

## **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

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- 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

## Team Members

	Name	Designation	Department
Team Leader	Dr. Ivan Huang	Associate 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	SN	Diagnostic Radiology
	Christina Ting	SN	Diagnostic Radiology
	Joy Ponce	Radiographer	Diagnostic Radiology
	Fiona Tan	SN	Ward
	Francis	Porter	Porter
	SAN Suchitra	StarTeam SN	StarTeam

Advisor: Dr. Pua Uei, Dr. Lawrence Quek, Kelly Wang Zhifan, Sister Chow, Chrsitina Tan, Abdul Rahman  
Sponsor: Adj A/Prof Gregory Kaw Jon Leng, Diagnostic Radiology HOD & Mentor: A/Prof Thomas Chee

## Evidence for a Problem Worth Solving

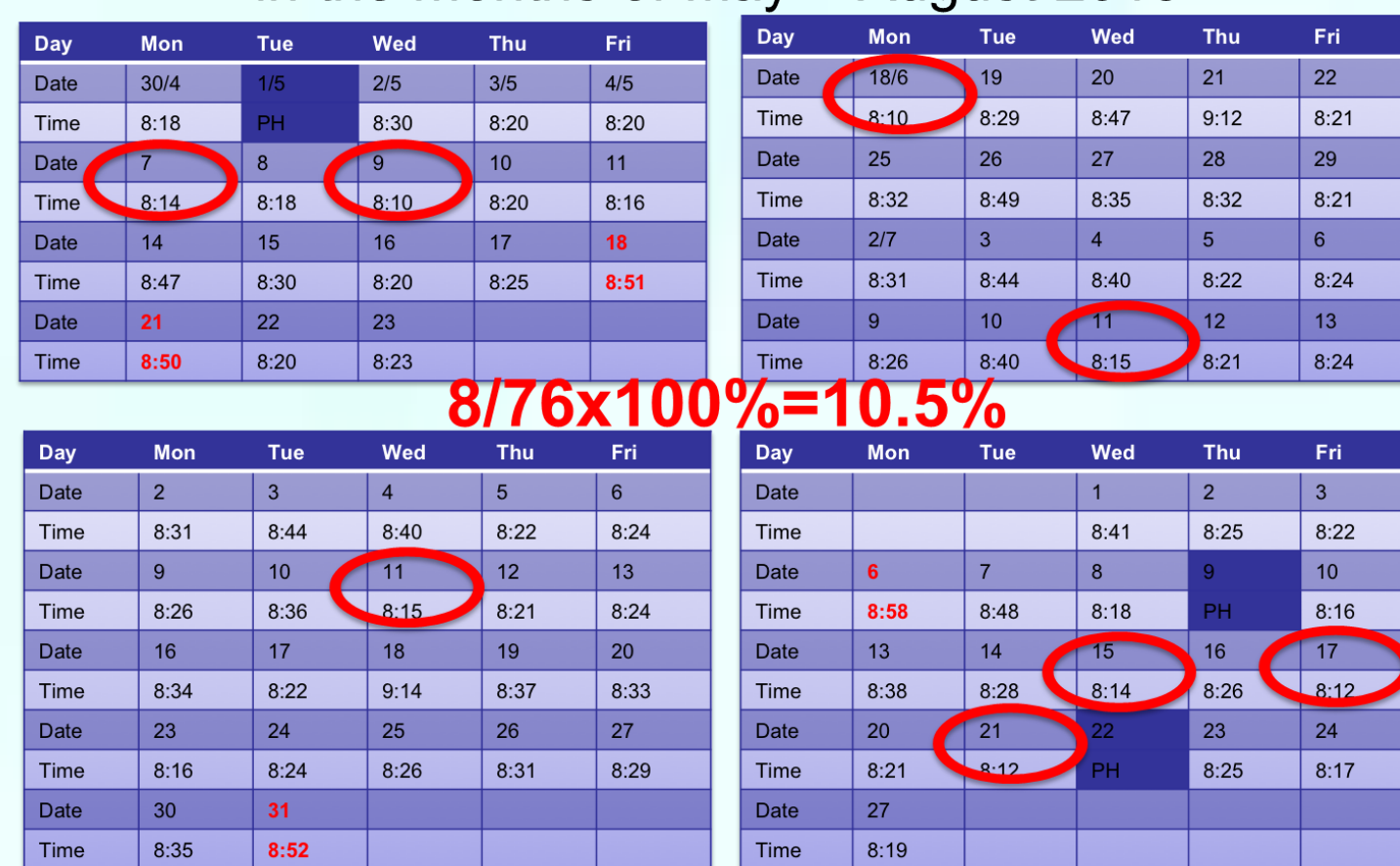
- Delay in start time of procedures done at VIR
- Wastage of working hour as nurses, radiographers and doctors end up starting the procedures late
- Additional stress throughout the day for staff and patients
- This can potentially result in an unsafe working environment for staff and also patients
-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

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.

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

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

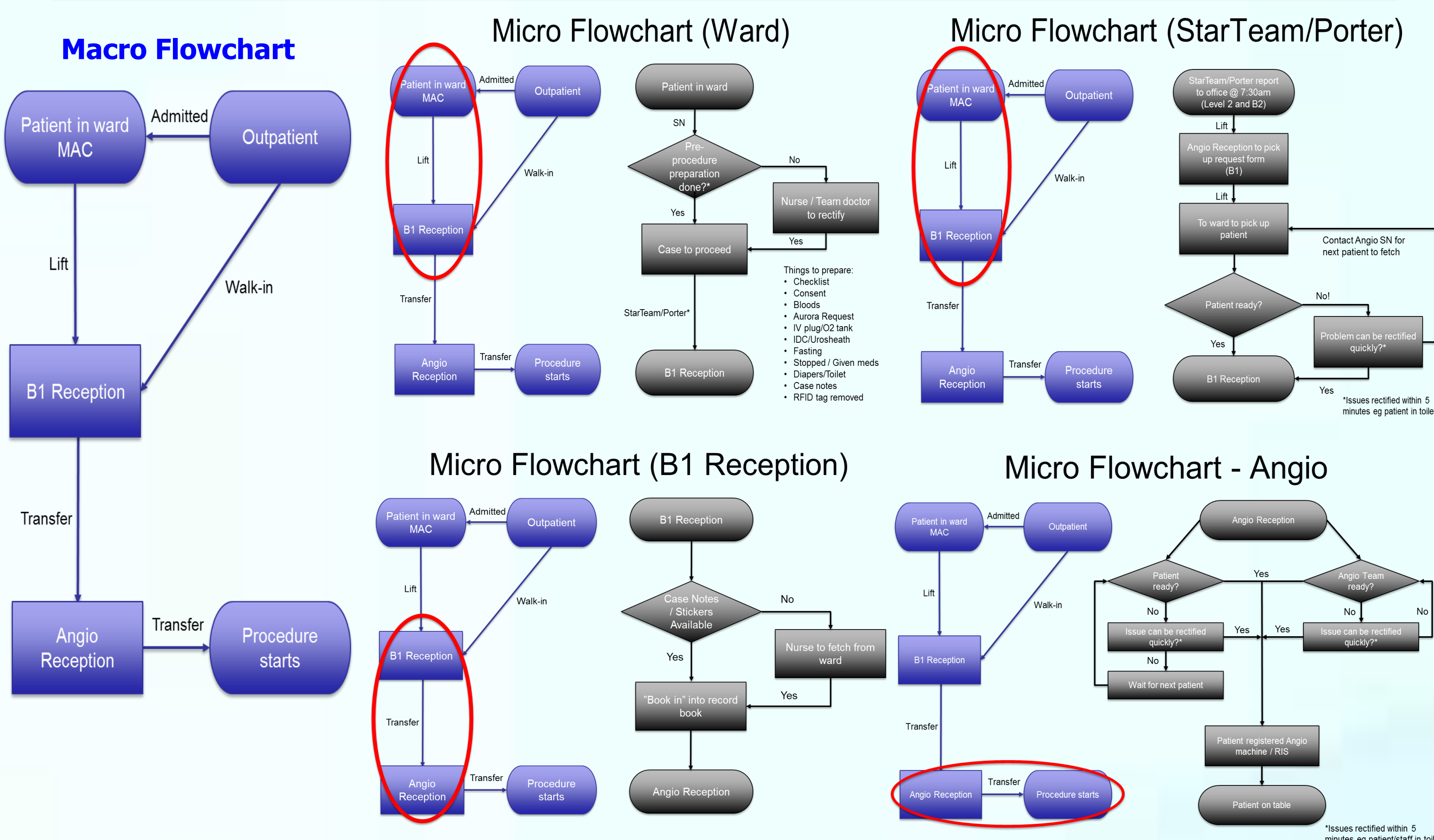


### 3.5.5 Starting on Time

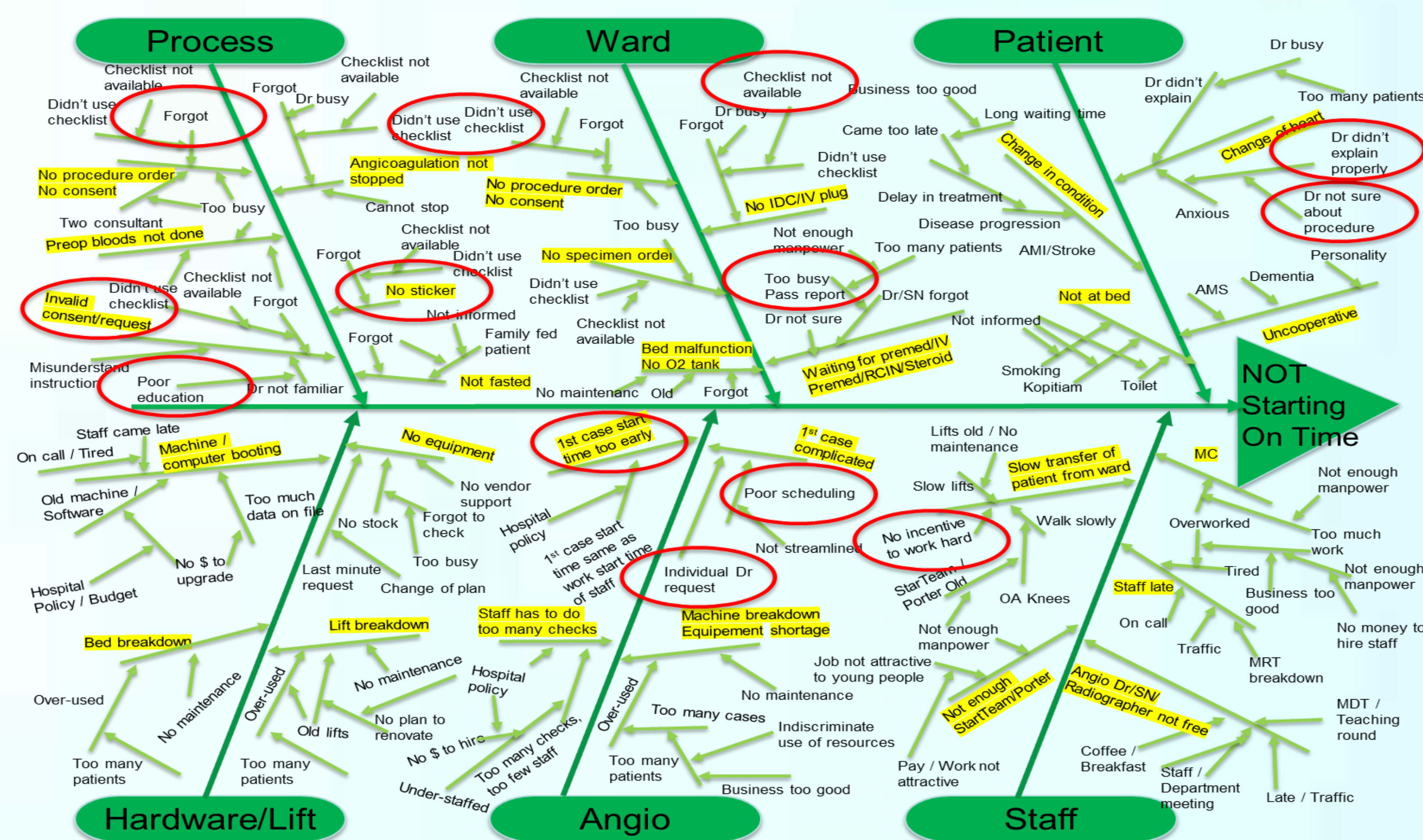
One of the key contributors to improving theatre efficiency is starting on time. Starting a list on time and as planned will ensure the greatest opportunity to finish on time (and thus minimise overtime costs), avoid unnecessary cancellations and maximise the use of available theatre time to increase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

## Flow Chart of Process

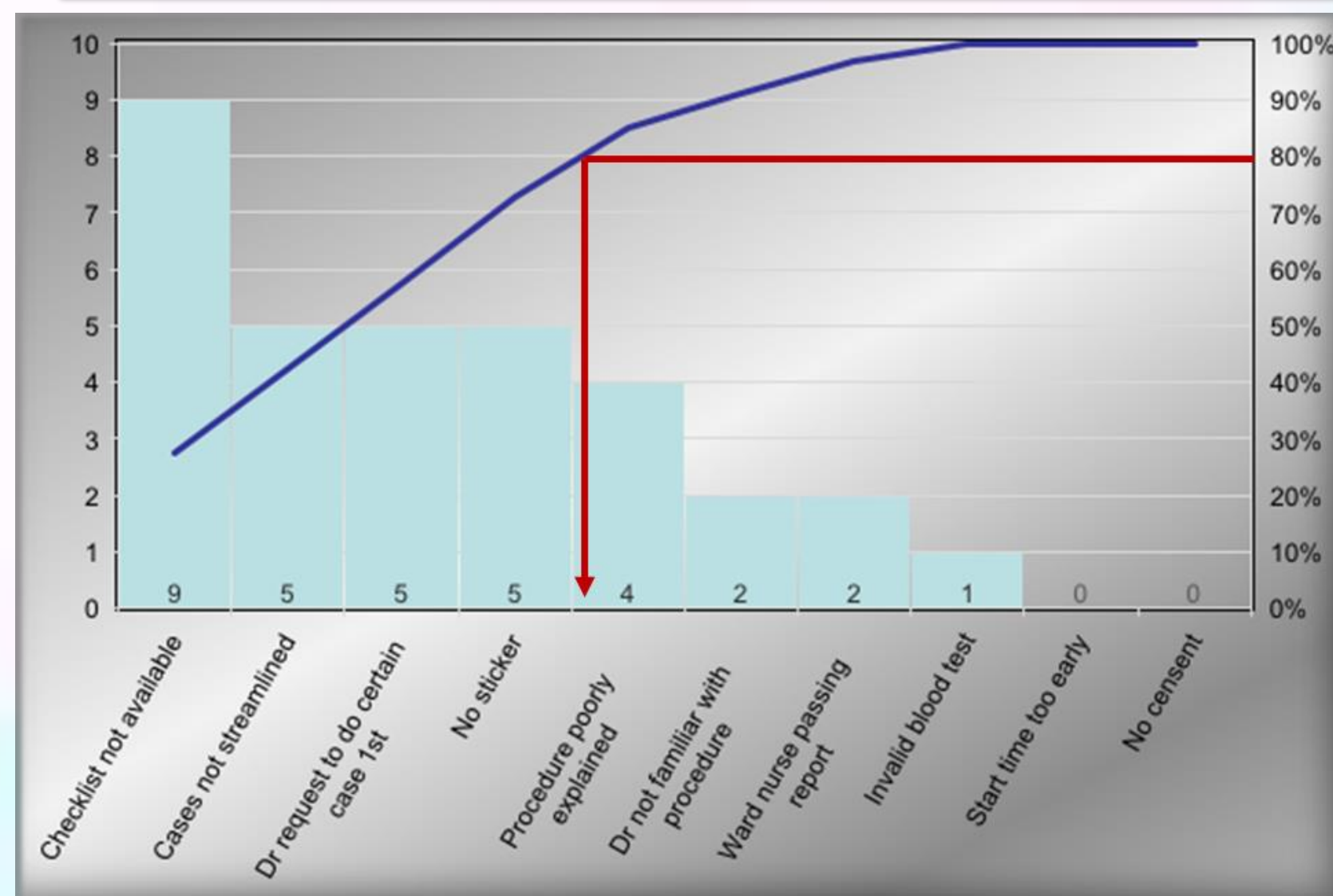
## Macro Flowchart



## Cause and Effect Diagram



## Pareto Chart

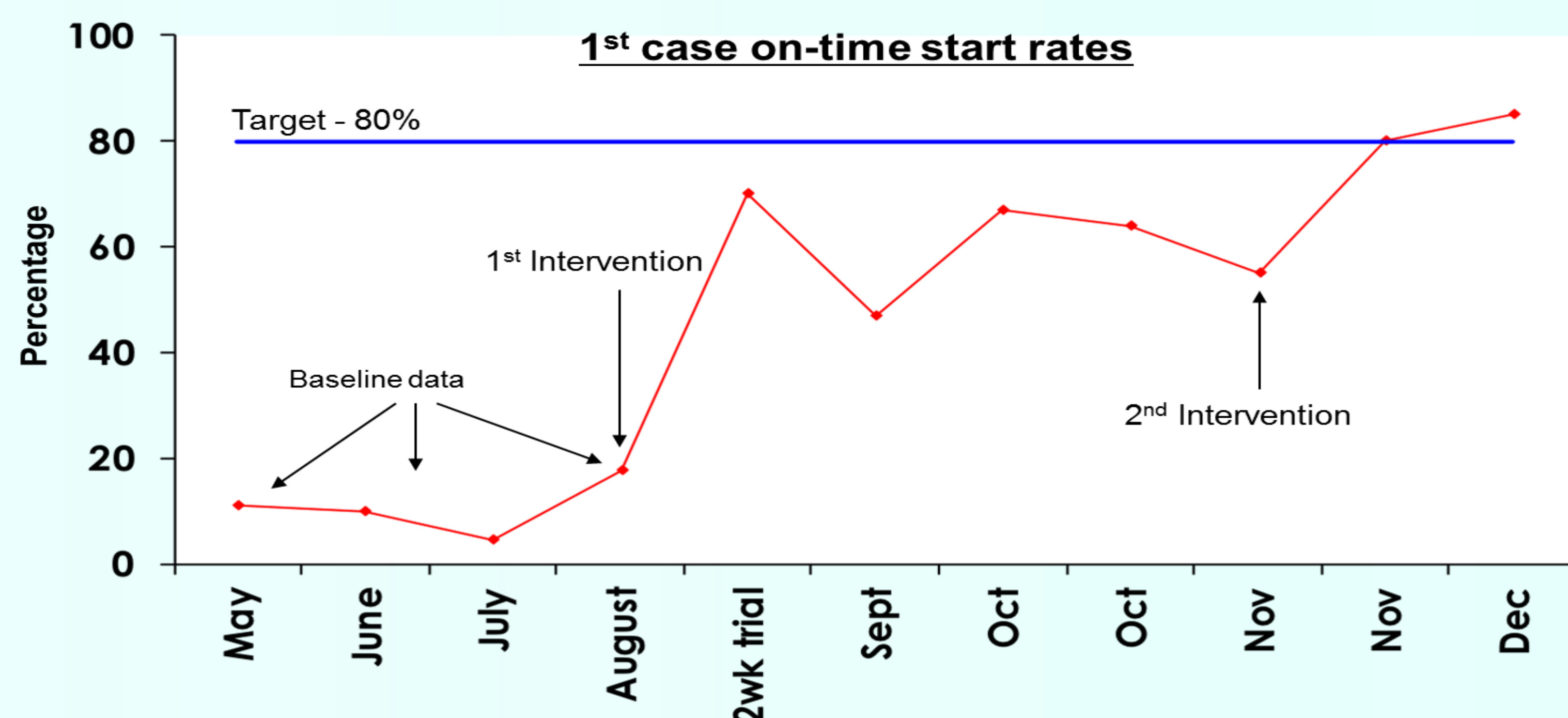


No	Root causes
1	Checklist not available
2	Cases not streamlined
3	Doctor request to do certain case 1st
4	No sticker
5	Procedure poorly explained
6	Doctor not familiar with procedure
7	Ward nurse passing report
8	Invalid blood test
9	Start time too early
10	No consent

## Implementation

CAUSE / PROBLEM (refer to Pareto Chart)	INTERVENTION	DATE OF IMPLEMENTATION
Check list not available in the ward	Check list made available to ward staff (delivered on D-1)	28 Aug 2018
Cases not streamlined	List "simple" cases first	19 Nov 2018
Doctor asked complicated case to be done first	Straightforward case to be fetched first, followed by 2 <sup>nd</sup> case complicated case	19 Nov 2018

## Results



## Cost Savings

Hourly manpower cost:

Radiographer - \$ 72/hour, Nurse - \$ 60/hour, Doctor - \$ 300/hour  
One room = one radiographer + two nurses + one doctor = \$ 432/hour

Three rooms = \$ 1296/hour

Assuming delay of 30 minutes per day

Idle manpower cost incurred = \$ 648/day

That's \$3,240/week; That's \$168,480/year

Estimated about 1 more case being done per day

- Simple case : \$300
- Complex case : \$2000
- Shortens waiting list
- Allows for existing infrastructure to be optimized

## Intangible gains

- Overtime cost from staff staying back to clear cases
- Cost of delay to other patients, who end up staying in hospital for longer
- Also, it improves patient satisfaction and staff morale

## Lessons Learnt

- Problems faced by a department may be the manifestation of issues along the entire "supply chain... It all adds up
- Engagement and buy-in from various stakeholders is important
- Inter-department collaborative work brings about positive outcome and experience for the patient
- Knowing the ground and its micro-processes is essential for planning the intervention
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## Strategies to Sustain

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