Correlating Patient Feedback to Avoidable
Readmissions and Patient Experience Outcomes

Sponsor Company: Tallahassee Memorial Healthcare

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Data Analytics Capstone I Final Paper

Dr. Jim Mennie

December 8, 2021

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Executive Summary

The purpose of this report is to examine and analyze the steps that have been taken thus far in our Data Analytics Capstone project. In this way, this report aims to address our project overview, research design, and future plans for the next steps of our project. By the completion of our project, our goal is to discuss the findings from our data analysis to identify areas of improvement in avoidable readmissions and HCAHPS scores at Tallahassee Memorial Healthcare. This report will discuss the actions we have taken up to the end of the term and those actions that we plan to take as our project progresses. We will also examine the various project management tools that were implemented into our decision-making processes to construct our Project Charter, Work Breakdown Structure (WBS), and Gantt Chart and how well our team has been able to execute those plans. Our team is confident that this detailed update of our Data Analytics Capstone project for Tallahassee Memorial Healthcare will summarize our project, report our progress thus far, outline our research and analysis framework, and discuss our plans for the next steps of this project.

Introduction

As a strategy to better understand and ultimately improve avoidable readmissions and HCAHPS scores at Tallahassee Memorial Healthcare (TMH), the Organizational Improvement (OI) team at TMH requested that our team assist in investigating any possible correlations between follow-up phone call survey responses and two outcomes: readmissions and patient surveys. Our goal is to explore the data to identify what patient response characteristics are more likely to result in patients being readmitted into the hospital or poor survey responses. For this

project, our primary focus is on reducing avoidable readmissions and improving HCAHPS scores at Tallahassee Memorial Healthcare.

Background

Tallahassee Memorial Healthcare (TMH) is a private, not-for-profit community healthcare system that serves a region of 17 different counties throughout north Florida and southern Georgia. This hospital contains 772-beds, a psychiatric hospital, and multiple specialty care centers. Readmissions are classified as unanticipated returns to the hospital after a patient has been discharged. Patient Readmission rates are a nationally recognized measure used for quality control and one that TMH is actively working to reduce. One process that TMH has already put into place to assist in reducing patient readmissions is a follow-up phone call to the patient after they have been discharged. This allows TMH to gather important information directly from the patient regarding their insights into their questions or concerns once they're home. CMS's CAHPS Hospital Survey (HCAHPS) is another quality measure that is considered. This nationally recognized hospital survey is used to rate the hospital based on their patient's experiences in the facility. By better understanding the relationship between the data collected from follow-up phone calls and patient outcomes (i.e. readmissions and HCAHPS survey scores), TMH may be able to help reduce avoidable readmissions and even improve the patient's experience as measured by the HCAHPS score.

Research Design

Research Question Two

Can we identify patient response characteristics that are more likely to lead to readmission?

We'll start by filtering the survey data to surveys with encounter IDs that are also in the readmissions dataset. This way, we'll have survey results only from people that were readmitted. We can then perform an exploratory data analysis on the reduced dataset with a focus on connect calls and survey responses that frequently occurred before readmission. Once we have an idea of what we're looking for, we can use hierarchical clustering to see how groups of responses correlate, instead of single responses. With that, we'll be able to see if there is a difference between single responses and grouped responses.

Project Structure

Project Charter

1. General Project Information			
Project Name:	Correlating Patient Feedback to Avoidable Readmissions and Patient Experience Outcomes		
Executive Sponsors:	Tallahassee Memorial Healthcare		
Department Sponsor:	Griselle Centeno		
Impact of project:	Provides information that can help Tallahassee Memorial Healthcare reduce avoidable readmission and improve HCAHPS scores		
2. Project Team			
	Name	Department	E-mail
Project Manager:	Hailey Skoglund	Business Analytics	hskoglund7612@floridapoly.edu
Team Members:	Maverick Hope		mhope5765@floridapoly.edu
	Gus Lipkin		glipkin6737@floridapoly.edu
3. Stakeholders			
Tallahassee Memorial Healthcare			
Tallahassee Memorial Healthcare patients			
4. Project Scope Statement			
Project Purpose / Business Justification			

To improve the quality measures of Tallahassee Memorial Healthcare specifically higher HCAHPS scores and a lower readmissions rate.

Objectives (in business terms)

HCAHPS are very important in healthcare and are tied to reimbursement therefore an improvement in score will lead to more funding for Tallahassee Memorial Healthcare.

Deliverables

Final findings will be reported to Tallahassee Memorial Healthcare in April 2022

Scope

This project will look at TMH's data on readmissions, HCAHPS, and phone surveys to find out if certain responses on the phone surveys are correlated with redamations and low HCAHPS scores

Project Milestones

Inception- 09/01/2020
Receive data from TMH- 11/7/2020
Exploratory data analysis – 11/15/2020
Report final results to TMH – 4/30/2021

See Gantt Chart for more details.

Major Known Risks (including significant Assumptions)

Risk	Risk Rating (Hi, Med, Lo)
Poor data	High
Unable to come to conclusions	Low

Constraints

- Receiving the data
- Time needed to do analysis
- Getting usable data

External Dependencies

Florida Polytechnic University
Tallahassee Memorial Healthcare

5. Communication Strategy

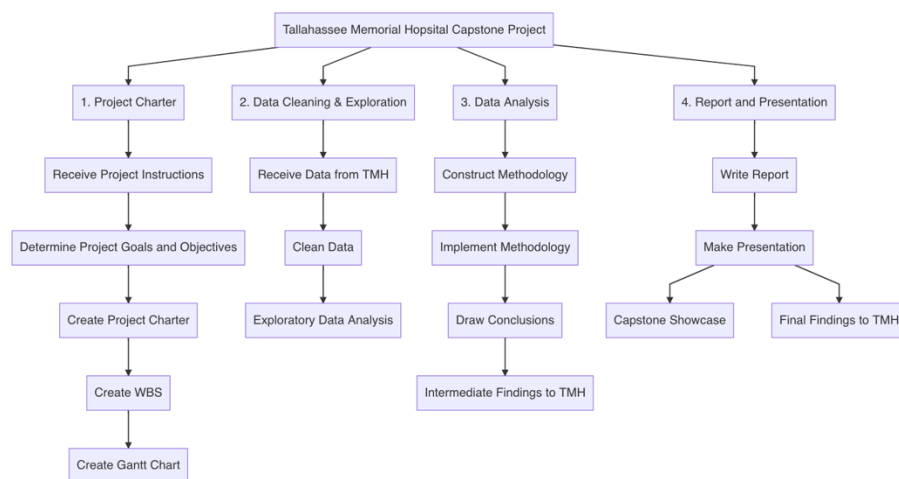|		
Hailey will communicate through email to Jessica Parker on a regular basis (Jessica.Parker@tmh.org). The team will meet in person and over Teams as needed. Day to day communication will be in person and by text message.		
6. Sign-off		
	Name	Date
Project Manager	Hailey Skoglund	2021-11-03
Team Members	Gus Lipkin	
	Maverick Hope	
7. Notes		
None at the moment ☺		

Work Breakdown Structure

The Work Breakdown Structure for the Tallahassee Memorial Hospital Capstone Project is relatively simple. The project is broken down into four phases: the project charter, data cleaning and exploration, the data analysis, and the report and presentation. The creation of the WBS itself is part of the project charter stage which also includes creating the project charter and the Gantt chart. All three of which are essential to defining the project, its milestones, and the project timeline. In the second section, data cleaning and exploration, we will receive data from TMH, do any more cleaning it may need, and perform an exploratory data analysis. The EDA

will allow us to determine if the data we have is sufficient to answer our research questions and

will give us time to become comfortable with the dataset. The data analysis comprises the most

important steps. Constructing the methodology, using the methodology to conduct the analysis,

and drawing the conclusions. Those three steps must be repeated for each research question. The

last step is to write the final report and presentation and do the capstone showcase and report our

final findings to TMH.

As of November 29, 2021, we are well into the first iteration of stage three, the data

analysis. We have just completed our research methodology for research question two and will

be beginning implementation this week.

Gantt Chart
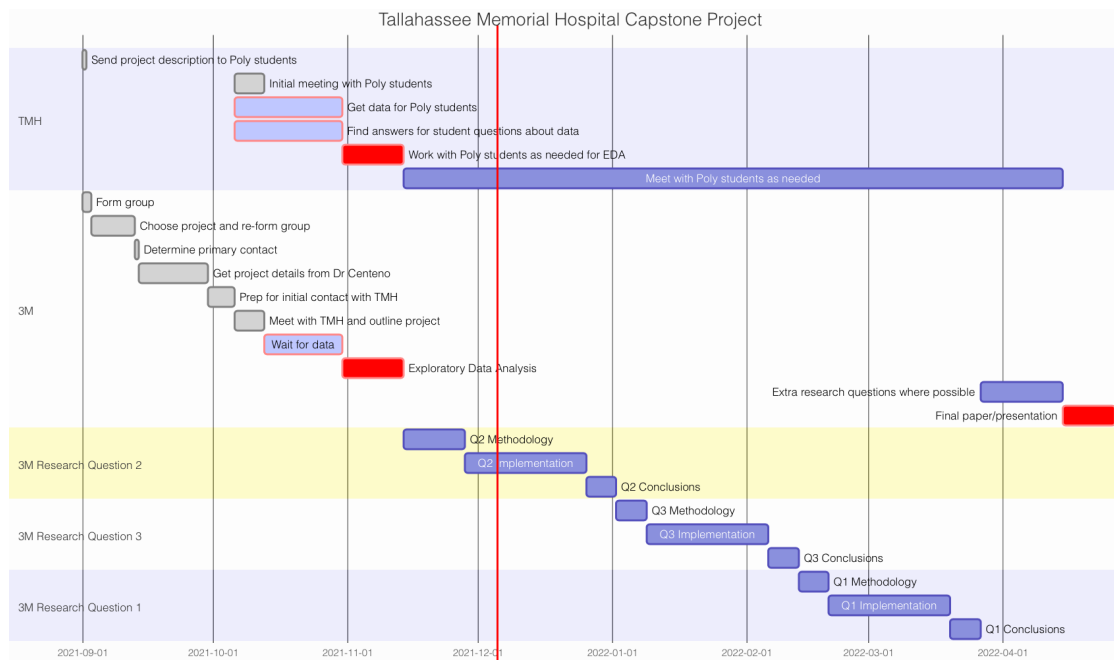
This is our Gantt chart as of December 5, 2021. It is broken down into five distinct

sections. At the top, we have a general timeline for tasks that we need Tallahassee Memorial

Hospital to complete for us to be successful in our endeavors. The questions are separated into

the next three sections to show that they are completely independent of each other. We can run any number of them concurrently or consecutively, or any combination thereof, including inserting additional questions where the opportunity presents itself. In addition, by separating them out, we have more flexibility in how long each one will take us. They are ordered, however, because the later questions will be made easier to answer by successfully answering the preceding questions.

Constructing our methodology for research question two took a week longer than expected and so cut into our time for extra research questions. Nevertheless, we are not at all behind and are confident that we can get back on track and hope to make up for that week and give ourselves that time for extra research questions.

Analysis

For this data analysis, our goal is to provide insight on three different research questions. First, we will analyze the data to see whether there is any correlation between phone call responses and outcomes of readmissions or patient surveys scores (HCAHPS), survey scores. Next, we will use the data to identify the patient response characteristics that have the strongest relationship to these two outcomes. Lastly, we will analyze any correlations between patient response characteristics. For example, when patients are confused about how to take their medication, they are more likely to be readmitted within 14 days. Other relationships such as responses by unit or patient diagnosis can also be explored. Once we have acquired the necessary data to answer these questions, our team will utilize techniques such as regression analysis and sentiment analysis to better understand how patient response characteristics are correlated to hospital readmissions and HCAHPS survey scores.

Exploratory Data Analysis (EDA)

Getting the data into a usable format was a bit of a process, but we were able to automate it in R so that if we ever get new data, we'll be able to quickly update it and make it ready for use. Our data is now ready for use in research, and we did a quick exploratory data analysis to get an idea of what we were looking at for our first research question.
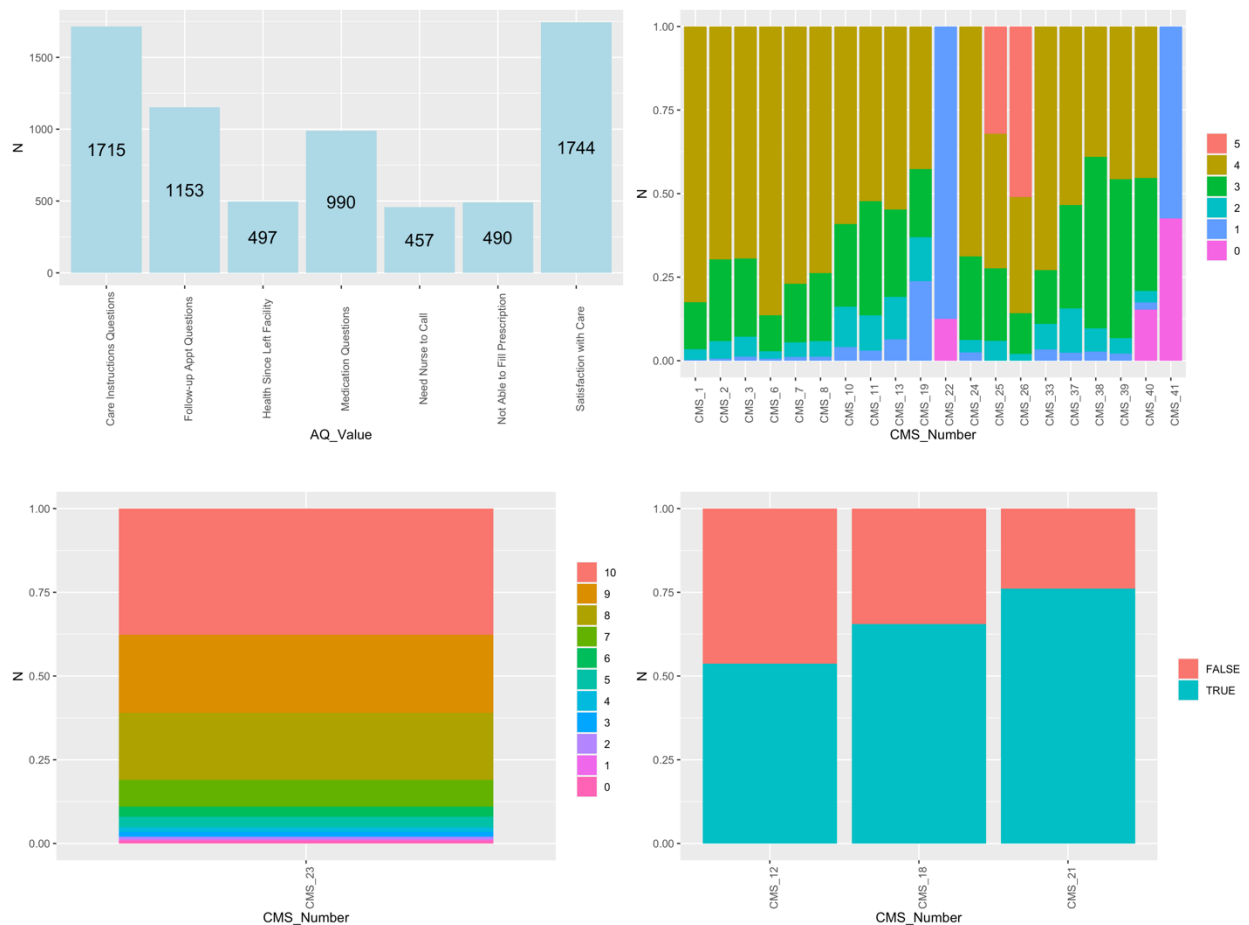
While those charts may look good, they are not ready for distribution and are just for giving us an idea of the data.

Research Question Two

Can we identify patient response characteristics that are more likely to lead to readmission?

To start, we separated the data into two categories. Data from people who were readmitted and data from people who were not. We then compared survey responses between the two groups.

From this quick overview of the survey questions, we can see that readmitted patients generally gave lower ratings, were more poorly informed about their care, and were more likely to have been admitted through the emergency room.

Literature Review

The first article that we looked at was *Improving the US hospital reimbursement: how patient satisfaction in HCAHPS reflects lower readmission*. This article looked at data on HCAHPS, 30-days readmission rates, and related payments for heart failure and pneumonia

patients at 2,711 acute care hospitals in the US. They found unsurprisingly that people who rated the hospitals poorly were more likely to be readmitted to the hospital than patients who rated a hospital highly.

Drivers of Inpatient Hospital Experience Using the HCAHPS Survey in a Canadian Setting looked at HCAHPS data from April 1st, 2011, to March 31st in Alberta, Canada. What they found was that people who don't have a family practitioner and people who were not discharged home to have the strongest negative impact to HCAHPS scores, but many more variables can contribute to a negative score such as being male, having a higher education, being born in Canada, and urgent admission. The main variable that was associated with a better HCAHPS score was having a hospital stay for less than 3 days.

In *Three Nursing Interventions' Impact on HCAHPS Scores*, the authors found that three separate nursing interventions at a 28-bed surgical unit affected HCAHPS scores. The first intervention was manager rounding, which is when the manager meets with patients daily to hear any complaints which can help address them before the patient is discharged and takes the HCAHPS. The second intervention was discharge phone calls, which helped with medication compliance and lowered rehospitalization rates. Lastly, they implemented discharge teaching which standardized the practice of giving patients a physical note of all the medications and care that the patient may need as well as give them notes such as this narcotic causes constipation and to not stop the medication if that happens. All these changes had a positive effect on the surgical units HCAHPS scores. This article shows the importance of communication for improving HCAHPS and that if the patient understands what is going on they are more likely to be satisfied with their visit.

In *The Value of Patients' Handwritten Comments on HCAHPS Surveys* the article looks at HCAHPS ratings and comments to see how they were correlated. The article found that people who rated a hospital very highly and very poorly were more likely to leave comments on the HCAHPS. Overall, 20% of patients tend to leave comments on the HCAHPS. What the article mainly focused on was the usefulness of the comments. What they found was that patients often left more context as to why they gave the scores that they did which can help hospitals to improve when they read them instead of just looking at the data from the surveys themselves.

In *Characteristics and Predictors of HCAHPS Nonresponse After Spine Surgery* they looked at HCAHPS response data from 5517 spine surgeries to find out what leads to people not responding to the survey. What they found was that people who are black, who had a minor or major adverse event, hospital readmission, or a long hospital stay were less likely to respond to the HCAHPS survey. What this showed was that for spine surgery patients those with worse outcomes were less likely to respond to the HCAHPS survey than those with positive outcomes.

Next Steps

Since our project has only just begun, the majority of the work is still far ahead of us. As for the immediate next steps of this project though, we will be implementing our methodology for research question two. Once implemented, we will work to prepare a small report on our findings. From there, we will continue working on the project by answering the remaining research questions and following the steps outlined in the work breakdown structure.

Conclusion

In summary, after analyzing the various steps that have been taken thus far in our Data Analytics Capstone project, our team is confident that this report has outlined our project progress up to this point. As discussed above, we aim to use our findings from the data analysis to identify several areas of improvement that could be developed to enhance TMH's HCAHPS survey scores and reduce the hospital readmission rate. Although our project is well underway, we still have so much ahead of us. As for the immediate next steps of this project, we hope to answer the second research question and draw conclusions before the end of the calendar year. Reflecting on our project overview has helped bring the overall goal of our project into view while paving a clear path with reachable milestones to ensure that we are moving in the right direction.

References

Chen, H., Cates, T., Taylor, M., & Cates, C. (2020). *Improving the US hospital reimbursement: how patient satisfaction in HCAHPS reflects lower readmission.* International Journal of Health Care Quality Assurance, 33(4/5), 333–344. https://doi.org/10.1108/IJHCQA-03-2019-0066

Huppertz, J. W., & Smith, R. (2014). The value of patients' handwritten comments on HCAHPS surveys. *Journal of Healthcare Management*, *59*(1), 31–47. https://doi.org/10.1097/00115514-201401000-00007

Kemp, K. A., Chan, N., McCormack, B., & Douglas-England, K. (2014). Drivers of Inpatient Hospital experience using the HCAHPS survey in a Canadian setting. *Health Services Research*, *50*(4), 982–997. https://doi.org/10.1111/1475-6773.12271

Kennedy, B., Craig, J. B., Wetsel, M., Reimels, E., & Wright, J. (2013). Three nursing interventions' impact on HCAHPS scores. *Journal of Nursing Care Quality*, *28*(4), 327–334. https://doi.org/10.1097/ncq.0b013e31828b494c

Malpani, R., Adrados, M., Mercier, M. R., McLynn, R. P., Galivanche, A. R., Pathak, N., & Grauer, J. N. (2020). Characteristics and predictors of HCAHPS nonresponse after spine surgery. *Spine*, *45*(8). https://doi.org/10.1097/brs.0000000000003287
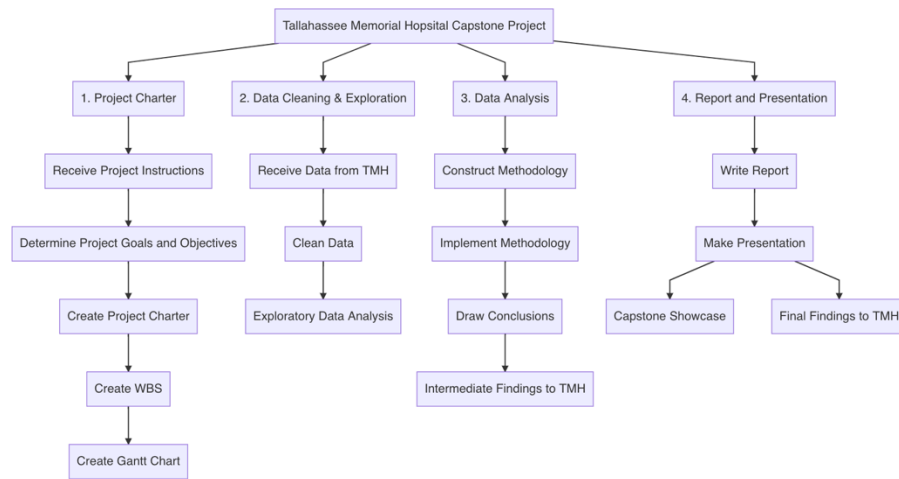
Appendix

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	Name	Department		E-mail
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Team Members:	Maverick Hope	Analytics		mhope5765@floridapoly.edu
	Gus Lipkin			glipkin6737@floridapoly.edu

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6. Sign-off

	Name		Date
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Team Members	Gus Lipkin		
	Maverick Hope		

7. Notes

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