

# Children's Health Insurance Status and Emergency Room Utilization: An Examination of Complex Survey Data

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## Abstract

Since the Children's Health Insurance Program's passage into law in 1997, the program has increased in cost to over \$15 billion in recent years. Emergency room usage has also increased throughout the United States, leading to nationwide issues in overcrowding and surges in service costs. This study seeks to examine emergency room utilization of children insured under Children's Health Insurance Program to determine if Children's Health Insurance Program enrollees use the emergency room more or less frequently than their privately insured counterparts. The data used in this study were from the 2017 National Health Interview Survey. SAS statistical software was used to conduct a multinomial regression assessing the relationship between insurance type (private v. Children's Health Insurance Program) and frequency of emergency room utilization over the last 12 months. The analysis results indicate no statistically significant difference between Children's Health Insurance Program insured and privately insured children in terms of frequency of emergency room utilization and suggest a need to explore other factors that more directly influence Children's Health Insurance Program costs.

## Keywords

CHIP, emergency room, health care utilization, health insurance, children

### What do we already know about this topic?

The Children's Health Insurance Program (CHIP) costs American taxpayers over \$15 billion. Higher insurance costs can be associated with the utilization of higher-cost health care services, such as the emergency room. Frequent emergency room utilization can result in higher costs, particularly if used for routine care.

### How does your research contribute to the field?

This study allows the field to explore factors related to CHIP cost containment and health care service utilization. Specifically, it allows distinction in emergency room utilization trends between CHIP-insured and privately insured children in the United States.

### What are your research's implications toward theory, practice, or policy?

Findings imply that children insured under CHIP do not appear to utilize the emergency room differently than privately insured children. Policymakers should consider this point when investigating and creating legislative decisions surrounding CHIP and health care costs.

## Introduction

The Children's Health Insurance Program (CHIP), a health insurance program jointly funded by both the American federal government and states, has significantly increased in cost in recent years. Since CHIP's passage into law in 1997, states have expanded coverage considerably through their CHIP programs, with almost every state providing coverage for children up to at least 200% of the Federal Poverty Level (FPL). As of 2016, CHIP costs the United States around \$15.6 billion, with \$14.4 billion in federal funding and around \$1.2

billion from the states directly.<sup>1</sup> The cost of CHIP is attributed to its availability in every state and the allowance of health care to both children and pregnant women from families whose income is too high to qualify for Medicaid.<sup>2</sup> As of

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2018, the total number of CHIP enrollees across all states has increased from 660 351 to 9 460 160.<sup>2</sup>

CHIP coverage allows participants to receive benefits for a range of health care services including check-ups, immunizations, doctor visits, prescriptions, dental and vision care, inpatient and outpatient hospital care, laboratory and x-ray services, and emergency services.<sup>3</sup> Previous research indicates that within the CHIP enrollee population, those with chronic conditions account for nearly three-quarters of all spending due to increased utilization of costly health care services, such as emergency services.<sup>4</sup> Even for nonemergency uses of emergency services, cost-sharing between the government and the CHIP utilizer is not generally allowed<sup>5</sup> and can leave a potential for increased CHIP spending on higher-cost services.

Given this concern, federal budget allocation toward CHIP has been deliberated over in recent years. In 2018, the Congressional Budget Office (CBO) conducted multiple assessments of proposed changes to federal CHIP funding. CBO specifically examined the budgetary implications of changing federal matching rates and eligibility requirements for CHIP enrollees,<sup>6</sup> as well as a rescission of \$1.9 billion from the federal CHIP budget.<sup>7</sup> These analyses indicate nuances in the investment priorities within CHIP.

Although overall federal investment in CHIP remains a point of political debate, health insurance coverage for low-income children continues to be a priority in most states.<sup>8</sup> General concerns center around higher out-of-pocket costs for enrollees if CHIP funding were to be changed.<sup>9,10</sup> This indicates that while there is a consensus on the necessity of CHIP, the contemporary issue is whether the program is implemented in a cost-effective manner. One consideration for such discussions is whether current CHIP funds may be subsidizing higher-cost services, such as emergency room (ER) visits.

Emergency room use in the United States has increased as the number of emergency departments has declined and overcrowding has increased.<sup>11</sup> The cost of ER use is high, with recent estimates indicating that on average one ER visit translates to \$2032, compared to \$167 at a physician's office, approximately 12 times the cost.<sup>12</sup> High ER usage has been found to be associated with insurance status, with Medicaid enrollees more likely than their privately insured and uninsured counterparts to visit an ER.<sup>13</sup> However, it remains unclear whether this same phenomenon takes place with CHIP, which was initially created as an expansion of Medicaid to provide coverage to children outside Medicaid eligibility.<sup>3</sup> Previous research in this realm is limited and suggests that factors beyond CHIP enrollee status may be more predictive of excessive ER utilization,<sup>14</sup> indicating that deeper exploration is needed.

The purpose of this study is to better understand current trends in CHIP costs across the United States by examining high-cost health care utilization behaviors. Specifically, we

aim to compare ER utilization between CHIP and privately insured children in order to better determine if current ER utilization patterns may indicate overuse among publicly funded children. The research question this study seeks to answer is whether there is an association between CHIP coverage and an increased number of ER visits in the past 12 months.

## Methodology

This study seeks to understand current trends in CHIP costs across the United States by examining ER utilization trends using data from the Centers for Disease Control and Prevention's (CDC) National Health Interview Survey (NHIS). The NHIS is a national cross-sectional survey that consists of a range of health data from noninstitutionalized civilians, including basic health and demographic items and related information such as health insurance coverage and health care service utilization.<sup>15</sup> NHIS data is intended to represent a snapshot of the overall health of the US population in a given year. The 2017 NHIS data set, the latest release at the time of analysis, was used for this study. 2017 NHIS includes interview data from 49 067 households of 78 132 individuals.<sup>16</sup> This data, as is the case with other years of NHIS, includes an oversampling of certain subgroups such as racial/ethnic minorities due to interest in the inequalities in health status and health care access in these groups.<sup>15,16</sup> Given that the majority composition of enrollees in CHIP include many of these subgroups, NHIS serves as a useful dataset for the present analysis.

## Statistical Analysis

The NHIS data were analyzed using SAS statistical software version 9.4.<sup>17</sup> The NHIS data files included the Family, Person, and Sample Child files which incorporates variables related specifically to the family-level characteristics of each child in the sample such as income level, type of health insurance, health care service utilization, and other demographics.

Specific variables included in this analysis were family income level, sex, age, race/ethnicity minority (Black or Hispanic to non-Black or Hispanic), US geographic region (South, Midwest, Northeast, or West), child's health insurance (private vs CHIP coverage), and number of times child has gone to the ER over the last 12 months.

A multinomial logistic regression was conducted using insurance type of the child (privately insured or CHIP insured) as the independent variable and the number of times in the ER over the last 12 months (0, 1, or 2 or more times) as the dependent variable. This analysis technique was selected as the outcomes observed from the NHIS data set consists of several nonordinal categories<sup>18</sup> and has been previously utilized in similarly structured cross-sectional studies with health care utilization outcomes.<sup>19,20</sup> Additionally, a cross-sectional

**Table 1.** Child Demographics by Health Insurance Status (n = 5178).

|                         | Privately insured<br>(n = 5018) | CHIP insured<br>(n = 160) |
|-------------------------|---------------------------------|---------------------------|
| Age (%)                 |                                 |                           |
| 1-5 years               | 1396 (27.8%)                    | 44 (27.2%)                |
| 6-11 years              | 1670 (33.3%)                    | 54 (34.0%)                |
| 12-17 years             | 1952 (38.9%)                    | 62 (38.8%)                |
| Race/Ethnicity (%)      |                                 |                           |
| Black or Hispanic       | 1750 (34.9%)                    | 48 (30.0%)                |
| Non-Black or Hispanic   | 3268 (65.1%)                    | 112 (70.0%)               |
| Sex (%)                 |                                 |                           |
| Male                    | 2646 (52.7%)                    | 82 (51.3%)                |
| Female                  | 2372 (47.3%)                    | 78 (48.6%)                |
| US Region (%)           |                                 |                           |
| Northeast               | 786 (15.7%)                     | 27 (16.9%)                |
| Midwest                 | 1102 (22.0%)                    | 43 (26.9%)                |
| South                   | 1914 (38.1%)                    | 50 (31.3%)                |
| West                    | 1216 (24.2%)                    | 40 (25.0%)                |
| Family income level (%) |                                 |                           |
| ≤199% FPL               | 4975 (99.1%)                    | 160 (100%)                |
| ≥200% FPL               | 40 (0.9%)                       | 0                         |

CHIP = Children's Health Insurance Program; FPL = Federal Poverty Level.

analysis of NHIS mirrors the intention of the survey which serves a point-in-time health snapshot of the American people.

For this analysis, adjustments were made for the complex survey design through application of sampling weights. Descriptive statistics were run to compare health-related, demographic, and socioeconomic variables among privately insured and CHIP-insured children in the sample. Separate bivariate analyses were conducted to measure associations between demographic variables and the primary outcome of ER utilization. A multinomial logistic regression analysis was then run to evaluate the association between health-related, demographic, and socioeconomic factors and ER utilization.

## Results

Descriptive statistics of both the privately insured (n = 5018) and CHIP-insured (n = 160) children in the 2017 NHIS data set are included in Table 1. Both populations had similar weighted distributions across the age ranges of 1 to 5 years old (27.8% privately insured, 27.2% CHIP insured), 6 to 11 years old (33.2% and 34.0%), and 12 to 17 years old (38.9% and 38.8%). Similarly, both populations had about a third who were Black or Hispanic (34.9% and 30.0%). This race/ethnicity distribution is expected as NHIS oversamples Black and Hispanic populations<sup>21</sup> and so is divided in such a way for this study as publicly insured children are more likely to fall into these 2 race/ethnicity categories so they are

a subpopulation of interest.<sup>14</sup> Sex was relatively equally distributed between both health insurance populations with slightly more males than females in both populations (52.7% privately insured and 51.3% CHIP insured). The geographic distribution of both health insurance populations was also similar. For the privately insured population, 15.7% lived in the Northwest, 22.0% were in the Midwest, 38.1% were in the South, and 24.2% in the West. For the CHIP population, the distribution was 16.9% in the Northwest, 26.9% in the Midwest, 31.3% in the South, and 25.0% in the West. Finally, most of the children in the sample were <199% below the FPL with 100% of the CHIP population and 99.1% of privately insured in this bracket. Since the CHIP population is required to fall into this income level bracket, this can make for a more direct comparison between the 2 health insurance populations in respect to income.

Table 2 includes comparisons of children with complete data (n = 4867). This shows the associations between independent variables, including type of health insurance coverage, on the frequency of using the ER over the last 12 months. This table includes regression results for the independent variable of interest, children's health insurance status, as well as related predictor variables. The statistical model was not adjusted for each of these analyses. When compared to their private insurance counterparts, there was no statistically significant odds of CHIP-insured children visiting the ER one or more times over the last 12 months.

In regard to other variables, compared to 12 to 17-year-olds, 1 to 5-year-olds were 51% more likely to go to an ER once (95% confidence interval [CI], 1.22-1.85) and over 2.5 times as likely to go twice or more (95% CI, 1.87-3.49). Also, compared to counterparts in the Northeast, which has significantly more urban areas, those in the Midwest were about 1.4 times as likely to go to an ER once (95% CI, 1.04-1.85) or 2 or more times (95% CI, 0.93-2.20). Finally, children who were 200% or higher than the FPL were 2.4 times as likely to visit the ER once over the last year (95% CI, 1.13-5.24) than those that were lower than this income threshold. This trend did not emerge for children who visited the ER 2 or more times over the past 12 months.

## Discussion

Results from this study indicate, based on cross-sectional data, that there is no statistically significant difference in how often CHIP-insured children use the ER compared to their privately insured counterparts in the 2017 NHIS sample. While CHIP coverage was not closely associated with an increased frequency of ER utilization in this study, other factors such as age and geographic region demonstrated statistically significant associations in this analysis. These findings provide some insight into the current use of emergency care nationally.

In this study, demographic variables linked to increased ER utilization, including age and geographic location, could

**Table 2.** Results of Multinomial Logistic Regression Model Measuring Association of Health Insurance, Number of ER Visits Over Past 12 Months, and Covariates (n = 4867).

|  | 1 ER visit over past 12 months<br>versus no ER visit over 12 months | 2 or more ER visits over past 12 months<br>versus no ER visit over 12 months |
|--|---|--|
| CHIP<br>(Reference category: privately insured)        | 0.74 (0.42-1.3)   | 0.75 (0.33-1.72)   |
| Age (Reference category: 12-17 years)                  |   |  |
| 1-5 years  | <b>1.51 (1.22-1.85)</b>   | <b>2.55 (1.87-3.49)</b>  |
| 6-11 years   | 1.05 (0.85-1.29)  | 1.31 (0.93-1.82)   |
| Race/Ethnicity (Reference category: Black or Hispanic) |   |  |
| Non-Black or Hispanic                                  | 0.80 (0.67-0.96)  | 0.66 (0.51-0.87)   |
| Sex  |   |  |
| Female   | 1.18 (1.00-1.40)  | 1.10 (0.85-1.41)   |
| US Region (Reference category: Northeast)              |   |  |
| Midwest  | <b>1.39 (1.04-1.85)</b>   | <b>1.43 (0.93-2.20)</b>  |
| South  | 1.18 (0.90-1.54)  | 1.15 (0.77-1.71)   |
| West   | 0.99 (0.74-1.33)  | 0.92 (0.59-1.43)   |
| Family income level (Reference category: ≤199% FPL)    |   |  |
| ≥200% FPL  | <b>2.44 (1.13-5.24)</b>   | 1.41 (0.32-6.18)   |

ER = emergency room; CHIP = Children's Health Insurance Program; FPL = Federal Poverty Level.

Note: 95% Confidence intervals in parenthesis.

Bold values are statistically significant confidence intervals.

be due to existing individual health and environmental factors. Younger children visiting the ER more often may be indicative of neonatal health concerns that are often addressed in the pediatric emergency department.<sup>22</sup> Injuries, trauma, fever, and stomach or breathing issues are some of the top reasons children go to the ER.<sup>23</sup> In younger children, these types of issues, as well as young age-specific health issues, oftentimes lead to excessive ER visits due to factors outside of the state of the child's health, including if parents are single, low income, or have less than a high school education.<sup>24</sup>

This study also indicated a higher use of the ER in the Midwest compared to the Northeast. This finding could be attributable to a known physician shortage in primarily rural areas.<sup>25</sup> Given a shortage of physicians, patients may be either more frequently using the ER in the place of standard visits, or waiting longer to address health issues, leading to an eventual use of an ER rather than a physician visit. In addition, research indicates that in more rural areas, shorter distances to the emergency department compared to a physician's office is correlated with higher ER use, particularly in regions of high-pocket ER use.<sup>26</sup>

Another emergent trend in this analysis was the increased ER use among those in the sample >200% FPL compared to low-income counterparts. This finding is counter to some prior evidence.<sup>13</sup> However, given that patients of low socioeconomic status are more sensitive to economic disincentives for ER use, this finding may also indicate that those that are above 200% FPL may be more comfortable seeking ER care due to financial flexibility.<sup>27</sup> Further research should explore the frequency of utilization beyond 12 months to

determine if similar trends continue to emerge and if health insurance type draws an association with ER utilization when reviewing the issue over a period of time.

A few limitations in this study shed light on the direction that other future research could explore. A cross-sectional examination of NHIS data, as it is self-reported, can present limitations due to potential recall bias as well as low sample sizes for specific inquiries. Longitudinal explorations across many years of data could help the field better understand trends of ER usage over time and allow for a larger sample of CHIP enrollees in the study design. Given the relatively small sample size of CHIP enrollees in this study, these results limit the authors in drawing conclusions specific to CHIP ER utilization. An examination of data over time may alleviate this issue. Additionally, while a multinomial logistic regression was useful in this particular study to look at leveled outcomes related to ER utilization, other statistical procedures may be more meaningful to explore when reviewing long-term or binary outcomes. Future research can also consider incorporating other health care status or utilization variables, such as outpatient and primary care that may provide more insight on ER utilization beyond what is explored in this analysis.

Despite these limitations, this study helps address a knowledge gap on how CHIP enrollees across the United States utilize the ER. Previous studies on health care services and CHIP have reviewed the program on a policy level,<sup>27,28</sup> or reviewed ER utilization as a dichotomous outcome rather than a multilevel inquiry.<sup>14</sup> Our analysis provides not only a closer look at ER utilization between privately insured and CHIP-insured children, but presents other factors that may



be more indicative of ER use, including age and geographic region.

Due to the high cost of CHIP, as well as financial and public health costs related to ER overcrowding in the United States,<sup>29</sup> ER utilization among publicly insured children is an important point in health care policy discussions. The findings from this analysis indicate that children under CHIP may not necessarily be utilizing the ER more than their privately insured counterparts.

These study results suggest that individual and locational factors related to utilization may have greater impact on CHIP costs. Continued explorations on the nuances of CHIP, such as variations by age, geographic region or state, and family income level, could help better inform policymakers on health insurance cost drivers and provide evidence-informed opportunities for public insurance cost containment.

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