

Project Title

Care Re-designed - Decrease usage of inpatient beds by increasing percentage of day surgeries

Project Lead and Members

Project Lead: Stephanie Teo

Project Members: A/Prof Cheah Wei Keat, Josephine Wong

Organisation(s) Involved

Ng Teng Fong General Hospital

Healthcare Family Group(s) Involved in this Project

Medical; Nursing; Healthcare Administration

Applicable Specialty or Discipline

Department of General Surgery & Orthopaedic Surgery

Project Period

Start date: Jul 2017

Completed date: Nov 2019

Aim(s)

To re-design care to decrease the usage of inpatient beds by increasing percentage of day surgeries

Background

See poster appended/ below

Methods

See poster appended/ below

Results

See poster appended/ below

Lessons Learnt

- Systematic analysis and intervention selection using QI tools were important in prioritising interventions that are impactful when well-implemented.
- Stakeholders' buy-in is crucial for implementation and support by senior leadership is just as important - this project was successful as it was led by the (former) CMB.
- Integrating interventions as part of routine work helped to make it "stick".

In retrospect, one thing that we might have done differently would be to space out the implementation of first 6 interventions, so that the individual impact of each intervention can be assessed.

Conclusion

See poster appended/ below

Additional Information

Large scale transformative projects to re-design care can be successfully implemented with use of QI tools, stakeholders' buy-in and senior leadership support. Interventions "stick" only when they become part of routine work.

Complex, multi-disciplinary projects like this takes years to implement and bear permanent fruits. The years of hard work is worth it, so do be patient!

Project Category

Care & Process Redesign

Value Based Care, Length of Stay, Quality Improvement, Workflow Redesign

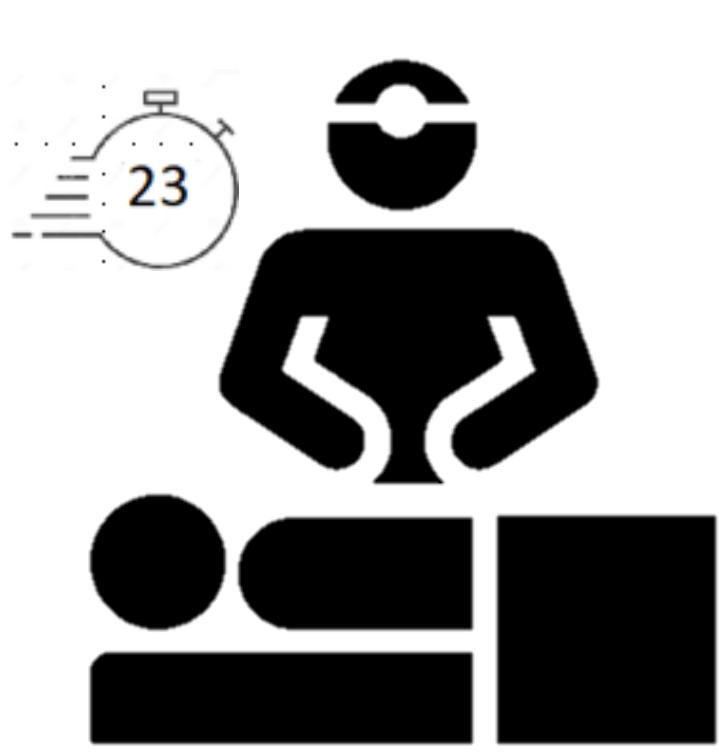
Keywords

Decreasing Inpatient Bed Utilisation

Name and Email of Project Contact Person(s)

Name: Stephanie Teo

Email: stephanie_teo@nuhs.edu.sg



CARE RE-DESIGNED - DECREASE USAGE OF INPATIENT BEDS BY INCREASING DAY SURGERIES

MEMBERS: MS STEPHANIE TEO, MS JOSEPHINE WONG, A/PROF CHEAH WEI KEAT

Define Problem & Opportunity

PROBLEM

Short-staying (0-2 days) surgical patients were occupying inpatient beds which is a higher cost facility compared to Day Surgery (DS) / DS23 facilities, & was contributing to high inpatient bed occupancy rate (BOR) & bed crunches in NTFGH.

OPPORTUNITY

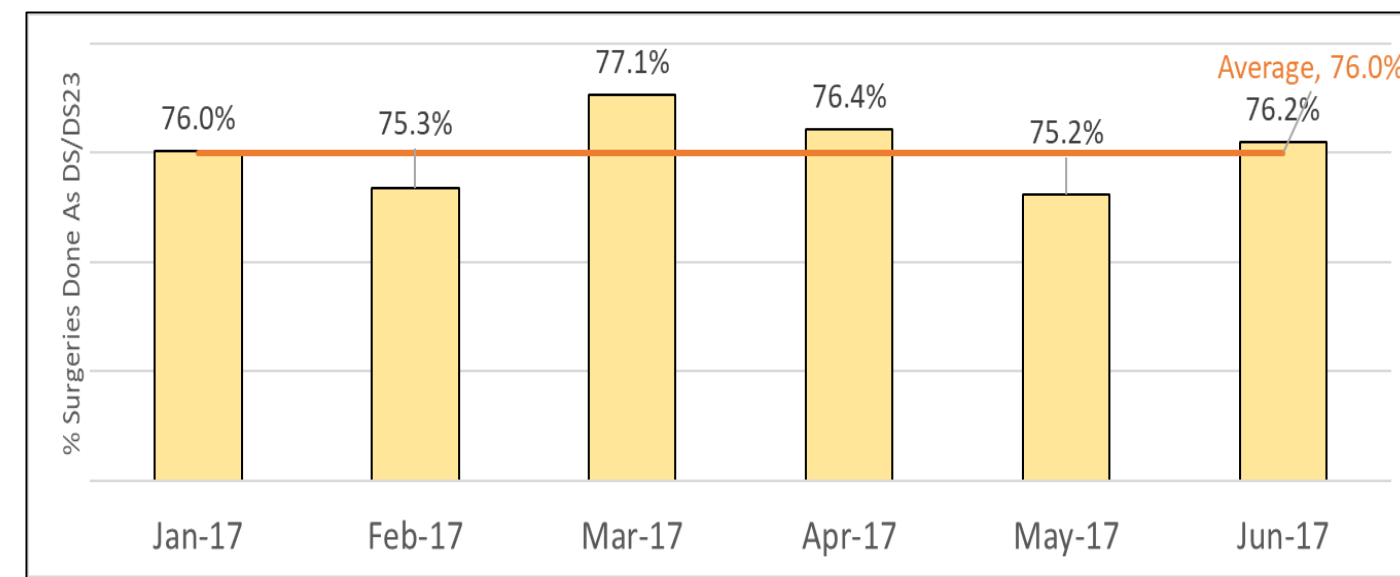
These patients might be suitable for day surgery, either for same day discharge (DS) or discharge within 23 hours (DS23). They would benefit from shorter hospital stays & lower patient bills. For the hospital, this translates to cost-savings. More importantly, every opportunity to right-site to DS/ DS23 facilities frees up at least 1 inpatient bed-day, which allows another patient to access inpatient care.

Set Aim, Establish Measure, Form Team

Using the IHI Model for Improvement, the aim was set, baseline measurement established, & team formed.

ESTABLISH BASELINE MEASURE (Ref: Figure 1)

The % of surgeries done as DS/DS23 for 6 months were plotted. It averaged at 76%. This formed the baseline.



(Fig.1) Baseline measure

SET AIM

Using the baseline measurement as a reference, the aim of "increase day surgeries by 5% (from 76% to 81%) in 2 years was set. With monthly surgical load of 1,000 cases on the average, a 5% increase would free up 600 inpatient bed-days per year.

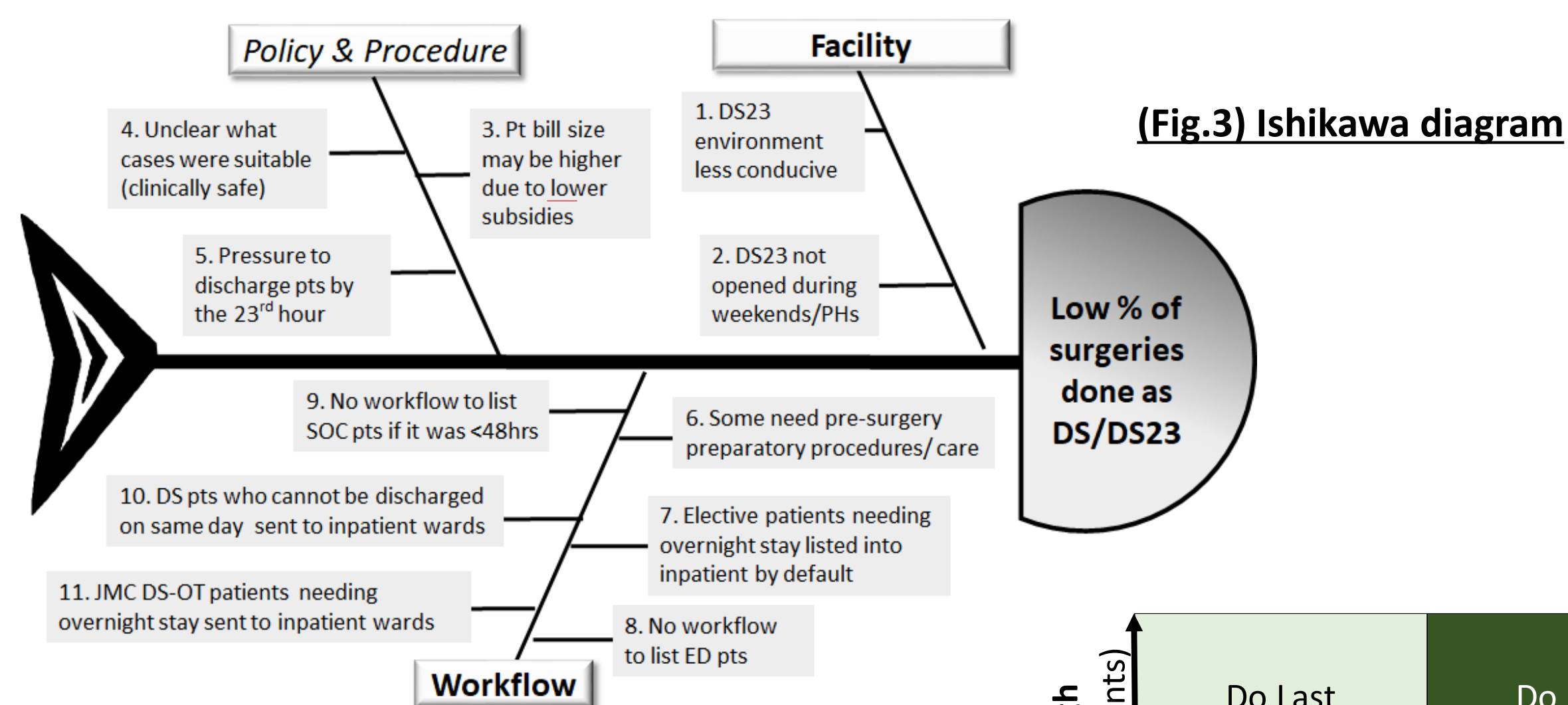
FORM TEAM (Ref: Figure 2)

A project of this scale involved many departments. Stakeholders from diverse backgrounds were identified & recruited as associate team members. During the project's active phases, the team members met regularly, with each member contributing his expertise & experience enthusiastically towards the projects aim.

Job Family	Department	Team Members
Clinical (Doctors)	CMB Office	A/Prof Cheah Wei Keat (Former CMB)
	General Surgery	A/Prof Philip Lau, Dr Heng Chin Tiong, Dr Jesse Hu, Dr Cheong Chern Yuen & all Doctors
	Orthopaedic Surgery	A/Prof Fareded Kadga, Dr Audrey Tan, Dr Lim Jin Xi & all Doctors
	Anaesthesia	Dr Yap Sau Hsien, Dr Chia Chui Ping & all Doctors
	ENT Head & Neck Surgery	A/Prof Raymond Ngo & all Doctors
	Ophthalmology Doctors	Dr Lennard Thean & all Doctors
	Dental	A/Prof Adrian Yap & all Doctors
	Gastroenterology	Dr Wong Guan Wee, Dr Qurishi Ahmed & all Doctors
	Cardiology	A/Prof Pipin Kojodajojo & all Doctors
	OT Committee	A/Prof Harvinder Raj & committee members
Nursing	Nursing (Ambulatory)	ADN Jolyn Tan, NC Wang Lili, ANC Meng Zhuyun & all Nurses
	Nursing (SOC)	NC Tang Min Yee, ANC Lim Li Lian, NC Manjinder Kaur & all Listing Nurses
	Nursing (Operating Theatre)	ADN Joanna Tan, SNM Kathie Teo & all Nurses
	Specialty Operations	Ms Fione Gun, Ms Evelyn Low, Ms Renee Tan & all who support participating clinical departments
Administrative & Ancillary	Emergency Department	Ms Joyce Loke, Ms Janna Goh & all in ED
	Medical Informatics	Ms Nor'ain Nordin, Mr Felix Lim, Mr Rayner Koh & teams
	Admissions Office	Mr Goh Yee Hwee & team
	Business Office	Ms Goh Bee Bee & team
	Clinical Operations (Former: Specialty Ops + Clin Projects)	Ms Chee Thong Gan
	Clinical Projects (MA)	Ms Stephanie Teo, Ms Josephine Wong, Ms Michelle Fong

(Fig.2) Associate team members (as at Aug 2021)

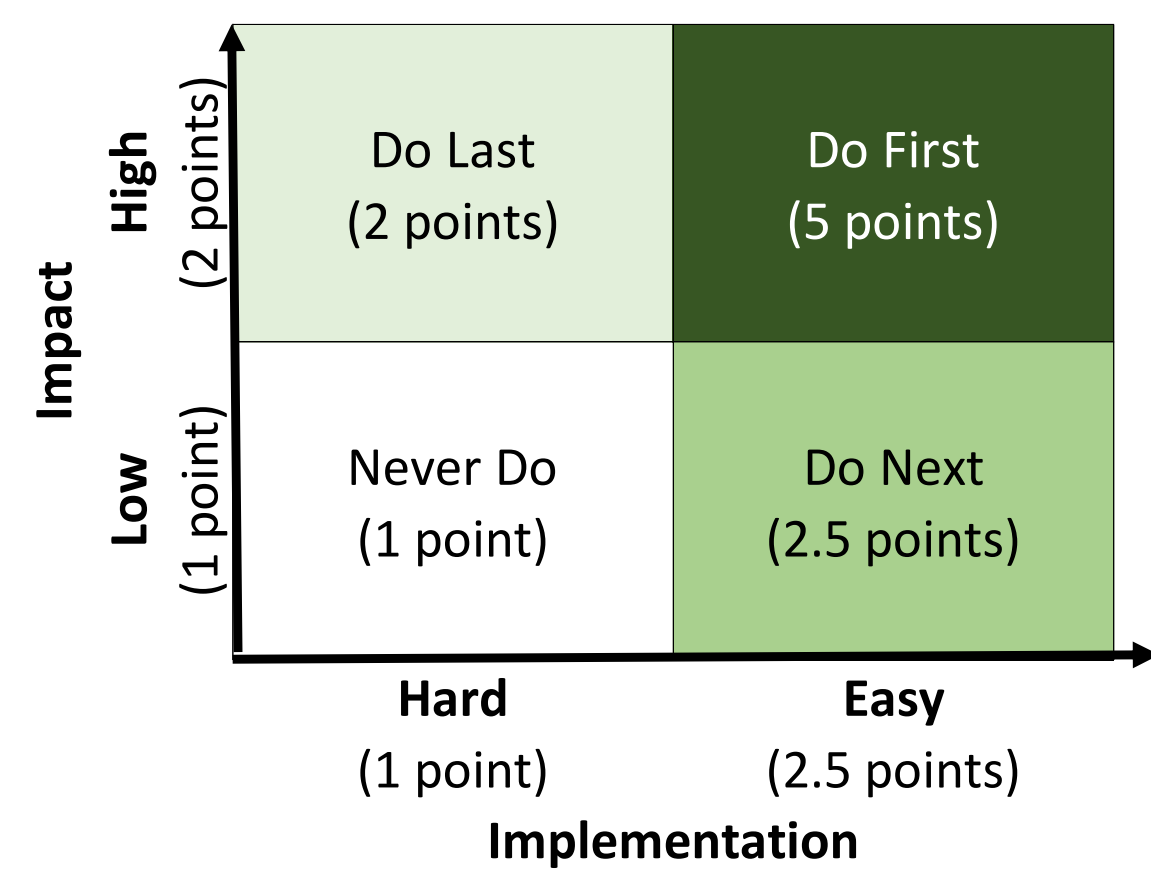
Analyse Problem, Select Interventions



(Fig.3) Ishikawa diagram

ANALYSE PROBLEM – The Ishikawa diagram (Figure 3) was used to drill down to the root causes.

SELECT INTERVENTIONS – Corresponding possible interventions were proposed to address each root cause (Figure 5). The impact-implementation matrix (Figure 4) was used to guide our solution selection & sequence of implementation (Figure 5).



(Fig.4) above & Fig.5 below

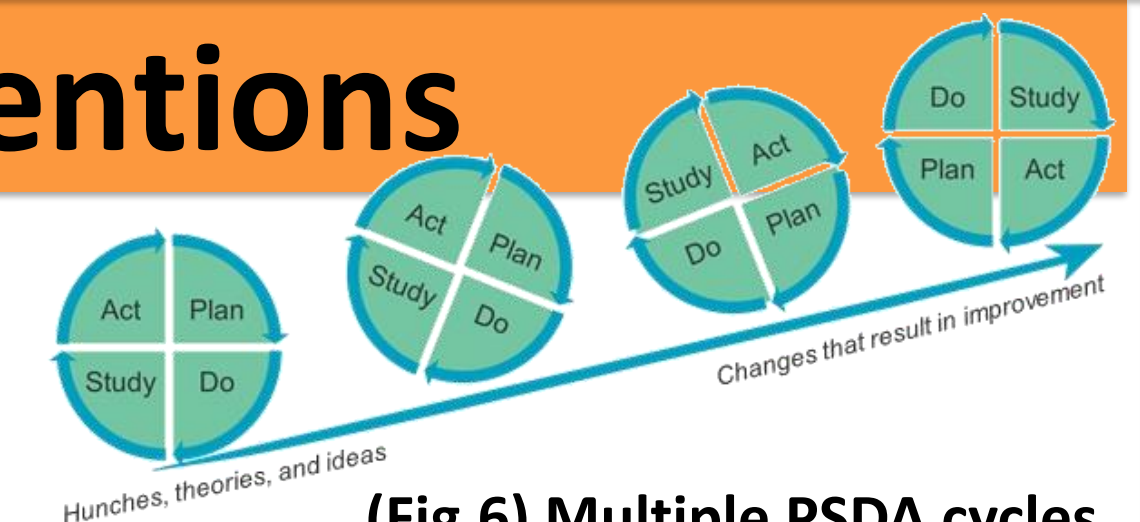
Impact implementation matrix & its usage

Root Cause	Possible Intervention	Implementation (Hard = 1) (Easy = 2.5)	Impact (Low = 1) (High = 2)	Impact * Implementation
1. DS23 environment was less conducive compared to inpatient wards	A Enhance DS23 facility	2.5	2	5
2. DS23 facility not opened during weekends and public holidays	Extend facility opening to more days	1	1	1
3. Worry that patient bill size may be higher in DS/DS23 due to lower subsidies for DS compared to inpatient	B Ensure DS patient bill size is similar to inpatient stays	2.5	2	5
4. Unclear what cases were suitable (clinically safe) for DS/DS23	C Establish clinical criteria	2.5	2	5
5. For DS23, there's pressure to discharge patient by the 23 rd hour	Establish hourly work to ensure timely discharge.	1	1	1
6. Some patients were admitted earlier for pre-surgery preparatory procedures/ care	D Find ways to do pre-surgery preparatory procedures/ care outside inpatient setting	1	2	2
7. Elective patients needing overnight stay were listed into inpatient wards by default	E Change listing practice for elective patients	1	2	2
8. No workflow to list ED pts	F Establish ED to DS/DS23 workflow	1	2	2
9. No workflow to list SOC pts if it was <48hrs	G Establish Expedited SOC to DS/DS23 workflow	1	2	2
10. DS patients who cannot be discharged the same day were sent to inpatient wards	Establish DS-turn-DS23 workflow*	1	1	1
11. JMC DS-OT patients needing overnight observation were sent to inpatient wards	Establish JMC DSOT-turn-DS23 workflow*	1	1	1

Note on * : Although these weren't selected interventions, they were being initiated & worked on by local teams, even as the main project gains momentum.

Implement Interventions

For each intervention listed in this section, multiple plan-do-study-act cycles (Figure 6) were carried out to perfect its implementation. This was followed by a long period of monitoring to ensure that the intervention sticks & forms part of routine work.



(Fig.6) Multiple PSDA cycles carried out for every intervention

Most interventions were piloted by General Surgery &/or Orthopaedic Surgery departments, then spread to all other surgical departments, & eventually to medicine divisions with procedural work (i.e. Cardiology & Gastroenterology).

A Enhance DS23 facility – The DS23 facility was made more conducive & similar to inpatient wards - trolley beds replaced with ward beds, patients given proper meals instead of snacks. More beds (including private ones) were added in 2019 as the demand for DS23 facilities increased.

B Ensure DS23 patient bill size is similar to inpatient stay – Bill sizes were studied, & it was ascertained that for non-major surgeries (TOSP <5), DS23 cost less than inpatient. DS23 was made the default choice for clinically suitable patients.

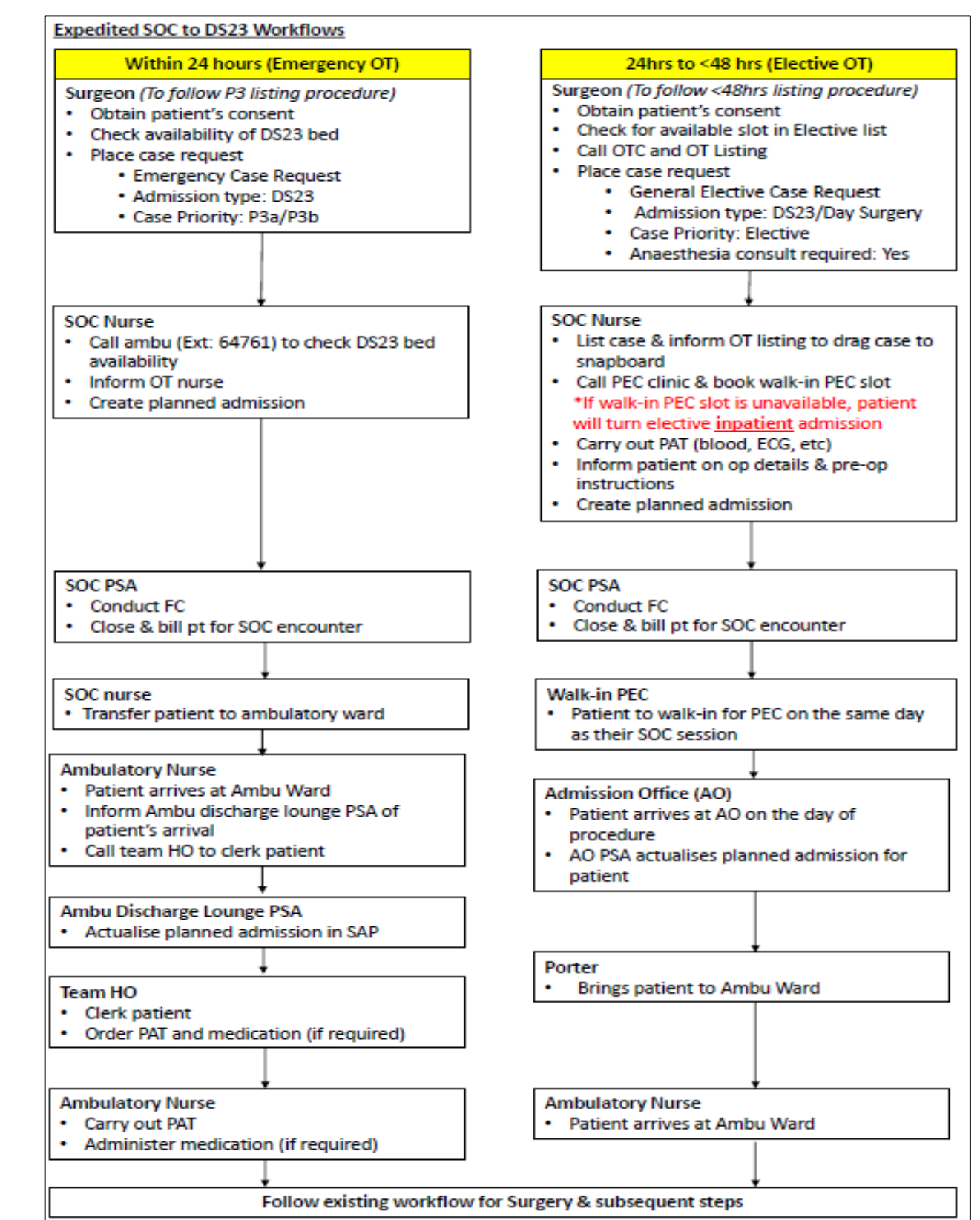
C Establish clinical criteria – Clinical criteria (E.g. by ASA, TOSP procedures, medical fitness) for DS/DS23 patients were established & documented in procedural manuals. These criteria(s) were discussed & communicated at clinical departmental meetings.

D Find ways to do pre-surgery preparatory procedures/care outside inpatient setting – Feasibility studies were conducted. Operational & administrative processes were adjusted for some of these to be safely done as outpatients, or even at home by patients themselves.

E Change listing practice for elective patients – To make the changes stick, on a weekly basis, a list of elective inpatients with potential for conversion to DS/DS23 was generated, reviewed by the clinicians, & converted to DS/DS23 if found suitable.

F Establish ED to DS/DS23 workflow – Initiated by Orthopaedic Surgery & General Surgery departments, a robust referral system was set up. This included the creation of clear workflow, referral criteria, Epic smart texts, Epic "ED to DS/DS" order buttons. This workflow enabled the use of DS facilities for patients who received emergency surgeries and could be discharged as DS/DS23.

G Establish Expedited SOC to DS/DS23 workflow – The workflow (Ref: Figure 7) went through a few iterations based on input from all functional teams involved in the workflow. A trial was carried out for 2 patients, then extended to all GS abscess cases. However, full implementation was delayed due to Covid-19.



(Fig.7) Sample of a workflow after a few interactions/ PSDA cycles

Note on * : Intervention F was also subsequently extended to JCH

Achieve Outcome

All suitable patients, regardless where they are listed from, could soon be listed to DS/DS23, forming a complete matrix for listing patients to DS/DS23.

Facility pts are listed from ->	Time bet listing & surgery ->	SOC			ED
		≥ 48 hrs	< 48 hrs	< 24 hrs	
Facility pts are listed to	Inpatient Ward	✓	✓	✓	
	DS23	✗	✗	✗	
	DS	✓	✗	✗	

(Fig.8) Where patients can be listed to - at start state & end states of project

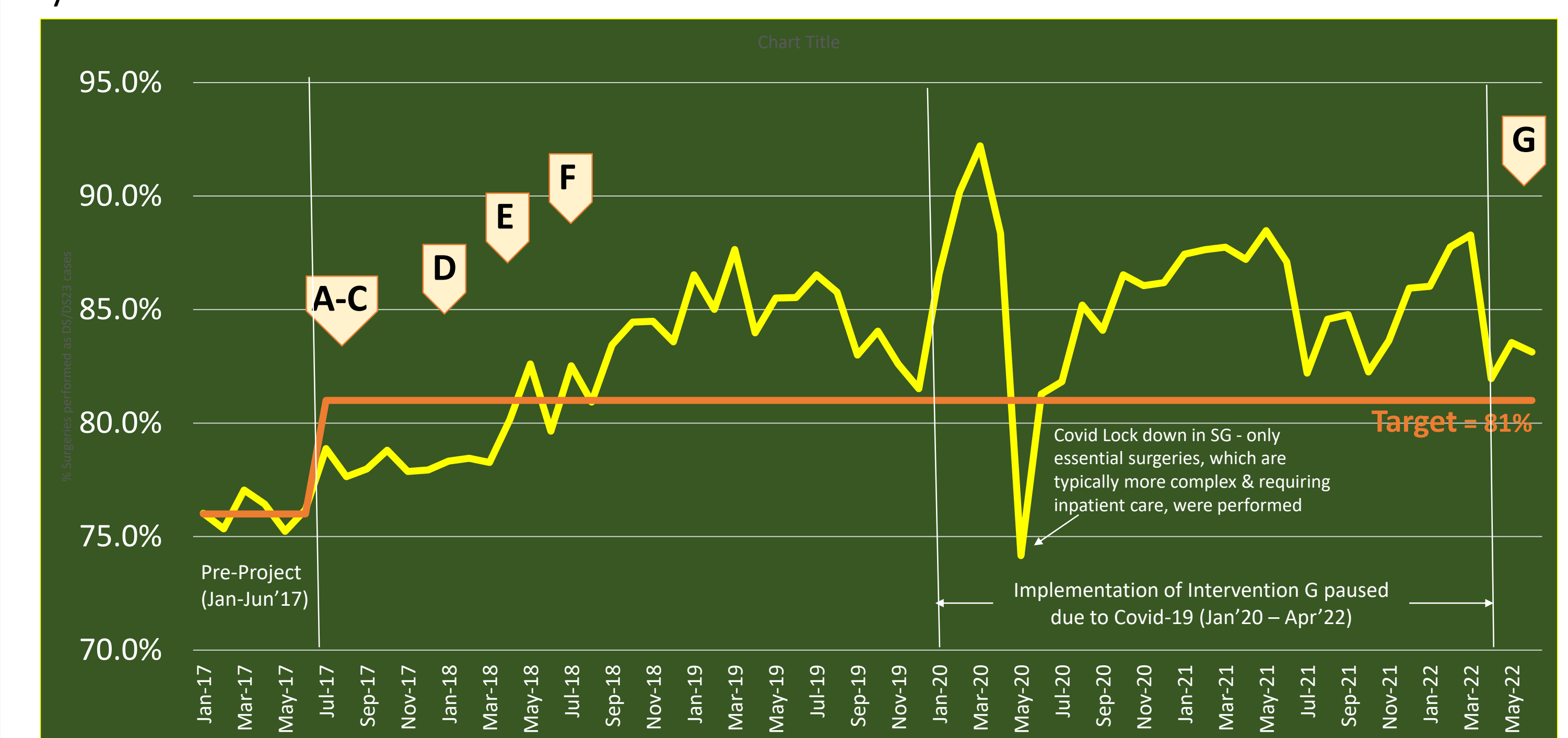
Suitable cases can now be performed as DS/DS23 instead of inpatient cases. Listed below are 8 procedures with the highest conversion rate.

Department	TOSP Code	TOSP Description	% DS/DS23 cases		
			In 2017	In 2020	% change
1 General Surgery (Urology)	SH835P	Prostate gland, various lesions, saturation prostate biopsy***	-	95%	95%
2 Orthopaedic Surgery	SB710S	Shoulder, shoulder soft tissue injury, arthroscopic/ open decompression with cuff repair	0%	90%	90%
3 Orthopaedic Surgery	SB700K	Knee, arthroscopy, knee ligament reconstruction	5%	94%	89%
4 Orthopaedic Surgery	SB701K	Knee, Ligaments/ Meniscus/ Cartilage/ Bone Combined, Arthroscopic ACL Or PCL Reconstruction	0%	89%	89%
5 Otolaryngology	SM829E	Ear, various lesions, myringoplasty (post-aural/ endaural approach)	0%	86%	86%
6 General Surgery	SA823B	Breast, tumor (malignant), wide excision/ lumpectomy/ segmental mastectomy/ partial mastectomy	0%	84%	84%
7 Orthopaedic Surgery	SB801S	Shoulder, acromioclavicular joint stabilisation/ reconstruction	0%	83%	83%
8 Otolaryngology	SM724N	Nose, various lesions, septoplasty/ submucous Resection	2%	82%	80%

Note on *** : Prostate biopsy started only in 2018, & listing to DS/DS23 (instead of same-day-admission to inpatient) was immediately made the default because of this project.

(Fig.9) Surgeries with the highest conversion rate

The project's overall aim of increasing day surgeries by 5% (from 76% to 81%) was met after one year's efforts. The performance has stayed consistently above the target (except for 1 month), even during the acute Covid-19 period. This project has freed up an average of >1,400 bed-days a year.



(Fig.10) Outcome Measure - Percentage of surgeries done as DS/DS23