

## Project Title

Nurse-Led Anaesthetic Discharge in Post Anaesthesia Care Unit in Day Surgery Centre.  
(NLAD)

## Project Lead and Members

Project lead: Dr Lye Soh Teng

Project members:

Adj A/Prof Edwin Seet, Senior Consultant & Head, Anaesthesia Dept

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## Organisation(s) Involved

Khoo Teck Puat Hospital, Yishun Health

## Project Period

Start date: 2018

Completed date: 2019

## Aims

The team's goal is to implement a hassle free surgery care path to improve post-operative care and discharge of surgical patients from Day Surgery Centre, Khoo Teck Puat Hospital

Objectives included:

- Reduce Bottlenecks during intraoperative transfers
- Lower healthcare cost
- Increase efficiency
- Optimise manpower by practicing top-of-license

- Reduce hassle to patient
- Maintain patient safety

In essence, the trained NLAD nurse will carry out the routine post-operative care and subsequently use the discharge checklist to assess patient's suitability and readiness to be discharged.

## Background

This is a collaborative project by Department of Anaesthesia and Day Surgery Nursing Team. The Nurse-Led Anaesthetic Discharge (NLAD) initiative aims to enhancing quality and care experience to our surgical patients by transforming care via training and empowering nurses to discharge post-surgery patients from Post-Anaesthesia care Unit (PACU).

It started in 2018 as a series of quality improvement initiatives on the various touchpoints of a patient's surgical journey. It involved workforce transformation and care-re-design.

This transdisciplinary project focused on patient's surgical journey in Day Surgery Centre. The team comprise of:

- Anaesthesia Team
- Nursing Team
- Operations Staff

Anaesthesia Team:

- Proposed evidence-based solutions and contributes in the training and curriculum of the DSC nurses
- Provide overall supervision over DSC Anaesthesia Nurses

DSC Anaesthesia Nurse:

- DSC Nurses are trained/certified to assess and discharge the patients under their care, under Nurse-Initiated Discharge, practising on top of their license
- Perform physician-extenders' role and discharge patients from recovery unit.

Operations Team:

- Coordinates within the team and among inter-departments

- Collates data used for statistical reporting on workload and analysis, supporting the project implementation & timeline.

Finance Staff:

- Provides cost-benefit analysis to help the team in making decisions and in measuring outcomes such as cost and manpower savings

## Methods

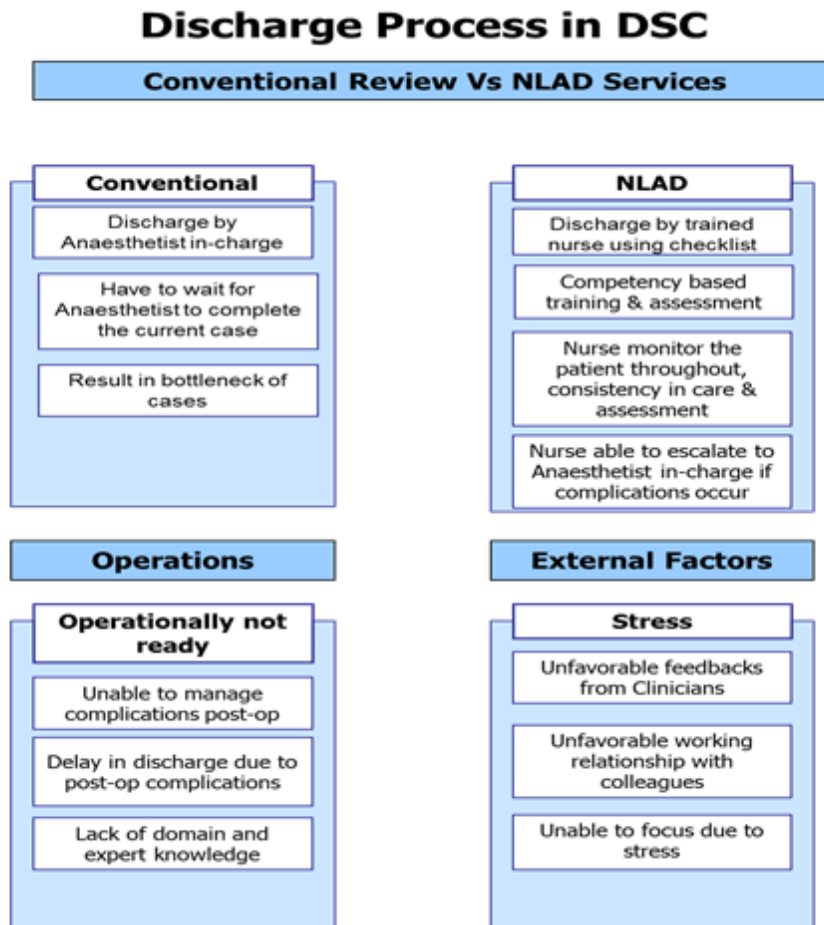
The team applied total organisational approach using lean 6-sigma methodology, with the aim of a sustainable, value-add & affordable Nurse-led Discharge service.

Lean 6-sigma DMAIC approach:

1. Define - stakeholder's meeting, collaborative leadership and influencing strategies to consolidate points for decision making. Two main phases include:
  - a. Pre-Operative Assessment and Ordering of Nurse-led services by Anaesthetist
  - b. Nurse-led Discharge of Post Anaesthesia Care Unit patients in Day Surgery Centre
2. Measure the ground problems by quantifying the workload, turnaround time (TAT) and costs involved. The team also gathered baseline data for further monitoring.
3. Analyse the gaps in the workflow transforming post-operative care using evidence-based, expert-endorsed inclusion & exclusion criteria. Tools used include Failure Modes & Effects Analysis (FMEA) and Affinity Diagram.

Nurse-led Discharge of Post Anaesthesia Care Unit patients Affinity Diagram

(Diagram)



Nurse-led Discharge of Post Anaesthesia Care Unit patients FMEA to manage risk

(Diagram)

Process step	Potential failure mode	Potential failure effects	Severity	Potential causes	Occurrence	Current control	Detection	RPN
Preop assessment and ordering of NLAD services by the doctor	Wrong ordering of cases for NLAD services	Patient has pain and operative complications	9	Junior doctor not complied with NLAD criteria	3	NLAD criteria informed to all doctors through clinical meetings. All cases reviewed by senior doctors	2	54
Financial Counselling by listing room nurse	NLAD cases sent to AC instead of POA clinic	Extra visit to AC and additional cost of tests	4		2	NLAD cases are seen at POA clinic	1	8
Monitoring of patients by NLAD trained nurse	Patient developing anaesthetic complications, become unfit for NLAD services	Patient has pain and operative complications	9	NLAD nurse with lower competency	2	Stringent accreditation, re-accreditation and continuous workplace-based learning	1	18
Recovery after surgery at Day Surgery PACU	Patient developing anaesthetic complications, become unfit for NLAD services	Compromise of patient safety	9	Change/deterioration of the patient's health	2	Senior Anaesthetist in-charge of the case called to review case in PACU	1	18

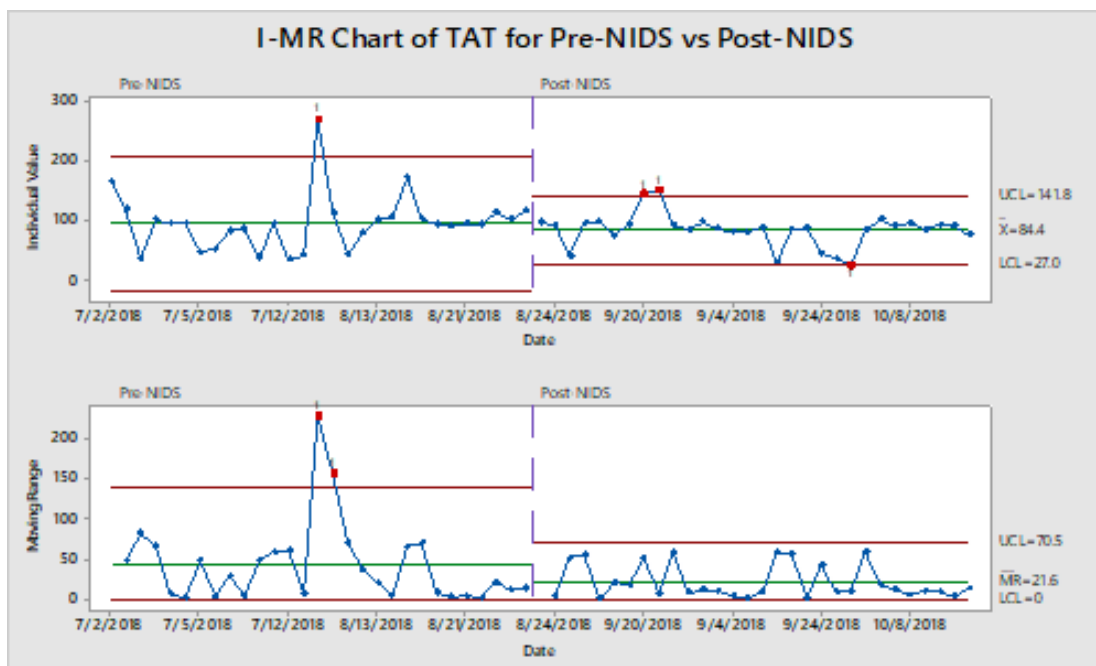
4. Improve with new processes for Surgical flow through:
  - a. Pre-Operative Assessment by Anaesthetist
  - b. Nurse-led Discharge of Post-Anaesthesia Care Unit
  
5. Control plan for sustainability:

- Process Standardization
- Cross Functional & Deployment flow charting
- Staff Orientation & Refresher Training
- Mistake proofing the process e.g. standardised screening protocols
- Run charts to monitor long term progress

## Results

The team collected baseline data and compared with pilot and implemented data.

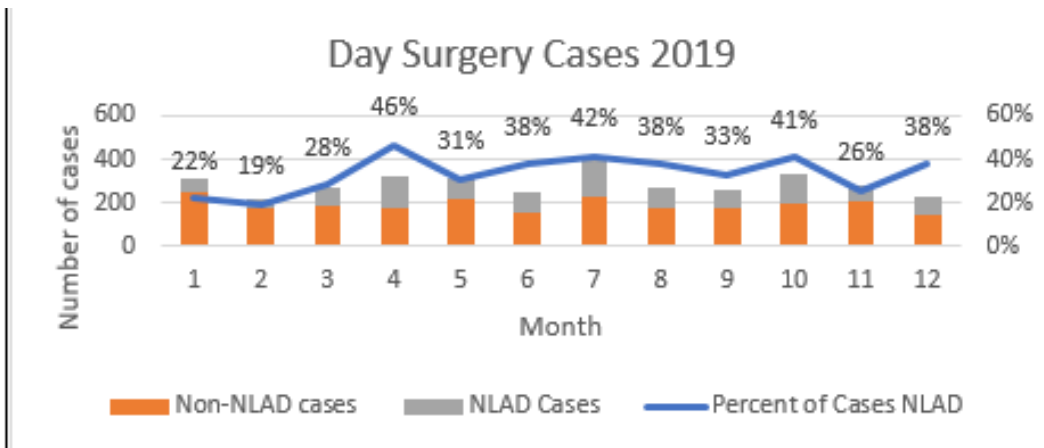
Pilot Data: In 2018, two months pre and post data were captured. The I-MR Chart below shows that there was a decrease in the TAT from 95.9 minutes (Pre-NIDS), down to 84.4 minutes, post-NIDS. T-test show that there was no significant difference with the decrease (as p-value is less than 0.05). Downward trend evident that with more data to be collected, the trend would most likely improve over time, after the pilot.



(Pre-Pilot data from July-August 2018; subsequently compared with Sept-Oct 2018)

The results and effect are shown as below:

Initiatives / Measurement & Impact	Hospital savings	Patient savings & care	Productivity
Nurse-led Discharge of Post Anaesthesia Care Patients in Day Surgery Centre	<b>Time-Savings:</b> Time needed to review patient is negated. <b>GA Time Savings: 40 Mins</b> <b>MAC Time savings: 10mins</b>	Care process is streamlined. <b>Patient Savings</b> Patients do not need to stay longer in recovery unit resulting in <b>faster discharges. Cost avoidance of additional charges to prolonged stay in recovery</b>	<b>Productivity savings</b> Anaesthetist do not need to come out from OT to review the case in PACU. <b>Total time savings for 3458 patients: 51,870mins = 36 days</b>



During pilot stage, 120 NLAD cases were done. After implementation, 3458 NLAD cases have been achieved and kept consistent. The average TAT time has further improved from 84.4 mins to 79.6mins.

Time Savings:

1. Anaesthetist Time

Time saved for Anaesthetist to discharge 1 patient : 15 mins

Total time savings for 3458 patients: 51,870mins = 36 days

2. Patients Time

Category	GA	MAC
Non-NID	167.31	41.86
NID	126.36	30.94

Average time savings (per Case)	40.95	10.92
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For GA cases, average time saved by using NLAD services is 40mins.

For MAC cases, average time saved by using NLAD services is 10mins.

The team successfully rolled out the initiatives to meet the objectives and benefiting about a total of 3458 patients per year with:

1. Improved Discharge Process

The streamlined process improved the lead times for post-anaesthesia care discharge by removing the need to be discharged by the Anaesthetist who is with another patient in the operating room. During the trial, no anaesthetic complication was encountered for patients discharged by accredited NLAD nurse. Patient's length of stay in the PACU is effectively reduced with efficient discharge process in place. Bottleneck at PACU stay is prevented.

2. Trained Staff

To date, 7 AU nurses were trained to function independently to carry out Nurse-Initiated Discharge under the supervision of the Consultant Anaesthetist.

The competency of the NLAD nurse is assessed and certified by the Senior Consultant Anaesthetist using a competency checklist upon the passing of this assessment.

3. Positive Feedback from stakeholders

Nurses verbalized that they felt confident in their clinical work and they are comfortable to carry out the discharge procedure. The Consultant Anaesthetist, who supervised the NLAD nurses, commented that the nurses were confident as there was no difference to the current care provided as compared previously except for giving the nurses autonomy to execute discharge. Positive feedbacks from all staff were mainly faster discharge process, and streamlining of the existing processes.

4. Reduced Delayed Patient Discharges

NLAD is not simply deciding a patient fit for discharge without consultation with relevant professionals. It is performed by the trained NLAD nurses who provide ongoing patient assessments to the patients throughout the PACU stay. NLAD empowers nurses to make discharge decision using official criteria, thus resulted in timely discharges. Often, delays in

discharges were caused by Anaesthetists who are unable to leave their current patients in the operating room. They can only discharge when they have staff relief or when they had finished their surgery. In this NLAD initiative, delayed discharges from PACU are reduced, patients from other operating rooms can also be transferred out to PACU timely as sufficient PACU beds will be available. This also promotes the smooth running of the operating list.

5. Empowering the Nurses

The strategy place emphasis on the development of current job roles and ways of working, reduction of reliance on other professionals, promotes seamless service integration, improved efficiency, with improved outcomes.

Nurse led discharge is also about

- a. Shaping the culture of taking responsibility for initiating and following through on the decision to discharge which may be carried out in partnership with medical colleagues and within clear protocols.
- b. If the patient does not fit the criteria, the trained nurse is empowered to escalate a medical review.
- c. This culture change of nurses taking ownership of driving patient discharge has real potential to make far reaching changes in future transformation in nursing care.
- d. Sustained improved care as enhanced quality of care provided by trained nurses

6. Cost Avoidance

- a. With streamlined workflow and reduced bottlenecks, additional PACU charges are avoided.

## Lessons Learnt

1. Lean 6 sigma DMAIC approach is a valuable tool to identify and address the weak points in a workflow. The team gained wider perspective on the areas that hindered better service to patients.
2. Challenging the norm in a process, e.g. empowering and up-skilling nurses to work on top-of-their-licences and providing holistic care to patients. Quality of care improved with focused training.



3. In alignment to 3T10A, as part of Campus Flow, this initiative helps to smoothen flow of patients through the campus and improve the overall discharge process. This hassle free process will also benefit upcoming Acute and Elective Service Lines that may come through Day Surgery Centre.
4. Cialdini's 6 Principles of Influence that allows the team to engage and manage its stakeholders:
  - Commitment & Consistency - common goal to improve patient care quality & efficiency
  - Reciprocity – acknowledgements
  - Social proof - peer pressure, set a “gold” standard
  - Authority - good repute, seniority, protocol-based management
  - Liking - good collegial & social relationship
  - Scarcity - limited & costly OT slots, manpower, patients

### Conclusion

This trans-disciplinary project involves the integration & coordination to become a standardised care path, communication is done among team members founded on:

1. Mutual respect & professionalism
2. Collaborative approach & collective leadership
3. Value-add, patient-centric, coordinated care

The team also adopts having a C.A.R.E. mind-set:

- Committed to improving patient care;
- Aspiring to new care models and management paradigm;
- Revolutionary by going beyond the norm; and
- Engaging collaborators as a team to ensure the project comes to fruition.

In conclusion, the Nurse-Led Discharge is beneficial as it:

- contributed to the reform and transformation of nurse practice in healthcare
- Optimised resource utilization
- Increased productivity & reduces cost & improves safety
- Improved the quality of discharge planning and the patient experience without compromising quality & safety
- achieved win-win conditions of increased value for money and effective patient care and improved professional knowledge and skills in the long run

### **Project Category**

Workforce Transformation

### **Keywords**

Workforce Transformation, Improvement Tool, Staff Training, Khoo Teck Puat Hospital, Lean 6 Sigma DMAIC, Anaesthetic Discharge, Post-Anaesthesia Care, Affinity Diagram, Failure Modes and Effects Analysis

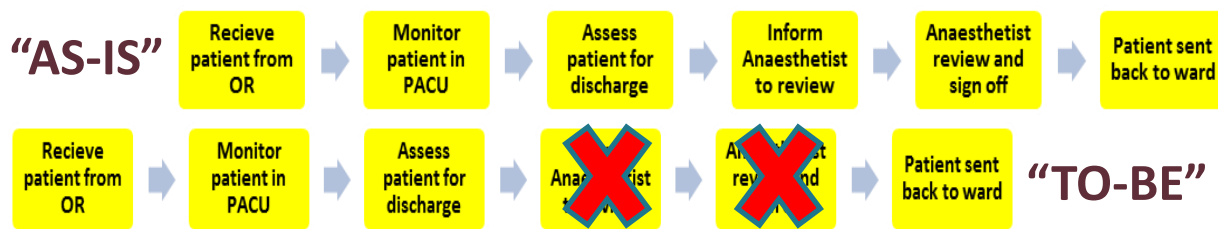
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# Nurse-Led Anaesthetic Discharge in Post Anaesthesia Care Unit in Day Surgery Centre

A collaborative project by Anaesthesia Department and Day Surgery Centre. The **Nurse-Led Anaesthetic Discharge (NLAD)** initiative aims to utilize a **trained nurse to provide post-operative anaesthetic care & provide autonomy for them to discharge patient under their care**, under protocol guidance & supervision of the Anaesthetist.



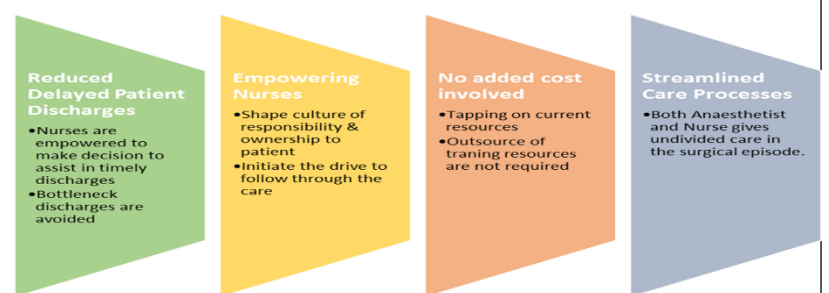
Post-op, Anaesthetist selects suitable patients & indicate in the system. NLAD Trained Nurse carries out post-care instructions & discharge according to criteria

NLAD nurses are trained in **Basic Modules 136hours & Specific structured curriculum of 13 hours** with E-learning as yearly competency.

**Results achieved: Patient's stay in the PACU is effectively reduced**

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**Project Impact**



**Sustainability** is achieved via:

<b>Process Standardization</b>	<ul style="list-style-type: none"> <li>Standardized Training Structure</li> <li>Standardized workflow</li> </ul>
<b>Focused Improvement</b>	<ul style="list-style-type: none"> <li>Team members empowered to identify &amp; resolve problem(s) themselves. Problem-solving can be shared retrospectively for case-learning.</li> </ul>
<b>Mistake Proofing the Process</b>	<ul style="list-style-type: none"> <li>Standardised Operating Procedures</li> <li>Standardised Training Methodology</li> <li>Simulation Exercises</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>Control Charts to monitor progress</li> </ul>

**Conclusion**

**The Nurse-led Discharge is safe, effective and sustainable discharge model for post surgery patients in Singapore healthcare context**

<sup>1</sup>Lai, F.W.; <sup>1</sup>Koh, S.L.; <sup>1</sup>Leong, A.; <sup>1</sup>Chan, Y.S.; <sup>1</sup>Shao, M.; <sup>2</sup>Seet, E.; <sup>2</sup>Lye, S.T.  
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