

Internship at  
**BLK Super Specialty Hospital**  
**New Delhi**





# **SALIENT FEATURES OF HOSPITAL**

- Spread on five acres of land, with a capacity of 700 beds, BLK Super Speciality Hospital is one of the largest tertiary care private hospitals in the country.
- The outpatient services are spread on two floors with 60 consultation rooms.
- The hospital has 17 state-of-the-art well equipped modular operation theatres with three stage air filtration and gas scavenging system to ensure patient safety.
- The Hospital has one of the biggest critical care programmes in the region with 125 beds in different intensive care units viz Medical, Surgical, Cardiac, Paediatrics, Neonatology, Neurosciences and Organ Transplant.
- Liver and Renal Transplant Centres have been equipped with dedicated ICUs with individual hepafilters, specialized instruments and equipments, Veno-venous bypass system and dedicated anaesthesia equipment.

# STATE-OF-THE-ART-EQUIPMENT:

- **Cyberknife VSI**– BLK recently became the proud home to Cyberknife VSI, Asia Pacific's first whole body robotic radio-surgery system for treatment of hitherto inoperable tumors.
- **PET CT Scan**– BLK has installed the latest generation PET CT Scan machine to aid accurate diagnosis and treatment of a plethora of diseases. This makes BLK the first hospital in Delhi to offer coupled services of PET CT and Cyberknife.
- **A TriologyTx Linear Accelerator with cone beam CT for Radiation Oncology**– Image guided radiotherapy (IGRT), Intensity Modulated Radiotherapy (IMRT) and Gated Radiotherapy.
- **MRI**– The hospital is equipped with 1.5 Tesla volume MRI. The special feature of the 1.5 Tesla MRI is its ability to generate 3D images, which cuts the acquisition time by half and increase the comfort and convenience for the patients.
- **CT Scan**– 128 Slice volume CT Scan capable of generating high quality 3D images.
- **Cath Lab**– Flat panel combo Cath. Lab with 3D reconstruction, DSA and Electrophysiological studies.
- **Nuclear medicine**– The hospital has a first of its kind dual head Spect CT, with variable angle gamma camera.



# **DISSERTATION**

***STUDY ON CURRENT DISCHARGE PROCESS  
OF THE HOSPITAL IN ORDER TO IDENTIFY  
THE AREAS OF DELAY AND IMPROVE THE  
AVERAGE TURN-AROUND TIME  
USING SIX SIGMA APPROACH.***



# INTRODUCTION

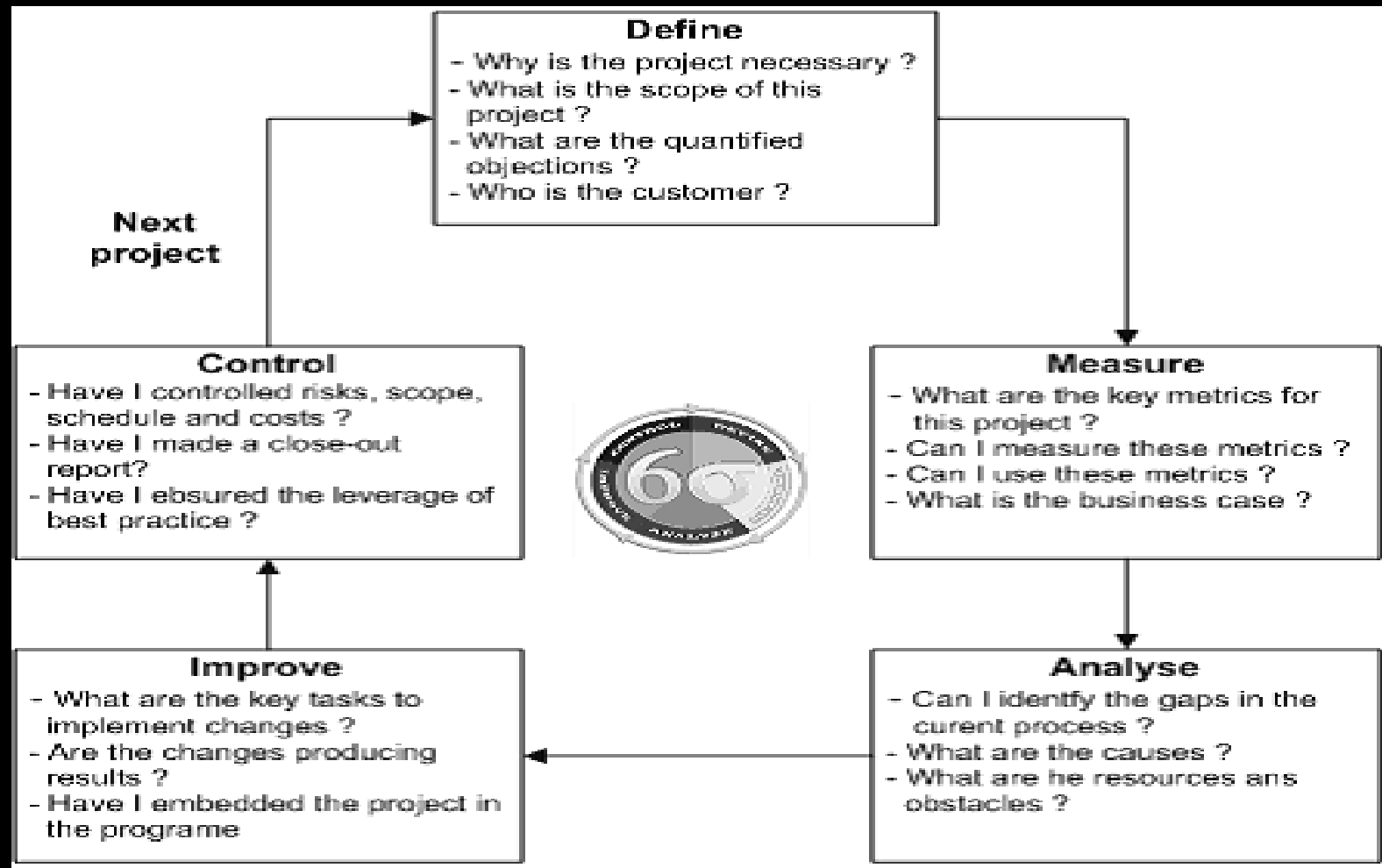
- **Discharge**, by definition is to formally terminate a patient's care, and releasing him/her from a hospital or health care facility. A patient is discharged only when he/she has recovered fully or satisfactorily according to the concerned physician.
- It is imperative to have a timely discharge. A delayed discharge has an impact on the physical, mental, emotional, and psychological status of the patient and also has negative financial implications on the hospital.
- It is in the interest of the hospital to hasten the discharge process as –
  - ✓ It will reduce the chances of HAI for the patient.
  - ✓ Better experience as the patient leaves.
  - ✓ Better utilization of resources per bed.
- **Delayed discharge** refers to the situation where a patient is deemed to be medically well enough for discharge, but, where the patient is unable to leave hospital due to slowing down of the entire process.



# Quality in Healthcare

- Improving quality while simultaneously reducing costs is the critical concern facing hospitals nowadays.
- One of the methodologies used for quality improvement of hospital operations processes is Six Sigma, which constitutes a number of approaches and techniques for quality improvement.
- A major weakness of the discharge process is the relative lack of attention to detail from the hospital team at the time of discharge, compared to the admission process.
- The development and improvement in the discharge process requires a detailed insight into the discharge process being followed and the understanding of the reasons for delay in the hospital.
- Thus to improve the discharge process, one of the approaches of Six Sigma known as **DMAIC (Define, Measure, Analyze, Improve, and Control)** forms the baseline of this study. DMAIC is an acronym for five interconnected phases: define measure, analyze, improve and control., which refers to data-driven life-cycle approach to Six Sigma projects.

# DMAIC APPROACH





## **AIM OF THE STUDY**

To analyze the current discharge process of the hospital in order to identify the areas of delay and improve the average turn-around time using Six Sigma approach.

## **OBJECTIVES:**

- To analyze the current discharge process.
- To study the effect of process monitoring on the time taken for discharge.
- To identify the areas of delay and factors responsible for increased turn-around time of discharge process.
- To suggest strategies to improve the identified problem areas.
- To assess the improvements after the interventions.



## **METHODOLOGY**

### **Key Research Question:**

What is the gap between the average discharge TAT and the benchmark time and the factors causing the gap?

### **Other Research Questions:**

- What are the key problem areas causing delay in discharge process?
- What are the activities leading to wastes (of time and resources) in the process?



## **STUDY DESIGN**

- **STUDY TYPE:** Cross-sectional Analytical Study
- **STUDY PERIOD:** 1<sup>st</sup> February, 2014 to 31<sup>st</sup> April, 2014
- **SAMPLE SIZE:** The study sample was categorized into 2 types, for primary data and secondary data respectively. For *Secondary Data*, sample was the entire population of discharged patients during the study period. For *Primary Data*, sample size was 150 patient discharges, as per convenience sampling.
- Inclusion Criteria: The sample size included all in-patient discharges, to estimate the average discharge time of the hospital.
- Exclusion Criteria: Discharges of patients admitted in day-care were not included in the sample population.
- **SAMPLING METHOD:** Non-Probability Purposive Sampling.



## STUDY PROCEDURE

The study was conducted using the 5-phased DMAIC approach of Six Sigma. These were:

- Define by identifying, prioritizing and selecting the right process,
- Measure key process characteristics, the scope of parameters and their performances,
- Analyze by identifying key causes and process determinants,
- Improve by changing the process and optimizing performance,
- Control by sustaining the gain and monitoring the improvements continuously.



## PHASE I – DEFINE

- Scope of the problem is defined.
- This phase aimed at describing the problem quantifiably and the underlying process to determine how performance will be measured.
- The process was documented to understand the current sub-processes involved in the discharge of a patient from the time when the doctor decides the patient should be discharged to the time when the patient leaves the room.
- The tool used for defining the scope of the problem was **Process Mapping**. It is the technique used to follow the detailed flow of a product through a manufacturing cycle.
- A process map is a pictorial representation of the sequence of actions that comprise a process.
- [Discharge Process Map](#)



The following Sub-Processes were identified from the Process Map:

- Discharge Summary Finalization
- Pharmacy Clearance
- File Preparation
- File Transportation
- Bill Generation
- Bill Clearance
- Room Vacation



## PHASE II – MEASURE

- This phase marked the **Data Collection Phase** for the study.
- It aimed at measuring the problem; describe it with process and performance facts, data, and metrics.
- .The objective of this phase is to establish the current state, or the “baseline” of the process before making any changes.
- The baseline of measurement was defined as the turn-around time for the entire discharge process starting from the time the physician decides that the patient can be discharged till the time the room was vacated by the patient. This time was defined as the Total Cycle Time.
- The benchmark time was taken as 45 minutes since this was the desired TAT for all discharges.



Other parameters or metrics taken for measurement of discharge TAT were:

- Total Cycle Time
- Summary Finalization Time
- Pharmacy Clearance Time
- File Preparation Time
- File Transportation Time
- Bill Generation Time
- Bill Clearance Time
- Room Vacation Time



# **DATA COLLECTION**

## **Secondary Data:**

Secondary data was collected for 5 parameters defined after identifying the sub-processes.

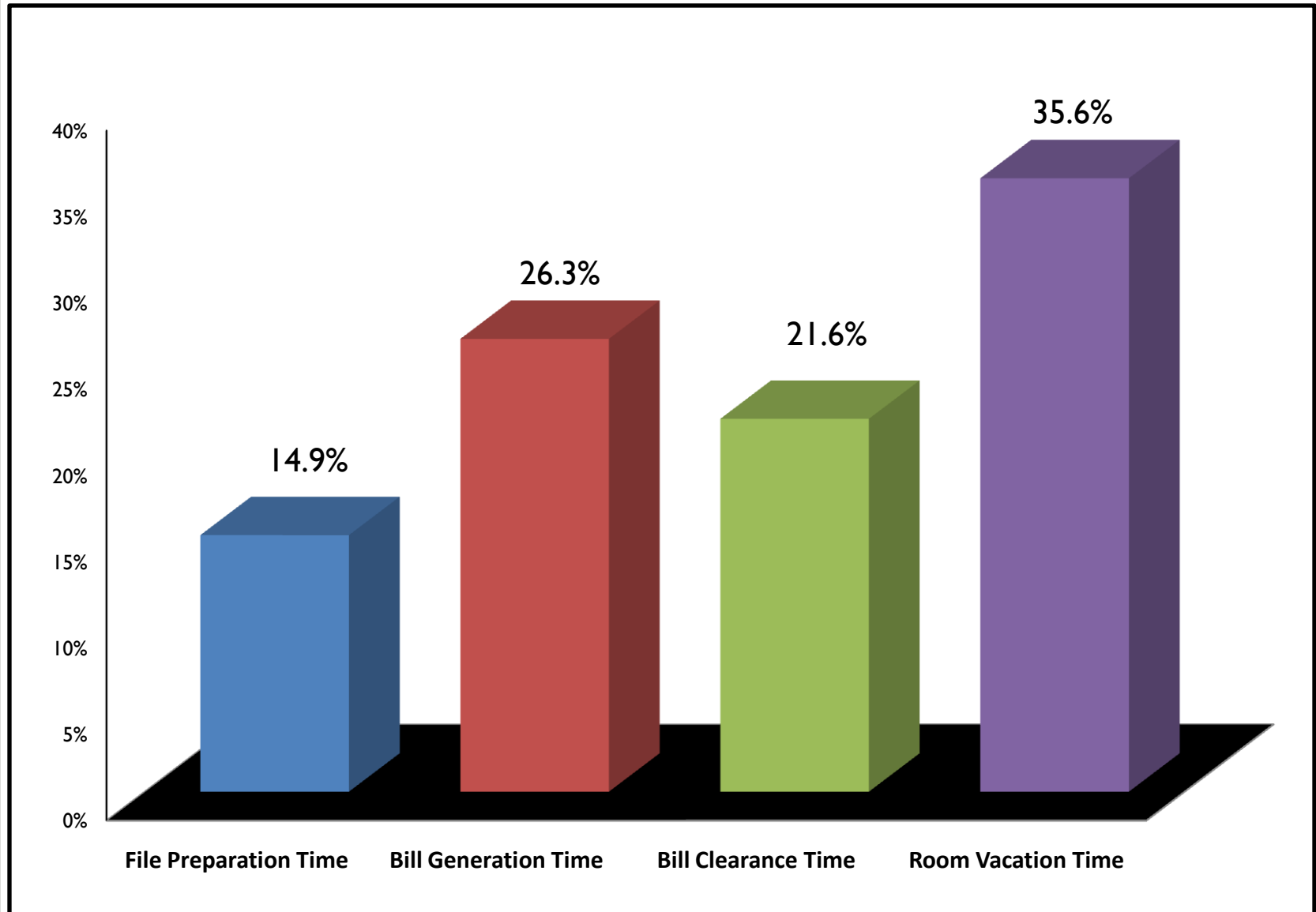
Source of Data: The data was collected from the HIS on daily basis and compiled using Microsoft Excel to calculate the average TAT for the following parameters:

- Total Cycle Time
- File Preparation Time
- Bill Generation Time
- Bill Clearance Time
- Room Vacation Time

## Average TAT for CASH Payments

| Measurement Parameters | Average TAT for Month of February | Average TAT for Month of March | Mean TAT |
|------------------------|-----------------------------------|--------------------------------|----------|
| Total Cycle Time       | 5:17                              | 5:17                           | 5:17     |
| File Preparation Time  | 0:48                              | 0:45                           | 0:47     |
| Bill Generation Time   | 1:21                              | 1:24                           | 1:23     |
| Bill Clearance Time    | 1:09                              | 1:07                           | 1:08     |
| Room Vacation Time     | 1:51                              | 1:53                           | 1:52     |

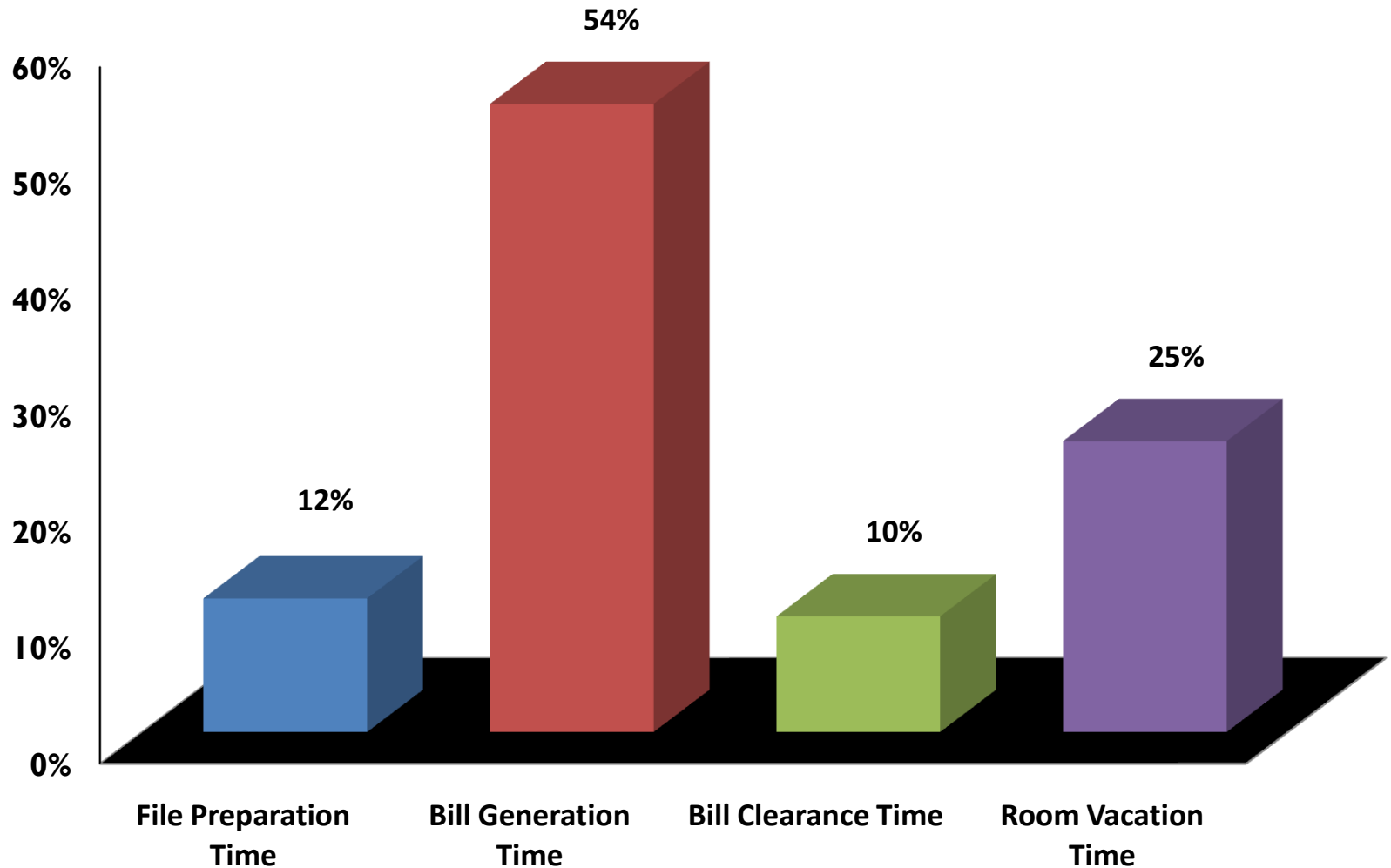
# Percentage division of Total Cycle Time (CASH Payments )



## Average TAT for TPA Payments

| Measurement Parameters | Average TAT for Month of February | Average TAT for Month of March | Mean TAT |
|------------------------|-----------------------------------|--------------------------------|----------|
| Total Cycle Time       | 6:47                              | 7:06                           | 6:57     |
| File Preparation Time  | 0:49                              | 0:46                           | 0:48     |
| Bill Generation Time   | 3:36                              | 3:55                           | 3:45     |
| Bill Clearance Time    | 0:42                              | 0:40                           | 0:41     |
| Room Vacation Time     | 1:43                              | 1:45                           | 1:44     |

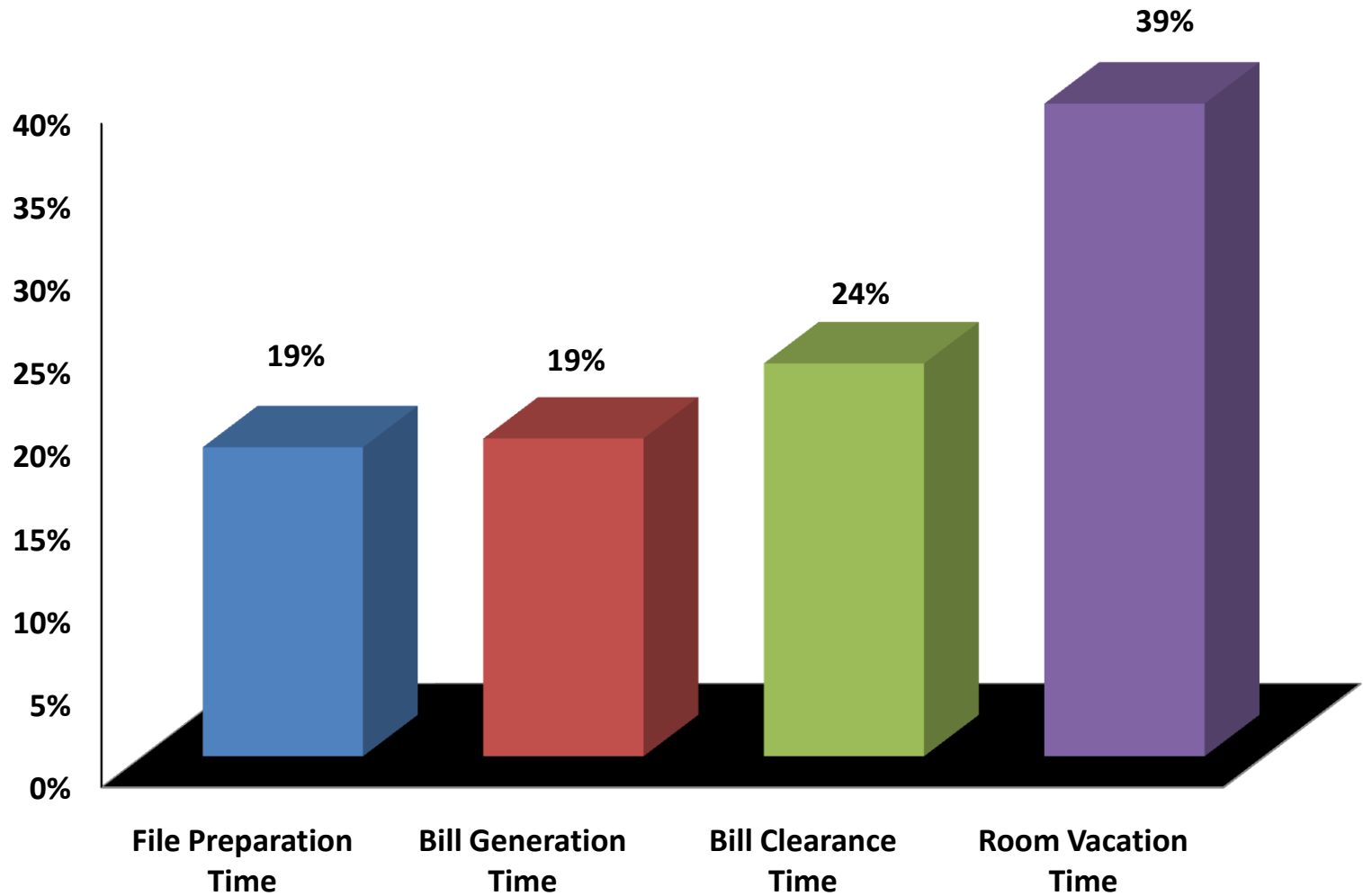
# Percentage division of Total Cycle Time (TPA Payments )



## Average TAT for PANEL Payments

| Measurement Parameters | Average TAT for Month of February | Average TAT for Month of March | Mean TAT |
|------------------------|-----------------------------------|--------------------------------|----------|
| Total Cycle Time       | 4:42                              | 4:44                           | 4:43     |
| File Preparation Time  | 0:53                              | 0:52                           | 0:52     |
| Bill Generation Time   | 0:51                              | 0:57                           | 0:54     |
| Bill Clearance Time    | 1:09                              | 1:04                           | 1:07     |
| Room Vacation Time     | 1:49                              | 1:53                           | 1:51     |

# Percentage division of Total Cycle Time (PANEL Payments )





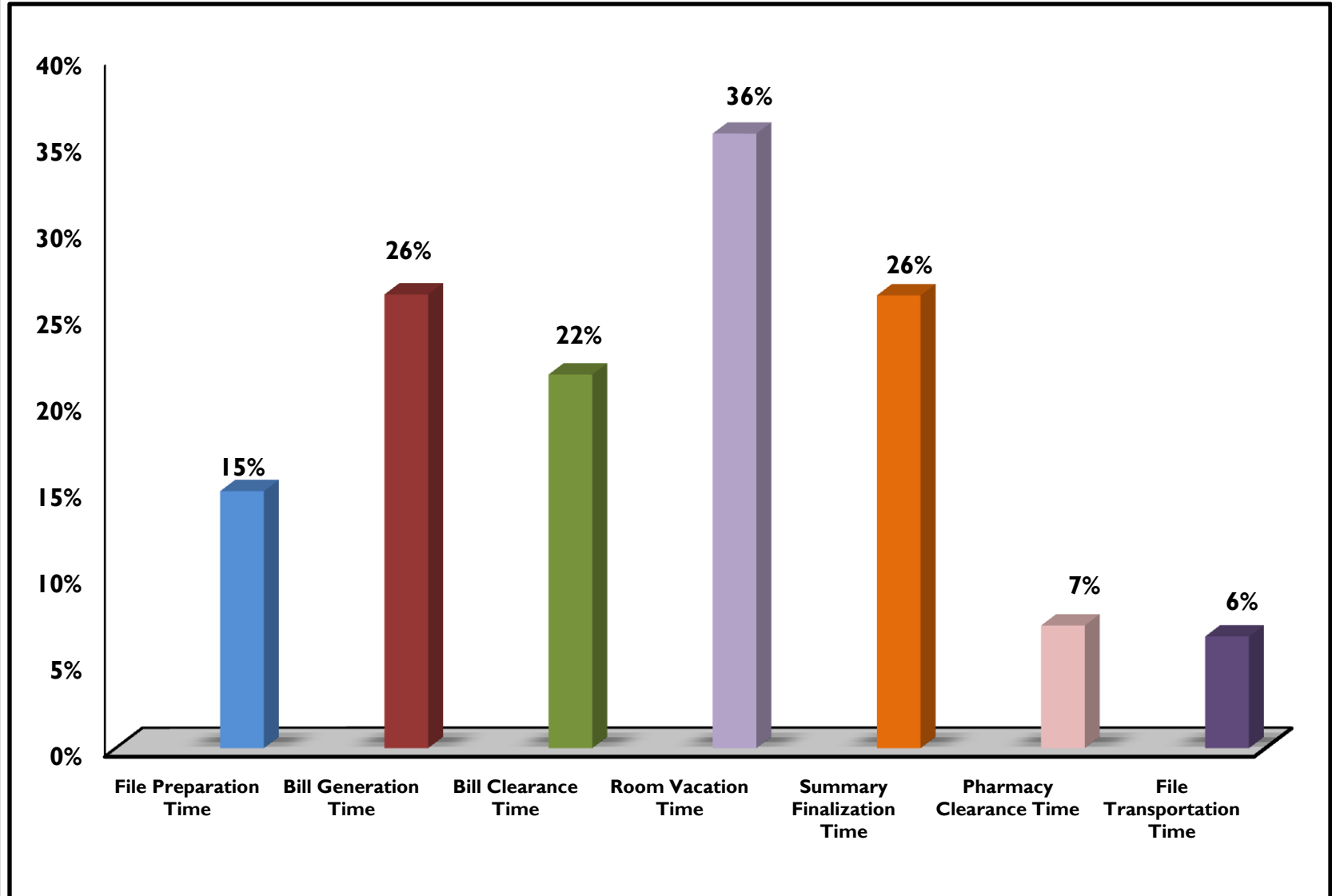
## **Primary Data:**

- The primary data was collected for 3 parameters –
  - Summary Finalization Time
  - Pharmacy Clearance Time
  - File Transportation Time
- The investigator recorded the start time and the end time of every sub process for the daily discharges.
- Observation by the investigator was the method used for collection of the primary data.

# Average TAT

| Measurement Parameters    | Average TAT for Month of February | Average TAT for Month of March | Mean TAT |
|---------------------------|-----------------------------------|--------------------------------|----------|
| Summary Finalization Time | 1:12                              | 1:33                           | 1:23     |
| Pharmacy Clearance Time   | 0:20                              | 0:25                           | 0:22     |
| File Transportation Time  | 0:18                              | 0:23                           | 0:20     |

# Percentage Division of Cycle Time (Based on Primary Data)



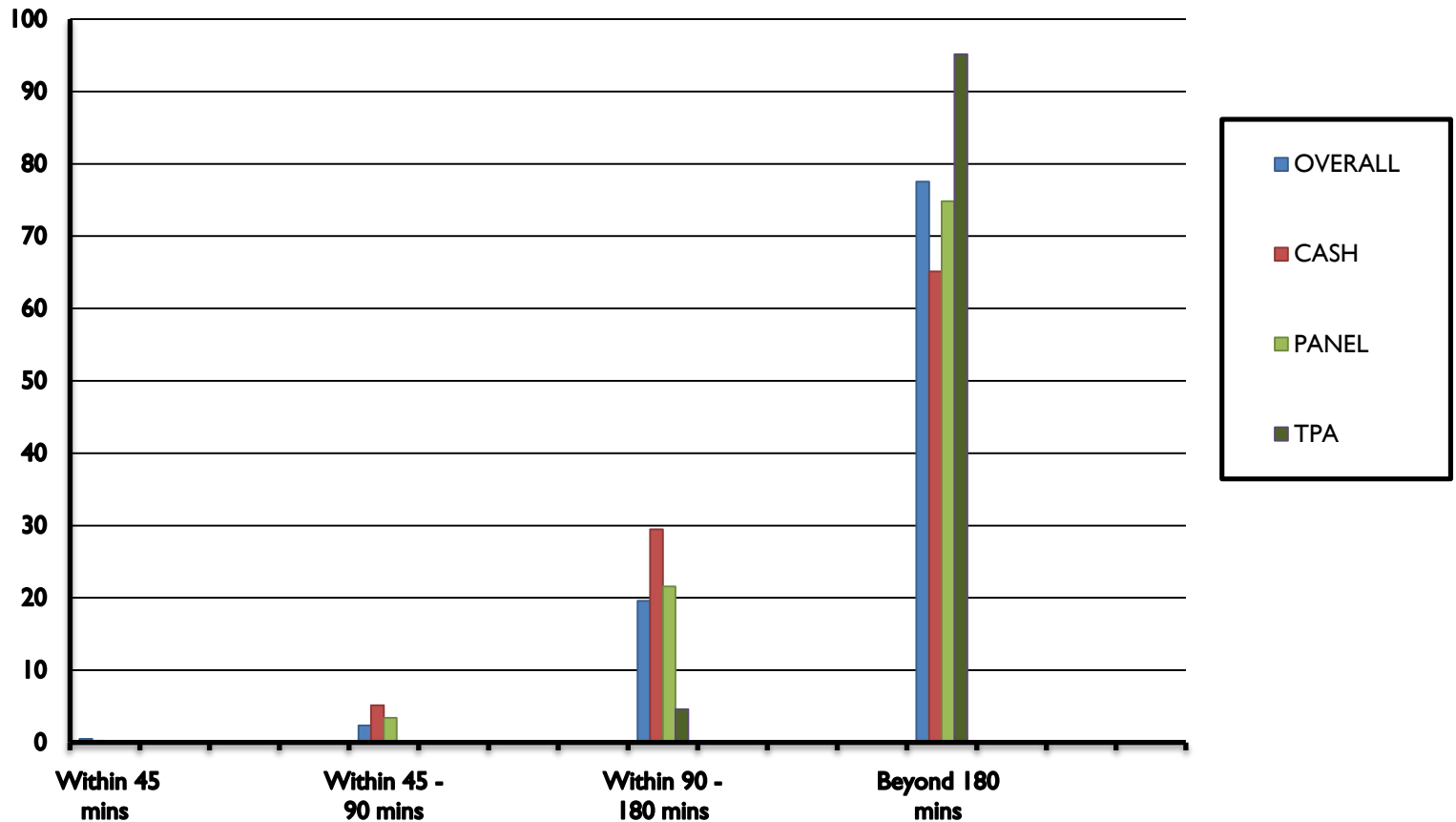


## PHASE III – ANALYZE

- The phase aims at analyzing the current performance to isolate the problem. Through analysis (both statistical and qualitatively), the root cause of the problem is formulated.
- Analysis was done in three steps:
  - Calculating the percentages of discharges those were within the benchmark TAT of 45 minutes.  
Percentages of discharges were categorized according to the mode of payment as – Cash, Insurance (TPA) and Panel.
  - Cause and Effect Analysis was done using the concept of Cause and Effect Diagram.
  - Waste Identification

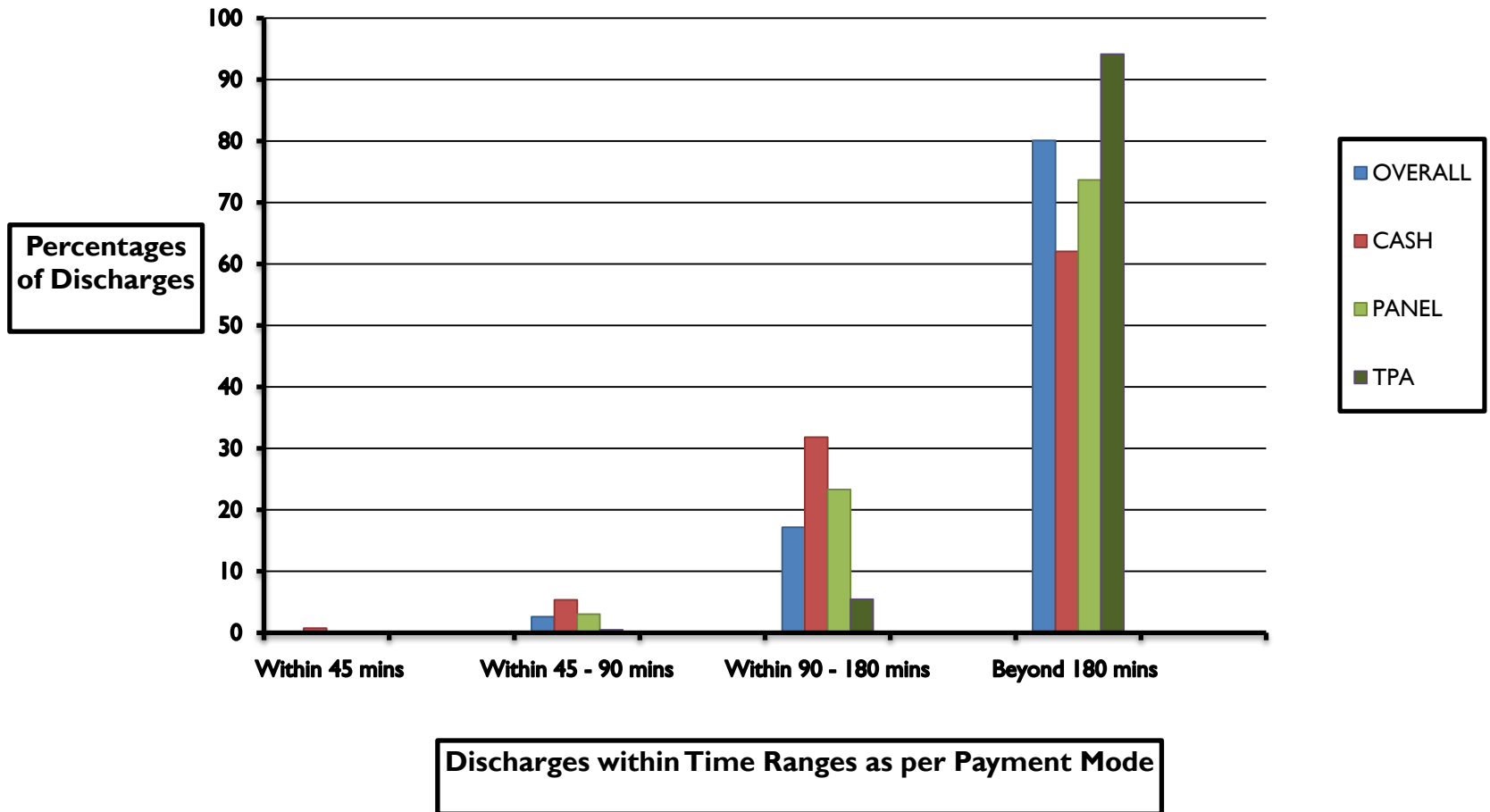
# Calculating the Percentages of Discharges (February)

Percentages of Discharges



Discharges within Time Ranges as per Payment Mode

# Calculating the Percentages of Discharges (March)

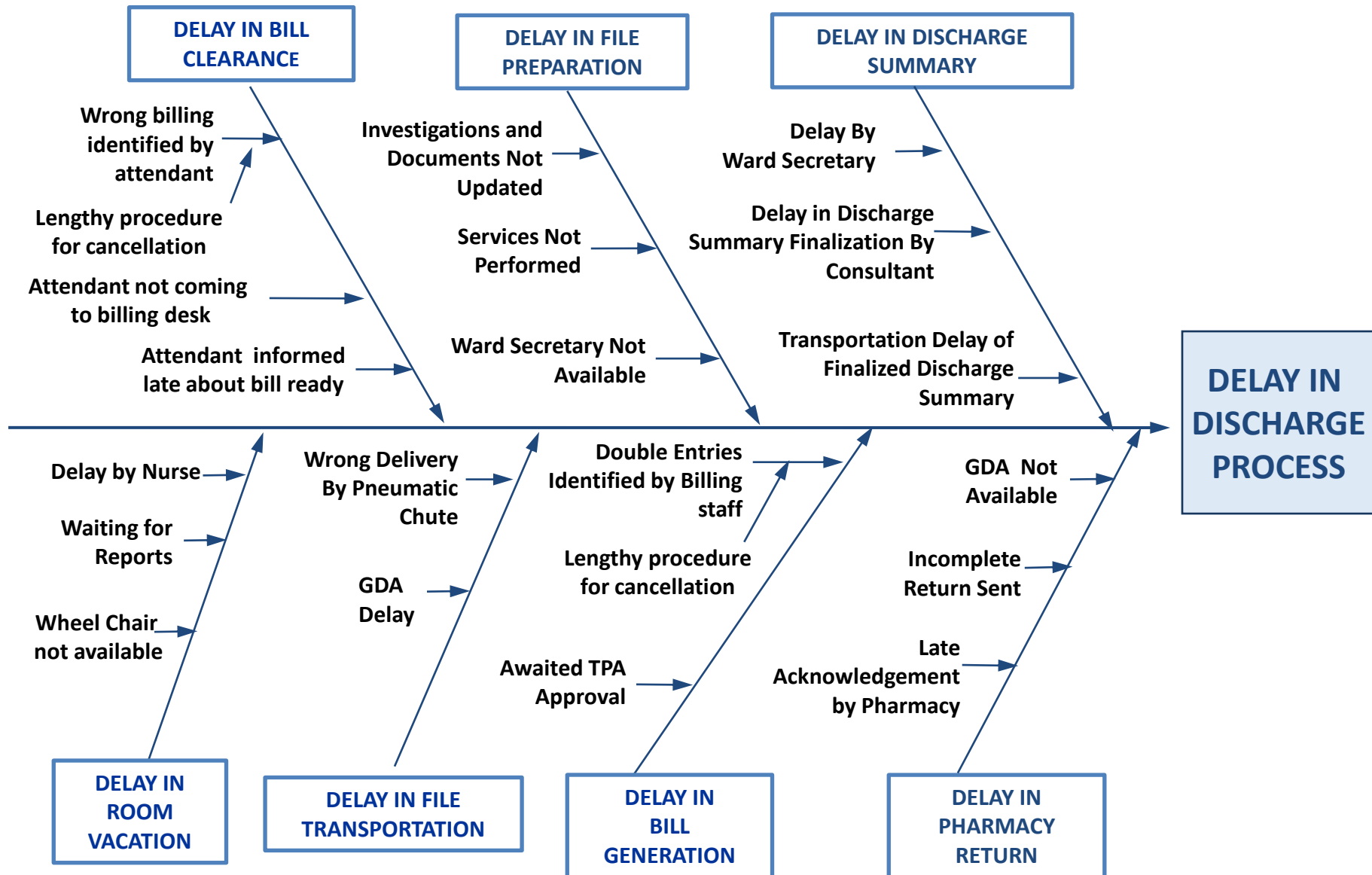




# CAUSE AND EFFECT ANALYSIS

- A Cause-and-Effect Diagram is a tool that helps identify, sort, and display possible causes of a specific problem or quality characteristic.
- It graphically illustrates the relationship between a given outcome and all the factors that influence the outcome.
- This type of diagram is sometimes called an "Ishikawa diagram" because it was invented by Kaoru Ishikawa, or a **"fishbone diagram"** because of the way it looks.
- The diagram was constructed in the following steps:
  - The outcome or EFFECT to be analyzed was identified as the Delay in Discharge Process.
  - The main CAUSES contributing to the effect being studied were established. These formed the labels for the major branches of the diagram and became categories under which to list the many causes related to those categories. For each major branch, identify other specific factors which may be the CAUSES of the EFFECT.
  - For each major branch, other specific factors which may be the CAUSES of the EFFECT were identified.

# DELAY IN DISCHARGE PROCESS





**Controlled factors**, those dependent only on the internal environment and customers, that can be modified were identified from the Fish-bone analysis. These were defined as the Problem Statements for the next phase of the study where interventions were to be designed.

- **Problem Statement 1: Delay in Discharge Summary**
  - Delay by Consultant
  - Delay in Transporting Finalized Discharge Summary
  
- **Problem Statement 2: Delay in Pharmacy Return**
  - Incomplete Return Sent
  - Late acknowledgment by Pharmacy Department
  
- **Problem Statement 3: Delay in File Preparation**
  - Documents in the file not updated in routine
  - Services not performed not checked in routine
  
- **Problem Statement 4 : Delay in Bill Generation**
  - Wrong or duplicate entries of investigations done in HIS
  
- **Problem Statement 5 : Delay in Bill Clearance**
  - Wrong billing identified by the attendant at the time of bill clearance
  - Delay in informing the attendant to clear the bills

## PHASE IV – IMPROVE

- Results of the analyze phase are used to make tentative design change recommendations.
- The factors identified in the analyze phase are considered for improvements and brainstorming was done to find solutions to the problem statements that were the major controlled causes of delay in discharge.
- **Problem Statement 1: Delay in Discharge Summary**
- **Recommendation:**

The discharge summary should be updated a day prior to the expected date by the resident doctor and ward secretary, such that when the doctors go on rounds they are able to complete the process of discharge summary and sign it at the nursing station, immediately after the rounds. Also the recommendation of Computer On Wheels (COW) was put forward, such that the doctors on their morning rounds can update and sign the summary within the patient room.



## **Problem Statement 2: Delay in Pharmacy Return**

- Incomplete Return Sent – After the assigned nurse has finalized the pharmacy to be returned, the in charge should counter check and signs the return material. This will decrease the waste of time in returning the medicines several times, due to minor errors such as counting.
- Late acknowledgment by Pharmacy Department – The recommendation is to introduce a different-colored flash should appear against the patient's name whose pharmacy return is entered in the system and the same should repeat when the pharmacy clearance is done.



- **Problem Statement 3: Delay in File Preparation**

- **Recommendation**

For the above stated problems, the recommendation of daily updating the services not performed by the assigned nurse and processing the cancellation was put forward. The documents were recommended to be updated in the files on daily basis by the ward secretary.

- **Problem Statement 4 : Delay in Bill Generation**

- **Recommendation**

The ward secretary should check for any duplication in the entries of investigations while updating the reports in the files. If any duplication is found, the same should be informed to the assigned nurse, who in turn would initiate the process of cancellation on the same day or next day, after the wrong entry has been done. This will ensure that on the day of billing there is minimum chance of wrong entries in the bill.



## **Problem Statement 5 : Delay in Bill Clearance**

- Wrong billing identified by the attendant at the time of bill clearance

- Recommendation

The attendant should be provided with a printed provisional bill a day prior to the expected date of discharge, so that the verifications at the consumer's end are done and any corrections to be done can be completed before the time for final bill clearance.

- Delay in informing the attendant to clear the bills

- Recommendation

The recommendation of intervention by IT department was put forward, such that there could be a colored flash against the patient's name as soon as the bill is updated to be ready in HIS. This will help the nursing staff to identify the patient whose bills are ready, so that the same can be communicated to the attendant without any delay.



## PHASE V – CONTROL

- Control phase focuses on the measurement of improvement after the interventions are applied. The same parameters should be recorded and analyzed to find the level of improvement with the interventions done.
- This phase also monitors the continuous implication of the interventions for quality improvement of the discharge process.
- In this study, the control phase could not be carried out due to the time limitation.



*Thank you*