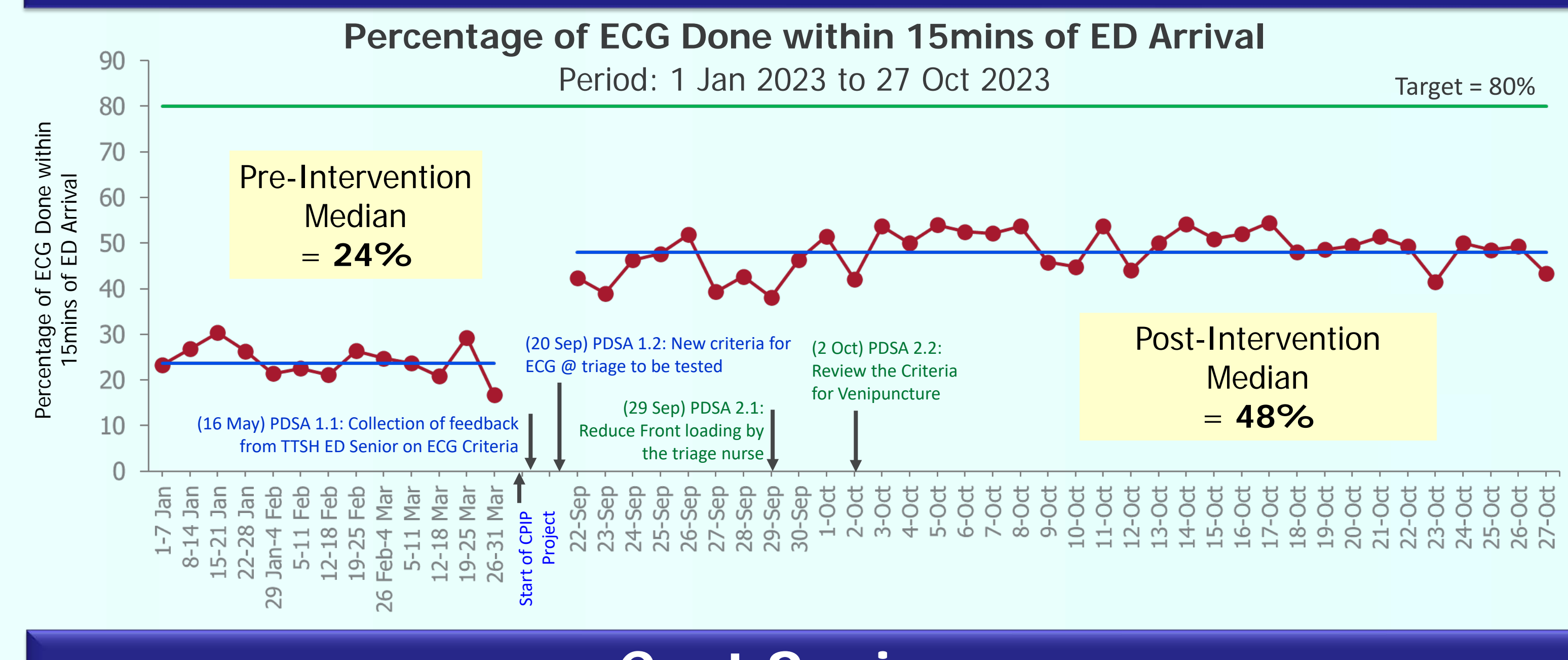
Pareto Chart



Implementation

CAUSE	INTERVENTION	DATE OF IMPLEMENTATION
Cause A: ECG Criteria at triage is too wide	To review ECG criteria at triage and select criteria for prioritisation of ECGs at triage	22 Sep 2023
Cause B: Too many task by triage nurse at triage Cause F: Triage nurse spend time order & do front-loading labs [dengue, Full Blood Count (FBC)/Xrays]	To review and reduce total number of front-loading tasks	29 Sep 2023

Results



Cost Savings

- We noticed a reduction of ECG done overall among the patient who came to ED after the 1st and 2nd intervention. This range from 15-25 per day. (Average 20 ECGs per day).
- Each ECG ideally cost 8 SGD (however, this amount is included in total ED fee, 140 SGD/visit, as ECG is a standard test)
- ECG usually performed by Healthcare Attendant (HA) /Assistant Nurse (AN) in TTSH ED and it consume usually 3 minutes to do the ECG alone, however, their time is spent to get trolley to do ECG, transfer patient, keep shoes, put blanket, push the trolley into appropriate area and get Senior Doctor to sign ECG.
- Average time taken to acknowledge ECG is 15 secs = 0.25 mins

ECG lead + Paper cost/patient	Time save (Average) by Healthcare Attendant (HA) /Assistant Nurse (AN)	Time save (Average) by Senior Doctor
1.3 x 20 x 365	10mins x 0.33sgd x 20 x 365	0.25mins x 4.215sgd* x 20 x 365
9490 SGD	24090 SGD	7692 SGD
Total cost saving is 41,272 SGD per year		

*4.215 SGD derived from average time per mins from Senior Consultant (SC), Consultant (C), Associate Consultant (AC) and Registrar (Reg)

Problems Encountered

Problems encountered include non-compliance with criteria, such as performing ECGs that do not meet the required guidelines and forgetting to place orders by doctors after the initial consultation. This can potentially disrupt patient flow if an ECG is needed post-consultation. However, we have strategies to optimize post-consultation ECGs by moving the ECG machine and creating dedicated area for ECG procedures.

Strategies to Sustain

- Monthly Triage audit on compliance of nurses to new ECG criteria
- Timely individualized feedback to the triage nurse
- Senior doctor and Nursing officer on duty will continue to monitor DTE time
- Updated Nursing triage course to ensure new triage nurse know the criteria
- Possible advancing technology for self-perform ECG by patient in future