# Impact of Public Insurance Expansion on Medical Care Utilization of Children

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## Detailed Abstract

The Affordable Care Act fills current gaps in coverage for the poorest Americans by creating a minimum Medicaid income eligibility level across the country. Beginning in January 2014, individuals under 65 years of age with income below 133 percent of the federal poverty level(FPL)[1] will be eligible for Medicaid as a way to achieve the universal level of health insurance in the country. It is meaningful to see at this point of time, how the public health insurance expansion affects individuals' health and their welfare as a precursor of the new policy implementation. It is important to examine how the individual choices of medical utilization change as their health insurance status changes from uncovered to covered, and to investigate how choices would be different if covered by private insurances or by public insurances. To examine the potential impact of public health insurance expansion, I focus on children under age 18, the population group have been main target to expand public health insurance coverage through the Children's Health Insurance Program(CHIP, formerly States' Children Health Insurance Program). In 1997, the CHIP was enacted to fill the gap of Medicaid program. The CHIP is designed to insure low-income children who are not eligible for Medicaid but cannot afford private insurance. There has been a non-ceasing effort to cover as many uninsured children as possible so that the income threshold for the eligibility has increased in many states over years. In some states the income threshold ranges up to 300% of Federal Poverty Line(FPL) after the reauthorization of the program in 2009.[2]

Expansion of public insurance is expected to increase the medical care utilization. More access to effective, timely primary care is expected to lead the decrease in avoidable hospitalizations; the hospitalization would not happen had received effective primary care. In the analysis, I focus on the diseases of respiratory system

[1] $23,550 for a family of four in 2013

[2] In Massachusetts, there is a state program for children's coverage along with CHIP and its income threshold goes up to 400% of FPL.

which are most prevalent in children and primary care sensitive and see whether medical care utilization pattern for those disease has changed for both primary and inpatient care.

The analysis utilizes several different data to obtain measure of policy change and medical care utilization. First, I use the Current Population Survey(CPS) March Supplement. I derive the share of children who are eligible for Medicaid/CHIP by each age group, state and year as an independent variable for the analysis. The age group is divided by 4 age groups of age 0, 1-5 and 6-15 and 16-18 according to categorization of income threshold for the eligibility. The eligibility is defined by percentage of Federal Poverty Line(FPL) varying by age group and state over years, thus there are two sources of variation, one is from the policy threshold change and the other is from income distribution change. I also derive the actual share of Medicaid/CHIP covered children for each age group, state and year using health insurance coverage information in CPS March supplement. The Kids' Inpatient Database(KID) released by HealthCare Cost and Utilization Project(HCUP) of the Agency for Healthcare Research and Quality(AHRQ) is used as the primary data of the analysis to track the change in the hospital care utilization and cost distribution. The KID is a cross-sectional, nationwide data of pediatric discharges from all community, non-rehabilitation hospitals in the United States. The data set includes charges, payer information (Private insurance, Medicaid, Medicare or uninsured),diagnosis, length of stay, procedures and basic demographic information including gender, race and hospital information. I focus on diseases of respiratory system diagnoses which are the most prevalent in children and many of them are counted as avoidable hospitalization. I draw on data from the 2000, 2003, 2006 and 2009 waves of KID and included children under age 18 and excluded new-born birth cases.

## Model 1: Main regression model

I used variation across states, within states over time and across different age groups in the same state at a give point in time to identify the impact of Medicaid/CHIP expansion on the hospitalization induced by disease of respiratory system. I classified diseases of respiratory system following *International Classification of Diseases, ninth Revision, Clinical Modification*(ICD−9−CM code), such as asthma, pneumonia and bronchitis.

$$Hosp_{ast} = \alpha + \beta Eligible_{ast} + \gamma_a + \delta_s + \zeta_t + \epsilon_{ast}$$

$a$ indexes age groups, $s$ indexes states and $t$ indexes years, and $\gamma_a$, $\delta_s$, $\zeta_t$ are sets of dummy variables for age group, state and year respectively. $Hosp_{ast}$ is the total number of hospitalizations for each subgroups

and *Eligible* is share of children who are eligible for Medicaid/CHIP coverage according to the designated income threshold in each states over years. Expansion of public health insurance coverage usually increases the utilization of medical services, due to the decrease in price of medical service usage, but also insurance coverage is expected to lead more efficient medical care utilization. Newly covered children are likely to decrease hospitalization and emergency room visits due to increased access to regular source of care such as physician visits, preventive care. To see the impact of Medicaid expansion on outpatient care, I re-run the regression outpatient care utilization for respiratory diseases.

## Model 2: Quantile Regression

Cost is one of the most important issue in expansion of public health insurance and budget burden is the main target of criticism. It is expected that the cost would increase because more medical care is provided to public health insurance holders, so the cost could increase. Contrast to this possibility, less care could be provided to patients. The latter is the effect that I expected. To see whether there is structural change in hospitalization cost by health insurance status.

$$ChargeQ_{ihast} = \beta_1 Eligible_{ast} + \beta_2 Severity_{ihast} + \beta_3 LOS_{ihast} + \beta_4 X_{ihast} + \alpha_h + \gamma_a + \delta_s + \zeta_t + \epsilon_{ihast}$$

$i$ indexes individual discharge and $h$ indexes hospital $a$ indexes age groups, $s$ indexes states and $t$ indexes years, and $\alpha_h$ $\gamma_a$, $\delta_s$, $\zeta_t$ are sets of dummy variables for hospital age group, state and year respectively. $Eligible_{ast}$ is the share of Medicaid/CHIP eligible children in the age group , state and year. $Severity_{ihast}$ is included to control the degree of severity of disease which affects the total charge. $LOS_{ihast}$ is the length of stay in hospital. $X_{ihast}$ is individual demographic information including gender, race, health insurance status.

Table 1 is the basic result of OLS Regression on hospitalization level. I clustered at state level to control serial correlation within state. As 1000 additional children are eligible for public insurance, there are about 3.6 additional hospitalization. However the level of hospitalization of public insurance enrolled children decreases by 1.6 hospitalization per additional 1000 public insurance eligible children. However the direction of result is reversed if I transform the dependent variable and independent variable to log. This implies that the utilization pattern can differ by how many children are covered by public insurances. To verify the difference, I use quantile regression on hospitalization utilization.

Tab. 1: OLS Regression on Hospitalization Level

| | total hospitalization | total hospitalization covered by public insurance |
|---|---|---|
| Public Insurance Eligible Population | 0.0036345*** | -0.00116** |
| (s.e) | (0.001158) | (0.000456) |
| state, year, agegroup fixed effect | Y | Y |
| R-square | 0.97778 | 0.9691 |
| N | 572 | 572 |

Tab. 2: The OLS Regression on Respiratory Disease Hospitalizaion

| | respiratory diseases hospitalization | respiratory diseases hospitalization covered by public insurance |
|---|---|---|
| Public Insurance Eligible Population | -0.0013*** | -0.00119*** |
| (s.e) | (0.000102) | (0.0000756) |
| state, year, agegroup fixed effect | Y | Y |
| R-square | 0.7624 | 0.7362 |
| N | 572 | 572 |

Table 2 shows the hospitalization due to diseases of respiratory system. For all children regardless of insurance status, the hospitalization due to respiratory disease decreases as more children are eligible for public insurance. Children covered by private insurance and uninsured children also showed decreasing pattern but the magnitude were smaller than children covered by public insurance and the result was not significant.