

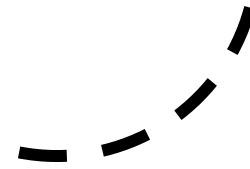
TEAM TWO

**ANLY482: Analytics Practicum
Mid-Terms Presentation**

**Identifying key predictors that affects the
Length-of-Stay (LOS) in the Emergency
Department of a local hospital**

THE TEAM

JINQ YI
[DATA ANALYST]



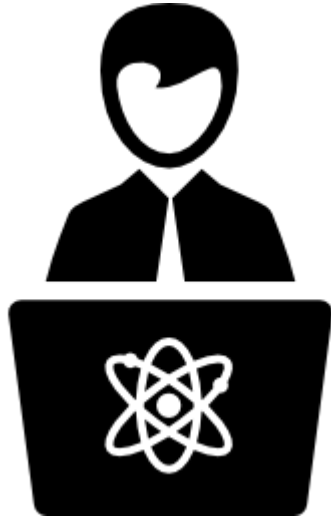
MARCUS
[DATA ANALYST]



FARIS
[DATA ANALYST]



SPONSOR



DR. LAM SHAO WEI, SEAN

Manager, Health Service Research

Singapore General Hospital

SPONSOR



DR. TAN KAR WAY

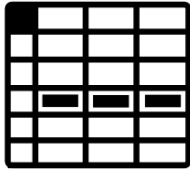
Assistant Professor of information
Systems (Practice),
[Singapore Management University](#)



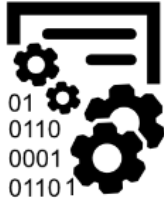
AGENDA



BACKGROUND



DATA DETAILS



ANALYZING DATA



SUBSEQUENT ANALYSIS



BACKGROUND



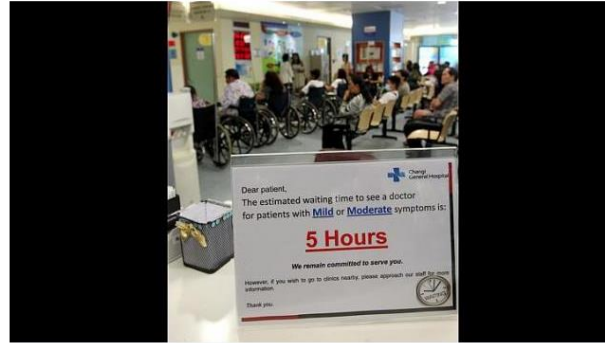
MOTIVATION

A&E units flooded with non-emergency cases

Such cases make up more than half of A&E patients in four public hospitals

PUBLISHED ON MAR 31, 2013 6:00 AM

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Every hospital, like CGH (above), has signs informing patients of the expected waiting time. -- BERITA HARIAN FILE PHOTO

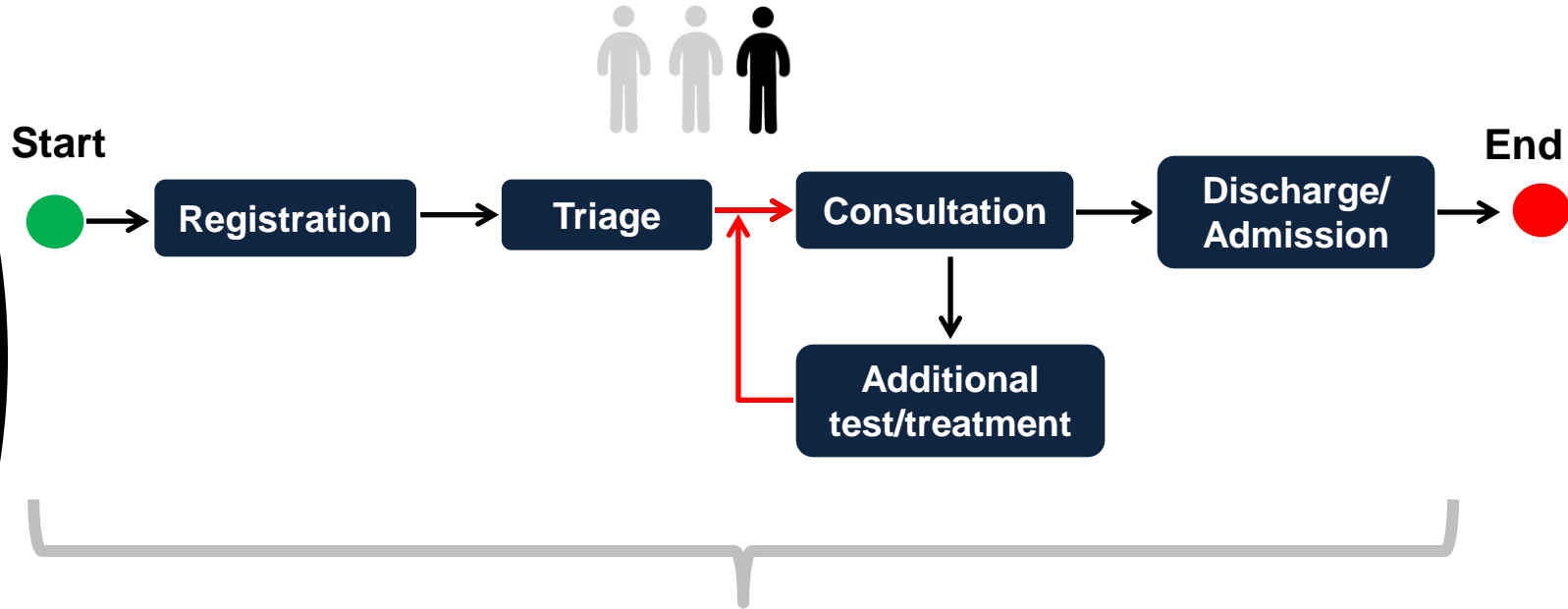


MOTIVATION

Reduce the waiting time at the Emergency Department (ED) with data-driven process improvement techniques.



PROCESS FLOW IN EMERGENCY DEPT



Length-of-Stay (LoS)

OBJECTIVES

Work towards a **classification model** which will classify patients **waiting time** into different categories through analyzing patient's:

Length-of-Stay (LoS)

&

Type of Tests Ordered

No. Of Re-entries

Results of Test







DATA DETAILS

DATA SETS

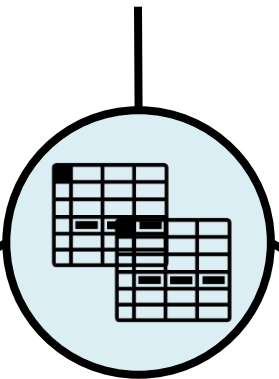
**January
2013**

**March
2013**

3 Months

1

EMERGE



2

CPOE



Visit ID

Account No

Registration Date

Triage Date

Triage Category

Time of Attendance

Chief Complaint

Primary Diagnosis


Disposition

Disposition Time

10

EMERGE

Log of patients entering the ED
Non life-threatening (P3) patients



19918 DATA POINTS

Visit ID

Account No

Registration Date

Triage Date

Triage Category

Time of Attendance

Chief Complaint

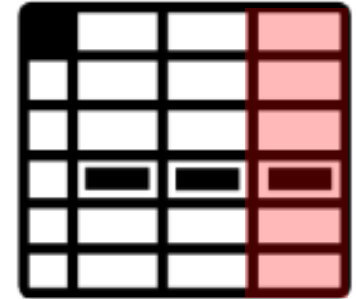
Primary Diagnosis

Disposition

Disposition Time

EMERGE

Derived Variable: **Length-of-Stay**



Visit ID

Account No

Registration Date

Triage Date

Triage Category

Time of Attendance

Chief Complaint

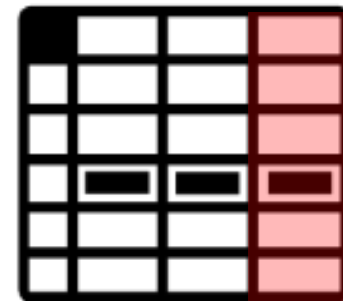
Primary Diagnosis

Disposition

Disposition Time

EMERGE

Derived Variable: **Length-of-Stay**



Disposition Time

-

Time of Attendance

Account No

Test Ordered

Test Code

Test Requested Date Time

Test Value

6

CPOE

Computerized Patients Order Entry

Tests ordered for each patient

9 TEST CATEGORIES

Account No

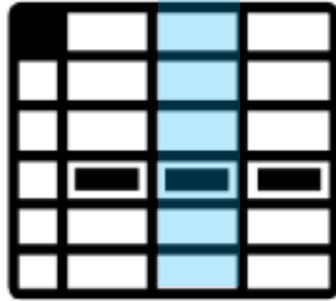
Test Ordered

Test Code

Test Requested Date Time

Test Value

CPOE



Cardiovascular
Obstetrics
Laboratory
Non-Parenteral
Radiology

Operating Theatre
Gynecology
Pharmacy
Parenteral

9 TEST CATEGORIES

Account No

Test Ordered

Test Code

Test Requested Date Time

Test Value

CPOE

EG.



PATIENT 1

BLOOD TEST

10:00AM

HAND X-RAY

11:00AM

DERIVED VARIABLE: NUMBER OF RE ENTRIES

Account No

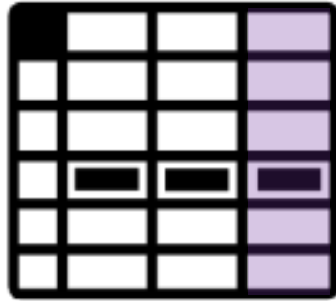
Test Ordered

Test Code

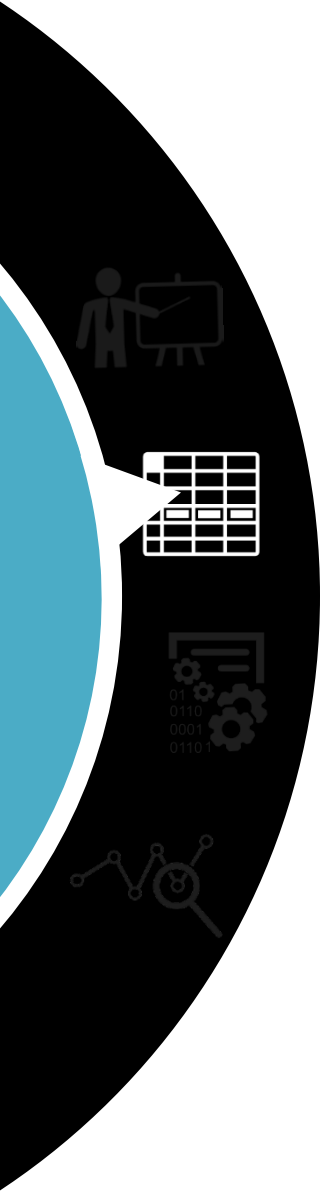
Test Requested Date Time

Test Value

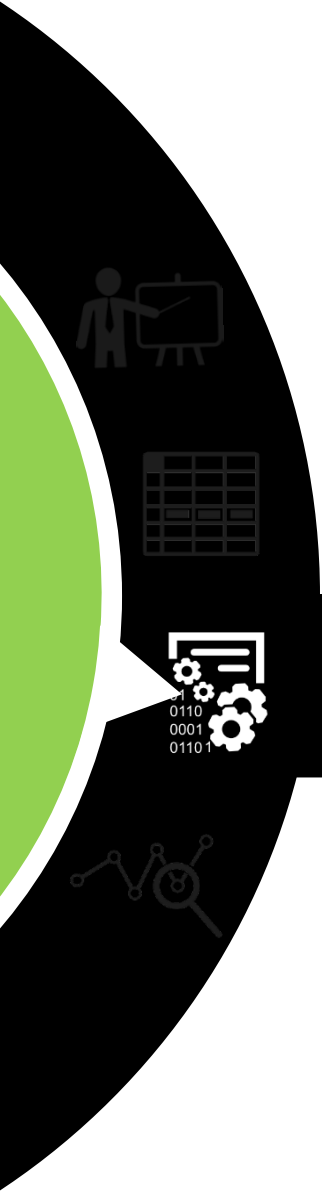
CPOE



TEST VALUE: **CLEAR** OR **FAIL**







EXPLORING DATA

TOOLS USED



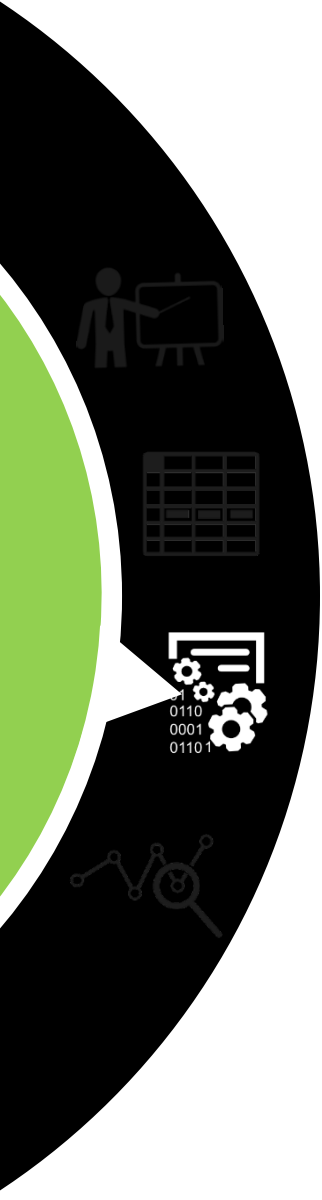
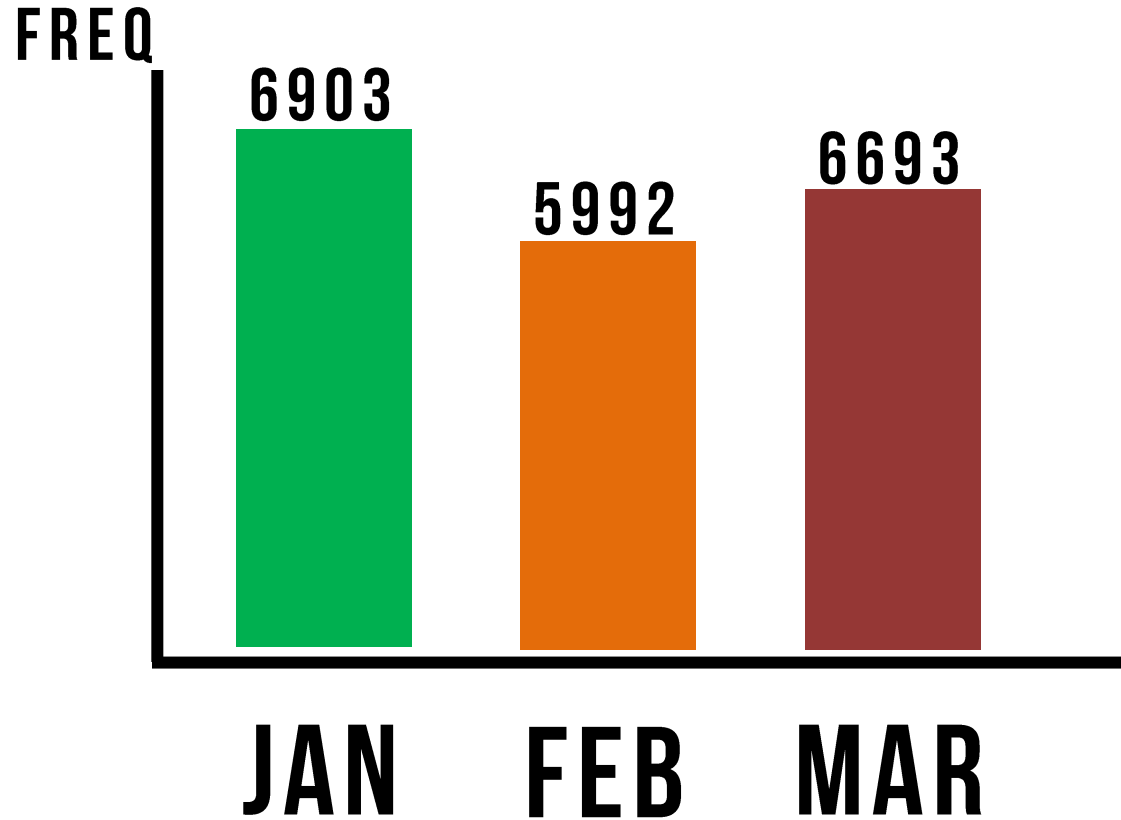
MICROSOFT EXCEL

SAS ENTERPRISE GUIDE

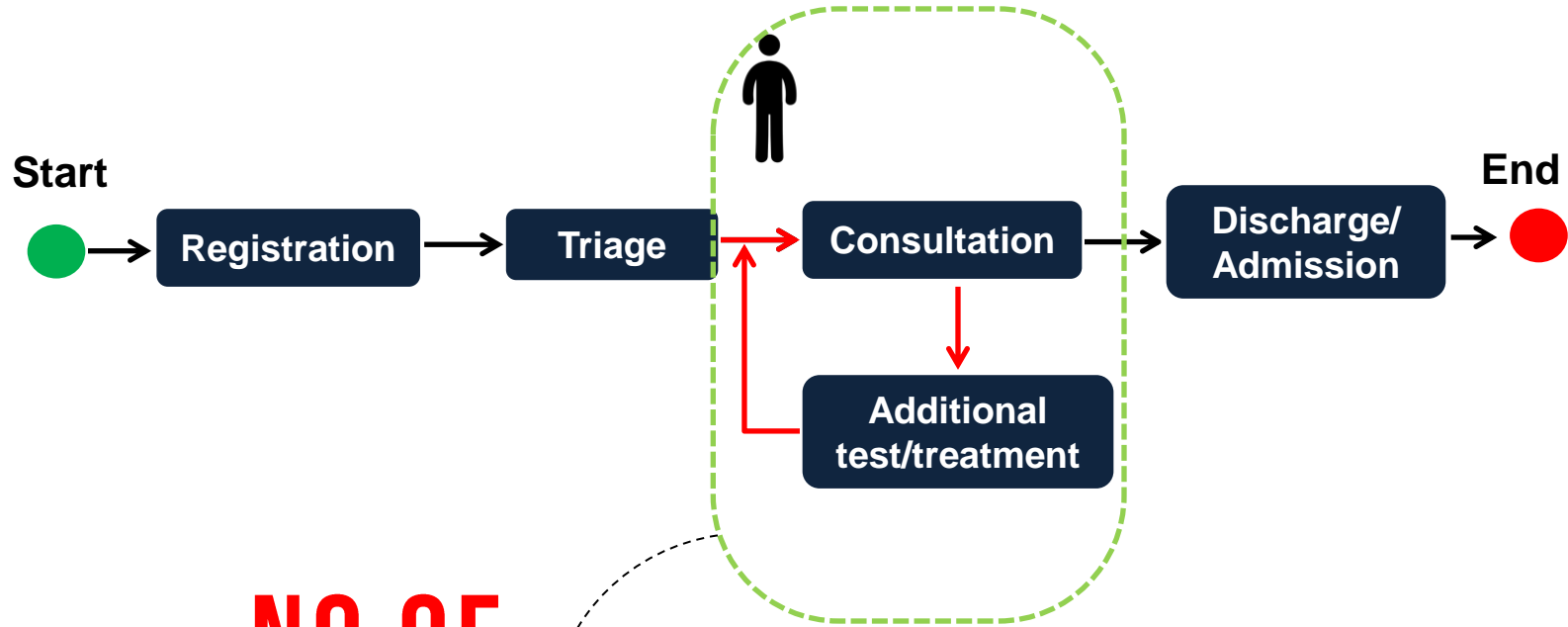
SAS ENTERPRISE MINER

MINITAB

DISTRIBUTION OF PATIENTS



PROCESS FLOW IN EMERGENCY DEPT

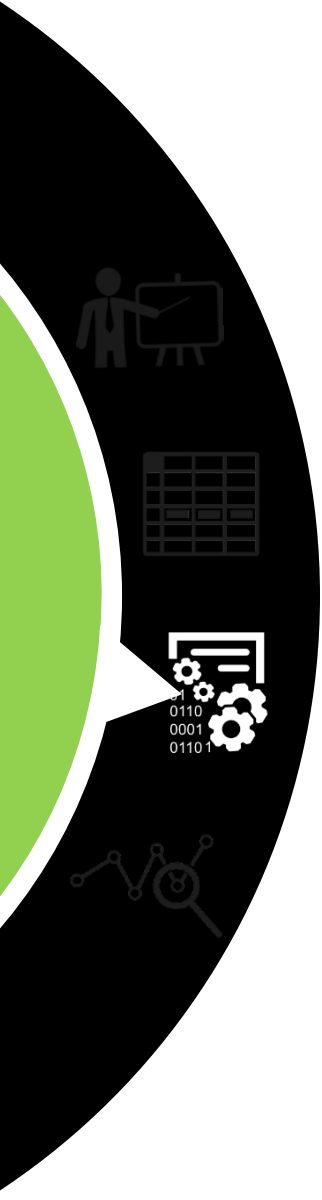
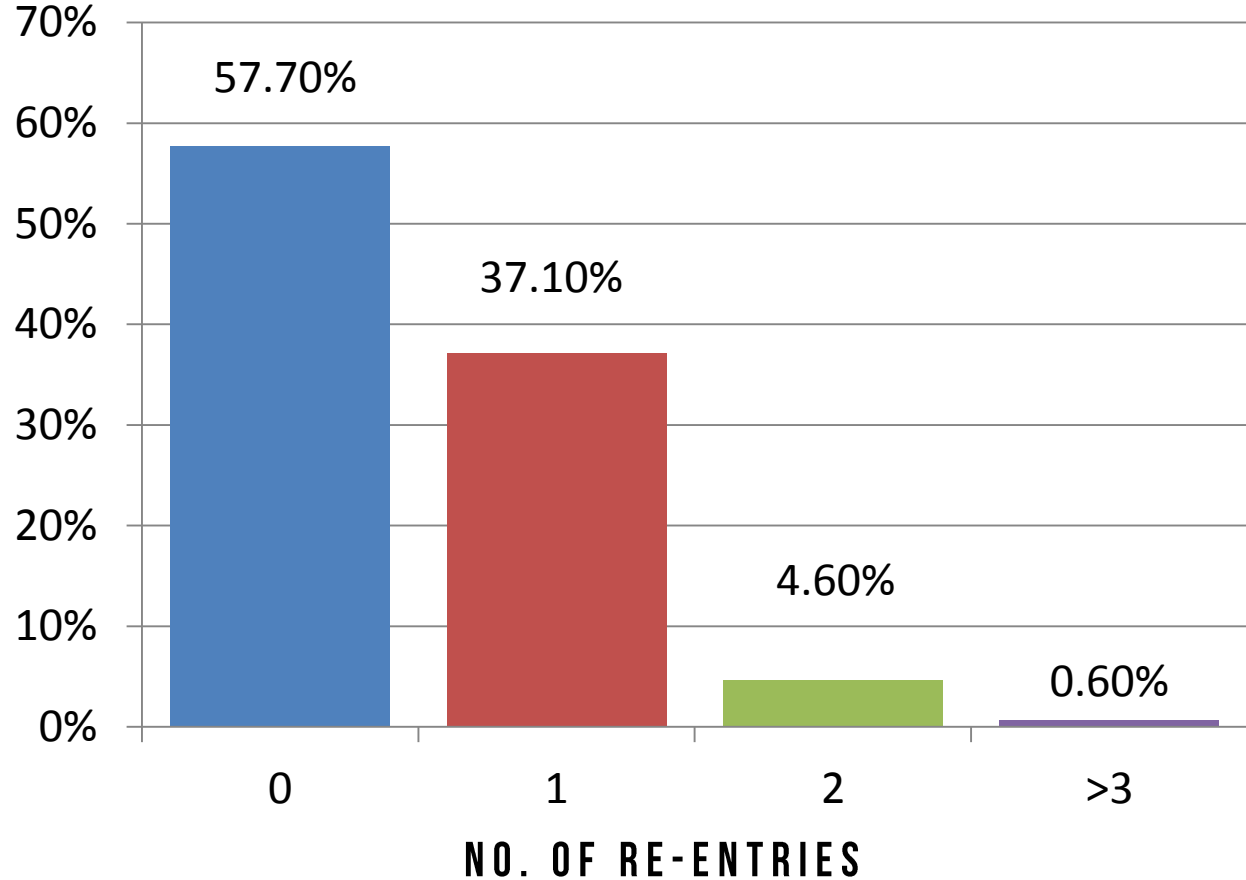


**NO OF
RE-ENTRIES:**

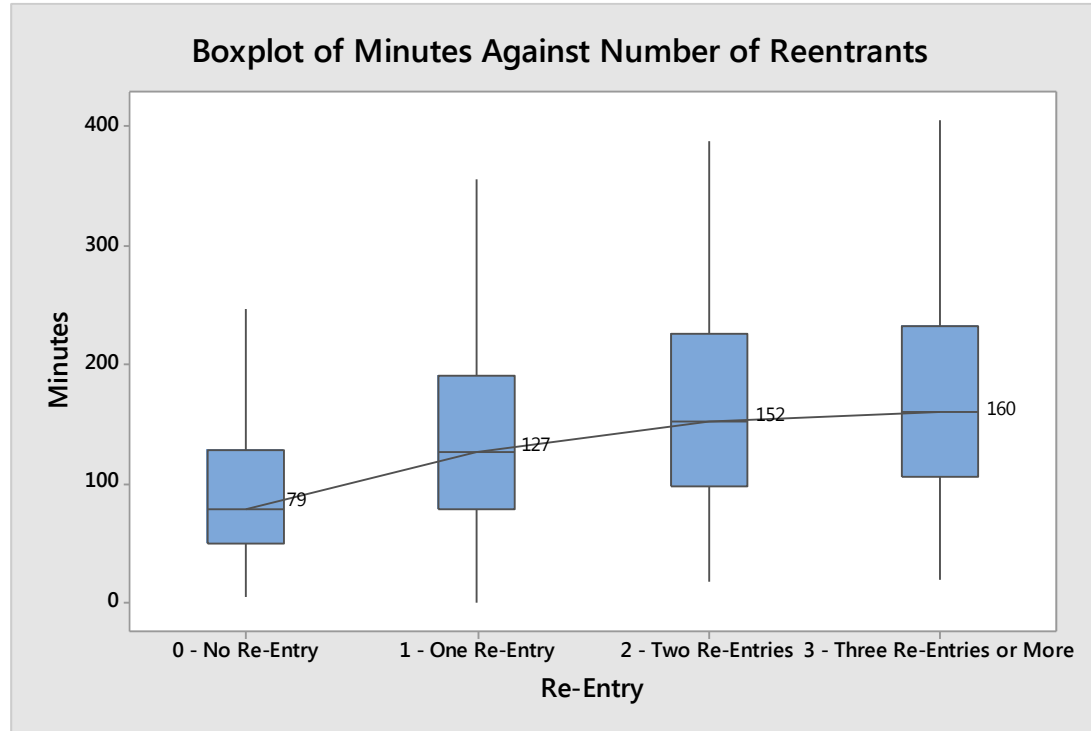
2

PROPORTION OF RE-ENTRANTS

PROPORTION OF PATIENTS

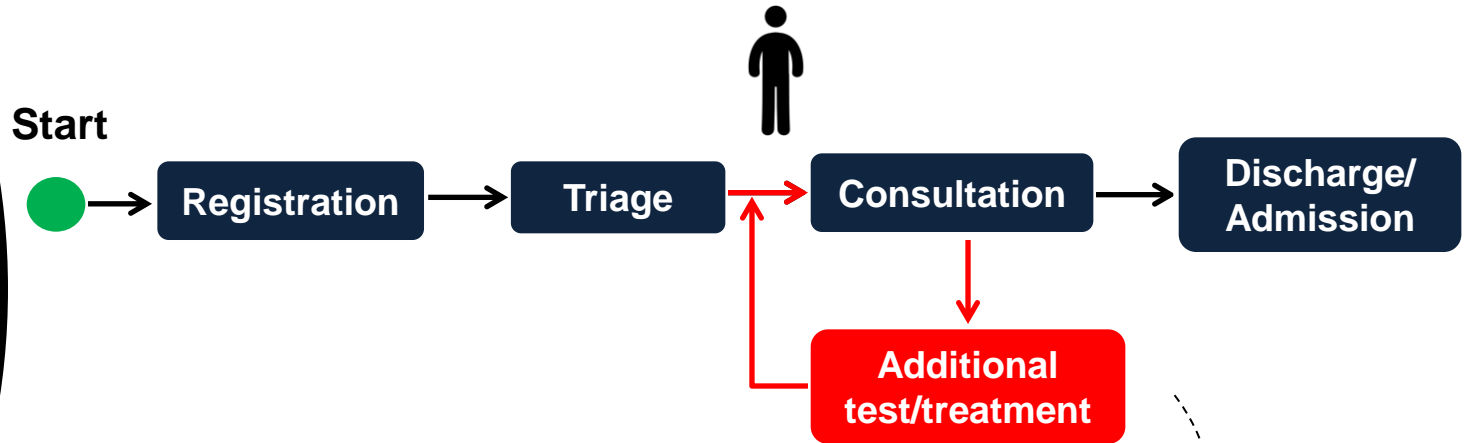


LOS AGAINST RE-ENTRANTS



HIGHER RE-ENTRIES, THE LONGER THE LOS

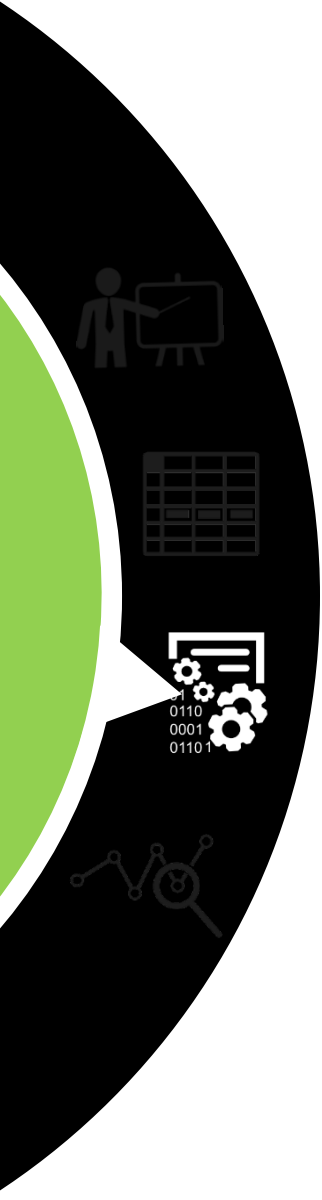
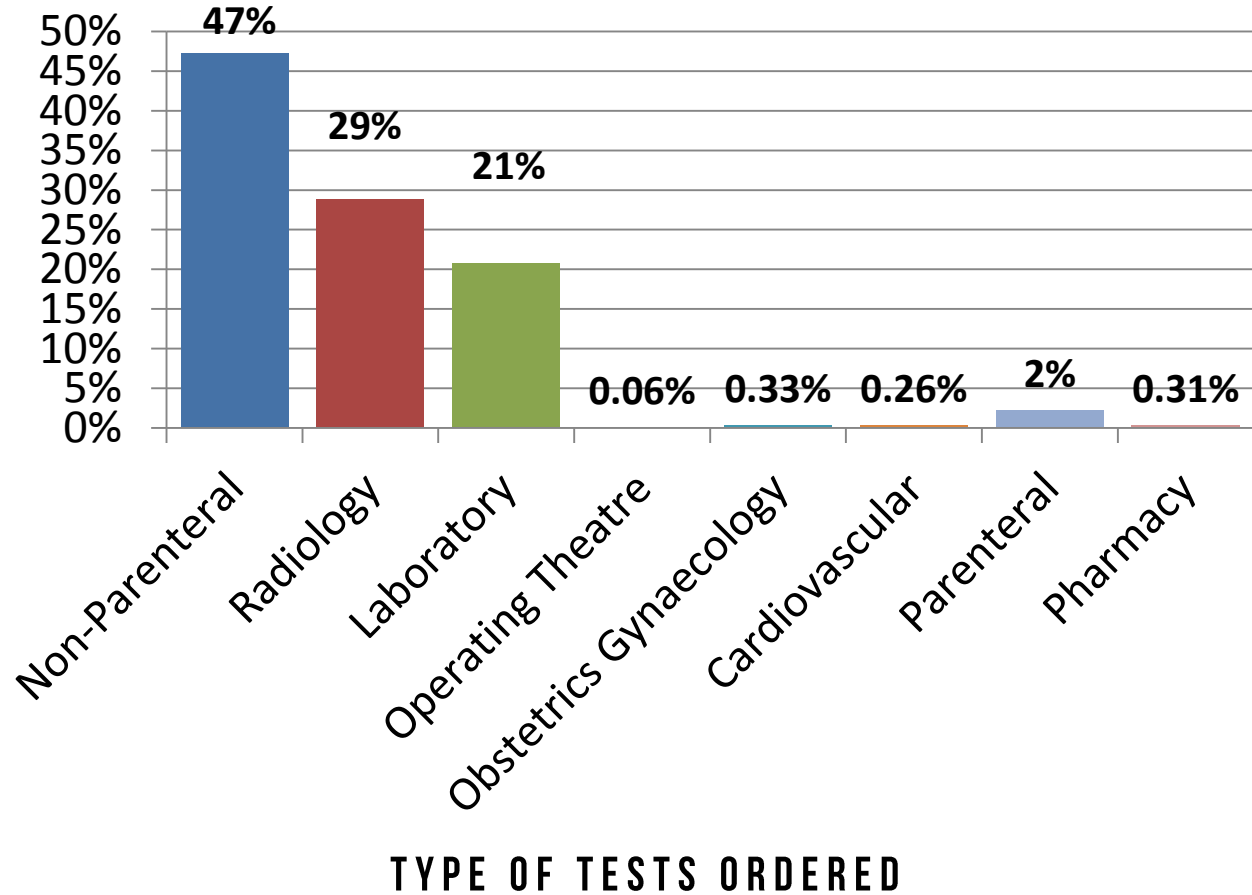
PROCESS FLOW IN EMERGENCY DEPT



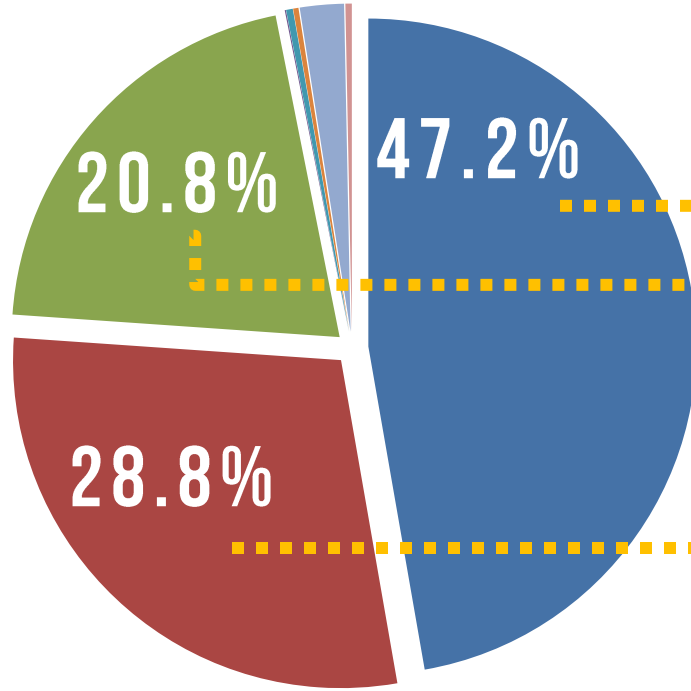
**TYPE OF TESTS
ORDERED**

PROPORTION OF TESTS ORDERED

PROPORTION OF PATIENTS



PROPORTION OF TESTS ORDERED



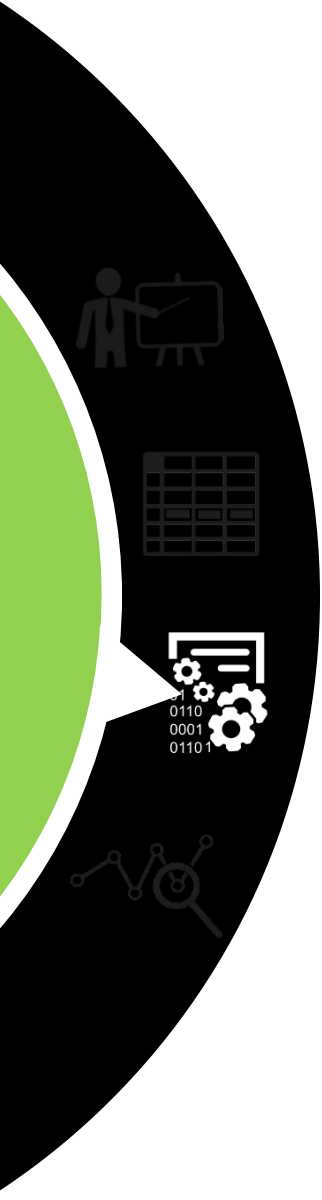
3 MAJOR TESTS CATEGORIES

NON-PARENTERAL

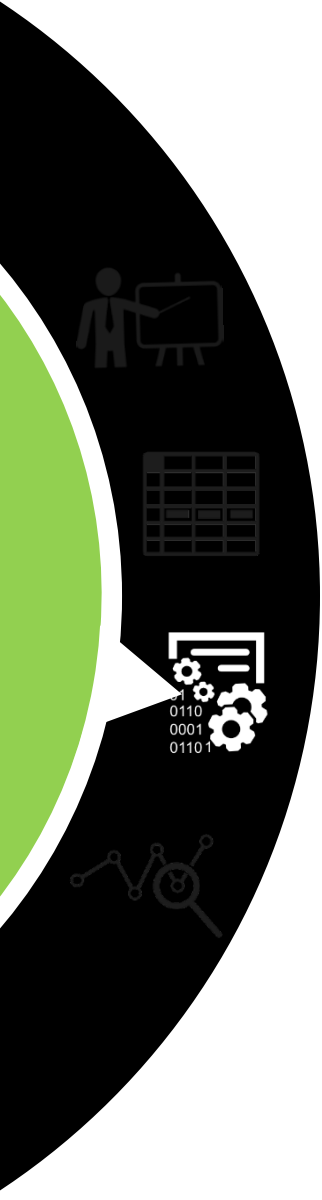
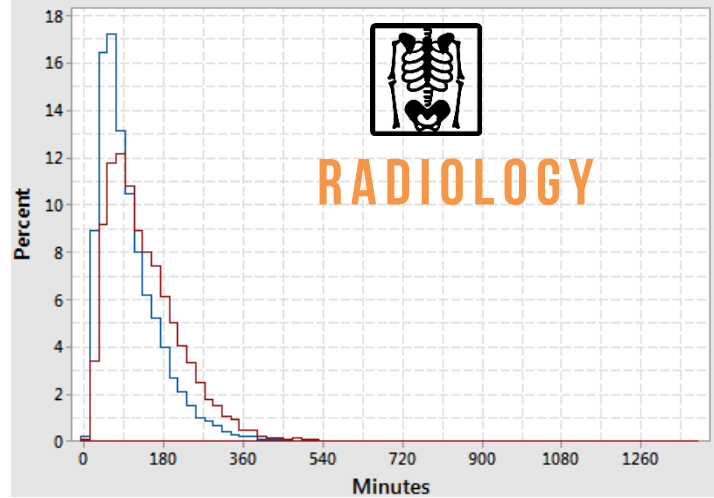
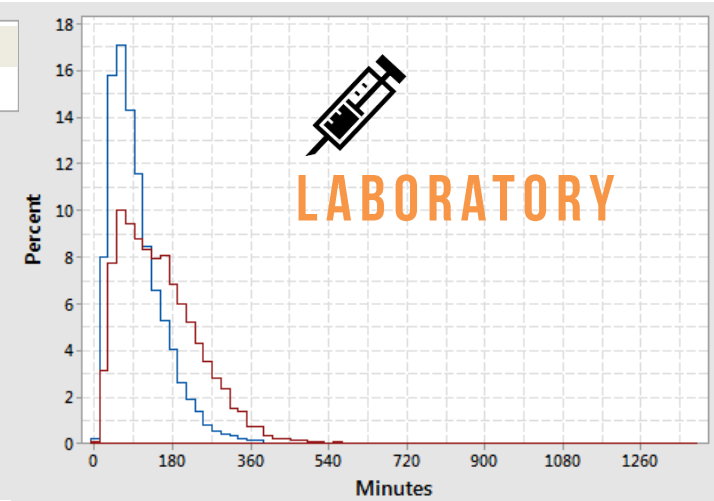
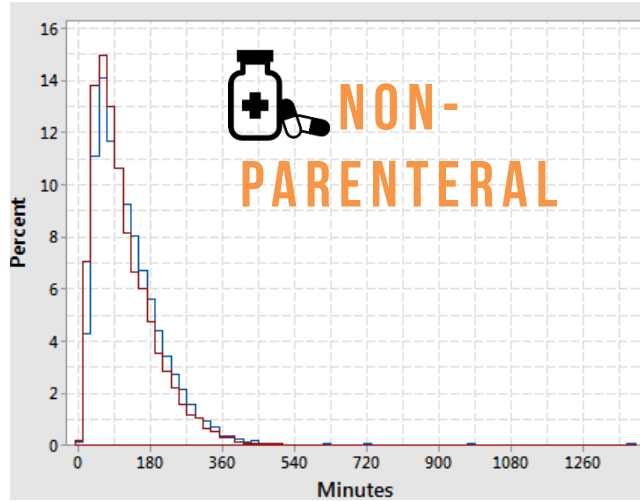
LABORATORY

RADIOLOGY

~97%

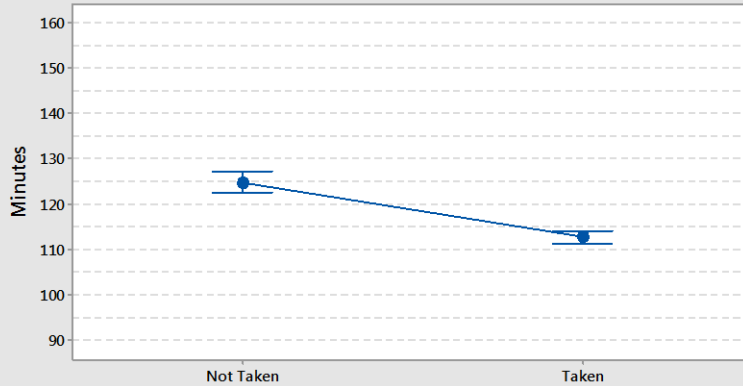


LOS AGAINST TESTS ORDERED

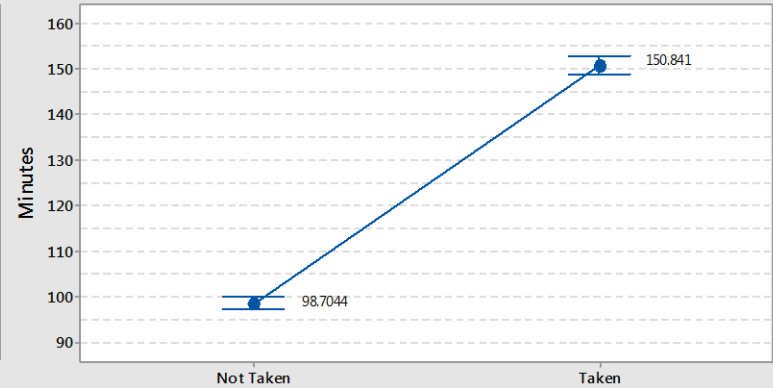


LOS AGAINST TESTS ORDERED

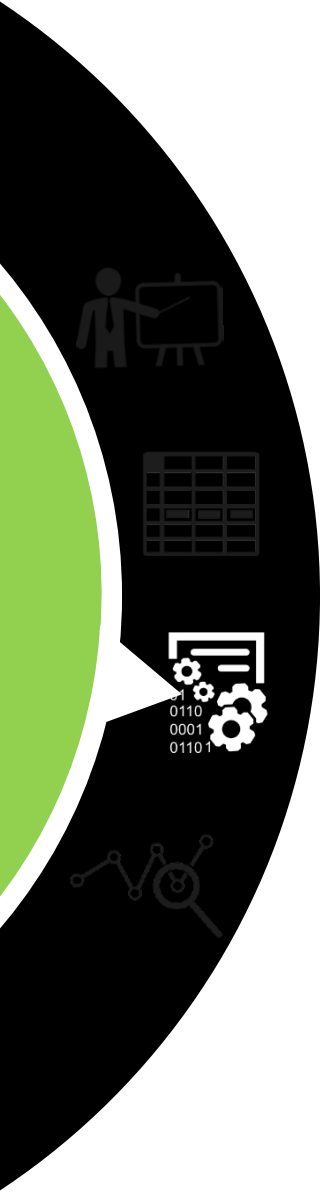
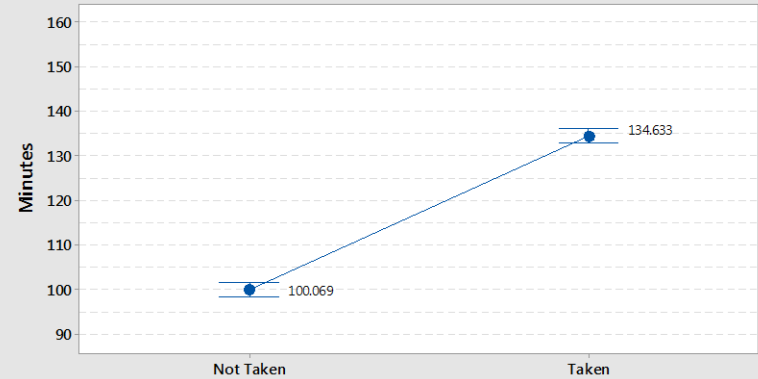
Interval Plot of Los (Medication (Non-Parenteral))
95% CI for the Mean



Interval Plot of LoS (Laboratory)
95% CI for the Mean



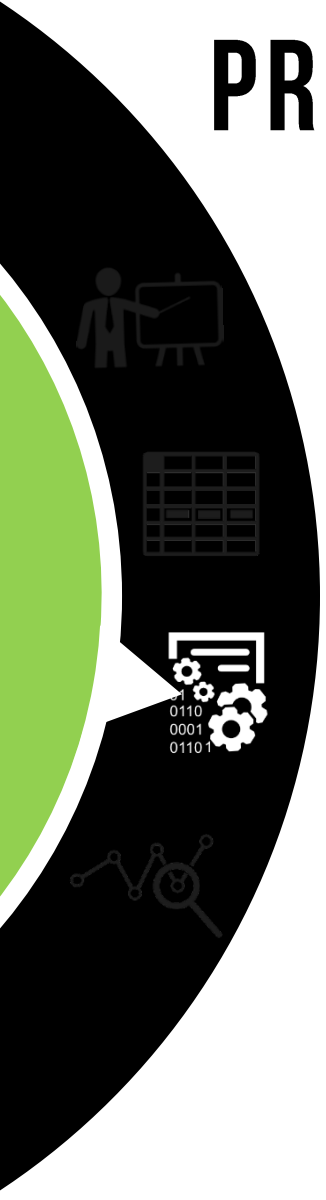
Interval Plot of LoS (Radiology)
95% CI for the Mean



PROPORTION OF TESTS COMBINATIONS

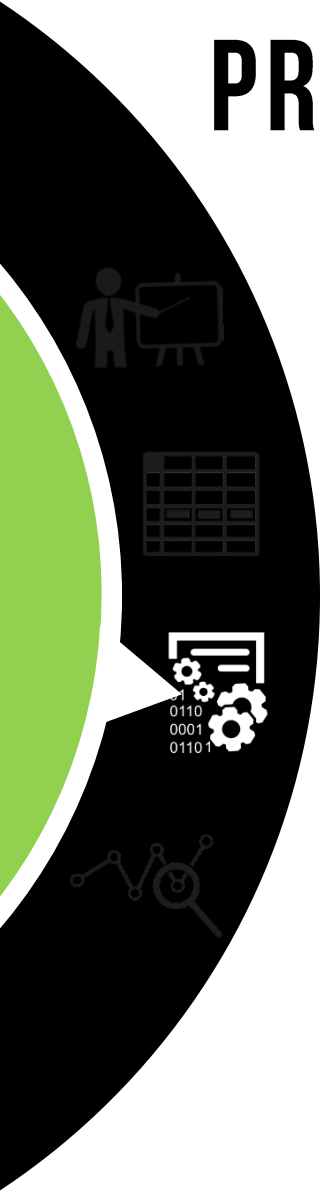
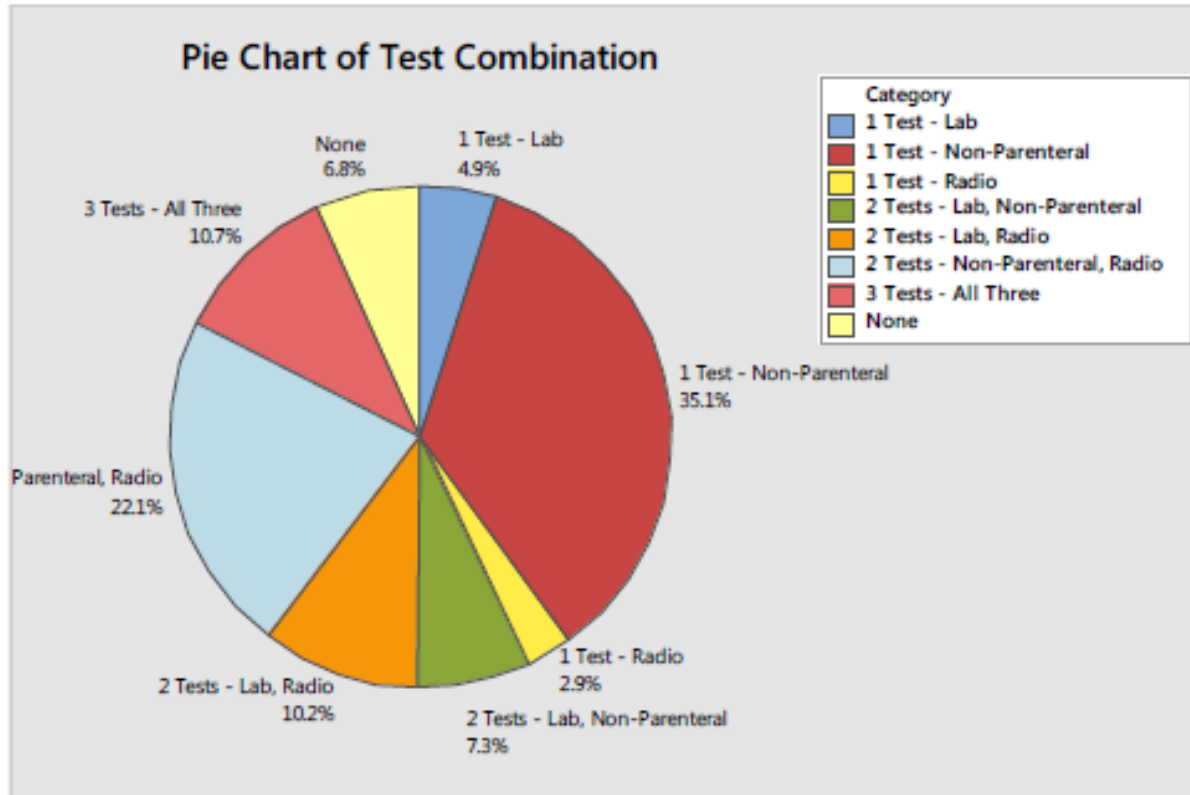
8 COMBINATIONS OF TESTS

1. NO TEST
2. NON-PARENTERAL
3. RADIOLOGY
4. LAB
5. NON-PARENTERAL + RADIOLOGY
6. NON-PARENTERAL + LAB
7. RADIOLOGY + LAB
8. NON PARENTARAL + RADIOLOGY + LAB

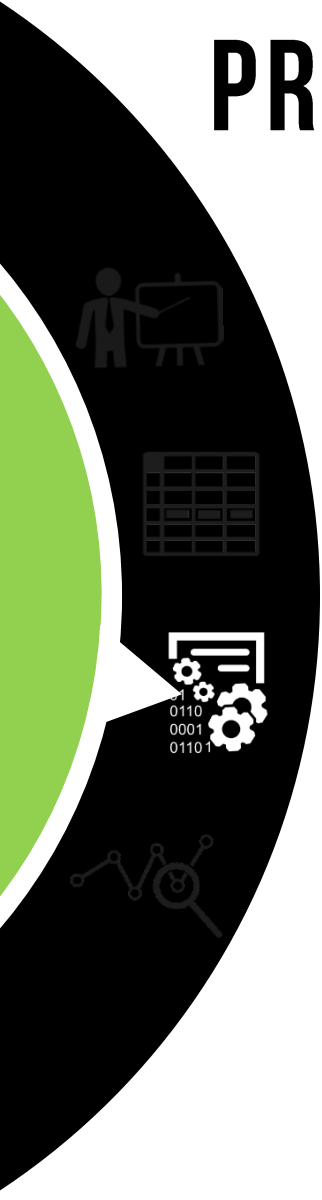


PROPORTION OF TESTS COMBINATIONS

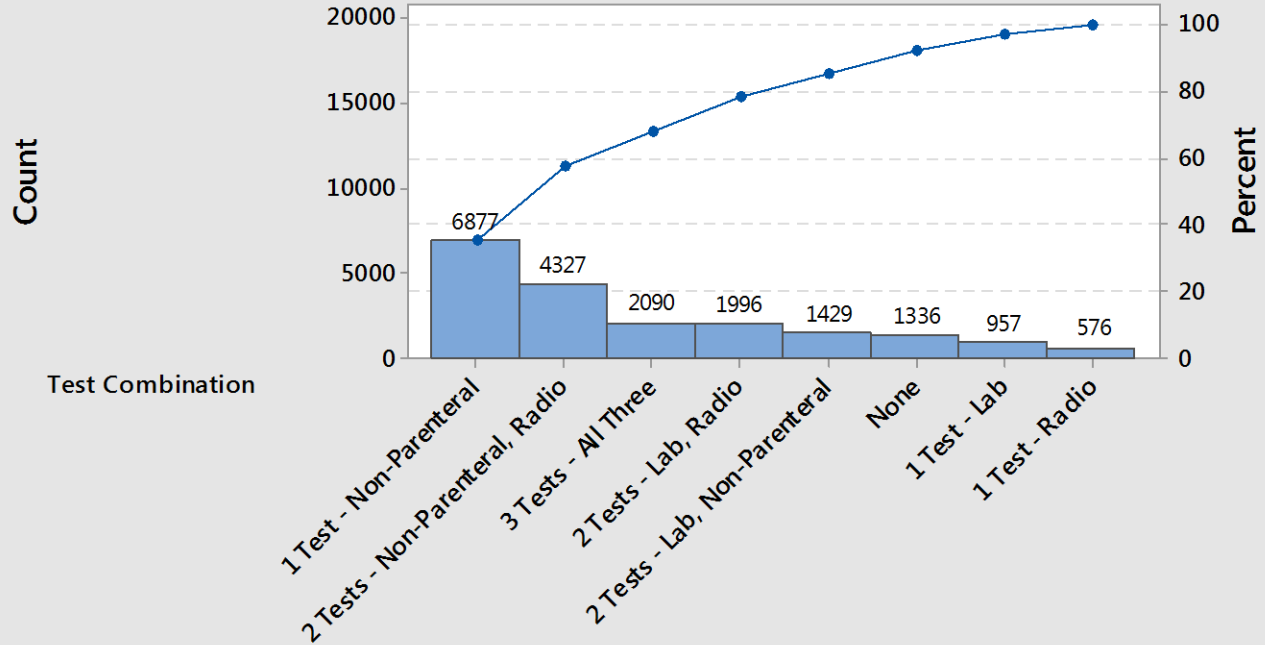
8 COMBINATIONS OF TESTS



PROPORTION OF TESTS COMBINATIONS

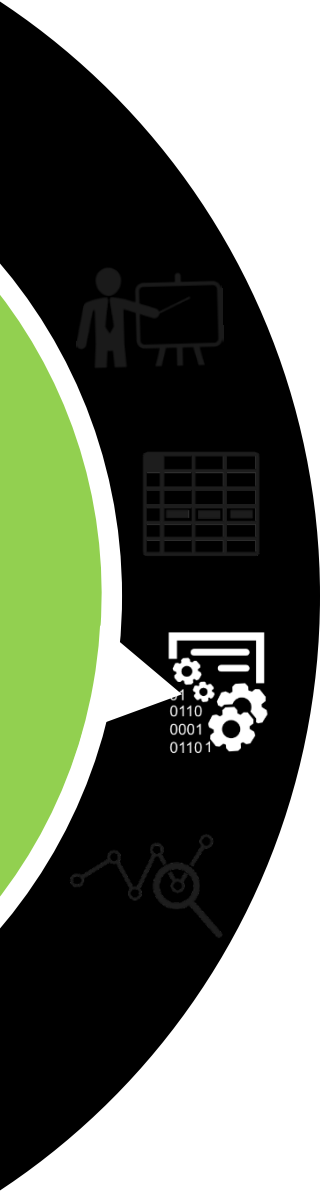
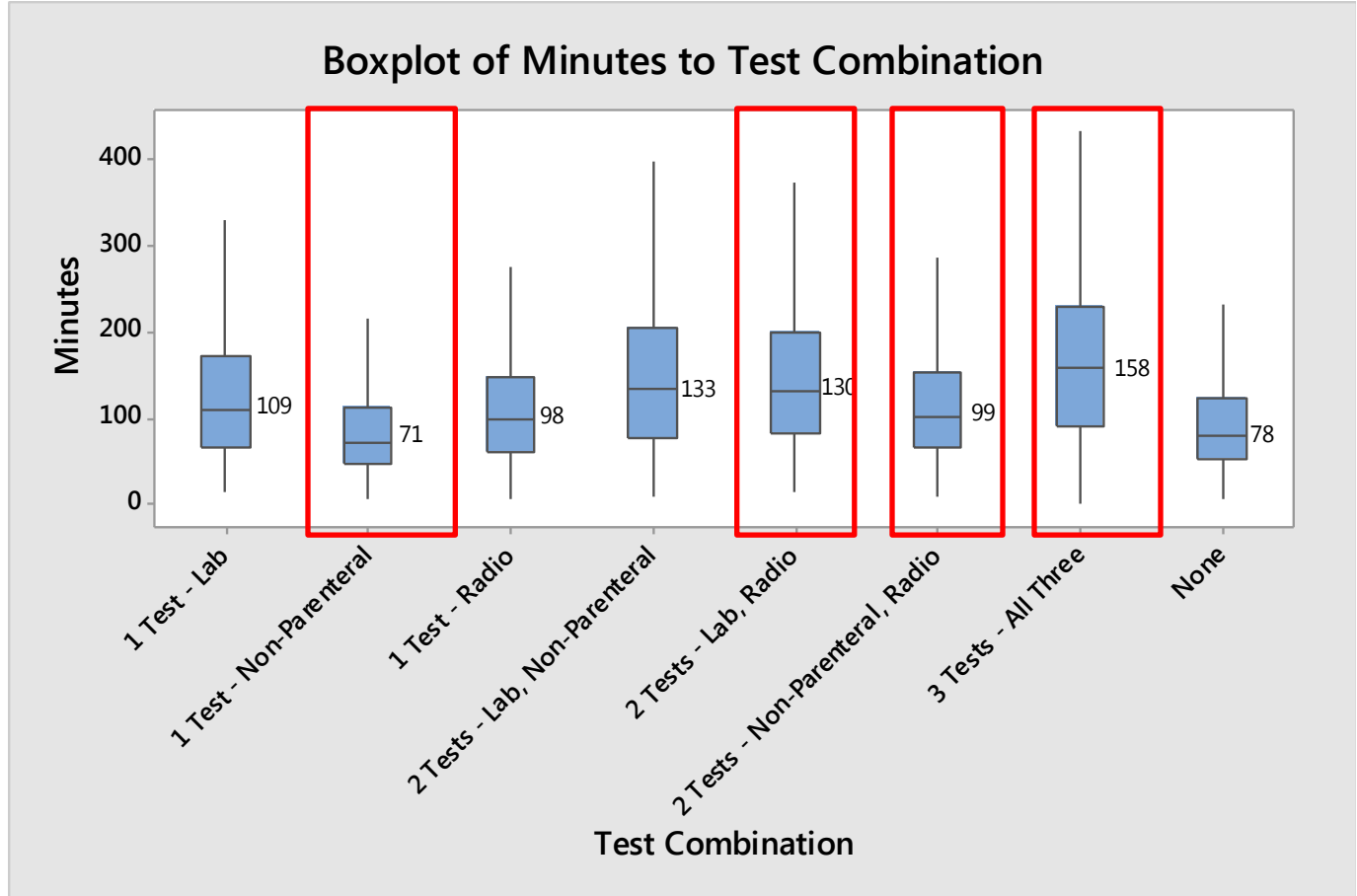


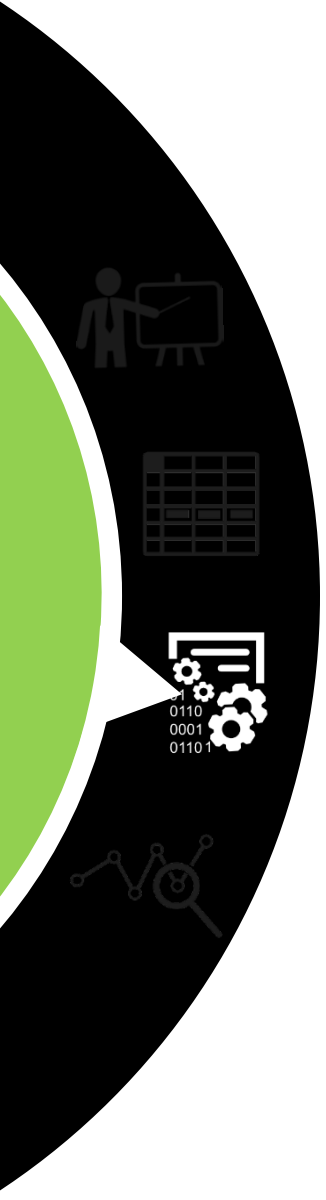
Pareto Chart of Test Combination



Count	6877	4327	2090	1996	1429	1336	957	576
Percent	35.1	22.1	10.7	10.2	7.3	6.8	4.9	2.9
Cumulative %	35.1	57.2	67.9	78.1	85.4	92.2	97.1	100.0

LOS AGAINST TESTS COMBINATIONS







SUBSEQUENT ANALYSIS

MOVING FORWARD

Analyzing of Test Results

CLEAR

FAIL

VAGUE

&

THE IMPACT ON LOS



MOVING FORWARD



1

Linear Regression

2

Decision Tree Model

3

Survival Analysis

To determine the most significant factors that affects LoS





THANK YOU

TEAM TWO 