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Association Between the ACA Medicaid Expansions and Changes in Cardiovascular Risk Factors Among Low-Income Individuals

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BACKGROUND: Evidence is limited as to whether the introduction of the Affordable Care Act (ACA)'s Medicaid expansions was associated with improvements in cardiovascular risk factors at the population level.

OBJECTIVE: To examine the association between the ACA Medicaid expansions and changes in cardiovascular risk factors among low-income individuals during the first 3 years of the implementation of the ACA Medicaid expansions at the national level.

DESIGN: A quasi-experimental difference-in-differences (DID) analysis to compare outcomes before (2005–2012) and after (2015–2016) the implementation of the ACA Medicaid expansions between individuals in states that expanded Medicaid and individuals in non-expansion states.

PARTICIPANTS: A nationally representative sample of individuals aged 19–64 years with family incomes below 138% of the federal poverty level from the 2005–2016 National Health and Nutrition Examination Survey (NHANES).

INTERVENTION: ACA Medicaid expansions.

MAIN MEASURES: Cardiovascular risk factors included (1) systolic and diastolic blood pressure, (2) hemoglobin A1c (HbA1c) level, and (3) cholesterol levels (low-density lipoprotein cholesterol, triglyceride, and high-density lipoprotein cholesterol).

KEY RESULTS: A total of 9177 low-income individuals were included in our analysis. We found that the ACA Medicaid expansions were associated with a lower systolic blood pressure (DID estimate, − 3.03 mmHg; 95% CI, − 5.33 mmHg to − 0.73 mmHg; $P = 0.01$; $P = 0.03$ after adjustment for multiple comparisons) and lower HbA1c level (DID estimate, − 0.14 percentage points [pp]; 95% CI, − 0.24 pp to − 0.03 pp; $P = 0.01$; $P = 0.03$ after adjustment for multiple comparisons). We found no evidence that diastolic blood pressure and cholesterol levels changed following the ACA Medicaid expansions.

CONCLUSION: Using the nationally representative data of individuals who were affected by the ACA, we found that the ACA Medicaid expansions were associated with a modest improvement in cardiovascular risk factors related to hypertension and diabetes during the first 3 years of implementation.

KEY WORDS: health policy; ACA Medicaid expansions; hypertension; diabetes; hyperlipidemia.

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INTRODUCTION

The Affordable Care Act (ACA) expanded Medicaid eligibility to individuals earning up to 138% of the federal poverty level (FPL) and introduced new subsidized private coverage through health insurance marketplaces. Research has found that states that expanded their Medicaid programs experienced a decline in the number of uninsured and underinsured low-income individuals, and those individuals experienced reduced financial strain due to medical bills.[1–7] One of the goals of the ACA, however, is to improve population health by providing affordable health insurance coverage and better access to healthcare services.[8] Individuals without health insurance are less likely to receive recommended screening tests and treatments,[9,10] and experience worse health outcomes including delayed diagnoses and higher mortality rates.[11–13] Therefore, it is possible that expanded health coverage through the ACA may improve the health status of the low-income individuals—particularly cardiovascular risk factors given that they are highly prevalent and potentially modifiable in a relatively short time-frame.[14] Yet, evidence is limited as to whether the ACA Medicaid expansions were associated with improved cardiovascular risk factors at the national level.

Existing research on the impact of the ACA Medicaid expansions on health outcomes is limited to studies that rely on self-reported health status or disease diagnosis,[6,7,15–17] studies that focus on a specific population,[18–22] or an ecological study using aggregated data at the regional level[23] (therefore, susceptible to "ecological fallacy"[24]). To our knowledge, there has been no national study that used individual-level clinically measured health data (e.g., blood pressure, blood glucose level, cholesterol level) to examine the relationship between the ACA's Medicaid expansions and cardiovascular risk factors. Given the ongoing active discussions regarding the achievements and shortcomings of the ACA, and whether it is appropriate to repeal or substantially modify its design, it is critically important for policymakers to understand whether the ACA's Medicaid expansions were associated with the improvements in population cardiovascular health using valid and reliable clinical data.

To address this knowledge gap, we examined the association between the ACA Medicaid expansions and changes in cardiovascular risk factors, using a nationally representative sample of low-income adults with objectively measured clinical data. We investigated clinically measured health data related to hypertension, diabetes, and hyperlipidemia, as these conditions are highly prevalent and are leading causes of mortality and morbidity in the USA.[14,25]

METHODS

Data Source and Study Population

We analyzed the 2005–2016 National Health and Nutrition Examination Survey (NHANES), a nationally representative survey of the non-institutionalized population in the USA conducted by the National Center for Health Statistics (NCHS).[26] NHANES conducts interviews in participants' homes to collect information about their health, disease, medications, and diet. Qualified participants are subsequently invited to a mobile examination center (MEC) for additional interviews, physical examinations, and laboratory tests (blood and urine). In addition, a subsample of MEC participants is randomly selected for morning fasting laboratory testing.[27] NHANES data are released in 2-year cycles, and the mean overall response rate was 68.5%.[28] We linked the American Community Survey (ACS) data to incorporate information about the neighborhood socioeconomic status (SES) of participants into our study (see Appendix Section 1 for details). The merge between NHANES and ACS was conducted by an analyst at NCHS using NHANES restricted geographic variables, including state, county, and census tract.

We restricted our study sample to individuals aged 19–64 years old with family incomes lower than 138% of the FPL, based on the eligibility criteria of the ACA Medicaid expansions. Those with missing data on family incomes or covariates were excluded from the study sample (see Appendix Section 2 and Appendix Figure 1 for details).

Expansion Status

Most states implemented the ACA Medicaid expansions on January 1, 2014, whereas several states expanded after that date. We defined expansion states as states that implemented the ACA Medicaid expansion or an equivalent program by the end of 2016 and non-expansion states as those did not. Based on this definition, there would be 33 expansion states (including the District of Columbia) and 18 non-expansion states (Appendix Table 1). However, given that NHANES does not visit all 51 states in every survey period (while allowing to produce national estimates), our study only included the data from 25 expansion and 15 non-expansion states which NHANES visited during the study period.[29] We analyzed the data using a masked state variable provided by NHANES due to disclosure risk (therefore, we cannot specify which states were included in our analysis). We conducted several sensitivity analyses with alternative definitions of expansion states to test the robustness of our findings.

Pre- and post-expansion statuses were defined based on the actual timing (the implementation dates) of the Medicaid expansions for each state. For non-expansion states and most expansion states that expanded Medicaid on January 1, 2014, we defined NHANES cycles 2005/2006, 2007/2008, 2009/2010, and 2011/2012 as "pre-expansion" period; 2013/2014 as "transition" period; and 2015/2016 as "post-expansion" period. We used the transition period in our analyses because the ACA Medicaid expansions were implemented in the middle of the survey cycle 2013/2014, and this period may contain data from both before and after the implementation (see Appendix Table 1 for the definitions of the study periods for those states that implemented the Medicaid expansions after January 1, 2014).

Cardiovascular Risk Factors

Blood Pressure. We examined mean systolic and diastolic blood pressure among MEC participants with at least one recorded value (see Appendix Figure 1 for a flowchart). Mean systolic and diastolic blood pressure was calculated after excluding the first reading of individuals with more than one value as recommended by NHANES.[30]

Blood Glucose Level. We analyzed hemoglobin A1c (HbA1c) levels among MEC participants who were 20 years and older with recorded HbA1c values (Appendix Figure 1).

Cholesterol Level. We examined low-density lipoprotein cholesterol (LDL-C) and triglyceride levels among participants who were 20 years and older in a fasting subsample, and high-density lipoprotein cholesterol (HDL-C) level among MEC participants who were 20 years and older (Appendix Figure 1). We used LDL-C values that were estimated by NHANES from measured values of total cholesterol, triglycerides, and HDL-C according to the Friedewald calculation (LDL-C values are not provided for participants with triglycerides > 400 mg/dL).[31]

Adjustment Variables

We included the data on participants' characteristics as adjustment variables. Adjustment variables include age (as continuous), sex, race/ethnicity (non-Hispanic White, non-Hispanic Black, Hispanic, and other), education attainment (less than high school, high school, some college, or bachelor's degree or more), family size (as continuous), and neighborhood SES (as continuous). We also adjusted for state- and year-specific fixed effects to account for time-invariant state factors and the secular trend. We constructed an index of neighborhood SES based on six census tract-level variables from the ACS data such as median household income, an approach used in previous literature (see Appendix Section 1 for details).[32]

Statistical Analysis

We used a difference-in-differences (DID) method to compare changes in cardiovascular risk factors between participants in the expansion and non-expansion states before and after the ACA Medicaid expansions, a widely used approach.[6–8,15–18,20,23] In our multivariable regression models, we included two interaction terms between the expansion state indicator and each of the transition period and the post-expansion period indicators, along with the adjustment variables. The coefficients of these interaction terms represent the mean difference in outcomes between expansion and non-expansion states during each of the transition and the post-expansion periods, relative to the pre-expansion period.[7,33] We used multivariable linear regression models for all study outcomes for the interpretability of the regression coefficients of the interaction term (see Appendix Section 3 for more details about the model specification).[7,34] To examine the validity of our estimates, we formally tested the parallel trend assumption of the DID method; i.e., the outcome variables of individuals in the expansion states would have had a similar trend as those in the non-expansion states if the ACA Medicaid expansions had not been implemented (see Appendix Section 4 for more details).

All analyses were accounted for the complex survey design of NHANES with the weights specified for each of the household interview sample, MEC sample, and fasting subsample, following the instruction provided by NHANES.[35] We clustered the standard errors at the state level to account for both the non-independence of observations within a state (i.e., multi-level data structure) and heteroscedasticity of the data.[6,7,36,37] We used the Benjamini-Hochberg method to account for the multiple comparisons entailed by our use of multiple primary outcomes and report the effects of those adjustments on our results (adjusted *P* value of less than 0.05 was considered to indicate statistical significance).[38–40] We conducted all analyses in the California Census Research Data Center.

Secondary Analyses

We conducted a series of secondary analyses. First, as sensitivity tests, we reanalyzed the data using alternative sample definitions: (i) excluding 5 states that provided Medicaid or similar coverage to adults with incomes up to 100% FPL or higher during prior to 2014, an approach used in previous literature [7,15]; (ii) excluding 7 states that expanded Medicaid after January 1, 2014; (iii) excluding non-US citizens from the study sample (because non-US citizens have to meet the criteria to be eligible for Medicaid coverage [41]); (iv) excluding observations with a missing value in the ratio of family income to poverty but with family income recoded as "under $20,000" (see Appendix Section 2 for detail); (v) excluding people 19–25 years old, the target of the 2010 ACA Dependent Coverage Mandate; and (vi) excluding adults with incomes below 100% FPL (because they might have been already covered by Medicaid before the expansions in certain states). Second, as falsification tests, we analyzed the impact of Medicaid expansions on cardiovascular risk factors among (vii) participants with family incomes greater than 400% FPL and (viii) participants aged 65 years and older, each of whom should be unaffected by the ACA Medicaid expansions. Third, we conducted analyses by restricting the sample to those with a condition relevant to each cardiovascular risk factor (e.g., evaluated the impact on blood pressure restricting to participants with hypertension) (see Appendix Section 5 for more details). Lastly, we analyzed the data by additionally adjusting for individual-level comorbidity indicators (e.g., obesity, cardiovascular disease) in our models because the comorbidity prevalence could be associated with the state's decision to adopt the Medicaid expansion and confound our estimates (see Appendix Section 6 for more details).

All analyses were conducted with Stata software version 15.1 (StataCorp, TX, USA). The University of California, Los Angeles, Institutional Review Board approved this study.

RESULTS

Our study included 9177 individuals (see Appendix Figure 1 for a flowchart). Table 1 presents the baseline characteristics of individuals by expansion status based on the NHANES 2005–2012 data. We found no systematic differences in the characteristics of participants between the expansion and non-expansion states.

Figures 1, 2, and 3 show unadjusted yearly trends in outcomes for the expansion and non-expansion states. The formal test of the parallel trend assumption of the DID method showed no evidence that the baseline trends in outcome variables differed between the expansion and non-expansion states except for diastolic blood pressure (see Appendix Table 2 in the Supplement for the results).

Cardiovascular Risk Factors

We report DID estimates for the post-expansion period in the main text and estimates for the transition period are presented in Appendix Table 3.

Blood Pressure. The adjusted mean blood pressures (adjusted for potential confounders using the marginal standardization method [42]) during the pre-expansion period were 119.1/70.2 mmHg in the expansion states and 119.9/70.3 in the

Table 1 Baseline Characteristics of Participants by ACA Medicaid Expansion Status

Characteristic[a]	Expansion states[b] (*n* = 4232)	Non-expansion states[b] (*n* = 1869)	*P* value
Mean age (year)	37.1 (13.3)	37.1 (13.5)	0.99
Female sex (%)	54.4	53.9	0.74
Race/ethnicity (%)			0.25
White, non-Hispanic	51.1	40.2	
Hispanic	15.9	22.4	
Black, non-Hispanic	26.2	31.1	
Other	6.8	6.4	
Education attainment (%)			0.39
Less than high school	35.3	35.8	
High school	26.9	25.6	
Some college	28.5	32.1	
College degree or more	9.3	6.4	
Mean family size	3.7 (1.9)	3.7 (1.9)	0.90
Neighborhood SES index[c]	− 0.3 (0.8)	− 0.4 (0.7)	0.94

ACA, Affordable Care Act; SES, socioeconomic status
[a]Presented values are weighted to be nationally representative of individuals 19 to 64 years of age with family incomes lower than 138% of the federal poverty level based on the pooled data of the National Health and Nutrition Examination Survey 2005–2012. Standard deviations in parentheses
[b]Our analysis included 25 expansion states and 15 non-expansion states as NHANES does not collect data from all 51 states (see the main text for detail)
[c]Neighborhood socioeconomic status (SES) is a continuous variable in a Z-score based on American Community Survey 5-year summary files, and a larger number indicates a higher SES (for details, see Appendix Section 1 in the Supplement)

non-expansion states (Table 2). We found that the ACA Medicaid expansions were associated with lower systolic blood pressure (DID estimate, − 3.03 mmHg; 95% CI, − 5.33 mmHg to − 0.73 mmHg; $P = 0.01$; $P = 0.03$ after adjustment for multiple comparisons). We found no evidence that diastolic blood pressure changed after the Medicaid expansions.

Blood Glucose Level. The adjusted mean HbA1c at baseline was 5.6% in both the expansion and non-expansion states (Table 2). We found that the ACA Medicaid expansions were associated with a lower HbA1c level (DID estimate, − 0.14 percentage points [pp]; 95% CI, − 0.24 pp to − 0.03 pp; $P = 0.01$; $P = 0.03$ after adjustment for multiple comparisons).

Cholesterol Level. We found no evidence that LDL-C level, triglyceride level, and HDL-C level changed following the ACA Medicaid expansions.

Secondary Analyses

Analyses using alternative sample definitions did not qualitatively affect our findings demonstrating the robustness of our findings (except that analyses excluding adults with incomes below 100% FPL showed larger reductions in HbA1c, LDL-C level, and triglyceride level while there was no evidence that systolic blood pressure changed following the Medicaid expansions among this population) (Appendix Table 4). The falsification tests showed no evidence that the implementation of the ACA Medicaid expansions was associated with changes in the cardiovascular risk factors among individuals with incomes greater than 400% FPL and those aged 65 years and older, except that the point estimate for the falsification test for 65 years and older for systolic blood pressure is similar to the main analysis while it was not statistically significant (Appendix Table 4). Analyses restricting the sample to those with a condition relevant to each outcome showed larger changes in systolic blood pressure and HbA1c than those of the main analysis (Appendix Table 5). Additional adjustment for individual-level comorbidity indicators yielded very similar results to the main analysis, except for a marginal decrease in the HDL-cholesterol (Appendix Table 6).

DISCUSSION

Using a nationally representative sample of low-income individuals in the USA, we found that the ACA Medicaid expansions were associated with a small reduction in systolic blood pressure and HbA1c level during the first 3 years of the program implementation. We found no evidence that diastolic blood pressure and cholesterol levels changed significantly after the Medicaid expansions. These findings indicate that ACA's Medicaid expansions may be achieving one of the major goals of the ACA—improving population health among those who gained insurance coverage.

While the differences in systolic blood pressure and HbA1c level we observed might appear small at the individual level, these differences are arguably clinically meaningful at the population level, given that even small improvements in these cardiovascular risk factors at the individual level may translate into a large number of reduced cardiovascular events (e.g., strokes, myocardial infarctions) in the population.[43] Based on epidemiological studies, if the observed association is causal, a 3.0-mmHg decrease in the mean systolic blood pressure at the population level would lead to about 15% and 10% fewer deaths due to stroke and ischemic heart disease, respectively.[44] Similarly, a previous study suggests that 0.14% lower HbA1c level is associated with about 2% and 5% fewer myocardial infarction and microvascular complications, respectively.[45]

Furthermore, we may have underestimated the true impact of the Medicaid expansions because our estimates were diluted by a substantial number of individuals who did not benefit from improved access to care (e.g., those who had normal blood pressure and/or HbA1c level and therefore, did not require medical interventions) and those whose health coverage was unaffected by the ACA (e.g., individuals who were already covered by Medicaid prior to the expansions, and those who remained uninsured or covered by private insurance throughout the study period). The mechanism of improvement

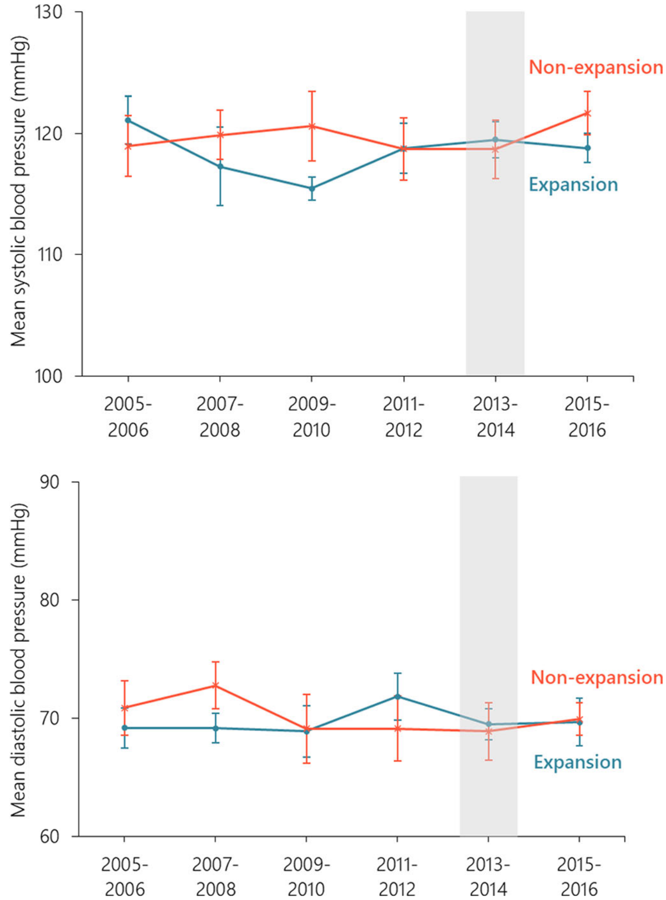

Figure 1 Unadjusted yearly trend in blood pressures by ACA Medicaid expansion status. Data shown are weighted means of systolic and diastolic blood pressure among individuals 19–64 years old with family incomes below 138% of the federal poverty level in states that expanded Medicaid on January 1, 2014, and non-expansion states based on the 2005–2016 National Health and Nutrition Examination Survey. Gray bars indicate the implementation of the ACA Medicaid expansion on January 1, 2014. I bars indicate 95% confidence intervals. Note the differences in scales on *y*-axes. ACA, Affordable Care Act.

we observed is probably due to better access to care following the Medicaid expansions that led to identification of undiagnosed diseases and subsequent treatments.[46] This hypothesis is supported by our secondary analyses suggesting larger effect sizes when restricting the sample to those with a condition relevant to each cardiovascular risk factor (Appendix Table 5).

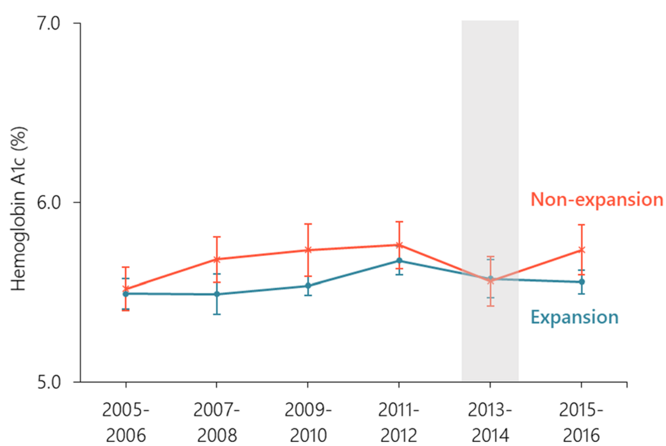

Figure 2 Unadjusted yearly trend in hemoglobin A1c by ACA Medicaid expansion status. Data shown are weighted means of hemoglobin A1c among individuals 19–64 years old with family incomes below 138% of the federal poverty level in states that expanded Medicaid on January 1, 2014, and non-expansion states based on the 2005–2016 National Health and Nutrition Examination Survey. Gray bars indicate the implementation of the ACA Medicaid expansion on January 1, 2014. I bars indicate 95% confidence intervals. ACA, Affordable Care Act.

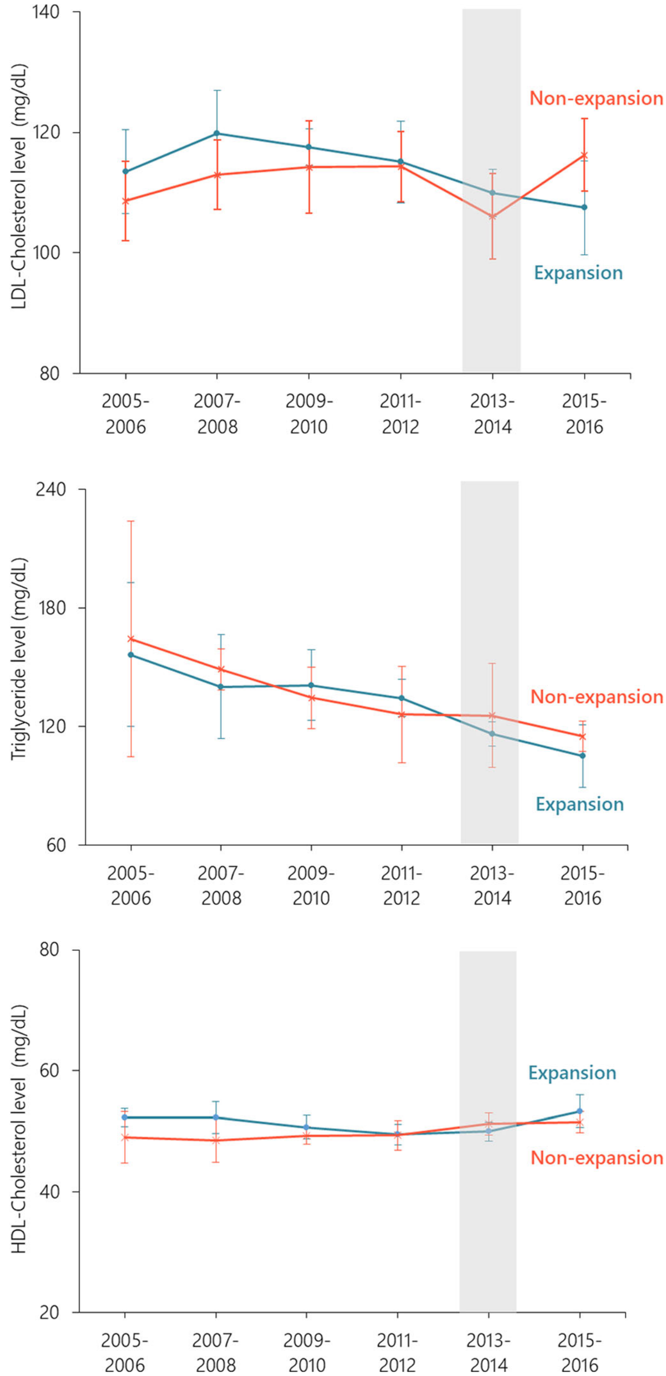

Figure 3 Unadjusted yearly trend in cholesterol levels by ACA Medicaid expansion status. Data shown are weighted means of LDL-cholesterol, triglyceride, and HDL-cholesterol levels among individuals 19–64 years old with family incomes below 138% of the federal poverty level in states that expanded Medicaid on January 1, 2014, and non-expansion states based on the 2005–2016 National Health and Nutrition Examination Survey. Gray bars indicate the implementation of the ACA Medicaid expansion on January 1, 2014. I bars indicate 95% confidence intervals. Note the differences in scales on *y*-axes. ACA, Affordable Care Act.

We found no evidence that diastolic blood pressure changed following the Medicaid expansions. It is possible that interventions on blood pressure lead to a smaller change in diastolic blood pressure compared to in systolic blood pressure as shown in a previous study,[47] and the impact on diastolic blood pressure probably was not large enough to be detected in our study.

Our study was built on prior research that investigated the effects of the ACA Medicaid expansions on health outcomes. Miller and Wherry analyzed the data from a national survey and reported that the ACA Medicaid expansions were associated with an increase in self-reported diagnoses of diabetes and high cholesterol with no change in the diagnosis of hypertension or depression.[6,7] Khatana and colleagues conducted an ecological study using aggregated data at the county

Table 2 Change in Cardiovascular Risk Factors Following the ACA Medicaid Expansions

Outcomes[a]	Sample size for DID estimation	Adjusted mean in expansion states[b,c]		Adjusted mean in non-expansion states[b,c]		DID estimates[d]		
		Pre-expansion	Post-expansion	Pre-expansion	Post-expansion	Adjusted change [95% CI]	Unadjusted *P* value	Adjusted *P* value[e]
Systolic blood pressure (mmHg)	8473	119.1	117.3	119.9	119.9	− 3.03 [− 5.33 to − 0.73]	0.01	0.03
Diastolic blood pressure (mmHg)	8473	70.2	70.5	70.3	70.5	1.05 [− 2.44 to + 4.53]	0.55	0.66
Hemoglobin A1c (%)	7939	5.6	5.4	5.6	5.6	− 0.14 [− 0.24 to − 0.03]	0.01	0.03
LDL-cholesterol (mg/dL)	3409	117.3	112.1	115.2	117.7	− 6.82 [− 16.75 to + 3.11]	0.17	0.34
Triglyceride (mg/dL)	3489	141.1	139.4	144.9	142.7	− 4.66 [− 31.64 to + 22.32]	0.73	0.73
HDL-cholesterol (mg/dL)	7860	51.0	51.4	49.7	50.0	− 1.05 [− 4.18 to + 2.09]	0.50	0.66

ACA, Affordable Care Act; CI, confidence interval; DID, difference-in-differences; HDL, high-density lipoprotein; LDL, low-density lipoprotein

[a]*Presented values are weighted to be nationally representative of individuals 19–64 years old with family incomes below 138% of the federal poverty level (FPL) based on the 2005–2016 National Health and Nutrition Examination Survey (NHANES)*

[b]*Our analysis included 25 expansion states and 15 non-expansion states as NHANES does not collect data from all 51 states (see the main text for detail). The post-expansion period indicates the years 2015 and 2016 for most states but not for all (see Appendix Table 1 in the Supplement for detail)*

[c]*Values are adjusted for age, sex, race/ethnicity, education, family size, neighborhood socioeconomic status, and year-specific fixed effects using the marginal standardization method*

[d]*DID estimates are differential changes between individuals in expansion states and those in non-expansion states comparing the pre-expansion and post-expansion periods. We used multivariable linear regression models controlled for age, sex, race/ethnicity, education, family size, neighborhood socioeconomic status, as well as state- and year-specific fixed effects. Estimates are reported as percentage point changes for hemoglobin A1c*

[e]*We used the Benjamini-Hochberg procedure to account for multiple comparisons*

level and reported that the ACA Medicaid expansions were associated with lower cardiovascular mortality.[23] Other studies evaluated the impact of the ACA Medicaid expansions on the health status of patients who have specific health conditions (e.g., end-stage renal disease, heart failure) or patients who were receiving treatment from specific healthcare providers (e.g., federally qualified health centers).[18–22] However, these studies are limited due to their reliance on self-reported data [6,7,17] (which may be influenced by measurement errors, recall bias, and social desirability bias[48]); restriction on narrowly focused patient population (and therefore, unclear whether their findings are generalizable to individuals with other health conditions)[18–22]; or the use of aggregated data [23] that are subject to ecological fallacy.[24] To our knowledge, our study is the first national study to show that the ACA Medicaid expansions were associated with a modest improvement in population cardiovascular health using objectively measured clinical data.

Our findings differed from what was observed in the Oregon Health Insurance Experiment (OHIE)—a randomized experiment of Medicaid program in Oregon—that found no significant change in measured clinical outcomes (except for a decrease in the probability of a positive depression screening result).[14] There are several potential reasons for the differences. First, the estimated impact of Medicaid expansion in Oregon may not be generalizable to other states due to the meaningful differences in the study populations. For example, participants of the OHIE consisted of people who voluntarily signed up for the lottery for a new Medicaid program; therefore, they probably were experiencing more medical and social needs compared to our national sample. Given that the participants of the OHIE might be sicker and had more complex medical needs, the new Medicaid coverage probably did not benefit them as much as the national Medicaid expansions. Second, given that Medicaid programs vary widely between states, differences in their structure might explain the observed differences. Finally, our study employed a longer follow-up period after Medicaid expansions compared to the OHIE (13–36 months after Medicaid expansions in our study vs. an average of 17 months for the OHIE).[14] Considering the complicated and lengthy process of how individuals' health status improves by new insurance coverage (i.e., improved access to care, disease detection, and treatment), the follow-up period of the OHIE might not have been sufficiently long for significant clinical effects to be materialized.

Our study has limitations. First, the quasi-experimental difference-in-differences method relies on the parallel trend assumption to account for measured and unmeasured confounders. While our formal tests found no evidence of the violation of this assumption except for diastolic blood pressure, it is still possible that these tests may be underpowered, and our results could be explained by random variation. Second, our study might be underpowered to detect small but clinically meaningful changes, particularly for the analysis of cholesterol levels that has a smaller sample size than other analyses (because the data on cholesterol levels were available only in the fasting sample). Future studies with a larger sample size are warranted to determine if the ACA Medicaid expansions were associated with an improvement in cardiovascular risk factors for which our study did not observe significant changes. Lastly, although a set of clinical outcomes related to blood pressure, diabetes, and cholesterol investigated in our study are leading causes of morbidity and mortality in the USA, our findings may not be generalizable to other cardiovascular risk factors.

In summary, using a nationally representative sample of low-income individuals, we found modest improvements in two out of three important cardiovascular risk factors during the first 3 years of the implementation of the ACA Medicaid expansions. Our findings should be informative for policymakers and supplement important evidence to the national debates over the potential benefits of the ACA Medicaid expansions.

Supplementary Information *The online version contains supplementary material available at https://doi.org/10.1007/s11606-020-06417-6.*

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Compliance with Ethical Standards:

Conflict of Interest: *The authors declare that they do not have a conflict of interest.*

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