



International Forum on
QUALITY & SAFETY
in **HEALTHCARE**

18-20 September 2019
Taipei

H Institute for
Healthcare
Improvement

BMJ



Adopting Lean in Healthcare: An Experience of Paradigm Shift in Taiping Hospital

CHUNG WAI MUN

Malaysia

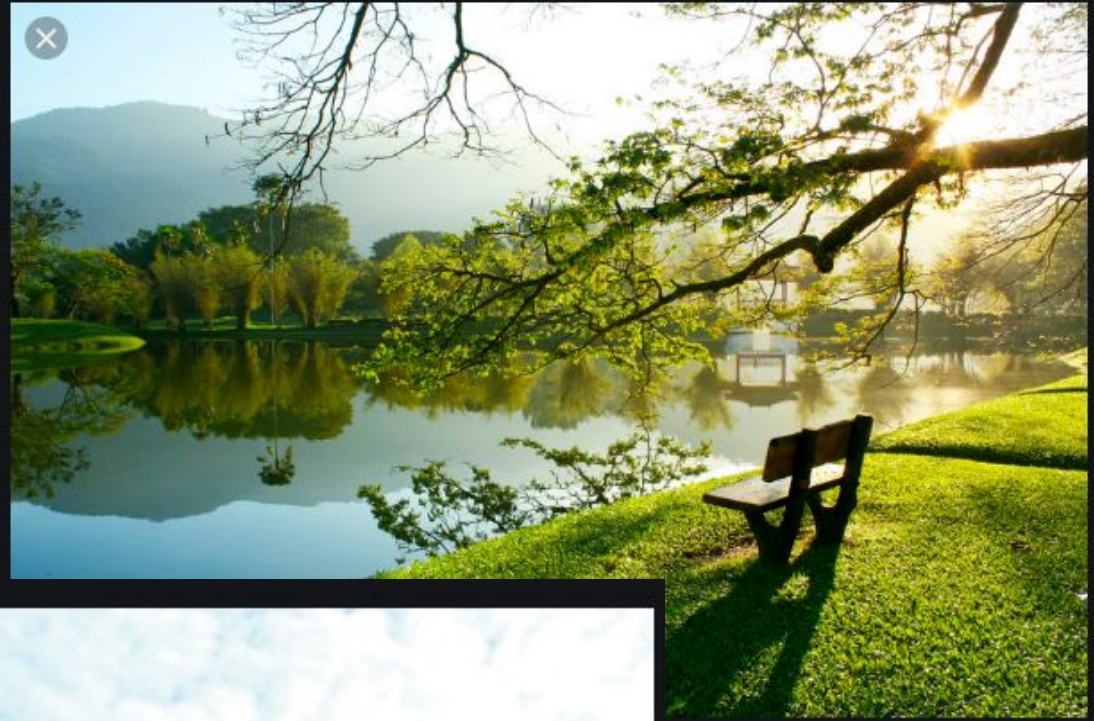
Declaration of Interest


- No conflict of interest









 New Straits Times

Taiping is No 3 most sustainable city in t





Hospital Taiping

Content

- Introduction
 - Lean Healthcare in Emergency Department
 - Kaizen & Challenges
 - What's Next?
-
- Lean.... You have invited a **CHANGE**....

Where it all started....

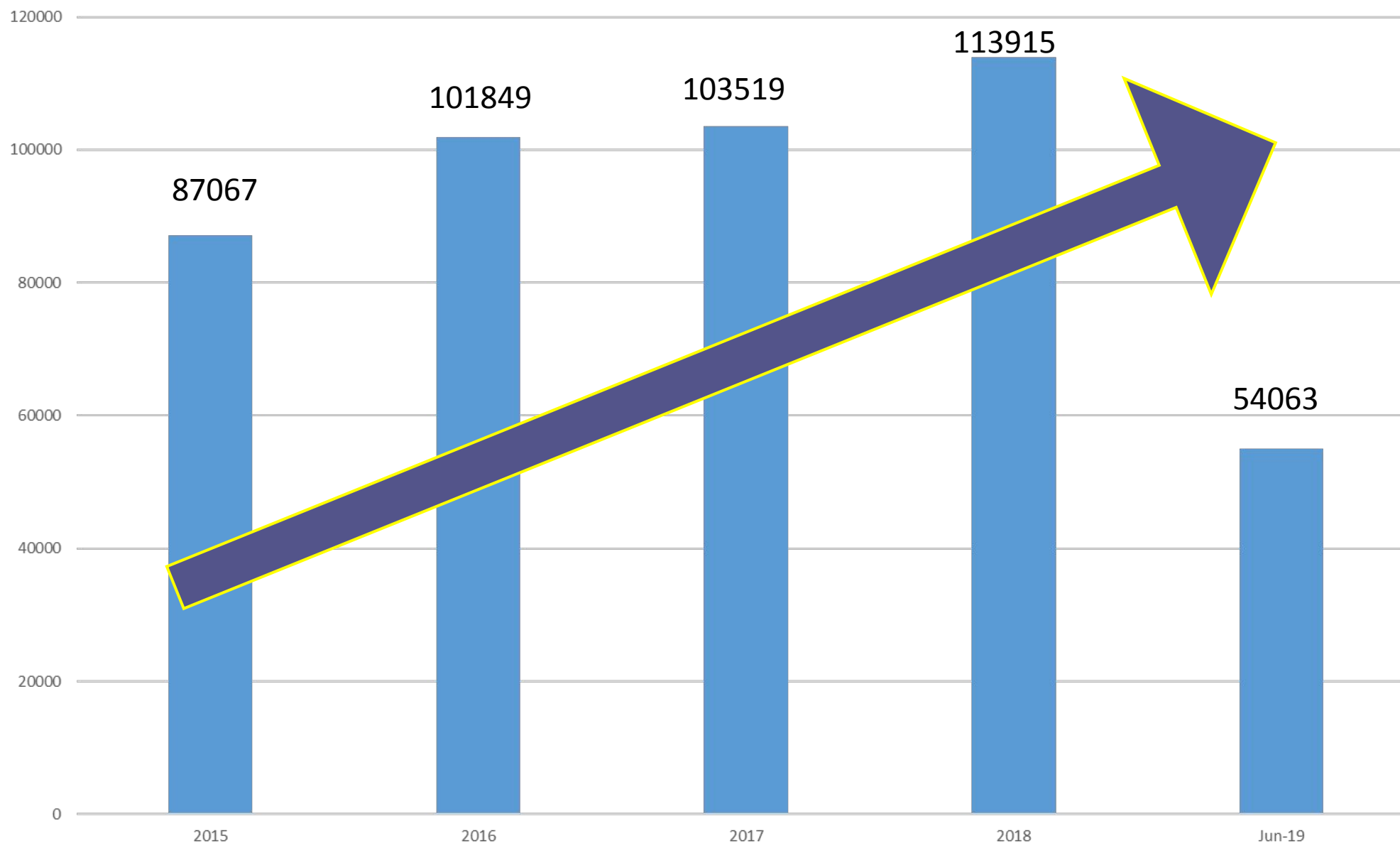


8th-10th March 2016

iHSR
INSTITUTE FOR HEALTH SYSTEMS RESEARCH



Total Number of Patients Presented to Emergency Department, Taiping Hospital



No. Of Clinical Beds In Emergency Department

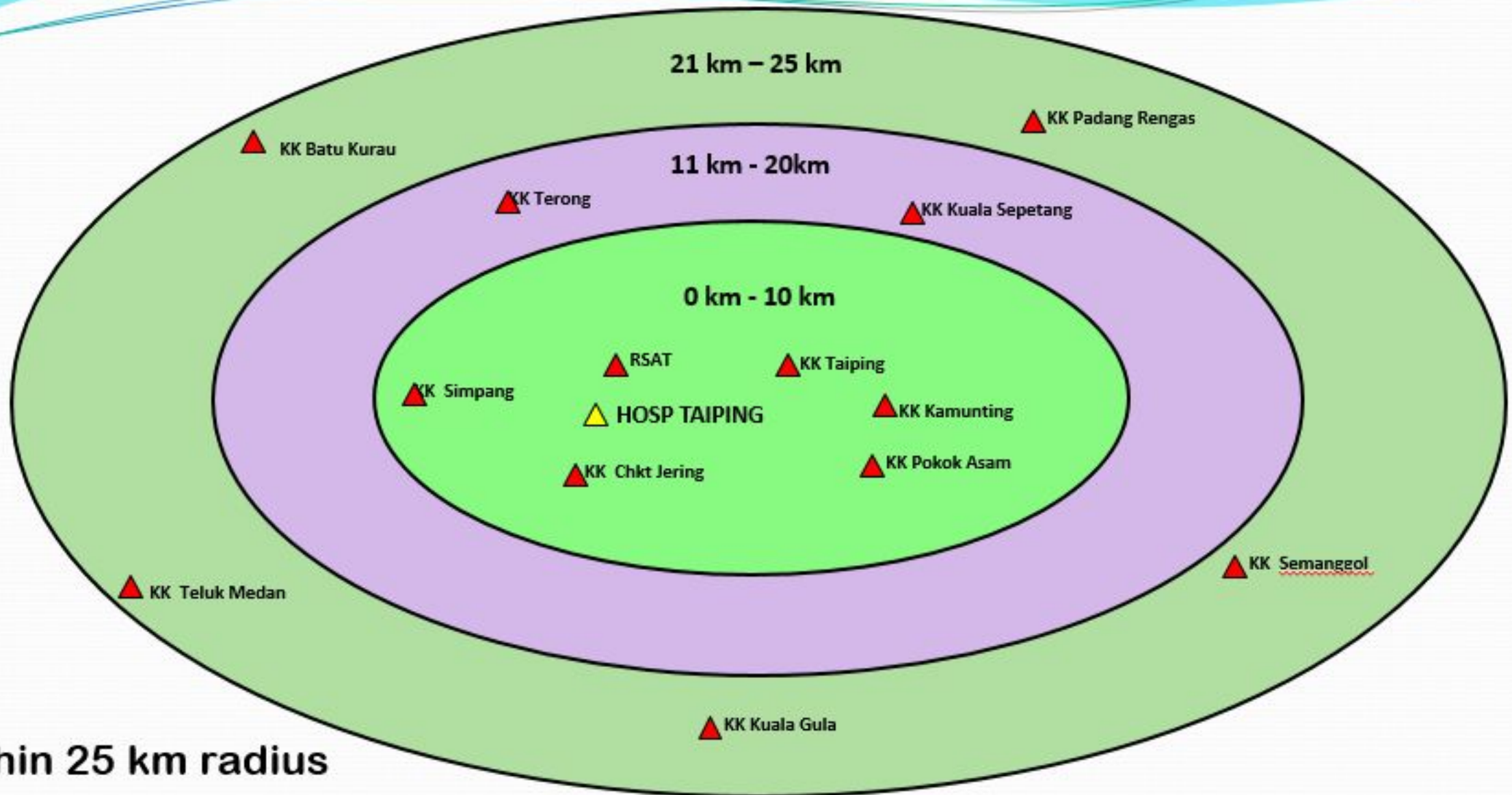
ZONE	NO. OF BEDS
RED (CRITICAL)	3
INTERMEDIATE RED/YELLOW	5
YELLOW (SEMI-CRITICAL)	9
OBSERVATION ROOM	8
ISOLATION	1
TOTAL	26

ZONE	ROOM
GREEN (NON-CRITICAL)	2

Staff Strength in Emergency Department

NO	STAFF	QUANTITY
1	Specialist	3
2	Medical Officer	18
3	House Officer (Interns)	22 (Seasonal)
4	Chief Medical Assistant (Paramedics)	8
5	Chief Nurse	2
6	Medical Assistant (Paramedics)	26
7	Staff Nurse	22

Hospital Taiping and Health Clinics (KK) – Geographical Illustration



within 25 km radius

Global Issue

- Access Block
- Overcrowding
- Burn-out
- Multitasking
- Limited spaces
- And the list continues.....

- We need changes....

WHAT IS LEAN?



*Lean refers to a **collection of principles and methods** that focus on the **identification and elimination** of **non-value added activity (waste)** in any process*

James Womack, Daniel Jones, and Daniel Roos coined the term “lean” in their 1990 book *The Machine that Changed the World* to describe the manufacturing paradigm (often referred to as the Toyota Production System) developed by the Toyota Motor Company based on principles pioneered by Henry Ford.

LEAN THINKING

(by Father of Lean)



*“Lean enable the production and delivery of **the right amount of high quality products and service** (as defined by your customers) at the **right time** at the **first time** while **minimizing waste** and being open to change...”*

Taicchi Ohno

Father of Toyota Production System,
Kanban
Production Engineer Toyota

LEAN AND 8 WASTES

The 8 Wastes

To remember The 8 Wastes, you can use the acronym "DOWNTIME."

D	Defects
O	Overproduction
W	Waiting
N	Non-Utilized Talent
T	Transportation
I	Inventory
M	Motion
E	Extra-Processing



Defects

Efforts caused by rework, scrap, and incorrect information.



Overproduction

Production that is more than needed or before it is needed.



Waiting

Wasted time waiting for the next step in a process.



Non-Utilized Talent

Underutilizing people's talents, skills, & knowledge.



Transportation

Unnecessary movements of products & materials.



Inventory

Excess products and materials not being processed.



Motion

Unnecessary movements by people (e.g., walking).



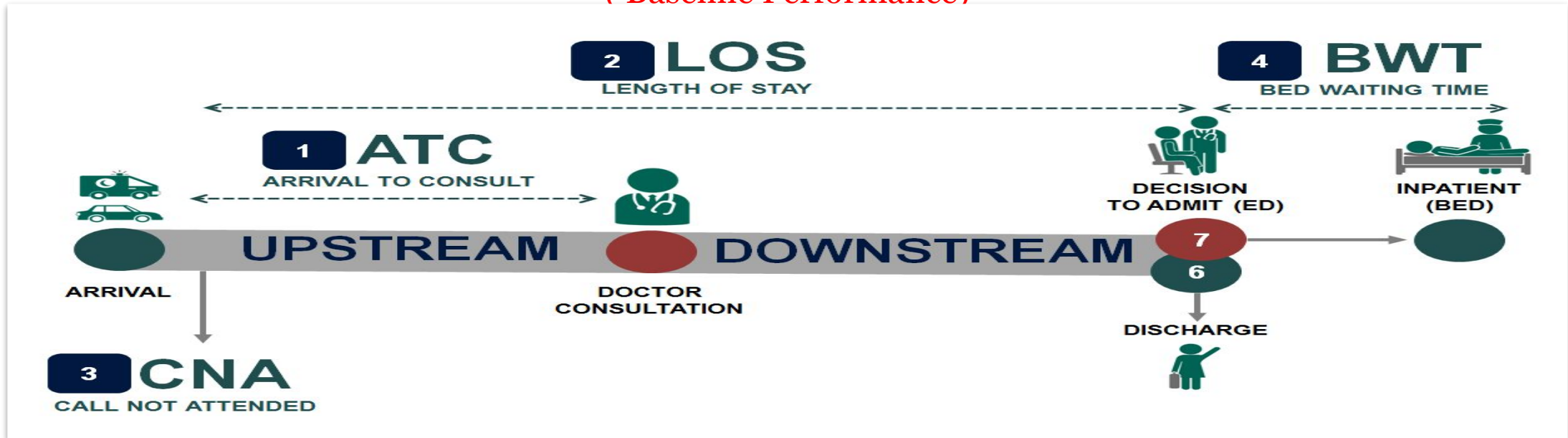
Extra-Processing

More work or higher quality than is required by the customer.



CURRENT SITUATION

(Baseline Performance)



NO	DATA (PERFORMANCE METRICS)	PRE LEAN	KPI	THROUGHPUT
1	ARRIVAL TO CONSULTATION (ATC)	37 mins	<90 Mins	95.8%
2	LENGTH OF STAY (LOS)	1 hr 19 mins	< 2 hrs	81.6%
3	BED WAITING TIME (BWT)	1 hr 19mins	< 2 hrs	83.6%
4	CALL NOT ATTENDED (CNA)	0.8%	<1.0%	-

- So many data to collect...
- So much work to do....
- Is Lean applicable even for us?
- The patient waiting time/ work flow in our department was quite good... Is Lean really worth the shot?



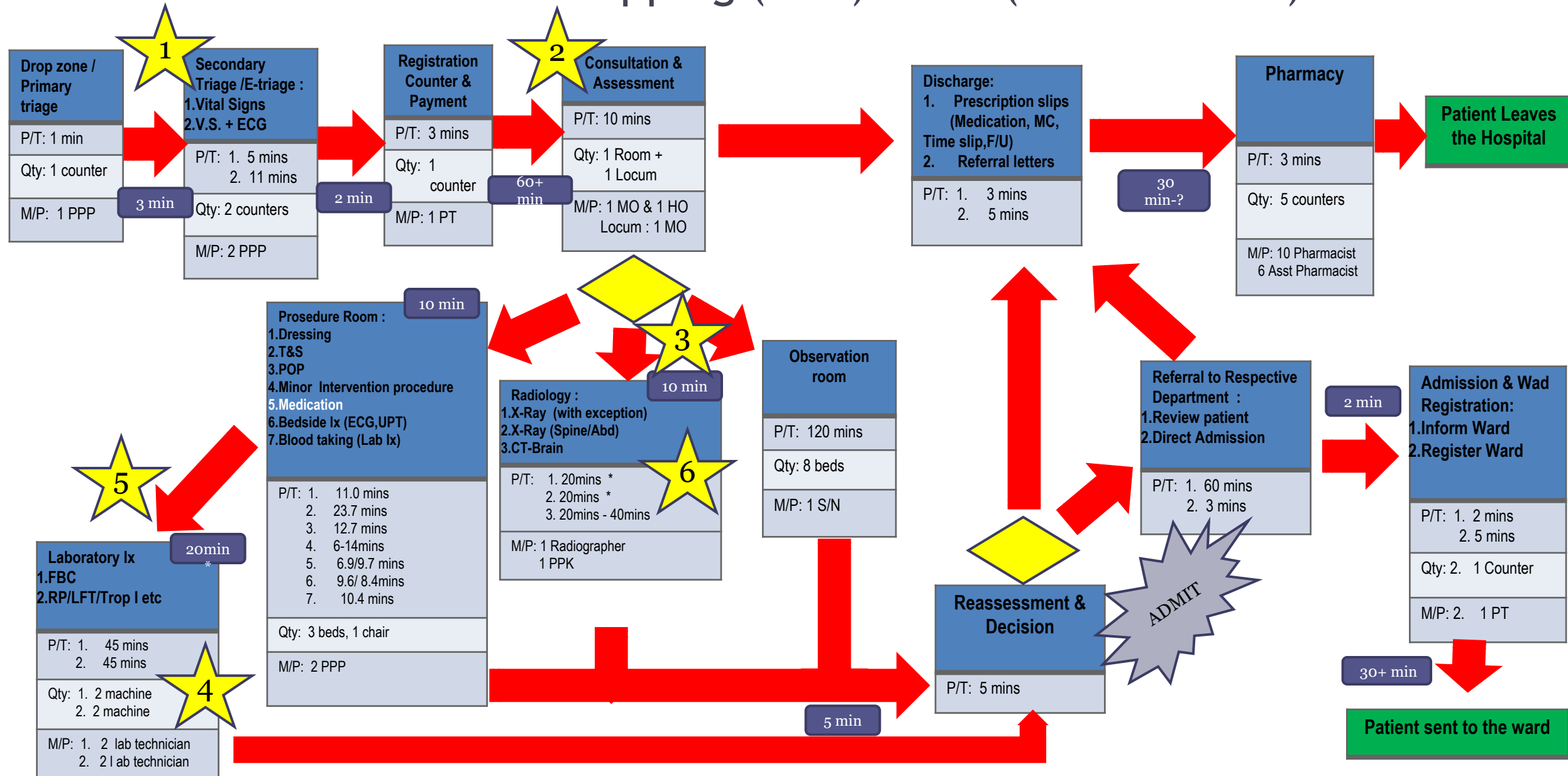
Methods

- Spaghetti diagram
- Heijunka
- Facility layout
- Visual workplace
- 5S

- **Value Stream Mapping**

- **AND many others.....**

Value Stream Mapping (VSM) in ED (GREEN ZONE)



Emergency Department Green Zone

VALUE ADDED / NON VALUE ADDED / BUSSINESS REQUIREMENT

	VALUE ADDED	NON VALUE ADDED	BUSSINESS REQUIREMENT
PRIMARY TRIAGE			
Primary triaging/ Ask chief complaint	√		
WAITING AREA			
Wait at secondary triage		√	
SECONDARY TRIAGE			
Brief history taking	√		
Check vital signs and record	√		
Perform simple procedure / dressing / medications if needed	√		
Register patient into E-Triage using patient's IC/Passport			√
REGISTRATION COUNTER AND PAYMENT			
Register patient into system using IC			√
Patient make payment/present GL		√	
Patient's ticket will be printed in Bilik A (Green Zone) via E-Triage			√
WAITING AREA IN GREEN ZONE			

	VALUE ADDED	NON VALUE ADDED	BUSSINESS REQUIREMENT
CONSULTATION & ASSESSMENT			
History taking	√		
Physical examination	√		
Documentating the history and examination			√
Refer to respective team if required		√	
Prescribe medications & Discharge	√		
Endorse medical leave	√		
Fill in forms - investigation, x-ray, notifications etc.			√
Give forms (investigation, x-ray, procedure) to patient		√	
Give radiology form to radiographer			√
Wait till being called for radio imaging		√	

	VALUE ADDED	NON VALUE ADDED	BUSSINESS REQUIREMENT
OBSERVATION ROOM			
Give prosedur slip to staff nurse			√
Patient was put on a bed	√		
Vital Signs taken		√	
Prosedur being done (Blood taking, ECG,CBS, Branula)	√		
Treatment administered (Medication, IV drips)	√		
Patient being monitored in observation room		√	
Staff nurse trace lab investigation results		√	
Inform Dr to review patient		√	
LABORATORY INVESTIGATIONS			
Compile blood sample and forms		√	
PPK send blood sample to lab		√	
Register lab form at lab counter			√
PPK take investigation results from pigeon hole		√	
PPK bring the investigation results to green zone		√	
Staff trace lab results via computer		√	

	VALUE ADDED	NON VALUE ADDED	BUSSINESS REQUIREMENT
RE-CONSULTATION (ASSESSMENT & DECISION)			
Review investigation results		√	
Consultation with patient	√		
Fill up forms - procedure form / consent / notifications / referral letter / etc			√
Prescribe medications & Discharge	√		
Endorse medical leave	√		
Refer to respective team for admission/early clinic appointments/opinions		√	
Write diagnosis in patient census/ documentation			√
Give ticket to patient for registration		√	
ADMISSION & REGISTRATION			
Patient /relative register at counter for admission with IC		√	
PT confirm bed availability in ward		√	
Registration form and patient sticker printed			√
Registration form/ticket given to patient/relative to be given back to staff		√	
Staff inform ward regarding admission			√
Put Registration form/ticket at PPK counter		√	
Patient wait at green zone/ observation room before being sent into the ward		√	

KAIZEN / STRATEGIES

Kaizen/Strategies

1. Triage Screener
 2. E- Triage development
 3. Patient Pitstop
 4. Directives/Signage
 5. Laboratory Notification System
 6. Availability of Abdominal & Spine Xray in Satellite X-ray
- +
1. Microphone in Green zone consultation rooms
 2. Rearrangement of forms
 3. Patient Disposition Status Monitoring (PDSM)
 4. Bed Status in Ward

1. Triage Screener



MAKLUMAT PESAKIT

Tahun

Bulan

Hari

Aras Rekod: 54886Jum Rekod : 54338

No_KP

IDPesakit

(New)

Nama

Alamat

Bandar

Poskod

Negeri

Tarikh_Lahir

Umur

Umur(Bulan)

Umur(Hari)

Keturunan

TarafPerkahwinan

Jantina

Agama

Warga

Warga(Nyatakan)

OPesakit

IDPesakit

Tarikh

Masa_Triage

DokumenI

Daftar_Oleh

Presen

PRIMARY/SECONDARY TRIAGE

RIDPesakit

9

Tarikh

21/12/2017

Masa_Triage

4:06:50 PM

No_Giliran

Daftar_Oleh

PPP

MOHAMAD YUNUS BIN MOHAMAD

JenisKes

01

BARU

Sumber_Aduan

01

PESAKIT

JikaSumberLain

Keadaan_Pesakit

02

WHEEL CHAIR

Kes_Perundangan

02

KES BUKAN PERUNDANGAN

No_Report

Punca_Rujukan

01

SENDIRI

Rujukan(Nyatakan)

Kategori_Kes

04

PERUBATAN

JenisTrauma

00

TIDAK BERKAITAN

KategoriPesakit:

2

Non Trauma

Version 1.1/ 2015

eTriage

Sistem Data Klinikal Pesakit

Jabatan Kecemasan & Trauma

Tuesday, 2 October, 2018

AKTIVITI

PENDAFTARAN

LAPORAN TRIAGE

SYIF PAGI

SYIF PETANG

SYIF MALAM

PENDAFTARAN KES RED

PESAKIT PAGI

PESAKIT PETANG

PESAKIT MALAM

PESAKIT WP

PESAKIT LWP

PENDAFTARAN KES YELLOW

PESAKIT PAGI

PESAKIT PETANG

PESAKIT MALAM

PESAKIT WP

PESAKIT LWP

PENDAFTARAN KES HIJAU

PESAKIT PAGI

PESAKIT PETANG

PESAKIT MALAM

PESAKIT WP

PESAKIT LWP

STATISTIK

TRIAGE - PL 210A

PL206-A

PL206-B

PL206-C

LAIN-LAIN

PL206-D

PL206-E

PL206-F

PUNCA RUJUKAN

PROSEDUR

PL 212

INFORMASI

PENDAFTARAN

LAPORAN DAFTAR

PESAKIT PAGI

LAPORAN RED ZONE

PESAKIT PAGI

LAPORAN YELLOW ZONE

PESAKIT PAGI

LAPORAN GREEN ZONE

PESAKIT PAGI

PESAKIT PETANG

PESAKIT MALAM

MAKLUMAT UNIT/WAD

NAMA WAD

MAKLUMAT ANGGOTA

PEN PEG PERUBATAN

PEGAWAI PERUBATAN

JURURAWAT

ADUAN PESAKIT

PresentingComplain

giddiness

both leg pain

vomiting

PostMed/SurgicalHx

SEJARAH PESAKIT

Asthma

HPT

DM

IHD

CKD

Lain-lain(Nyatakan)

KodTriage

03

VISITAG

BP

125

/

53

G1

PR

81

SPO2

100

ECG

RR

18

Temp

36.7

FindingECG

PainScore

2

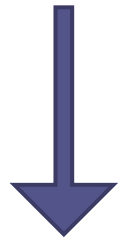
CBS

TandaVitalLai

Physical Examination

2. E- Triage

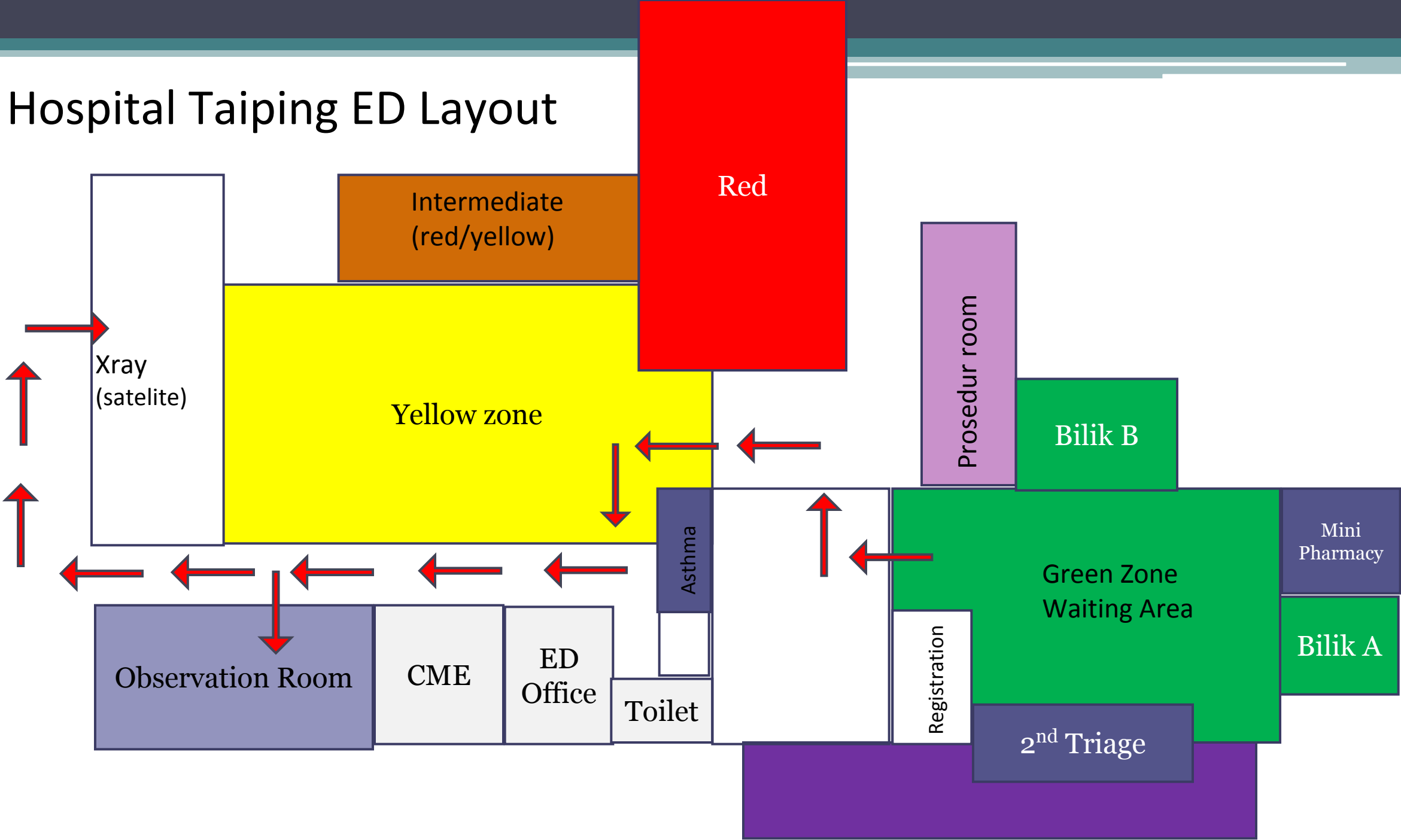
3. Patient Pitstop



4. Microphones in consultation rooms



Hospital Taiping ED Layout





18/07/2016 11:35



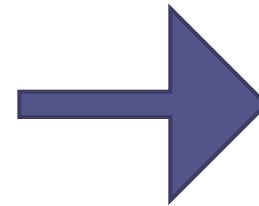
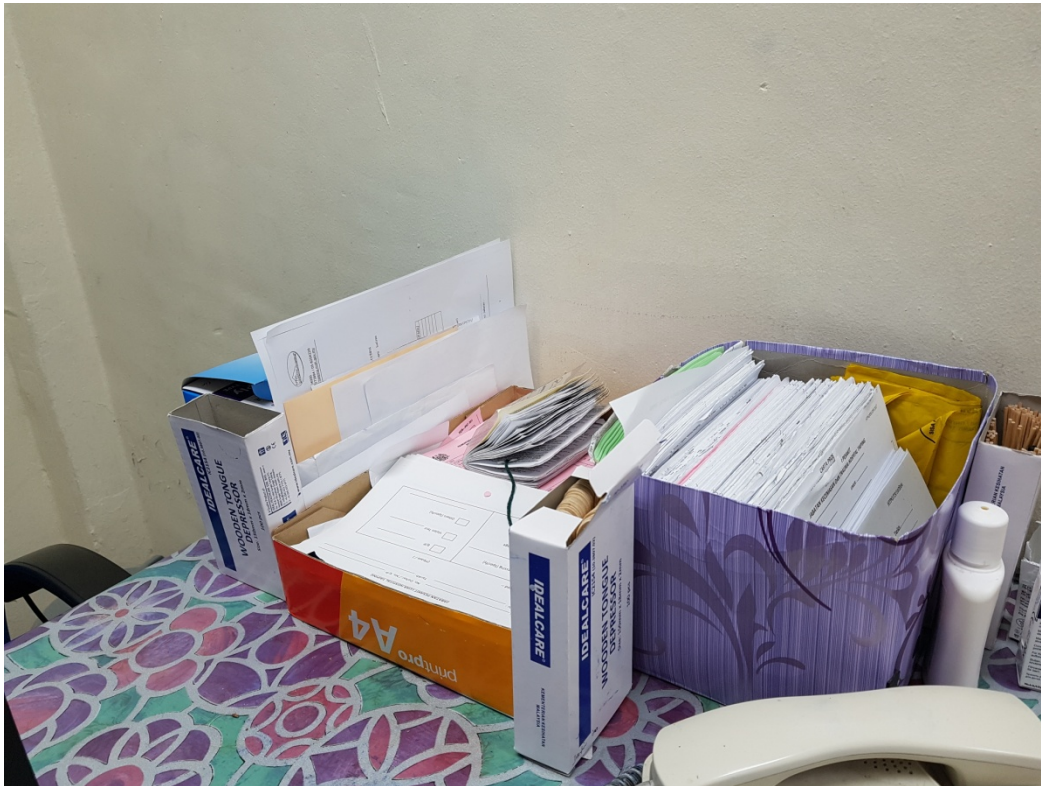
5. Directives



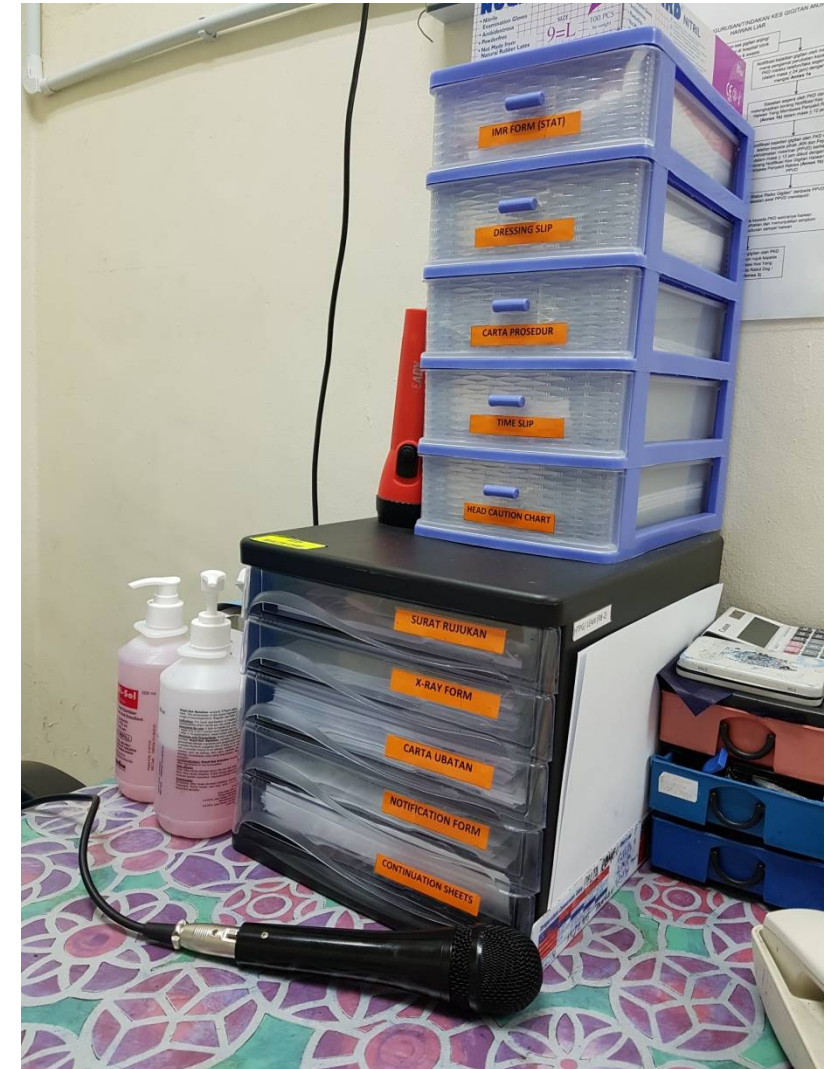
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7. Rearrangement of forms

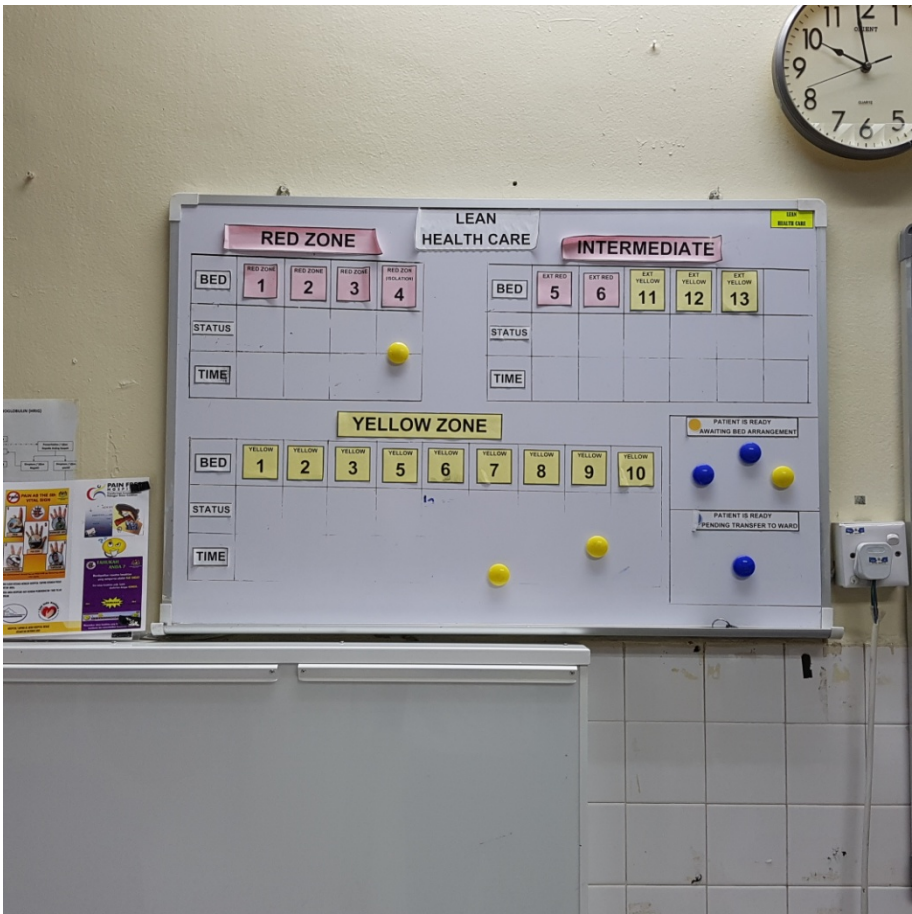
BEFORE



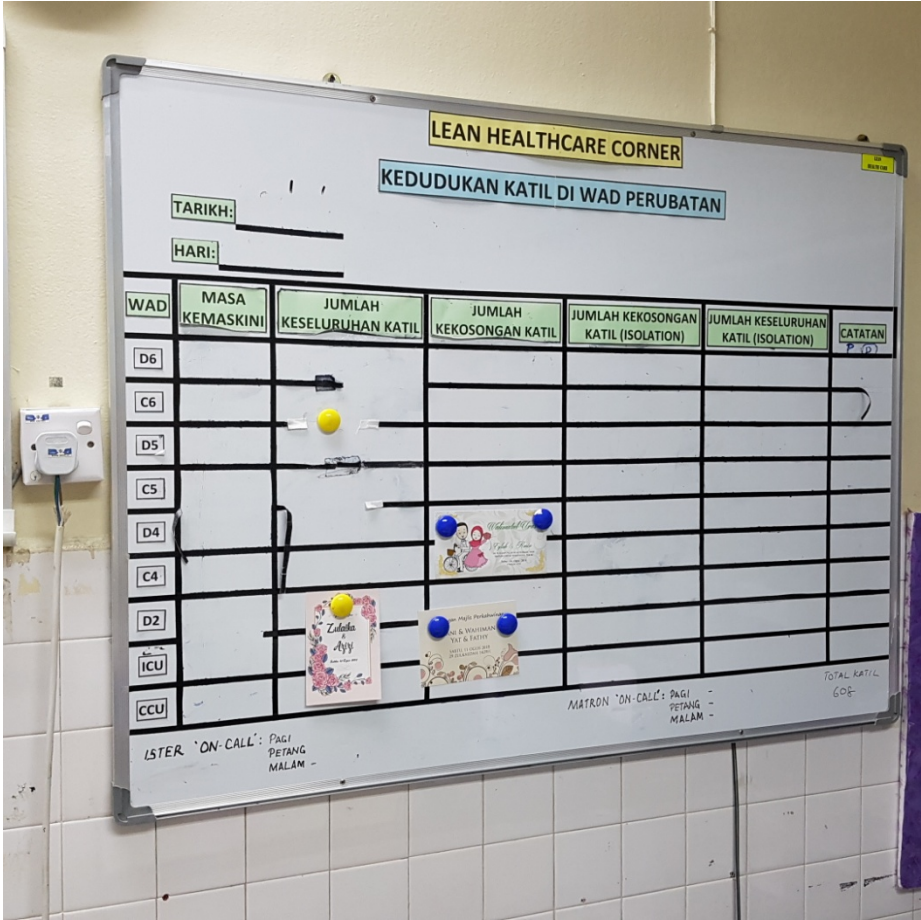
AFTER



8. Patient Disposition Status Monitoring (PDSM)



9. Bed Status in Medical Ward



DATA COLLECTED IN EMERGENCY DEPARTMENT

NO	DATA	PRELEAN 12/04/16 - 26/04/16	POST LEAN 1 19/09/16 - 02/10/16	POST LEAN 2 10/07/17 - 16/7/17	POST LEAN 3 30/04/18 - 06/05/18	POST LEAN 4 19/11/18 - 25/11/18
1.	SAMPLE SIZE	ATC : 2188 LOS : 2188 BWT : 201	ATC : 1819 LOS : 1673 BWT : 171	ATC : 651 LOS : 642 BWT : 74	ATC : 1134 LOS : 1134 BWT : 90	ATC : 1336 LOS : 523 BWT : 53
2.	Mean ATC (Green Zone)	37 mins	27 mins	31 mins	33 mins	33 mins
3.	Throughput ATC (<90mins)	95.8 %	97.3 %	94.5 %	95.1 %	96.9 %
4.	Mean LOS (Green Zone)	1 hr 19 mins	1 hr 17 mins	1 hr 27 mins	1 hr	1 hr 25 mins
5.	Throughput LOS (<2 hrs)	81.6 %	82.0 %	78.8 %	77.3 %	72.1 %
6.	Mean BWT (Medical case)	1 hr 19 mins	1 hr 57 mins	2 hrs 32 mins	3 hrs 13 mins	2 hr 51 mins
7.	Throughput BWT (< 2hrs)	83.6 %	69.6 %	54.1 %	36.7 %	34.0 %
8.	CNA (Call not available) (KPI ≤ 1%)	0.8 %	1.6 %	1.2 %	0.8 %	0.67 %

ATC : Arrival To Consultation

LOS : Length Of Stay

BWT : Bed Waiting Time

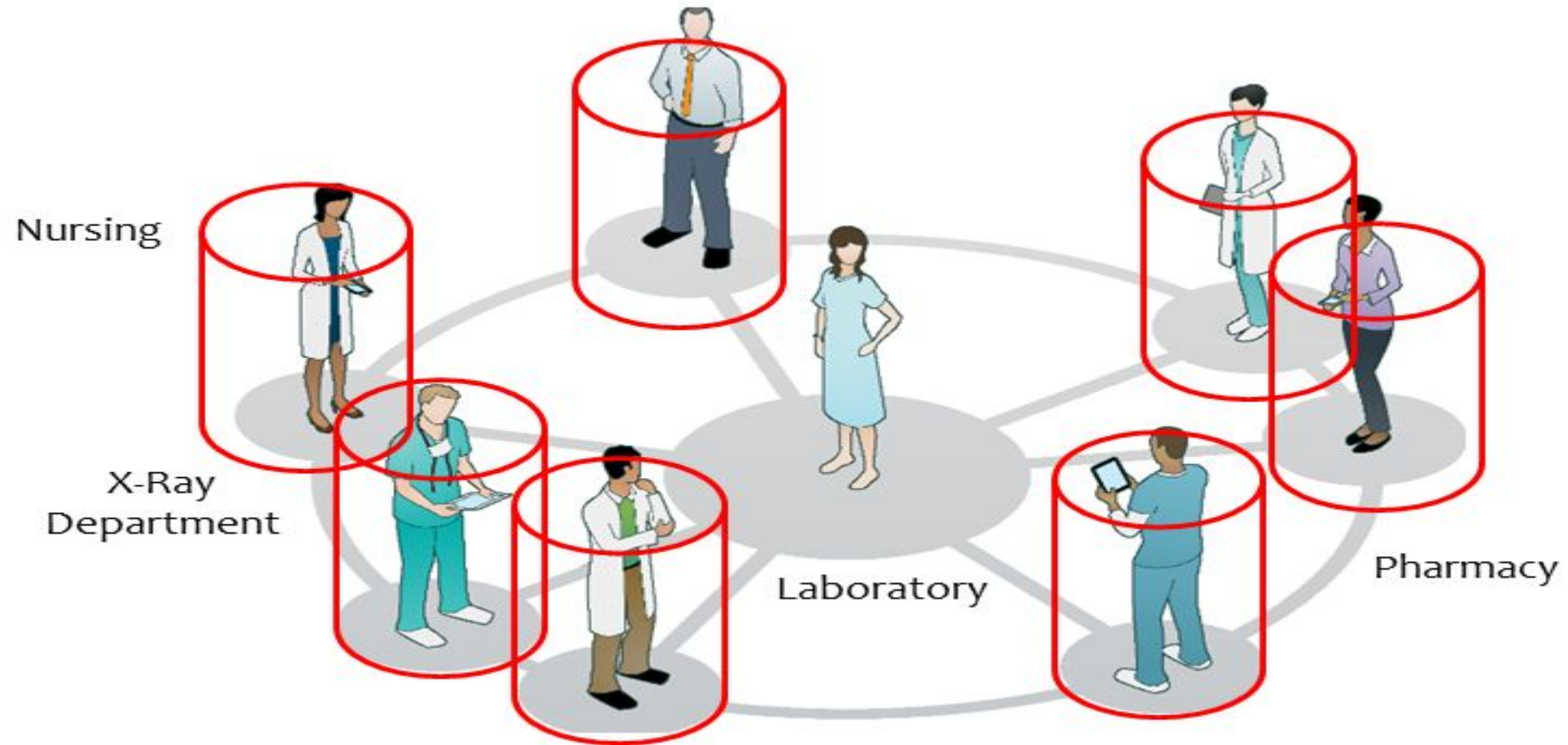
CNA : Call Not Attended

What's next?

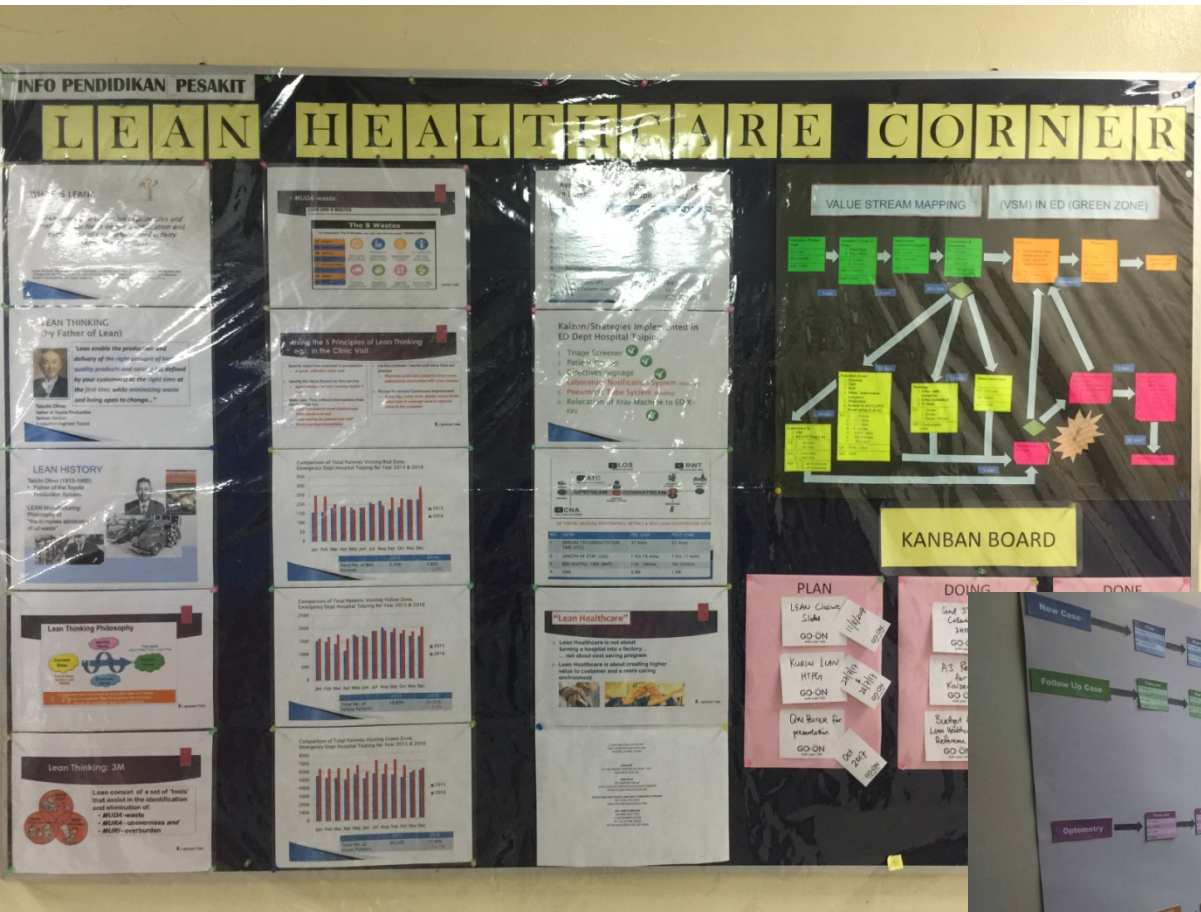
CHALLENGES IN HEALTHCARE SERVICE IN ADOPTING LEAN

1. Failure to recognize
2. Resistance to accept /
change
3. Sustainability
4. Existence of silo

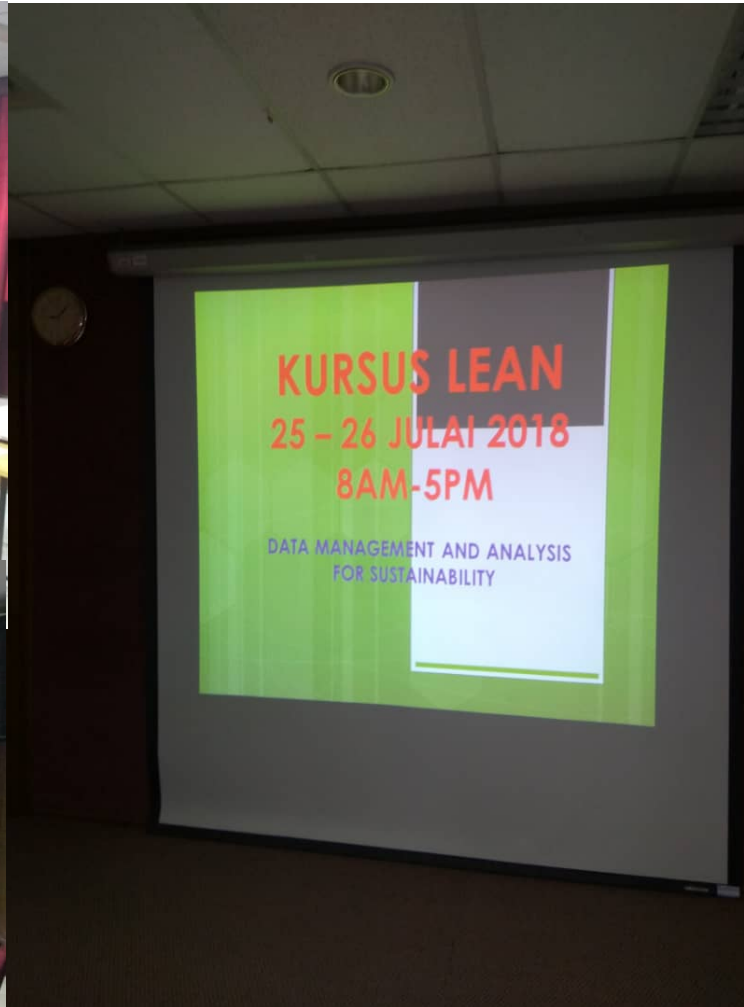
Another important value creation generated from this project is **breaking-up the silos** .



Creating awareness in other Depts



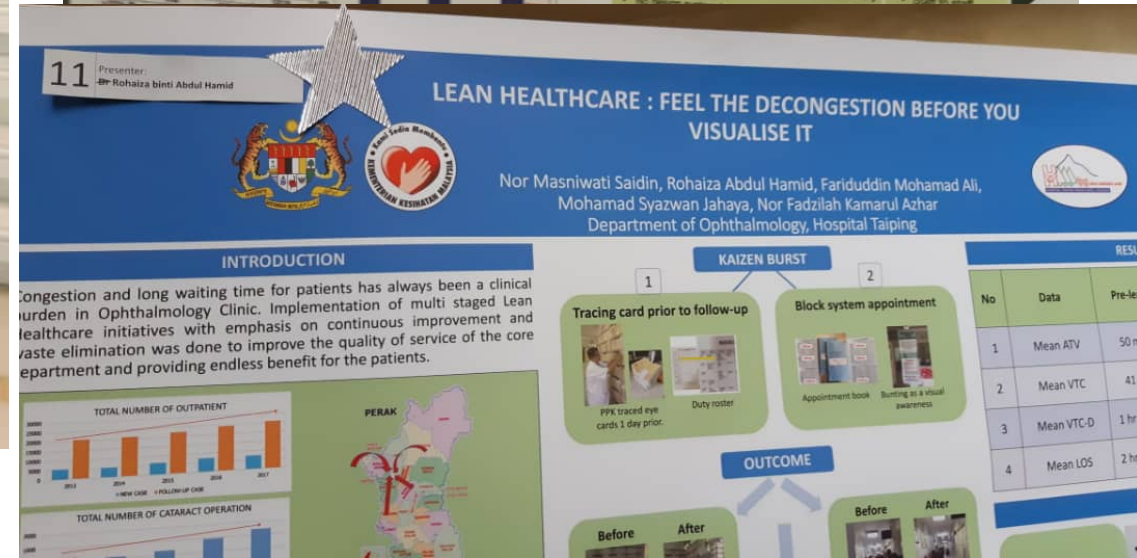
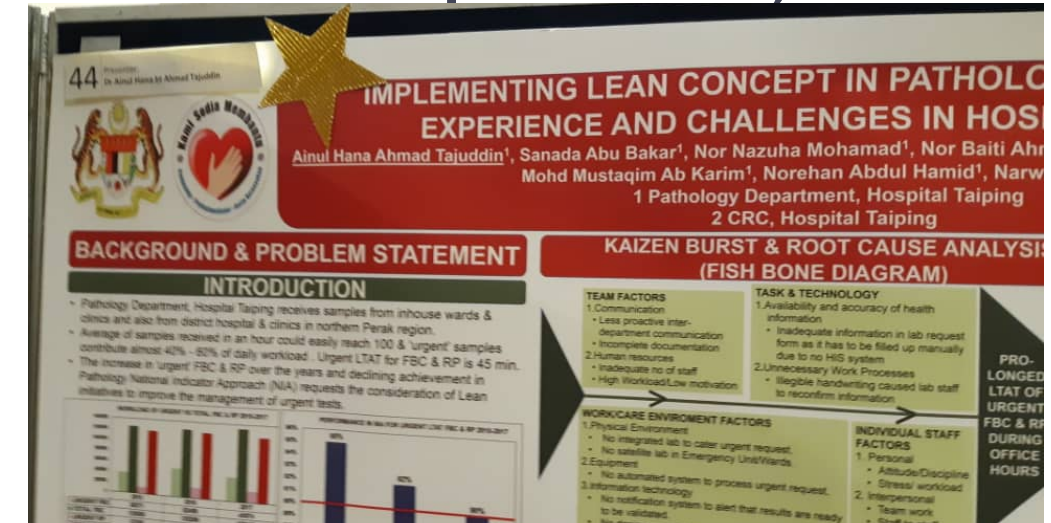
...and share the knowledge...



...involve the top level...



NATIONAL LEAN HEALTHCARE CONFERENCE 2018 : Everybody Can Lean (25th Sept - 27th Sept 2018)



Until June 2019.....

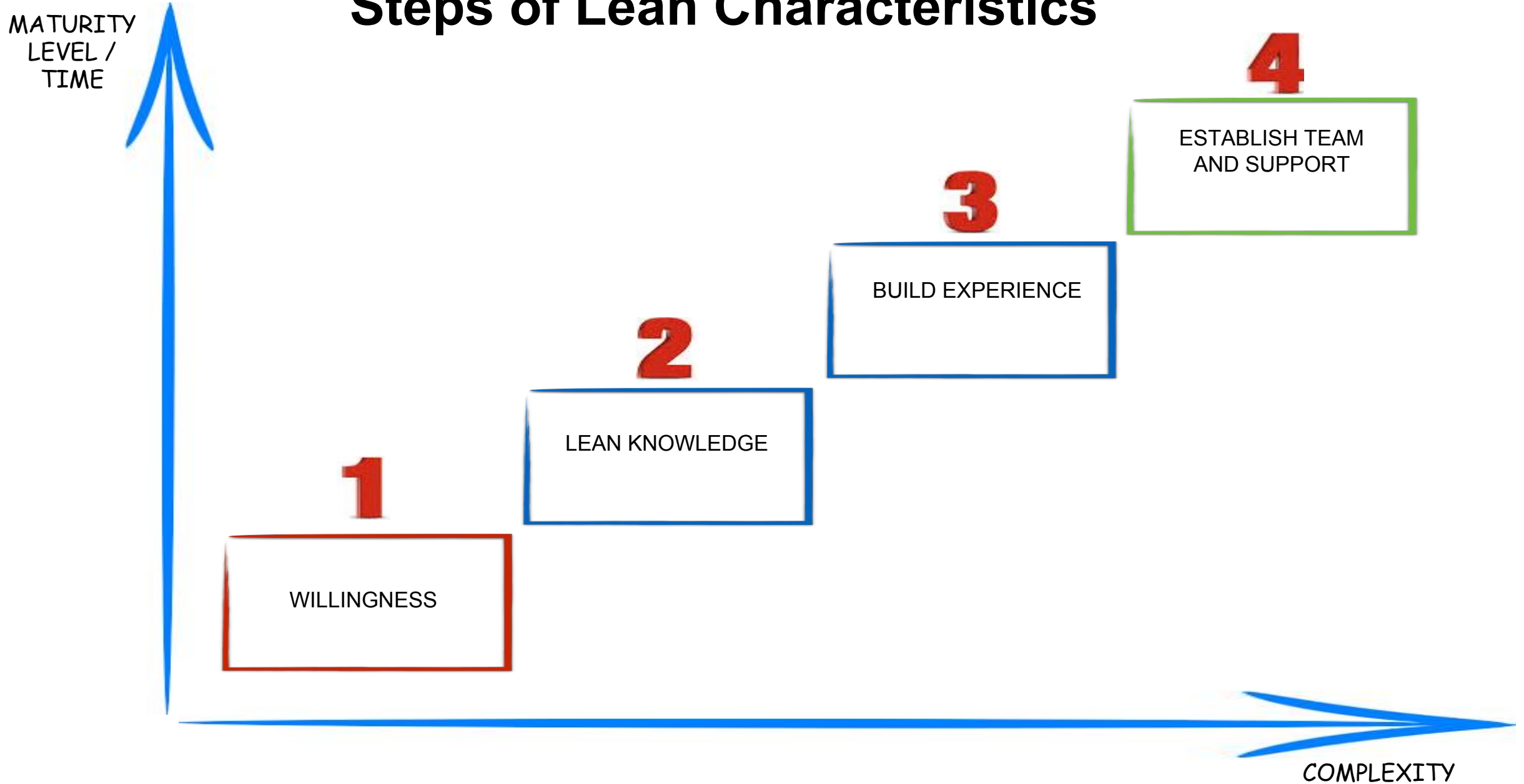
- Emergency Medicine
- Internal Medicine
- Pathology
- Ophthalmology
- Radiology
- Orthopedics
- Pharmacy
- Pediatrics
- Dietetics
- General Surgery
- Research Center
- Administrative office

Since Year 2017.... The idea of c introduced...

- Lead Hospital : Taiping Hospital
- Non Lead Hospital :
Selama Hospital (46.5km)
Parit Buntar Hospital (52.7km)
Grik Hospital (124km)
Kuala Kangsar Hospital (36.5km)



Steps of Lean Characteristics



Focus Effort

Typical way of doing
improvement



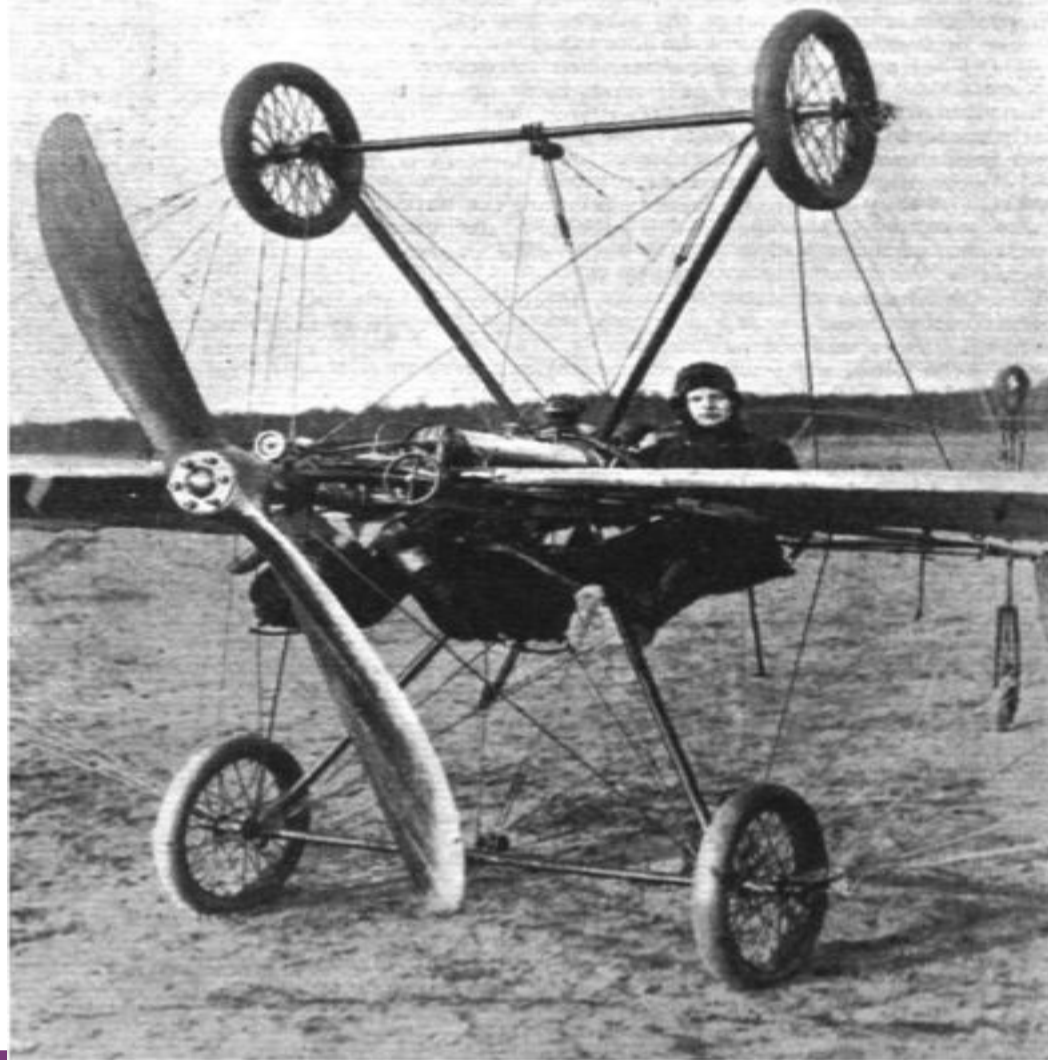
FIRE FIGHTING



New way of doing
improvement



FIRE PREVENTION



Knowing
is not enough.
We must apply.
Willing
is not enough.
We must do.

~ Bruce Lee

“Lean

Healthcare” *“Having no problem” is the biggest problem of all ...”*

Taiichi

Ohno

- Lean Healthcare is not a project, it is a journey...As you go along this journey, new hurdles will emerge and we need to try to solve it. This is an ongoing cycle...

Thank You