



Tan Tock Seng
HOSPITAL
National Healthcare Group

BETTER CARE FOR SEVERE COMMUNITY ACQUIRED PNEUMONIA PATIENTS IN HOSPITAL (BREATH)

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Adding years of healthy life

Mission Statement

Reducing unplanned transfers of patients* with severe community acquired pneumonia# from General Ward to Intensive Care Unit within 24 hours of admission from the Emergency Department, from 12% to less than 5% in 6 months

* for active management

defined by PSI (class ≥ 4)

Team Members

| | Name | Designation | Department |
|--------------|----------------------------|-------------------------|---------------------|
| Team Leaders | Dr Sennen Lew Jin Wen | Senior Consultant | RCCM |
| | Dr Daniel Quek Yong Jing | Associate Consultant | Emergency Medicine |
| Team Members | Dr Situ Wangmin Jacqueline | Senior Resident | Emergency Medicine |
| | Lionel Ang Wai Jian | Senior Staff Nurse | Emergency Medicine |
| | Dr Caroline Choong | Senior Resident | RCCM |
| | Geraldine Ng Li Yuen | Advanced Practice Nurse | General Medicine |
| | Jennifer Guan Huey Chen | Senior Resident | General Medicine |
| | Ken Kuo Hong-Ju | Respiratory Therapist | Respiratory Therapy |

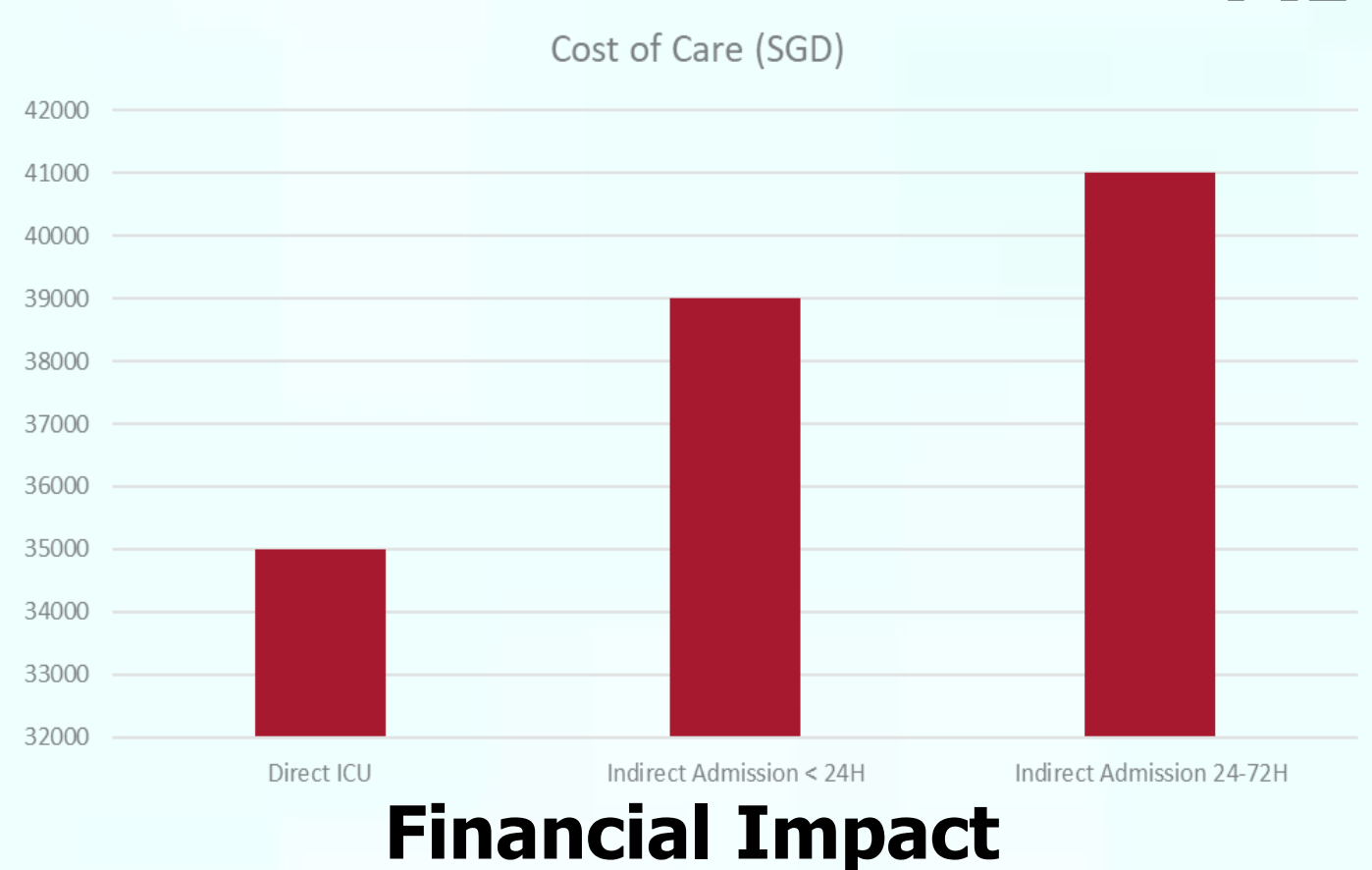
RCCM = Respiratory and Critical Care Medicine

Evidence for a Problem Worth Solving

- Overall burden of pneumonia in TTSH - 5246 patients diagnosed with pneumonia/chest infection in ED in 2016. 4674 Jan-Oct 2017 (estimated 2% increase over same period) Source: EDWeb
- 24 hour audits (ED) - 43 patients for which transfer may be "attributable" to ED/Inpatient team, 2015-mid 2017 Source: ED 24-Hour transfer audits
- Approximately 36% of Severe CAP patients are initially sited in the ward before transfer to MICU.

Evidence for a Problem Worth Solving

MICU/HD Data

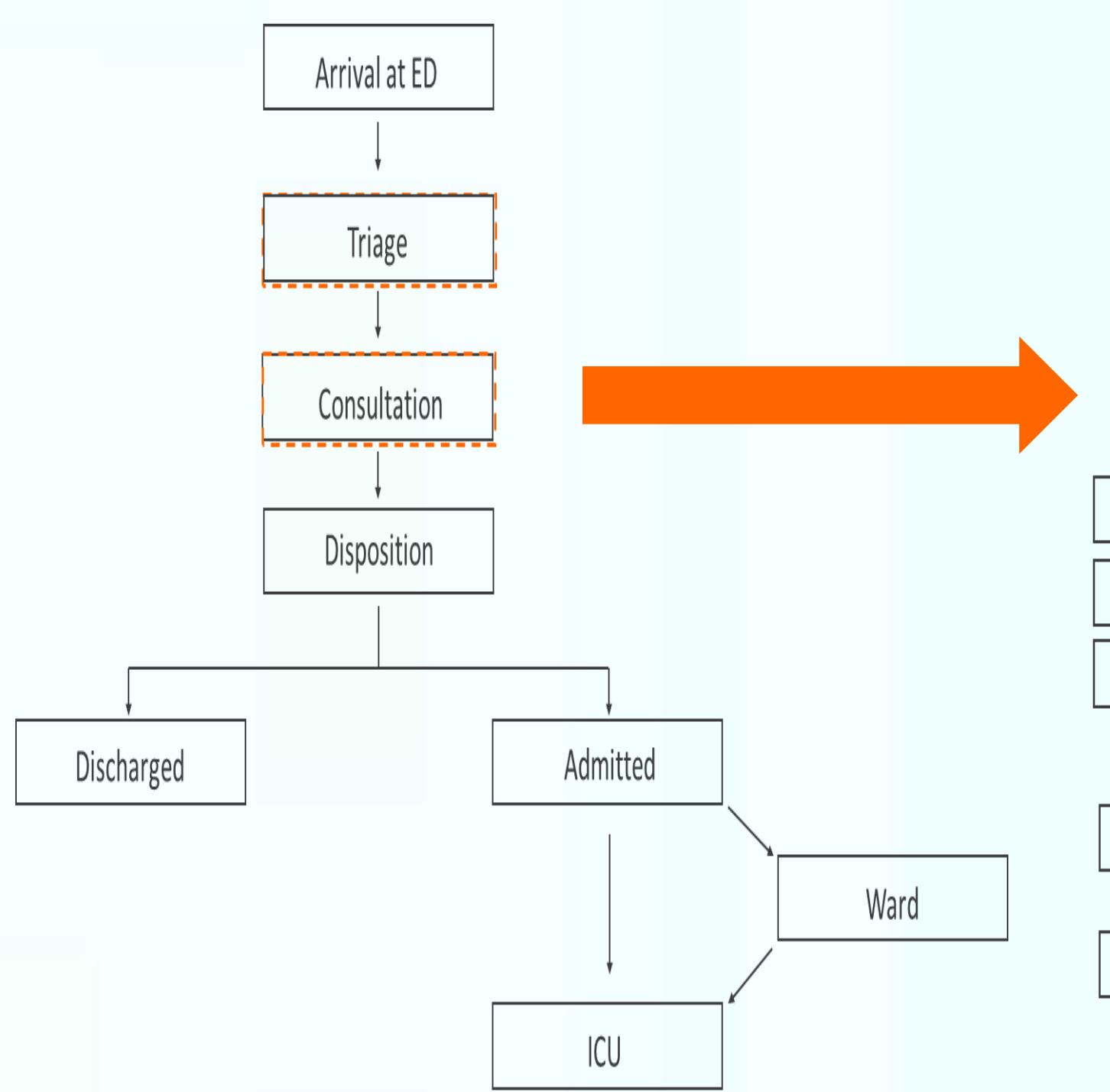


| | Direct ICU Admission | Delayed Admission <24H | Delayed Admission 24H-72H |
|---------|----------------------|------------------------|---------------------------|
| ICU LOS | 11.6 | 14.7 | 28.3 |
| H LOS | 22.7 | 28.4 | 38.5 |

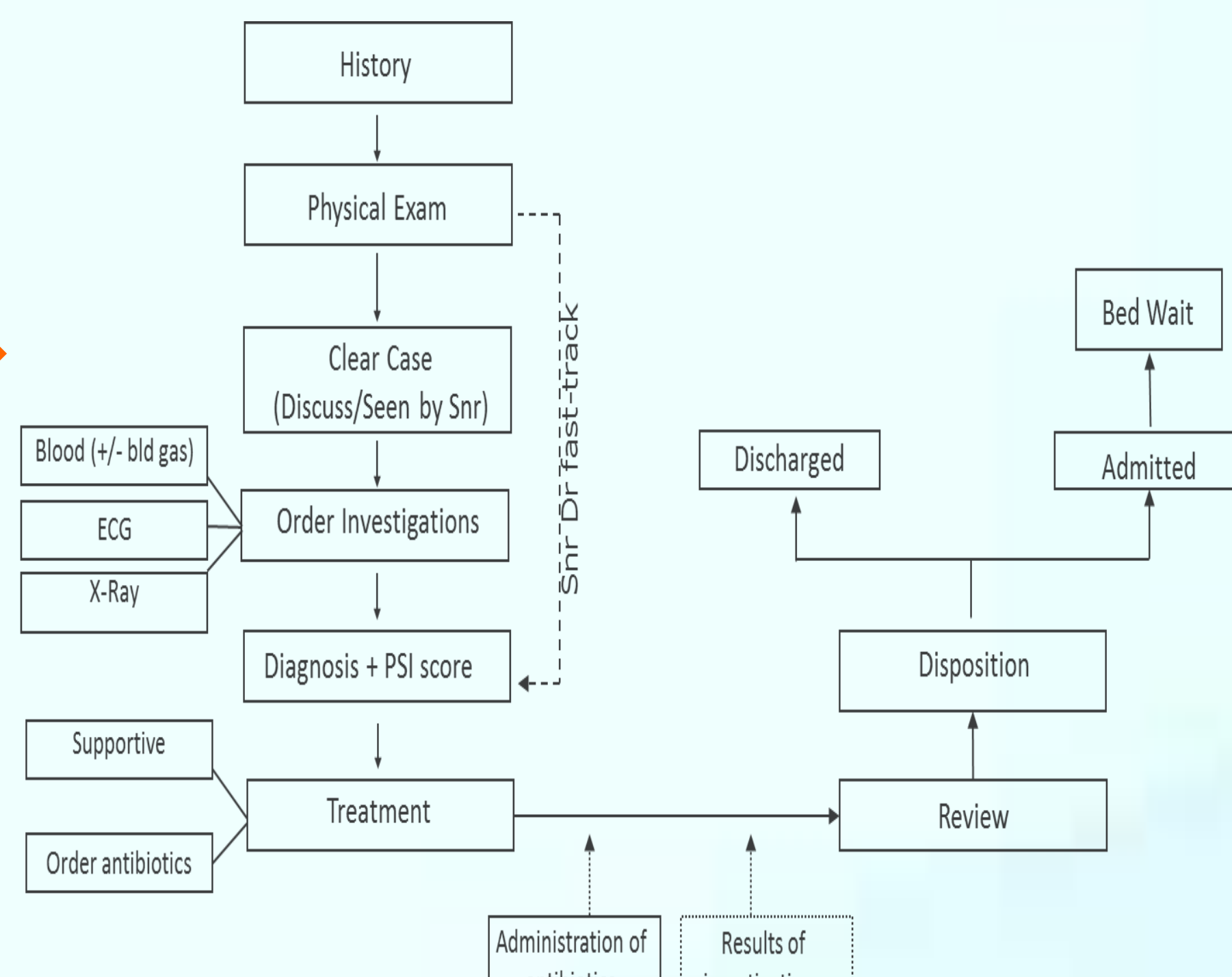
Length of Stay

Flow Chart of Process

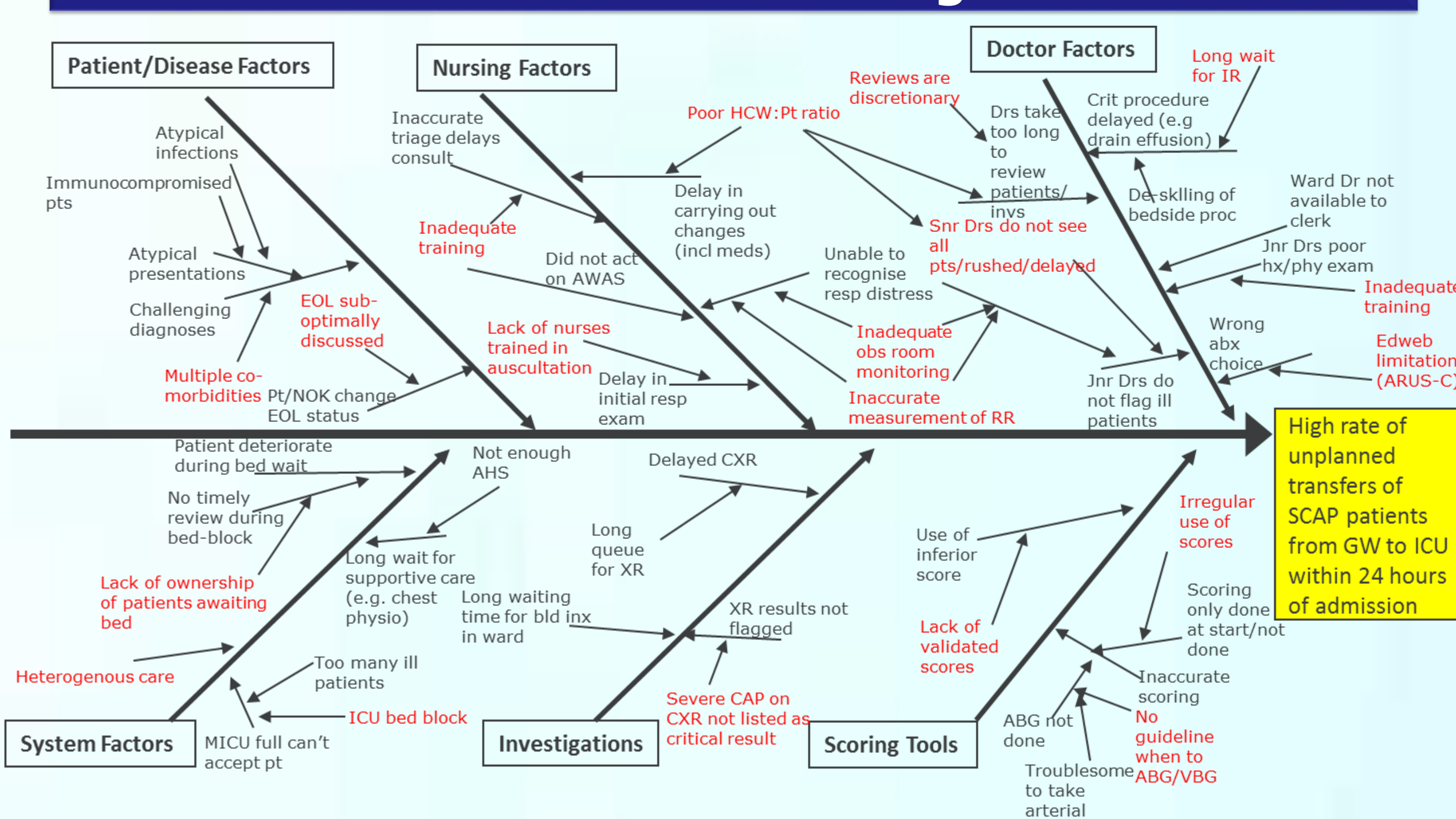
Micro Flow Chart



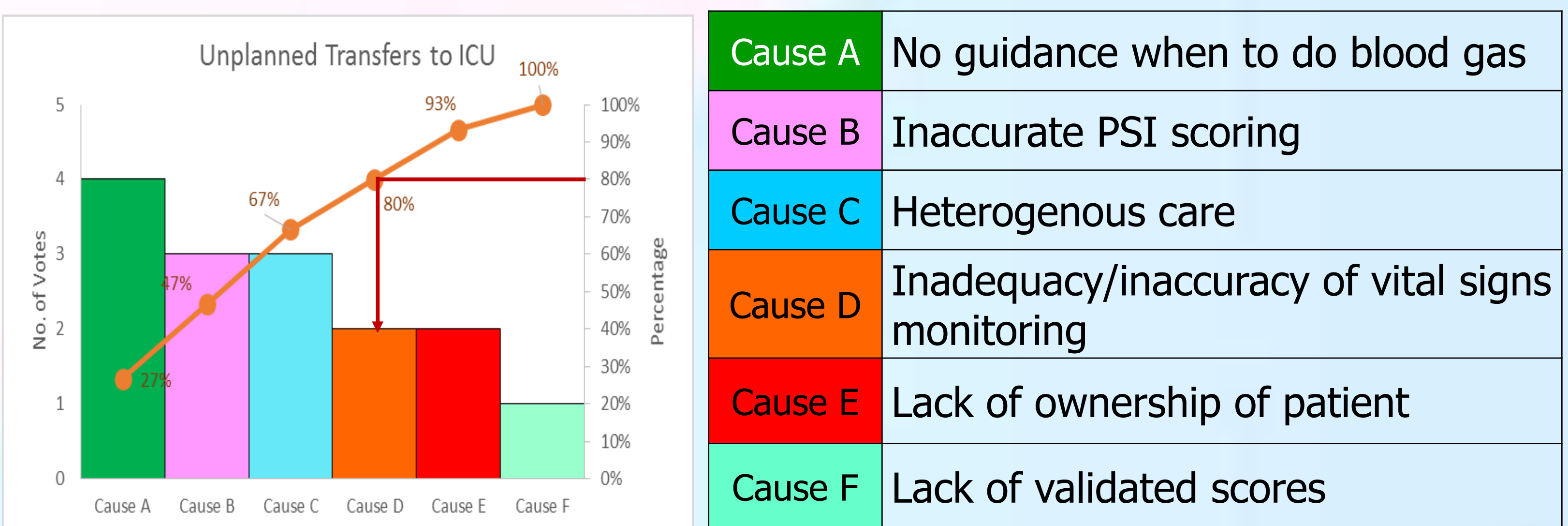
Micro Flow Chart - ED Consultation



Cause and Effect Diagram



Pareto Chart



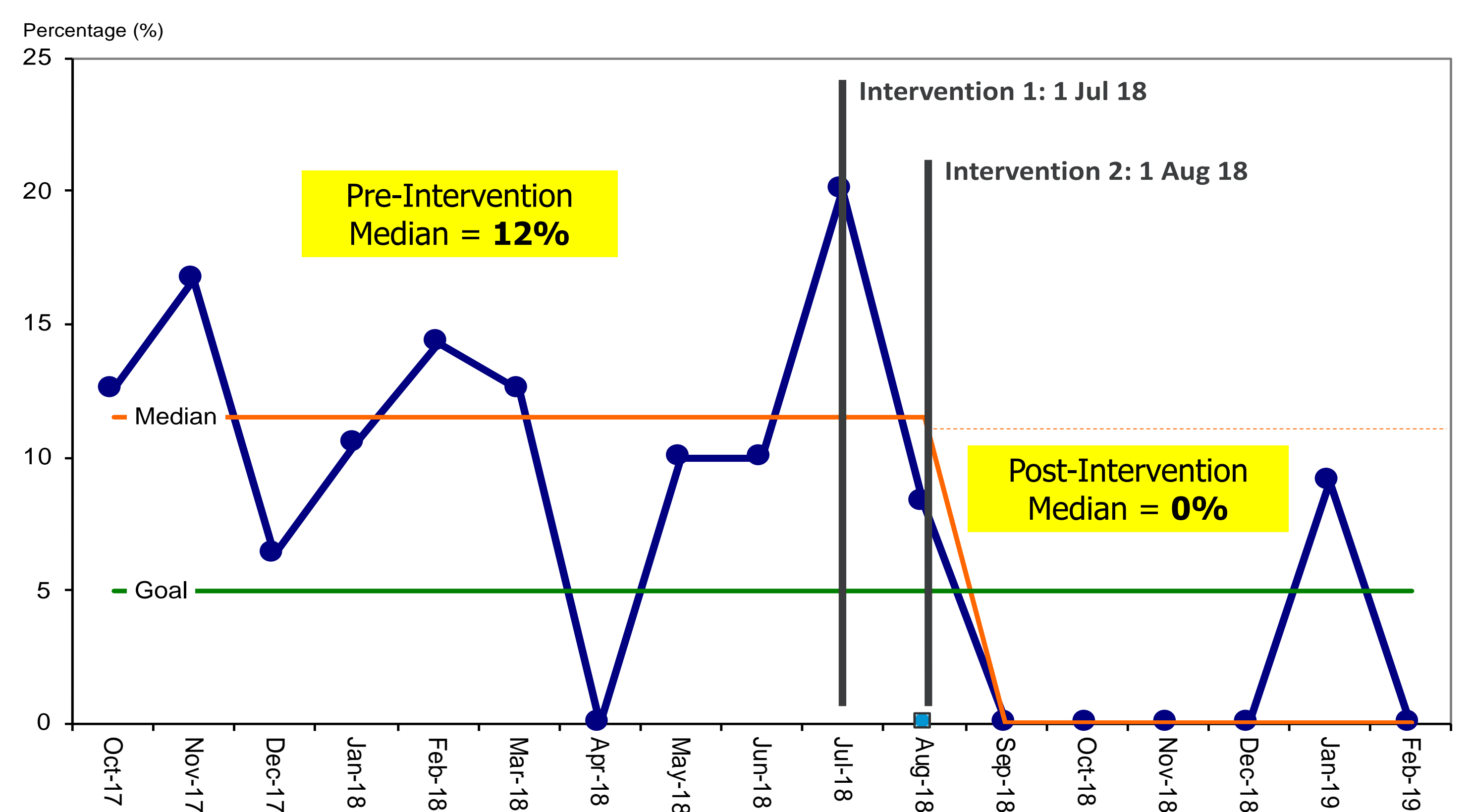
| | |
|---------|---|
| Cause A | No guidance when to do blood gas |
| Cause B | Inaccurate PSI scoring |
| Cause C | Heterogenous care |
| Cause D | Inadequacy/inaccuracy of vital signs monitoring |
| Cause E | Lack of ownership of patient |
| Cause F | Lack of validated scores |

Implementation

| CAUSE / PROBLEM (refer to Pareto Chart) | INTERVENTION | DATE OF IMPLEMENTATION |
|--|---|------------------------|
| No clear guidance as to when to perform ABG in a pneumonia patient | Calculate PaO2/FiO2 ratio for all patients with PNEUMONIA ABG for patients (active management) requiring FiO2 ≥ 0.35 Consider HD/ICU if PaO2/FiO2 < 250 | 1 Jul 2018 |
| Inaccurate PSI scoring | Score PSI prior to disposition Consider HD/ICU if PSI 4/5 | 1 Aug 2018 |

Results

Percentage of Severe Community Acquired Pneumonia Admissions to MICU which were initially sited in the General Ward within 24 Hours of Admission from the ED



Cost Savings

- No of MICU Admissions per annum = 750
- Average Severe CAP admissions meeting intervention criteria per annum = 150 X 12% = 18
- Average cost saving per case = SGD 4000
- Net cost savings by reducing wrong siting of cases to 0% = SGD 4000 X 18 = **SGD 72 000**

Lessons Learnt

- Such an undertaking is a multidisciplinary effort and requires interdepartmental and indeed interdivisional cooperation
- A lot of interpersonal communication is required, including going down to the shop floor and speaking to individual staff personally about the implementation of new protocols.
- It is interesting that just by tweaking the workflow slightly (in terms of IT system solutions and some education for colleagues) can result in such a magnitude of effect.
- The ability to recognize acute illness clinically is inherently prone to failure and clinical judgement should be backed up with objective scientific data.
- Human factors must be addressed in order to successfully achieve an improvement in process measures.

Strategies to Sustain

- Changes in the IT solution will ensure that there is appropriate assessment of the PSI score which will ensure right siting.
- Heightened awareness of acute / critical illness in the ED and on the part of the Registrars covering MICU should be sustained by reminders at ED M&M meetings Division of Medicine Meetings.