

Data Analytics Academy

Final Capstone Project Proposal

Length Of Stay (LOS) Analysis

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Introduction:

This project is named Length Of Stay (LOS). Our team motivation for performing this data analysis is to obtain a clear insight into the many factors that can affect Inpatient Hospital Length Of Stay (LOS).

Our Interest in choosing this dataset for this analysis is to be able to gain an understanding of the many factors impacting LOS. Our exploratory and descriptive analysis of IP_ LOS will aid in predicting strategies to provide the best quality of care upon admission, reducing cost, and subsequently increase Hospital Revenue.

The goal of our data analysis is to understand LOS as an indicator to devise strategies that will minimize the risk of patient health complications due to medication and/or infection while providing better Hospital bed management.

Business Goal

Our goal is to acquire and explore qualitative data that will answer our research questions. Once data has been processed and transformed to answer our hypothesis, we will report our findings to stakeholders to create awareness about health disparities and hospital stay of residents residing in marginalized zip codes of the Bronx, NY, and bordering areas.

Scope of the project

One of the bigger challenges of public health care is balancing the high cost of better Hospital bed management and increasing Hospital Revenue. Populations residing in poor communities experience lack or low paying health insurance; therefore, they suffer frequent hospitalizations due to chronic medical conditions. Hospitals servicing these communities face financial challenges to meeting the medical needs and, in most cases, local health care facilities depend on state and federal to meet these financial challenges and continue providing medical care to the neediest population.

This analysis will focus in understanding the different social determinants and health risk factors affecting hospital admissions and consequently the length of their hospital stay. We plan to look at trends of prevalence of hospitalization while identifying ethnicity and age groups most impacted by health disparities in Bronx and surrounding area zip codes. We will also explore financial challenges faced by medical institutions servicing the population with a high rate of uninsured patients.

The first step in our analysis is to go back to the goal of reducing LOS which will minimize the risk of patient health complications due to medication and/or infection while analyzing specific subsets of at-risk populations in relation to the highest and lowest volume of admissions with longer and short LOS.

Our team is aiming to complete a descriptive and exploratory analysis of Length Of Stay (LOS) in Jacobi Hospital for 2019. Within our description will establish predictions to help meet national hospital LOS average.

The goal for the LOS data analysis is to strongly support our hypothesis through numerous findings which will be presented using charts and graphs amongst other methods to provide visual explanation of the LOS research findings.

LOS is a patient data; our team must adhere to the stipulations of the Health Insurance Portability And Accountability Act (HIPAA). Therefore, any patient names, phone numbers, address, MRN numbers and other PHI identifiers must be protected and excluded from any reports.

Data inputs

https://drive.google.com/file/d/1_ob0AiBrobmMCybqQkLCkzVcUJ5JvG7d/view?usp=sharing

Hypothesis

Our team has two research hypothesis:

H_a : Prevalence of hospitalizations and longer hospital stays are higher among patients who have not established care with a primary care physician.

H_a : Hospitals servicing government-issued insured and uninsured (fee scale) populations are challenged with longer hospitalizations and lower financial reimbursement costs.

Null Hypothesis:

H_0 : Having established care with a primary care physician does not cause longer hospital stay.

H_0 : Hospitals servicing populations with high rates of government-issued insurance and fee scale coverage have no significant impact on longer hospitalizations and lower financial reimbursement costs.

Success Criteria

Based on these findings an initiative will be made to decrease hospitals LOS average from 7.1 days to meet the national average of 4.5 days.

We expect to see a decrease in hospital cost for inpatient stay based on the decrease of IP LOS, increasing hospital revenue and reimbursement.

Our team also seeks to engage stakeholders to actively participate in discussing the findings of the data analysis. We will measure success in this area by engaging our stakeholders in formulating and communicating their own questions and analysis on the information being presented to them.

Project Data Background and Data Sources

LOS is a work data obtained from NYC Health + Hospital Corporation / Jacobi Hospital - Billing Department. LOS Data is collected and organized into an excel file by Jacobi Hospital billing department. A formal written request was made to the director of Statistics who approved our request. Access to the LOS data came with the following stipulations, restrictions and conditions:

The research team was instructed *to strictly use this data in confidence and respect to the patients listed, and only share between H+H staff.*

The team was reminded that LOS data contains patient d information, and when presenting, patient names, phone numbers, address, MRN numbers and other PHI identifiers must be excluded. The director of Statistics also noted that some patients are repeated in the data set depending on their utilization, so some filtering will be necessary.

Research questions

Our team will explore and answer the following research questions

1. What is the prevalence of diagnosis trends by ethnicity and zip codes?
2. What is the percentage of uninsured (fee scale) patients in comparison to insured patients when evaluating hospital stay?
3. Which departments have the highest and lowest volume of admissions with the longest and shortest LOS?
4. What is the average LOS for each diagnosis?
5. What percentage of IP patients have established Primary Care Providers?
6. Is there an increase of LOS for those patients with no PCP?

Conclusion

In conclusion, our team plan to:

1. Identify all the many factors which include ethnicity, insurance status ,department of admission and diagnosis which all play a part in determining the Hospital LOS of a Pt from the moment a Pt is admitted up unto to the point of Discharge.
2. Explore the relationship between patients with no established Primary Care Provider and their likeliness to have a hospital admittance rate with longer LOS due to lack of preventative care. Assisting with establishing a PCP will prevent patient readmittance.

3. Describe length of stay (LOS) as an important indicator of the efficiency of hospital management. A progressive improvement in processing and monitoring LOS may allow more efficient management of the LOS of inpatients.

References

NYC Health + Hospital Corporation / Jacobi Hospital

<http://www.datasciencepublicpolicy.org/>

www.ncbi.nlm.nih.gov

<https://journals.plos.org>

<https://www.hcup-us.ahrq.gov/reports/statbriefs/sb246-Geographic-Variation-Hospital-Stays.jsp>

<https://simplystatistics.org/>

Research paper

Analysis of length of hospital stay using electronic health records: A statistical and data mining approach

- By: Hyunyoung Baek , Minsu Cho , Seok Kim, Hee Hwang, Minseok Song, Sooyoung Yoo Published: April 13, 2018
- <https://doi.org/10.1371/journal.pone.0195901>

