

INDUSTRIAL, MANUFACTURING, & SYSTEMS ENGINEERING

CAPSTONE PROJECT /INTERNSHIP SUMMARY



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Type of Capstone (research, teaching, practical application): Practical Application

Capstone Project Title: Del Sol Medical Center Interventional Radiology Patient Flow Improvement

Year and semester: Fall, 2016



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INTRODUCTION

The department of Interventional Radiology at Del Sol Medical Center (East El Paso) has been struggling with out patient (patients from out side the hospital) and inpatients (patients from the hospital) having delays to perform simple medical examinations (CT's, Ultrasound, and Special Procedures). Since there was not concrete information we could use to do analysis and design solutions, we were able to do observations (time studies), interviews and statistical analysis (Pareto chart, and bar graphs) to define real causes of delays and therefore design solutions. Using this information, we will also design and run a simulation that would reflect the actual process of patient going through medical examinations in the ASU till the patient finishes its medical exam. Later, will design a simulation that reflects the differences in delay after applying our solutions.

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PROJECT OUTCOMES

For outpatients, after we gathered our data by having time studies, we used it to define a system from both inpatients and outpatients. Once we had a system we needed to define the requirements, since it's what it needed to include in the system no matter what. After the data was gathered, it was used to create two Pareto charts: one to visualize where in the medical examination process had most time delay and another to see what factor within a process was causing time delays. The process that received the most delays was within the ASU process (before the medical exam) and the reasons were that there was lack of resources (IR staff) and lack of communication (IR nurses and patients). After identifying real causes of delay, using the data collected we were able to analyze the distributions of each medical procedure (CTs, Ultrasound, and Special Procedure) so that we were able to get the standard deviations and means so that later we can proceed with a simulation.

The simulation of the actual process used the actual data we collected. As a result, 79 patients having a medical examination within 20 days (one month equivalent) and having a bottleneck in the ASU process, which was the observation we were making. We established two alternatives within each problem (lack of communication and lack of resources). For lack of resources, the first alternative we proposed to add a nurse after doing a cost/benefit and came up to have better results after hiring a nurse. The second alternative was to add a kiosk, which will help with the processing of the patient's information given to nurse. The cost/benefit analysis define that two kiosks was helping make and improvement. Comparing both alternatives using a priority matrix, it was now established that just adding a nurse would help the system. For the lack of communication between patients and nurses, we also had two alternatives; one was making pre-procedure preparation package, and pre-procedure calls. There is already a pre-procedure preparation package but since the design of the paper itself was very confusing, especially for elderly people, and there was a lot of acronyms undefined, it was hard to follow through. The information give is crucial for the pre-preparation of the patient so we proposed a redesign that would be a lot clearer to read, everything will be defined and it will state clearly it is a document designed for patients. Also, it will include a section where medication will be listed at home so it will be ready to be taken to the hospital. The alternative two (pre-procedure calls) includes having just IR staff call IR patients to remind them

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about pre-procedures preparations. It will include a checklist for the caller so that all information will be given to patients without missing anything important. Also, the IR caller will keep track of the patients called. Doing the prioritization matrix for both alternatives, it was concluded that both have about the same weight of importance, therefore both alternatives would be applied. Now adding all solutions in the new simulation made, it was reflected that there was about a 12.6% reduction of time within the medical exam system, which is better than our actual goal of 5%.

Inpatient recommendations were based in pure observations and interviews since there was not enough data to make a whole analysis. The recommendations made based on lack of communication between IR staff. Two alternatives were made; one is to reduce the usage of STAT (importance to make medical examinations) by having awareness to doctors and making huddles with IR staff to increase communications with them.

INDUSTRIAL ENGINEERING PROGRAM ASSESSMENT

At the beginning of the project, there were several challenges encountered. The medical field, especially if dealing with actual people, was a new field for any of us so we didn't really think of having many more factors to consider through the project. Also, the hospital does not have a database where we could acquire historical data for our analysis, so we needed to start from scratch to determine what data we needed and how we were going to get it. In the end, the challenge became welcome since now it gave all of us an idea of how the real world of industrial engineering was really about. Sometimes you will have the data needed, and sometimes you will not and you need to find a way to get that data to improve your project. We were happy to have our mentor, who helped a lot with anything we needed. The staff at the Del Sol Medical Center helped also, and was more than happy to help. We enjoyed our project at the Del Sol Medical Center.

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