

# UTILISATION OF CT HEAD IN THE ELDERLY WITH MINOR HEAD INJURY

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## Mission Statement

To reduce the proportion of inappropriate\* CT Heads in patients over the age 65 years presenting to TTSH Emergency Department (ED) with a minor head injury\*\*, from 70% to 20% within 6 months.

\* Performance of CT Head not supported by the Canadian Head CT rule

\*\* Minor head injury defined as a GCS score 13 -15 with either witnessed loss of consciousness, definite amnesia or witnessed disorientation

## Team Members

	Name	Designation	Department
Team Leader	Adj. Asst. Prof. James Kwan Wei-Yung	Senior Consultant	Emergency Medicine
Team Members	Dr Lee Chiao-Hao	Associate Consultant	Emergency Medicine
	Dr Franklin Santos Magbitang	Resident Physician	Emergency Medicine
	Dr Praseetha Nair	Senior Resident	Emergency Medicine
	Lionel Ang Wai Jian	Senior Staff Nurse	Emergency Medicine
	V Jeevitha	Radiographer	NNI Radiology
	Dr Priyantha Karunarathna	Clinical Fellow	Clinical Standards & Improvement

**Sponsors:** Adj. Asst. Prof. Ang Hou, Head & Senior Consultant of Emergency Medicine; A/Prof Sitoh Yih Yian, Head & Senior Consultant of Neuroradiology (NNI@TTSH)

**Mentor:** A/Prof Thomas Lew, Head & Senior Consultant of Anaesthesiology, Intensive Care & Pain Medicine

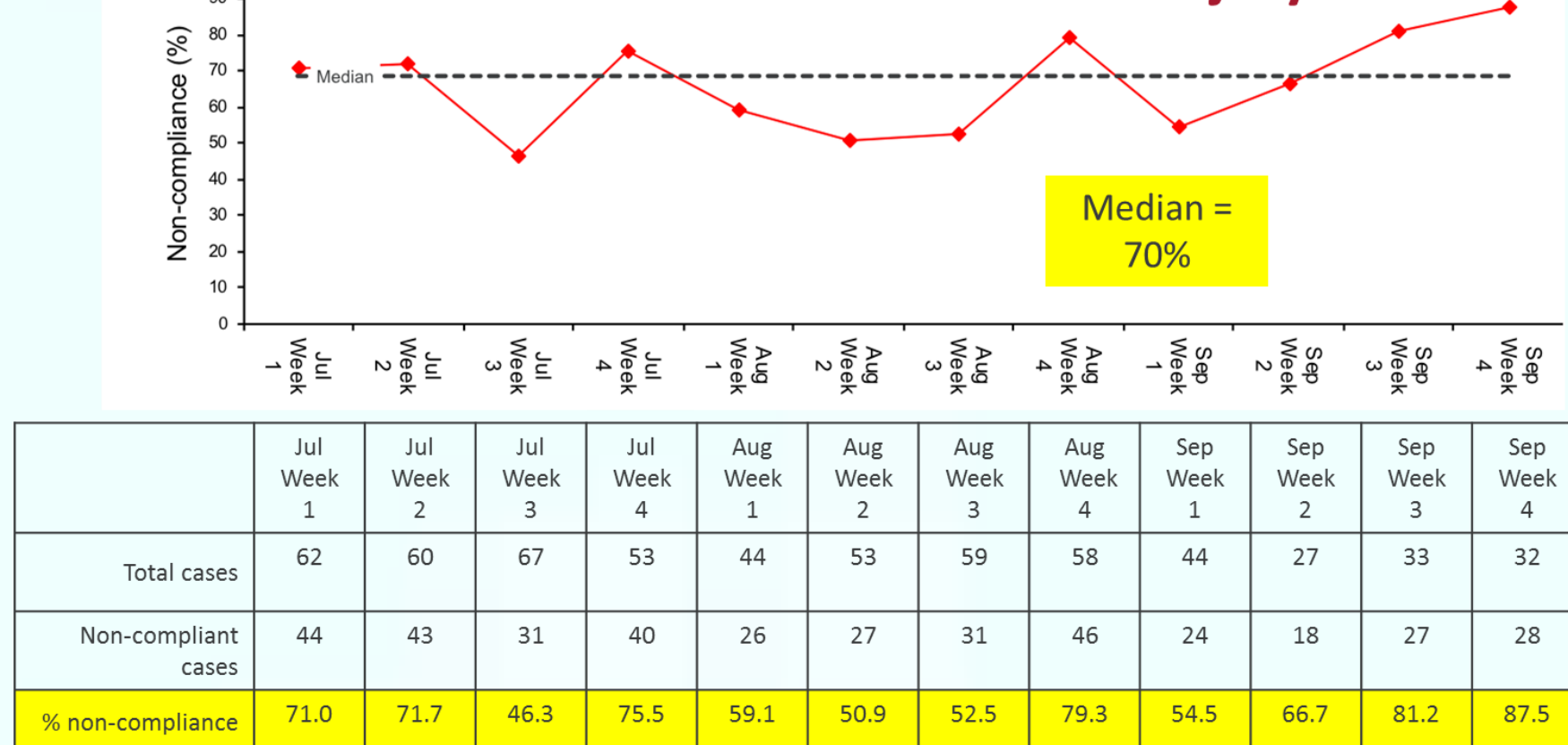
## Evidence for a Problem Worth Solving

- Canadian CT Head Rule<sup>1</sup> (CCHR) has been adopted by TTSH ED, other EDs in Singapore and overseas to support decision making for ordering CT Head in patients with minor head injury
- Non-compliance with application of CCHR was found to be 28.7% (all ages) in study conducted at National University Hospital Singapore ED<sup>2</sup>

1. Stiell IG, Wells GA, Vandemheen K, Clement C, Lesiuk H, Laupacis A, et al. The Canadian CT Head Rule for patients with minor head injury. The Lancet. 2001;357(9266):1391-6.  
2. Tan DW, Lim AME, Ong DY, Peng LI, Chan YH, Ibrahim I, et al. Computed tomography of the head for adult patients with minor head injury: are clinical decision rules a necessary evil? Singapore Medical Journal. 2018;59(4):199-204.

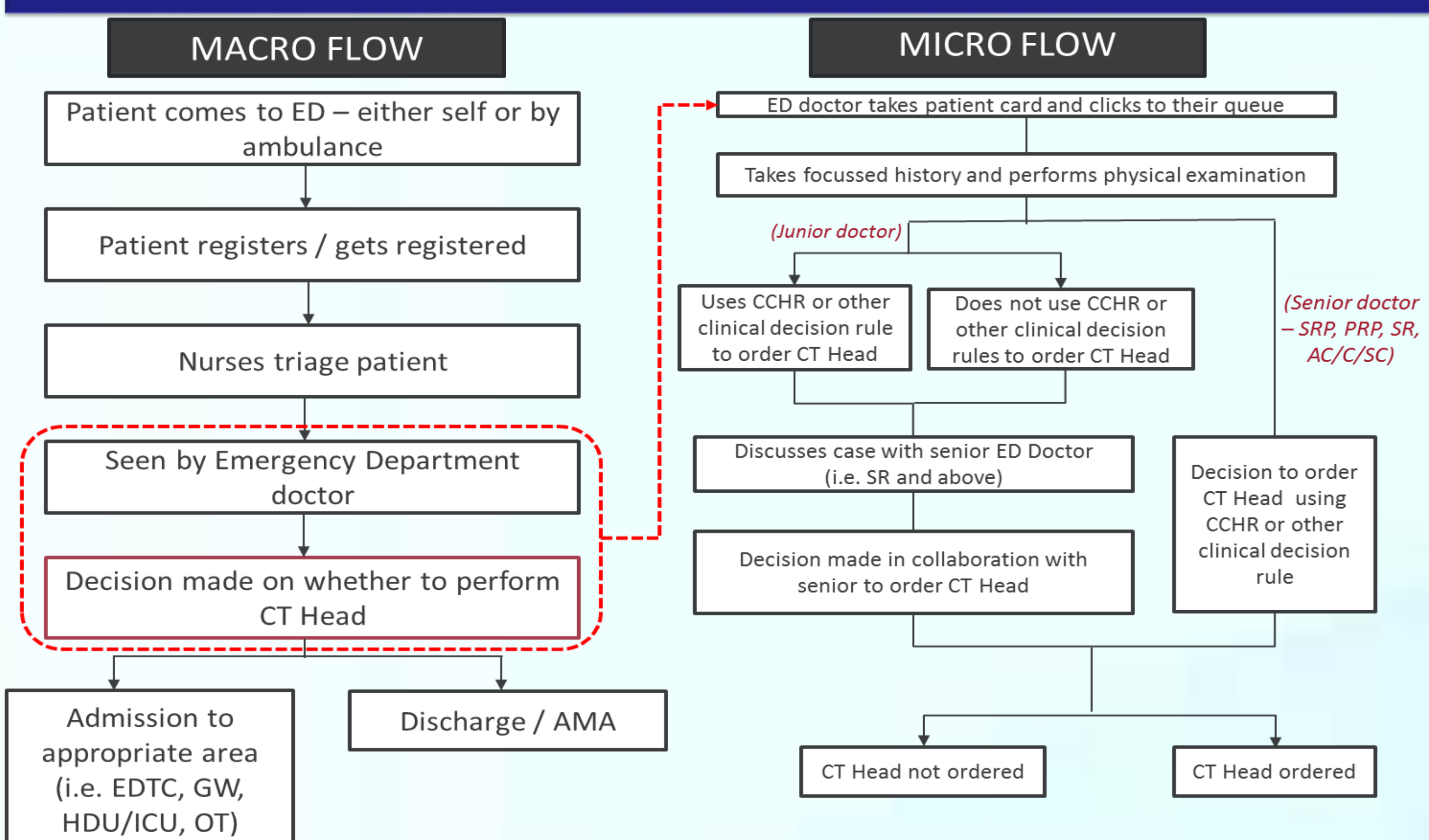
## Current Performance of a Process

Non-compliance with CCHR in patients 65 years and over with minor head injury

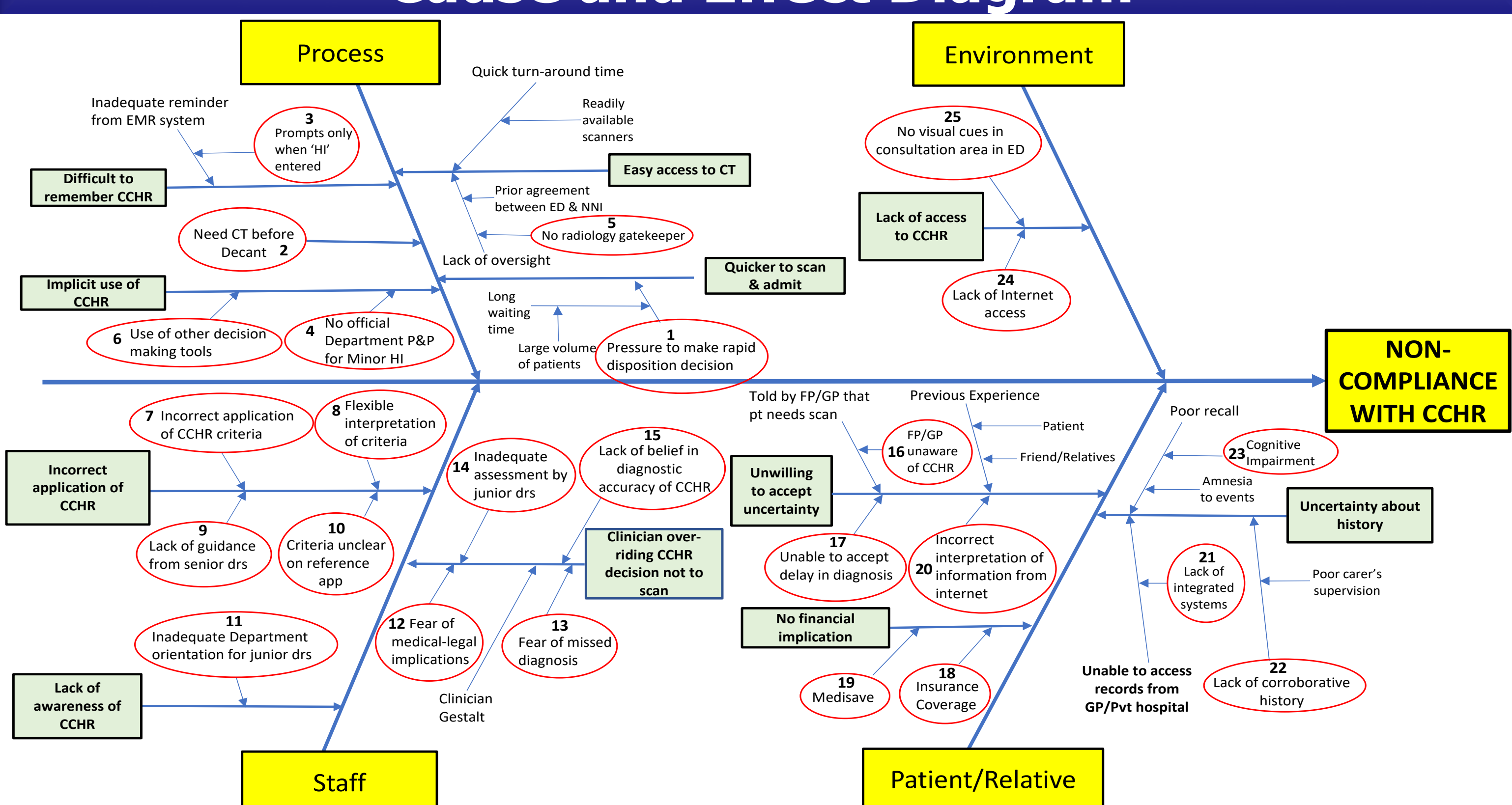


**70% of CT Heads performed in patients 65 years and over who presented to TTSH ED with minor head injury were not compliant with CCHR**

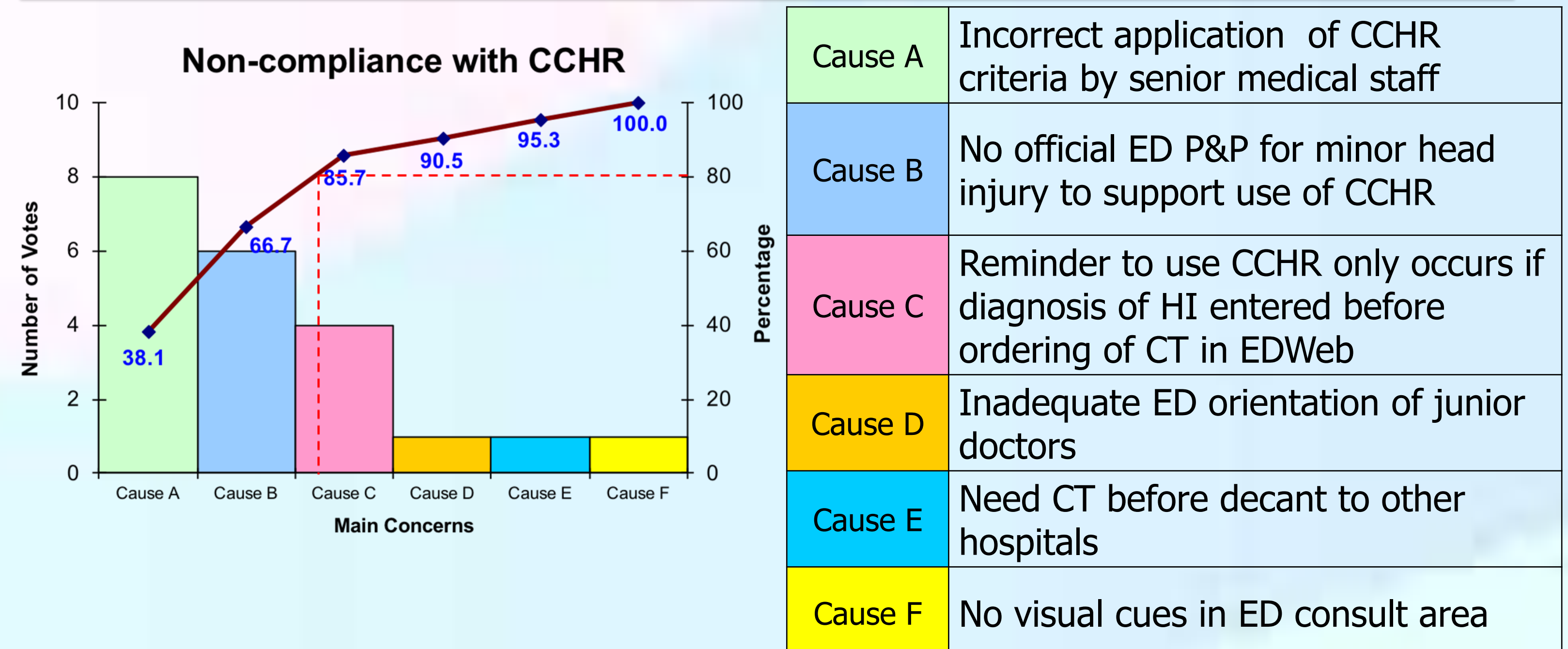
## Flow Chart of Process



## Cause and Effect Diagram



## Pareto Chart

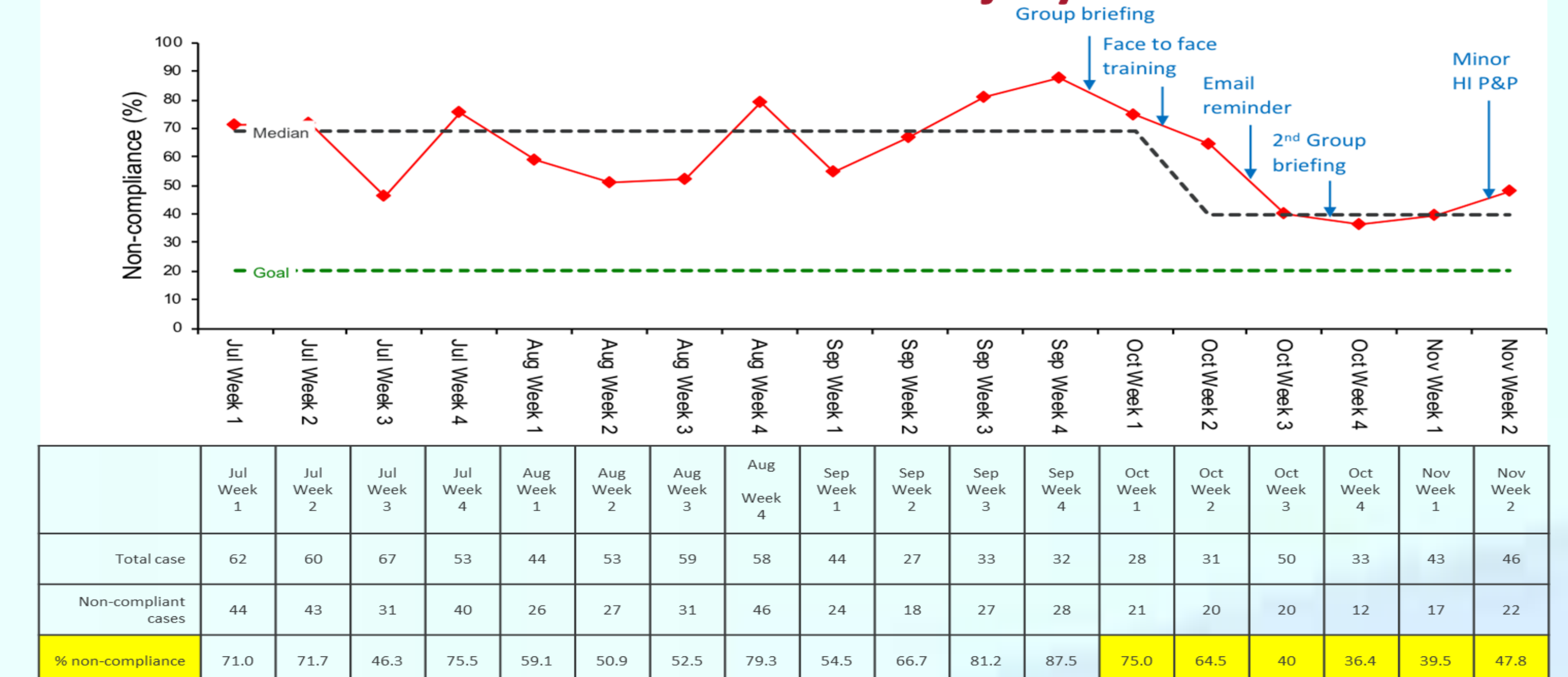


## Implementation

CAUSE / PROBLEM	INTERVENTION	DATE OF IMPLEMENTATION
1. Incorrect application of CCHR by senior medical staff	<ul style="list-style-type: none"> <li>Group briefing of ED senior medical staff at dept meeting</li> <li>Individualised face to face training for ED senior medical staff on interpreting CCHR</li> <li>Email reminders to ED senior medical staff</li> </ul>	27th September 2018
2. No official ED minor head injury policy and procedure to support use of CCHR	Implement ED minor head injury P&P	9th November 2018
3. Reminder to use CCHR only occurs if diagnosis of HI entered before ordering of CT in EDWeb	CT Brain cannot be ordered in EDWeb until diagnosis is entered	In-Progress

## Results

Non-compliance with CCHR in patients 65 years and over with minor head injury



## Cost Savings

	Pre-Intervention	Post-Intervention
% of Non-Compliance (Median)	70%	40%
Projected number of non-compliant cases (Assume No. of CTs ordered per month = 242)	169	97
Difference in number of non-compliant CTs (per month)		97-169 = -72
Difference in number of non-compliant CTs (annualized)		-\$1614 x 72 x 12months = <b>-\$1,394,496</b>

**Note:**

Cost of 1 CT = Cost of 24 hours admission to EDTC + Cost of CT Head = \$1,200 + \$414 = \$1,614

## Problems Encountered

- A range of modalities e.g. group and individual face to face, email is necessary to engage stakeholders
- One to one, face to face interaction necessary to get commitment, especially from senior doctors
- Explicit support e.g. P&P, from HOD and hospital administration necessary for buy in from stakeholders
- Role modelling by local champions can lead to change in practice and in the long term change in culture

## Strategies to Sustain

- Continue to measure compliance to CCHR for next 6 months
- Share the success with the dept to motivate senior medical staff to continue to comply with use of CCHR
- Reminders and opportunities for Q+A at monthly dept meetings for senior medical staff
- Email reminders at regular intervals to senior medical staff
- Encourage role modelling by local champions