Exploring Cost and Quality of Medicare in the United States Using a Health Analytics Approach

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Abstract

Background
This paper explores the association between Medicare costs and quality of care indicators including geographic location. The analysis determines the areas in the US where medical procedures are most affordable and most expensive for Medicare recipients.

Methods
Analytics is used to explore the association between cost and quality of Medicare. IBM Cognos and Tableau are used for data visualization and analyses. The variables analyzed include hospital location (both metro areas and state), number of discharges, number of readmissions, mortality, age, percentage of uninsured population, and Medicare charges.

Results
Our results indicate that Medicare cost is not positively associated with quality of care, suggesting that patients in higher priced facilities do not necessarily receive better quality of care. In addition, there are cost variations across the nation for the fees charged for the same procedure. These cost variances are not necessarily associated with any measure of quality. We also show how a national effort to standardize costs of heart related Medicare procedures can result in about 31% savings in healthcare spending.

Conclusions
Medicare beneficiaries and Centers for Medicare & Medicaid Services can use this information to make better decisions about spending on medical procedures with the objective of improving service. Moreover, our results offer US hospitals actionable insights and possible implications for improving their operational efficiency in the long term.

**Keywords**: Analytics, Medicare cost, DRG, Healthcare, Hospital, Mortality, Readmission, Quality of care, Tableau, Cognos.

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1 **Introduction**

Medicare is a national insurance program that was introduced in 1965 by the US government to offer health insurance coverage to Americans aged 65 and older who have worked and contributed to the system through payroll taxes. Coverage also extends to people younger than 65 who have disabilities, or who have been diagnosed with end stage renal disease or amyotrophic lateral sclerosis. Although Medicare covers a wide range of diseases, the focus of this paper is on cardiovascular conditions, which constitute 27% of the total hospital discharges in the US in 2011.

About 48 million people benefitted from Medicare in 2010. In 2011, there were approximately 15.3 million inpatient stays, constituting 47.2% of total inpatient hospital costs in the US [1]. Understanding Medicare payment rates is important because according to the Congressional Budget Office (CBO), approximately 50 million people (almost 20% of the US population) currently rely on this government program for medical care reimbursement [2]. In 2011, gross spending for Medicare was $560 billion, or approximately 3.5% of GDP, and these numbers are expected to rise in the future. In the CBO’s extended baseline scenario, Medicare will rise to almost 6% of GDP by 2030 [3]. The Medicare payment rates for identical procedures vary, in some cases greatly, depending on where they are performed and who is performing the procedures, but higher payment rates do not always correlate to higher quality of care. We look at this paradox with a view to analyzing the association between cost, procedure
type, and location, using current research findings. We also identify factors other than cost that
measure quality of care. Given Medicare is a social insurance program, it is imperative that
costs and quality of care be regulated so as to provide affordable healthcare across the nation.

We analyze the association between Medicare cost and quality of care using indicator
variables extracted from reliable sources, such as the Medicare Provider Charge Inpatient
database FY2011, *US News & World Report* Hospital Rankings, and the Centers for Disease
Control and Prevention (CDC). Data pertaining to cardiovascular and heart procedures was
extracted. Analytics methodology was used to analyze the data for relationships or associations
between cost and quality of service. (We did not, however, expect to find an association
between higher Medicare cost and higher quality of service.) Tableau and Cognos Insight
analytic tools were used as the analytics technology. The results provide insights and
implications to the health care system for optimizing spending on Medicare.

The paper is organized as follows: Section 2 reviews the background of the research;
Section 3 discusses the methodology; Section 4 presents results and discussion; Section 5
contains the scope and limitations of the research; Section 6 describes the policy implications.
Section 7 presents the conclusions with implications for future research.

### Background

The Medicare program consists of four parts: Part A, which is the hospital insurance;
Part B, the medical insurance; Part C, which allows private companies to provide medical
benefits; and Part D, which covers prescription drug benefits. Hospital insurance includes
semiprivate room, food, and hospital tests. Medical insurance, as a complement of hospital
insurance, helps cover the cost of other services during inpatient stays, including physician and
nursing services, x-rays, laboratory and diagnostic tests, influenza and pneumonia vaccinations, blood transfusions, renal dialysis, outpatient hospital procedures, limited ambulance transportation, immunosuppressive drugs for organ transplant recipients, chemotherapy, hormonal treatments (such as Lupron), and other outpatient medical treatments administered in a doctor's office.

Medicare differs from private insurance programs in a few ways. It is a social insurance program that is sponsored by the government to cater to a defined population. The program is characterized by heavy subsidies that motivate most eligible individuals to choose to participate in it. Also, because it is a federally guaranteed program, it is difficult to change the cost of Medicare spending. This is one reason the prices of private insurance programs have escalated by 60% more than Medicare prices since 1970. Medicare policies and payments rates are standardized and publicly available. In contrast, individuals can customize their private insurance coverage based on cost and their particular needs—although research shows that people have trouble choosing the appropriate insurance coverage and budgeting [4]. Note, too, that there is too much variation in private insurance coverage regarding what individuals choose to buy and at what price to draw conclusions about costs and quality of care. Compared to other health care programs, Medicare represents a large allocation of the national budget and plays a major role in the health care system in the country.

Healthcare costs escalate each year, and hospital costs make up a large part of the healthcare spending. In 2011, 39 million hospital stays aggregated $387 billion in hospital costs [1]. Of these, 15.3 hospital stays were covered by Medicare to the tune of $182.7 billion, or 47.2% of all hospital costs nationally [1]. Among the challenges faced by Medicare are the
growing older population (non-workers), managing the escalating cost of providing care, and
coping with variations in quality of care across facilities [5].

Medicare is under tremendous and increasing financial pressure as more and more people qualify for the program. Medicare spending is expected to increase from $523 billion in 2010 to $932 million in 2020. In enrollment terms, the number is expected to increase from 47 million in 2010 to 79 million in 2030. During this timeframe, the ratio of workers to enrollees is expected to decrease from 3.7 to 2.4 (https://www.cms.gov/ReportsTrustFunds/downloads/tr2010.pdf). By 2030, there will be 40% fewer workers per Medicare beneficiary than in 2000 [6]. Thus, sustaining Medicare will become increasingly challenging. Investigating ways to reduce the cost and improve the quality of Medicare is imperative.

Methods

Ethics Statement

This research did not involve human subjects.

Using an analytics methodology, we analyzed Medicare data and ascertained patterns of associations that offer insight into Medicare cost and quality of care. Our methodology includes the generic stages of data collection and variable selection, Extraction-Transformation-Loading to prepare the data for analysis, analytics platform and tool selection, and analytics implementation (Table 1).

Table 1: Research Methodology

<table>
<thead>
<tr>
<th>Data Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicare Provider Charge Inpatient FY2011</td>
</tr>
<tr>
<td>The US News and World Report Hospital Rankings</td>
</tr>
</tbody>
</table>
Variables Selection
DRG (Disease Related Group) definition
Provider id, provider name, provider address
Hospital referral region, Hospital name
Number and rate of discharges,
Average covered charges
Number and rate of readmissions
Mortality rate
Percentage of population aged 65 and over
Percent of uninsured population

Control Variables: City, State, Hospital region, Median income of the state

ETL Process
Extract: Data extracted from World Bank website in csv format
Transform: Data transformed and prepared for loading, with Framework Manager
Load: Prepared data loaded into IBM’s DB2 database and IBM’s Cognos-8

Analytics Platform/Tools Selection
DBMS: IBM DB2
Analytics: IBM Cognos and Tableau

Analytics Implementation
Analysis and reports implementation using Cognos Studio and Tableau

Data Collection and Variable Selection
In the domain of healthcare, data typically comes from diverse sources, including hospitals, clinical laboratories, radiology centers, insurance companies, and public health systems, such as the Center for Disease Control and Prevention and the World Health Organization. For our research, we collected 2011 health data from the databases of the Medicare Provider Charge Inpatient FY2011, the US News and World Report Hospital Rankings, and the Center for Disease Control and Prevention. The data from the multiple sources had to be reconciled for uniformity and standardization in representation. We specifically focused on data related to the cost and quality of care for cardiovascular and heart
related procedures. The data was collected at different levels, including state, city, and hospital.

Our variables include DRG (Disease Related Group) definition, provider ID, provider name, provider address (city, state and zip code), hospital referral region, number and rate of discharges, average covered charges, average total payment, and number and rate of readmissions. We used city, state, hospital region, and the median income of the state in which the procedure is performed as our control variables.

**Extraction-Transformation-Loading (ETL)**

The raw data were integrated, cleansed and standardized to ready for processing. We then loaded the data into a data warehouse that contains one or more servers, called relational database management systems (RDBMSs). We used querying techniques (such as query structures, optimizations, filtering, aggregation, and drill down) and reporting techniques (such as definition, execution and generation of accurate reports) on the data and then defined and published cubes of data for processing, which we loaded into the analytics tool.

**Analytics Platform and Tool Selection**

We selected Cognos Studio and Tableau as the analytics tools. Tableau is effective for studying trends and patterns in the data. Cognos creates queries and reports and performs calculations for performing different kinds of analysis that offer insight on health outcomes by state and hospital. Approaches for analysis include ranking, association, and data visualization of the health data.

**Analytics Implementation**

To test for different kinds of association between Medicare variables, we used the query and reporting tools of Cognos Studio. Some of the analyses were to detect for a positive association between the cost of Medicare and the quality of care; to see if the Medicare cost varies by
Results and Discussion

We looked for associations between Medicare charges (cost) and such quality of care measures as discharge rates, mortality rates, age, and re-admission rates.

We analyzed the average charges for cardiovascular and heart-related treatments by state as shown in Figure 1.

Figure 1 shows the total Medicare charges, the state, and the median age for each state. Different colors of states represent different costs of procedures. The darker colors represent higher costs. California has the highest cost of Medicare for cardiovascular and heart related treatments. Florida also has a high cost of Medicare for these conditions. States like North Dakota, Iowa, and Michigan show a low cost. While this gave us an idea of cost by state, we wanted to do a base level comparison. We therefore compared the cost per state with the national average of $32,682 (Figure 2).

Figure 2 shows how costs vary significantly from state to state when compared with the national average (shown as a straight line). Fifteen states charge more than the national average, including California, New Jersey, Nevada and Florida—the states with the highest costs. The state with the lowest cost, at $18,000, is West Virginia. Interestingly, among east coast states, New York, Vermont and Massachusetts all show a below-average cost, while New Jersey is second after California with the highest cost of treatment. An explanation for the high costs in states like California and Florida could be the high
proportion of senior citizens receiving Medicare benefits in those regions, resulting in higher demand, which naturally drives up prices/costs.

We analyzed the data for an association between the cost of treatment and the frequency of cardiovascular and heart related procedures, with the expectation that the more frequent the procedure, the lower the cost (Figure 3).

Figure 3 shows the net number of hospital discharges as well as the average charges by state. While the length of the bar depicts the average charges, the color depicts the number of discharges. The greener the bar, the greater the number of discharges. A large number of discharges indicate high frequency of the procedure. Florida and New York, for instance, with the dark green bars have the highest number of discharges. California and Illinois, with the light green bar, have the next highest number of discharges. Typically in healthcare, higher volume or higher frequency is associated with lower cost [7], [8]. But our findings do not indicate a consistent trend between cost and number of discharges. California and Florida, two of the states with a high number of discharges, also rank among the top five most expensive states. New York, on the other hand, has a high number of discharges but a relatively low cost.

We drilled down from the aggregate group of heart conditions to a specific DRG 313 (chest pain) to further analyze association between average cost and number of discharges. Figure 4 contains provider IDs for the 10 least and 10 most expensive DRGs.

The results from Figure 4 show that there is no consistent trend between the number of discharges and the average charges, or cost of treatment, for chest pain. In some cases with more discharges, the fees are also higher. For instance, in San Jose, California, the average cost for chest pain is $66,000. Yet, based on the
sample, the discharges were the second highest in the group. In certain other cases, as in Modesto, California, the cost is high but the number of discharges is low.

We performed the same analysis for states for the specific group DRG 292 (heart failure and shock with comorbid conditions (cc)) (Figure 5).

Figure 5 shows that Los Angeles has the highest cost for DRG 292, followed by Philadelphia with $1,845,012, and Houston with $6,532,629. Figure 6 shows a drill down analysis for the City of Los Angeles, by hospital.

Figure 6 shows Cedars-Sinai Medical Center in Los Angeles as the hospital with the highest fees, at $83,950, and the highest number of discharges, about 1700. In the analysis by hospital, as in the case of analysis by state, there was no consistent trend between the number of discharges and the cost of the procedure. While Providence Holy Cross has a low number of discharges relative to other hospitals, about 500, the cost is high at $81,366. On the other hand, Antelope Valley Hospital has a low cost of $20,125 and a low number of discharges, about 410.

We wanted to see if the existing data could offer some insight on reducing the overall national healthcare cost (Figure 7).

Figure 7 shows that if the US federal government, in an effort to standardize costs across the country, decided to target the 15 states that charge more than the national average, it could reduce the cost of heart related procedures nationwide by 31%. The potential cost savings amounts to $12.1 billion, which is about a 2% reduction in the total cost of Medicare spending.
We wanted to see if the percentage of uninsured population of a state shows any association with the Medicare cost of treatment. We did the analysis for DRG 292, which is a specific condition of heart failure and shock with comorbid conditions (cc) (Figure 8).

<insert Figure 8 here>

Figure 8 shows the percentage of uninsured population and the average covered charges for each state. We expected that a higher percentage of uninsured population would be associated with a higher cost, but for this particular DRG, our results do not show any association between the two. New Jersey and California have the two highest costs even though the percentage of uninsured is not high. Texas, on the other hand, has a high percentage of uninsured population but does not have high charges.

We turned our attention to the 30-day readmission rates for DRG 292 (heart failure and shock with cc) for hospitals in the state of New Jersey (Figure 9).

<insert Figure 9 here>

Higher 30-day readmission rates (https://data.medicare.gov/data/hospital-compare) did not necessarily have any association with cost, for the hospitals in New Jersey. The hospitals with the highest 30-day readmission rates, such as Liberty Health Jersey City Medical (35%), Raritan Bay Medical Center (about 34%), and Bayshore Community Hospital (about 32%), do not have high charges. Hospitals with the highest charges, such as Bayonne Hospital Center and Saint Peters University Hospital, do not show high readmission rates.

The same analysis on readmission rates and hospital charges was done for hospitals in California for DRG 292, which is heart failure and shock with comorbid conditions (cc) (Figure 10).

<insert Figure 10 here>

As seen in Figure 10, Kaiser Foundation Hospital has the highest readmission rate, at 40%, followed by Los Angeles Community Hospital, East Los Angeles Doctors Hospital, San Dimas Community Hospital,
and Hollywood Community hospital. However, these hospitals do not show high costs. In fact, the five hospitals with the highest readmission rates were among the fifteen hospitals with the lowest fee for DRG 292.

Assuming that the cost of healthcare would increase relative to a state’s population aged 65 and older, we analyzed Medicare cost using each state’s percentage of population aged 65 and over (Figure 11).

Figure 11 depicts the senior population in 27 states along with healthcare costs. Florida has the highest percentage of population aged 65 and older (about 18%) but, at an average of $46,000 per case, does not come at a high cost, relatively speaking. Despite differences in the demographics of the senior population, the states of California, New Jersey and Florida all have high healthcare costs. Therefore, population age is not associated with health care charges.

The analysis for mortality as a result of heart related disease and Medicare cost for the condition of chest pain (DRG 313) is shown in Figure 12.

Figure 12 shows the mortality rates for hospitals along with the national average, for DRG 313 (chest pain). Results show that mortality resulting from heart disease is not positively associated with Medicare fees. Actually, there are no instances that show higher mortality is associated with higher fees for the condition. Mortality is not a significant influence on Medicare cost.

Among all states and in terms of Medicare fees, California is consistently among the most expensive (Figure 13). We depict the numbers for DRG 313, chest pain.
Figure 13 depicts chest pain treatment in California, where 52 providers charged Medicare at two standard deviations above the national average (>35K). The highest is $79.147K followed by 466.83K, $62.42K, and $61.11K. The lowest provider charges for Medicare is $35.22K.

The Medicare fees in New York are also high for DRG 313/chest pain (Figure 14). The chart shows the number of hospitals that provide the treatment in New York.

As shown in Figure 14, there are 22 facilities that treat chest pains in New York. Although California has an equal number of facilities for this treatment, the price ranges within the two states vary significantly. In New York, the cost of treating chest pains ranges from $6,000 to $7,000, while in California it ranges from $35,000 to $50,000. This wide variation in costs for the same procedure is a striking example of one of the challenges in Medicare.

The chart in Figure 15 depicts the prices along with the number of hospitals that offer the treatment for chest pain in California.

The graph in Figure 15 was generated assuming that a higher number of neighbouring facilities performing similar heart procedures would result in lower prices given the competition. But the assumption was not borne out: neighbouring facilities offering similar procedures did not seem to have an impact on price.

To wrap up our pricing analysis, we compared prices in top-ranked hospitals nationwide for cardiology and heart surgery to the national average (ranked by US News & World Report) (Figure 16).
As seen in Figure 16, on average, top-ranked US hospitals charge 61% more than the national average. These hospitals have only 2% of total cardiovascular discharges. All other non-ranked hospitals were in-line with the national average.

Our findings reveal that higher prices for cardiovascular and heart-related procedures covered by Medicare do not necessarily mean higher quality of care. In addition, there are regional variations across the nation in fees charged for the same procedure. But these cost variances are not necessarily associated with any measure of quality, such as the net number of discharges, readmission rates, mortality rates, and with demographics such as population’s median age, percentage of population aged 65 and older, and percentage of uninsured people.

On average, about 15 states charge more than the national average for Medicare fees—California, New Jersey, Nevada and Florida being among the most expensive states. An interesting revelation is the potential benefit of about a 31% reduction in healthcare spending that would arise from a national effort to standardize costs of heart related Medicare procedures.

**Scope and Limitations**

Our research suffers from certain limitations. First, our study is cross sectional and covers only the year 2011. Second, we considered a limited set of variables from a few selected sources. There are many other possible sources and a larger range of variables that could be included in a more extensive study. Third, there is no standard for billing Medicare, so each state does it its own way, which certainly could explain inconsistencies in the information output by state. For example, the state of Maryland has a unique waiver that exempts it from the Inpatient Prospective Payment Systems (IPPS) and Outpatient Prospective Payment System (OPPS), and allows it to determine an all-payer rating system for services. In this system, all payers pay the same rate for the same service within the same hospital. Medicare claims for hospitals in
other states break out additional payments for indirect medical education (IME) costs—because Medicare
contributes to funding a part of the medical residency training programs in the US—and disproportionate
share hospital (DSH) adjustments. Fourth, we did not remove outliers from the data, which may have
skewed the results of our analysis.

Policy Implications and Future Research

In spite of the limitations, our research offers several contributions to the literature on Medicare and
healthcare. Healthcare workers, policymakers and regulators can specifically address hospitals, which are
identified as having a high cost but a low quality of care. In general, policymakers can set pricing
guidelines to regulate the cost associated with cardiovascular and heart-related procedures. In addition to
streamlining government spending on Medicare, this will promote healthy competition among
neighboring facilities, which will improve the efficiency. With the advent of the Patient Protection and
Affordable Care Act of 2010, making healthcare affordable and accessible is a prime objective. Our
research contributes to this goal by enabling patients suffering from heart ailments to find affordable care
nationwide.

Future research should investigate facilities where the highest cost discrepancies exist and study
different practices, determining whether this differential leads to more efficient operations. Research can
focus on potential factors that contribute to the differential in Medicare payments. Another potential area
of research lies in investigating the possible Medicare cost outliers.

Conclusions

Measuring quality of healthcare has been a daunting task. Studies that shed light on evaluating the
performance of Medicare, in terms of cost and critical success factors, are central to improving national
healthcare. Enhancing quality of care entails taking charge of what the healthcare system currently offers and identifying which areas, if any, warrant improvement. Offering hospitals incentives to improve the quality and disincentives to increase costs are effective measures for the long term. For Medicare, it has been seen that high costs do not necessarily signal high quality of care, low mortality, or low readmission rates. Central to improving national and public healthcare will be research that adds new perspective to the situation, by generating a portfolio of schemes that encourage hospitals to improve efficiency, enable patient access, and offer affordable care.

**List of Abbreviations**

Not Applicable

**Competing interests**

The authors declare that they have no competing interests.

**Authors’ contributions**

Both authors have contributed equally to all aspects of this research.

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WR is Professor of Information Systems, School of Business, Fordham University, New York; Program Director of the M.S. in Business Analytics Program; and Director of the Center for Digital Transformation (http://www.fordham.edu/CDT). He is co-editor for North America of the International Journal of Healthcare Information Systems & Informatics. He has also guest edited (with Dr. Joseph Tan) a special issue of Topics in Health Information Management (1999) and guest edited a special section on healthcare information systems for Communications of the ACM (1997). He was the founding editor of the International Journal of Computational Intelligence and Organizations (1995–1997). He also served as an Ad Hoc Editorial Review Board Member, Journal of Systems Management of the Association for Systems Management.
Management, 1996–1997. Prof. Raghupathi has published forty journal articles and written papers in refereed conference proceedings, abstracts in international conferences, book chapters, editorials, and reviews, including several in the healthcare IT field.

Acknowledgments

None.

References


Figure 1. Average Cost per state
Figure 2. Average Cost per State vs. National Average
Figure 3. Average Charges and Frequency of Procedure
Figure 4. Average charges and Number of discharges for DRG 313 - chest pain
Figure 5. Drill-down analysis for Average Charges and Number of Discharges for DRG 292

<table>
<thead>
<tr>
<th>City</th>
<th>Average Charges</th>
<th>Number of Discharges</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA - Los Angeles</td>
<td>3,082,769</td>
<td></td>
</tr>
<tr>
<td>NY - East Long Island</td>
<td>936,593</td>
<td></td>
</tr>
<tr>
<td>FL - Fort Lauderdale</td>
<td>832,274</td>
<td></td>
</tr>
<tr>
<td>MO - St. Louis</td>
<td>775,599</td>
<td></td>
</tr>
<tr>
<td>NY - Manhattan</td>
<td>772,266</td>
<td></td>
</tr>
<tr>
<td>TX - Houston</td>
<td>1,532,629</td>
<td></td>
</tr>
<tr>
<td>MO - Kansas City</td>
<td>763,637</td>
<td></td>
</tr>
<tr>
<td>AL - Birmingham</td>
<td>740,540</td>
<td></td>
</tr>
<tr>
<td>TX - Dallas</td>
<td>1,392,732</td>
<td></td>
</tr>
<tr>
<td>CA - San Diego</td>
<td>737,848</td>
<td></td>
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<tr>
<td>FL - Miami</td>
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<td></td>
</tr>
<tr>
<td>AZ - Phoenix</td>
<td>736,694</td>
<td></td>
</tr>
<tr>
<td>CA - Sacramento</td>
<td>709,249</td>
<td></td>
</tr>
<tr>
<td>GA - Atlanta</td>
<td>1,023,887</td>
<td></td>
</tr>
<tr>
<td>CA - San Jose</td>
<td>551,198</td>
<td></td>
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<tr>
<td>MA - Boston</td>
<td>535,144</td>
<td></td>
</tr>
<tr>
<td>TX - Fort Worth</td>
<td>692,016</td>
<td></td>
</tr>
<tr>
<td>OK - Oklahoma</td>
<td>688,806</td>
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<tr>
<td>MN - Minneapolis</td>
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<tr>
<td>CA - San Bernardino</td>
<td>655,050</td>
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<tr>
<td>CA - Orange County</td>
<td>650,977</td>
<td></td>
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<tr>
<td>CA - Contra Costa</td>
<td>644,077</td>
<td></td>
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<tr>
<td>OH - Cleveland</td>
<td>639,046</td>
<td></td>
</tr>
<tr>
<td>TX - San Antonio</td>
<td>639,046</td>
<td></td>
</tr>
<tr>
<td>WI - Milwaukee</td>
<td>639,046</td>
<td></td>
</tr>
<tr>
<td>TN - Memphis</td>
<td>639,046</td>
<td></td>
</tr>
</tbody>
</table>

SUM(Average Covered Charges) = 3,082,769

10,693
Figure 6. Average Charges and Number of Discharges for CA- Los Angeles by hospital
<table>
<thead>
<tr>
<th>State Name</th>
<th>Avg. Charge</th>
<th>Natl. Avg.</th>
<th>Net Diff.</th>
<th># of Discharges</th>
<th>Existing Total Cost</th>
<th>Potential Reformed Cost</th>
<th>Potential Savings</th>
<th>% Cost Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>California</td>
<td>$66,410</td>
<td>$32,682</td>
<td>$33,729</td>
<td>115,732</td>
<td>$7,685,771,895</td>
<td>$3,782,301,885</td>
<td>$3,903,470,001</td>
<td>51%</td>
</tr>
<tr>
<td>New Jersey</td>
<td>$65,135</td>
<td>$32,682</td>
<td>$32,453</td>
<td>74,912</td>
<td>$4,879,377,840</td>
<td>$2,448,240,759</td>
<td>$2,431,137,081</td>
<td>50%</td>
</tr>
<tr>
<td>Nevada</td>
<td>$60,546</td>
<td>$32,682</td>
<td>$27,865</td>
<td>11,259</td>
<td>$681,692,128</td>
<td>$357,961,644</td>
<td>$313,730,483</td>
<td>48%</td>
</tr>
<tr>
<td>Florida</td>
<td>$46,749</td>
<td>$32,682</td>
<td>$14,067</td>
<td>153,460</td>
<td>$7,174,100,218</td>
<td>$5,015,311,657</td>
<td>$2,158,788,551</td>
<td>30%</td>
</tr>
<tr>
<td>Alaska</td>
<td>$44,399</td>
<td>$32,682</td>
<td>$11,718</td>
<td>1,412</td>
<td>$62,691,560</td>
<td>$46,146,358</td>
<td>$16,545,203</td>
<td>26%</td>
</tr>
<tr>
<td>Colorado</td>
<td>$44,055</td>
<td>$32,682</td>
<td>$11,373</td>
<td>12,565</td>
<td>$553,551,874</td>
<td>$410,648,757</td>
<td>$142,908,117</td>
<td>26%</td>
</tr>
<tr>
<td>Arizona</td>
<td>$44,028</td>
<td>$32,682</td>
<td>$11,346</td>
<td>27,217</td>
<td>$1,198,306,420</td>
<td>$889,493,923</td>
<td>$308,812,497</td>
<td>26%</td>
</tr>
<tr>
<td>Texas</td>
<td>$42,727</td>
<td>$32,682</td>
<td>$10,046</td>
<td>121,534</td>
<td>$5,192,804,944</td>
<td>$3,971,920,285</td>
<td>$1,220,884,658</td>
<td>24%</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>$41,223</td>
<td>$32,682</td>
<td>$8,541</td>
<td>90,301</td>
<td>$3,722,454,005</td>
<td>$2,951,177,232</td>
<td>$771,276,773</td>
<td>21%</td>
</tr>
<tr>
<td>Illinois</td>
<td>$38,500</td>
<td>$32,682</td>
<td>$5,818</td>
<td>96,243</td>
<td>$3,705,329,654</td>
<td>$3,145,371,040</td>
<td>$559,958,514</td>
<td>15%</td>
</tr>
<tr>
<td>District of Columbia</td>
<td>$38,160</td>
<td>$32,682</td>
<td>$5,479</td>
<td>6,367</td>
<td>$242,966,383</td>
<td>$208,083,470</td>
<td>$34,882,913</td>
<td>14%</td>
</tr>
<tr>
<td>Washington</td>
<td>$36,843</td>
<td>$32,682</td>
<td>$4,162</td>
<td>25,406</td>
<td>$956,041,406</td>
<td>$830,307,624</td>
<td>$105,733,783</td>
<td>11%</td>
</tr>
<tr>
<td>South Carolina</td>
<td>$35,463</td>
<td>$32,682</td>
<td>$2,781</td>
<td>32,764</td>
<td>$1,161,906,211</td>
<td>$1,070,778,517</td>
<td>$91,127,695</td>
<td>8%</td>
</tr>
<tr>
<td>Louisiana</td>
<td>$35,001</td>
<td>$32,682</td>
<td>$2,320</td>
<td>29,666</td>
<td>$1,038,342,284</td>
<td>$969,931,055</td>
<td>$68,811,230</td>
<td>7%</td>
</tr>
<tr>
<td>Kansas</td>
<td>$33,497</td>
<td>$32,682</td>
<td>$816</td>
<td>14,962</td>
<td>$501,187,300</td>
<td>$488,981,448</td>
<td>$12,205,852</td>
<td>2%</td>
</tr>
<tr>
<td><strong>Summary</strong></td>
<td><strong>$47,600</strong></td>
<td><strong>$32,682</strong></td>
<td><strong>$14,918</strong></td>
<td><strong>813,800</strong></td>
<td><strong>$38,736,524,124</strong></td>
<td><strong>$26,596,250,664</strong></td>
<td><strong>$12,140,273,460</strong></td>
<td><strong>31%</strong></td>
</tr>
</tbody>
</table>
Figure 8. Average Covered Charges and % of Uninsured Population for DRG 292 – Heart Failure and Shock with comorbid conditions (cc)
Figure 9. 30-Day Readmission Rates and Average Charges for Hospitals in NJ for DRG 292
Figure 10. 30-Day Readmission Rates and Costs for California Hospitals for DRG 292
Figure 11. Average Covered Charges and Percent of Population Aged 65 and Over.
Figure 12. Mortality and Average Covered Charges for DRG 313 – Chest Pain
Figure 13. Average Covered Charges in California for DRG 313- chest pain.
Figure 14. Average Covered Charges in New York for DRG 313 - chest pain.
Figure 15. Average Covered Charges and Number of Hospitals in California for DRG 313- chest pain.
**Figure 16. Pricing in Top Ranked Hospitals vs. National Average**

<table>
<thead>
<tr>
<th>Natl Ranking</th>
<th>Hospital Name</th>
<th>City</th>
<th>State</th>
<th>Net # Discharges</th>
<th>% of Total</th>
<th>Avg. Cost</th>
<th>Premium Over Natl Avg.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CLEVELAND CLINIC</td>
<td>CLEVELAND</td>
<td>OH</td>
<td>3,082</td>
<td>0%</td>
<td>50,228</td>
<td>54%</td>
</tr>
<tr>
<td>2</td>
<td>MAYO CLINIC - SAINT MARYS HOSPITAL</td>
<td>ROCHESTER</td>
<td>MN</td>
<td>3,015</td>
<td>0%</td>
<td>29,002</td>
<td>-11%</td>
</tr>
<tr>
<td>3</td>
<td>NEW YORK-PRESBYTERIAN HOSPITAL</td>
<td>NEW YORK</td>
<td>NY</td>
<td>6,851</td>
<td>0%</td>
<td>44,811</td>
<td>37%</td>
</tr>
<tr>
<td>4</td>
<td>JOHNS HOPKINS HOSPITAL, THE</td>
<td>BALTIMORE</td>
<td>MD</td>
<td>2,770</td>
<td>0%</td>
<td>20,748</td>
<td>-37%</td>
</tr>
<tr>
<td>5</td>
<td>BRIGHAM AND WOMEN'S HOSPITAL</td>
<td>BOSTON</td>
<td>MA</td>
<td>2,241</td>
<td>0%</td>
<td>54,396</td>
<td>66%</td>
</tr>
<tr>
<td>6</td>
<td>DUKE UNIVERSITY HOSPITAL</td>
<td>DURHAM</td>
<td>NC</td>
<td>2,240</td>
<td>0%</td>
<td>44,047</td>
<td>35%</td>
</tr>
<tr>
<td>7</td>
<td>MASSACHUSETTS GENERAL HOSPITAL</td>
<td>BOSTON</td>
<td>MA</td>
<td>3,142</td>
<td>0%</td>
<td>53,867</td>
<td>65%</td>
</tr>
<tr>
<td>8</td>
<td>ST FRANCIS HOSPITAL, ROSLYN</td>
<td>ROSLYN</td>
<td>NY</td>
<td>4,189</td>
<td>0%</td>
<td>50,676</td>
<td>55%</td>
</tr>
<tr>
<td>9</td>
<td>CEDARS-SINAI MEDICAL CENTER</td>
<td>LOS ANGELES</td>
<td>CA</td>
<td>2,836</td>
<td>0%</td>
<td>123,269</td>
<td>277%</td>
</tr>
<tr>
<td>10</td>
<td>ST LUKES EPISCOPAL HOSPITAL</td>
<td>HOUSTON</td>
<td>TX</td>
<td>2,308</td>
<td>0%</td>
<td>52,510</td>
<td>61%</td>
</tr>
</tbody>
</table>

Top 10 Hospitals | 32,674 | 2% | 52,355 | 60% |
All Others       | 1,843,342 | 98% | 32,599 | 0%  |
Grand Total      | 1,876,016 | 32,682 | 32,682 |