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The Affordable Care Act Attenuates Financial Strain According to Poverty Level

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Abstract

We use data from the 2011–2016 National Health Interview Survey to examine how the Patient Protection and Affordable Care Act (ACA) has influenced disparities in health care–related financial strain, access to care, and utilization of services by categories of the Federal Poverty Level (FPL). We use multivariable regression analyses to determine the ACA's effects on these outcome measures, as well as to determine how changes in these measures varied across different FPL levels. We find that the national implementation of the ACA's insurance expansion provisions in 2014 was associated with improvements in health care–related financial strain, access, and utilization. Relative to adults earning more than 400% of the FPL, the largest effects were observed among those earning between 0% to 124% and 125% to 199% of the FPL after the implementation of the ACA. Both groups experienced reductions in disparities in financial strain and uninsurance relative to the highest FPL group. Overall, the ACA has attenuated health care–related financial strain and improved access to and the utilization of health services for low- and middle-income adults who have traditionally not met income eligibility requirements for public insurance programs. Policy changes that would replace the ACA with less generous age-based tax subsidies and reductions in Medicaid funding could reverse these gains.

Keywords

health policy, health policy research, health care delivery, HSR, health disparities, health economics, quantitative methods, secondary analysis, large data sets, ACA

What do we already know about this topic?

The ACA has helped to improve health care access and utilization for low-income individuals.

How does your research contribute to the field?

We examine poverty-driven disparities in health-related financial strain, and specifically examine how poverty-driven disparities in financial strain have changed as a result of the ACA.

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

Our most original finding is that the national implementation of the ACA appears to have attenuated health care–related financial uncertainty and strain among those in the low- and middle-FPL categories, making these groups the most sensitive to potential repeal efforts.

Introduction

The Patient Protection and Affordable Care Act (ACA) represented the largest legislative change to health care financing since the 1960s, with key provisions focused on expanding insurance to working-age adults and their children. By 2016, the uninsured rate among adults aged 18 to 64 years had fallen to a historic low of 12.3%, a 40% reduction from its high in 2013.¹ The results of the 2016 presidential election, however, signaled a shift toward more conservative health care policy. Republican leaders in Congress and the Trump administration proposed legislation and enacted

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executive orders to curtail provisions of the ACA. The Congressional Budget Office (CBO) estimated that the proposed legislation would reverse nearly all of the gains in coverage attributable to the ACA.^{2,3} As policy makers consider changes to the ACA, it is important to determine the impact of the ACA on different population groups.

A hallmark feature of the ACA is that it aims to improve population health by reducing barriers to health care and improving insurance coverage, quality, and affordability.⁴ The ACA specifically targets populations that have had historically high rates of uninsurance but did not meet income eligibility thresholds for Medicaid or other means-tested safety-net programs. Prior to the ACA, the median Medicaid income eligibility level for childless adults was 61% of the Federal Poverty Level (FPL) across states,⁵ and eligibility levels for adults with children varied by state.⁶ This rendered many poor and “near-poor”⁷ adults ineligible for Medicaid, while still not having the means to afford coverage in the private insurance market. This gap in access to care has contributed to persistent disparities in the utilization of health care, particularly among near-poor households, which has left many of them financially vulnerable when health care needs arise.^{8,9}

Recognizing this gap, the crafters of the ACA sought to extend affordable coverage to individuals through the following 3 primary means: (1) expansion of the Medicaid income eligibility threshold for adults to 133% of the FPL, (2) providing federal tax credits to reduce private insurance premium costs for those with incomes between 100% and 400% of the FPL, and (3) cost-sharing subsidies to reduce out-of-pocket spending for those with incomes between 100% and 250% of the FPL. These tax credits allowed individuals to purchase insurance through health insurance marketplace exchanges that were also created through the ACA.

Since the ACA was enacted, studies have demonstrated that insurance coverage and health care access and utilization have improved across the country, particularly among groups that have historically had low levels of coverage, such as low-income individuals.¹⁰⁻¹⁶ What is not well established, however, is how financial strain and vulnerability have improved as a result of the ACA’s increase in access, specifically with regard to different FPL groups. Other insurance expansion programs, such as the Massachusetts Health Reform and Oregon Health Insurance Experiment, have been shown that insurance reduced health-related financial stress.¹⁷⁻¹⁹ Early evidence has shown that Medicaid expansion has been associated with a reduction in credit card balances, improvements in credit scores, and a reduction in delinquent payments for those in expansion states.^{20,21} Those on Medicaid, however, represent only a portion of the newly insured population, and any future health reform is likely to affect those who have obtained insurance on the exchanges as well.¹ Given the uncertainty surrounding the future of the ACA, it is important to identify which population groups are likely to be impacted by future reforms, including those that benefit from major coverage provisions of the ACA that are targeted based on the FPL.

In this study, we examine the change from preimplementation of the ACA to postimplementation in health care–related financial strain and health care access and utilization. The study has important implications for reform efforts via identification of the groups most sensitive to repeal of provisions targeted based on FPL. We hypothesize that, all else equal, (1) the ACA’s insurance expansion will have attenuated financial strain, and (2) disparities in financial vulnerability between populations with income just above the eligibility threshold for Medicaid and those in higher-FPL categories will have attenuated post-ACA as the “near poor” enroll in health insurance via the exchanges. To test these hypotheses, we use nationally representative data to examine changes in health care financial strain, access, and utilization from before and after the implementation of the ACA. In addition, our analyses highlight changes in FPL-driven disparities in health care financial strain, and utilization among working-age adults.

Data and Methods

Data

We use data from the 2011 through 2016 National Health Interview Survey (NHIS). This annual national survey provides information on health-related financial strain, insurance coverage, health care utilization, and socioeconomic and demographic information, among other measures, for the civilian noninstitutionalized population in the United States.²² NHIS interviews are conducted in person, with all adult family members in sampled households over the age of 17 years invited to participate. In addition, we make use of the adult core, in which one randomly selected adult answers additional detailed questions relating to his or her health and health care behaviors. Our sample consists of 133 672 adults aged 18 to 64 years, with FPL categories of 0% to 124%, 125% to 199%, 200% to 299%, 300% to 399%, and $\geq 400\%$. We utilized FPL rather than family income, as FPL is a standardized measure of income taking into account family size. Our FPL categories were chosen to match as closely as possible to the 133% FPL threshold in Medicaid expansion states, as well as the cost sharing and premium supports available under the ACA. These data are nonidentifying, publically available, and are exempt from institutional review board review.

Measures

To assess the impact of the ACA’s insurance expansion and to stay consistent with the literature, we examine outcomes across 3 domains: health care financial strain, health care access, and health care utilization.^{9,13,23} Health care financial strain was measured as not being able to afford prescription medications, delaying care due to costs, not getting necessary care due to costs, having problems paying medical bills in the past 12 months, and whether the participant had worried in the past 12 months that he or she would be unable to pay his or her medical bills if he or she were to become ill or injured. Access was measured by insurance status and having experienced a

long wait time in a physician's (doctor or other medical professional) office in the past 12 months. Utilization was measured as having had at least 1 physician visit and having had at least 1 emergency department (ED) visit in the past 12 months.

To guide the selection of covariates that could affect health care access, utilization, and financial strain, we relied on the Andersen behavioral model of health services utilization.²⁴ In this framework, covariates can be categorized across the domains of predisposing, enabling, and need. Predisposing covariates consisted of sex, age (18-34 years, 35-44 years, 45-54 years, 55-64 years) and race/ethnicity (non-Latino white, non-Latino black, Latino, non-Latino other). In addition to FPL, US citizenship, education (less than high school, high school, bachelor's degree, advanced degree), language of interview (English, Spanish, English and Spanish, other), marital status (married, unmarried), family structure (1 adult, no children; multiple adults, no children; 1 adult, at least 1 child; multiple adults, at least 1 child), and Census region (Northeast, Midwest, South, West) composed the enabling factors. Need measures consisted of self-reported health status (excellent, very good, good, fair, poor) and having any functional limitations (limited in any way, not limited in any way).

Statistical Analyses

All analyses were conducted with Stata 14 and used sampling weights and design variables to account for the complex sampling design of NHIS.²⁵ To assess how exposure to the ACA has affected our sample, we compare the pre-ACA period (2011-2013) with the post-ACA period following full national implementation of the ACA coverage provisions (2014-2016).

First, we summarize trends in outcomes by FPL over time (2011-2013, 2014-2016). Second, multivariable linear probability models were used to test the associations between the ACA and the outcome measures, as well as to examine FPL-driven disparities in the outcomes. Finally, we interacted the indicator variable for national ACA implementation (years 2014-2016) with FPL to assess how the ACA has affected FPL-driven disparities in the outcome measures. We make use of linear probability models, as the coefficients are additive, which makes the interaction terms directly interpretable. In addition, because the marginal effects are the quantities of interest, the linear probability model produces marginal effects similar to its nonlinear counterparts.²⁶ As a robustness check, we ran all models using multivariable logistic regression and found no observable changes in the significance or direction of the effects. The $\geq 400\%$ FPL category served as our reference, and the pre-ACA period (2011-2013) served as the reference period. Wald tests of the overall significance of the interaction terms were conducted for all outcomes. Again, as a robustness check, we conducted additional analyses that excluded young adults (ages 18-26 years) and omitted the years 2011-2012. These results are available in Tables A2-A5), and they are overall consistent with the main results of the study.

Results

Table 1 presents chi-squared analyses of the outcome measures stratified by FPL across time. Full national implementation of ACA's insurance expansion corresponded with improvements in outcomes relative to previous years. Those in the $\geq 400\%$ FPL category had the most favorable outcomes both before and after the national implementation of the ACA and experienced the least variation within outcomes over time. Over time, the largest variation in outcomes was found within the 0% to 124% and 125% to 199% FPL categories, with the post-ACA time period observing the largest reductions in measures of financial strain and the largest increases in insurance coverage. In addition, these variations were significantly different across the FPL categories for all of our outcome measures both in the pre and post periods. These results can be seen in Appendix Table A1.

In Table 2, we show the adjusted associations of FPL and year with the health care financial strain, access, and utilization outcomes. Compared with adults earning more than 400% of the FPL, those in the lower FPL groups were more likely to have experienced financial strain, were less likely to have health insurance, and more likely to have utilized health care, with the exception of physician visits. This was particularly true for the 0% to 124% and 125% to 199% FPL categories, which had the worst outcomes relative to the highest FPL category. Compared with the $\geq 400\%$ FPL group, the 125% to 199% FPL group was 13.7% more likely to delay medical care due to costs, 12.1% more likely to not get care due to costs, 17.2% more likely to report having a problem paying medical bills, and 22% more likely to worry about being able to pay for medical bills.

Relative to the pre-ACA period, the post-ACA period was associated with significant improvements in the outcome measures (Table 2). The national implementation of the ACA was associated with significant improvements in all of the financial strain measures. In addition, the likelihood of being uninsured was reduced by 6.5% after national implementation of the ACA relative to the pre-ACA period.

In Table 3, we show interactions between FPL and time variables to examine how implementation of the ACA affected FPL-related disparities in health care financial strain, access, and utilization. FPL-driven disparities relative to the highest FPL group improved after full national implementation of the ACA, with the largest improvements being observed for the 0% to 124% and 125% to 199% groups. Both groups experienced significant reductions in FPL-driven disparities in the measures of financial strain. All FPL groups had significantly lower likelihoods of not being able to afford prescription medication and being unable to get needed care due to costs. These were also the only 2 groups that were more likely to have had a physician visit relative to the highest FPL group in the post-ACA era. Those in the 0% to 124% and 125% to 199% FPL groups experienced an average reduction in uninsurance of 11.2% and 14.1% in the

Table 1. Financial Strain, Health Care Access and Utilization by FPL and Time, NHIS 2011-2016 (N = 133°672).

Outcome	≥400% FPL			300-399% FPL			200-299% FPL			125-199% FPL			0-124% FPL		
	Pre-ACA	Post-ACA	P value	Pre-ACA	Post-ACA	P value	Pre-ACA	Post-ACA	P value	Pre-ACA	Post-ACA	P value	Pre-ACA	Post-ACA	P value
Financial strain															
Couldn't afford prescription medication in past 12 months due to cost	0.030	0.025	.027	0.030	0.025	<.001	0.111	0.086	<.001	0.168	0.125	<.001	0.192	0.146	<.001
Delayed care due to cost in past 12 months	0.061	0.053	.003	0.121	0.110	.061	0.183	0.148	<.001	0.248	0.181	<.001	0.229	0.174	<.001
Didn't get needed care due to cost in past 12 months	0.032	0.027	.019	0.079	0.062	<.001	0.128	0.103	<.001	0.198	0.152	<.001	0.203	0.152	<.001
Problems paying medical bills in past 12 months	0.078	0.067	<.001	0.182	0.157	<.001	0.249	0.210	<.001	0.331	0.331	<.001	0.617	0.547	.0168
Worried about paying medical bills in past 12 months	0.399	0.372	<.001	0.036	0.030	.044	0.623	0.577	<.001	0.700	0.630	<.001	0.617	0.547	<.001
Access															
Currently uninsured	0.049	0.036	<.001	0.127	0.095	<.001	0.237	0.161	<.001	0.373	0.234	<.001	0.354	0.236	<.001
Waited too long in physician's office in past 12 months	0.035	0.029	.004	0.021	0.017	.002	0.037	0.040	.451	0.053	0.050	.505	0.067	0.060	.028
Utilization															
≥1 Physician visit in past 12 months	0.856	0.860	.314	0.809	0.806	.691	0.754	0.768	.054	0.710	0.742	<.001	0.727	0.758	<.001
≥1 ED visit in past 12 months	0.137	0.130	.082	0.157	0.160	.658	0.187	0.172	<.001	0.233	0.240	.268	0.303	0.299	.5667

Note. Pre-ACA is an indicator for the years 2011-2013. Post-ACA is an indicator for the years 2014-2016. All P values are shown for chi-squared analyses. All statistics represent proportions. FPL = Federal Poverty Level; NHIS = National Health Interview Survey; ACA = Patient Protection and Affordable Care Act; ED = emergency department.

Table 2. Multivariable Regression Results of Financial Strain, Access, and Utilization, NHIS 2011-2016 (N = 133,672).

	Financial strain			Access			Utilization		
	Couldn't afford prescription medication in past 12 months due to cost	Delayed care due to cost in past 12 months	Didn't get needed care due to cost in past 12 months	Problems paying medical bills in past 12 months	Worried about paying medical bills in past 12 months	Currently uninsured	Waited too long in physician's office in past 12 months	≥ 1 physician visit in past 12 months	≥ 1 ED visit in past 12 months
Pre-ACA (2011-2013)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Post-ACA (2014-2016)	-0.024*** (-0.03 to -0.02)	-0.031*** (-0.04 to -0.03)	-0.025*** (-0.03 to -0.02)	-0.035*** (-0.04 to -0.03)	-0.047*** (-0.05 to -0.04)	-0.065*** (-0.07 to -0.06)	-0.005*** (-0.01 to -0.00)	0.013*** (0.01 to 0.02)	-0.003 (-0.01 to 0.00)
FPL									
0%-124%	0.099*** (0.09 to 0.11)	0.101*** (0.09 to 0.11)	0.105*** (0.10 to 0.11)	0.128*** (0.12 to 0.14)	0.130*** (0.12 to 0.14)	0.198*** (0.19 to 0.21)	0.007** (0.00 to 0.01)	-0.098*** (-0.11 to -0.09)	0.074*** (0.07 to 0.08)
125%-199%	0.090*** (0.08 to 0.10)	0.137*** (0.13 to 0.14)	0.121*** (0.11 to 0.13)	0.172*** (0.16 to 0.18)	0.220*** (0.21 to 0.23)	0.204*** (0.19 to 0.21)	0.003 (-0.00 to 0.01)	-0.107*** (-0.12 to -0.10)	0.039*** (0.03 to 0.05)
200%-299%	0.056*** (0.05 to 0.06)	0.094*** (0.09 to 0.10)	0.070*** (0.06 to 0.08)	0.129*** (0.12 to 0.14)	0.182*** (0.17 to 0.19)	0.122*** (0.11 to 0.13)	-0.002 (-0.01 to 0.00)	-0.076*** (-0.09 to -0.07)	0.005 (-0.00 to 0.01)
300%-399%	0.025*** (0.02 to 0.03)	0.049*** (0.04 to 0.06)	0.031*** (0.03 to 0.04)	0.075*** (0.07 to 0.08)	0.133*** (0.12 to 0.14)	0.048*** (0.04 to 0.05)	-0.004 (-0.01 to 0.00)	-0.038*** (-0.05 to -0.03)	-0.004 (-0.01 to 0.00)
400 and up	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref

Note. All models are adjusted for sex, age, race/ethnicity, income, education, citizenship status, self-reported health, interview language, functional limitations, marital status, family structure, and US Census Region. All regression results are presented as regression coefficients with 95% confidence intervals. NHIS = National Health Interview Survey; ED = emergency department; ACA = Patient Protection and Affordable Care Act; FPL = Federal Poverty Level.
*P < .05. **p < .01. ***p < .001.

Table 3. Multivariable Interaction Regression Results of Financial Strain, Health Care Access, and Utilization, NHIS 2011-2016 (N = 133,672).

	Financial strain			Access			Utilization		
	Couldn't afford prescription medication in past 12 months due to cost	Delayed care due to cost in past 12 months	Didn't get needed care due to cost in past 12 months	Problems paying medical bills in past 12 months	Worried about paying medical bills in past 12 months	Currently uninsured	Waited too long in physician's office in past 12 months	≥1 physician visit in past 12 months	≥1 ED visit in past 12 months
	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Pre-ACA (2011-2013)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Post-ACA (2014-2016)	-0.005** (-0.01 to -0.00)	-0.007** (-0.01 to -0.00)	-0.004* (-0.01 to -0.00)	-0.010*** (-0.02 to -0.00)	-0.028*** (-0.04 to -0.02)	-0.013*** (-0.02 to -0.01)	-0.006** (-0.01 to -0.00)	0.004 (-0.00 to 0.01)	-0.005 (-0.01 to 0.00)
Post-ACA x 0%-124%	-0.042*** (-0.05 to -0.03)	-0.050*** (-0.06 to -0.04)	-0.048*** (-0.06 to -0.04)	-0.042*** (-0.05 to -0.03)	-0.040*** (-0.06 to -0.02)	-0.099*** (-0.11 to -0.08)	-0.002 (-0.01 to 0.01)	0.020** (0.01 to 0.03)	0.001 (-0.01 to 0.01)
Post-ACA x 125%-199%	-0.040*** (-0.05 to -0.03)	-0.062*** (-0.07 to -0.05)	-0.044*** (-0.06 to -0.03)	-0.068*** (-0.08 to -0.05)	-0.046*** (-0.06 to -0.03)	-0.128*** (-0.14 to -0.11)	0.002 (-0.01 to 0.01)	0.025** (0.01 to 0.04)	0.011 (-0.00 to 0.03)
Post-ACA x 200%-299%	-0.018*** (-0.03 to -0.01)	-0.026*** (-0.04 to -0.01)	-0.020*** (-0.03 to -0.01)	-0.026*** (-0.04 to -0.01)	-0.020* (-0.04 to -0.00)	-0.065*** (-0.08 to -0.05)	0.008* (0.00 to 0.01)	0.013 (-0.00 to 0.03)	-0.007 (-0.02 to 0.01)
Post-ACA x 300%-399%	-0.011* (-0.02 to -0.00)	-0.003 (-0.01 to 0.01)	-0.012** (-0.02 to -0.00)	-0.012 (-0.03 to 0.00)	-0.009 (-0.03 to 0.01)	-0.018** (-0.03 to -0.01)	-0.001 (-0.01 to 0.01)	-0.006 (-0.02 to 0.01)	0.010 (-0.01 to 0.02)
Post-ACA x 400 and up	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
FPL									
0%-124%	0.120*** (0.11 to 0.13)	0.126*** (0.11 to 0.14)	0.129*** (0.12 to 0.14)	0.149*** (0.14 to 0.16)	0.150*** (0.13 to 0.17)	0.247*** (0.23 to 0.26)	0.008** (0.00 to 0.01)	-0.109*** (-0.12 to -0.10)	0.074*** (0.06 to 0.08)
125%-199%	0.111*** (0.10 to 0.12)	0.169*** (0.16 to 0.18)	0.144*** (0.13 to 0.15)	0.207*** (0.20 to 0.22)	0.243*** (0.23 to 0.26)	0.270*** (0.26 to 0.28)	0.002 (-0.00 to 0.01)	-0.120*** (-0.13 to -0.11)	0.033*** (0.02 to 0.04)
200%-299%	0.065*** (0.06 to 0.07)	0.107*** (0.10 to 0.12)	0.080*** (0.07 to 0.09)	0.143*** (0.13 to 0.15)	0.192*** (0.18 to 0.20)	0.155*** (0.14 to 0.16)	-0.006* (-0.01 to -0.00)	-0.083*** (-0.09 to -0.07)	0.008 (-0.00 to 0.02)
300%-399%	0.031*** (0.02 to 0.04)	0.051*** (0.04 to 0.06)	0.038*** (0.03 to 0.04)	0.082*** (0.07 to 0.09)	0.138*** (0.12 to 0.15)	0.058*** (0.05 to 0.07)	-0.003 (-0.01 to 0.00)	-0.036*** (-0.05 to -0.02)	-0.009 (-0.02 to 0.00)
400% and up	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Wald test of interactions (F-statistic)	152.52***	181.24***	206.08***	241.68***	261.68***	326.33***	5.14***	72.82***	49.94***

Note. All models are adjusted for sex, age, race/ethnicity, income, education, citizenship status, self-reported health, interview language, functional limitations, marital status, family structure, and US Census Region. All regression results are presented as regression coefficients with 95% confidence intervals. NHIS = National Health Interview Survey; ED = emergency department; ACA = Patient Protection and Affordable Care Act; FPL = Federal Poverty Level.

*P < .05. **P < .01. ***P < .001.

post-ACA era, respectively. The 200% to 299% FPL group was 0.8% more likely to experience a long wait time.

Discussion

We found that the national implementation of the ACA was associated with decreased health care financial strain, increased access to care, and increased utilization of services. Our most original finding is that the national implementation of the ACA appears to have attenuated health care–related financial uncertainty and strain among those in the low- and middle-FPL categories. A plausible explanation for this observation is that the ACA mandates that insurance plans cover the 10 essential health benefits and outlines metrics of affordability of insurance (eg, modified community rated premiums, standardization of benefits, caps on out-of-pocket spending). Given the potential impact of financial strain on physical and mental health via pathways such as stress, we believe future work is warranted to understand the specific pathways through which provisions of the ACA have alleviated financial strain. This is particularly important given initiatives by the legislative and executive branches to repeal key provisions of the ACA.

Our results on access and utilization largely corroborate results of previous work examining the ACA's impact on racial and ethnic minorities, low-income households, and those with low levels of education.^{12-15,27-29} The ACA was associated with lower rates of uninsurance but was not associated with differences in wait times, which indicates that the health care system was able to absorb the increased demand for primary care.^{30,31} We observed increases in physician visits but did not observe any significant changes in ED use. This is likely because insurance lowers the out-of-pocket cost of using the ED and thus leads to increased ED utilization; however, it could also prevent utilization among those who have been using the ED as a substitute for primary care, which could lead to mixed results.^{12-15,27}

In addition to improvement in the levels of financial strain, access, and utilization, FPL-driven disparities in these outcomes narrowed following national implementation of the ACA. Specifically, reductions in disparities were driven by improvements among the low- to middle-FPL groups that were greater in magnitude than those among the higher-FPL groups. After national ACA implementation, we found that adults in the 125% to 199% FPL group experienced the largest reductions in financial strain. These gains likely come from a combination of the Medicaid expansion and heavily subsidized private coverage premiums combined with cost-sharing reduction subsidies. For this FPL group, both Medicaid and private marketplace coverage are explicitly designed to minimize cost sharing. Despite these gains, however, disparities persist, and adults in lower FPL groups continue to have worse outcomes relative to those in the highest FPL group.

Collectively, our findings suggest those in low- to middle-FPL groups may be particularly sensitive to changes to the ACA; this is perhaps unsurprising given that these groups benefited the most from the main provisions of the ACA. While the

United States has several means-tested programs that offer assistance to the lowest income individuals (eg, Medicaid, Supplemental Nutrition Assistance Program recipients), few public assistance programs provide support to those living just above the FPL. This population has historically struggled with maintaining continuous health insurance coverage, accessing preventive services, and receiving care for chronic health conditions. Prior to the ACA, some of this population likely “churned” in and out of Medicaid with income fluctuations and experienced disjointed care, lapses in insurance, and poor outcomes.³² Policy makers should be sensitive to how future changes to the ACA will affect adults in these FPL groups, particularly with respect to increased financial strain that could arise from less generous coverage either through the elimination of cost-sharing reduction payments or cuts to Medicaid benefits as a result of new funding formulas. For example, in response to the government's elimination of cost-sharing reduction payments to insurers, states may allow the cost to be loaded onto the marketplace's silver plans. While this would leave those between 100% and 200% FPL unharmed due to income-based tax credits linked to the value of silver benchmark plans, it would benefit higher income exchange participants who will receive more generous tax credits than if cost-sharing reduction payments were continued.³³ In addition, with the removal of the individual mandate's financial penalty starting in 2019, 4 million individuals are expected to forego purchasing insurance. The CBO projects that premiums on the nongroup market are expected to rise by approximately 10%, increasing the financial strain on those who continue to obtain insurance through ACA marketplaces.³⁴

Limitations

There are several important limitations to our study. First, some of the ACA's provisions began in 2010, the year prior to the first year in our analyses. Thus, the pre-ACA indicator will be picking up the effects of programs such as the young adult mandate and states that engaged in the early expansion of Medicaid, which likely underestimates the effects of the post-ACA indicator. Given that some participants may have already benefitted from programs in the pre-ACA period, particularly for people in the 0% to 124% FPL group in the early Medicaid expansion states, this likely biases results to the null. Second, although we utilized national-level data, we are unable to control for state-level effects. Several ACA provisions, such as Medicaid expansion, were not implemented uniformly across states or at the same time. The inability to control for heterogeneity in the implementation of the various ACA provisions introduces potential bias into our study, which likely biases results to the null. Third, as with most survey questionnaires that require participants to remember behaviors and events, NHIS is subject to recall bias. Finally, as was previously mentioned, our FPL thresholds do not matchup perfectly to the levels specified in the ACA. Thus, it is possible that participants in the 0% to 124% FPL group who reside in nonexpansion states could cause the observed gains for their counterparts in expansion states to be underestimated.

Appendix
Table A1. Financial Strain, Health Care Access and Utilization by Time and FPL, NHIS 2011-2016 (N = 133 672).

Outcome	Pre-ACA						Post-ACA					
	≥400%	300%-399%	200%-299%	125%-199%	0%-124%	P value	≥400%	300%-399%	200%-299%	125%-199%	0%-124%	P value
Financial strain												
Couldn't afford prescription medication in past 12 months due to cost	0.030	0.030	0.111	0.168	0.192	<.001	0.025	0.025	0.086	0.125	0.146	<.001
Delayed care due to cost in past 12 months	0.061	0.121	0.183	0.248	0.229	<.001	0.053	0.110	0.148	0.181	0.174	<.001
Didn't get needed care due to cost in past 12 months	0.032	0.079	0.128	0.198	0.203	<.001	0.027	0.062	0.103	0.152	0.152	<.001
Problems paying medical bills in past 12 months	0.078	0.182	0.249	0.331	0.617	<.001	0.067	0.157	0.210	0.331	0.547	<.001
Worried about paying medical bills in past 12 months	0.399	0.036	0.623	0.700	0.617	<.001	0.372	0.030	0.577	0.630	0.547	<.001
Access												
Currently uninsured	0.049	0.127	0.237	0.373	0.354	<.001	0.036	0.095	0.161	0.234	0.236	<.001
Waited too long in physician's office in past 12 months	0.035	0.021	0.037	0.053	0.067	<.001	0.029	0.017	0.040	0.050	0.060	.035
Utilization												
≥1 Physician visit in past 12 months	0.856	0.809	0.754	0.710	0.727	<.001	0.860	0.806	0.768	0.742	0.758	<.001
≥1 ED visit in past 12 months	0.137	0.157	0.187	0.233	0.303	<.001	0.130	0.160	0.172	0.240	0.299	<.001

Note. Pre-ACA is an indicator for the years 2011-2013. Post-ACA is an indicator for the years 2014-2016. All P values are shown for chi-squared analyses. All statistics represent proportions. FPL = Federal Poverty Level; NHIS = National Health Interview Survey; ACA = Patient Protection and Affordable Care Act; ED = emergency department.

Table A2. Multivariable Regression Results of Financial Strain, Access, and Utilization, Ages 27-64 (N = 111,485).

	Financial strain			Access			Utilization		
	Couldn't afford prescription medication in past 12 months due to cost	Delayed care due to cost in past 12 months	Didn't get needed care due to cost in past 12 months	Problems paying medical bills in past 12 months	Worried about paying medical bills in past 12 months	Currently uninsured	Waited too long in physician's office in past 12 months	≥1 physician visit in past 12 months	≥1 ED visit in past 12 months
Pre-ACA (2011-2013)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Post-ACA (2014-2016)	-0.024*** (-0.03 to -0.02)	-0.031*** (-0.04 to -0.03)	-0.025*** (-0.03 to -0.02)	-0.033*** (-0.04 to -0.03)	-0.044*** (-0.05 to -0.04)	-0.061*** (-0.07 to -0.06)	-0.005*** (-0.01 to -0.00)	0.011*** (0.01 to 0.02)	-0.001 (-0.01 to 0.00)
FPL									
0%-124%	0.126*** (0.12 to 0.13)	0.133*** (0.12 to 0.14)	0.140*** (0.13 to 0.15)	0.158*** (0.15 to 0.17)	0.166*** (0.15 to 0.18)	0.247*** (0.24 to 0.26)	0.011*** (0.01 to 0.02)	-0.125*** (-0.14 to -0.12)	0.087*** (0.08 to 0.10)
125%-199%	0.104*** (0.10 to 0.11)	0.155*** (0.15 to 0.16)	0.140*** (0.13 to 0.15)	0.191*** (0.18 to 0.20)	0.234*** (0.22 to 0.25)	0.224*** (0.22 to 0.23)	0.004 (-0.00 to 0.01)	-0.116*** (-0.13 to -0.11)	0.039*** (0.00 to 0.05)
200%-299%	0.059*** (0.05 to 0.07)	0.102*** (0.09 to 0.11)	0.078*** (0.07 to 0.08)	0.141*** (0.13 to 0.15)	0.188*** (0.18 to 0.20)	0.128*** (0.12 to 0.14)	-0.003 (-0.01 to 0.00)	-0.080*** (-0.09 to -0.07)	0.005 (-0.00 to 0.01)
300%-399%	0.0263*** (0.0207 to 0.0319)	0.0519*** (0.0452 to 0.0585)	0.0341*** (0.0292 to 0.0390)	0.0781*** (0.0703 to 0.0858)	0.135*** (0.123 to 0.147)	0.0491*** (0.0426 to 0.0557)	-0.00383* (-0.00760 to -0.0000507)	-0.0375*** (-0.0463 to -0.0287)	-0.00434 (-0.0125 to 0.00380)
400% and up	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref

Source: NHIS 2011-2016.

Note: All models are adjusted for sex, age, race/ethnicity, income, education, citizenship status, self-reported health, interview language, functional limitations, marital status, family structure, and US Census Region. All regression results are presented as regression coefficients with 95% confidence intervals. ED = emergency department; ACA = Patient Protection and Affordable Care Act; FPL = Federal Poverty Level; NHIS = National Health Interview Survey. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table A3. Multivariable Interaction Regression Results of Health Care Financial Strain, Access and Utilization by FPL, Ages 27-64 (N = 111,485).

	Financial strain			Access			Utilization		
	Couldn't afford prescription medication in past 12 months due to cost	Delayed care due to cost in past 12 months	Didn't get needed care due to cost in past 12 months	Problems paying medical bills in past 12 months	Worried about paying medical bills in past 12 months	Currently uninsured	Waited too long in physician's office in past 12 months	≥1 physician visit in past 12 months	≥1 ED visit in past 12 months
Pre-ACA	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Post-ACA (2014-2016)	-0.005 ^{***} (-0.01 to -0.00)	-0.006 [*] (-0.01 to -0.001)	-0.003 (-0.01 to 0.00)	-0.010 ^{***} (-0.02 to -0.01)	-0.026 ^{***} (-0.04 to -0.02)	-0.011 ^{***} (-0.01 to -0.01)	-0.006 ^{***} (-0.01 to -0.00)	0.002 (-0.01 to 0.01)	-0.006 (-0.01 to 0.00)
Post-ACA × 0%-12.4%	-0.047 ^{***} (-0.06 to -0.03)	-0.065 ^{***} (-0.08 to -0.05)	-0.058 ^{***} (-0.07 to -0.04)	-0.045 ^{***} (-0.06 to -0.03)	-0.048 ^{***} (-0.07 to -0.03)	-0.111 ^{***} (-0.13 to -0.10)	-0.004 (-0.01 to 0.00)	0.020 ^{**} (0.01 to 0.04)	0.018 [*] (0.00 to 0.03)
Post-ACA × 12.5%-19.9%	-0.045 ^{***} (-0.06 to -0.03)	-0.068 ^{***} (-0.08 to -0.05)	-0.045 ^{***} (-0.06 to -0.03)	-0.070 ^{***} (-0.09 to -0.05)	-0.047 ^{***} (-0.07 to -0.03)	-0.137 ^{***} (-0.15 to -0.12)	0.002 (-0.01 to 0.01)	0.0264 ^{***} (0.01 to 0.04)	0.018 [*] (0.002 to 0.034)
Post-ACA × 20.0%-29.9%	-0.021 ^{***} (-0.03 to -0.01)	-0.026 ^{***} (-0.04 to -0.01)	-0.023 ^{***} (-0.03 to -0.01)	-0.028 ^{***} (-0.04 to -0.01)	-0.016 (-0.04 to 0.00)	-0.064 ^{***} (-0.08 to -0.05)	0.007 (-0.00 to 0.02)	0.011 (-0.00 to 0.03)	-0.009 (-0.02 to 0.01)
Post-ACA × 30.0%-39.9%	-0.011 [*] (-0.02 to -0.00)	-0.004 (-0.02 to 0.01)	-0.015 ^{**} (-0.02 to -0.01)	-0.011 (-0.03 to 0.00)	-0.003 (-0.03 to 0.02)	-0.019 ^{***} (-0.03 to -0.01)	-0.00 (-0.01 to 0.01)	-0.002 (-0.02 to 0.01)	0.005 (-0.01 to 0.02)
Post-ACA × 40.0% and up	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
FPL									
0%-12.4%	0.149 ^{***} (0.14 to 0.16)	0.165 ^{***} (0.15 to 0.18)	0.169 ^{***} (0.16 to 0.18)	0.180 ^{***} (0.17 to 0.19)	0.189 ^{***} (0.17 to 0.21)	0.302 ^{***} (0.29 to 0.32)	0.013 ^{***} (0.01 to 0.02)	-0.135 ^{***} (-0.15 to -0.12)	0.078 ^{***} (0.07 to 0.09)
12.5%-19.9%	0.127 ^{***} (0.12 to 0.14)	0.190 ^{***} (0.18 to 0.20)	0.164 ^{***} (0.15 to 0.17)	0.228 ^{***} (0.21 to 0.24)	0.258 ^{***} (0.24 to 0.27)	0.295 ^{***} (0.28 to 0.31)	0.003 (-0.00 to 0.01)	-0.129 ^{***} (-0.143 to -0.116)	0.030 ^{***} (0.02 to 0.04)
20.0%-29.9%	0.070 ^{***} (0.06 to 0.08)	0.115 ^{***} (0.11 to 0.13)	0.089 ^{***} (0.08 to 0.10)	0.155 ^{***} (0.14 to 0.17)	0.196 ^{***} (0.18 to 0.21)	0.160 ^{***} (0.15 to 0.17)	-0.006 [*] (-0.01 to -0.00)	-0.085 ^{***} (-0.09 to -0.07)	0.009 (-0.00 to 0.02)
30.0%-39.9%	0.032 ^{***} (0.02 to 0.04)	0.054 ^{***} (0.05 to 0.06)	0.042 ^{***} (0.04 to 0.05)	0.084 ^{***} (0.07 to 0.09)	0.138 ^{***} (0.12 to 0.15)	0.0596 ^{***} (0.05 to 0.07)	-0.003 (-0.01 to 0.00)	-0.037 ^{***} (-0.05 to -0.03)	-0.007 (-0.02 to 0.00)
40.0% and up	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Wald test of interactions (F-statistic)	171.69 ^{***}	200.39 ^{***}	256.08 ^{***}	269.52 ^{***}	232.72 ^{***}	423.01 ^{***}	6.25 ^{***}	87.13 ^{***}	45.22 ^{***}

Source: NHIS 2011-2016.

Note. All models are adjusted for sex, age, race/ethnicity, income, education, citizenship status, self-reported health, interview language, functional limitations, marital status, family structure, and US Census Region. All regression results are presented as regression coefficients with 95% confidence intervals. FPL = Federal Poverty Level; ED = emergency department; ACA = Patient Protection and Affordable Care Act; NHIS = National Health Interview Survey. *p < .05. **p < .01. ***p < .001.

Table A4. Multivariable Regression Results of Financial Strain, Access, and Utilization, NHIS 2013-2016 (N = 88°945).

	Financial strain			Access			Utilization		
	Couldn't afford prescription medication in past 12 months due to cost	Delayed care due to cost in past 12 months	Didn't get needed care due to cost in past 12 months	Problems paying medical bills in past 12 months	Worried about paying medical bills in past 12 months	Currently uninsured	Waited too long in physician's office in past 12 months	≥1 physician visit in past 12 months	≥1 ED visit in past 12 months
Pre-ACA (2013)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Post-ACA	-0.020 ^{***} (-0.02 to -0.01)	-0.020 ^{***} (-0.02 to -0.01)	-0.020 ^{***} (-0.02 to -0.01)	-0.030 ^{***} (-0.03 to -0.02)	-0.040 ^{***} (-0.05 to -0.03)	-0.06 ^{***} (-0.07 to -0.06)	0.001 (-0.00 to 0.00)	0.01 ^{***} (0.01 to 0.02)	0.001 (-0.01 to 0.01)
FPL									
0%-124%	0.090 ^{***} (0.08 to 0.10)	0.090 ^{***} (0.08 to 0.10)	0.090 ^{***} (0.08 to 0.10)	0.100 ^{***} (0.1 to 0.1)	0.100 ^{***} (0.10 to 0.10)	0.200 ^{***} (0.20 to 0.20)	0.007 ^{**} (0.00 to 0.01)	-0.090 ^{***} (-0.10 to -0.08)	0.08 ^{***} (0.06 to 0.09)
125%-199%	0.080 ^{***} (0.07 to 0.08)	0.100 ^{***} (0.1 to 0.1)	0.100 ^{***} (0.10 to 0.10)	0.200 ^{***} (0.1 to 0.2)	0.200 ^{***} (0.20 to 0.20)	0.200 ^{***} (0.20 to 0.20)	0.004 (-0.00 to 0.01)	-0.100 ^{***} (-0.10 to -0.09)	0.04 ^{***} (0.03 to 0.05)
200%-299%	0.05 ^{***} (0.04 to 0.06)	0.090 ^{***} (0.08 to 0.10)	0.070 ^{***} (0.06 to 0.07)	0.100 ^{***} (0.10 to 0.10)	0.200 ^{***} (0.20 to 0.20)	0.100 ^{***} (0.10 to 0.10)	-0.001 (-0.01 to 0.00)	-0.070 ^{***} (-0.09 to -0.06)	0.003 (-0.01 to 0.01)
300%-399%	0.020 ^{***} (0.02 to 0.03)	0.050 ^{***} (0.04 to 0.06)	0.030 ^{***} (0.02 to 0.03)	0.070 ^{***} (0.06 to 0.08)	0.100 ^{***} (0.10 to 0.10)	0.040 ^{***} (0.04 to 0.05)	-0.001 (-0.01 to 0.03)	-0.040 ^{***} (-0.05 to -0.03)	0.000 (-0.01 to 0.01)
400% and up	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref

Note. All models are adjusted for sex, age, race/ethnicity, income, education, citizenship status, self-reported health, interview language, functional limitations, marital status, family structure, and US Census Region. All regression results are presented as regression coefficients with 95% confidence intervals. NHIS = National Health Interview Survey; ED = emergency department; ACA = Patient Protection and Affordable Care Act; FPL = Federal Poverty Level. *p < .05. **p < .01. ***p < .001.

Table A5. Multivariable Interaction Regression Results of Health Care Financial Strain, Access and Utilization by FPL, NHIS 2013-2016 (N = 88°945).

	Financial strain			Access			Utilization		
	Couldn't afford prescription medication in past 12 months due to cost	Delayed care due to cost in past 12 months	Didn't Get needed care due to cost in past 12 months	Problems paying medical bills in past 12 months	Worried about paying medical bills in past 12 months	Currently uninsured	Waited too long in physician's office in past 12 months	≥1 physician visit in past 12 months	≥1 ED visit in past 12 months
Pre-ACA (2013)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Post-ACA (2014-2016)	-0.004 (-0.01 to 0.00)	-0.00 (-0.01 to 0.01)	-0.001 (-0.01 to 0.00)	-0.01 (-0.02 to 0.00)	-0.020* (-0.03 to -0.01)	-0.010*** (-0.02 to -0.01)	-0.002 (-0.01 to 0.00)	0.004 (-0.01 to 0.02)	0.001 (-0.01 to 0.01)
Post-ACA × 0%-124%	-0.040*** (-0.05 to -0.02)	-0.040*** (-0.05 to -0.02)	-0.04*** (-0.06 to -0.02)	-0.03*** (-0.05 to -0.01)	-0.040** (-0.07 to -0.01)	-0.100*** (-0.10 to -0.08)	0.003 (-0.01 to 0.01)	0.020 (-0.00 to 0.04)	-0.002 (-0.02 to 0.02)
Post-ACA × 125%-199%	-0.020** (-0.04 to -0.01)	-0.050*** (-0.06 to -0.03)	-0.030*** (-0.05 to -0.02)	-0.070*** (-0.09 to -0.04)	-0.0500*** (-0.07 to -0.03)	-0.100*** (-0.20 to -0.10)	0.007 (-0.00 to 0.02)	0.020* (0.00 to 0.05)	0.007 (-0.01 to 0.03)
Post-ACA × 200%-299%	-0.010 (-0.03 to 0.00)	-0.020* (-0.04 to -0.01)	-0.02** (-0.04 to -0.01)	-0.020 (-0.04 to 0.00)	-0.030* (-0.05 to -0.00)	-0.060*** (-0.08 to -0.04)	0.010** (0.00 to 0.02)	0.020 (-0.00 to 0.04)	-0.006 (-0.02 to 0.01)
Post-ACA × 300%-399%	-0.007 (-0.02 to 0.01)	-0.001 (-0.02 to 0.020)	-0.010 (-0.02 to 0.00)	-0.010 (-0.03 to 0.01)	-0.020 (-0.05 to 0.01)	-0.020* (-0.04 to -0.00)	-0.007 (-0.02 to 0.00)	-0.003 (-0.03 to 0.02)	0.001 (-0.02 to 0.02)
Post-ACA × 400% and up	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
FPL									
0%-124%	0.100*** (0.10 to 0.10)	0.100*** (0.10 to 0.10)	0.100*** (0.10 to 0.10)	0.100*** (0.10 to 0.20)	0.100*** (0.10 to 0.20)	0.200*** (0.2 to 0.3)	0.005 (-0.00 to 0.01)	-0.100*** (-0.10 to -0.09)	0.080*** (0.06 to 0.09)
125%-199%	0.090*** (0.08 to 0.10)	0.200*** (0.10 to 0.20)	0.100*** (0.10 to 0.20)	0.200*** (0.20 to 0.20)	0.200*** (0.20 to 0.30)	0.300*** (0.30 to 0.30)	-0.002 (-0.01 to 0.01)	-0.100*** (-0.1 to -0.10)	0.040*** (0.02 to 0.06)
200%-299%	0.060*** (0.05 to 0.07)	0.100*** (0.09 to 0.10)	0.080*** (0.07 to 0.10)	0.100*** (0.10 to 0.20)	0.200*** (0.20 to 0.20)	0.200*** (0.10 to 0.20)	-0.010* (-0.02 to -0.00)	-0.090*** (-0.10 to -0.07)	0.010 (-0.01 to 0.02)
300%-399%	0.030*** (0.02 to 0.04)	0.050*** (0.03 to 0.06)	0.040*** (0.02 to 0.05)	0.080*** (0.06 to 0.10)	0.100*** (0.10 to 0.20)	0.060*** (0.04 to 0.07)	0.003 (-0.01 to 0.01)	-0.040*** (-0.06 to -0.02)	-0.010 (-0.02 to 0.02)
400% and up	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Wald test of interactions (F-statistic)	160.51***	170.68***	202.00***	245.70***	257.34***	383.53***	2.37*	78.83***	50.11***

Note. All models are adjusted for sex, age, race/ethnicity, income, education, citizenship status, self-reported health, interview language, functional limitations, marital status, family structure, and US Census Region. All regression results are presented as regression coefficients with 95% confidence intervals. FPL = Federal Poverty Level; NHIS = National Health Interview Survey; ED = emergency department; ACA = Patient Protection and Affordable Care Act. *p < .05. **p < .01. ***p < .001.

Conclusions

Over 20 million US citizens have gained health insurance coverage since the national implementation of the ACA.¹ We demonstrated that much of these gains have been experienced by adults between 0% to 124% FPL and 125% to 199% FPL, of which the latter is a group that has not traditionally benefited from public assistance programs. As policy makers continue to consider efforts to repeal and replace the ACA, it is critical to identify strategies to maintain the improvements seen over the last 5 years, especially those in low- to middle-income groupings.


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