# The Effect of Insurance Policies and Regional Variation on Cerebral Venous Thrombosis Hospitalization

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## Introduction

Cerebral venous thrombosis affects 1.32–1.57 per 100,000 people – an incidence rate 685% higher than a decade prior (Luo, 2018). Consequently, attention has shifted toward all-too-common misdiagnoses and mismanagement of CVT patients (Sasidharan, 2012). Due to CVT's heterogenous contributory factors, patient population, and risk for recurrence, it's incredibly important for CVT patients to receive the appropriate duration of care.

However, this is not always the case. Research has correlated a patient's insurance and access to a rural/urban hospital to their standard of care. According to the Journal of Health Economics, "treatment intensity [for the same condition] varies...according to the method by which their insurers pay physicians" (Glied, 2002). Due to more limited resources, studies have also shown that rural hospitals tend to "reduce hospitalized injury and its cost" with shorter lengths of stay (Mitchell, 2018).

**Purpose:** To examine the relationship between health insurance and a hospital's urban-rural classification in regards to the duration of stay and, therefore, the cost of a stay in CVT patients.

**Hypothesis**: Based on published findings, we hypothesize that if a Medicare/Medicaid patient gets diagnosed with CVT in a rural hospital, then he/she is more likely to have a longer length of stay than a CVT patient with private insurance in an urban hospital. This is because previous studies have shown that inpatients with the same problems get decreased intensity of treatment and cost of stay with government sponsored insurance policies and rural hospital settings.

## Methodology

- Study was performed on 1,000 cavernous sinus thrombosis patients from HealthFacts database, but only 841 patients with identifiable health insurance types were used.
- HealthFacts includes data extracted directly from the EMR from hospitals in which Cerner has a data use agreement, made up of 63 unique patients and 863 total facilities
- Data was collected for each patient's age, rural vs. urban status, and health insurance class.
- Insurance types were divided into 6 groups: 1- Private insurance, 2- Medicaid, 3- Medicaid Managed Care, 4- Medicare, 5- Medicare Managed Care, 6- Self Pay.
- Private insurance included: Blue Cross/Blue Shield, CHAMPUS, Other Commercial Payer, Other Government, Other Non-Govt, PPO, Title V, and Worker's Compensation.
- First, we compared Private Insurance (1), Medicaid and Medicaid Managed Care (2/3), Medicare and Medicare Managed Care (4/ 5), and Self Pay (6) in regards to duration of hospital stay.
- Next, we stratified the data and compared all 6 groups in regards to duration of hospital stay to compare Medicaid and Medicare to Medicaid Managed Care and Medicare Managed Care respectively.

## Results

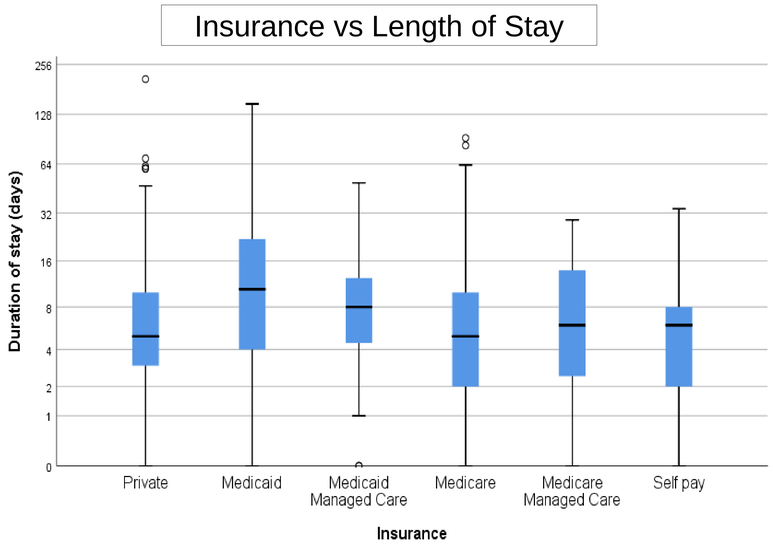


**Figure 1:** A comparison of all six insurance groups was done through an analysis of variance (ANOVA) model. The p value for all six groups was rounded up to p=0.001. Medicaid LOS was statistically longer than private insurance, Medicare, and self-pay. However, Medicaid was not statistically different from Medicaid Managed Care and Medicare Managed care, though the effect was borderline.

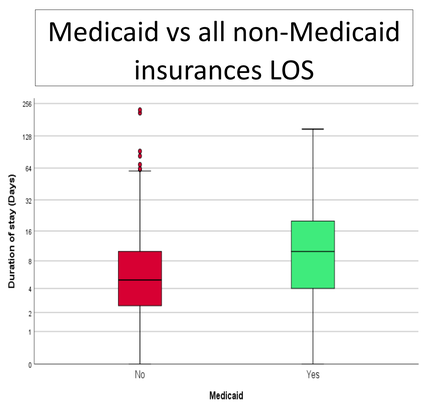


**Figure 2:** We found that Medicaid (including Medicaid and Medicaid Managed Care) was has a significantly longer LOS compared to the other insurance groups with p=0.001.

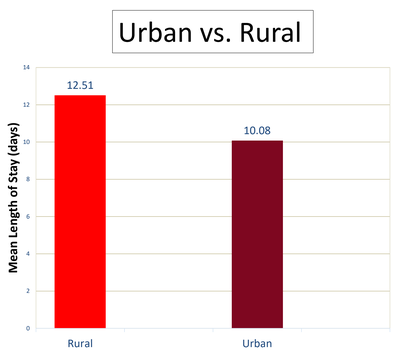


**Figure 3:** A comparison of the average length of stay for urban and rural cerebral venous thrombosis patients was performed by a two sample t-test. The p-value found was p=0.062.

## Summary/Conclusion

**Summary:**

- Length of stay (LOS) was significantly longer for Medicaid when compared to private insurance, self pay and Medicare (p=0.0001).
- LOS for Medicaid patients was not statistically different from Medicaid Managed Care and Medicare Managed Care
- Among private insurance, Medicaid Managed Care, Medicare, Medicare Managed Care, and self pay, LOS was not found to be statistically different.
- LOS was not significantly different between urban vs rural areas (p=0.065). The average LOS in rural hospitals is 13 days while it is 10 days in urban hospitals.

**Conclusions**:

- Total cost and length of stay have found to be correlated, as supported by the Journal of Hospital Medicine (Youngwerth 2011)
- Medicaid patients having a longer LOS is potentially due to:
  - Financial and disability requirements for Medicaid eligibility
  - Compensation of a hospital's financial loss with extraneous testing and decreased readmissions. Recently, under the HRRP, hospitals are under financial risk if they have excessive readmissions. Therefore, there has been a push financially for longer LOSs to avoid further problems long term (Goldsmith, 2017).
- Medicare patients having a nonsignificant LOS suggests:
  - Older patients (>65 yrs) potentially receive less aggressive treatment that would otherwise extend LOS, due to increased risk association with further treatment
  - Financial burden placed on hospitals for longer LOSs, especially with Medicare patients (Goldsmith, 2017)
    - Average hospital profit margin on Medicare patients: -10%,
    - Mayo clinic lost $546 million..in unpaid Medicaid portions in 2016

**Limitations**:

- Sample size could have impacted the results of this investigation.
  - For rural vs urban statistics, a larger sample size of data could result in a statistically significant data.
  - For Medicaid and Medicaid managed care data not being statistically significantly different, these effects are borderline and could change with larger sample size
- 159 patients were excluded due to missing data. From the insurance categories given, we had to exclude patients with the following insurances: MIA, Not Mapped, NULL, and Unknown/Missing/Invalid
- Duration of care cannot be directly correlated to their quality of care.
- A duration of care of 0 days does not necessarily mean that the patient stopped receiving care. For example, a patient could have been referred to another location for treatment.

## References

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