****

ANALYTICS IN HEALTHCARE

**Analysis of Medical Insurance Payments for Spine Surgery Procedures to**

**Hospitals in Texas, Colorado, Georgia, Ohio, and Michigan States**

Introduction

This memorandum presents an in-depth analysis of medical insurance payments made to hospitals by insurance providers for various spine surgery procedures in the states of Texas, Georgia, Ohio, and Michigan. The focus is to assess whether hospitals with Blue Distinction or Distinction+ designations receive higher payments compared to those without such designations, based on the premise that these designations reflect superior quality and efficiency in healthcare delivery.

Medical Insurance Payments to Hospitals

Medical insurance payments are a vital component of the healthcare industry, ensuring that hospitals can cover the costs associated with medical procedures, maintain high standards of care, and invest in new technologies and infrastructure. These payments often reflect the complexity and quality of care provided by the hospitals. Blue Distinction and Distinction+ designations are awarded to hospitals that meet rigorous standards for patient safety, treatment outcomes, and cost-efficiency.

Healthcare Industry Context:

Blue Distinction Program: The Blue Cross Blue Shield Association’s Blue Distinction program is designed to help patients find high-performing healthcare providers. Hospitals earn these designations by demonstrating expertise in delivering safe and effective specialty care, often translating into better health outcomes and higher patient satisfaction.

Spine Surgery: Spine surgeries, such as spinal fusion, laminectomy, and disc replacement, are complex procedures requiring specialized care and expertise. The costs associated with these surgeries can vary significantly based on factors like hospital location, patient health status, and the presence of post-operative complications.

Healthcare Economics: In healthcare economics, hospitals recognized for high standards often negotiate higher reimbursement rates with insurance providers. This is due to the perceived value in minimizing complications and readmissions, ultimately reducing long-term healthcare costs.

Analysis Summary

In determining the five states selected for this analysis, reference was made to the 2023 Healthgrades Spine Surgery State Ranking Award with Texas and Colorado ranked among the top 5 states in the US with a substantive count of hospitals with eligible healthcare specialty in spine surgery. The states of Georgia, Ohio, and Michigan were also included in this analysis because of the significant number of hospitals providing spine care procedures in the dataset provided. Hospitals were categorized based on whether they held a Blue Distinction or Distinction+ designation (Distinction 1) or not (Distinction 0) using the 2024 Blue Distinction Centers for Spine Surgery Directory of Providers.

The descriptive statistics for insurance payments are detailed below:



The descriptive statistics for insurance payments made to hospitals in the listed states above provide insight into the distribution and central tendencies of these payments.

Colorado stands out with the highest mean and median payments, indicating generally higher insurance reimbursements for spine surgeries in this state. Ohio has the lowest mean and median payments, suggesting lower insurance payouts for spine surgeries when compared to other states. Texas and Georgia have relatively high counts and show moderate mean and median payments, indicating a more balanced distribution of insurance payments. Michigan has the lowest variability (as indicated by the standard error) compared to other states, suggesting more consistent payment patterns. These descriptive statistics provide a snapshot of the insurance payment landscape for spine surgeries across different states analyzed, highlighting variations and potential areas for further investigation.

Statistical Analysis and Findings

Methodology: A rigorous statistical analysis was conducted using t-tests to compare the mean total spine surgery costs between hospitals with and without Blue Distinction or Distinction+ designations. The t-tests assessed whether the differences observed were statistically significant. The null hypothesis was that there is no difference in the mean Total Cost insurance payments made to hospitals designated with or without a distinction/distinction+ while the alternative hypothesis stated otherwise.

The summary of the t-test analysis is detailed below:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **State** | **Mean Total Spine Surgery Cost (Distinction 1)** | **Mean Total Spine Surgery Cost (Distinction 0)** | **T-Statistic** | **P-Value** |
| Texas | $252,615.03 | $137,573.06 | 7.825 | 2.02E-13 |
| Georgia | $267,520.63 | $160,849.16 | 6.643 | 1.87E-09 |
| Ohio | $242,651.79 | $145,363.56 | 8.671 | 2.15E-14 |
| Colorado | $326,454.00 | $231,714.00 | 2.78 | 1.10E-02 |
| Michigan | $217,390.74 | $144,292.39 | 6.342 | 5.83E-09 |

Key Findings:

**Higher Mean Costs for Distinguished Hospitals:** Hospitals with Blue Distinction or Distinction+ designations consistently reported higher mean total spine surgery costs compared to hospitals without these designations across all five states.

**Statistical Significance:** The t-tests for each state yielded t-statistics well above the critical value and p-values significantly below 0.05, indicating that the differences in payments were not due to chance. The results strongly support the hypothesis that hospitals with higher-quality designations receive higher payments.

**Implications for Healthcare Quality and Cost:** The higher payments to distinguished hospitals may reflect the additional resources and investments these hospitals make to maintain high standards of care, such as advanced surgical equipment, specialized staff, and comprehensive post-operative care.

A diagram of a health insurance

Description automatically generated with medium confidence

**Consistency Across States:** The consistency of results across Texas, Colorado, Georgia, Ohio, and Michigan states suggests a broader industry trend where quality designations influence reimbursement rates. This uniformity reinforces the credibility of the findings.

A graph of a patient's cost

Description automatically generated

The histogram visualizes the distribution of mean total spine surgery costs, highlighting the differences in cost distribution between hospitals with and without the distinction designation.

**Regression Plot**: Analysis of the combined data from the five states reveals a significant difference in medical insurance payments for spine surgery procedures based on distinction ratings. Hospitals with Blue Distinction or Distinction+ designations receive higher payments, as reflected in the regression analysis results. This suggests that insurance companies are willing to pay a premium for hospitals that meet higher quality standards, reinforcing the value of these designations in the healthcare market.

A graph with a line

Description automatically generated

The regression plot above visualizes the relationship between the distinction rating and the mean total spine surgery costs for hospitals across the combined states. The plot indicates clearly that hospitals with a Blue Distinction or Distinction+ designation (Distinction Rating 1) tend to have higher spine surgery costs compared to those without the designation (Distinction Rating 0).

This regression analysis also confirms the earlier assumptions that:

* Positive Relationship: There is a clear positive relationship between the distinction rating and the mean total spine surgery cost, as shown by the upward trend in the regression line.
* Higher Costs for Distinguished Hospitals: The plot confirms that hospitals with the distinction designation generally have higher mean total spine surgery costs, consistent with the results of the statistical analysis.

**Specific Spine Care Procedures**: Digging deeper into the analysis and x-raying the average individual cost per procedure also shows that the different specific procedures in hospitals with Blue Distinction or Distinction+ designations receive higher medical insurance payments for spine surgery procedures based on distinction ratings as reflected in the bar chart below:

A screenshot of a graph

Description automatically generated

Conclusion

The analysis conclusively shows that insurance companies pay more to hospitals that have achieved Blue Distinction or Distinction+ designations for spine surgery procedures. These hospitals, recognized for their excellence in safety, effectiveness, and cost-efficiency, receive significantly higher payments on average. This finding underscores the value of such designations in the healthcare market, both in terms of financial incentives and enhanced patient care. The statistical t-test and regression analysis strongly support the conclusion that insurance companies pay more to hospitals that meet higher quality standards, as indicated by the Blue Distinction or Distinction+ designations for spine surgery procedures.

Recommendations

**Hospitals:** Hospitalsshould pursue Blue Distinction or Distinction+ designations to demonstrate a commitment to high-quality care and secure higher reimbursement rates. Invest in continuous improvement and maintain high standards in patient safety and treatment outcomes to achieve and retain these designations.

**Insurance Companies:** They should continue to incentivize high-quality care by providing higher payments to hospitals with these designations. Monitor and evaluate the impact of these payments on overall healthcare costs and patient outcomes to ensure the sustainability of the reimbursement model.

**Policy Makers:** Policy makers should support initiatives and policies that encourage hospitals to achieve high standards of care. Foster transparency in healthcare quality metrics to enable patients to make informed decisions about their care providers.