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Medicare Hospital Spending by Claim

Reported by many sources since 2010, the United States spends more on healthcare than any other industrialized country; however, the US healthcare system is not better, and its quality is inconsistent. High-level trends when identified will impact healthcare roles and decision-making. They can continue the market transformation and impact relationships among multiple stakeholders.

Medicare is the largest single payer in the United States, providing health insurance for 52 million elderly and disabled beneficiaries. Despite consistent benefits, the amount that Medicare spends per beneficiary in its traditional program is not constant nationwide. Through our analysis we intend to showcase the few interesting trends we observed that can help policy makers make better and informed decisions.

The dataset we are using for our analysis is ***'Medicare hospital spending by Claims'*** which gives us data about the claims different hospitals across US spent their money on, for the year 2015. The data describes average spending levels during hospitals' Medicare Spending per Beneficiary (MSPB) episodes. An MSPB episode includes all Medicare Part A and Part B claims paid during the period from 3 days prior to an inpatient hospital admission through 30 days after discharge. The table divides each hospital's average episode spending levels into three time-periods: 1) 1 to 3 days Prior to Index Hospital Admission, 2) During Index Hospital Admission, and 3) 1 through 30 days After Discharge from Index Hospital Admission. Within these three time-periods, the average episode spending levels are further broken down into the seven claim types (e.g., inpatient, outpatient)

Medicare is a federal healthcare program created in 1965 with the passage of the Social Security Amendments to ensure that citizens 65 and older as well as younger persons with certain disabilities have access to quality healthcare. Medicare is administered by the Centres for Medicare and Medicaid Services (CMS). CMS manages Medicare programs by selecting official Medicare administrative contractors (MACs) to process the Medicare claims associated with various parts of Medicare.

Hence, our audience persona for this dataset is Seema Verma, an administrator for CMS (Centre for Medicare and Medicaid services. She played a key role in implementing some important Medicare decisions ever since she took charge as administrator for CMS. Through our analysis we hope to help her increase the transparency of care for consumers and recognize hospitals that are involved in the provision of high-quality care at lower cost to Medicare.

The data shows average spending levels during hospitals' Medicare Spending per Beneficiary (MSPB) episodes. An MSPB episode includes all Medicare Part A and Part B claims paid during the period from 3 days prior to a hospital admission through 30 days after discharge. These average Medicare payment amounts have been price-standardized to remove the effect of geographic payment differences and add-on payments for indirect medical education (IME) and disproportionate share hospitals (DSH).
The data contain 13 Columns and 69631 rows.
The following ***data manipulation*** was done on this data:

- The start and end dates were removed since they were same throughout the dataset, i.e. 2015
- For better readability, the cost/spending was formatted as a number
- The period data was re-annotated with suitable acronyms
- For better readability, the claim types and hospital names were re-annotated with suitable acronyms
- Columns names were abbreviated with suitable acronyms
- All the rows with the spending of zero, were removed as they don't contribute to our analysis
- For better results, all the percentage values were changed to a decimal

After cleaning up the data, there were 11 columns and 55316 rows, where we have deleted 14315 rows with '0' values for Average spending per hospital.

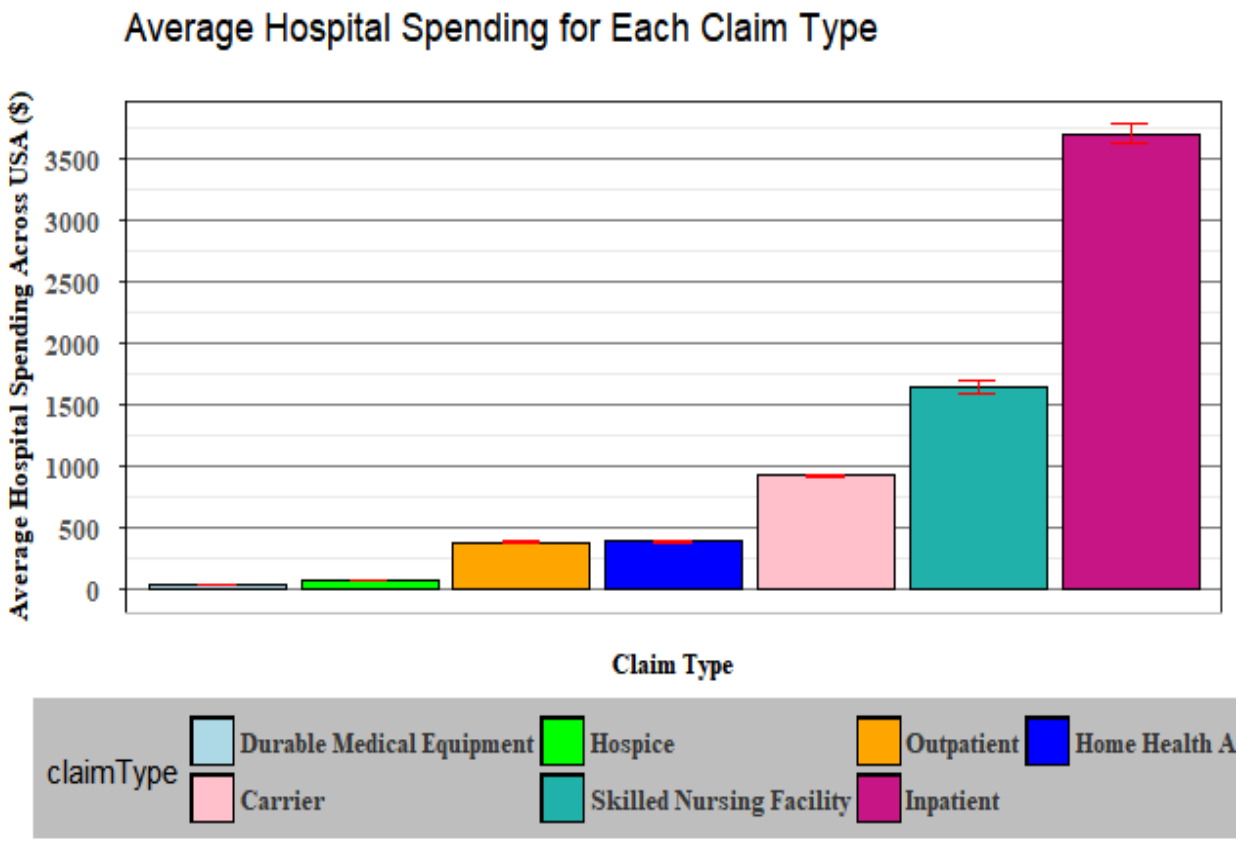
After data were cleaned up, we used R packages by R studio to do descriptive analysis and ggplot2 package to generate suitable plot.

R Plots:

The following are the R plots that were plotted in the process of answering our research questions:

To be able to answer our first research question about the claim type on which the hospitals spent the most and to observe the highest and lowest claim states, we plotted the following R plot.

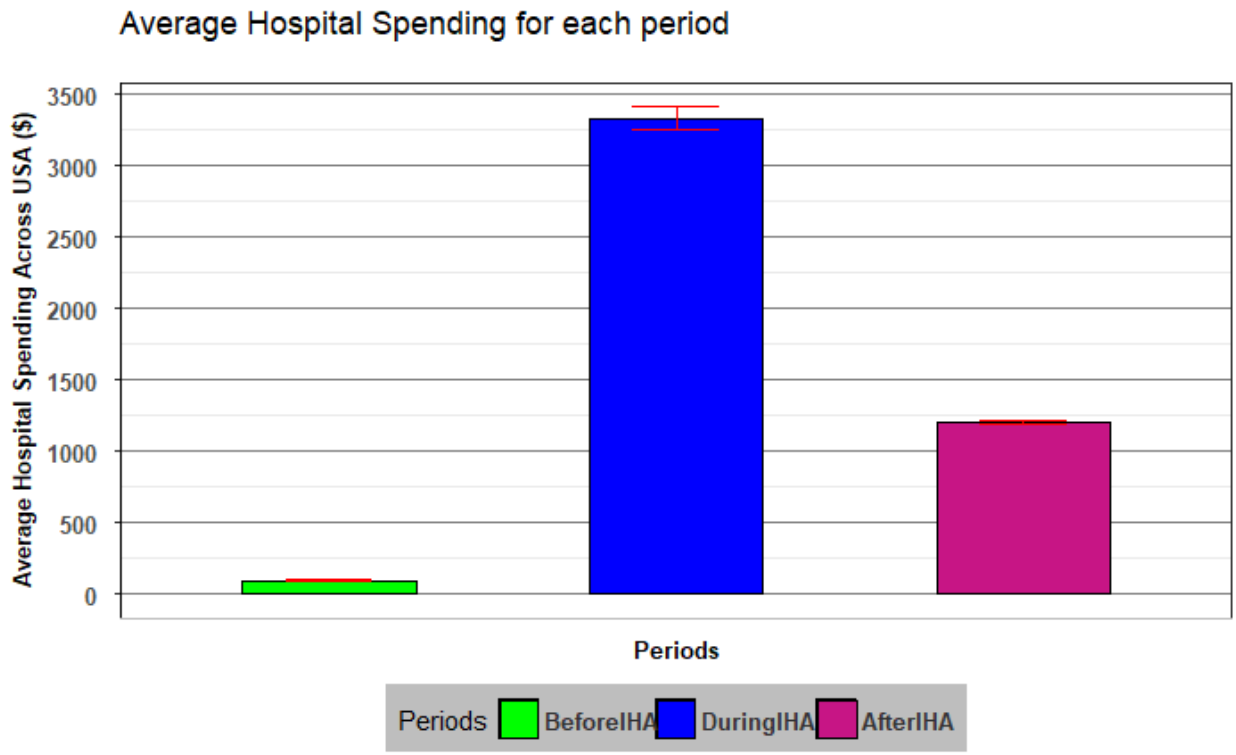
Figure 1: Average Hospital Spending for Each Claim Type Across USA in 2015.



Interpretation:

Figure 1 represents the average hospital spending for each claim type such as carrier, Durable medical equipment, home health agency, hospice, impatient, outpatient and skilled nursing facility based on the hospital spending data in 2015. From the figure, we found that the average hospital spending on inpatient is the most, skilled nursing facility, then outpatient, the least is durable medical equipment, during Index Hospital Admission is the most, then 1 through 30 days After Discharge. This pattern may be explained by multiple costs from doctor, nurse, equipment, room and usually longer time in hospital comparing to other claim types.

Figure 2: Average Hospital Spending for Each Period Across USA in 2015.

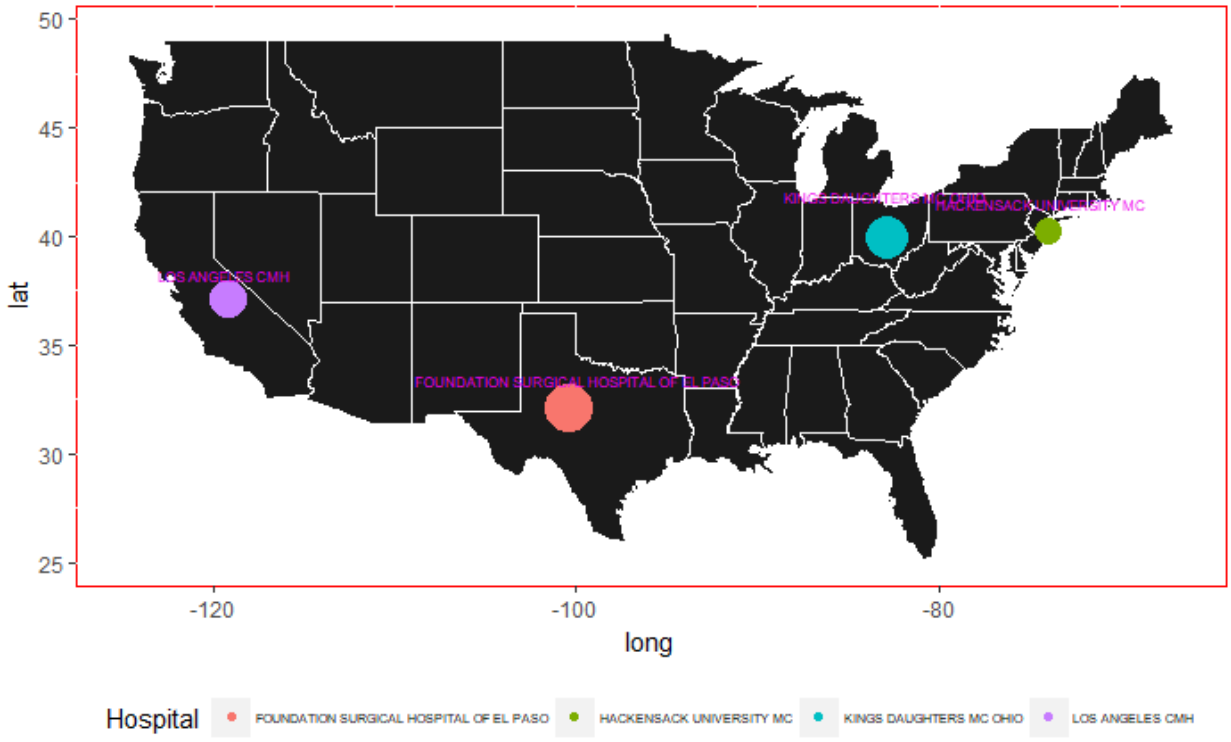


Interpretation:

Figure 2 represents the average hospital spending for each period such as 1 to 3 days Prior to Index Hospital Admission; 1 through 30 days After Discharge from Index Hospital Admission and During Index Hospital Admission based on the hospital spending data from the following. From Figure 2, we found that the average hospital spending on during Index Hospital Admission is the most, then 1 through 30 days After Discharge from Index Hospital Admission, the least

one is 1 to 3 days Prior to Index Hospital Admission. This pattern may be due to multiple costs from doctor, nurse, equipment, room in hospital comparing to other periods, which are considerable expensive.

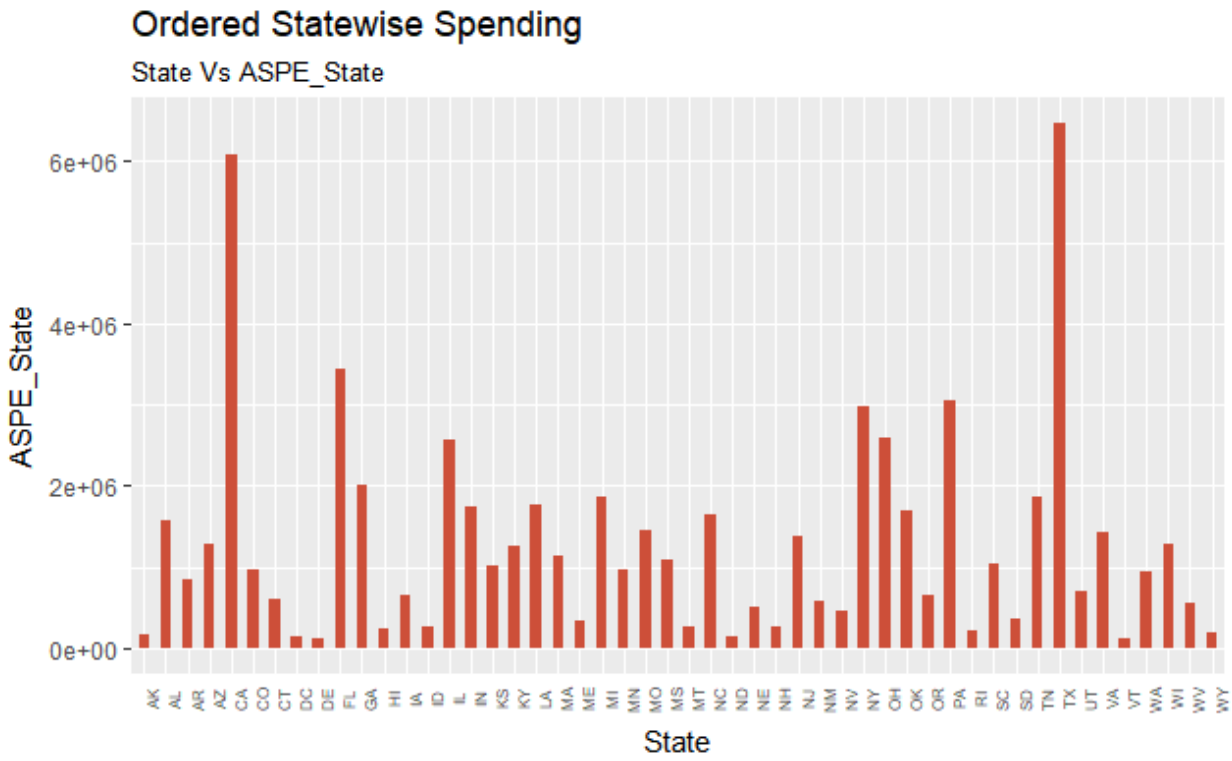
Figure 3: Highest spending hospital by region



Interpretation:

From the graph we can infer that, Foundation Surgical hospital from Texas has spent more money on its patients in South region. Similarly, Hackensack University medical centre**,** Kings daughters medical centre and Los Angeles hospitals have spent good amount on patients in their regions. If we compare between the highest spending hospital from the graph, then Foundation Surgical hospital from Texas has spent more when compared to Hackensack University medical centre**.**

Figure 4: Average Spending per episode by State



Interpretation: As you can see from the figure Texas spends the most and Vermont spends the least. The interesting thing, both are based in the South region of the USA. But Texas has substantially more population than that of Vermont. Throughout the country, the Medicare spending by hospitals were consistent with the population density.

There are differences in spending levels both at the hospital and state level. Also, there are inconsistencies in claim wise spending in different states and different hospitals. Many health care researchers and policy makers have suggested that reducing this geographic variation could provide an opportunity for reducing overall health care spending. Even after applying risk factor corrections to the data, many inconsistencies were found in State wise Medicare spending. The fact that the amount and type of health care services provided to Medicare beneficiaries varies in different regions/states may reflect diverse approaches to treating conditions taken by local

physicians as well as other factors such as the income levels of the beneficiaries and care preferences or state policies.

The most populous state California doesn't have the most Medicare spending.

The least populous State Vermont doesn't have the least Medicare spending.

Is variation in Medicare payment to different states the reason? No, as many researches have concluded that the payment variations do not affect the Medicare spending substantially. Therefore, a thorough research is to be conducted to understand the variations in the Medicare spending in different states and regions. Before making important Medicare policies, it is important to lay down the reasons for some sharp inconsistencies. Also, it becomes imperative to understand what steps the lower spending states are taking to provide affordable yet quality healthcare.

Word Count: 1291

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