

# Enhanced Recovery After Surgery (ERAS) programme for Total Knee Replacement patients

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## Background

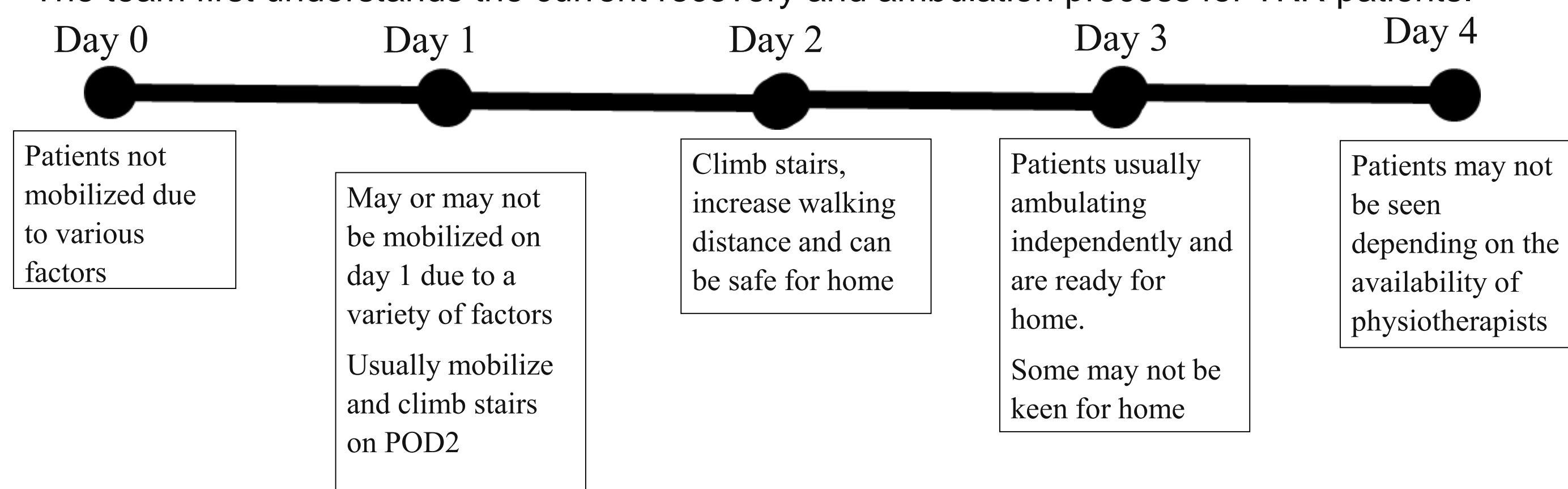
In SGH, the length of stay of patients after Total Knee Replacement (TKR) is 4-5 days. Internationally, outpatient arthroplasty services have allowed patients to be discharged home on Post-operative Day (POD) 0 or 1. This has been made possible by advances in preoperative patient education, improved perioperative multimodal pain management strategies and Enhanced Recovery after Surgery (ERAS) programmes. It has been demonstrated that early mobilisation after TKR reduces length of stay. Currently, TKR patients at SGH are assessed by the physiotherapist on POD1 for ambulation and rehabilitation and discharged after 4-5 days. This project aims to decrease the length of stay post TKR, enhance utilisation of hospital beds, reduce hospitalisation-related costs for patients and the hospital and decrease complications related with prolonged hospital stay, as part of SGH's goal towards value-driven healthcare.

## Mission Statement

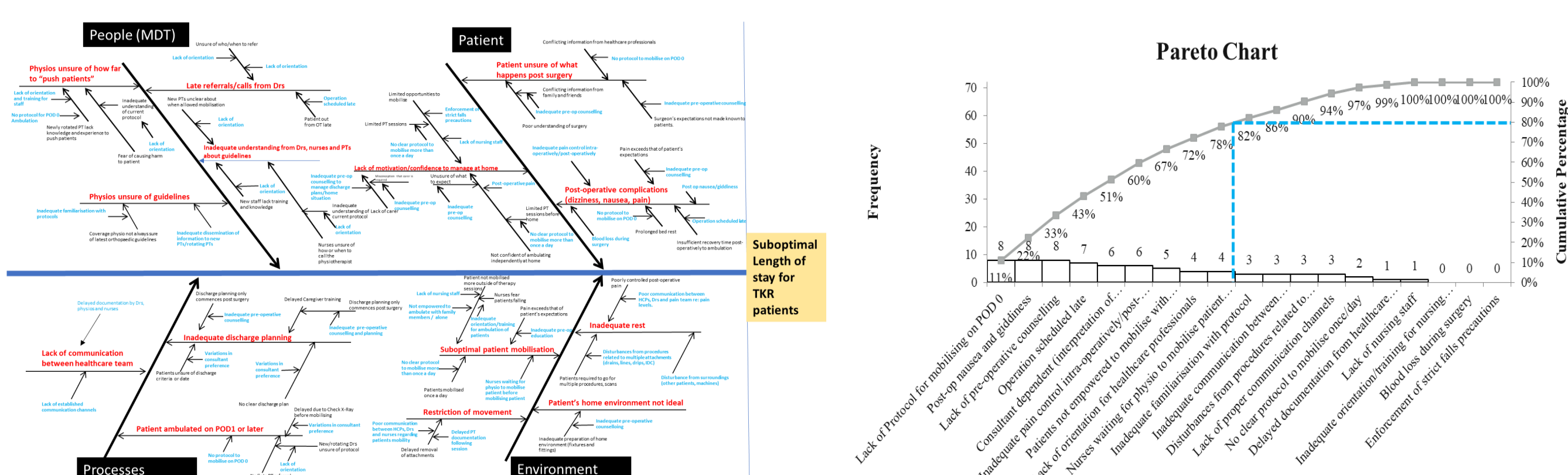
To decrease length of stay from for Total Knee Replacement (TKR) patients in SGH from a median of 4 to 3 days within 6 months.

## Analysis of Problem

The team first understands the current recovery and ambulation process for TKR patients.



The team used the fishbone diagram to brainstorm root causes and did two rounds of multi-voting to prioritize the final root causes.



The team then brainstormed for solutions based on the 9 root causes that were prioritized via multi-voting using Pareto Chart. Using time, budget and feasibility as our main criteria for evaluation, we implemented solutions that meet all 3 criteria.

Final Root Causes	Primary Drivers	Change ideas	Can be implemented in 6 months?	Budget?	Feasible?
Lack of protocol for mobilizing on POD 0	To implement a new ERAS protocol for POD 0 ambulation for selected patients with clear discharge goals/time frame	Work with surgeons to implement a protocol that is applied to suitable ERAS patients. Ambulation on Day 0 and 1. Home physiotherapy in 1 week, nursing visit in 2 weeks and outpatient physio in 3 weeks	Yes	Yes	Yes
Variability in consultant preferences					
Lack of pre-operative counselling	To improve patient's expectations with regards to what to expect after surgery	Provide pre-op education to set patient's expectations and allow patients and family to prepare well for surgery	Yes	Yes	Yes
Lack of orientation for healthcare professionals	To improve orientation programmes for each healthcare professionals	Incorporating information on the ERAS programme as part of orthopaedic house officers' briefings, physiotherapy afterhours briefings and for new nurses' orientation	Yes	Yes	Yes
Patients not empowered to mobilise with their family members or on their own	To empower patients to mobilise with their family members or on their own	Give patients confidence knowing that they will have adequate follow-up at home on discharge	Yes	Yes	Yes
Post-operative nausea and giddiness	To reduce risk of post-operative nausea and giddiness	Anti-emetics given and no opioids for ERAS patients to give them the best chance to ambulate on POD 0.	Yes	Yes	Yes
Inadequate pain control intra and post-operatively	To control intra and post-operative pain	Surgical techniques to minimize muscle dissection and peri-articular injections given.			
Operation scheduled late	To ensure that patients are given the best chance of participating in their therapy sessions on the same day of surgery	Listing patients under the ERAS programme as the earliest patients in the operating lists and working with the bed management unit to ensure that beds are assigned on time	Yes	Yes	Yes
Nurses waiting for Physiotherapist to start ambulating	To ensure that TKR patients are prioritized for Physiotherapy session	Standardize the practice for nurses and physiotherapists to prioritize TKR patients for physiotherapy	Yes	Yes	No (There may be ongoing/more urgent cases to attend to)

## Implementation

The finalized solutions were implemented in Aug 2019. Based on staff feedback, the team also subsequently implemented additional measures to further enhance the ERAS programme and improve the cooperation between clinical teams.

### Initial Phase

1. Drawing up and implementing an ERAS protocol
2. Briefings for new house officers
3. Orientation given for physiotherapists and nurses
4. Incorporating pre-operative physiotherapy and patient education
5. Standardize intra-operative procedures/protocol by prescribing anti-emetics, withholding opioids, minimizing muscle dissection and providing peri-articular injections for ERAS patients

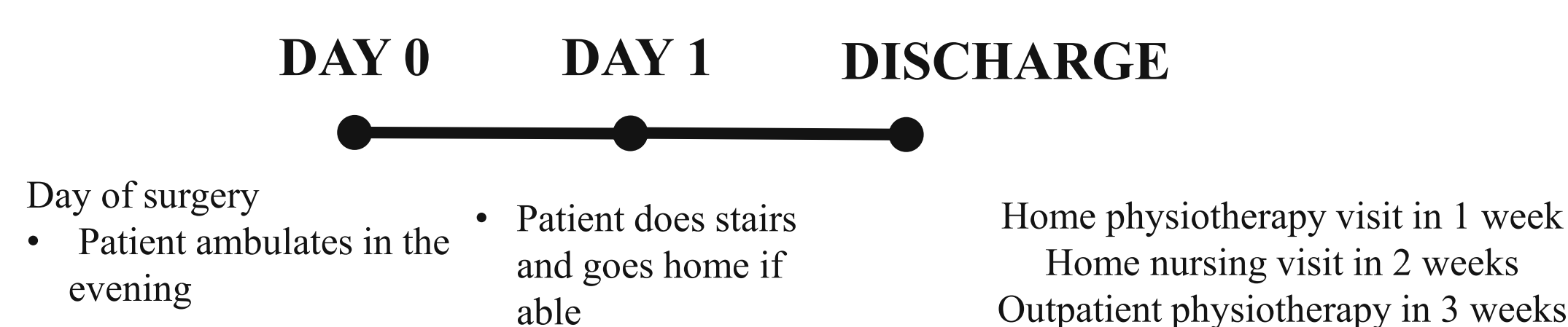
### Revamp

1. Confirming patients' ERAS status using emails from the business office
2. Use of dedicated Tiger Connect group chats to communicate
3. Implementing same-day discharges at ASC

### Sustainability Plans

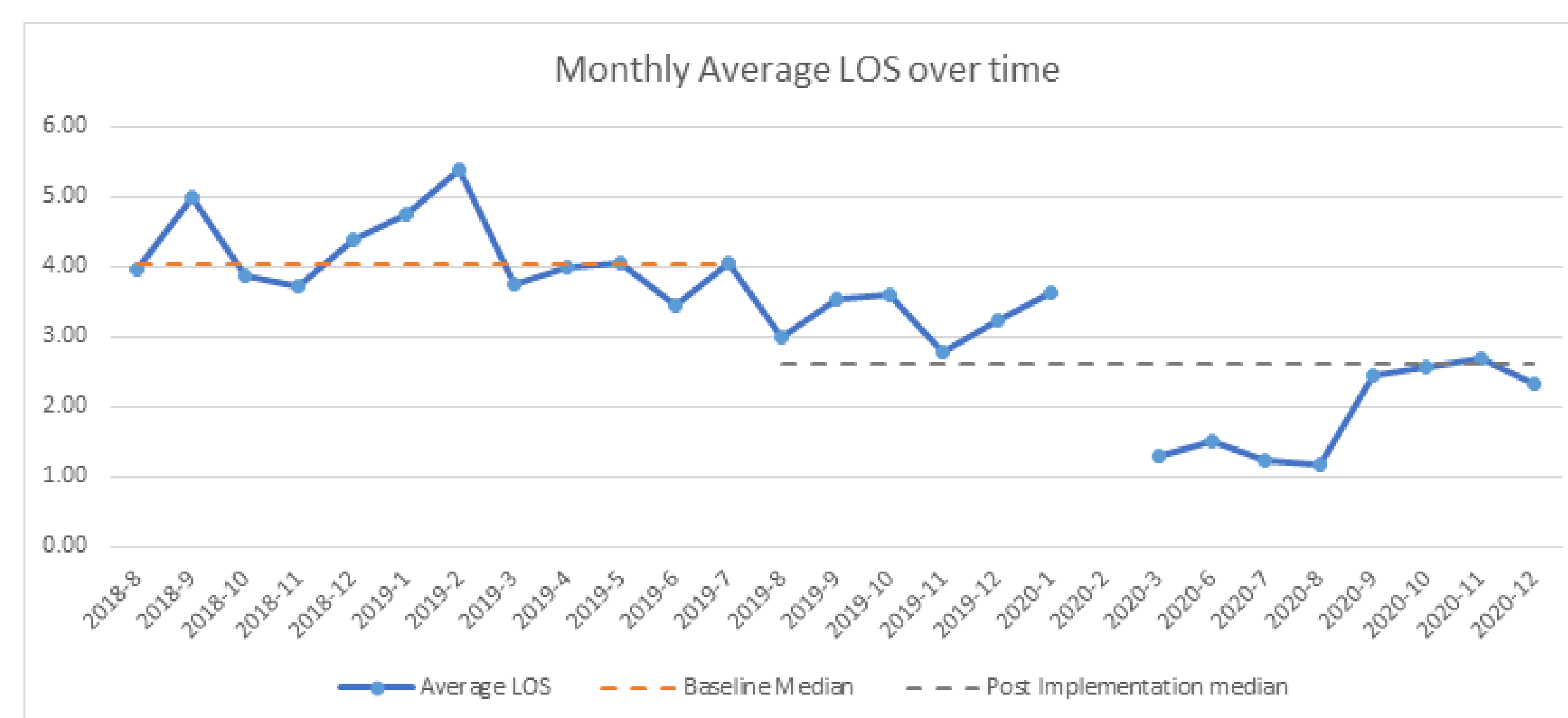
1. Constant feedback between healthcare professionals
2. Continue orientation to house officers, physiotherapists and nurses
3. Expansion of programme to other surgeons
4. Working with community partners to expand the service

### Post Intervention Patient Discharge Process



## Results

Based on data collected for 470 patients pre-intervention and 605 patients post-intervention, there was a statistically significant difference in the median LOS after the implementation of the ERAS programme, with a reduction of LOS from 4.03 days to 2.63 days, which has exceeded our goal of reducing the LOS by 25%.



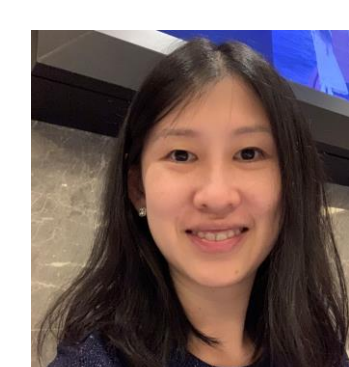
Data from February 2020 to June 2020 was limited due to the height of the COVID-19 pandemic during Singapore's Circuit Breaker period. February 2020's data has been excluded as it is an anomaly because there was only one patient who was waiting for community hospital and hence was removed from the ERAS programme. Following the gradual easing of measures in July, we saw a sharp increase in number of surgeries but this did not compromise the LOS as the numbers fared relatively similar compared to the rest of the months. There was a statistically significant increase in knee flexion range of motion (66.5 to 86.0 degrees  $p < 0.05$ ) and a statistically significant increase in knee extension range of motion (1.50 to 3.60 degrees  $p < 0.05$ ) as well, showing that patients are able to regain mobility better through the intervention.

Assuming TKR patients are warded on typical SGH B1 Bed, the 1.4 bed days saving per patient amounts to an estimated savings of \$126,720 per annum based on an average of 30 patients per month.

We have clearly shown that the implementation of an ERAS programme is not only beneficial for the hospital in terms of cost-savings but also allows patients to recuperate in the comfort of their own home.

## Sustainability Plans

1. Flagging up patients who may not be suitable for the ERAS programme pre-operatively.
2. Quarterly meetings and discussions on how to further enhance the ERAS experience for patients.
3. Expanding the programme to include community therapists and nurses to reduce the strain on inpatient services.
4. Rolling out of ERAS programme to other surgeons now that a protocol has been developed.



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