Project Title

Improve the On-Time Start Rates for First Case on Weekdays in TTSH Radiology Angio Suite

Project Lead and Members

Project lead: Dr Ivan Huang Kuang Hsin

Project members: Dr Gavin Lim Hock Tai, Dr Adeline Teh Hui Lynn, Dr Puah Ser Hon, Ms Poh See Yin, Ms Christina Ting Sia King, Mr Joy Hansen Saldivar Ponce, Ms Fiona Tan Ai Ping, Mr Francis, Ms Suchitra

Organisation(s) Involved

Tan Tock Seng Hospital

Project Period

Start date: June-2018

Completed date: December-2018

Aims

To improve the first case on-time start* rates on weekdays in TTSH Radiology Angio Suite from 10% to 80% in 6 months

* The first case will usually be an inpatient case (<10% outpatient first case in last 6 months)

Avoids manpower time wastage and help avoid unsafe practice such as the staff rushing to prepare the case (Start Time = 8.15am, Mon-Fri)

Background

1) Delay in start time of procedures done at Angio Suites in Tan Tock Seng Hospital
2) Wastage of working hour as nurses, radiographers and doctors end up starting the procedures late.
3) Additional stress throughout the day for staff and patients
4) This can potentially result in an unsafe working environment for staff and also patients
5) Staff work overtime resulted in overtime cost

Methods

The process flow from when patient was admitted to MAC ward to when first procedure case started were mapped out and root causes were identified using diagnostic tools such as fishbone diagram, multi-voting and Pareto chart. The intervention strategies were implemented using PDSA cycles.

Results

The project had successfully increased the first case on-time start rates on weekdays in TTSH Radiology Angio Suite, from 10% to 75%, from June to December 2018 and is sustained as of April 2019.

Lessons Learnt

1) Problems faced by a department may be the manifestation of issues along the entire "supply chain… It all adds up
2) Engagement and buy-in from various stakeholders is important
3) Inter-department collaborative work brings about positive outcome and experience for the patient
4) Knowing the ground and its micro-processes is essential for planning the intervention
5) Everyone in the team is important... No voice is too small to be heard
6) Sometimes, modification of existing processes is what's needed.
7) Interventions may not always work at first

Conclusion

The improvement in first case on-time start rates has improved the performance of the angio suite and help to lessen wastage in idle time and overtime costs.

Project Category

Clinical Improvement, Process Improvement

Keywords

Clinical Improvement, Process Improvement, Safe Care, Quality Improvement Tools, Fishbone Diagram, Pareto Chart, Waster Reduction, Cost Savings, Nursing, Radiology,

Medical Services, Tan Tock Seng Hospital, Angio Suite, Theatre Efficiency, Overtime Cost, First Case, On-Time, Start Rates

Name and Email of Project Contact Person(s)

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IMPROVE FIRST CASE ON-TIME START AT RADIOLOGY ANGIO SUITE (SUSTAINABILITY PHASE)

Dr Ivan Huang Kuang Hsin

Department of Diagnostic Radiology

Mission Statement

To improve the first case on-time start rates on weekdays in TTSH Radiology Angio Suite from 10% to 80% over a sustained period

Team Members

	Name	Designation	Department
Team Leader	Dr. Ivan Huang	Consultant	Diagnostic Radiology
Team Members	Dr. Gavin Lim	Consultant	Diagnostic Radiology
	Dr. Adeline Teh	Consultant	Respiratory & Critical Care Medicine
	Dr. Puah Ser Hon	Consultant	Respiratory & Critical Care Medicine
	Poh See Yin	Staff Nurse (SN)	Diagnostic Radiology
	Christina Ting	SN	Diagnostic Radiology
	Joy Ponce	Radiographer	Diagnostic Radiology
	Fiona Tan	SN	Ward
	Francis	Porter	Porter
	Suchitra	Star Team SN	Star Team

Advisors: Dr. Pua Uei, Dr. Lawrence Quek, Kelly Wang Zhifan, Sister Chow, Christina Tan, Abdul Rahman

Sponsors: Adj A/Prof Gregory Kaw Jon Leng, Diagnostic Radiology Head of Department

Mentor: A/Prof Thomas Chee

Evidence for a Problem Worth Solving

- Delay in start time of procedures done at VIR
- Wastage of working hour as nurses, radiographers and doctors end up starting the procedures late.
- Additional stress throughout the day for staff and patients
- This can potentially result in an unsafe working environment for staff and also patients
- Staff work overtime → overtime co$t

1st case start time in TTSH Angio Suite in the months of May – August 2018

Day	Mon	Tue	Wed	Thu	Fri
Date	30/4	1/5	2/5	3/5	4/5
Time	8:18	PH	8:30	8:20	8:20
Date	7	8	9	10	11
Time	8:14	8:18	8:10	8:20	8:16
Date	14	15	16	17	18
Time	8:47	8:30	8:20	8:25	8:51
Date	21	22	23		
Time	8:50	8:20	8:23		

Day	Mon	Tue	Wed	Thu	Fri
Date	18/6	19	20	21	22
Time	8:10	8:29	8:47	9:12	8:21
Date	25	26	27	28	29
Time	8:32	8:49	8:35	8:32	8:21
Date	2/7	3	4	5	6
Time	8:31	8:44	8:40	8:22	8:24
Date	9	10	11	12	13
Time	8:26	8:40	8:15	8:21	8:24

8/76x100%=10.5%

Day	Mon	Tue	Wed	Thu	Fri
Date	2	3	4	5	6
Time	8:31	8:44	8:40	8:22	8:24
Date	9	10	11	12	13
Time	8:26	8:36	8:15	8:21	8:24
Date	16	17	18	19	20
Time	8:34	8:22	9:14	8:37	8:33
Date	23	24	25	26	27
Time	8:16	8:24	8:26	8:31	8:29
Date	30	31			
Time	8:35	8:52			

Day	Mon	Tue	Wed	Thu	Fri
Date			1	2	3
Time			8:41	8:25	8:22
Date	6	7	8	9	10
Time	8:58	8:48	8:18	PH	8:16
Date	13	14	15	16	17
Time	8:38	8:28	8:14	8:26	8:12
Date	20	21	22	23	24
Time	8:21	8:12	PH	8:25	8:17
Date	27				
Time	8:19				

More than a third of elective surgery sessions started late

Starting elective surgery sessions late was a problem at all five hospitals. In 2014, 37 per cent of elective sessions started late, resulting in a significant lost time. For example, four per cent of sessions started more than one hour late resulting in 571 hours of unused operating theatre time.

Starting the first case of a session on time makes it more likely that the session will finish on time. It also reduces the likelihood of day of surgery cancellations.

Operating Theatre Efficiency

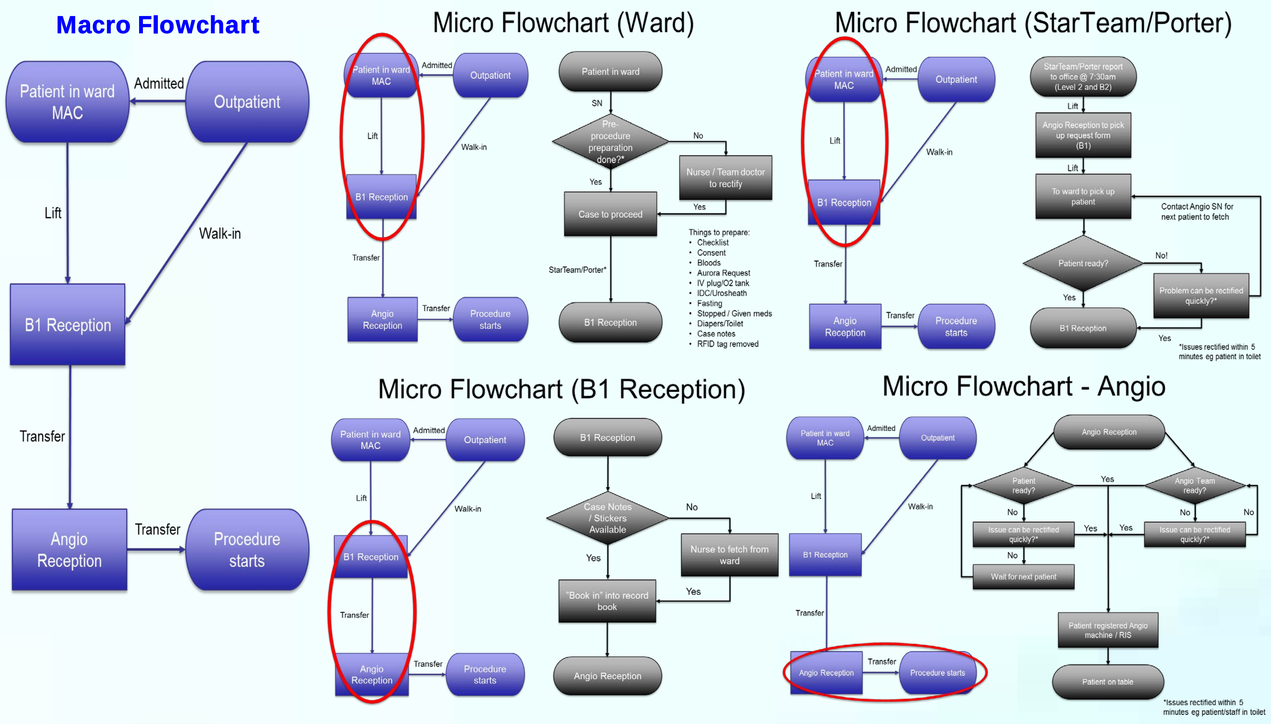
	SCGH	OPH	SDH	BH	AH	TOTAL
>10 minutes late	28%	67%	27%	42%	40%	37%
>30 minutes late	10%	17%	6%	12%	7%	11%
>60 minutes late	4%	3%	2%	5%	2%	4%

Table 1: Proportion of elective sessions that started late in 2014, based on when the first patient of the session arrived in theatre

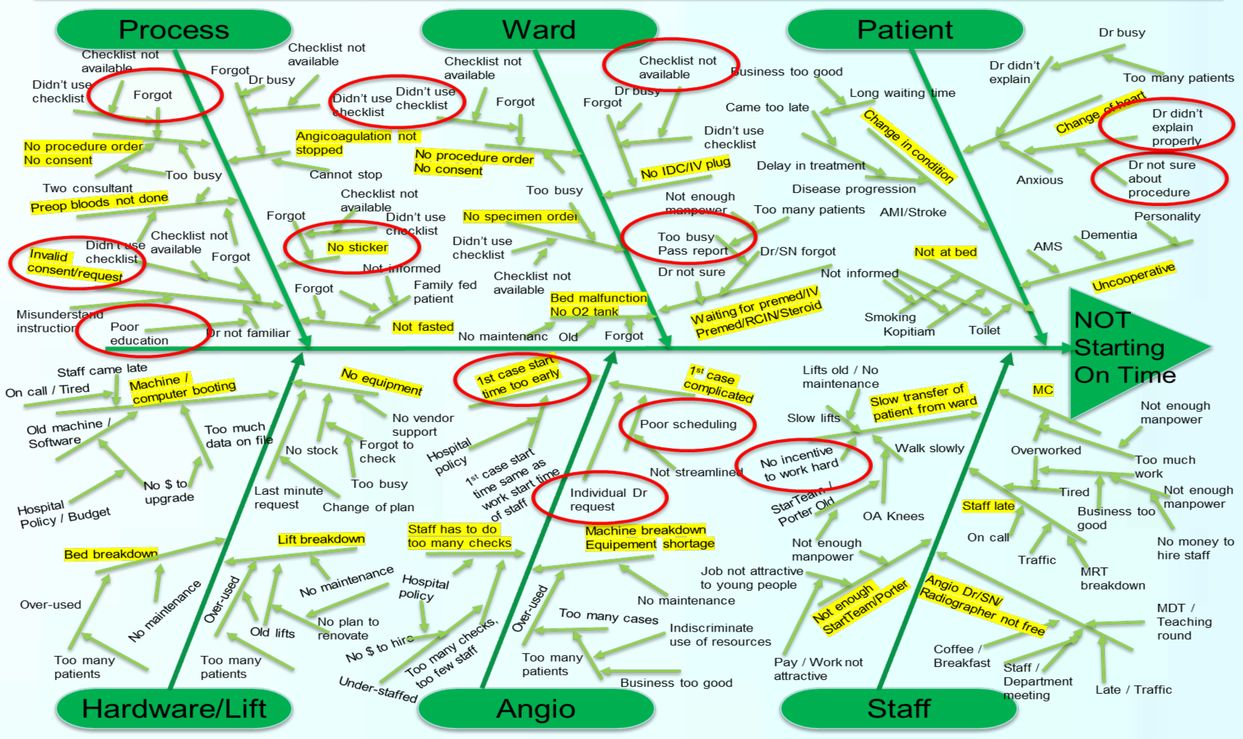
3.5.5 Starting on Time

One of the key contributors to improving theatre efficiency is starting on time. Starting a list on time and as planned will ensure the greatest opportunity to finish on time (and thus minimise overtime costs), avoid unnecessary cancellations and maximise the use of available theatre time to increase productivity.

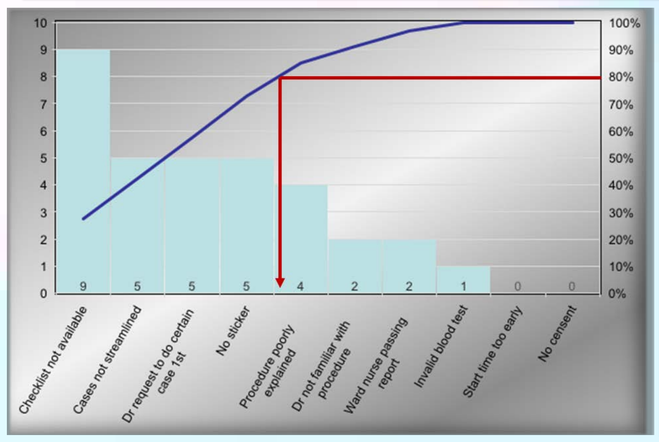
Flow Chart of Process



Cause and Effect Diagram



Pareto Chart

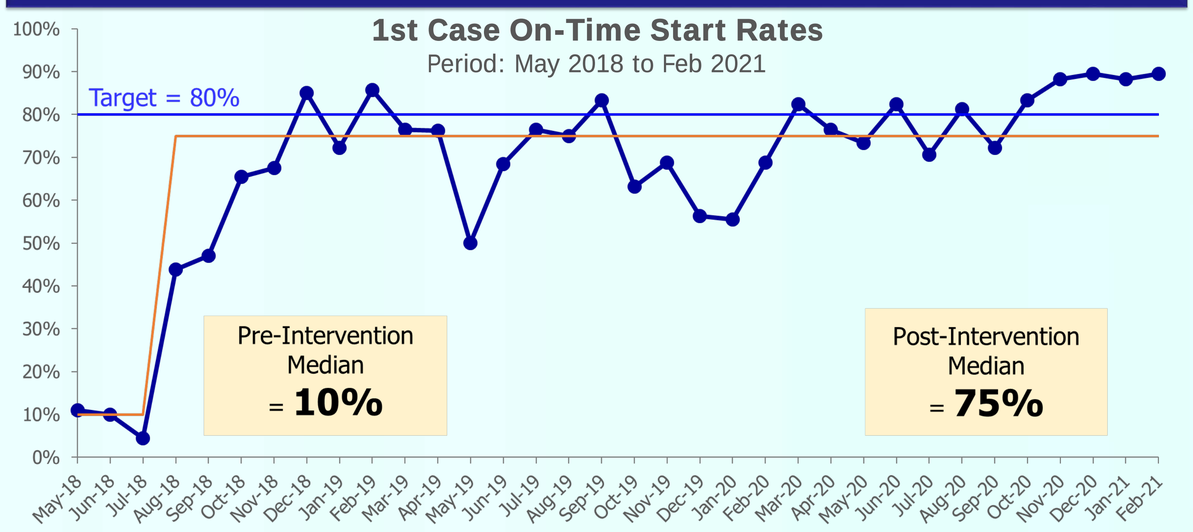


No	Root Causes
1	Checklist not available
2	Cases not streamlined
3	Doctor request to do certain case 1st
4	No sticker
5	Procedure poorly explained
6	Doctor not familiar with procedure
7	Ward nurse passing report
8	Invalid blood test
9	Start time too early
10	No consent

Implementation

Root Cause	Intervention	Implementation Date
Checklist not available	Checklist made available to ward staff (delivered on D-1)	28 Aug 2018
Cases not streamlined	List "simple" cases first	19 Nov 2018
Doctor request to do certain case 1st	Straightforward case to be fetched first, followed by 2nd case complicated case.	19 Nov 2018

Results



Cost Savings

	Pre-Intervention	Post-Intervention
Average Idle Manhour (Per Week)	450 mins	125 mins
Idle Manhour Avoided (Per Week)	**325 mins**	
Idle Manhour Cost Avoided (Per Week)	$3,604.50 - $1,001.25 = **$2,603.25**	
Average Idle Manhour (Annualized)	23,580 mins	6,550 mins
Idle Manhour Avoided (Annualized)	**17,030 mins**	
Idle Manhour Cost Avoided (Annnualized)	$188,875.80 - $52,465.50 = **$136,410.30**	

- Assuming average idle manhour of 30 minutes per day per room
- Number of resources required per room: 1 Radiographer, 2 Nurses, 1 Doctor.

Lessons Learnt

1. Problems faced by a department may be the manifestation of issues along the entire supply chain ... It all adds up
2. Engagement and buy-in from various stakeholders is important
3. Inter-department collaborative work brings about positive outcome and experience for the patient
4. Knowing the ground and its micro-processes is essential for planning the intervention
5. Everyone in the team is important ... No voice is too small to be heard
6. Sometimes, modification of existing processes is what's needed.
7. Interventions may not always work at first

Strategies to Sustain

1. Positive outcome is the result of input from all stakeholders
2. Continuous staff feedback and optimization of workflow will ensure sustainability
3. Inter-department collaborative work should be encouraged
4. Continual auditing is important
5. Times and circumstances may change again → we must change and adapt with time
6. Never be afraid to go back to square 1, especially when circumstances are different.