1-1-2019

Differential Effects Of Medicaid Expansion On Racial/ethnic Disparities In Primary Care Access

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A Thesis Submitted to the
Yale School of Public Health
Social and Behavioral Sciences Concentration

for Candidacy for the Master of Public Health
in Social and Behavioral Sciences
to be awarded in 2019

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April 2019

Abstract

By providing health insurance to low-income and disabled children and adults, the United States' Medicaid program increases health care access and utilization by those with limited access to affordable private insurance. To increase coverage, the Affordable Care Act (ACA) helped fund state expansions of Medicaid's eligibility criteria to include low-income adults with incomes up to 138% of the Federal Poverty level. This paper examines the differential effects of Medicaid expansion on racial/ethnic disparities in primary care access using a quasi-experimental differences-in-differences design. Regression analyses consider low income adults (defined as below 138% FPL) ages 19-64. When analyzing both short term and longer-term effects, we found that those in expansion states experienced significant gains in health insurance, having personal doctors, and having the ability to afford health care post Medicaid expansion. There were no significant effects in regards to flu vaccination rates. We initially found that Medicaid expansion did not have differential effects between racial and ethnic groups on health insurance coverage. However, after controlling for state-by-race and year-by-race fixed effects, we found that non-Hispanic blacks and Hispanics benefitted significantly less than non-Hispanic whites (7.39 percentage points and 5.66 percentage points respectively). We also found that non-Hispanic blacks benefitted significantly less than non-Hispanic whites when examining affordability of care after Medicaid expansion. We conclude that the benefits of Medicaid expansion were not experienced equally across different racial and ethnic groups. Further research should evaluate more disaggregated racial and ethnic group categories to better understand the disparities at play to formulate tailored policy solutions and to better examine the "chilling effect".

Acknowledgements

I would like to acknowledge my advisor, Abby, for pushing me to complete a quantitative thesis and to learn Stata in a matter of a few months. Thank you for your guidance, your grace, your time, and your encouragement. I would also like to thank my community group at Vox Church, my roommates, and my Friday night crew for their continual support, prayer, patience, and accountability. Lastly, a huge thank you to my mom for supporting me every step of the way.

Table of Contents

Introduction

By providing health insurance to low-income and disabled children and adults, the United States' Medicaid program increases health care access and utilization by those with limited access to affordable private insurance (Grogan and Park 2017). To increase coverage, the Affordable Care Act (ACA) helped fund state expansions of Medicaid's eligibility criteria to include low-income adults with incomes up to 138% of the Federal Poverty level. To date, thirty-seven states (including Washington, D.C.) have expanded Medicaid, drastically reducing the U.S. uninsured rate while improving the affordability of care for and financial security of low-income populations (Blavin et al. 2018). 19.3% of Americans currently receive coverage through Medicaid (Kaiser Family Foundation 2018).

However, there is a concern that this program's benefits may have differed across races and ethnicities. A study in 2018 by Yue et al. assessed the racial/ethnic differential impacts of the ACA's Medicaid expansion on low-income, nonelderly adults' access to primary care. Among the full study population, Medicaid expansion saw statistically significant associations with increases in health insurance coverage, having personal doctors, and affordability. They did not find significant changes to the probability of receiving a flu shot. When assessing differential effects by race and ethnicity, they found that Hispanics received the fewest benefits for health insurance coverage. They also found increases in having personal doctors for non-Hispanic Black and non-Hispanic other populations, although these findings were not statistically significant.

Yue et al.'s findings for Hispanics coincide with recent evidence that regarding Hispanic participation in public programs related to undocumented individuals. Specifically, a recent study by Cohen and Schpero (2018) found that household immigration status may have undermined the "woodwork effect", in which enhanced knowledge and awareness of Medicaid increased enrollment

for eligible individuals in non-expansion states in recent years. This also supports the "chilling effect", in which recent immigration and welfare reforms discourage immigrants from accessing health, nutrition, and social services, including Medicaid (Batalova et al. 2018)[i]. The evidence surrounding the extent to which the "chilling effect" impacts Medicaid enrollment remains unclear.

Many other prior studies evaluated the immediate effects of Medicaid expansion. These studies found that Medicaid expansion had positive associations with increased insurance coverage, access to care, affordability of care, and health care utilization on both state and national levels (Sommers et al. 2015, Courtemanche et al. 2017, Blavin et al. 2018). However, the literature remains sparse on longer-term effects of Medicaid expansion on these outcomes. Additionally, few studies explore the effects of Medicaid expansion on reducing racial and ethnic disparities in coverage. Yet, even these studies only assess broad effects, comparing Non-Hispanic Whites to Non-Whites or analyzing racial and ethnic disparities across all income levels (Gonzales and Sommers 2018).

Therefore, we build upon the Yue et al. study to explore longer term effects of Medicaid expansion on health insurance coverage and other primary care outcomes using data from 2011 to 2017. Like the Yue et al. study, we compare Non-Hispanic Whites to Non-Hispanic Blacks, Hispanics, and Non-Hispanic Others. Many of these groups typically have larger proportions of low-income adults eligible for Medicaid under expansion; therefore, this study can more effectively identify policy priorities and more accurately determine the effects of Medicaid expansion on reducing disparities in coverage based on race and ethnicity.

Controlling for pre-expansion trends and considering policy-effects over several years post-expansion will clarify the policy's impact, allowing for potential delays in both policy implementation (due to administrative challenges) and consumer enrollment (Sommers et al. 2013). Based on Yue et al.'s results, we expect to find that the Medicaid expansion yielded increases in health insurance coverage, having a personal doctor, and affordability of care among low income, nonelderly adults.

We do not expect to find significant effects of Medicaid expansion on the probability of receiving a flu shot. We expect to find differential impacts based on race, with Non-Hispanic Whites benefiting more than other groups. However, we also hope to find gains for non-Hispanic Black and non-Hispanic Other populations for having a personal doctor. We do not expect to find significant differences between racial and ethnic groups for affordability of health care. Based on Cohen and Schpero's findings, we expect to see lower benefits among the Hispanic population relative to other racial and ethnic groups across all outcome variables possibly attributable to the "chilling effect".

This paper proceeds with the methodology employed, including the data and measures included, giving an overview of the characteristics of the study population. This also includes a the study design to assess the relationship between Medicaid expansion its differential effects on primary care access between racial and ethnic groups. The next section discusses the empirical findings and concludes.

Methodology

Data and Measures

We utilize the 2011 to 2017 waves of the Behavioral Risk Factor Surveillance System (BRFSS) to individual Medicaid eligibility based on the respondent's state and interview date. Nationally- and state-representative for non-institutionalized adults aged 18 and older, the BRFSS uses telephone interviews to collect information on health status, access to care, health behavior, demographic characteristics. The Centers for Disease Control and Prevention (CDC) assists state health departments in administering the BRFSS surveys continuously through each year. Random Digit Dialing (RDD) techniques are utilized to administer the survey. The survey was traditionally conducted using landlines but began using cell phones to interview respondents starting in 2011.

Our analytic sample excludes five states that expanded insurance coverage to low income adults prior to 2014[1]. We limit the study population to respondents between the ages of 18 and 65 with household incomes below 138% of the Federal Poverty level with no missing data. Data on the number of active primary care physicians and employment rates by state-year were also merged into the BRFSS dataset (AMA 2011, 2013, 2015, and 2017).

The primary dependent variable of interest is a binary indicator for having any health insurance coverage, based on answers to the BRFSS question, "Do you have any kind of health care coverage, including health insurance, prepaid plans such as HMOs or government plans such as Medicare, or Indian Health Service?". Other dependent variables of interest include binary indicators for "having personal doctors," "being unable to see doctors because of cost in the past 12 months," and "received a flu shot in the past 12 months."

Additional control variables included age, sex, marital status, self-reported general health condition, annual household income, race (Non-Hispanic white, Non-Hispanic Black, Hispanic, and Non-Hispanic Others), education level, employment status, English language fluency, number of children in the household, number of adults in the household, state primary physicians (per 100,000) and the average state unemployment mean.

Table 1 below shows the characteristics of low-income, non-elderly adults prior to Medicaid expansion for both sets of analyses. There were 16,483 observations in the non-expansion group and 14,359 observations in the expansion group using 2013 data (Table 1, columns 1-3). The population in the non-expansion states versus expansion states did not have significant differences in regards to age or employment statistics. However, there were statistically significant differences for all other outcome and demographic variables pre-Medicaid expansion (Table 1, column 3).

[1] Five states implemented Medicaid expansion or similar coverage expansion during 2010 and 2013, including District of Columbia, Delaware, Massachusetts, New York, and Vermont

Specifically, while 56.5% of low-income individuals in non-expansion states had health insurance coverage, this was true for 65.4% of low-income individuals in expansion states in 2013. 66.6% in non-expansion states had at least one personal doctor compared to 67.8% of low-income individuals in expansion states. The corresponding characteristics are 39.6% and 32.6% for the inability to see doctors due to the cost of care. Lastly, 30.8% of the study population in non-expansion states reported having received a flu shot, compared to 31.6% in expansion states.

Demographically, those in non-expansion states were more likely to be older, female, married, unemployed, an English language speaker, have fewer adults in the household, fewer active state primary care physicians, and a lower state unemployment rate compared to the population in expansion states in 2013. Demographics from the sensitivity check using income lower bounds were consistent in significance and direction with the main analysis (Appendix, Table A1, columns 1-3). As expected, there were more observations in this sample than in the sample using the upper income bounds, with 23,783 observations in the non-expansion group and 20,935 observations in the expansion group.

For the 2011-2017 data, there were 45,592 in the non-expansion group and 54,584 observations in the expansion group (Table 1, columns 4-6). The population in the non-expansion states versus expansion states did not have significant differences in regards to having personal doctors, employment status, or number of children in the household. However, there were statistically significant differences for all other outcome and demographic variables pre-Medicaid expansion.

Focusing on the dependent variables of interest shows statistically significant differences. Prior to Medicaid's expansion, 53.5% in non-expansion states had health insurance coverage, as compared to 63.3% of those in expansion states. For inability to see a doctor due to cost, the

corresponding statistics are 40.8% and 33.4% For expansion and non-expansion states, respectively, 28.1% and 29.0% of low-income adults under-age-65 received a flu shot in the past 12 months.

In terms of demographics, respondent ages, self-reported health, household income, sex, education, race, marital status, number of adults in the household, and non-English speaking status all differed significantly between expansion and non-expansion states, as did the state unemployment rate and primary care physicians per capita (See Table 2, column 6). In particular, expansion state respondents are more likely to be male, younger, unmarried, and non-English language speakers, and face a higher unemployment rate and greater physicians per capita.

Study Design

Using a quasi-experimental difference-in-differences design, the independent variable of interest is an interaction between two binary indicators: whether the respondent lives in a state that expanded Medicaid ($Expansion_s$) and whether that expansion had occurred by the respondent's interview date ($Post_{ts}$).[2] Of the 25 expansion states included in this study, 20 expanded Medicaid on January 1st, 2014[3], while five afterwards in the years 2014[4] or 2015[5]. By controlling for time trends and state fixed effects, this specification compares the dependent variable in states that did versus did not expand Medicaid, before versus after that expansion occurred, in order to estimate the policy's effect on each outcome.

To compare respondent behavior in Medicaid expansion and non-expansion states before and after the expansions occurred, a linear regression estimates the following difference-in-differences specification:

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[2] There were 25 expansion states and 21 non-expansion states[2]. The expansion states included all states that expanded Medicaid on January 1st, 2014[2], as well as five additional states that expanded Medicaid in the middle of 2014[2] and in 2015[2]. Five states that expanded insurance coverage to low income adults prior to 2014 were excluded from this study[2].
[3] States that expanded Medicaid on January 1, 2014 include Arizona, Arkansas, California, Colorado, Connecticut, Hawaii, Illinois, Iowa, Kentucky, Maryland, Minnesota, Nevada, New Jersey, New Mexico, North Dakota, Ohio, Oregon, Rhode Island, Washington, and West Virginia
[4] States that expanded Medicaid in 2014 after January 1 include Michigan (4/1/2014) and New Hampshire (8/15/2014)
[5] States that expanded Medicaid in 2015 include Pennsylvania (1/1/2015), Indiana (2/1/2015), and Alaska (9/1/2015)

$$Y = \beta_0 + \beta_1 * Expansion_s * Post_{ts} + \partial * \mathbf{X_{i,s,t}} + \pi_S + \mu_t + \varepsilon.$$

$Expansion_{s,t}$ is a binary indicator for states *s* that expanded Medicaid in year *t*, with state fixed effects (π_S) adjusting for time-invariant state characteristics and year fixed effects (μ_t) adjusting for common time trends. Additional covariates control for the following respondent and state demographics ($X_{i,s,t}$): age, sex, race, education level, marital status, employment rate, number of adults in household, average number of children and adults in the household, language of the interview, self-reported health status, state fixed effects, the state-year specific unemployment rate, and the state-year specific number of primary care physicians per 10,000 people. Year fixed effects and cell phone use are also added into covariate controls for the 2011-2017 analysis, as Yue et al. seemed to exclude year fixed effects and cell phone users.

Two sets of analyses are considered. First, Yue et al's results are replicated using the 2013 and 2015 data, with sensitivity checks testing whether their results are sensitive to how individuals' FPL is estimated. The units of this analysis are individuals in each survey wave. Specifically, Yue et al. used upper bounds of the BRFSS's (categorical) income variable to define each respondent's household FPL.[6] Sensitivity checks use the lower bound of income categories instead.[7]

Following Yue et al.'s methodology, separate survey weighted difference-in-differences models were estimated for each racial and ethnic group: non-Hispanic White, non-Hispanic Black, Hispanic, and non-Hispanic Other. The corresponding treatment effects were compared to analyze if and how Medicaid expansion had differential effects between different these groups. To formally

[6] For example, in 2015, 138 percent FPL for a household size of three is $20,090. Thus, respondents with a household size of three and annual income "less than $10,000" or "$10,000 to $15,000" or "$15,000 to $20,000" were coded as "low-income", and all other respondents with a household size of three in 2015 were coded as "not low-income."

[7] Using the same example as above, in 2015, 13 percent FPL for a household size of three is $20,090. Thus, respondents with a household size of three and annual income "less than $10,000", "$10,000 to $15,000". "$15,000 to $20,000", or "$20,000 to $25,000" were coded as "low-income", and all other respondents with a household size of three in 2015 were coded as "not low-income."

test whether the difference-in-differences estimates differed among racial/ethnic groups, a formal test of proportions was run. Additionally, all analyses were checked with a difference-in differences model that analyzed effects of Medicaid expansion on outcomes by state, for the full analytic sample.

The next set of analyses uses data from 2011 through 2017, coding states that expanded Medicaid after 2015 and before 2018 as expansion states. This survey weighted analysis utilizes upper income bounds and includes cell phone survey respondents previously excluded in Yue et al's analysis [8]. The units of this analysis are individuals in each survey wave. In this analysis, we run three different regressions. The first only includes state and year fixed effects to analyze the impacts of Medicaid expansion on the full analytic sample. The other regressions use a three-way interaction term (Expansion*Post*Race) to examine whether these difference-in-difference coefficients have differential effects by race/ethnicity compared to the reference group (non-Hispanic Whites). The second regression includes state and year fixed effects as well as state-by-race fixed effects to assess the differential effects of Medicaid expansion. The third regression builds upon the second by including year-by-race fixed effects. Because not all adults eligible for Medicaid successfully enrolled, all analyses explore the intent-to-treat effects of Medicaid expansion. All analyses were conducted using Stata, version 15.1.

Results

Findings from 2013 and 2015 Analysis

Table 2 reproduces Yue et al's analysis. The adjusted difference-in-differences estimates use 2013 and 2015 data and explores the impacts of Medicaid expansion on binary outcome variables for low-income, non-elderly adults in the U.S. Following Yue et al.'s methodology, income is coded based on the upper bounds of the BRFSS income group ranges. Results are given for the overall

[8] States that expanded Medicaid between 2015 and 2018 include Montana (1/1/2016) and Louisiana (7/1/2016)

sample as well as for each race/ethnicity category. All estimates were from linear probability regression with survey weights, adjusted for covariates.

Findings are largely consistent with those of Yue et al., in terms of both direction and statistical significance (Table 2). Analysis from the sensitivity check using income lower bounds can be found in Appendix Table 2A. For our primary health insurance coverage variable (Table 2, column 1), Medicaid expansion yielded a statistically significant 8.85 percentage-point increase in health insurance coverage for the full analytic sample. Non-Hispanic Whites benefitted the most, with a significant 13.44 percentage point increase in health insurance coverage. No other racial/ethnic group saw a significant increase. In fact, Hispanics and non-Hispanic others had a decrease in health insurance coverage, though not significant.

In terms of having personal doctors (Table 2, column 2), there was an overall 5.14 percentage point increase. This increase was significant for Non-Hispanic Blacks (15.71%), but not for any other race/ethnicity. For affordability of care (Table 2, column 3), the full sample saw a 5.81 percentage point decrease in the inability to see doctors due to cost of care. This was significant for Non-Hispanic whites only (6.41%). There was an insignificant decrease in the probability of receiving a flu shot for the full sample. Non-Hispanic whites saw an increase, and all other racial/ethnic groups had a decrease, though none of these coefficients were significant (Table 2, column 4).

Findings from 2011-2017 Analysis

Tables 3, 4, 5, and 6 present the results from the regressions analyzing the impacts of Medicaid expansion on our outcome variables. Each table shows results for one outcome variable. For all four tables, column 1 represents the general model with state and year fixed effects. Column 2 represents the results utilizing the triple interaction term. Column 3 represents the analysis from column 2 with added state-by-race and year-by-race fixed effects.

Current Insurance Status

Table 3 presents the analyses considering our primary outcome variable of health insurance coverage using data from 2011 through 2017. Regression results including covariate controls can be found in Table A3 in the Appendix. In all three regressions, we find a significant increase in overall health insurance coverage rates for the full analytic sample due to Medicaid expansion. This increase was 6.83, 6.93, and 9.92 percentage points respectively (Table 3, columns 1-3). We initially found that Medicaid expansion did not have differential effects between racial and ethnic groups on health insurance coverage (Table 3, column 2). However, after controlling for state-by-race and year-by-race fixed effects, we found that non-Hispanic blacks and Hispanics benefitted significantly less than non-Hispanic whites (7.39 percentage points and 5.66 percentage points respectively). Respondents in the non-Hispanic other category also benefitted less than non-Hispanic whites, though this difference was not statistically significant.

Having Personal Doctors

Table 4 presents the 2011-2017 analyses considering the effects of Medicaid expansion on having personal doctor. Regression results including covariate controls can be found in Appendix Table A4. For all three regressions, we find that Medicaid expansion was associated with a statistically significant increase in having personal doctors for the full analytic sample (Table 4, columns 1-3). These increases are 5.15, 3.23, and 3.57 percentage points respectively. Before controlling for state-by-race and year-by-race fixed effects, we found that Non-Hispanic blacks and non-Hispanic others had a greater increase in having personal doctors compared to non-Hispanic whites, though these differences were not statistically significant (Table 4, column 2). Additionally, we found that Hispanics had a 5.92 significant percentage point gain compared to non-Hispanic whites in this analysis. However, when we controlled for state-by-race and year-by-race fixed effects, Hispanics no longer had a significant benefit compared to non-Hispanic whites (Table 4, column 3).

The differences between the other racial and ethnic groups and the reference group remained insignificant.

Affordability

Findings from analyses exploring the effects of Medicaid expansion on the ability to afford care can be found in Table 5. Appendix Table A5 shows regression results including covariate controls. All regressions show a significant decrease in the inability to see doctors due to cost of care. These decreases are 5.05, 6.22, and 6.26 percentage points respectively. For the analyses with and without state-by-race fixed effects and year-by-race fixed effects, non-Hispanic blacks benefitted significantly less than non-Hispanic whites in both regression models. These differences were 3.89 and 6.79 percentage points respectively. All other racial and ethnic groups saw no significant differences when compared to the reference group in regards to the affordability of their health care.

Flu Shot

The regression results considering for the flu shot outcome are found in Table 6. Results including all covariate controls can be found in Appendix Table A6. None of the analyses show significant impacts of Medicaid expansion on the probability that a respondent received a flu shot. Additionally, there were no significant differences between non-Hispanic whites and any other racial/ethnic group.

Discussion

This study examined the impacts of Medicaid expansion on health insurance coverage and access to primary care among low income non-elderly adults in the U.S. This study also analyzed the differential effects of Medicaid expansion on racial and ethnic disparities in evaluating these outcomes.

When analyzing both short term and longer-term effects, we found that those in expansion states experienced significant gains in health insurance, having personal doctors, and having the

ability to afford health care. However, there were no significant effects in regards to flu vaccination rates. However, we also found that these benefits were not experienced equally across different racial and ethnic groups.

In regards to health insurance coverage, non-Hispanic whites benefited significantly more than non-Hispanic blacks and Hispanics. Other racial and ethnic groups saw greater gains in having personal doctors compared to non-Hispanic whites, but this difference was not statistically significant. Non-Hispanic whites also benefitted significantly more than non-Hispanic blacks in terms of affordability of health care. This was true between non-Hispanic whites and the other racial groups as well, though not statistically significant. There were no significant effects of Medicaid expansion on flu shot vaccination rates.

And thus, non-Hispanic Whites benefited significantly more than other racial groups overall. Though not significant, the significant decreases in health insurance coverage rates after Medicaid expansion for Hispanics continue to support the "chilling effect" hypothesis. However, due to the lack of significance in the other outcome analyses and inability to assess immigration status, the association remains unclear.

This study had several additional limitations. We were only able to examine the intent to treat effects of Medicaid enrollment based on eligibility criteria as opposed to studying actual Medicaid enrollees. This is because the primary outcome variable, health insurance coverage, only asked if respondents have any insurance and did not ask about which specific type of insurance they had. Thus, the results may include individuals who qualified for Medicaid but did not enroll, leading to biased findings.

Furthermore, the broad race and ethnicity categories of the BRFSS data set do not allow for more nuanced analyses of differences within each racial and ethnic group. This can mask the realities of different people groups in the U.S. The BRFSS also did not ask about immigration status, which

may influence our analyses, especially for "Hispanics" and "Non-Hispanic Other race" categories when analyzing the "chilling effect". For example, 42% of Asian American and Pacific Islander immigrants are non-citizens and were considered "Non-Hispanic Other Race" (Batalova et al. 2018). Thus, future studies should look to disaggregate within each racial and ethnic group and by immigration status. This would paint a more nuanced and realistic picture of health care access in the U.S. and further explore the chilling effect hypothesis.

Additionally, difficulties arose in determining household size. Per Yue et al.'s methodology, household size was calculated as the sum of the number of self-reported adults in a household and the number of children in a household. This calculation may not accurately portray a household as defined by the Internal Revenue Service and Federal Poverty Guidelines. Though the BRFSS survey included a variable that could attribute the relationships between children to adults in a household, 85% of survey respondents had missing data for this variable. Thus it would not have been effective in determining true household size. Furthermore, the variable utilized by Yue et al. to determine number of adults in a household only applied to landline users. Additionally, the variable for number of household adults in cell phone surveys was not introduced until 2013 and may have led to inconsistencies in the findings. Furthermore, the BRFSS survey has become increasingly administered by cellular phone, which may further impact the findings from earlier years of the analysis.

These issues further complicated the determination of low-income individuals. As previously mentioned, the BRFSS's household income variable had categorical income ranges and did not align with Medicaid expansion eligibility criteria (138% FPL). Hence, the first analysis in this paper evaluates the effects of Medicaid expansion on low income individuals as determined by both the upper- and lower-income bounds. Low income status was attributed to individuals based on household size and self-reported income; however, many observations had missing data for one or

both variables. These respondents were dropped from the study, and thus our sample may not be as representative of the study population had those data points been kept.

For the remaining population, the difference-in-differences analyses controlled for covariates in addition to demographic criteria. These variables included state-level unemployment rate and number of active primary care physicians in order to account for physician supply and macroeconomic effects. However, other confounding factors not accounted for in this model could have skewed results. Additionally, recall bias and human could have biased results, as the BRFSS survey largely depends on self-reporting. Moreover, we analyzed pre-expansion trends and found several significant trends by outcome and racial group, which suggests that the findings from this analysis may not be causal. However, this does not mean that the associations are not significant.

This paper seeks to evaluate disparities in health insurance coverage; however, the literature between health insurance and health outcomes as well as quality of care remains uncertain. As marginalized populations face unique determinants, such as their culture, citizenship status, dominant language, the impacts of health care on health outcomes for communities of color are influenced by the systems and individuals providing the care (Hall et al. 2015). Further research must more rigorously evaluate the effects of increased coverage rates for people of color on health outcomes and quality of health care provided.

Conclusion

Despite all of these limitations, our analysis not only confirms but also builds upon previous findings that Medicaid expansion had significant broad effects on health insurance coverage, having personal doctors, and health care affordability. We found these associations to be true both immediately after Medicaid expansion as well as longer term through 2017. Despite these blanket effects, we also found that Medicaid expansion differentially impacted outcomes for different racial/ethnic groups. Non-Hispanic Whites had the most significant benefits compared to all other

races, especially in regards to increases in insurance coverage rates and ability to afford health care. There is mixed evidence on the positive effects of Medicaid expansion on non-Hispanic black, Hispanic, and non-Hispanic other populations. And thus, though the goals of Medicaid expansion centered around improving health care access for previously marginalized populations, evidence suggests that these goals may not have been realized. Additionally, this paper highlights the need to add in appropriate controls that bias results. In our case, we controlled for state-by-race and year-by-race fixed effects. Further studies should examine more disaggregated racial and ethnic groups, and additional studies are necessary to explore the chilling effect hypothesis.

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Table 1: Sample Characteristics Prior to Medicaid Expansion

Data:	2013			2011-2017		
	Non-expansion States	Expansion States	p-value for comparison test	Non-expansion States	Expansion States	p-value for comparison test
	(1)	(2)	(3)	(4)	(5)	(6)
Outcomes (%)						
Health insurance coverage	56.5	65.4	<0.001**	53.5	63.3	<0.001**
Having personal doctors	66.6	67.8	<0.001**	66.0	66.3	0.281
Unable to see doctors due to cost	39.8	32.6	<0.001**	40.8	33.4	<0.001**
Received a flu shot	30.8	31.6	<0.001**	28.1	29.0	0.047*
Covariates						
Age (m, SD)	44.6 (0.24)	43.3 (0.26)	0.156	43.1 (0.14)	41.3 (0.13)	<0.001**
Female (%)	60.7	57.5	<0.001**	58.2	56.9	<0.001*
Married (%)	32.9	31.5	0.008*	39.9	36.9	<0.001*
General health (%)			<0.001**			<0.001***
Excellent	10.1	10.7		13.0	10.1	
Very good	17.5	18.4		22.7	24.6	
Good	34.6	34.0		34.7	34.1	
Fair	23.4	25.0		19.8	19.6	
Poor	13.4	11.8		10.8	11.5	
Annual household income (n, %)			0.042*			0.032***
<10,000	20.6	24.4		21.5	24.6	
<15,000	21.3	21.1		21.3	21.0	
<20,000	26.1	24.0		26.7	23.2	
<25,000	22.5	20.7		21.7	20.2	
<35,000	8.6	8.5		8.2	9.9	
<50,000	0.8	1.3		0.6	1.2	
<75,000	0.1	0.1		0.0	0.0	
Race (n, %)			<0.001**			<0.001***
White, non-Hispanic	49.2	50.0		48.6	45.5	
Black, non-Hispanic	26.6	11.1		23.1	13.2	
Hispanic	22.7	37.9		23.1	33.3	
Others, non-Hispanic	1.5	1.0		5.1	7.9	
Education level (n, %)			<0.001***			<0.001***
Some High School	31.3	32.9		30.8	32.1	
HS Graduate	35.8	33.9		35.7	34.3	
Attended college or technical school	25.5	25.4		24.6	25.6	
College graduate	7.4	7.7		7.0	7.9	
Employed (%)	39.8	40.5	0.552	40.1	42.0	0.260

English language speaker (%)	86.8	81.6	<0.001*	14.7	20.4	<0.001*
Number of children in household (n, SD)	1.2 (0.03)	1.2 (0.03)	0.001**	1.2 (0.02)	1.3 (0.01)	0.163
Number of adults in household (n, SD)	2.6 (0.03)	2.7 (0.03)	0.002**	2.5 (0.01)	2.7 (0.01)	<0.001**
State active primary care physicians (per 100,000) (SD)	79.2 (0.13)	92.4 (0.10)	<0.001**	79.1 (0.08)	91.8 (0.05)	<0.001**
State unemployment rate (mean)	6.9 (0.01)	8.1 (0.01)	0.001**	7.9 (0.01)	9.0 (0.01)	<0.001**
N	16,483	14,359		45,592	54,584	

Notes*:* The unweighted sample size was restricted to adults ages 19-64 with income levels below 138% of the Federal Poverty Line prior to Medicaid expansion. Income upper bound categories were utilized to identify "low income" observations. Weighted statistics included survey weights. SD denotes standard error. Data sources: analysis of 2011-2017 Behavioral Risk Factor Surveillance System (BRFSS), 2011-2017 AAMC State Physician Workforce Data Book, and 2011-2017 Local Area Unemployment Statistics. Comparison tests included two sample test of proportions for binary variables, two sample t-tests for continuous variables, and χ^2 test for categorical variables. *p<0.05.

Table 2. Difference-in-Differences Estimates of Effects of Medicaid Expansion on Access to Primary Care by Race, 2013 & 2015 Coefficient/(Standard Error)

	Having health insurance	Having personal doctors	Unable to see doctors due to cost	Received flu shot
	(1)	(2)	(3)	(4)
Full analytic sample	8.85* 0.02	5.14* (0.02)	-5.81* (0.02)	-0.52 (0.02)
Non-Hispanic White	13.44* (0.02)	2.10 (0.02)	-6.41* (0.02)	4.96 (0.03)
Non-Hispanic Black	9.42 (0.06)	15.71* (0.07)	-6.55 (0.05)	-9.79 (0.05)
Hispanic	-0.88 (0.06)	3.50 (0.04)	-6.00 (0.06)	-5.66 (0.04)
Non-Hispanic Others	-0.93 (0.06)	6.57 (0.09)	-8.76 (0.06)	-4.84 (0.08)

Notes: Survey weighted linear probability models use data from the 2013 and 2015 waves of BRFSS to analyze how Medicaid expansions related to health insurance coverage rates, having personal doctors, inability to see doctors due to cost, and probability of receiving a flu shot, by race and ethnicity. The sample included adults ages 19-26 with income less that 138% of the Federal Poverty Line. Income upper bound categories were utilized to identify "low income" observations. Controls not listed include state fixed effects, age, sex, marital status, self-reported general health status, education status, employment status, language of the interview, number of children in household, number of adults in household, state-year specific unemployment rate, and state-year specific number of primary care physicians per 100,000 people. SEs are clustered at the state level..* $p<0.05$

Table 3. Difference-in-Differences Estimates of Effects of Medicaid Expansion on Insurance Coverage by Race, 2011-2017 Coefficient/(Standard Error)

	Current Insurance Status		
	(1)	(2)	(3)
Expansion*Post	0.0683**	0.0693**	0.0992**
	(0.016)	(0.021)	(0.016)
Expansion*Post*Non-Hispanic Black		-0.0237	-0.0739*
		(0.017)	(0.032)
Expansion*Post*Hispanic		0.0153	-0.0566*
		(0.020)	(0.026)
Expansion*Post*Non-Hispanic Other		-0.0271	-0.0380
		(0.032)	(0.046)
Expansion state	0.0611**	0.0614**	-0.0393
	(0.021)	(0.021)	(0.073)
Constant	0.1949	0.1943	0.5955*
	(0.100)	(0.098)	(0.269)
State & Year Fixed Effects?	Yes	Yes	Yes
State-by-Race Fixed Effects?	No	No	Yes
Year-by-Race Fixed Effects?	No	No	Yes
N	137709	137709	137709
Adjusted R^2	0.101	0.101	0.115

Notes: Survey weighted linear probability models use data from the 2011 through 2017 waves of BRFSS to how Medicaid Expansions related to health insurance, by race and ethnicity. Controls not listed include state fixed effects, year fixed effects, age, sex, marital status, self-reported general health status, education status, employment status, language of the interview, number of children in household, number of adults in household, state-year specific unemployment rate, and state-year specific number of primary care physicians per 100,000 people. Full regression results can be found in Appendix. Reference group includes individuals who are male, not married, in poor health status, have a household income of <$10,000, did no graduate high school, are not employed, and speak English. SEs are clustered at the state level. * $p<0.05$, ** $p<0.01$

Table 4: Difference-in-Differences Estimates of Effects of Medicaid Expansion on Having Personal Doctors by Race, 2011-2017 Coefficient/(Standard Error)

	Having a personal doctor		
	(1)	(2)	(3)
Full analytic sample	0.0515**	0.0323*	0.0357*
	(0.014)	(0.013)	(0.016)
Non-Hispanic Black		0.0178	0.0272
		(0.017)	(0.031)
Hispanic		0.0592**	0.0310
		(0.013)	(0.039)
Non-Hispanic Other		0.0112	-0.0121
		(0.021)	(0.052)
Constant	0.3078**	0.3123**	0.4113**
	(0.066)	(0.064)	(0.129)
State & Year Fixed Effects?	Yes	Yes	Yes
State-by-Race Fixed Effects?	No	No	Yes
Year-by-Race Fixed Effects?	No	No	Yes
N	137709	137709	137709
Adjusted R^2	0.118	0.119	0.127

Notes: Survey weighted linear probability models use data from the 2011 through 2017 waves of BRFSS to how Medicaid Expansions related to having personal doctors by race and ethnicity. Controls not listed include state fixed effects, year fixed effects, age, sex, marital status, self reported general health status, education status, employment status, language of the interview, number of children in household, number of adults in household, state-year specific unemployment rate, and state-year specific number of primary care physicians per 100,000 people. Full regression results can be found in the Appendix. Reference group includes individuals who are male, not married, in poor health status, have a household income of <$10,000, did no graduate high school, are not employed, and speak English. SEs are clustered at the state level. * $p<0.05$, ** $p<0.01$

Table 5: Difference-in-Differences Estimates of Effects of Medicaid Expansion on Inability to See Doctor Due to Cost of Care by Race, 2011-2017 Coefficient/(Standard Error)

	Unable to See Doctor Due to Cost of Care		
	(1)	(2)	(3)
Expansion*Full analytic sample	-0.0505**	-0.0622**	-0.0626**
	(0.015)	(0.013)	(0.014)
Expansion*Non-Hispanic Black		0.0389**	0.0679**
		(0.013)	(0.022)
Expansion*Hispanic		0.0154	0.0083
		(0.024)	(0.027)
Expansion*Non-Hispanic Others		0.0327	0.0045
		(0.026)	(0.045)
Constant	0.5973**	0.6004**	-0.1173
	(0.059)	(0.058)	(0.263)
State & Year Fixed Effects?	Yes	Yes	Yes
State-by-Race Fixed Effects?	No	No	Yes
Year-by- Race Fixed Effects?	No	No	Yes
N	137709	137709	137709
Adjusted R^2	0.051	0.051	0.060

Notes: Survey weighted linear probability models use data from the 2011 through 2017 waves of BRFSS to how Medicaid Expansions related to the inability to see doctor due to cost of care, by race and ethnicity. Controls not listed include state fixed effects, year fixed effects, age, sex, marital status, self reported general health status, education status, employment status, language of the interview, number of children in household, number of adults in household, state-year specific unemployment rate, and state-year specific number of primary care physicians per 100,000 people. Full regression results can be found in the Appendix. Reference group includes individuals who are male, not married, in poor health status, have a household income of <$10,000, did no graduate high school, are not employed, and speak English. SEs are clustered at the state level. * $p<0.05$, ** $p<0.01$

Table 6: Difference-in-Differences Estimates of Effects of Medicaid Expansion on Probability of Receiving a Flu Shot by Race, 2011-2017 Coefficient/(Standard Error)

	Received a Flu Shot		
	(1)	(2)	(3)
Expansion*Post	-0.0088	-0.0213	0.0033
	(0.013)	(0.013)	(0.015)
Expansion*Post*Non-Hispanic Black		0.0287	-0.0053
		(0.025)	(0.028)
Expansion*Post*Hispanic		0.0232	-0.0391
		(0.014)	(0.029)
Expansion*Post*Non-Hispanic Other		0.0326	-0.0093
		(0.021)	(0.035)
Constant	0.2426**	0.2457**	0.9748**
	(0.077)	(0.077)	(0.171)
State & Year Fixed Effects?	Yes	Yes	Yes
State-by-Race Fixed Effects?	No	No	Yes
Year-by-Race Fixed Effects?	No	No	Yes
N	137709	137709	137709
Adjusted R^2	0.033	0.033	0.043

Notes: Survey weighted linear probability models use data from the 2011 through 2017 waves of BRFSS to how Medicaid Expansions related to the inability to see doctor due to probability that the participant received a flu shot, by race and ethnicity. Controls not listed include state fixed effects, year fixed effects, age, sex, marital status, self reported general health status, education status, employment status, language of the interview, number of children in household, number of adults in household, state-year specific unemployment rate, and state-year specific number of primary care physicians per 100,000 people. Full regression results can be found in the Appendix. Reference group includes individuals who are male, not married, in poor health status, have a household income of <$10,000, did no graduate high school, are not employed, and speak English. SEs are clustered at the state level. * $p<0.05$, ** $p<0.01$

Appendix

Table A1: Sample Characteristics Prior to Medicaid Expansion in 2013 (Specificity Check)

	Non-Expansion States	Expansion States	p-value for comparison tests
	(1)	(2)	(3)
Observations (n)			
Outcomes (n, %)			
Health Insurance Coverage	60.8	68.2	<0.001*
Having Personal Doctors	69.4	70.2	<0.001*
Unable to see doctors because of cost	36.1	30.3	<0.001*
Received a flu shot	31.5	31.8	<0.001*
Covariates			
Age (n, SD)	45.1 (0.20)	44.0 (0.21)	0.094
Female (n, %)	59.7	57.2	<0.001*
Married (n, %)	46.0	46.4	<0.001*
General health (n, %)			<0.001*
Excellent	10.6	11.2	
Very good	20.2	21.3	
Good	34.9	34.6	
Fair	22.0	22.8	
Poor	11.4	10.0	
Annual household income (n, %)			0.416
<10,000	14.8	17.3	
<15,000	15.2	15.0	
<20,000	21.3	19.6	
<25,000	23.9	20.8	
<35,000	17.0	17.3	
<50,000	6.9	9.4	
<75,000	0.5	0.6	
Race (n, %)			<0.001*
White, non-Hispanic	53.1	53.7	
Black, non-Hispanic	25.1	10.7	
Hispanic	20.4	34.6	
Others, non-Hispanic	1.4	1.0	
Education level (n, %)			<0.001*
Did not graduate high school	27.0	28.7	
Graduated high school	35.7	34.3	
Attended college or technical school	28.3	27.6	
Graduated from college or technical school	9.0	9.3	
Employed (n, %)	44.6	45.2	0.771
English language speaker (n, %)	88.7	84.0	<0.001*

Number of children in household (n, SD)	1.1 (0.02)	1.2 (0.02)	0.001*
Number of adults in household (n, SD)	2.5 (0.02)	2.7 (0.02)	<0.001*
State primary physicians (per 100,000) (SD)	79.4 (0.10)	92.4 (0.08)	<0.001*
State unemployment rate (mean)	6.9 (0.01)	8.0 (0.01)	<0.001*
N	23,783	20,935	

Notes*:* The unweighted sample size was restricted to adults ages 19-64 with income levels below 138% of the Federal Poverty Line prior to Medicaid expansion. Income lower bound categories were utilized to identify "low income" observations. Weighted statistics included survey weights. SD denotes standard error. Data sources: analysis of 2011-2017 Behavioral Risk Factor Surveillance System (BRFSS), 2011-2017 AAMC State Physician Workforce Data Book, and 2011-2017 Local Area Unemployment Statistics. Comparison tests included two sample test of proportions for binary variables, two sample t-tests for continuous variables, and χ^2 test for categorical variables. *$p<0.05$.

Table A2. Difference-in-Differences Estimates of Effects of Medicaid Expansion on Access to Primary Care by Race using Lower Income Bounds, 2013 & 2015 Coefficient/(Standard Error)

	Having health insurance	Having personal doctors	Unable to see doctors due to cost	Received flu shot
	(1)	(2)	(3)	(4)
Full analytic sample	6.41* (0.02)	5.66* (0.02)	-4.49* (0.01)	-0.47 (0.02)
Non-Hispanic White	10.02* (0.02)	2.74 (0.02)	-3.74* (0.02)	2.42 (0.03)
Non-Hispanic Black	5.27 (0.04)	14.61* (0.05)	-6.69 (0.04)	-4.59 (0.04)
Hispanic	1.44 (0.06)	7.77 (0.05)	-6.88 (0.06)	-4.02 (0.03)
Non-Hispanic Others	-3.50 (0.07)	-2.02 (0.08)	-7.29 (0.05)	-3.08 (0.06)

Notes: Survey weighted linear probability models use data from the 2013 and 2015 waves of BRFSS to analyze how Medicaid expansions related to health insurance coverage rates, having personal doctors, inability to see doctors due to cost, and probability of receiving a flu shot, by race and ethnicity. The sample included adults ages 19-26 with income less that 138% of the Federal Poverty Line. Income lower bound categories were utilized to identify "low income" observations. Controls not listed include state fixed effects, age, sex, marital status, self reported general health status, education status, employment status, language of the interview, number of children in household, number of adults in household, state-year specific unemployment rate, and state-year specific number of primary care physicians per 100,000 people. SEs are clustered at the state level. *p<0.05 ** p<0.01

Table A3: Difference-in-Differences Estimates of Effects of Medicaid Expansion on Insurance Coverage by Race, 2011-2017 Coefficient/(Standard Error)

	Current Insurance Status		
	(1)	(2)	(3)
Full analytic sample	0.0683**	0.0693**	0.0992**
	(0.016)	(0.021)	(0.016)
Non-Hispanic Black		-0.0237	-0.0739*
		(0.017)	(0.032)
Hispanic		0.0153	-0.0566*
		(0.020)	(0.026)
Non-Hispanic Other		-0.0271	-0.0380
		(0.032)	(0.046)
Expansion state	0.0611**	0.0614**	-0.0393
	(0.021)	(0.021)	(0.073)
Controls			
Interview Year			
2012	-0.0195	-0.0195	0.0125
	(0.016)	(0.016)	(0.014)
2013	0.0194	0.0194	0.0155
	(0.012)	(0.012)	(0.011)
2014	0.0825	0.0825	0.0917*
	(0.054)	(0.054)	(0.039)
2015	0.1454**	0.1449**	0.1296**
	(0.031)	(0.030)	(0.024)
2016	0.1577**	0.1580**	0.1334**
	(0.032)	(0.032)	(0.028)
2017	0.1703**	0.1709**	0.1345**
	(0.037)	(0.037)	(0.032)
2018	0.1438	0.1427	0.2343**
	(0.091)	(0.092)	(0.075)
Age	0.0021**	0.0021**	0.0022**
	(0.000)	(0.000)	(0.000)
Female	0.0427**	0.0425**	0.0442**
	(0.007)	(0.007)	(0.007)
Married	0.0122	0.0123	0.0147
	(0.008)	(0.008)	(0.008)
General Health Status			0.0000
Fair	-0.0849**	-0.0850**	-0.0862**
	(0.011)	(0.011)	(0.011)
Good	-0.1227**	-0.1228**	-0.1232**
	(0.011)	(0.011)	(0.011)
Very Good	-0.1203**	-0.1205**	-0.1262**
	(0.012)	(0.012)	(0.012)
Excellent	-0.1139**	-0.1139**	-0.1187**
	(0.013)	(0.013)	(0.013)
Annual household income			

<$15,000	0.0273**	0.0272**	0.0296**
	(0.007)	(0.007)	(0.007)
<$20,000	-0.0035	-0.0036	0.0040
	(0.007)	(0.007)	(0.006)
<$25,000	0.0440**	0.0437**	0.0521**
	(0.013)	(0.013)	(0.012)
<$35,000	0.1003**	0.1002**	0.1028**
	(0.015)	(0.015)	(0.014)
<$50,000	0.0639	0.0636	0.0610
	(0.035)	(0.035)	(0.033)
<$75,000	0.1154	0.1193	0.1396
	(0.119)	(0.119)	(0.114)
Race			
Non-Hispanic Black	0.0132	0.0160	0.0042
	(0.008)	(0.008)	(0.013)
Hispanic	-0.0305**	-0.0327**	0.2069**
	(0.011)	(0.012)	(0.014)
Non-Hispanic	0.0145	0.0191	0.0096
Other	(0.019)	(0.024)	(0.013)
Education Level			0.0000
Graduated high school	0.0311**	0.0313**	0.0319**
	(0.008)	(0.008)	(0.008)
Attended college or technical school	0.0360**	0.0361**	0.0376**
	(0.006)	(0.006)	(0.005)
Graduated from college or technical school	0.0533**	0.0535**	0.0583**
	(0.008)	(0.008)	(0.008)
Employed	-0.0387**	-0.0387**	-0.0397**
	(0.008)	(0.008)	(0.008)
Not an English Speaker	-0.1706**	-0.1705**	-0.1768**
	(0.043)	(0.042)	(0.038)
Number of children in household	0.0051	0.0052	0.0049
	(0.004)	(0.004)	(0.004)
Number of adults in household	-0.0164**	-0.0164**	-0.0179**
	(0.002)	(0.002)	(0.002)
State active primary physicians (per 100,000)	0.0033**	0.0033**	-0.0008
	(0.001)	(0.001)	(0.003)
Annual state unemployment statistics	0.0113	0.0113	0.0049
	(0.008)	(0.008)	(0.006)
Constant	0.1949	0.1943	0.5955*
	(0.100)	(0.098)	(0.269)
State & Year Fixed Effects?	Yes	Yes	Yes
State-by-Race Fixed Effects?	No	No	Yes
Year-by-Race Fixed Effects?	No	No	Yes
N	137709	137709	137709

Adjusted R^2	0.101	0.101	0.115

Notes: Survey weighted linear probability models use data from the 2011 through 2017 waves of BRFSS to how Medicaid Expansions related to health insurance coverage, by race and ethnicity. Controls not listed include state fixed effects, year fixed effects, age, sex, marital status, self reported general health status, education status, employment status, language of the interview, number of children in household, number of adults in household, state-year specific unemployment rate, and state-year specific number of primary care physicians per 100,000 people. Reference group includes individuals who are male, not married, in poor health status, have a household income of <$10,000, did no graduate high school, are not employed, and speak English. SEs are clustered at the state level. * $p<0.05$, ** $p<0.01$

Table A4: Difference-in-Differences Estimates of Effects of Medicaid Expansion on Having a Personal Doctor by Race, 2011-2017 Coefficient/(Standard Error)

	Having a personal doctor		
	(1)	(2)	(3)
Coefficient	0.0515**	0.0323*	0.0357*
	(0.014)	(0.013)	(0.016)
Expansion*Post*Non-Hispanic Black		0.0178	0.0272
		(0.017)	(0.031)
Expansion*Post*Hispanic		0.0592**	0.0310
		(0.013)	(0.039)
Expansion*Post*Non-Hispanic Other		0.0112	-0.0121
		(0.021)	(0.052)
Expansion state	0.0147	0.0157	-0.0829
	(0.015)	(0.014)	(0.044)
Controls			
Interview Year			
2012	0.0031	0.0034	0.0091
	(0.008)	(0.008)	(0.014)
2013	-0.0177	-0.0175*	-0.0262*
	(0.009)	(0.009)	(0.011)
2014	-0.0157	-0.0162	0.0223
	(0.025)	(0.025)	(0.032)
2015	0.0039	0.0030	-0.0055
	(0.016)	(0.015)	(0.020)
2016	-0.0145	-0.0134	-0.0145
	(0.024)	(0.023)	(0.020)
2017	-0.0223	-0.0203	-0.0455
	(0.022)	(0.022)	(0.034)
2018	-0.1031	-0.1055	-0.0698
	(0.065)	(0.066)	(0.042)
Age	0.0058**	0.0058**	0.0059**
	(0.000)	(0.000)	(0.000)
Female	0.1136**	0.1131**	0.1118**
	(0.005)	(0.005)	(0.005)
Married	0.0330**	0.0329**	0.0309**
	(0.005)	(0.005)	(0.005)
General Health Status			
Fair	-0.0700**	-0.0702**	-0.0698**
	(0.011)	(0.011)	(0.011)
Good	-0.1134**	-0.1134**	-0.1127**
	(0.010)	(0.010)	(0.010)
Very Good	-0.1096**	-0.1097**	-0.1089**
	(0.011)	(0.011)	(0.011)
Excellent	-0.1320**	-0.1321**	-0.1301**
	(0.007)	(0.007)	(0.008)
Annual household income			
<$15,000	0.0260**	0.0259**	0.0252**

	(0.006)	(0.006)	(0.006)
<$20,000	0.0175*	0.0175*	0.0160
	(0.009)	(0.009)	(0.008)
<$25,000	0.0575**	0.0571**	0.0535**
	(0.010)	(0.010)	(0.010)
<$35,000	0.0842**	0.0843**	0.0816**
	(0.015)	(0.015)	(0.015)
<$50,000	0.0850**	0.0848**	0.0794**
	(0.025)	(0.025)	(0.026)
<$75,000	0.0820	0.0820	0.0368
	(0.116)	(0.117)	(0.117)
Race			
Non-Hispanic Black	0.0131	0.0101	0.0158
	(0.008)	(0.009)	(0.013)
Hispanic	-0.0445**	-0.0535**	-0.0682**
	(0.012)	(0.014)	(0.011)
Non-Hispanic Other	-0.0338**	-0.0357**	-0.0332*
	(0.011)	(0.011)	(0.016)
Education Level			
Graduated high school	0.0369**	0.0372**	0.0377**
	(0.005)	(0.005)	(0.005)
Attended college or technical school	0.0483**	0.0486**	0.0527**
	(0.006)	(0.006)	(0.006)
Graduated from college or technical school	0.0631**	0.0632**	0.0654**
	(0.006)	(0.006)	(0.007)
Employed	-0.0592**	-0.0590**	-0.0591**
	(0.006)	(0.006)	(0.006)
Not an English Speaker	-0.1478**	-0.1478**	-0.1414**
	(0.022)	(0.021)	(0.020)
Number of children in household	-0.0017	-0.0016	-0.0012
	(0.003)	(0.002)	(0.003)
Number of adults in household	-0.0124**	-0.0125**	-0.0123**
	(0.003)	(0.003)	(0.003)
State active primary physicians (per 100,000)	0.0025**	0.0025**	0.0020
	(0.001)	(0.001)	(0.002)
Annual state unemployment statistics	-0.0073	-0.0071	-0.0072
	(0.004)	(0.004)	(0.004)
Constant	0.3078**	0.3123**	0.4113**
	(0.066)	(0.064)	(0.129)
State & Year Fixed Effects?	Yes	Yes	Yes
State-by-Race Fixed Effects?	No	No	Yes
Year-by-Race Fixed Effects?	No	No	Yes
N	137709	137709	137709
Adjusted R^2	0.118	0.119	0.127

Notes: Survey weighted linear probability models use data from the 2011 through 2017 waves of BRFSS to how Medicaid Expansions related to having personal doctors by race and ethnicity. Controls not listed include state fixed effects, year fixed effects, age, sex, marital status, self reported general health status, education status, employment status,

language of the interview, number of children in household, number of adults in household, state-year specific unemployment rate, and state-year specific number of primary care physicians per 100,000 people. Full regression results can be found in the Appendix. Reference group includes individuals who are male, not married, in poor health status, have a household income of <$10,000, did no graduate high school, are not employed, and speak English. SEs are clustered at the state level. * $p<0.05$, ** $p<0.01$

Table A5: Difference-in-Differences Estimates of Effects of Medicaid Expansion on Inability to See Doctor Due to Cost of Care by Race, 2011-2017 Coefficient/(Standard Error)

	Unable to See Doctor Due to Cost of Care		
	(1) Expansion*Post	(2) Expansion*Post by Race	(3) Expansion*Post*Race
	β/SE	β/SE	β/SE
Expansion*Full analytic sample	-0.0505** (0.015)	-0.0622** (0.013)	-0.0626** (0.014)
Expansion*Non-Hispanic Black		0.0389** (0.013)	0.0679** (0.022)
Expansion*Hispanic		0.0154 (0.024)	0.0083 (0.027)
Expansion*Non-Hispanic Others		0.0327 (0.026)	0.0045 (0.045)
Expansion state	-0.0512** (0.018)	-0.0510** (0.018)	-0.0828 (0.075)
Interview year	(.)	(.)	(.)
2012	-0.0004 (0.009)	-0.0003 (0.009)	0.0060 (0.009)
2013	-0.0075 (0.012)	-0.0074 (0.012)	0.0184 (0.013)
2014	-0.0850 (0.054)	-0.0853 (0.054)	-0.0616 (0.041)
2015	-0.0477** (0.016)	-0.0475** (0.016)	-0.0151 (0.020)
2016	-0.0699** (0.017)	-0.0696** (0.018)	-0.0229 (0.021)
2017	-0.0653** (0.023)	-0.0648** (0.024)	-0.0060 (0.031)
2018	-0.1947** (0.039)	-0.1948** (0.040)	-0.1411** (0.042)
Controls			
Age	-0.0010** (0.000)	-0.0010** (0.000)	-0.0011** (0.000)
Female	0.0504** (0.012)	0.0503** (0.012)	0.0492** (0.012)
Married	0.0201** (0.007)	0.0200** (0.007)	0.0192** (0.007)
General Health Status	0.0000	0.0000	0.0000
Fair	-0.0239** (0.007)	-0.0238** (0.007)	-0.0212** (0.007)
Good	-0.1084** (0.009)	-0.1083** (0.009)	-0.1052** (0.009)
Very Good	-0.1900** (0.012)	-0.1899** (0.012)	-0.1852** (0.013)
Excellent	-0.2444**	-0.2445**	-0.2420**

	(0.014)	(0.014)	(0.014)
Annual Household Income	0.0000	0.0000	0.0000
<$15,000	0.0029 (0.005)	0.0029 (0.005)	0.0009 (0.005)
<$20,000	-0.0017 (0.008)	-0.0015 (0.008)	-0.0064 (0.007)
<$25,000	-0.0226* (0.009)	-0.0225* (0.009)	-0.0280** (0.009)
<$35,000	-0.0839** (0.011)	-0.0838** (0.011)	-0.0857** (0.012)
<$50,000	-0.1068** (0.028)	-0.1064** (0.028)	-0.1060** (0.028)
<$75,000	-0.3211** (0.072)	-0.3248** (0.070)	-0.3488** (0.061)
Race	0.0000	0.0000	0.0000
Non-Hispanic Black	-0.0151 (0.008)	-0.0202* (0.008)	-0.0874** (0.013)
Hispanic	-0.0104 (0.011)	-0.0128 (0.010)	0.1157** (0.011)
Non-Hispanic Other	-0.0214 (0.014)	-0.0269 (0.016)	0.0062 (0.015)
Education Level			
Graduated high school	0.0015 (0.009)	0.0015 (0.009)	0.0013 (0.008)
Attended college or technical school	0.0340** (0.011)	0.0340** (0.011)	0.0334** (0.010)
Graduated from college or technical school	0.0334* (0.012)	0.0333* (0.012)	0.0329** (0.012)
Employed	0.0212** (0.008)	0.0212** (0.008)	0.0234** (0.008)
Not an English Speaker	-0.0206 (0.015)	-0.0207 (0.015)	-0.0090 (0.013)
Number of children in household	0.0087** (0.003)	0.0087** (0.003)	0.0092** (0.003)
Number of adults in household	0.0124** (0.003)	0.0124** (0.003)	0.0136** (0.003)
State active primary physicians (per 100,000)	-0.0019** (0.001)	-0.0019** (0.001)	0.0063 (0.003)
Annual state unemployment statistics	0.0045 (0.004)	0.0046 (0.004)	0.0185** (0.005)
Constant	0.5973** (0.059)	0.6004** (0.058)	-0.1173 (0.263)

State & Year Fixed Effects?	Yes	Yes	Yes
State-by-Race Fixed Effects?	No	No	Yes
Year-by-Race Fixed Effects?	No	No	Yes
N	137709	137709	137709
Adjusted R^2	0.051	0.051	0.060

Notes: Survey weighted linear probability models use data from the 2011 through 2017 waves of BRFSS to how Medicaid Expansions related to the inability to see doctor due to cost of care, by race and ethnicity. Controls not listed include state fixed effects, year fixed effects, age, sex, marital status, self reported general health status, education status, employment status, language of the interview, number of children in household, number of adults in household, state-year specific unemployment rate, and state-year specific number of primary care physicians per 100,000 people. Full regression results can be found in the Appendix. Reference group includes individuals who are male, not married, in poor health status, have a household income of <$10,000, did no graduate high school, are not employed, and speak English. SEs are clustered at the state level. * $p<0.05$, ** $p<0.01$

Table A6: Difference-in-Differences Estimates of Effects of Medicaid Expansion on Probability of Receiving a Flu Shot by Race, 2011-2017 Coefficient/(Standard Error)

	Received a Flu Shot		
	(1)	(2)	(3)
Expansion*Post	-0.0088	-0.0213	0.0033
	(0.013)	(0.013)	(0.015)
Expansion*Post*Non-Hispanic Black		0.0287	-0.0053
		(0.025)	(0.028)
Expansion*Post*Hispanic		0.0232	-0.0391
		(0.014)	(0.029)
Expansion*Post*Non-Hispanic Other		0.0326	-0.0093
		(0.021)	(0.035)
Expansion state	0.0242	0.0246	0.2804**
	(0.028)	(0.028)	(0.048)
Interview year	0.0000	0.0000	0.0000
2012	-0.0213*	-0.0212*	-0.0176
	(0.009)	(0.009)	(0.012)
2013	-0.0065	-0.0064	-0.0172
	(0.012)	(0.012)	(0.010)
2014	-0.0168	-0.0172	-0.0922*
	(0.027)	(0.027)	(0.039)
2015	-0.0045	-0.0046	-0.0118
	(0.018)	(0.018)	(0.018)
2016	-0.0335*	-0.0331*	-0.0276
	(0.016)	(0.016)	(0.024)
2017	-0.0193	-0.0186	-0.0411
	(0.023)	(0.023)	(0.023)
2018	-0.0545	-0.0550	-0.0173
	(0.061)	(0.062)	(0.090)
Constants			
Age	0.0036**	0.0036**	0.0038**
	(0.000)	(0.000)	(0.000)
Female	0.0449**	0.0448**	0.0454**
	(0.005)	(0.005)	(0.005)
Married	-0.0013	-0.0014	-0.0026
	(0.006)	(0.006)	(0.006)
General Health Status			
Fair	-0.0545**	-0.0545**	-0.0545**
	(0.009)	(0.009)	(0.008)
Good	-0.0897**	-0.0896**	-0.0891**
	(0.009)	(0.009)	(0.008)
Very Good	-0.1009**	-0.1008**	-0.1010**
	(0.010)	(0.010)	(0.010)
Excellent	-0.1059**	-0.1059**	-0.1040**
	(0.009)	(0.009)	(0.009)
Annual household income	0.0000	0.0000	0.0000

<$15,000	0.0240**	0.0240**	0.0238**
	(0.005)	(0.005)	(0.005)
<$20,000	0.0238*	0.0239*	0.0237*
	(0.011)	(0.011)	(0.010)
<$25,000	0.0218**	0.0217**	0.0225**
	(0.007)	(0.007)	(0.008)
<$35,000	0.0444**	0.0445**	0.0423**
	(0.008)	(0.008)	(0.008)
<$50,000	0.0288	0.0289	0.0265
	(0.020)	(0.019)	(0.019)
<$75,000	-0.0048	-0.0086	-0.0167
	(0.099)	(0.099)	(0.107)
Race	0.0000	0.0000	0.0000
Non-Hispanic	0.0035	-0.0004	-0.0497**
Black	(0.010)	(0.010)	(0.012)
Hispanic	0.0453**	0.0417**	0.0505**
	(0.010)	(0.011)	(0.008)
Non-Hispanic	0.0390**	0.0335*	-0.1046**
Other	(0.013)	(0.014)	(0.013)
Education Status	0.0000	0.0000	0.0000
Graduated high	0.0101	0.0101	0.0160*
school	(0.007)	(0.007)	(0.006)
Attended college	0.0153	0.0153	0.0231**
or technical school	(0.008)	(0.008)	(0.009)
Graduated from	0.0343**	0.0343**	0.0448**
college or technical	(0.011)	(0.011)	(0.011)
school			
Employed	-0.0410**	-0.0410**	-0.0419**
	(0.006)	(0.006)	(0.006)
Not an English speaker	-0.0012	-0.0012	-0.0027
	(0.011)	(0.011)	(0.011)
Number of children in	-0.0064**	-0.0063**	-0.0063**
household	(0.001)	(0.001)	(0.001)
Number of adults in	-0.0003	-0.0003	-0.0004
household	(0.002)	(0.002)	(0.002)
State active PCPs (per	0.0005	0.0004	-0.0089**
100,000)	(0.001)	(0.001)	(0.002)
Annual state	-0.0147**	-0.0146**	-0.0137**
unemployment statistics	(0.004)	(0.004)	(0.004)
Constant	0.2426**	0.2457**	0.9748**
	(0.077)	(0.077)	(0.171)
State & Year Fixed Effects?	Yes	Yes	Yes
State-by-Race Fixed Effects?	No	No	Yes
Year-by-Race Fixed Effects?	No	No	Yes
N	137709	137709	137709
Adjusted R^2	0.033	0.033	0.043

Notes: Survey weighted linear probability models use data from the 2011 through 2017 waves of BRFSS to how Medicaid Expansions related to the inability to see doctor due to probability that the participant received a flu shot, by

race and ethnicity. Controls not listed include state fixed effects, year fixed effects, age, sex, marital status, self reported general health status, education status, employment status, language of the interview, number of children in household, number of adults in household, state-year specific unemployment rate, and state-year specific number of primary care physicians per 100,000 people. Full regression results can be found in the Appendix. Reference group includes individuals who are male, not married, in poor health status, have a household income of <$10,000, did no graduate high school, are not employed, and speak English. SEs are clustered at the state level. * $p<0.05$, ** $p<0.01$