

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

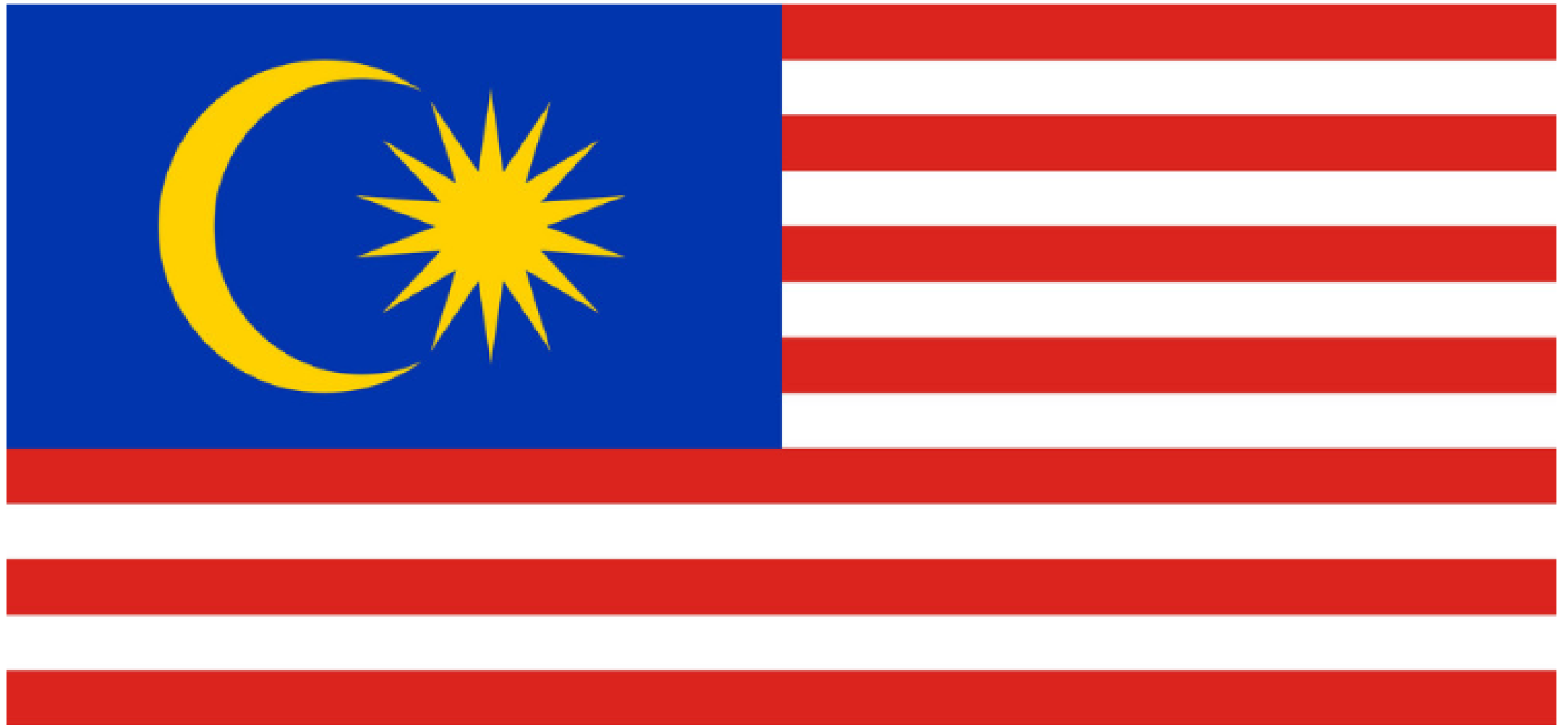
CHUNG WAI MUN

Malaysia

# Declaration of Interest

- No conflict of interest



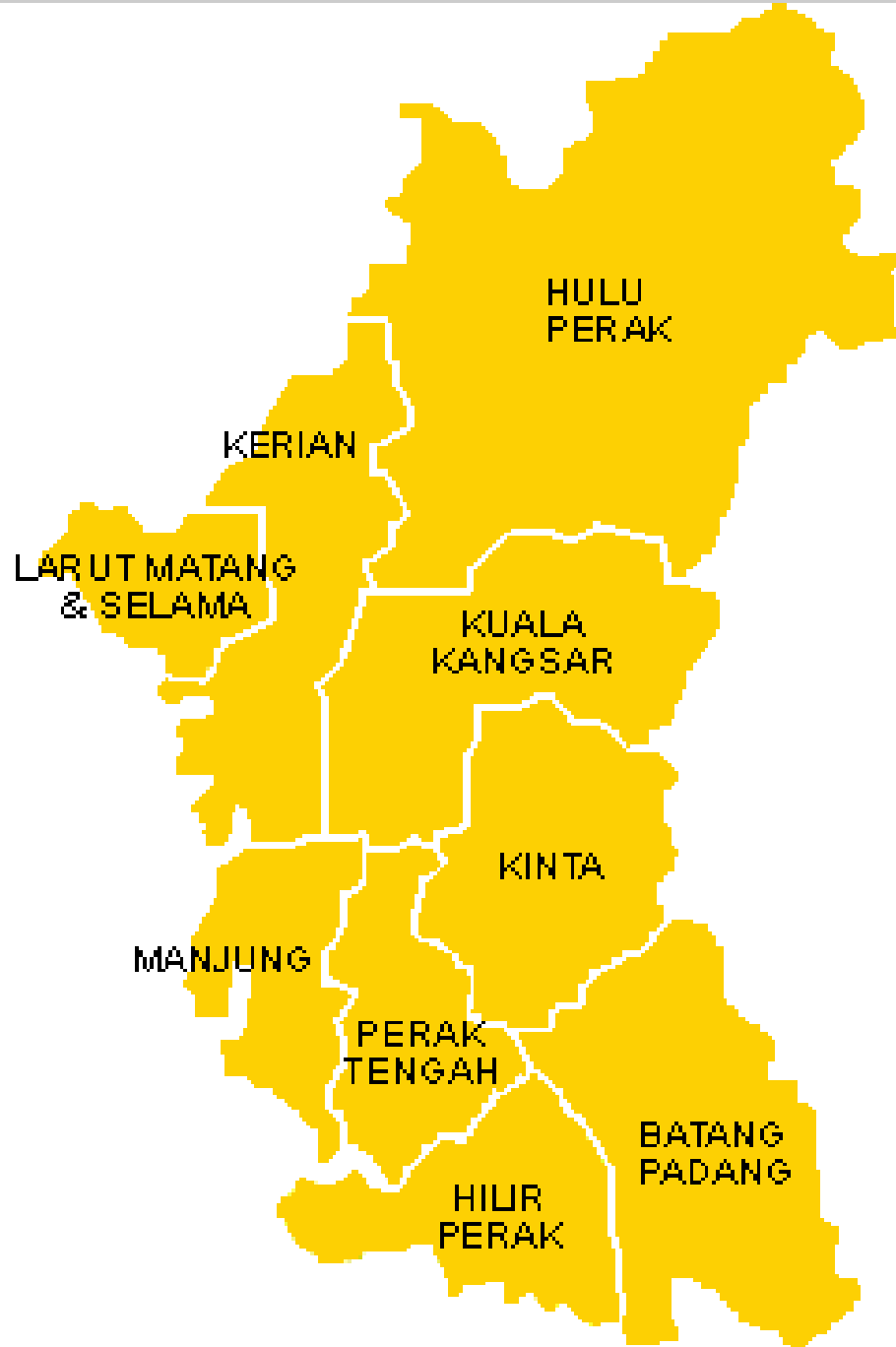


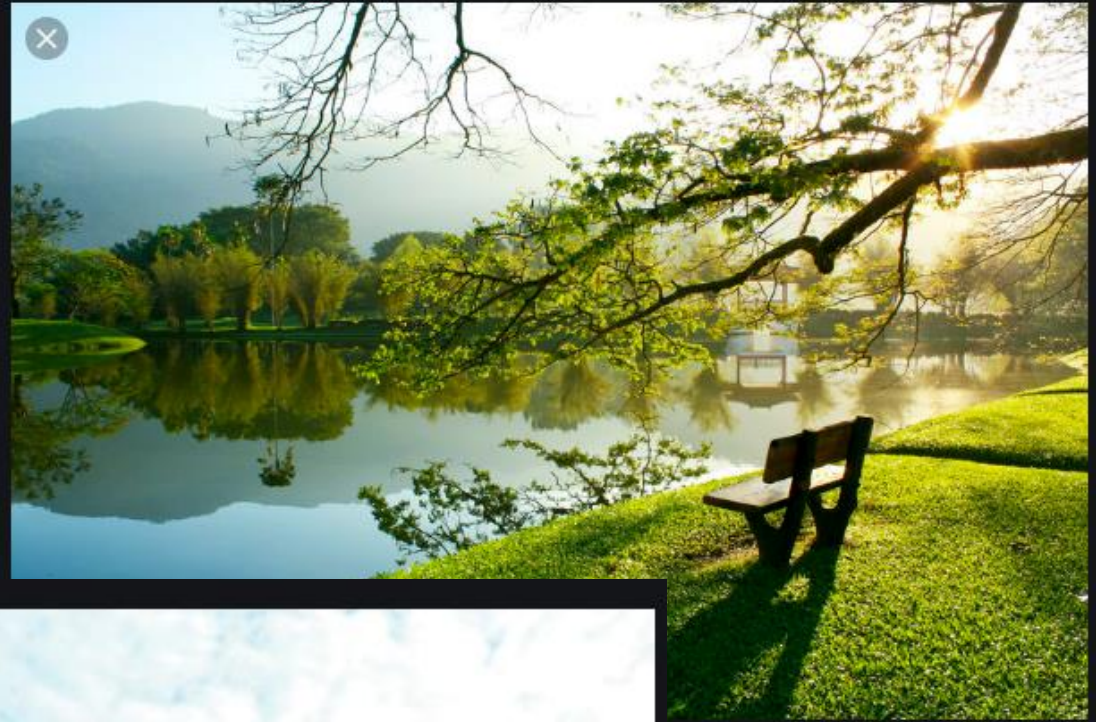
Proportion 1:2

Malaysia









 New Straits Times

Taiping is No 3 most sustainable city in t





Year 1880



Hospital Taiping





Lean in Emergency Department, Taiping  
Hospital  
A journey shared.....

# Content

- Introduction
  - Lean Healthcare in Emergency Department
  - Kaizen & Challenges
  - What's Next?
- 
- Lean.... Ready to change....

# Where it all started....



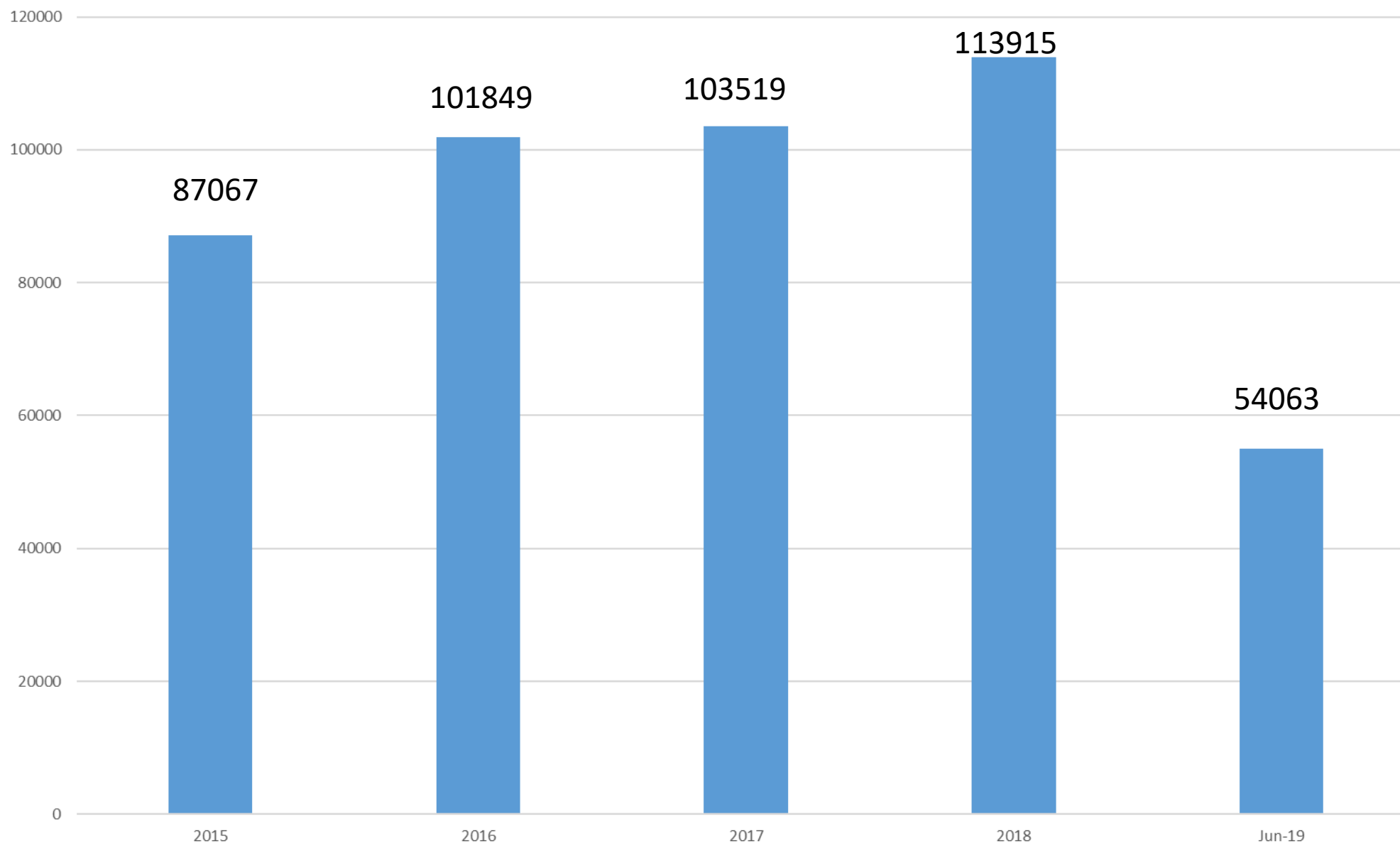
8<sup>th</sup>-10<sup>th</sup> March 2016

**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	3
INTERMEDIATE RED/YELLOW	5
YELLOW	9
OBSERVATION ROOM	8
ISOLATION	1
<b>TOTAL</b>	<b>26</b>

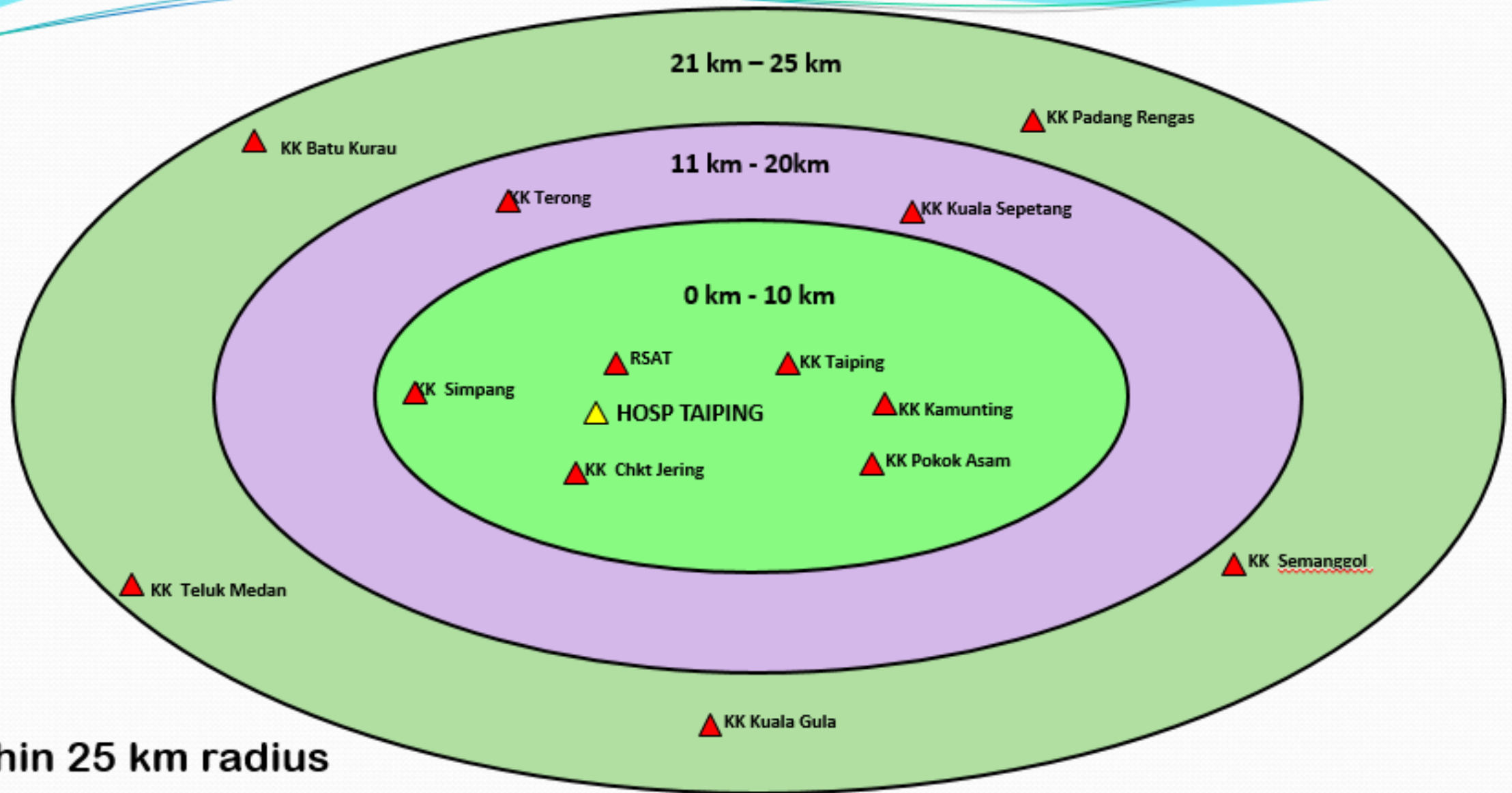
ZONE	ROOM
GREEN	ROOM A / ROOM B (LOCUM)

# Staff Strength in Emergency Department

NO	STAFF	QUANTITY
1	Specialist	5
2	Medical Officer	20
3	House Officer	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....



# 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

# 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 AND 8 WASTES

## The 8 Wastes

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

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



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.



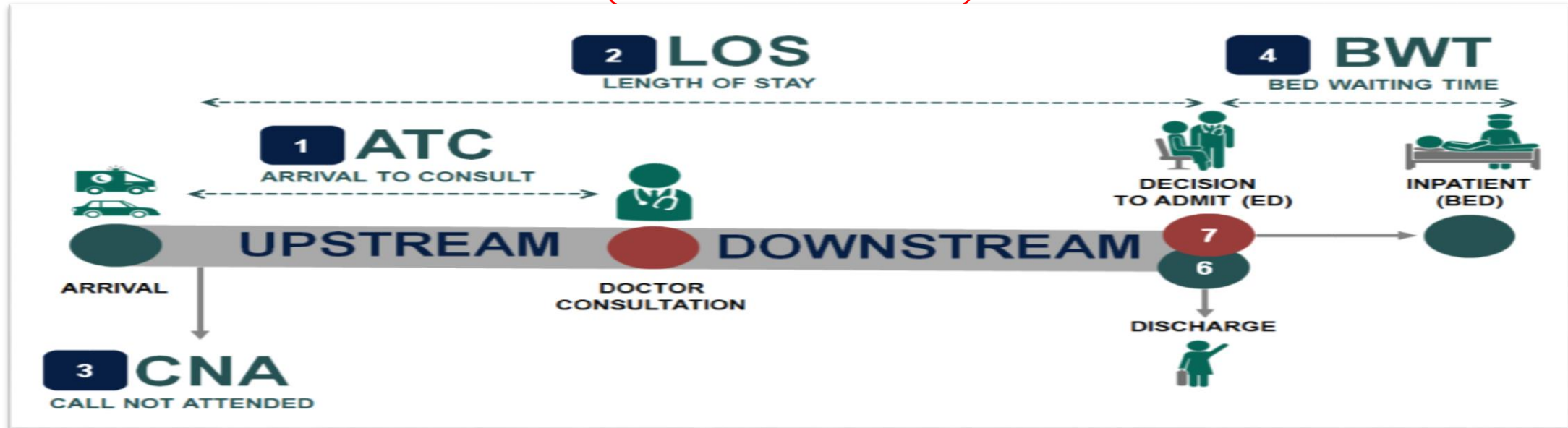
- So many data to collect...
- So much work to do....
- Is Lean applicable even for us?
- The patient waiting time/ work flow in our dept was quite good... Is Lean really worth the shot?





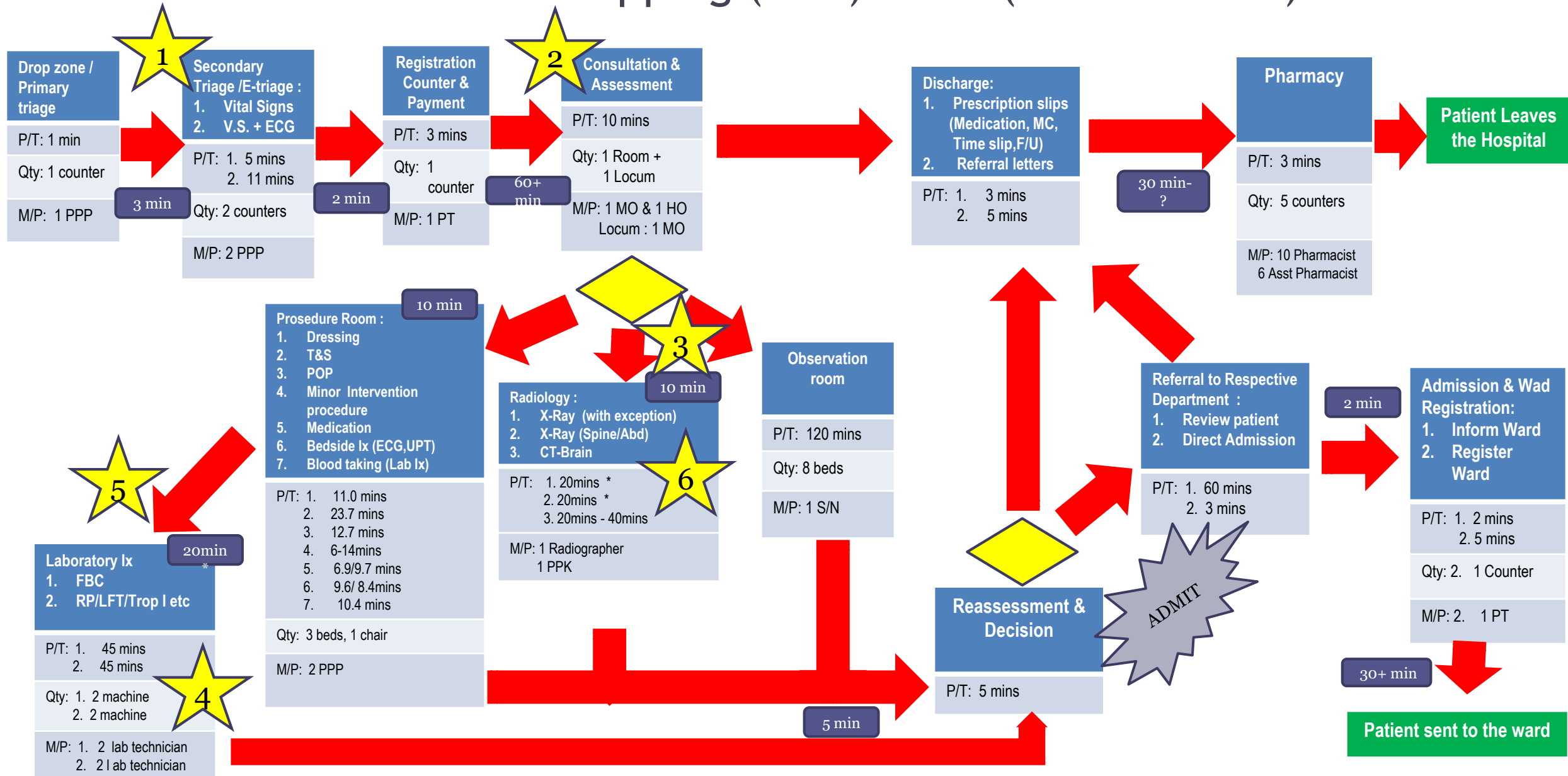
# CURRENT SITUATION

( Baseline Performance)



NO	DATA (PERFORMANCE METRICS)	PRE LEAN	KPI	THROUGHPUT
1	ARRIVAL TO CONSULTATION TIME (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	CNA	0.8%	<1.0%	-

# 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
<b>PRIMARY TRIAGE</b>			
Primary triaging/ Ask chief complaint	√		
<b>WAITING AREA</b>			
Wait at secondary triage		√	
<b>SECONDARY TRIAGE</b>			
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			√
<b>REGISTRATION COUNTER AND PAYMENT</b>			
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			√
<b>WAITING AREA IN GREEN ZONE</b>			
Wait at 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		√	
reconsultation		√	



	VALUE ADDED	NON VALUE ADDED	BUSSINESS REQUIREMENT
<b>OBSERVATION ROOM</b>			
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		√	
<b>LABORATORY INVESTIGATIONS</b>			
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
<b>RE-CONSULTATION (ASSESSMENT &amp; DECISION)</b>			
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		√	
<b>ADMISSION &amp; REGISTRATION</b>			
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. Pneumatic Tube System
7. Availability of Abdominal & Spine Xray in Satellite X-ray

+

1. Microphone in Green zone consultation rooms
2. Rearrangements 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)

DPesakit

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(Nyatakar)

Kategori\_Kes

04

PERUBATAN

JenisTrauma

00

TIDAK BERKAITAN

KategoriPesakit:

2

Non Trauma

AKTIVITI

PENDAFTARAN

INFORMASI

PENDAFTARAN

LAPORAN TRIAGE

SYIF PAGI

SYIF PETANG

SYIF MALAM

PENDAFTARAN KES RED

PESAKIT PAGI

PESAKIT PETANG

PESAKIT MALAM

PESAKIT WP

PESAKIT LWP

LAPORAN RED ZONE

PESAKIT PAGI

PENDAFTARAN KES YELLOW

PESAKIT PAGI

PESAKIT PETANG

PESAKIT MALAM

PESAKIT WP

PESAKIT LWP

LAPORAN YELLOW ZONE

PESAKIT PAGI

PENDAFTARAN KES HIJAU

PESAKIT PAGI

PESAKIT PETANG

PESAKIT MALAM

PESAKIT WP

PESAKIT LWP

LAPORAN GREEN ZONE

PESAKIT PAGI

PESAKIT PETANG

PESAKIT MALAM

STATISTIK

TRIAGE - PL 210A

PL206-A

PL206-B

PL206-C

LAIN-LAIN

PL206-D

PL206-E

PL206-F

PUNCA RUJUKAN

PROSEDUR

PL 212

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

V  
I  
S  
I  
T  
A  
L

BP

125

/

53

PR

81

SPO2

100

ECG

RR

18

Temp

36.7

FindingECG

PainScore

2

CBS

TandaVitalLai

Physical Examinati

VERSION 1.1/ 2015

eTriage

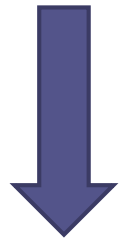
Sistem Data Klinikal Pesakit

Jabatan Kecemasan & Trauma

Tuesday, 2 October, 2018

2. E- Triage

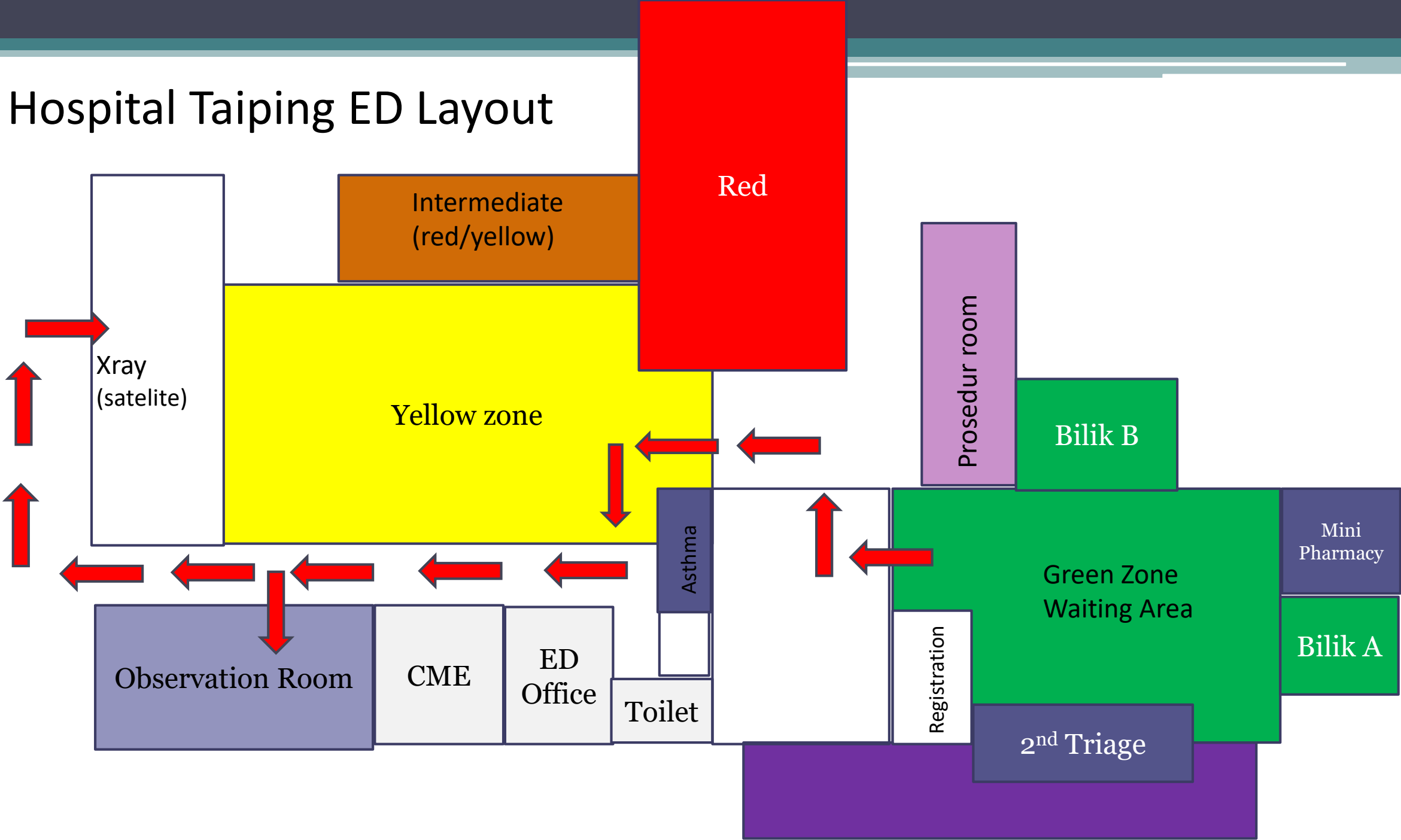
### 3. Patient Pitstop



### 4. Microphones in consultation rooms



# Hospital Taiping ED Layout







18/07/2016 11:35



## 5. Directives

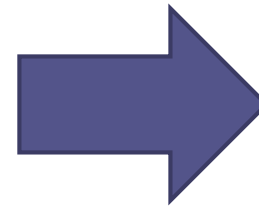
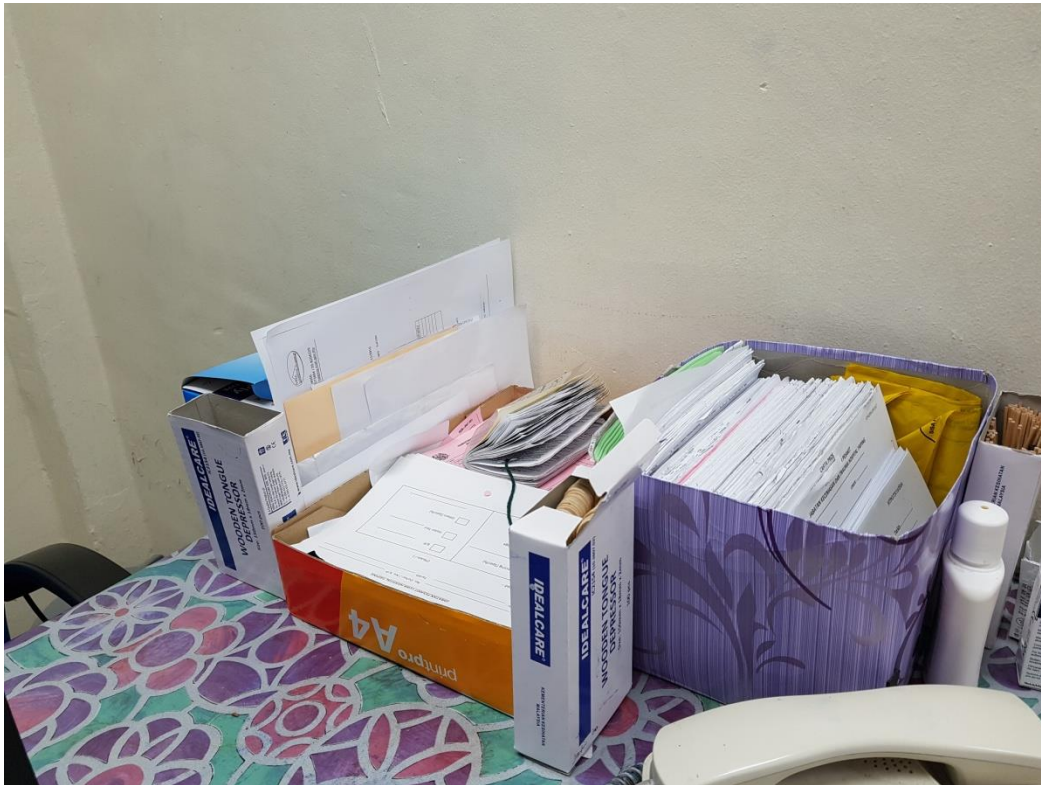


## 6. Availability of Abdominal & Spine Xray in Satellite X-ray



## 7. Rearrangement of forms

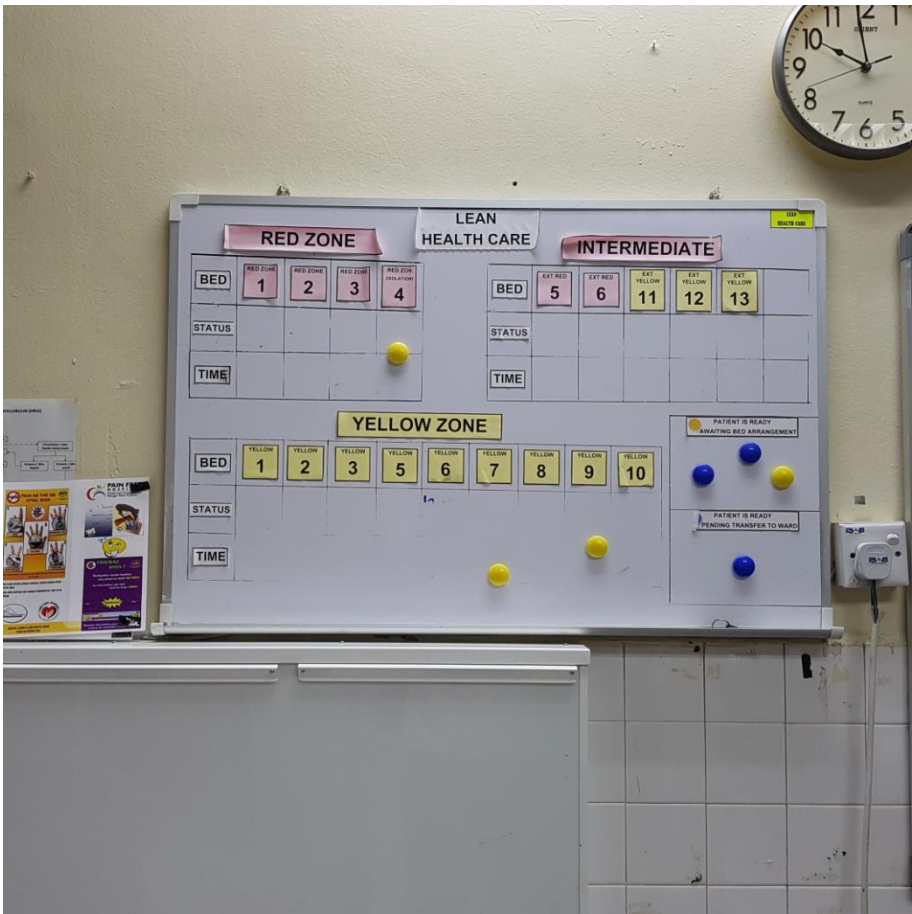
BEFORE



AFTER



## 8. Patient Disposition Status Monitoring (PDSM)



## 9. Bed Status in Medical Ward



## DATA COLLECTED IN EMERGENCY DEPARTMENT

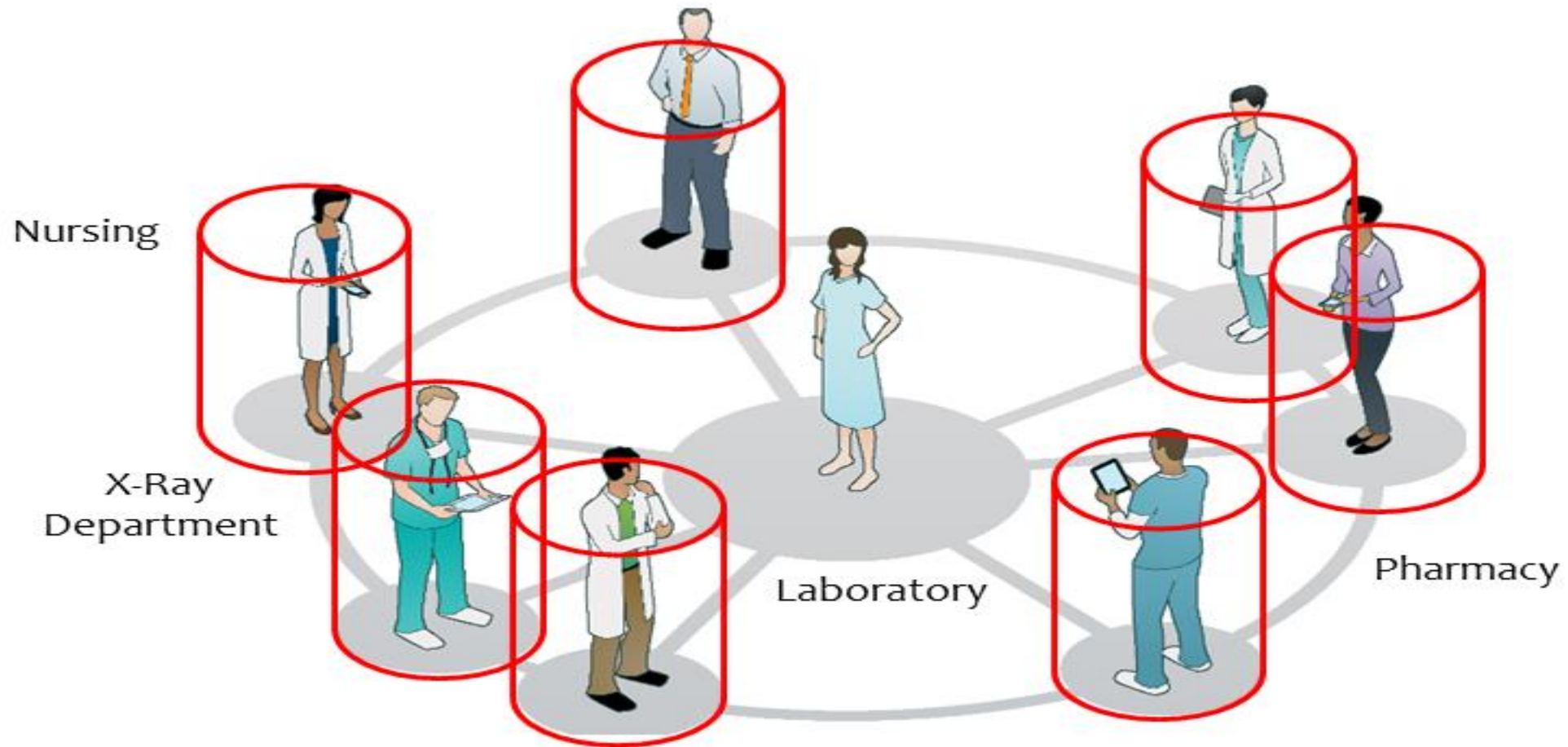
NO	DATA	PRELEAN 12/04/16 - 26/04/16	POST LEAN 1 19/09/16 - 02/10/16	POST LEAN 2 10/07/17 - 16/7/17	POST LEAN 3 30/04/18 - 06/05/18	POST LEAN 4 19/11/18 - 25/11/18
1.	SAMPLE SIZE	ATC : 2188 LOS : 2188 BWT : 201	ATC : 1819 LOS : 1673 BWT : 171	ATC : 651 LOS : 642 BWT : 74	ATC : 1134 LOS : 1134 BWT : 90	ATC : 1336 LOS : 523 BWT : 53
2.	Mean <b>ATC</b> (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 <b>LOS</b> (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 <b>BWT</b> (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.	<b>CNA</b> (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?

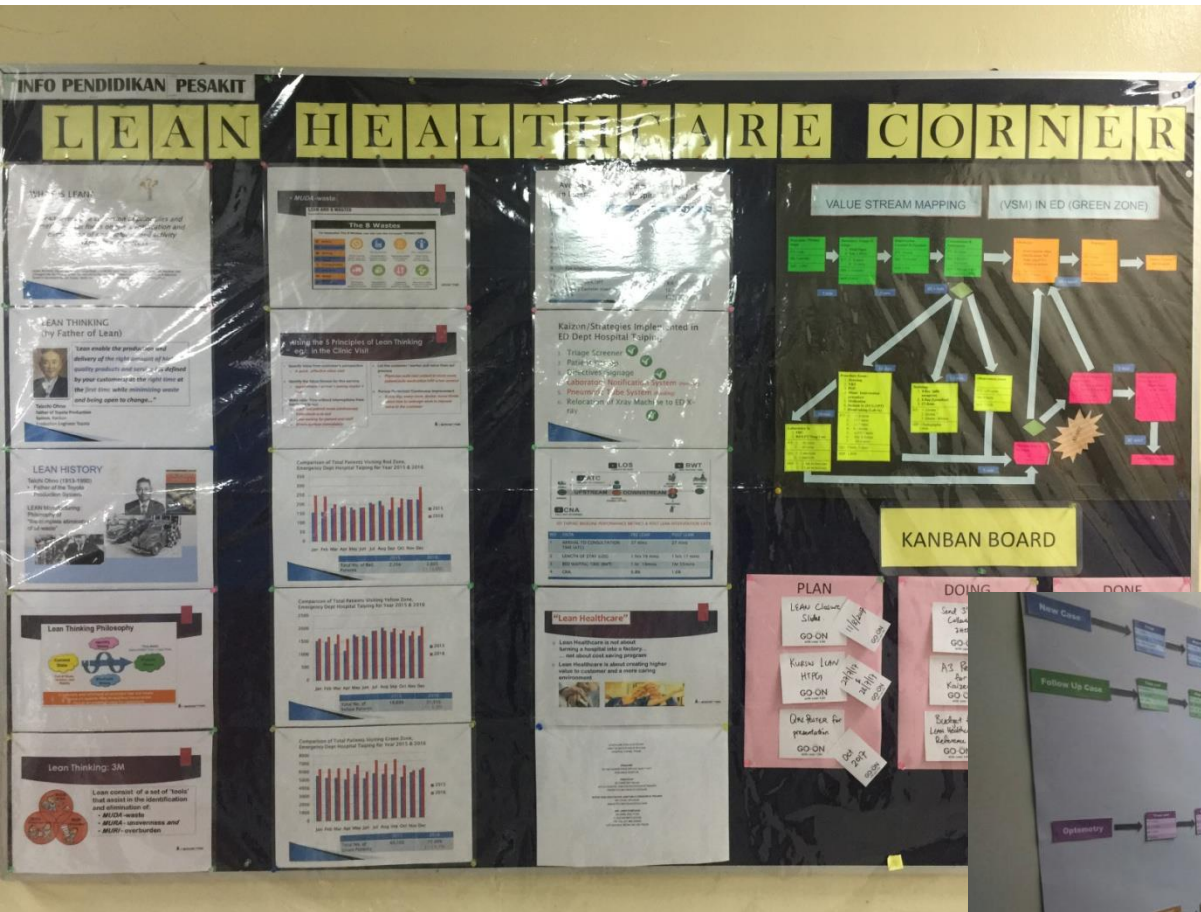


Another important value creation generated from this project is **breaking-up the silos** .



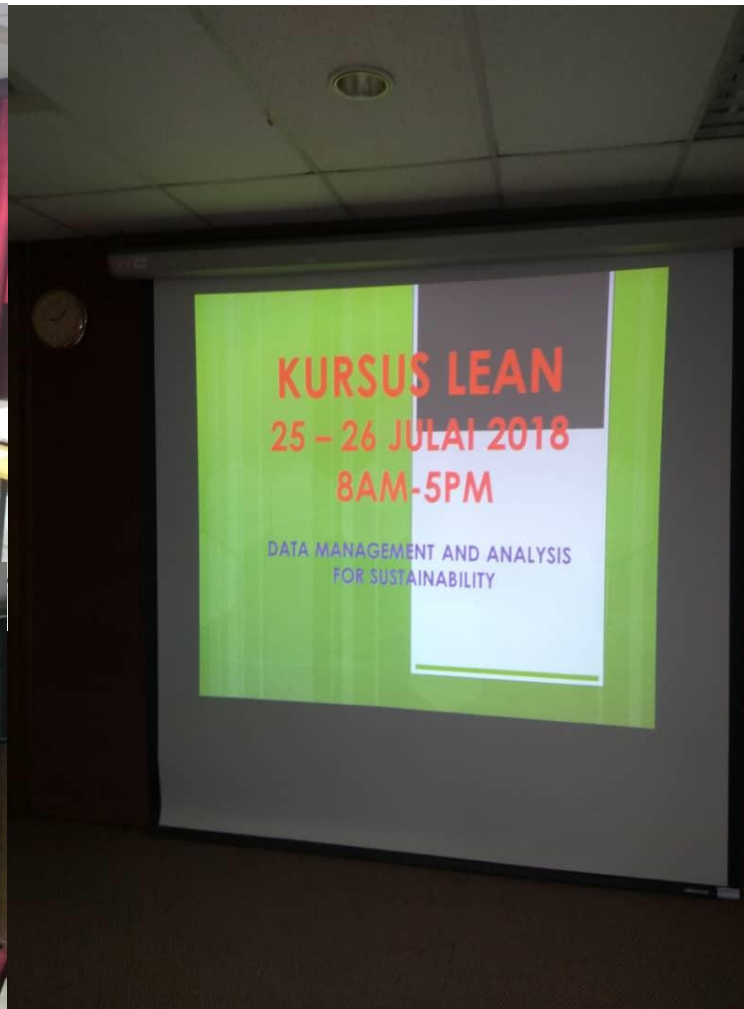


# Creating awareness in other Depts





...and share the knowledge...



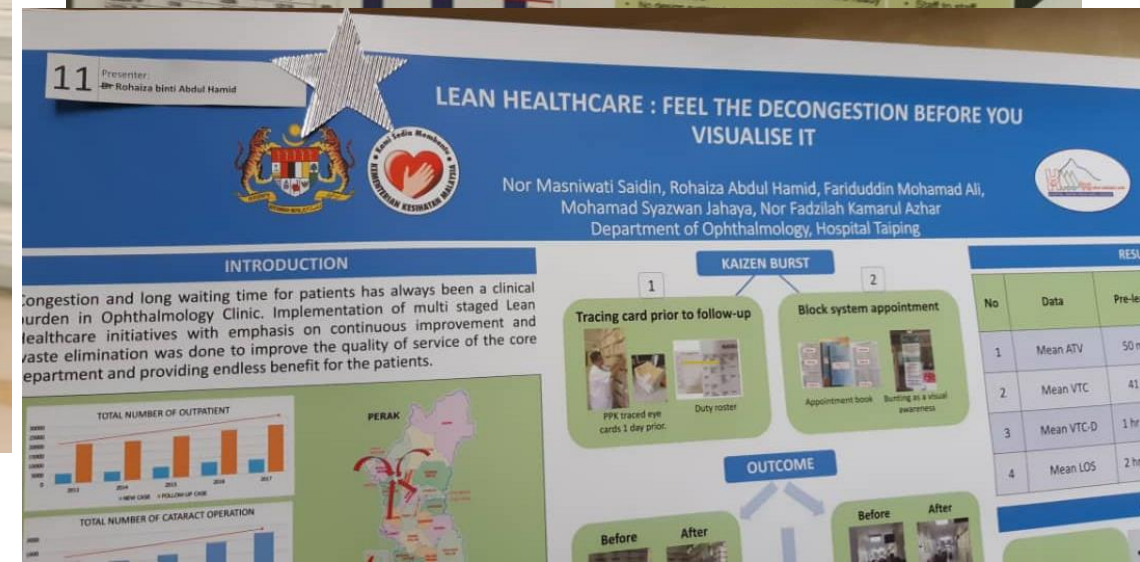
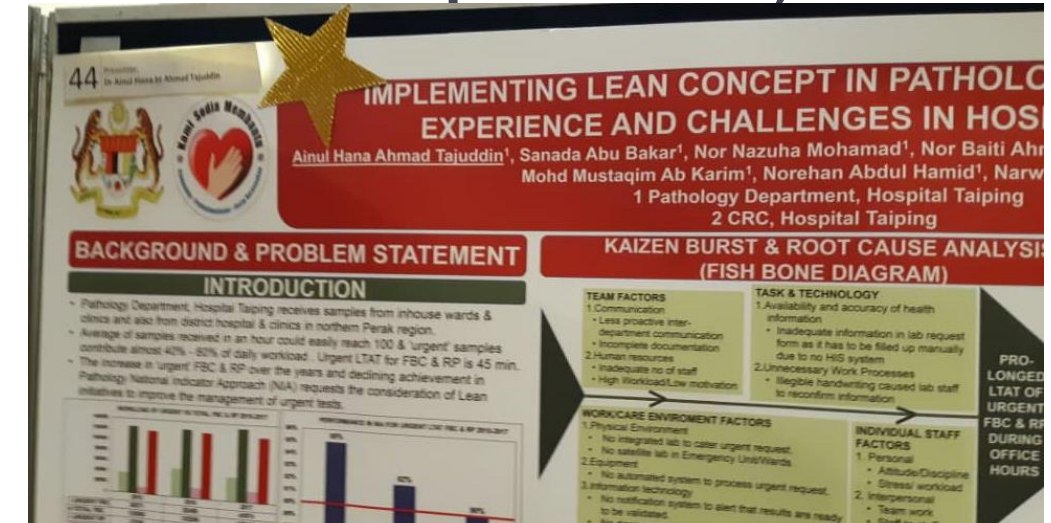


...involve the top level...





# NATIONAL LEAN HEALTHCARE CONFERENCE 2018 : Everybody Can Lean (25<sup>th</sup> Sept - 27<sup>th</sup> Sept 2018)

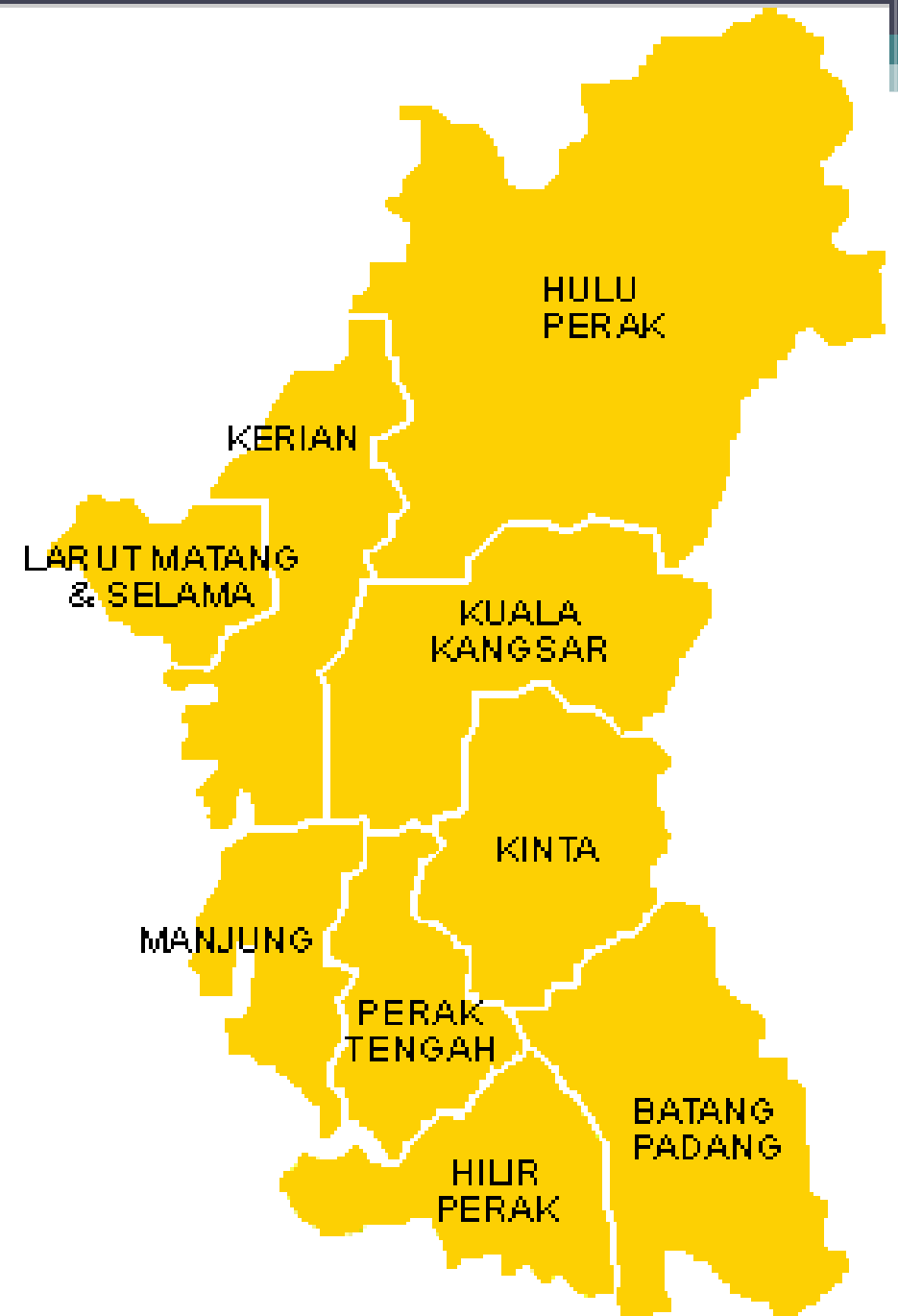


# Until June 2019.....

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

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

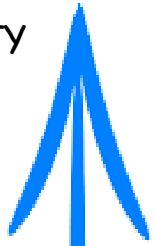
- Lead Hospital : Taiping Hospital
- Non Lead Hospital :  
Selama Hospital (46.5km)  
Parit Buntar Hospital (52.7km)  
Grik Hospital (124km)  
Kuala Kangsar Hospital (36.5km)





# Steps of Lean Characteristics

MATURITY  
LEVEL /  
TIME



**1**

WILLINGNESS

**2**

LEAN  
KNOWLEDGE

**3**

BUILD  
EXPERIENCE

**4**

ESTABLISH  
TEAM AND  
SUPPORT

COMPLEXITY



# Focus Effort

Typical way of doing  
improvement



FIRE FIGHTING



**Doing the  
work**

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