

REDUCING NON VALUE-ADDED ACTIVITIES IN A SPECIALIST OUT-PATIENT CLINIC

Department of Industrial & Systems Engineering

IE3100R : Systems Design Project

Supervisors: Dr. Huang Boray; Dr. Yap Chee Meng

TTSH Liaison: Ms. Ayliana Phe

Team Members: Asih Laraswati, Jo; Choo Liang; Chue Yan Wei; Hu Xiuming; Tan Chien Loong



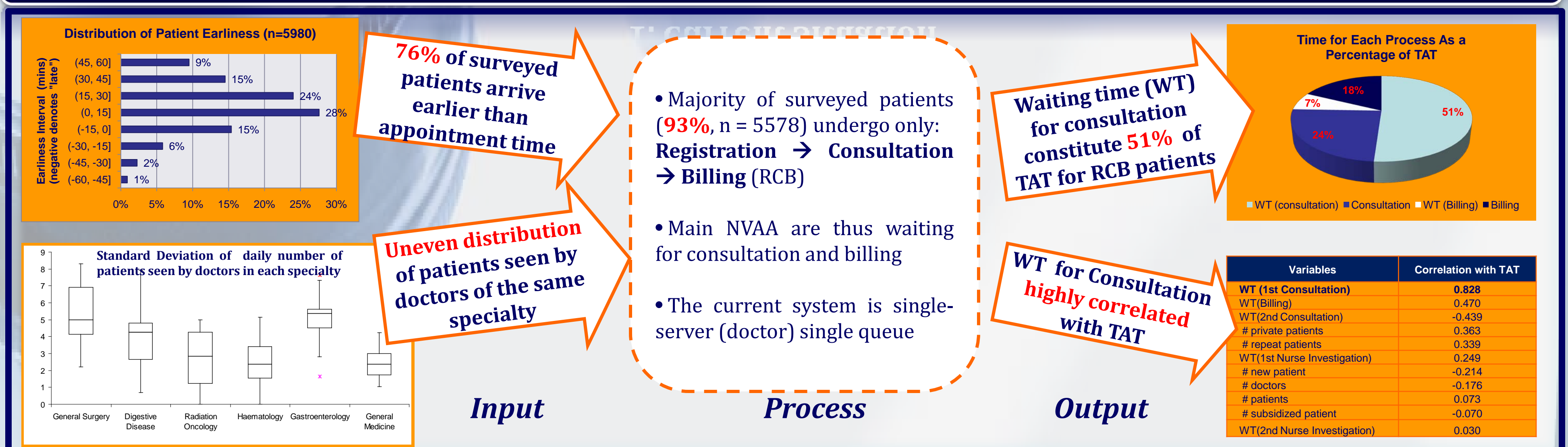
Background

Tan Tock Seng Hospital (TTSH) is the second largest acute care general hospital in Singapore. Specialist Outpatient Clinic 2A (SOC 2A), one of TTSH busiest clinics, receives up to 500 patients daily, and consists of 6 main specialties. This project focuses on reducing the duration of non value-added activities (NVAA) in SOC 2A to improve its operational efficiency.

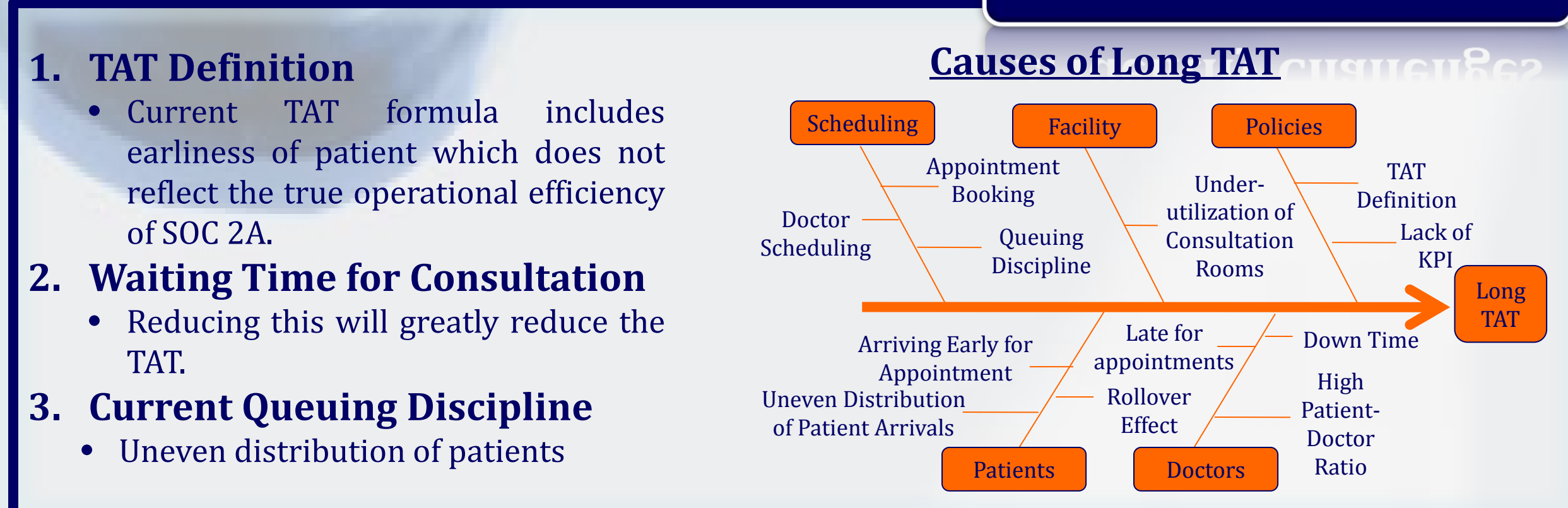
Objectives

- Conduct analysis on operational workflow of SOC 2A
- Develop recommendations to reduce the duration of NVAA and therefore decrease the Turn Around Time (TAT) of patients

1. Current Situation



2. Identify Challenges



3. Proposed Solutions

- New TAT Formula**
 - $TAT = \max(0, \text{end of billing time} - \text{appointment time or arrival time whichever is later})$
- Multiple Server – Single Queue**
 - Patients will be served once any doctor is free
- Optimization of Number of Doctor**
 - Determine number of doctors required for each specialty to achieve a certain WT

4. Simulation

4.1 Decision Support System

Purposes:

- To compare different system design alternatives
- To allow TTSH staff to determine required number of doctors for each specialty to achieve a certain waiting time (WT)

Platform: Excel



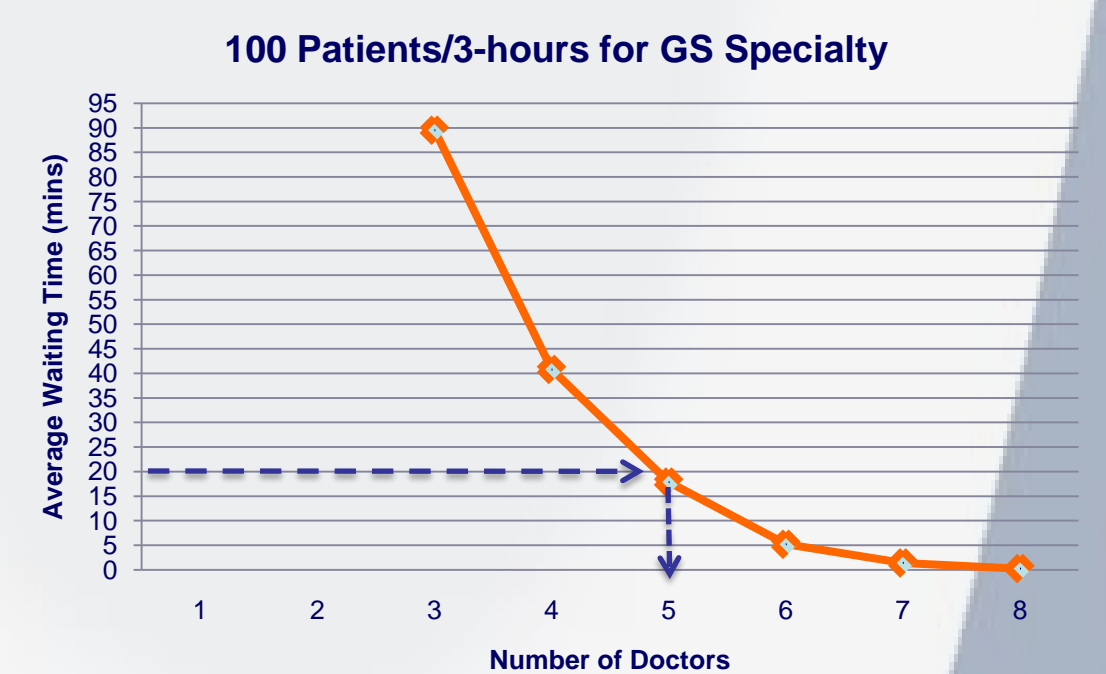
4.1.1 Compare Different System Designs

System Design Alternatives	Average Waiting Time for Consultation (mins)					
	Digestive Disease	Gastroenterology	General Surgery	Haematology	General Medicine	Radiation Oncology
Actual	26.24	20.27	21.81	33.84	26.79	14.8
A: Simulation (FCFS)	27.2	22.8	19.6	36.8	26.7	13.6
B: Simulation (FCFS + MSSQ)	5.35	5.11	21.3	5.98	15.8	6.23
C: Simulation (SSSQ + Appointment Based)	23.2	20.9	17.7	32.3	24.1	18.7
D: Simulation (MSSQ + Appointment Based)	3.14	1.06	7.12	5.21	1.72	13.64

FCFS: First-Come First-Serve; MSSQ: Multi-Server Single-Queue; SSSQ: Single-Server Single-Queue

Alternative D (multi-server single-queue & appointment time based service priority) results in the least average waiting time for consultation

4.1.2 Optimal Number of Doctors



In the above example for GS Specialty, 5 doctors is required to achieve a desired average waiting time for consultation of 20minutes when number of patients is 100

5. Recommendations

- To reduce the duration of NVAA and decrease the TAT of patients, here are our recommendations to TTSH:
- Adopt the new TAT formula
 - Adopt Alternative D (Multiple Server – Single Queue & Appointment-time Based Service Priority)
 - Integrate a decision support system to determine required number of doctors for each specialty to achieve a certain waiting time