

Community Health Centers Maintained Initial Increases in Medicaid Covered Adult Patients at 5-Years Post-Medicaid-Expansion

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Abstract

The Affordable Care Act (ACA) Medicaid expansion created new financial opportunities for community health centers (CHCs) providing primary care in medically-underserved communities. However, beyond evidence of initial policy effects, little is understood in the scholarly literature about whether the ACA Medicaid expansion affected longer-lasting changes in CHC patient insurance mix. This study's objective was to examine whether the ACA Medicaid expansion was associated with lasting increases in the annual percentage of adult CHC patients covered by Medicaid and decreases in the annual percentage of uninsured adult CHC patients at expansion-state CHCs, compared to non-expansion-state CHCs. This observational study examined 5353 CHC-year observations from 2012 to 2018 using Uniform Data System data and other national data sources. Using a 2-way fixed-effects multivariable regression approach and marginal analysis, intermediate-term policy effects of the Medicaid expansion on annual CHC patient coverage outcomes were estimated. By 5-years post-expansion, the Medicaid expansion was associated with an overall average increase of 11.7 percentage points in the percentage of adult patients with Medicaid coverage at expansion-state CHCs, compared to non-expansion-state CHCs. Among expansion-state CHCs, 39.8% of adult patients were predicted to have Medicaid coverage 5-years post-expansion, compared to 19.0% of non-expansion-state adult CHC patients. A state's decision to expand Medicaid was similarly associated with decreases in the annual percentage of uninsured adult CHC patients. Primary care operations at CHCs critically depend on patient Medicaid revenue. These findings suggest the ACA Medicaid expansion may provide longer-term financial security for expansion-state CHCs, which maintain increases in Medicaid-covered adult patients even 5-years post-expansion. However, these financial securities may be jeopardized should the ACA be ruled unconstitutional in 2021, a year after CHCs experienced new uncertainties caused by COVID-19.

Keywords

primary care, ACA, uninsured, health reform, enrollment

What do we already know about this topic?

The ACA Medicaid expansion was initially shown to be associated with increases in Medicaid-covered visits at expansion-state CHCs, suggesting CHCs were able to begin to connect previously-uninsured patients to Medicaid and engage newly-covered adult patients in 2014. However, beyond the initial policy effects, little is understood in the scholarly literature about whether the ACA Medicaid expansion affected longer-lasting changes in CHC patient insurance mix.

How does your research contribute to the field?

Findings from this study suggest CHCs in states that adopted the Medicaid expansion in 2014 appear to have maintained initial increases in the size of their Medicaid-covered adult patient populations and initial decreases in the size of their uninsured, typically uncompensated adult patient populations by 5-years post-expansion (ie, beyond the initial post-expansion changes), relative to changes in the non-expansion-state CHCs over the same time period. This helps calm concerns expressed by other authors prior to 2014.

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

CHC operations critically depend on patient Medicaid revenue, and these findings suggest the ACA Medicaid expansion may help CHCs establish the longer-term financial security needed to expand their services and better pursue their core mission in medically-underserved communities across the US.



Introduction

The federally-funded health center program delivers high-quality primary health care and supportive services to patients regardless of their ability to pay.¹ Community health centers (CHCs) served over 29 million people in 2019.^{2,3} Beyond improving access to care in low-income communities, many CHCs also demonstrate innovation in care delivery^{4,5} and generate value for Medicaid by providing services at lower costs than other outpatient providers.⁶ However, financial sustainability has eluded CHCs for decades. In the 1960s, the earliest contemporary CHCs were written off by opponents as temporary demonstration projects, expected to perish by the 1980s.⁷ CHCs overcame these initial financial uncertainties largely on account of their connection with the Medicaid program. Although federal operating grants and contracts once accounted for over 40% of CHC funding, patient Medicaid revenue emerged as the largest source of revenue for CHCs and extends vital support for CHC operations.⁸ Medicaid payments reasonably approximate the cost of care for CHC encounters, typically more than other payers, which incentivizes CHCs to seek and retain Medicaid-covered patients relative to uninsured patients.⁹

The Affordable Care Act (ACA) created new opportunities for CHCs to grow their patient Medicaid revenue by giving states the option to expand Medicaid eligibility to persons earning up to 138% of the FPL. Twenty-four states chose to expand their Medicaid programs at first opportunity in 2014. Expanded Medicaid eligibility was generally associated with reductions in uninsurance and mortality,^{10,11} and increases in having a usual source of care and preventive care visits.^{12,13} As most adult CHC patients live below the Federal Poverty Level (FPL),² the Medicaid expansion was initially shown to be associated with increases in Medicaid-covered visits at expansion-state CHCs and improvements in screening rates for preventive services,¹⁴⁻¹⁶ suggesting CHCs were able to begin to connect previously-uninsured patients to Medicaid and engage newly-covered adult patients in 2014. Beyond these initial policy effects, though, little is understood in the literature about whether the ACA Medicaid expansion affected longer-lasting changes in CHC patient insurance mix.

This study addresses this gap and extends upon earlier studies by examining the intermediate-term impact of the ACA Medicaid expansion on CHC patient insurance outcomes, investigating changes as the Medicaid expansion was implemented over time. Examining the multi-year

policy impact is critical for several reasons. Of importance to CHCs, one study predating the ACA demonstrated patients remain loyal to CHCs after they gained insurance coverage.¹⁷ Huguet et al¹⁸ also recently showed that CHC patients were significantly less likely than patients in other care settings to change their source of primary care, though many CHC patients do change their provider. Nationally, however, little is understood about whether CHCs retain Medicaid-covered patients following the adoption of the ACA coverage mechanisms, or if CHCs instead lose Medicaid-covered patients to competitor providers over time, a concern expressed by other authors leading up to 2014.¹⁹

More generally, the nonuniformity, length, and complexities of public policy implementation across states and time can affect desired policy outcomes beyond the decision to adopt a new policy (eg, Moulton and Sandfort²⁰). Little is also understood about the impact of uneven efforts to implement the Medicaid expansion, and variation in state-level implementation efforts could affect the enrollment and retention of Medicaid-covered patients served by CHCs over time. The full effects of Medicaid policies are not always observable until longer periods following policy enactment (eg, Zewde and Wilmer²¹ and Arthur and Rozier²²). As CHCs begin to navigate new financial uncertainties caused by the COVID-19 pandemic,²³ it is imperative to understand if and how the ACA Medicaid expansion impacted CHC patient insurance mix and Medicaid revenue leading up to the onset of the pandemic.

This study's objective was to examine whether the ACA Medicaid expansion was associated with lasting increases in the annual percentage of adult CHC patients covered by Medicaid and decreases in the annual percentage of uninsured adult CHC patients in expansion-state CHCs, compared to non-expansion-state CHCs. To accomplish these objectives, nationally-representative CHC and public policy data were examined from 2012 to 2018.

Methods

Data

This observational study used multiple data sources. The primary data source was the Uniform Data System (UDS) for the period 2012 to 2018 (calendar years from January 1 to December 31), accessed through 2 Freedom of Information Act requests (#19F122, #19F270).²⁴ The Health Resources and Services Administration (HRSA) collects UDS data

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annually from the universe of CHCs receiving federal funding. UDS data include standardized information on patients' demographic characteristics, utilization, care quality, and organizational features. Described below, additional data sources included the Kaiser Family Foundation²⁵ and Bureau of Labor Statistics.²⁶

Sample

Consistent with earlier studies, exclusions were made attempting to ensure the analytic sample CHCs experienced similar policy exposure and implementation efforts for similar amounts of time.^{27,28} CHCs in US territories were excluded, as were CHCs from 6 states (CA, CT, MN, NJ, WA, and DC) that expanded Medicaid in 2014, but also for some residents prior to 2014 (prior to the start of the study data).^{27,29} Lastly, CHCs from states that expanded Medicaid during the study period but after 2014 were excluded. This exclusion was made to avoid empirical concerns about the influence of variation in policy exposure timing on the estimated policy effects,³⁰ and to focus on examining the intermediate-term effects of the Medicaid expansion on previously-studied CHCs operating in states that expanded at first opportunity in 2014. Appendix Table B1 shows the complete list of Medicaid expansion states included in the analyses.

The study included 780 unique CHCs (representing 70.5% of all CHCs in the 50 US and DC in operation across the study period). The CHC-year was the unit of analysis, and the analytic sample included 5353 CHC-year observations. Over the study, the policy treatment group included 1952 expansion-state CHC-year observations from states that expanded Medicaid in 2014. The comparison group contributed 3401 non-expansion-state CHC-year observations.

Outcome Variables

There were 2 outcome variables in the main analysis. The first outcome variable measured the annual percentage of the CHC's adult patients that had Medicaid coverage (calendar year). The second outcome variable measured the annual percentage of the CHC's uninsured adult patients (calendar year).

Independent Variables

To examine the effect of the Medicaid expansion on the outcomes, Kaiser Family Foundation data were used to construct a binary variable indicating whether the Medicaid expansion was enacted in a state.²⁵ Because new Medicaid policies can take time to impact access to health services,^{22,31} the Medicaid expansion indicator was interacted with binary indicators of time since expansion (1-, 2-, 3-, 4-, and 5-years after expansion) to examine whether the estimated effect of the Medicaid expansion increased or decreased by later post-expansion periods.

Covariates

All statistical models included a vector of time-variant covariates to absorb residual variance in the outcomes or adjust for potential confounding factors, especially organizational and patient population differences between the expansion-state and non-expansion-state CHCs. UDS data were used to adjust for patient population differences at the CHC level, including the sex, non-elderly adult population (19-64 years), race/ethnicity (non-Hispanic white, non-Hispanic black, and Hispanic), and income (<100% of the FPL) compositions of the patient populations for each CHC-year. The models also included a measure of each CHC's annual HRSA grant expenditure to adjust for differences in CHC practice size and operational capacity, as well as a binary measure indicating whether each CHC was a special population homeless health center serving a higher-acuity patient population known to experience greater barriers to coverage under the ACA.³²

State-level BLS data on the unemployment rate were included to adjust for differences in employment conditions, which affect Medicaid coverage and access to care.³³ All models included year and state fixed effects to adjust for secular time trends and time-invariant aspects of Medicaid policies and other unique attributes of each state.

Analysis

Two-way fixed-effects multivariable linear regression models were specified to examine the effect of the ACA Medicaid expansion as a widening or narrowing of the gap in the annual outcomes between the expansion-state and non-expansion-state CHCs at different time periods.³⁴ All effects were estimated using the following general regression approach:

$$\begin{aligned}
 Y_{ct} = & \beta_0 + \beta_1 (\text{Medicaid Expansion} \times \text{One} \\
 & \quad - \text{Year Post} - \text{Expansion}_{ct}) \\
 & + \beta_2 \left(\text{Medicaid Expansion} \times \text{Two} \right. \\
 & \quad \left. - \text{Years Post} - \text{Expansion}_{ct} \right) \\
 & + \beta_3 \left(\text{Medicaid Expansion} \times \text{Three} \right. \\
 & \quad \left. - \text{Years Post} - \text{Expansion}_{ct} \right) \\
 & + \beta_4 \left(\text{Medicaid Expansion} \times \text{Four} \right. \\
 & \quad \left. - \text{Year Post} - \text{Expansion}_{ct} \right) \\
 & + \beta_5 \left(\text{Medicaid Expansion}_{ct} \times \text{Five} \right. \\
 & \quad \left. - \text{Year Post} - \text{Expansion}_{ct} \right) \\
 & + \text{State}_c + \text{Year}_t + \text{BZ}_{ct} + \varepsilon_{ct}
 \end{aligned} \tag{1}$$

where Y_{ct} was the outcome of interest for CHC c at time t , including State_c and Year_t fixed effects and the vector (Z_{ct}) of time-varying covariates.

Robust standard errors were clustered at the state level to correct for heteroskedasticity and serial correlation.³⁵ All parameters are presented as ordinary least squares

Table 1. Characteristics of the CHC-Years Analyzed from the Pooled Study Sample: 2012–2018.

	Expansion-state CHC-years	Non-expansion-state CHC-years	Full analytic sample	All CHC-years
Outcome characteristics				
Annual percentage of adult CHC patients with Medicaid coverage	40.7% (15.2)	18.7% (12.6)**	26.7% (17.2)	30.1% (18.3)
Annual percentage of uninsured adult CHC patients	20.4% (15.1)	44.2% (20.4)**	35.5% (21.9)	35.0% (21.1)
Policy characteristics				
ACA Medicaid expansion state CHC, n (%)				
No	0.0 (0.0)	3401 (100.0)**	3401 (63.5)	4207 (55.3)
Yes	1952 (100.0)	0 0.0	1952 (36.5)	3401 (44.7)
Health center characteristics				
Hispanic patients, %	22.0% (23.8)	22.8% (25.1)	22.5% (24.6)	25.5% (26.2)
White, non-Hispanic patients, %	49.1% (32.2)	47.1% (29.7)	47.8% (30.7)	43.7% (30.3)
Black, non-Hispanic patients, %	16.7% (22.5)	21.7% (25.0)**	19.9% (24.2)	19.3% (24.0)
Female patients, %	56.6% (5.9)	57.8% (6.4)**	57.3% (6.2)	57.1% (6.3)
Patients 18-64y old, %	62.9% (11.3)	63.6% (12.1)	63.3% (11.9)	63.5% (11.8)
Patients < 100% of poverty level, %	44.5% (23.8)	48.4% (21.7)**	47.0% (22.6)	48.7% (23.1)
Special population homeless CHC, n (%)				
No	1508 (77.3)	2763 (81.2)	4271 (79.8)	5958 (78.3)
Yes	444 (22.7)	638 (18.8)	1082 (20.2)	1650 (21.7)
Annual HRSA grant expenditures, in \$10,000s	\$334.0 (252.8)	\$277.0 (221.5)**	\$297.8 (235.0)	\$297.6 (246.2)
State characteristics				
Unemployment rate, %	4.3% (0.9)	4.0% (0.7)**	4.1% (0.8)	4.3% (5.8)
Observations	1952	3401	5353	7608

Notes. For each continuous variable, unadjusted average percentages or totals per year are shown for CHC-years from 2012 to 2018, and standard deviations are shown in parentheses. Categorical variables as described as counts for each category, as well as percentages for each category in parentheses. The CHC-year observations represent 780 unique CHCs in operation across the study period. The "All CHC-years" column describes the characteristics for all CHCs in operation across the study period, including CHCs from states excluded from the analytic sample. *P*-values were derived from tests comparing the non-expansion-state and expansion-state health center summary statistics. For continuous variables, the *P*-values were derived using 2-sample *t*-tests, and for categorical variables, *P*-values were derived using Wald chi-square tests, both accounting for non-independent observations over time. Author's analysis of data from the Uniform Data System, Kaiser Family Foundation, and the Bureau of Labor Statistics.

***P* < .01.

estimates. The coefficients of interest (β_1 - β_5) were policy estimates attributable to a state's decision to adopt the Medicaid expansion, testing the differences in the changes in the average outcomes from the pre-expansion period at each post-expansion period between the expansion-state and non-expansion-state CHCs.

This empirical approach assumed that, absent the Medicaid expansion, the average changes in the outcomes would have been the same for both the expansion-state and non-expansion-state groups. As presented below and expounded upon in the appendix, a corollary of this untestable common trends assumption was examined both graphically and statistically.^{36,37}

To ease the organization-level interpretation of the multi-variable analysis estimates, regression-adjusted predicted annual percentages of adult CHC patients covered by Medicaid and uninsured adult patients were also generated for each combination of Medicaid expansion enactment and time since expansion, keeping other covariates at their observed values (ie, using average marginal effects). All analyses were conducted using STATA version 15.1 (College Station, TX).

Robustness Tests

Two robustness tests were conducted. First, additional regression models were estimated examining alternative

outcome variables measuring the natural logs of the annual counts of adult CHC patients covered by Medicaid and uninsured adult patients. Second, the main regression analysis was replicated including CHCs in the 6 states mentioned earlier that expanded Medicaid eligibility for adults through the ACA in 2014, but also for some residents prior to 2014 (and before the start of the study).

Results

Over the study, 36.5% of the CHCs in a given year were expansion-state CHCs (Table 1). More than half the patients seen in the analytic sample CHCs in a year were non-elderly adults aged 18 to 64 (63.3%), and about 47.0% lived below the poverty level. Figure 1 shows the unadjusted trends in the outcomes between the expansion-state CHCs and non-expansion-state CHCs over the study period. Pre-expansion, in 2013, 27.7% of the adult patients at the expansion-state CHCs had Medicaid coverage, compared to 15.2% of the adult patients at the non-expansion-state CHCs. Moreover, 36.9% of the adult patients at the expansion-state CHCs were uninsured in 2013, compared to 52.5% of the adult patients at the non-expansion-state CHCs. Figure 1 also depicts similar pre-expansion outcome trends between the expansion- and non-expansion-state CHCs,³⁶ while Appendix A provides statistical evidence suggesting the corollary of the common

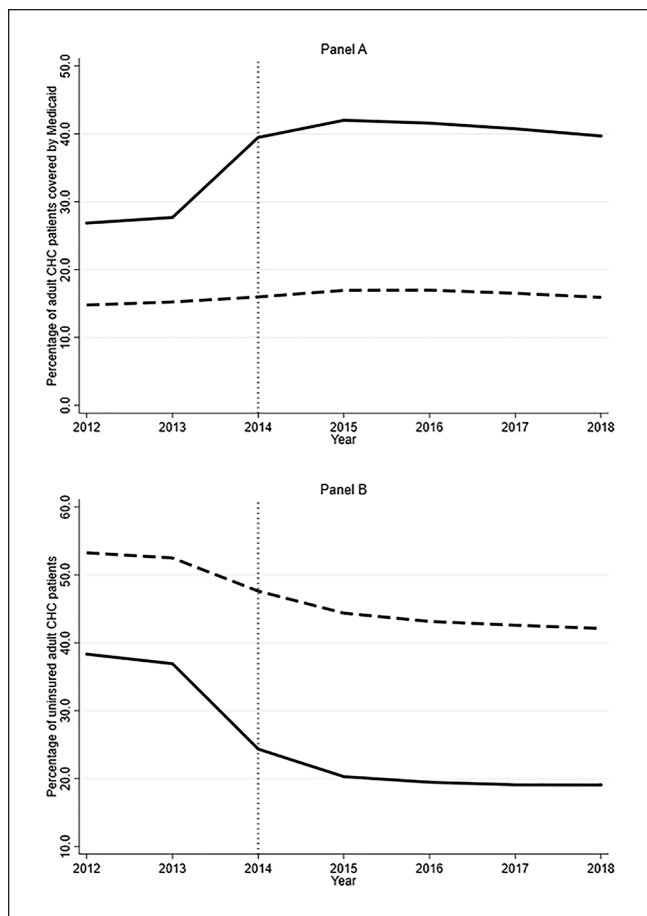


Figure 1. Unadjusted trends in the percentages of Medicaid-covered and uninsured adult CHC patients, by Medicaid expansion status: 2012 to 2018.

Notes. This figure shows the unadjusted trends in the outcomes between the expansion-state CHCs (solid black line) and non-expansion-state CHCs (dashed black line) over the study period, allowing for a visual examination of the pre-expansion common trends assumption in the outcomes. The vertical dashed gray line at 2014 indicates the ACA Medicaid expansion in this study. Panel A shows the percentage of adult CHC patients with Medicaid coverage by Medicaid expansion status over time. Panel B shows the percentage of uninsured adult CHC patients by Medicaid expansion status over time.

trends assumption was satisfactory for both outcomes (ie, the difference in differences were not significantly different between the 2 groups in the pre-treatment period).

Table 2 shows the results of the multivariable analysis. The coefficients of interest were policy estimates attributable to a state's decision to adopt the Medicaid expansion, testing the differences in the changes in the average outcomes from the pre-expansion period at each post-expansion period between the expansion-state and non-expansion-state CHCs. At 1-year post-expansion, adopting the Medicaid expansion was associated with an average increase of 11.5 percentage points in the percentage of adult patients with Medicaid coverage at expansion-state CHCs, compared to the change over the same time period at the non-expansion-state CHCs

($\beta=0.115$; $P<.001$). By 2-years post-expansion, the Medicaid expansion was associated with a peak increase of 13.0 percentage points in the percentage of adult patients with Medicaid coverage at expansion-state CHCs, on average, compared to non-expansion-state CHCs ($\beta=0.130$; $P<.001$). At 5-years post-expansion, the Medicaid expansion was still associated with an average increase of 11.7 percentage points in the percentage of adult patients with Medicaid coverage at expansion-state CHCs, compared to the change over the same time period at the non-expansion-state CHCs ($\beta=0.117$; $P<.001$).

A state's decision to expand Medicaid was similarly associated with decreases in the annual percentage of uninsured—typically uncompensated—adult CHC patients (Table 2, Model 2). At 1-year post-expansion, the Medicaid expansion was associated with an average decrease of 8.2 percentage points in the percentage of uninsured adult patients at expansion-state CHCs, compared to the change over the same time period at the non-expansion-state CHCs ($\beta=-0.082$; $P<.001$). At 5-years post-expansion, the Medicaid expansion was still associated with an overall average decrease of 7.5 percentage points in the percentage of uninsured adult patients at expansion-state CHCs, compared to the change over the same time period at the non-expansion-state CHCs ($\beta=-0.075$; $P<.001$).

To help demonstrate the organization-level implications of the multivariable analysis results, Figure 2 shows the regression-adjusted predicted annual percentage of Medicaid-covered adult patients at both expansion-state and non-expansion-state CHCs before expansion and at 1-year and 5-years post-expansion. Among expansion-state CHCs, 39.4% of adult patients were predicted to have Medicaid coverage 1 year after a state enacted the Medicaid expansion, compared to 18.8% of non-expansion-state adult CHC patients at the same period. This reflected the 11.5 average percentage-point increase attributable to the Medicaid expansion, a 12.62% point increase from the pre-expansion period minus the 1.13% point increase among the non-expansion-state CHCs over the time ($P<.001$). By 5-years post-expansion, 39.8% of adult patients at the expansion-state CHCs were predicted to have Medicaid coverage, compared to 19.0% of non-expansion-state adult CHC patients at the same period. This reflected the 11.7 average percentage-point increase attributable to the Medicaid expansion at 5-years post-expansion, a 13.06% point increase from the pre-expansion period minus the 1.32% point increase among the non-expansion-state CHCs from the pre-expansion period to 5-years post-expansion ($P<.001$).

Robustness Test Results

Estimates from the regression models examining the logged outcome measures of the total adult CHC patients covered by Medicaid and uninsured adult CHC patients in a year were similar to the main model results. Appendix Table B2 shows

Table 2. Multivariable Analysis Examining the Effects of the Medicaid Expansion on CHC Adult Patient Insurance Coverage Outcomes.

	1 Outcome: percentage of adult CHC patients with Medicaid coverage	2 Outcome: percentage of uninsured adult CHC patients
Medicaid expansion × time since expansion		
Non-expansion-state CHC (i.e., at each period)	Ref	Ref
Expansion-state CHC at 1-y post-expansion	0.115** 0.007	-0.082** 0.009
Expansion-state CHC at 2-y post-expansion	0.130** 0.008	-0.088** 0.01
Expansion-state CHC at 3-y post-expansion	0.126** 0.008	-0.082** 0.011
Expansion-state CHC at 4-y post-expansion	0.122** 0.009	-0.079** 0.011
Expansion-state CHC at 5-y post-expansion	0.117** 0.009	-0.075** 0.011
Hispanic patients (%)	-0.085** 0.026	0.163** 0.052
White non-Hispanic patients (%)	-0.036 0.025	-0.231** 0.045
Black non-Hispanic patients (%)	0.106** 0.038	-0.172** 0.057
Female patients (%)	0.268** 0.063	-0.368** 0.079
Patients 18-64 y old (%)	-0.135** 0.029	0.459** 0.04
Patients <100% of poverty level (%)	0.079** 0.014	0.132** 0.018
Annual CHC grant expenditures (\$, in 10000s)	$1.86 \times 10^{-5}+$ 1.46×10^{-5}	9.64×10^{-7} 1.79×10^{-5}
Special population homeless health center		
No	Ref	Ref
Yes	0.035** 0.008	0.020 0.013
Unemployment rate (state - %)	-0.002 0.003	0.005 + 0.003
Year		
2012	Ref	Ref
2013	0.008** 0.003	-0.009* 0.003
2014	0.016** 0.003	-0.055** 0.005
2015	0.025** 0.004	-0.088** 0.006
2016	0.028** 0.004	-0.102** 0.007
2017	0.023** 0.005	-0.104** 0.008
2018	0.017** 0.005	-0.108** 0.008
Constant	0.007 0.052	0.585** 0.085
Observations	5353	5353
Adjusted R-squared	0.70	0.69

Notes. Authors' analysis of data from the Uniform Data System, Kaiser Family Foundation, and the Bureau of Labor Statistics. The pre-expansion reference period is the average of outcomes from 2012-2013. The "Medicaid expansion status × time since expansion" coefficients are the coefficients of interest. These coefficients indicate the estimated effect of the Medicaid expansion by estimating whether the change in the average outcomes from the pre-expansion period (2012-2013) to the particular post-expansion period among the expansion-state CHCs minus the change in the average outcomes from the pre-expansion period (2012-2013) to the equivalent post-expansion-period among the non-expansion-state CHCs was statistically significant. State fixed effects estimates are not shown.

+ $P < .10$. * $P < .05$. ** $P < .01$.

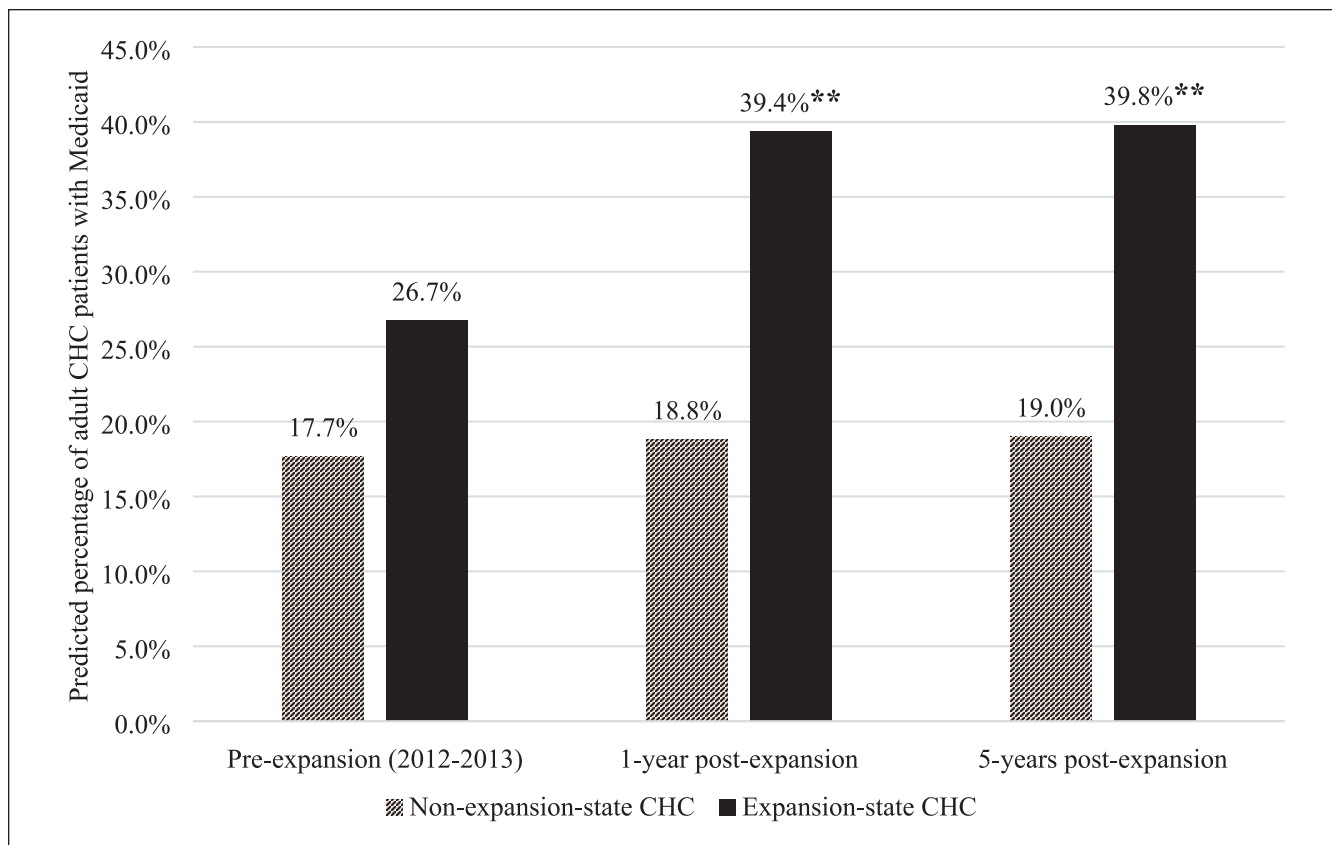


Figure 2. Predicted percentage of adult CHC patients with Medicaid coverage, by state Medicaid expansion status and time since expansion: 2012 to 2018.

Notes. Author's analysis of data from the Uniform Data System, Kaiser Family Foundation, and the Bureau of Labor Statistics. A ** indicated the difference in the average increase in the outcome from the pre-expansion period (2012-2013) to the post-expansion period (1-year or 5-years post-expansion) among the expansion-state CHCs minus the difference in the outcome from the pre-expansion period (2012-2013) to the same post-expansion-period among the non-expansion-state CHCs was statistically significant, $P < .01$. The magnitude of these difference-in-differences estimates are equivalent to the "Expansion-state CHC at 1-year post-expansion" and "Expansion-state CHC at 5-years post-expansion" coefficients shown in Table 2.

the Medicaid expansion was associated with a significant increase in the annual number of Medicaid-covered adult CHC patients at all post-expansion periods, compared to changes over the same periods at the non-expansion-state CHCs. For example, at 5-years post-expansion, the Medicaid expansion was associated with an average relative increase of 37.4% in the number of annual adult CHC patients with Medicaid coverage ($\beta = 0.374$; $P < .001$) and an average relative decrease of 51.6% in the number of annual uninsured adult CHC patients ($\beta = 0.516$; $P < .001$), compared to the changes experienced at the non-expansion-state CHCs over the same time period. The average expansion-state CHC had 13 679 adult patients before the Medicaid expansion, including 4079 Medicaid-covered adult patients and 4832 uninsured adult patients (data not shown).

The estimates of the additional regression models including the CHCs from CA, CT, MN, NJ, WA, and DC were also similar to the main model estimates, though the estimated policy effects of the Medicaid expansion on each outcome were slightly greater in magnitude, perhaps

explained by the pre-2014 anticipatory expansion efforts already underway in these states (Table B3).

Discussion

Medicaid coverage provides critical protections to low-income primary care patients and financial opportunities to CHCs operating in medically-underserved communities. Building on earlier studies, findings from this study suggest that the average increase in the percentage of adult patients covered by Medicaid and the average decrease in the percentage of uninsured adult patients attributable to the ACA Medicaid expansion were similar in magnitude at 1-year post-expansion and at 5-years post-expansion. In other words, CHCs in states that adopted the Medicaid expansion in 2014 appear to have maintained initial increases in the size of their Medicaid-covered adult patient populations and initial decreases in the size of their uninsured, typically uncompensated adult patient populations by 5-years post-expansion (ie, beyond the initial

post-expansion changes), relative to changes in the non-expansion-state CHCs over the same time period.

These findings are supported by the robustness tests estimating the changes in the total adult CHC patients covered by Medicaid and uninsured adult CHC patients over time. Extrapolating the results of the robustness test analysis suggests the average expansion-state CHC could gain about 1525 Medicaid-covered adult patients—whether existing or new—and experience a decrease of about 2493 uninsured adult patients by 5-years post-expansion. As described below, this study could not directly measure how many patients transitioned from being uninsured to covered. However, these findings likely indicate a transition to Medicaid coverage for many previously-uninsured adult CHC patients, especially considering that the average expansion-state CHC gained 3087 adult patients from 2013 to 2018. Other insurance mechanisms likely contributed to additional coverage opportunities.

The main findings of this study also suggest that the Medicaid expansion affected insurance coverage outcomes for CHC patient populations and the general adult population in similar ways. By 2015, the adjusted decrease in the percentage of uninsured adult CHC patients attributable to the ACA Medicaid expansion was similar to the estimated decrease in uninsurance experienced in a nationally-representative sample of the general adult population living in the 2014 expansion states.¹⁰ Moreover, in a recent study using similar methods and covering a similar study period, Olfson et al³⁸ found that the percentage of uninsured adults in the expansion states decreased by 6.6 percentage points (95% CI -9.1, -4.1) and the percentage of Medicaid-covered adults increased 12.1 (95% CI 9.9, 14.14) percentage points from 2012-2013 to 2014-2017, compared to adults living in non-expansion states.

This study may have important public policy implications. For the states that have not yet adopted the ACA Medicaid expansion,²⁵ including large and economically diverse states like Texas and Florida, 2 states with over 900 000 combined uninsured adult CHC patients in 2018,² adopting the Medicaid expansion may also significantly increase the size of the Medicaid-covered patient populations receiving care at CHCs in those states over at least a 5-year span. On the other hand, the benefits described in this study may be jeopardized for both new and existing expansion-state CHCs should the ACA be judged unconstitutional without intervention from CHC advocates or without the adoption of new programs supporting the expanded Medicaid benefits at the state or federal level (eg, Section 1115 demonstrations). The federal government was expected to pay \$82 billion in 2020 alone for coverage for adults made eligible by the ACA,³⁹ with states contributing only a small portion of funding for expansion beneficiaries.

In 2019, the US Court of Appeals for the fifth Circuit held oral argument in *Texas v. United States*, a case originally filed by Republican state attorneys-general after the US

Congress set the shared responsibility (individual mandate) payment to \$0 beginning in 2019 through the 2017 Tax Cuts and Jobs Act.⁴⁰ Even though the constitutionality of the individual mandate was upheld as a matter of Congressional taxing authority in *National Federation of Independent Business v. Sebelius* (2012), recent plaintiffs successfully argued that the zero-dollar penalty invalidated the mandate as a tax.^{41,42} For this reason, maintaining the policy effects investigated in this study could depend on how the US Supreme Court judges the constitutionality of the ACA in 2021, a year after CHCs experienced new financial uncertainties caused by the COVID-19 pandemic.

Limitations

This study had several limitations. First, the data were reported at the CHC grantee level. Grantee-level data can mask the counteractive effects of patient movement in and out of CHCs. As such, only aggregate changes in the average outcomes between the policy treatment and comparison groups could be observed. Changes in individual patient coverage outcomes could not be examined, nor could it be discerned whether patients had new or existing sources of Medicaid coverage. Although patient-level conclusions cannot be drawn from this analysis, the results of this study may suggest that expansion-state CHCs did not lose their Medicaid-covered patients to other providers even over longer periods post-expansion, which would address the concerns of earlier authors.¹⁹ This study may serve to inform patient-level studies to examine coverage retention at CHCs using medical record data or primary data.

Second, because this study examined data aggregated at the grantee level, the statistical models could not adjust for county-level factors. Although previous studies have linked county-level data (eg, poverty rate or rurality) to each CHC's headquarters location as reported in the UDS using Federal Information Processing Standards codes, it would be erroneous to do so because county-level measures of rurality and other county-level indicators may not be the same for all clinical sites operated by a CHC.

Third, data limitations precluded the measurement of changes in CHC patient revenue over time. Thus, explicit conclusions about the effect of the ACA Medicaid expansion on CHC revenue over time could not be made. However, inferences can be made about this relationship by examining the aggregate changes in the percentage of patients with Medicaid coverage, whose services are reimbursable, relative to changes in the percentage of uninsured CHC patients, whose services are typically uncompensated.¹ Moreover, supporting evidence shows health center Medicaid revenue did increase 97% from 2010 to 2017, mostly because of enrollment increases.⁴³

Fourth, all nonexperimental studies have threats to the validity of causal interpretations. Although the analytic

approach in this study adjusted for unobserved characteristics that are time invariant in states, time-variant unobserved characteristics that are correlated with the policy and outcome variables could still cause bias.

Finally, this study sought to build upon the results of earlier studies examining CHCs in the states that first adopted the ACA Medicaid expansion in 2014. For this reason, the generalizability of the findings is limited to the states included in the analytic sample.

Conclusions

Findings from this study suggest that the average increase in the percentage of adult patients covered by Medicaid and the average decrease in the percentage of uninsured adult patients attributable to the ACA Medicaid expansion were similar in magnitude at 1-year post-expansion and at 5-years post-expansion. CHC services and operations critically depend on patient Medicaid revenue.⁸ These findings suggest the ACA Medicaid expansion may help CHCs establish the longer-term financial security needed to expand their services and better pursue their core mission in medically-underserved communities across the US.¹⁹ More Medicaid-covered patients can increase patient revenue, and greater revenue can help CHC administrators incrementally expand operations and treatment capacity.³

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