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Abstract

In today's world, the competitive environment in the healthcare industries leaves no margin for error. In order to improve the quality of healthcare system and because patient comfort and satisfaction are vital, the processes of discharging patients from medical facilities must be addressed accordingly. Some of the benefits of having an efficient discharge protocol are, but not limited to, bed availability for emergency scenarios, an increase in customer satisfaction and hospital profitability. Therefore, this study aimed to minimize the patient's discharge time by 20% using the Six Sigma DMAIC Model approach in a multidisciplinary hospital setting in Puerto Rico's West area. Major findings in this study indicated that using a Six Sigma approach could improve patient flow by decreasing length of stay and wait time. Moreover, this method can improve patient volume in hospitals resulting in higher profitability. In this study the discharge process was reduced from 250 minutes to 190 minutes resulting in a 24% decrease.

Introduction

Six Sigma is a business improvement strategy used to improve business profitability to drive out waste, reduce costs of poor quality and to improve the effectiveness and efficiency of all operations in order to meet or even exceed the customer's needs and expectations (Anthony and Banuelas, 2001). Today, everybody is concerned about the quality of healthcare facilities, and hospitals are becoming the most important service industry. Hospital managers should strive to the utmost level of customer satisfaction and focus on reducing waste while properly addressing the unnecessary activities that result in an increase of the discharge process, which, naturally, ends up affecting the patient. By ensuring the proper discharge process, we can guarantee patient satisfaction and optimize the resources for more inpatient care. Inefficient patient discharge protocols not only cause frustration to the patients and, consequentially, their family members, but also has a negative impact on the incoming patient influx and the organization's revenues.

Problem & Objectives

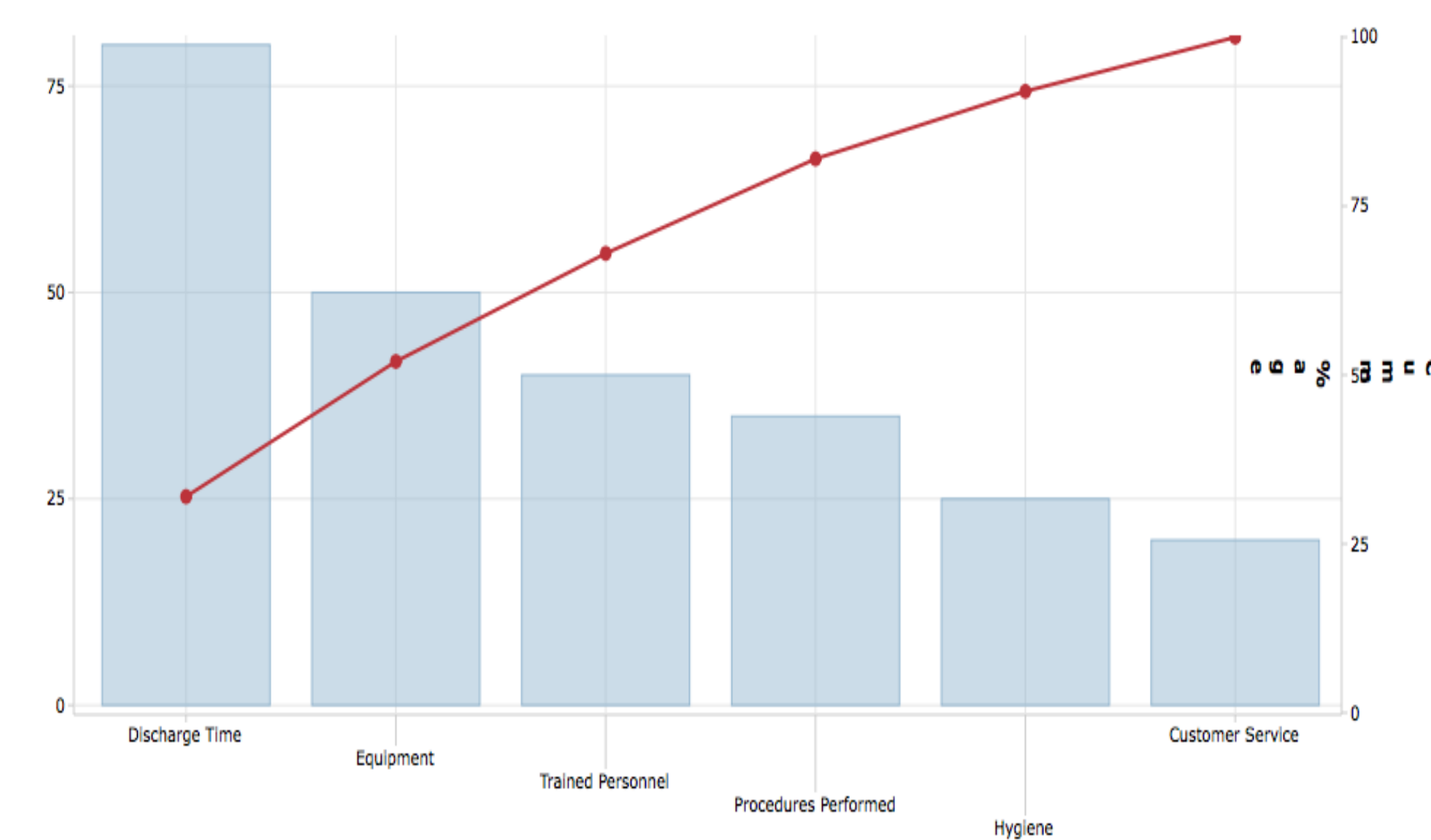
Today, public hospitals are facing enormous challenges due to a high volume of patients and a shortage of available beds. In a study conducted by Jones in 2011, it stated that most English hospitals operate a daily average occupancy rate close to 100% for more than a six-month period, which can lead to a 30% increase in the chance of in-hospital death. The aim of this project is to examine the effectiveness of Six Sigma DMAIC Methodology tool in the hospital discharge management process to increase operational excellence, customer satisfaction and finally cost reduction. The main objective is to reduce the patient's discharge time by 20%.

Methodology

Following a process of selection and scoping, a Six Sigma DMAIC project was assigned to a hospital located in the West area of Puerto Rico.

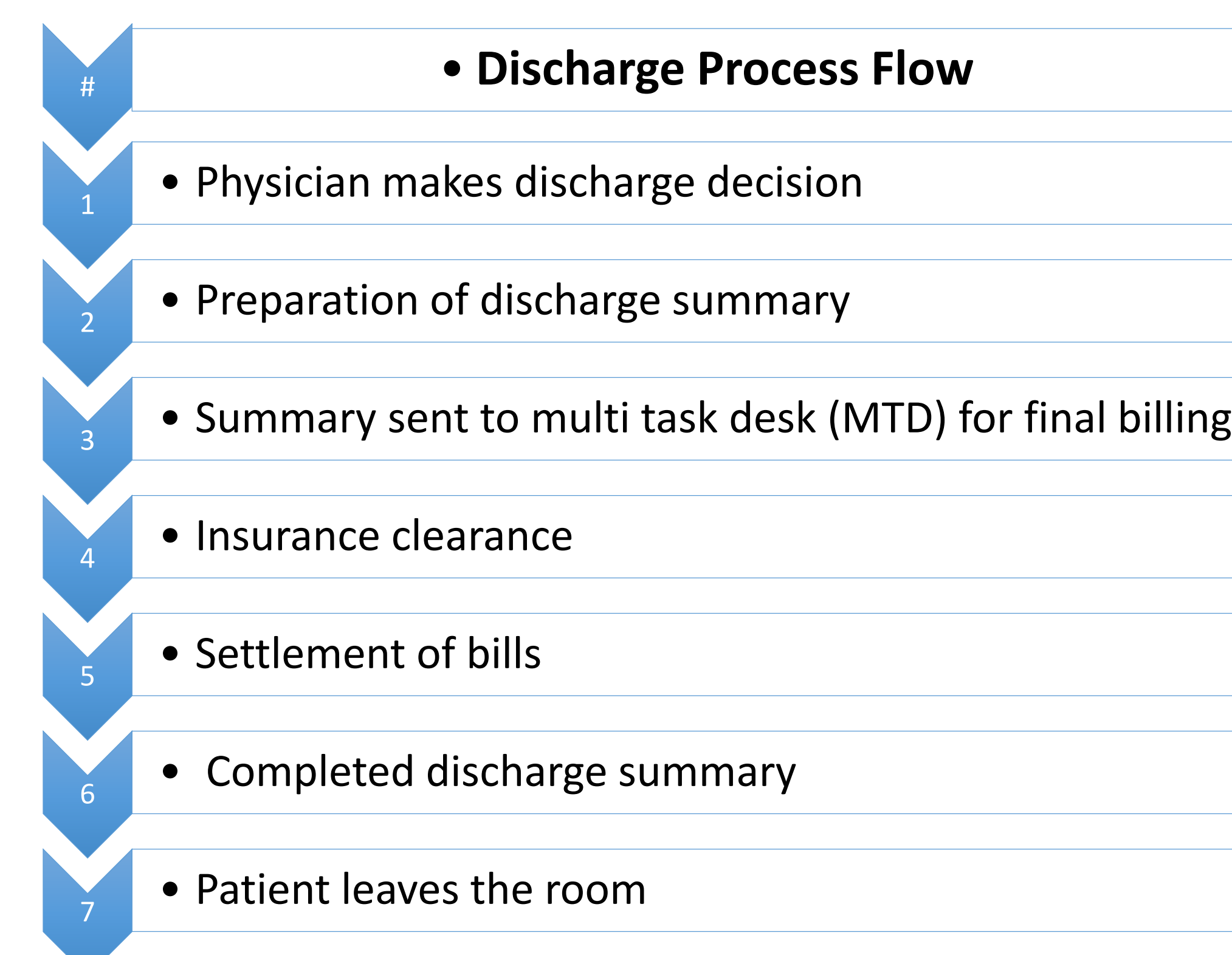
Define

In this first phase, a Voice of the Customer (VoC) or patient feedback will be used and consequently analyzed. In this research study 250 people were interviewed to find out the critical issues that the hospital is going through. According to patients, the hospital managers need to address 6 important issues: (1) reduce discharge time (32%), (2) facilities needs better equipment (20%), (3) hospital need more trained personnel (16%), (4) increase number of medical procedures performed (14%), (5) better hygiene/cleanliness (10%) and (6) superior customer service and better management of complaints (8%).



Measure

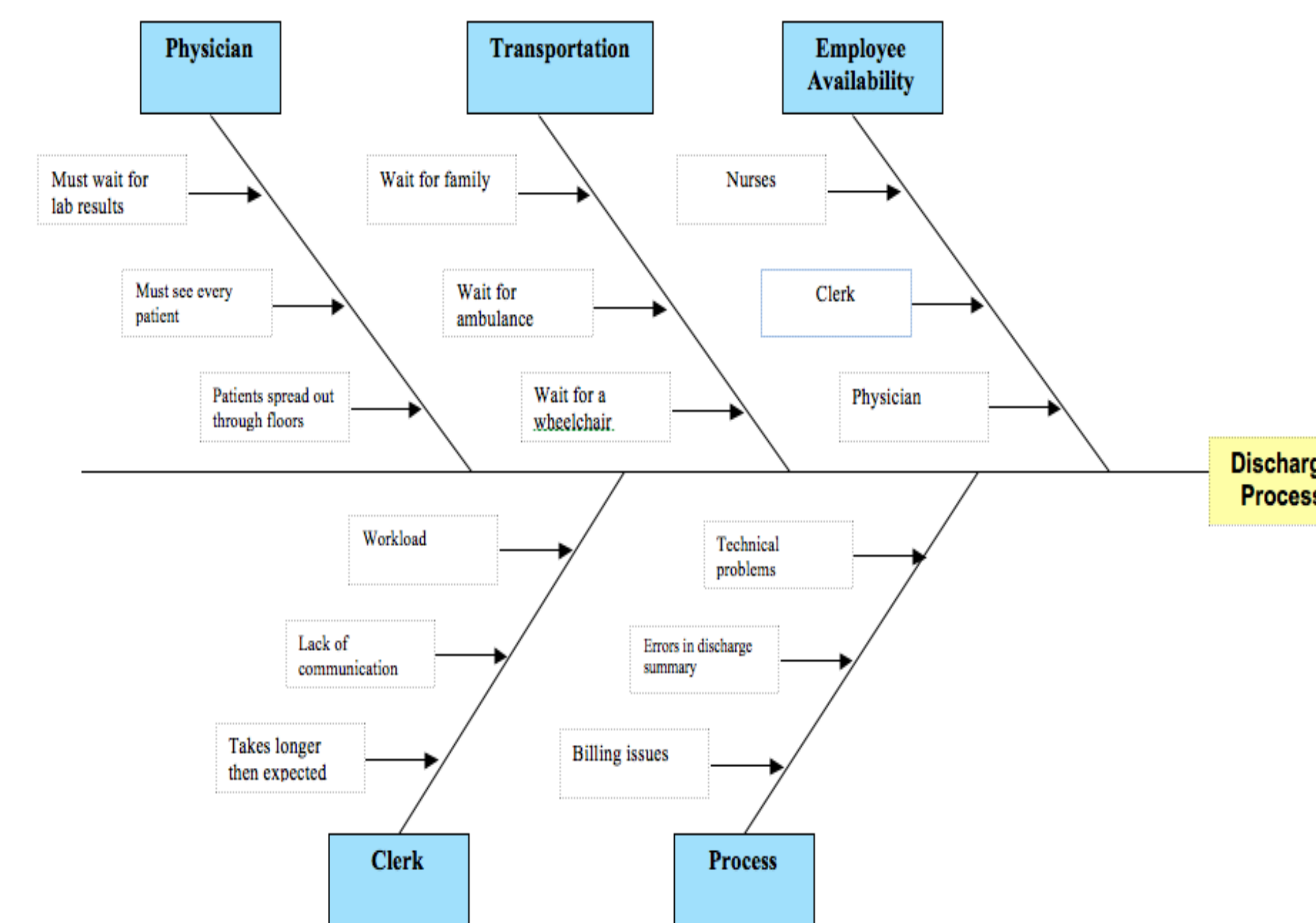
In this second phase a flow diagram will be developed to map a visual representation of all the major steps in the discharge process. It should be noted that the Upper Specification Limit (USL) is 120 minutes. In other words, the hospital has a general rule of 120 minutes (2 hours) for the discharge process.



Process	Observed mean time (min)	USL (min)
1. Physician makes discharge decision	30	20
2. Discharge summary preparation	40	25
3. Summary sent to MTD	70	10
4. Insurance clearance	30	25
5. Settlement of bills	25	10
6. Completed discharge summary	30	20
7. Patient leaves the room	25	10
Total	250	120

Analyze

In order to find the reasons for the delay in the discharge process, a root cause analysis was carried out.



Improve

In this phase, with root causes uncovered and prioritized, actions were taken to improve the discharge time.

- Billing hour start from 8:00 am instead of 9:00 am.
- Discharge process flow placed in the patient's room for better communication and understanding.
- During peak hours, additional trained employee from another department.
- Patient education must occur throughout the hospitalization, not during the time only of the discharge.
- Preparation of discharge summary at least 24 hours in advance.
- Early identification of patient for possible discharge; preferably 24 hours in advance.

Process	Observed mean time (min)	USL (min)
1. Physician makes discharge decision	30	20
2. Discharge summary preparation	30	25
3. Summary sent to MTD	30	10
4. Insurance clearance	30	25
5. Settlement of bills	25	10
6. Completed discharge summary	30	20
7. Patient leaves the room	15	10
Total	190	120

Control

To track results and to ensure the improved process remains as such over time, a checklist was created. The table below shows an example of the process checklist to sustain and control improvement.

Name of the Patient	Start Time	End Time	Total Time	Goal
Patient #1	1:00 pm	4:00 pm	180 minutes	120 minutes
Patient #2				

Conclusions

This research study validated the application of the Six Sigma DMAIC methodology to reduce and optimize the discharge time of a hospital in Puerto Rico. The discharge time was reduced from 250 minutes to 190 minutes resulting in a 24% decrease. The goal of the project was a 20% reduction. Practically, the discharge time was reduced from 4 hours to 3 hours. This project resulted in more patients being managed, resulting in a direct impact on the revenues. Six Sigma is a great solution to address mentioned concerns providing reliable results.

References

- Antony, J., & Banuelas, R. (2001). A strategy for survival. *Manufacturing Engineer*, 80(3), 119 - 121.
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