Enhanced Recovery After Spine Surgery (ERASS) - Reducing Inpatient Length of Stay After Lumbar Spinal Fusions

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Mission Statement

To reduce the inpatient length of stay for patients undergoing 1 or 2 level elective spinal fusion surgery from 8.9 days to ≤ 7 days over a 6-month period with a target of 90% of patients achieving this (57.8% of patients at baseline).

Team Members

	Name	Designation	Department
Team Leaders	Dr Yap Ming Quan Wayne	Consultant	Orthopaedic Surgery
	Ms Wang Dan	Nurse Clinician	Specialty Nursing
Team Members	Dr Nishal Kishinchand Primalani	Consultant	NNI Neurosurgery
	Dr Leong Kwong-Ming	Associate Consultant	Anaesthesiology, Intensive Care & Pain Medicine
	Emily Ang Liling	Nurse Clinician	NNI Neuroscience Nursing
	Petrina Tang Jia Li	Senior Physiotherapist	Physiotherapy

Sponsors:

- Adj Asst Prof Muhammad Farhan B Mohd Fadil (Head & Senior Consultant, Orthopaedic Surgery)
- Adj A/Prof Oh Yoong Leong Jacob (Senior Consultant, Orthopaedic Surgery)

Mentor: Dr Jennifer Ting Sye Jin (Senior Consultant, General Medicine)

Evidence for a Problem Worth Solving

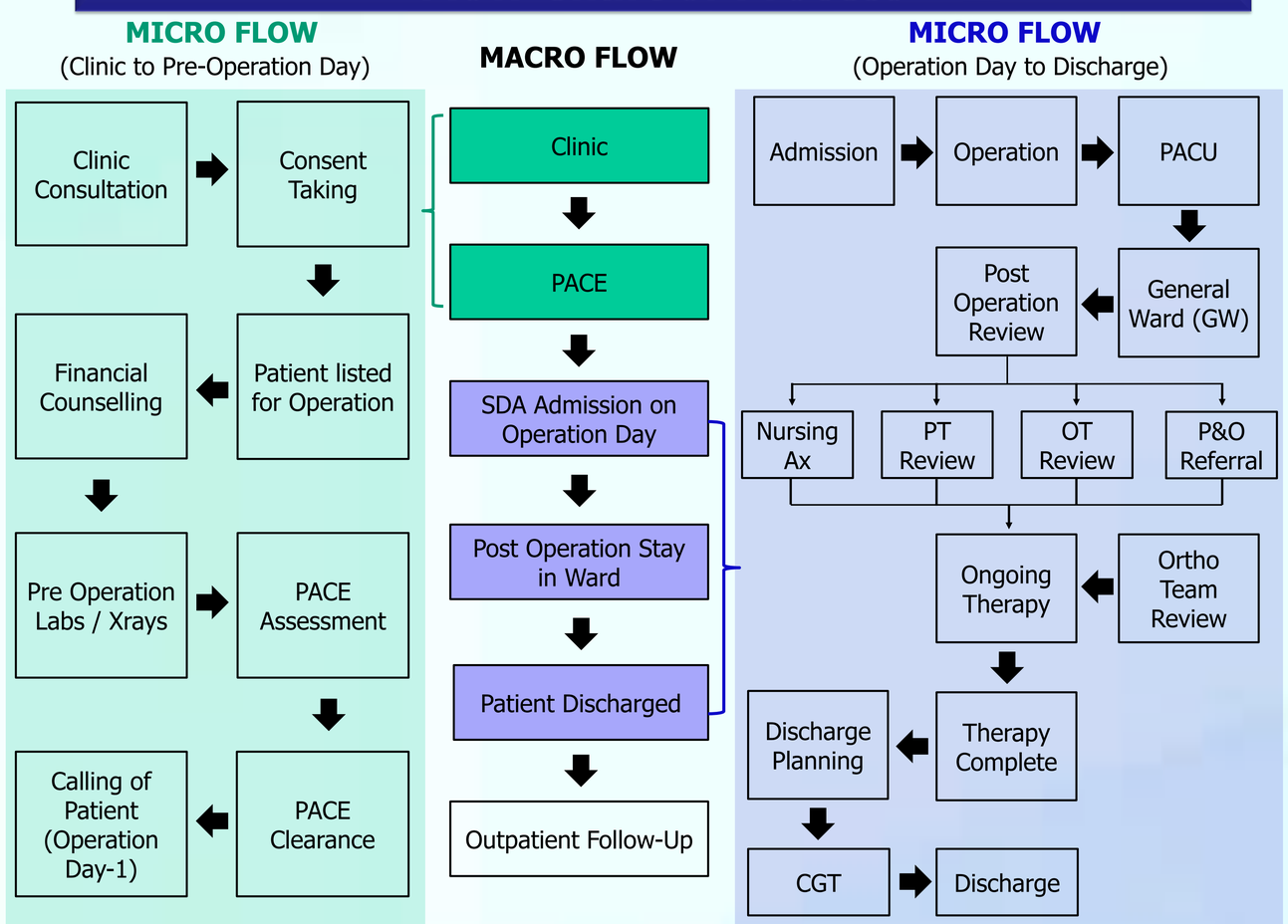
1. Clinical Quality Indicators

MOH Value Driven Outcomes data from 2014 to 2022 showed our quality indicators (ALOS) for Single and Double Level Spinal Fusion Surgery in TTSH lower compared to the national averages

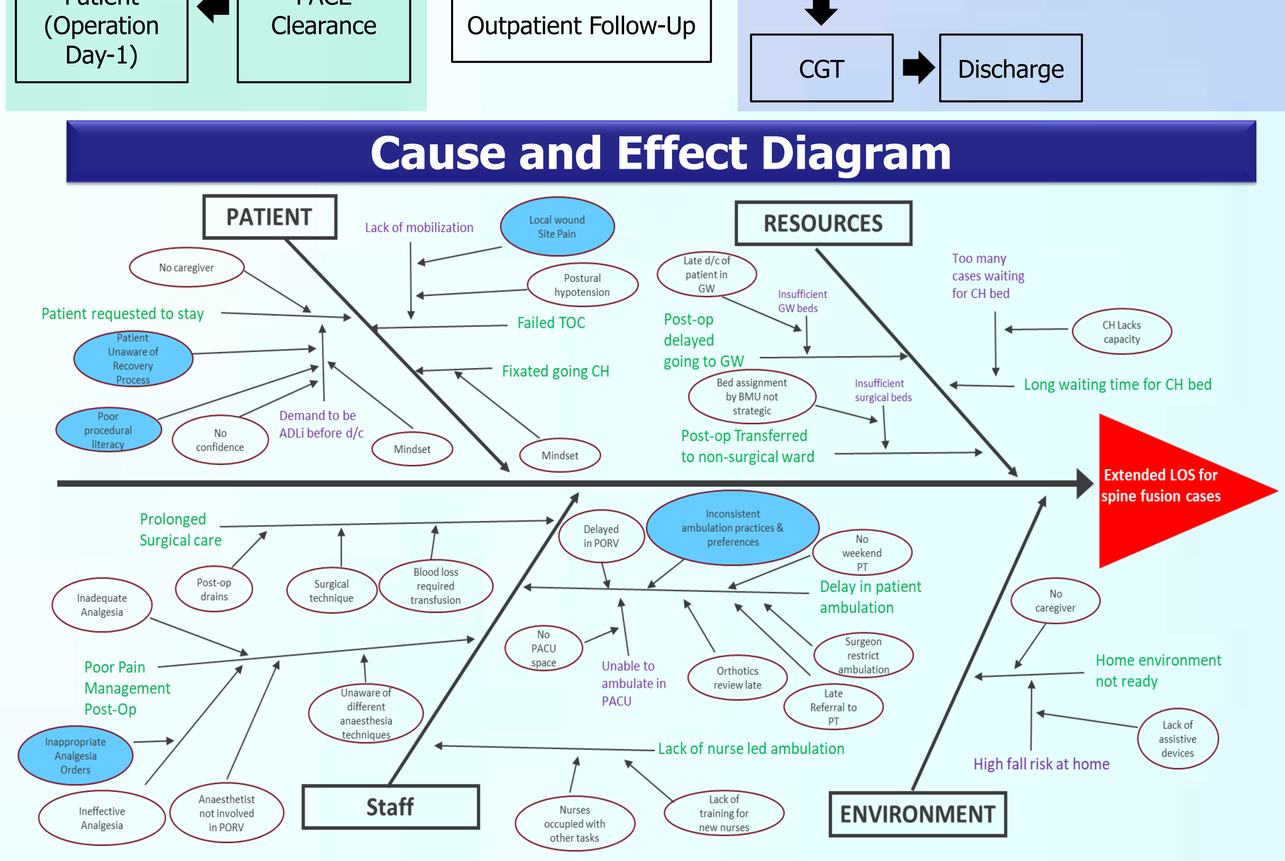
2. Adopting ERASS Practice Guidelines to Local Context

- Many past practices in perioperative spine care are now unnecessary or outdated and lack uniformity amongst surgeons
- ERASS practices has shown better outcomes overseas and has not been implemented in Singapore for Spine Surgery

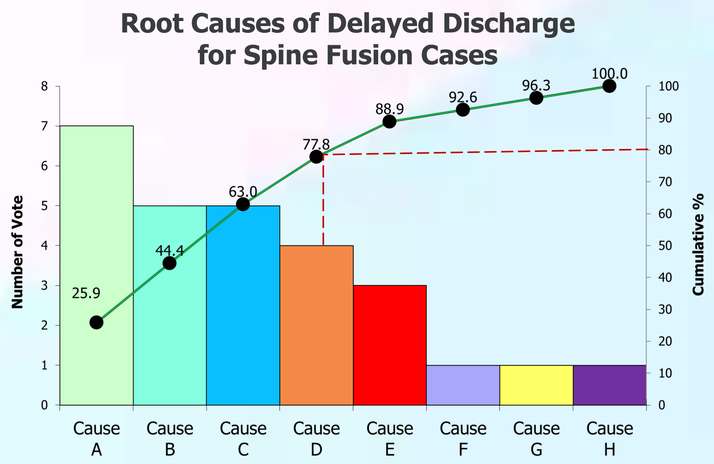
Flow Chart of Process



Cause and Effect Diagram



Pareto Chart



A	Inappropriate Analgesia Orders
B	Local Wound Site Pain
C	Staff (Surgeon/Physiotherapist)s have inconsistent ambulation practices & preferences
D	Patient Unaware of Recovery Process
E	Poor procedural literacy
F	Lack of training for new nurses
G	Unaware of different anaesthesia techniques
H	Late referral to Physiotherapist

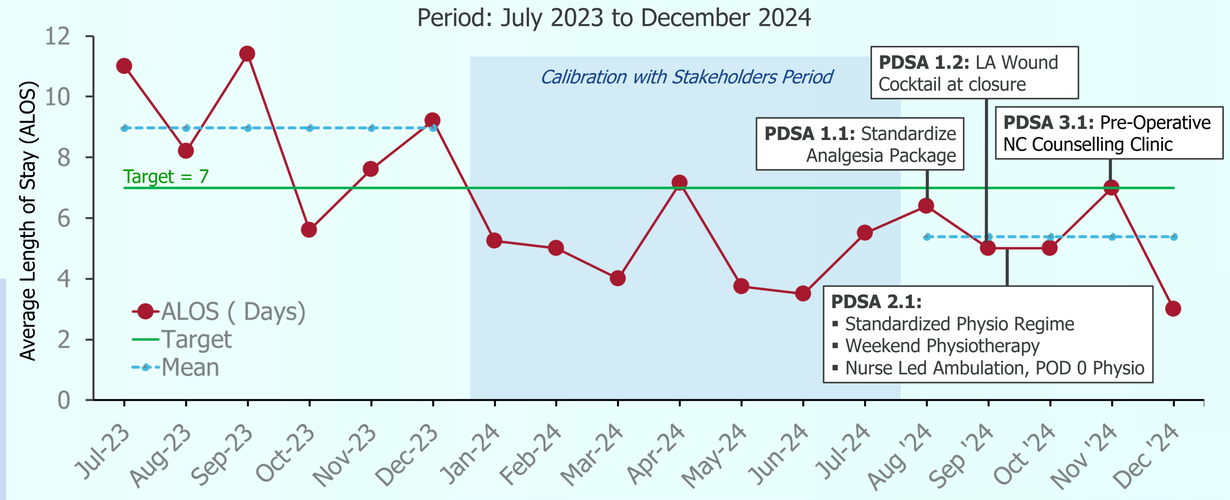
Implementation

Root Cause	Intervention	Implementation Date
Cause A: Inappropriate Analgesia Orders **Cause B:** Local Wound Site Pain	PDSA 1.1: Standardize Analgesia Protocol PDSA 1.2: LA Wound Cocktail at closure	5 Aug 2024 13 Sep 2024
Cause C: Staff (Surgeon/Physiotherapist)s have inconsistent ambulation practices & preferences	PDSA 2.1: ▪ Standardized Physio Regime ▪ Weekend Physiotherapy (PT) ▪ Nurse Led Ambulation, POD 0 Physio	30 Sep 2024
Cause D: Patient Unaware of Recovery Process **Cause E:** Poor Procedural Literacy	PDSA 3.1: Pre-Operative Nurse Clinician (NC) Counselling Clinic	18 Nov 2024

Results

Average Length of Stay (Days)

Period: July 2023 to December 2024



Pre-Intervention Mean = **8.97 days**

Percentage of Patient who achieved Post-Op LOS <=7 Days increased from **57.8% to 87.5%**

Post Intervention Mean = **5.38 days**

Cost Savings

	Pre-Intervention	Post-Intervention
Average Length of Stay (Per Patient)	8.97 days	5.38 days
Average Length of Stay Saved (Per Patient)	8.97 - 5.38 = **3.59 days**	
Cost of Inpatient Stay (Per Patient)	8.97 x 1046 = $9,382.62	5.38 x 1046 = $5,627.48
Cost Savings (Per Patient)	($9,382.62 - $5,627.48) = **$3,755.14**	
Assume No. of Patients for Spinal Fusion, 1 and 2 level fusion in 1 Year = 56		
Total Length of Stay Saved (Annualized)	3.59 days x 56 = **201 days**	
Cost Savings (Annualized)	$3,755.14 x 56 = **$210,288**	

Note: Unit Cost for Inpatient Stay Per Day Per Patient (Private Rate) = $1,046

Lessons Learnt

1. Multidisciplinary approach is essential in reducing ALOS for lumbar spine fusions
2. Communication amongst staff is key to close and identify gaps early
3. Intangible benefits from running such a program - greater shift toward minimally invasive surgeries, better nursing care.
4. Getting surgeons to modify their practice and agree to a standardized workflow is challenging

Strategies to Sustain

1. Show positive results to reinforce change; Reward for shortest ALOS.
2. Run consistent education campaigns for allied health & nurses so that they are aware of the protocols in place
3. Identify patients with extended ALOS and review the workflow processes that can be improved