## Project Title

Delay in Post Anaesthesia Care Unit (PACU) Discharge: How Nurse-Led PACU Discharge Improved Operating Theatre Efficiency

## Project Lead and Members

Project lead: Dr Lean Lyn Li, APN Yang Dongli

Project members: SSN Wang Hongyan, SN Yuan Lu, SSN Tang Xueru

## Organisation(s) Involved

Ng Teng Fong General Hospital

## Healthcare Family Group Involved in this Project

Medical, Nursing

## Applicable Specialty or Discipline

Anaesthesiology

## Project Period

Start date: Jan 2019

Completed date: Aug 2022

## Aims

- To increase the percentage of selected post-operative ASA I & ASA II patients with discharge order ready within 45 minutes from 74% to 80% by end of August 2022.
- To increase the percentage of selected post-operative ASA I & ASA II patients discharged out of PACU within 60 minutes from 45% to 60% by end of August 2022.

## Background

See poster attached

## Methods

See poster attached

## Results

See poster attached

## Lessons Learnt

See poster attached

## Project Category

Care & Process Redesign, Quality Improvement, Workflow Redesign

## Keywords

Nurse-led PACU discharge, Nurse Empowerment

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# DELAY IN PACU DISCHARGE: HOW NURSE-LED PACU DISCHARGE IMPROVED OPERATING THEATRE EFFICIENCY

✓ SAFETY ✓ PRODUCTIVITY
❑ QUALITY ❑ COST
❑ PATIENT EXPERIENCE


**LEAD: DR LEAN LYN LI (ANAESTHESIA), APN YANG DONGLI (NURSING)**

**TEAM MEMBERS: SSN Wang Hongyan, SN Yuan Lu, SSN Tang Xueru**

**SPONSORS: ADN Joanna Tan (MOT), Dr Yap Sau Hsien (Anaesthesiology), ADN Clarice Wee (Nursing Clinical Service)**


## Define Problem, Set Aim

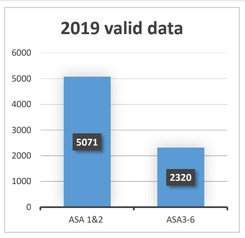
### Problem/Opportunity for Improvement

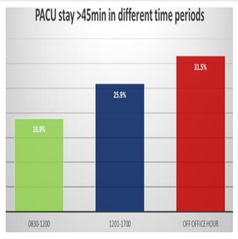
- A prolonged Post Anaesthesia Care Unit (PACU) stay has been shown to have implications on Operating Theatre (OT) efficiency. It may also lead to dissatisfaction of surgeons, nurses, patients and their families. Post-anaesthesia patients should be discharged as soon as deemed fit in order to promote bio-psycho-social wellbeing.
- Data obtained from January to December 2019 showed 69% of total patients were ASA 1 & 2 patients. 26% of them spent more than 45 minutes before a discharge order was put up and 55% of them spent more than 60 minutes before being discharged out of PACU. It was postulated that this delay was due to a delay in review and discharge of uneventfully recovered patients by PACU anaesthetists. It was our aim to reduce unnecessary delay of patient discharge from PACU.

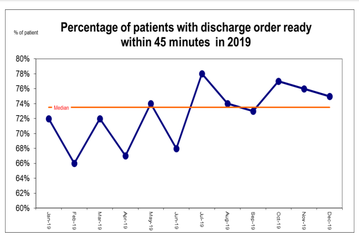
### Aim

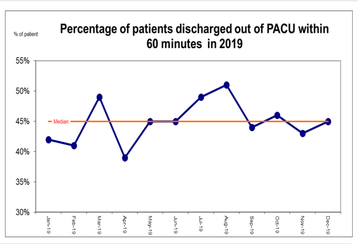
- To increase the percentage of selected post operative ASA I & ASA II patients with discharge order ready within 45 minutes from 74% to 80% by end of August 2022.
- To increase the percentage of selected post operative ASA I & ASA II patients discharged out of PACU within 60 minutes from 45% to 60% by end of August 2022.

## Establish Measures



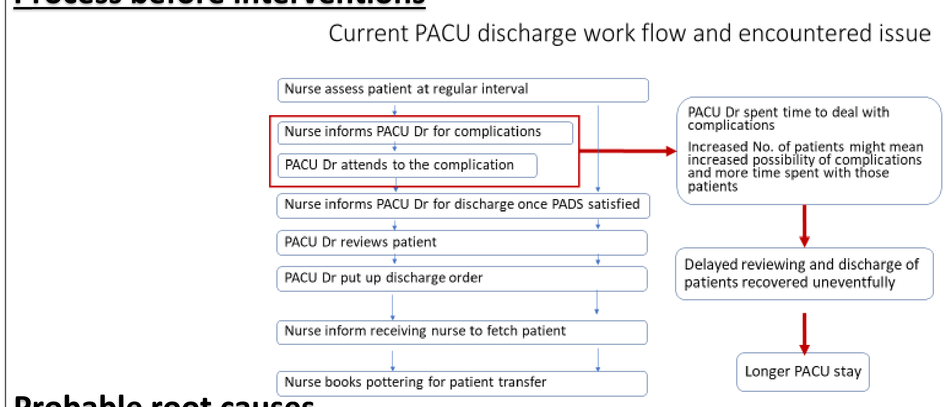




### Key measurements

Percentage of patients with discharge order ready within 45min and discharged out of PACU within 60min across the day and during various periods (8.30am-12NN, 1201-1700hrs, off office hours) and at various intervals (<=45min, 46-60min, 61-90min, 91-120min, >120min) will be measured.

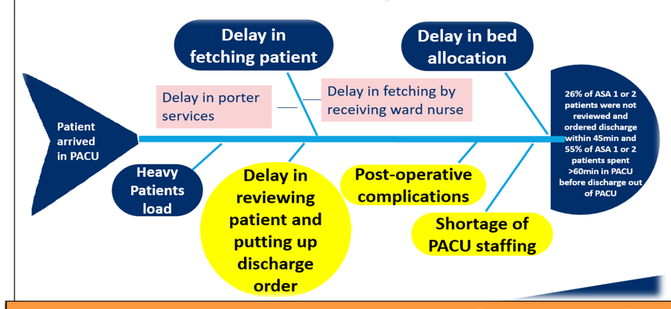
## Analyse Problem

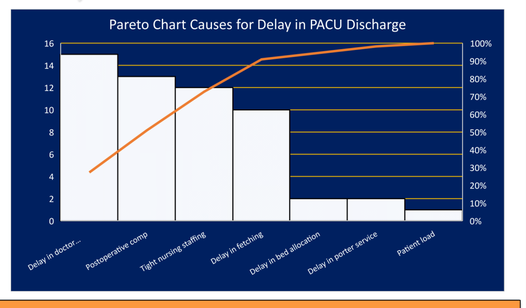
### Process before interventions




### Probable root causes

We identified Delay in reviewing patient by doctor as the root cause that is the most important, followed by Postoperative complications in PACU, shortage of nursing staff and delay in fetching from wards. Although the other root causes also contributed, our team felt that those factors may be more difficult to control.



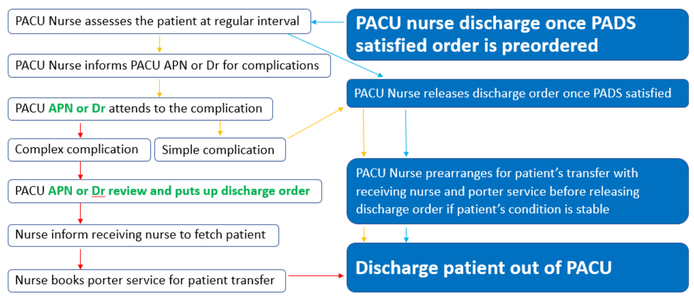




## Select Changes

| Root Cause | | Potential Solutions |
|---|---|---|
| Delay in review by doctor | 1 | ***Pilot and implement a Nurse-Led PACU Discharge Protocol:*** ***To improve OT efficiency and subsequently aid in hospital discharge and impact ward bed turnover*** ***To free up medical manpower to deal with postop complications more promptly*** ***To reduce PACU work load and improve work satisfaction to ease staffing issue*** |
| Postoperative complications in PACU | | |
| Tight nursing staffing | | |
| Delay in fetching patient | 1 | ***To allow nurses autonomy to pre-arrange transfer of patients with porter and receiving nurses to facilitate patient's transfer*** |

## Test & Implement Changes

Nurse led PACU discharge work flow and three ways of discharging patients (in red, orange and blue color codes)



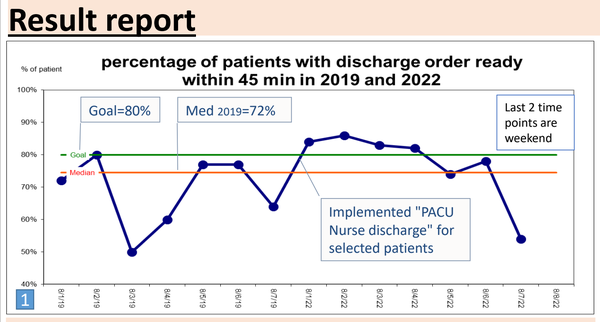

Project scope:
ASA 1 and ASA 2 patients not for major neuro, ENT, thoracic, abdominal, vascular surgery
Under Monitored Anaesthesia, Regional Anaesthesia and/or General Anaesthesia
Patients not at risk of OSA or difficult airways
Patients without significant intraoperative events or to be discharged to HDU
Phase I for suitable eye patients, Phase II for all suitable patients

- PLAN: From the root causes, we decided to implement a Nurse-Led Discharge workflow that will concurrently address ALL four root causes:
  - It solves the problem of delay in doctor reviewing patient
  - It leads to early discharge and improves patient flow in PACU
  - It frees up medical manpower to deal with postop complications
  - It increases nursing autonomy and satisfaction.

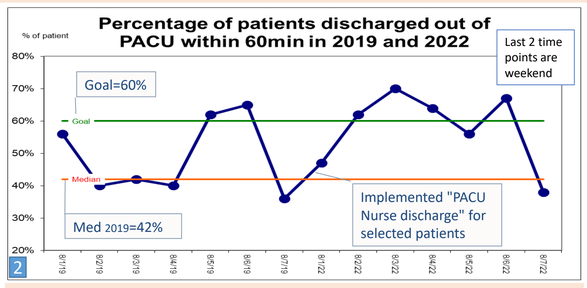
## Test & Implement Changes

| CYCLE | PLAN | DO | STUDY | ACT |
|---|---|---|---|---|
| 1 | Training and Engagement of staff included zoom and in person talks, medical and nursing in-service and competency assessments of the nurses were done to ensure patient safety. The NGEMR workflow was finalised | Nurse-Led PACU discharge protocol was restricted to MAC ophthalmology patients done during office hours. The test was carried out as planned. **Feedback and observation:** Some doctors were unsure about selection criteria and made incomplete orders. Some PACU nurses were not sure about when to release the discharge order | **Result:** There was improved PACU patient flow from observation **Learning point:** Identify champion as reference person for doctors and nurses; Orientation for new doctors joining department | OT efficiency improved and there were no postop complications or incidents Planned to proceed to next cycle |
| 2 | Medical and nursing champions were identified as reference persons; Orientation for new doctors joining department | Nurse-Led PACU discharge protocol involved all GA/MAC/RA cases, and at all times of the day. There was closure of OTs in August (from 9 elective OTs to 7), so more elective operations were listed in the limited numbers of OTs and ended late after office hours. Meanwhile, more emergency operations were done after office hours. | We tested out our hypothesis by collecting data for one week during 1-7 August 2022 and compared with data in the same week in 2019. Total 179 patients in 2019 and 190 patients in 2022 had valid data (N ASA 1 or ASA 2 = 134 in both year). 3 time periods (8.30am-12nn, 1201-1700hr, 1701-7.59am) and across all time periods were analyzed. | Conclusion: • OT efficiency improved and there were no post-discharge major adverse incidence • With proper training and guidelines, it was shown that PACU nurses were capable of making decisions for discharge for selected patients and at the same time able to maintain patient safety • There was high satisfaction in the work and performance for both medical and nursing staff, potentially improving nursing autonomy We proceeded to formalise Nurse-Led PACU discharge protocol into PACU discharge policy and work flow |

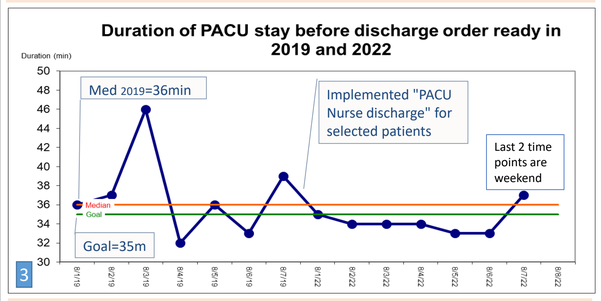
### Result report



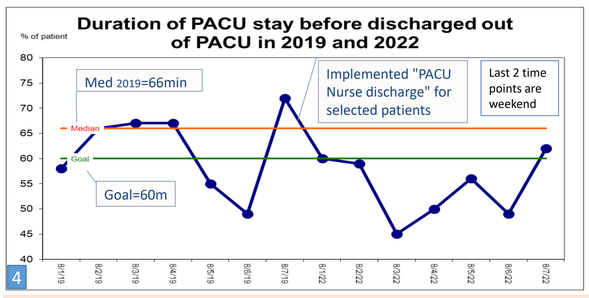

- **10% more** patients were reviewed with discharge order ready within 45 min (Med 2019 = 72%, Med 2022 = 82%).



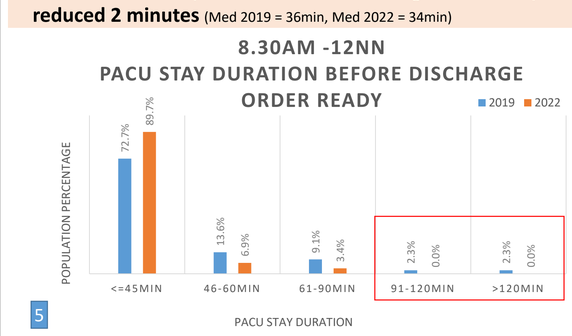

- **20% more** patients were discharged out of PACU within 60min (Med 2019 = 42%, Med 2022 = 62%).

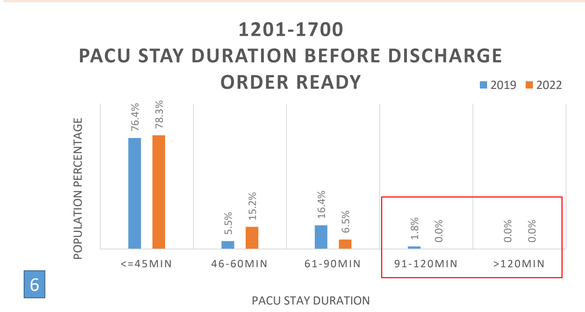



- Patients' PACU stay duration before discharge order ready **reduced 2 minutes** (Med 2019 = 36min, Med 2022 = 34min)

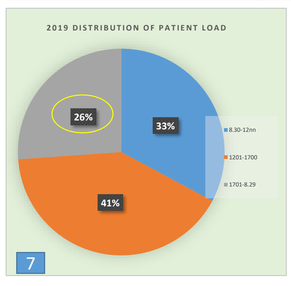


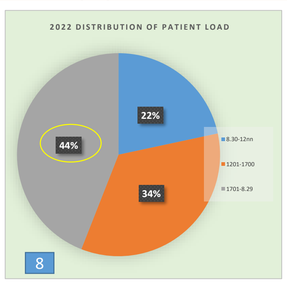

- Patients' PACU stay duration before being discharged out of PACU **reduced 10 minutes** (Med 2019 = 66min, Med 2022 = 56min)

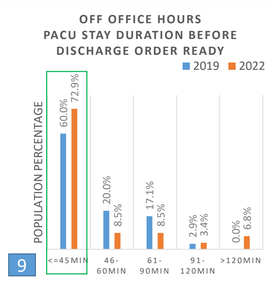


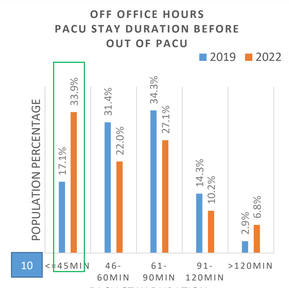




- Nurse-Led PACU Discharge freed up medical manpower to allow patients with complications to be attended to and treated early and subsequently discharged on time, which can be seen that more patients during office hours had discharge order ready within 60min and all had discharge order ready by 90min in 2022 (refer chart No. 5 & 6).

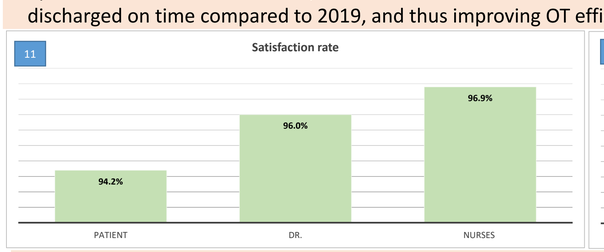


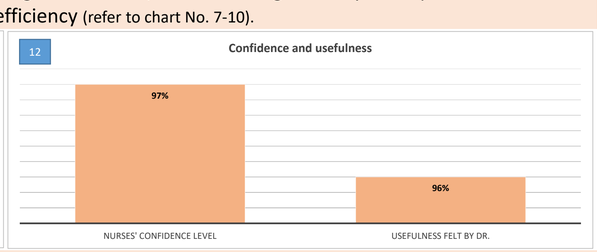




- Out of office hours patient caseload went up quite significantly in 2022. This is probably explained by the closure of OTs, so more elective operations were listed in the limited numbers of OTs and ended late into off office hours. Meanwhile, more emergency operations were listed. However, with our Nurse led PACU discharge established, there were significantly more patients who were discharged on time compared to 2019, and thus improving OT efficiency (refer to chart No. 7-10).




There were high satisfaction levels from the anaesthetists, PACU nurses and patients (refer to chart No. 11).
Nurses had a high confidence level in the new workflow with our workplace training and assessment (refer to chart No. 12).

## Learning Points

- Our Nurse-Led Discharge Protocol successfully increased the percentage of patients with discharge order ready by 10%.
- Effective training of the nurses increased their confidence and autonomy and so allowed them to proactively plan for timely discharge of patients out of PACU, successfully increasing the rate by 20%.
- Maintenance of the success of our protocol required continuous training and repeated cues from project champions.
- Our protocol empowered nurses to exercise their autonomy to manage less complex patients, allowing doctors to be able to focus on more complex patients, in order to achieve a shared goal of patient quality and safety.

Ng Teng Fong General Hospital

Jurong Community Hospital