

Access to Care and Health Outcomes Under Medicaid Expansion: Evidence from BRFSS 2010–2019

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1. Introduction

The Affordable Care Act (ACA) marked a major shift in U.S. health policy, aiming to expand access to care by allowing states to increase Medicaid eligibility for low-income adults. While states had the choice over expansion, the policy created a natural experiment in which researchers could compare health outcomes between expansion and non-expansion states. Understanding whether this coverage translated into improved health outcomes remains central to evaluating the policy's effectiveness. Therefore this study will focus on the years before and after the expansion from 2010 - 2018.

Literature

Prior research, such as Sommers, Baicker, and Epstein (2012), examined the effects of earlier state-level Medicaid expansions in the early 2000s, finding improved access to care and reductions in mortality using a difference-in-difference framework. Building on this approach, the present study analyzes the ACA Medicaid expansions implemented in 2014 to assess their effects on broader health outcomes and

healthcare access. The study will also use a difference-in-difference framework.

2. Data

This study uses data from the Behavioral Risk Factor Surveillance System (BRFSS), an annual cross-sectional telephone survey conducted by the Centers for Disease Control and Prevention. The analysis includes pooled data from 2010 to 2018 and restricts the sample to adults aged 19 to 64 to focus on the non-elderly population likely to be affected by the Medicaid expansion. Elderly individuals are eligible for Medicare over the age of 65. The final sample includes over two million observations after combining all years and excluding missing responses for key outcomes and covariate variables. Treatment is defined based on whether the state expanded Medicaid coverage after the implementation of the Affordable Care Act (ACA) in 2014.

Table 1 presents the summary statistics for the main outcome and demographic variables. Approximately 83% of respondents reported having a personal doctor, while 16% reported being unable to afford care. The prevalence of chronic health conditions such as diabetes (9%), heart attack (3%), and stroke (2%) aligned with expectations for the working age population. Respondents reported an average of 3.94 physically unhealthy days and 4.05 mentally unhealthy days in the past month. The average time since last check up was roughly 1.6 years on a 1-4 years scale.

In terms of demographics, the sample is majority White non-Hispanic (74.5%) with a substantial representation from Black (9.1%) and Hispanic (8.7%) populations. Income and education levels vary with 32.6% of respondents reporting household income above \$75,000 and 37.8% holding a college degree. These characteristics highlight the socioeconomic diversity of the sample and support the inclusion of controlled variables in subsequent models. Table 1 presents the summary statistics for the analytic sample used in the models that follow.

Table 1: Summary Statistics: Health Outcomes and Demographics

Category	Variable	Mean (%)	SD	Range or Breakdown
Health Outcomes (Binary)				
	Has personal doctor (1=yes)	82.5	38.0	[0, 1]
	Couldn't afford care (1=yes)	16.1	36.7	[0, 1]
	Has diabetes (1=yes)	9.3	29.0	[0, 1]
	Had heart attack (1=yes)	3.3	17.9	[0, 1]
	Had stroke (1=yes)	2.3	15.1	[0, 1]
Health Outcomes (Continuous)				
	Physically unhealthy days (past 30 days)	3.94	8.38	[0 - 30]
	Mentally unhealthy days (past 30 days)	4.05	8.28	[0 - 30]
	Time since last routine checkup (1–4 years)	1.60	0.98	[1 - 4]
Demographics (Categorical)				
	<i>Sex</i> (1=Male, 2=Female)	1.59	0.49	59% Female
	<i>Race/Ethnicity</i>			
	White (Non-Hispanic)			74.5%
	Black (Non-Hispanic)			9.1%
	Hispanic (Any race)			8.7%
	Asian (Non-Hispanic)			2.2%
	NH/PI (Non-Hispanic)			0.4%
	AI/AN (Non-Hispanic)			1.6%
	Multiracial (Non-Hispanic)			2.0%
	Missing			1.0%
	<i>Household Income Category</i>	5.85	2.20	
	Less than \$10,000			6.0%
	\$10,000–14,999			5.2%
	\$15,000–19,999			6.7%
	\$20,000–24,999			8.1%
	\$25,000–34,999			9.9%
	\$35,000–49,999			14.2%
	\$50,000–74,999			17.2%
	\$75,000 or more			32.6%
	<i>Education Level</i>	4.94	1.02	
	No school / Kindergarten			0.1%
	Grades 1–8			2.0%
	Some high school			5.0%
	High school graduate / GED			26.8%
	Some college or tech school			28.3%
	College graduate			37.8%

Source: Behavioral Risk Factor Surveillance System (BRFSS), 2010 - 2018.

3. Econometric Methods

The analysis uses difference-in-difference (DiD) framework to estimate the causal effect of Medicaid expansion on a range of health outcomes whether self reported, diagnosed or accessibility. Individuals residing in states that expanded Medicaid coverage on January 1st, 2014 are included in the treatment group. Although some states expanded months or years after, only states that immediately implemented the ACA are included. Those who live in states that did not expand at all are in the non-expansion states and serve as the control group. The treatment indicator is defined as the interaction term between an expansion state dummy and a post-2014 period indicator.

The general estimating equation is specified as:

$$Y_{ist} = \alpha + \beta_1 \text{Expansion}_s \times \text{Post}_t + \mathbf{X}'_{ist}\gamma + \delta_s + \lambda_t + \varepsilon_{ist}$$

where Y_{ist} represents the outcome for individual i in state s and year t ; Expansion_s is an indicator for whether state s adopted Medicaid expansion; Post_t is an indicator for the post-expansion period (2014 onward); \mathbf{X}_{ist} is a vector of individual-level covariates including sex, race, education, and income; δ_s and λ_t represent state and year fixed effects, respectively; and ε_{ist} is the error term.

Given the nature of the dependent variables, different nonlinear models were employed. Ordered logistic regression was used for ordinal outcomes (e.g., general health status and timing of last checkup), negative binomial regression for overdispersed count variables (e.g., physically and mentally unhealthy days), and logistic regression for binary outcomes (e.g., diabetes, personal doctor, cost barriers). Robust standard errors were clustered at the state level to account for intra-state correlation.

Marginal effects were computed using post-estimation commands to facilitate

interpretation. Specifically, the average marginal effect of the post-2014 period in expansion states was extracted for each outcome to reflect the estimated policy impact.

4. Results

Reported Health Outcomes

The ordered logistic regression results indicate a marginally significant positive association between Medicaid expansion and the probability of reporting excellent health ($p = 0.071$). However, the predicted probabilities show a small decline in the likelihood of excellent health in expansion states after 2014. As shown in Table 2, these differences are not visually distinguishable from zero, with overlapping confidence intervals across groups. This suggests that although there may have been a modest improvement in general health due to Medicaid expansion, the effect was limited and statistically weak. Estimates for the number of physically unhealthy days show a modest increase, suggesting worsened physical health after expansion. However, the size of the effect is small. Mentally unhealthy days increased slightly post-expansion, suggesting potential worsening of self-reported mental health, though the magnitude is small. Control variables in the reported health models reveal expected and consistent patterns. Females were more likely than males to report better general health and fewer physically and mentally unhealthy days. Education emerged as a strong predictor of health status: individuals with higher levels of schooling reported substantially better overall health and fewer unhealthy days. Income effects followed, with higher-income respondents experiencing significantly fewer days of poor physical and mental health.

Access to Care

Binary logit models were used for outcomes indicating whether a respondent had a personal doctor and whether they delayed care due to cost. For the ordinal outcome measuring the timing of last checkup, an ordered logit was used. Table 2 shows

the marginal effects of Medicaid expansion on access to care indicators. Individuals residing in expansion states experienced a statistically significant increase in the likelihood of having a personal doctor after 2014. The probability of receiving a routine checkup also increased among this group, while the probability of reporting cost-related barriers to care declined. The effects reflect an improvement in healthcare access linked to the expansion of Medicaid eligibility. Among the control variables, sex and education show consistent associations across models. Females are more likely to report having a personal doctor and attending regular checkups. Higher levels of education correlated with greater access to care, particularly in the probability of receiving preventative care. Race on the other hand shows disparities. White respondents consistently reported better access across all three outcomes compared to Black and Hispanic respondents. Income group effects further showed the barriers to care, with low-income groups reporting avoiding care due to the cost even after expansion. However, this gap narrowed post-2014.

Major Health Outcomes

All major health outcomes — self-reported diagnosis of diabetes, heart attack, and stroke — were modeled using binary logit regressions. Table 2 presents the estimated marginal effects of Medicaid expansion on major health outcomes. The probability of reporting a diabetes diagnosis increased slightly post-expansion in the treatment group, but the effect is not statistically significant. No statistically significant change in heart attack diagnosis was observed. Stroke reports also increased modestly among respondents in expansion states, although the effect remains statistically weak and sensitive to model specification.

In all outcomes, individual characteristics continued to show strong associations. Older respondents, males, and individuals with lower income levels were more likely to report chronic conditions such as diabetes or cardiovascular events. Education levels showed that those with higher levels of schooling were less likely to report

a history of stroke. These patterns align with established disparities in health status among demographic groups and support the inclusion of socioeconomic controls in evaluating treatment effects.

Table 2: Predicted Margins by Treatment Group for Key Health Outcomes

#	Outcome	Control, Pre	Control, Post	Treatment, Pre	Treatment, Post
1	Excellent Health	0.198 [0.192, 0.204]	0.187 [0.181, 0.194]	0.205 [0.196, 0.213]	0.190 [0.183, 0.197]
2	Physically Unhealthy Days	3.71 [3.54, 3.87]	3.92 [3.77, 4.07]	3.87 [3.72, 4.02]	4.13 [3.97, 4.29]
3	Mentally Unhealthy Days	3.74 [3.58, 3.90]	4.11 [3.93, 4.29]	4.04 [3.88, 4.20]	4.34 [4.18, 4.49]
4	Has Personal Doctor	0.810 [0.792, 0.827]	0.787 [0.768, 0.806]	0.820 [0.799, 0.841]	0.808 [0.787, 0.828]
5	Cost Barrier to Care	0.162 [0.151, 0.174]	0.150 [0.140, 0.159]	0.149 [0.138, 0.161]	0.127 [0.121, 0.133]
6	Routine Checkup Timing	0.665 [0.644, 0.686]	0.691 [0.674, 0.708]	0.682 [0.655, 0.710]	0.710 [0.690, 0.730]
7	Diabetes Diagnosis	0.092 [0.088, 0.097]	0.098 [0.093, 0.103]	0.087 [0.082, 0.092]	0.095 [0.089, 0.102]
8	Heart Attack	0.033 [0.030, 0.035]	0.033 [0.031, 0.035]	0.031 [0.029, 0.034]	0.032 [0.030, 0.035]
9	Stroke	0.023 [0.021, 0.024]	0.026 [0.024, 0.028]	0.021 [0.020, 0.023]	0.024 [0.023, 0.026]

Source: Behavioral Risk Factor Surveillance System (BRFSS), 2010 - 2018.

*Note: Values in brackets indicate 95% confidence intervals.

5. Conclusion

This study estimates the effect of Medicaid expansion on self-reported health, access to care, and major health conditions using a difference-in-differences framework. Results suggest that expansion states experienced improvements in several outcomes, including a higher likelihood of having a personal doctor and fewer cost-related barriers to care. Although changes in major health conditions such as diabetes, heart attack, and stroke were not statistically significant, the patterns may indicate a gradual trend toward improved prevention and earlier diagnosis. The findings highlight the policy's role in expanding access to care and reducing disparities among non-elderly adults.

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