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Healthcare Utilization of the Emergency Department by Payer

Healthcare Utilization

March 24, 2019

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Thomas Delaney
Barbara Carroll, EdD – Faculty Mentor

Author Contributions

Each author has participated sufficiently in the work to take responsibility for the content and be willing to provide any relevant data upon request.

All authors have contributed substantially to: (1) the concept and design, and (2) the drafting, revision, and/or approval of the final version of the article.

The researchers hypothesize that Vermont Medicaid beneficiaries incur greater charges from emergency department (ED) visits compared to non-Medicaid beneficiaries and that total charges for Medicaid beneficiaries have increased during the period of 2012 through 2016. The researchers also looked at associations between Medicaid ED charges and rurality.
ABSTRACT

Objective: To identify the differences in emergency department (ED) charges across all insurance payers and to evaluate ED charges for Medicaid beneficiaries over time.

Methods: The Vermont Department of Health's publicly-available Hospital Discharge Data Set (HDD) data for 2012, 2014 and 2016 was analyzed by insurance group and year, as predictor variables, with age and sex as covariates. The primary outcome variable was total charges as a binary variable.

Results: Medicare cases had the greatest odds of high total charge visits. The odds of Medicare records having high total charges were 65.0% greater than the odds of Medicaid records having high total charges, holding age group and sex constant. For records representing Medicaid beneficiaries, the odds of high total charges in 2012 and 2014 were 41.1% and 22.3% lower, respectively, than the odds of high total charges in 2016, holding rurality, age, and sex constant.

Conclusions: Medicare cases had the greatest odds of being classified as high total charge visits. The odds of Medicaid cases producing high total charges increased during each period from 2012 to 2016.

INTRODUCTION

Medicaid beneficiaries comprise one third of Vermont’s population of 625,000, creating a high cost to the state’s healthcare budget relative to its population. The growth in Medicaid expenses nationwide has mainly been due to Medicaid beneficiaries having twice the rate of ED use as individuals with private insurance. Medicaid beneficiaries incur elevated ED costs due in part to their higher rates of chronic illnesses, mental illnesses, substance use disorders and other health conditions than people with private insurance. Much of the increase in Medicaid costs stems from the inclusion of people age 18-64 who were not eligible for Medicaid coverage before implementation of the Medicaid expansion as part of the Patient Protection and Affordable Care Act (ACA) in 2014. Comparing differences in ED charges for Medicaid to other insurance payers may provide insight into overall patterns of ED use.
Vermont is a predominantly rural state, with only one major urban hospital located in the city of Burlington. Rural residency is associated with both higher ED use by Medicaid beneficiaries and lack of health care access, such as access to primary care providers and walk-in clinics. Medicaid beneficiaries may also lack continuity of care, contributing to increased likelihood of repeated ED visits, increasing costs to state Medicaid programs. The aims of the current study were to (1) identify the differences in ED charges across all insurance payers and (2) evaluate ED charges for Medicaid beneficiaries over time.

METHODS

Study Design

We conducted a cross-sectional analysis of data from the Vermont Uniform Hospital Discharge Data Set (HDD) to identify associations between insurance group and total charges for ED visits. Additionally, we looked at changes in total charges for Medicaid beneficiaries over time, using 2012, 2014, and 2016 data to conduct a trend analysis.

Data Source

The HDD comprises de-identified encounter-level data including ED discharge data. Vermont's 14 general acute care hospitals contribute records to the HDD, which is managed by the Vermont Department of Health.

Subjects

The available population for the study included Vermont residents and non-residents who visited a Vermont hospital. The study included all records for Vermont residents treated at and discharged from the ED in 2012, 2014 and 2016 (n=652,707). This study meets criteria for an exempt project based on the University of Vermont Institutional Review Board.
Methods

We downloaded the HDD public use files for the relevant years from the Vermont Department of Health website. We included age group, sex and rurality as covariates in our analysis. Insurance Group was consolidated to five categories: Medicaid, Medicare, Other government, Private Insurance, and Missing/Unknown/Other. Age Group was consolidated into three categories: Under 18, 18-44, and 45+. The binary Rurality variable was created by combining twelve 5-digit zip codes representing towns with populations greater than 10,000 as "Urban" and the remaining zip codes as "Rural". Our primary outcome variable, Total Charges, was originally a continuous positively skewed variable in the HDD. To deal with the non-normal distribution, we transformed it into a binary variable where total charges were considered high or low, above or at/below the median.

Analytic Plans

To identify the differences in ED charges across all insurance payers, we used logistic regression analysis. We evaluated the relationship between Insurance Group and Total Charges frequencies of the data set by level of total charges. To evaluate ED charges for Medicaid beneficiaries over time, we again used logistic regression analysis. We evaluated the relationship between Year and Total Charges, including age group, sex, and rurality as covariates.

Results

A total of 652,707 records from 2012, 2014 and 2016 were included in the sample, with approximately one third originating from each year (2012: 34.5%, 2014: 33.0%, 2016: 32.5%). Approximately half the records were attributed to males (46.3%) and half to female (53.7%). A majority of the records were for individuals aged 18-44 (41.2%), and 45+ (41.4%) with the smallest group being Under 18 (17.5%). In terms of insurance, Medicaid (36.5%) was listed most followed by Private Insurance (29.4%), Medicare (24.1%), Missing/Unknown/Other (7.5%), and Other government (2.4%). Over half of the records originated from rural regions (64.9%), with
the rest being urban. For total charges associated with each record, 50.2% were considered to have high total charges and 49.8% to have low total charges.

The results of both logistic regression analyses are shown in Figure 1. The odds of records with Medicare and Private Insurance having high total charges were significantly greater, 65.0% and 36.9% respectively, than the odds of records having high total charges with Medicaid, holding age group and sex constant. The odds of high total charges were greater for Medicaid beneficiaries than for records with Other government insurance or with Missing/unknown/other insurance. When looking at the estimated marginal mean values for total charges, this same trend was seen.

When evaluating ED charges for Medicaid beneficiaries over time, the odds of Medicaid records having high total charges in 2012 and 2014 were significantly lower compared to 2016 (41.1% and 22.3% respectively), holding rurality, age group, and sex constant. ED charges for Medicaid beneficiaries in 2016 were significantly higher than those in 2012 and 2014. Additionally, rurality was significantly positively associated with higher total charges, holding year, age group, and sex constant. This analysis of rurality was also tested without year included in the model and the relationship was not substantially changed, suggesting that the odds of higher total charges for urban records compared to rural records is mostly consistent.

Discussion

Medicare cases had the highest odds of being classified as high total charge visits across the time period we studied. Vermont residents eligible for Medicare comprise a larger portion of the state's population compared to other states. Older patients in Vermont may have more chronic conditions and poorer overall health status, which may contribute to the higher charges in the Medicare insurance group. Further research is necessary to determine which Vermont populations have the most frequent ED visits.

The odds of Medicaid cases having high charges increased during each period from 2012 to 2016. Studies have shown that new Medicaid enrollees tend to have a greater number of initial ED visits to address unattended medical issues. The initial increase in ED visits by new
enrollees could account in part for the progressively higher odds of high charge visits in the periods we analyzed. The initial increase in the number of Medicaid beneficiaries resulting from the 2014 Medicaid expansion through the ACA may partially explain these findings.

**Limitations**

The Vermont HDD public use files are limited and do not include personally identifiable data. Therefore, it was not possible to adjust for covariates associated with both emergency department visits and Medicaid enrollment status such as; race, ethnicity, education level, and socioeconomic status. The unit of analysis is an event, not a person, and the data cannot be aggregated to the person level. The data do not include out-of-state hospital discharges for Vermont residents, although residents living in Vermont towns along state borders routinely seek treatment in neighboring states. The HDD includes data on total charges rather than actual costs of ED visits. Identifying the diseases and conditions associated with high total charges and insurance payer was outside the scope of this research.
Table 1 – Logistic Regression Results

(1) Total Charges of All Insurance Groups Compared to Medicaid Results - Odds of higher total charges for varying insurance groups when compared to Medicaid. Both Medicare and Private insurance groups have higher odds of high total charges when compared to Medicaid.

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Significance</th>
<th>Odds Ratio</th>
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<th>Upper</th>
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<td>0.642</td>
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<td>0.950</td>
<td>0.931</td>
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(2) Medicaid Total Charges by Year, 2012 and 2014 Compared to 2016 Results - Odds of higher total charges for Medicaid Records for years 2012 and 2014 compared to 2016. Both 2012 and 2014 have lower odds of having high total charges when compared 2016.

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Significance</th>
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<th>Upper</th>
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Bibliography


