Association Between the ACA Medicaid Expansions and Primary Care and Emergency Department Use During the First 3 Years

Hiroshi Gotanda, MD[1,2], Gerald Kominski, PhD[2,3], and Yusuke Tsugawa, MD, MPH, PhD[3,4]

[1]Geriatric Research Education and Clinical Center, VA Greater Los Angeles Healthcare System, Los Angeles, CA, USA; [2]Department of Health Policy and Management, Los Angeles, UCLA Fielding School of Public Health, Los Angeles, CA, USA; [3]UCLA Center for Health Policy Research, Los Angeles, CA, USA; [4]Division of General Internal Medicine and Health Services Research, David Geffen School of Medicine at UCLA, Los Angeles, CA, USA.

BACKGROUND: Evidence is limited and mixed as to how the Patient Protection and Affordable Care Act (ACA) Medicaid expansions affected the utilization of primary care physicians (PCPs) and emergency departments (EDs) at the national level.

OBJECTIVE: To examine the association between the ACA Medicaid expansions and changes in the utilization of PCP and ED visits at the national level during the first 3 years (2014–2016) of the implementation.

DESIGN: A difference-in-differences analysis to compare outcomes between individuals in 32 states that expanded Medicaid versus individuals in 19 non-expansion states.

PARTICIPANTS: A nationally representative sample of US-born individuals 26–64 years old with family incomes lower than 138% of the federal poverty level from the 2010–2016 Medical Expenditure Panel Survey.

INTERVENTION: ACA Medicaid expansions

MAIN MEASURES: We examined PCP-related outcomes ((i) whether a participant had any PCP visit during a year and (ii) the annual number of PCP visits per person) and ED-related outcomes ((i) whether a participant had any ED visit during a year and (ii) the annual number of ED visits per person).

KEY RESULTS: A total of 17,803 participants were included in our analysis. We found that the proportion of individuals with any PCP visit during a year marginally increased (difference-in-differences estimate, + 3.6 percentage points [pp]; 95% CI, − 0.4 pp to + 7.6 pp; P = 0.08) following the Medicaid expansions, without any change in the annual number of PCP visits per person. We found no evidence that ED utilization (both the proportion of individuals with any ED visit during a year and the annual number of ED visits per person) changed meaningfully after the 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 access to PCPs without an increase in ED use.

KEY WORDS: health policy; Medicaid; primary care; emergency medicine; access to care.

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INTRODUCTION

Expanding the eligibility for the Medicaid program to individuals earning up to 138% of the federal poverty level (FPL) was one of the key components of the Patient Protection and Affordable Care Act (ACA) signed into law in 2010. Literature indicates that the introduction of the ACA led to a significant decline in the number of uninsured patients and a substantial improvement in financial risk protection.[1–3] One of the goals of the ACA was that, by removing financial barriers, Medicaid expansions would allow low-income people who were previously uninsured to gain access to appropriate primary care physicians (PCPs) and, as a consequence, reduce unnecessary use of emergency departments (EDs) and hospitalizations. However, evidence is limited and mixed as to how the ACA Medicaid expansions affected the utilization of PCPs and EDs at the national level.

The Oregon Health Insurance Experiment (OHIE) examined the impact of expanded Medicaid coverage among low-income families in the state of Oregon from 2008 through 2010. The results of the OHIE found a 50% increase in the number of outpatient visits and a 40% increase in the number of ED visits among those who were newly covered by Medicaid.[4–6] Observational studies found mixed findings as to how the Medicaid expansions affect the utilization of primary care[7–13] and ED.[7–10,14–20] While informative, previous studies (including the OHIE) were restricted to a small number of states, and therefore, it remains unclear whether their findings are generalizable to the national level.[4–8,14–19] In addition, many studies relied solely on self-reported data to identify PCP and ED visits (without verification by clinicians and

hospitals), and therefore, there have been concerns about the accuracy of measurements.[5,7–12] Given that many states are currently considering to expand their Medicaid programs and that expensive ED visits could potentially put a financial burden on the states' budgets,[21] it is critically important for policymakers to understand the national impact of the ACA Medicaid expansions on the utilization of PCPs and EDs.

In this context, using a nationally representative data of low-income working-age Americans, we examined how the ACA Medicaid expansions impacted on the utilization of PCP and ED visits in the first 3 years with a quasi-experimental difference-in-differences approach.

METHODS

Data Source and Study Population

Our study uses data from the 2010–2016 Medical Expenditure Panel Survey (MEPS). The MEPS collects data from a nationally representative sample of households through an overlapping panel design. Each year a new panel is enrolled, undergoes five interviews over a 2-year period and then ends its participation after the fifth interview. During a household interview, MEPS collects various data such as on demographics, healthcare utilization and expenditures, and health insurance coverage and verifies self-reported information with providers and hospitals. MEPS then publishes an annual file that contains data relevant to events that occurred during a calendar year. Because of the overlapping design, the same individual may appear in the data from two consecutive annual files (they are treated as two separate observations). However, this issue of multiple measurements is appropriately accounted for by the MEPS stratum and primary sampling unit (PSU) design variables.[22] The mean overall response rate of the MEPS data was 51.4%.[23]

We restricted our study sample to US-born participants 26–64 years old with family incomes lower than 138% of the FPL based on the eligibility criteria of the ACA 2014 Medicaid expansions. Non-US-born participants were excluded from the main analysis because there are specific requirements for non-US citizens to be eligible for Medicaid.[24] We also excluded adults 19–25 years old because many of them have access to their parents' health insurance under the 2010 dependent coverage mandate of the ACA,[25] a similar approach used by a prior study.[13] Observations with missing data in covariates were also excluded from the study sample. We used imputed data for missing income values, which were estimated by AHRQ using logical editing and weighted, sequential hot-decks.[26] To obtain information about which state participants lived in, we used restricted-access state identifiers for MEPS provided by AHRQ and all analysis was conducted in the California Census Research Data Center. The University of California, Los Angeles Institutional Review Board approved this study.

Expansion Status of States

The ACA Medicaid expansion became effective on January 1, 2014 for all expansion states except for the nine states that implemented the expansion after that date.[27] We defined expansion states as those states that expanded Medicaid or an equivalent program by June 2016. Based on this criterion, 32 states (including the District of Columbia [D.C.]) were identified as expansion states and 19 were considered non-expansion states (online Supplemental eTable 1).[27]

We also defined the years 2010–2013 as the "pre-expansion" period and 2014–2016 as the "post-expansion" period for non-expansion states and most expansion states that expanded Medicaid on January 1, 2014. For those states that expanded Medicaid after January 1, 2014, if a state expanded Medicaid before July 1 of a given year, the whole year was included in the pre-expansion period. If a state expanded after July 1 of a given year, the whole year was included in the post-expansion period (online Supplemental eTable 1 for details).

Health Insurance Coverage

We examined health insurance coverage outcomes to understand the pathway from the expanded Medicaid eligibility to potential changes in PCP and ED utilization. We used three insurance coverage variables: (i) uninsured defined as no coverage by Medicaid, Medicare, private insurance, military programs, or other public programs throughout the survey year; (ii) Medicaid defined as Medicaid coverage for at least one day during the survey year; and (iii) private health insurance defined as private health insurance coverage for at least one day during the survey year without any Medicaid coverage throughout the survey year.

Primary Care Physician and Emergency Department Visits

Our outcomes of interest were the utilization of PCPs and EDs. We examined two outcomes related to PCP visits: (i) whether a participant had any PCP visit during a year (as a binary outcome variable) and (ii) the annual number of PCP visits per person (as a continuous outcome variable). A physician was considered a PCP if their specialty was family practice, general practice, or internal medicine, excluding telephone encounters. Similarly, we analyzed two outcomes related to ED visits: (i) whether a participant had any ED visit during a year (as binary) and (ii) the annual number of ED visits per person (as continuous).

Statistical Analysis

We used a difference-in-differences (DID) design to compare changes in the outcomes between individuals in expansion states and those in non-expansion states before and after the ACA Medicaid expansions. The DID approach utilizes the control group (individuals living in non-expansion states in this study) to estimate the counterfactual outcomes of what

would have happened to the treatment group (individuals living in expansion states in this study) in the absence of the treatment (i.e., ACA Medicaid expansions) using the observational data. We estimated multivariable regression models that include an interaction term between expansion state indicator and post-expansion period indicator. The coefficients for the interaction terms (i.e., DID estimates) represent the changes in the outcomes that are attributable to the Medicaid expansions. We used linear probability models for binary outcomes (i.e., linear regression models for binary outcome variables), as opposed to logistic regression models, that allow better interpretation of the coefficients of the interaction terms (an estimated impact of the ACA Medicaid expansions using the DID design)[8–10,28] and negative binomial models for the number of visits outcomes to account for over-dispersed count data. The DID estimates are reported as percentage point changes for binary outcomes and as percent changes for number of visits outcomes. See online Supplemental Method Section 1 for the model specification and more details.

The models were adjusted for individual-level covariates including age (as continuous variable), sex, race/ethnicity (non-Hispanic White, non-Hispanic Black, Hispanic, and other), education attainment (less than high school, high school or some college, bachelor's degree, or more than bachelor's degree), and household size (as continuous variable). We additionally adjusted for state and year fixed effects (i.e., indicator variables for each state and year), which is an extension of the simple DID design.[9,10,29] State-specific fixed effects represent the combined (both observed and unobserved) effects of the time-invariant characteristics of a given state, and year-specific fixed effects represent the combined effects of a given time (i.e., the national trend of the outcome variables). This generalized model appropriately accounts for the different timings of each state's expansion of its Medicaid program.

All analyses accounted for the complex survey design of MEPS and the results were presented with cluster-robust standard errors to account for the non-independence of observations within a state. Statistical analyses were conducted with Stata software version 14.1 (StataCorp, TX, USA).

Testing the Robustness of Findings

We tested the robustness of our findings. First, we evaluated whether expansion and non-expansion states had similar trends in the outcomes prior to the ACA Medicaid expansions. In the DID approach, we need to assume that the trends of outcome variables are parallel between the treatment and control groups (i.e., parallel trend assumption) in order for the control group to serve as an appropriate counterfactual of the treatment group. Although we cannot directly test this in the post-treatment period (i.e., after the ACA Medicaid expansions), the fact that the trends are parallel between the two groups in the pre-treatment period (i.e., before the ACA Medicaid expansions) supports the validity of this assumption. Second, to test the probability that the changes were clinically meaningful but too small for us to detect based on our limited sample size, we calculated the minimum detectable differences for the outcomes related to the number of visits. We used 80% power and an alpha of 0.05. See online Supplemental Method Section 2 for more details.

Sensitivity Analyses

To evaluate the sensitivity of our results to alternative sample definitions, we conducted a series of sensitivity analyses. First, we used alternative definitions of expansion states: (1) excluding states that already provided comprehensive coverage for low-income adults prior to 2014; (2) excluding states that partially expanded Medicaid in 2010 or 2011; (3) excluding states that expanded Medicaid after January 1, 2014; and (4) excluding Wisconsin that started comprehensive coverage for low-income adults on January 1, 2014 without adopting the ACA Medicaid expansion. Second, we used alternative criteria for the sample selection: (1) including participants who were not born in the USA as they can become eligible for Medicaid under certain circumstances; (2) including participants 19–25 years old, the target of the 2010 ACA dependent coverage mandate; and (3) analyzing adults 26–64 years old with incomes greater than 400% of the FPL as a falsification test. See online Supplemental Method Section 3 for more details.

RESULTS

A total of 17,803 participants were included for the analyses (see online Supplemental eFigure 1 for a flow chart). Table 1 shows the characteristics of participants in expansion and non-expansion states according to expansion period. The proportion of non-Hispanic Black participants was lower in expansion states compared to non-expansion states.

Health Insurance Coverage

The analysis for health insurance coverage showed that the probability of being covered by Medicaid increased by 10.6 percentage points (pp) ($P < 0.001$) and the probability of being uninsured reduced by 8.0 pp ($P = 0.004$) in expansion states relative to non-expansion states (Table 2).

Primary Care Physician Visits

We observed a marginal increase in the proportion of those who had any PCP visit during a year in expansion states relative to non-expansion states after the ACA Medicaid expansions (DID estimate, + 3.6 pp; 95% CI, − 0.4 to + 7.6 pp; $P = 0.08$) (Table 2). However, we did not observe any significant change in the annual number of PCP visits per person (DID estimate, − 6.5%; 95% CI, − 19.1 to + 8.1%; $P = 0.36$). See online Supplemental eTable 3 for the regression table containing coefficients for each variable.

Table 1 Characteristics of Study Participants in Expansion and Non-expansion States According to Expansion Period

Characteristics	Pre-expansion period (2010–2013)*			Post-expansion period (2014–2016)*		
	Expansion states (*n* = 5745)	Non-expansion states (*n* = 4380)	*P* value	Expansion states (*n* = 4636)	Non-expansion states (*n* = 3042)	*P* value
Mean age	43.6 ± 12.2	43.8 ± 12.9	0.63	43.7 ± 12.0	44.3 ± 13.3	0.24
Male sex (%)	43.8	42.4	0.30	43.1	41.4	0.25
Race (%)			0.06			0.007
White, non-Hispanic	61.8	58.4		65.4	54.1	
Hispanic	9.9	9.3		9.8	9.0	
Black, non-Hispanic	22.5	29.6		19.5	30.6	
Other	5.8	2.7		5.3	6.2	
Married (%)	29.1	32.9	0.12	27.5	31.1	0.14
Education (%)			0.06			0.33
Less than high school	20.2	21.8		18.3	20.8	
High school or some college	69.0	69.6		71.0	70.6	
Bachelor's degree	8.2	7.2		8.2	6.8	
More than bachelor's degree	2.6	1.4		2.5	1.8	
Mean household size	2.5 ± 1.8	2.6 ± 2.0	0.12	2.4 ± 1.7	2.5 ± 1.9	0.19
Private health insurance (%)†	22.6	27.8	0.006	20.6	28.4	< 0.001
Medicaid (%)†	47.0	28.6	< 0.001	60.3	33.6	< 0.001
Uninsured (%)†	25.8	38.2	< 0.001	13.1	32.0	< 0.001
Any PCP visit during a year (%)	51.1	46.2	< 0.001	52.2	44.5	< 0.001
Annual number of PCP visits per 100 persons	172	145	< 0.001	166	142	0.02
Any ED visit during a year (%)	24.1	23.9	0.89	26.5	26.8	0.84
Annual number of ED visits per 100 persons	41	40	0.62	44	42	0.53

Presented values are weighted baseline characteristics of US citizens 26–64 years old with family incomes lower than 138% of the federal poverty level from the data of Medical Expenditure Panel Survey 2010–2016. Plus-minus values are means ± SD
ED emergency department, PCP primary care physician
**Pre-expansion and post-expansion periods indicate years 2010–2013 and 2014–2016, respectively, for most states but not for all (see online Supplemental eTable 1 for details)*
†Health insurance variables are binary indicators. See the main text for the definitions

Emergency Department Visits

We found no evidence that the proportion of those who had any ED visit during a year changed significantly in expansion states relative to non-expansion states after the ACA Medicaid expansions (DID estimate, − 0.5 pp; 95% CI, − 4.3 to + 3.3 pp; $P = 0.80$) (Table 2). The annual number of ED visits per person also did not change (DID estimate, + 2.0%; 95% CI, − 17.4% to + 26.0%; $P = 0.85$). See online Supplemental eTable 4 for the regression table containing coefficients for each variable.

Testing the Robustness of Findings

Figures 1 and 2 present unadjusted yearly trends in the utilization of PCPs and EDs, respectively, by expansion status. The trends of the proportion of individuals with any PCP visit during a year were similar between the two groups before

Table 2 Association Between ACA Medicaid Expansions and Health Insurance, Primary Care Physician Visits, and Emergency Department Visits

Outcome	DID estimate*	[95% CI]	*P* value
Health insurance outcome			
Private insurance	− 3.8 pp	[− 7.5 pp, − 0.1 pp]	0.046
Medicaid	+ 10.6 pp	[+ 5.0 pp, + 16.2 pp]	< 0.001
Uninsured	− 8.0 pp	[− 13.2 pp, − 2.7 pp]	0.004
PCP-related outcome			
Any PCP visit during a year	+ 3.6 pp	[− 0.4 pp, + 7.6 pp]	0.08
Annual number of PCP visits	− 6.5%	[− 19.1%, + 8.1%]	0.36
ED-related outcome			
Any ED visit during a year	− 0.5 pp	[− 4.3 pp, + 3.3 pp]	0.80
Annual number of ED visits	+ 2.0%	[− 17.4%, + 26.0%]	0.85

Presented values are difference-in-differences (DID) estimates from multivariable regression models adjusted for age, sex, race/ethnicity, education attainment, marital status, household size, and state- and year-fixed effects based on the data of Medical Expenditure Panel Survey 2010–2016 (n=17,803)
ACA Patient Protection and Affordable Care Act, CI confidence interval, DID difference-in-differences ED emergency department, PCP primary care physician
**DID estimates are reported as percentage point changes for binary outcomes and as percent changes in annual number for the number of visits outcomes*

Figure 1 Unadjusted trends in outcomes related to primary care physician visits by ACA Medicaid expansion status. Data shown are unadjusted weighted mean (a) percentages of individuals who had any PCP visit during a year and (b) annual numbers of PCP visits (per 100 persons) for states that expanded Medicaid on January 1, 2014 and non-expansion states. The sample included US citizens 26–64 years old with family incomes lower than 138% of the federal poverty level from the Medical Expenditure Panel Survey 2010–2016. The dashed line indicates the implementation of the ACA 2014 Medicaid expansion. Note the difference in scales in the *y*-axis. ACA, Patient Protection and Affordable Care Act; PCP, primary care physician.

2014. Unadjusted trends by study period and expansion status (i.e., 4 data points) are presented in online Supplemental eFigure 2. The formal statistical tests showed no significant difference in baseline trends between the two groups for all outcomes we studied (online Supplemental eTable 5).

We found that our study was powered enough to detect an approximately 12% and 17% changes in the annual number of PCP and ED visits, respectively, net of any changes observed in non-expansion states (online Supplemental Method Section 2).

Sensitivity Analyses

Our findings were qualitatively unaffected by alternative definitions of expansion states or alternative criteria for the sample selection (online Supplemental eTable 6).

DISCUSSION

Using a nationally representative sample of low-income, working-age Americans, we found that the ACA Medicaid expansions were associated with a marginally higher likelihood of receiving care provided by PCPs at the national level during the first 3 years of its implementation. We found no evidence that the annual number of PCP visits per person changed or that the utilization of EDs (both the likelihood of receiving care at EDs and the annual number of ED visits per person) changed due to the ACA Medicaid expansions. Taken together, these findings suggest that the ACA Medicaid expansions have probably achieved its goal of improving access to primary care, at least with respect to the likelihood of seeing a PCP once a year (without overwhelming primary care providers[30,31]). Our findings indicating the lack of meaningful change in the utilization of EDs should be reassuring for states and policymakers who were concerned about the potential financial burden of increased use of EDs associated with the ACA Medicaid expansions.

Our finding that the ACA Medicaid expansions were associated with an increased utilization of PCPs was consistent with previous studies. For example, the OHIE observed a 50% increase in the annual number of office visits.[5] Several observational studies examining the impact of the ACA Medicaid expansions also found an increased use of primary care providers[7,8,10,13] (whereas other observational studies found no evidence that the utilization of primary care changed after the Medicaid expansions[9,11,12]). However, these observational studies had limitations because they were conducted in a small number of states,[7,8] relied solely on self-reports (without

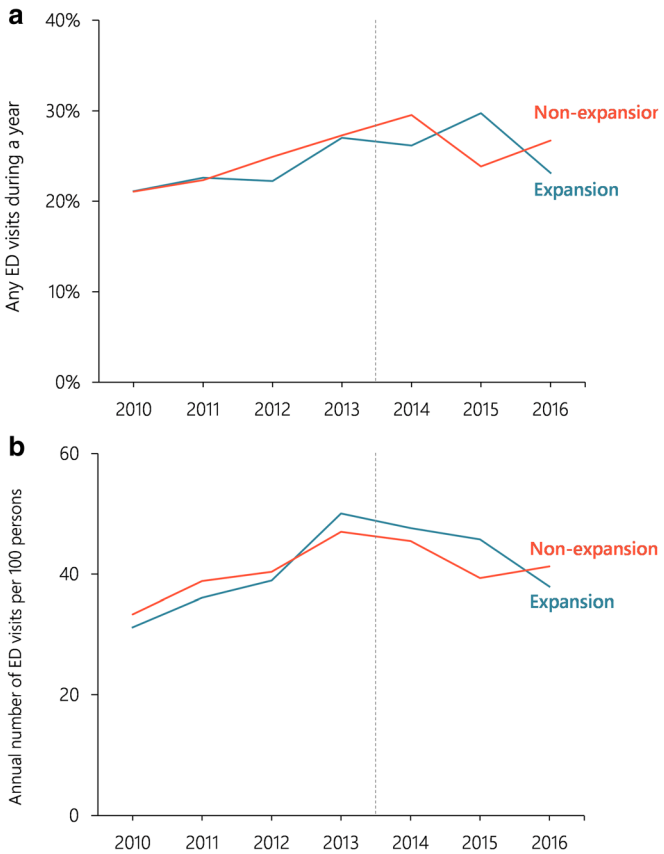

Figure 2 Unadjusted trends in outcomes related to emergency department visits by ACA Medicaid expansion status. Data shown are unadjusted weighted mean (a) percentages of individuals who had any ED visit during a year and (b) annual numbers of ED visits (per 100 persons) for states that expanded Medicaid on January 1, 2014 and non-expansion states. The sample included US citizens 26–64 years old with family incomes lower than 138% of the federal poverty level from the Medical Expenditure Panel Survey 2010–2016. The dashed line indicates the implementation of the ACA 2014 Medicaid expansion. Note the difference in scales in the *y*-axis. ACA, Patient Protection and Affordable Care Act; ED, emergency department.

verification by clinicians and hospitals as done in MEPS),[7–12] or examined only short-term effects of the policy implementation.[13] To our knowledge, this is the first study that examined the long-term impact of Medical expansions on the utilization of PCP visits using nationally representative data and valid and reliable measurements.

Improved access to primary care providers due to Medicaid coverage can, in theory, prevent patients from receiving care at EDs. However, it is also possible that people visit ED more frequently because of both perceived and actual lower out-of-pocket costs for receiving care at ED, or because PCPs (to whom they have improved access) could refer more patients to EDs.[6] Our findings, in comparison to the findings from the OHIE showing a significant increase in ED visits after the Medicaid expansion in Oregon,[4–6] suggest that the impact of the Medicaid expansion may vary by state. Previous observational studies found mixed evidence as to how the ACA Medicaid expansions affected the utilization of EDs,[7–10,14–19] but these studies have the same limitations that they studied a small number of states,[7,8,14–19] relied totally on self-reported data,[5,7–10] or evaluated only the short-term impact.[15,17]

There are several potential reasons why our findings differed from the findings from the OHIE. First, given substantial variation in how Medicaid programs are designed and implemented in each state,[32] it is possible that the findings from Oregon were not generalizable to the national level. For example, Oregon spent 13% more on Medicaid ($6272 per Medicaid enrollee) compared to the national average ($5527 per enrollee) in 2009,[32] which suggests that Medicaid beneficiaries in Oregon might have better access to healthcare providers allowing them to utilize more healthcare services than other states. Second, the participants of the OHIE might have had higher medical needs than our national sample. The OHIE analyzed only the uninsured who voluntarily signed up for a lottery for Medicaid coverage (using an intention-to-treat analysis, the OHIE found a significant 10% increase in the number of ED visits),[4] whereas our study included all individuals who became eligible for the Medicaid coverage due to the ACA Medicaid expansions (including those individuals who had been covered by Medicaid prior to the expansions). This hypothesis is supported by the data showing the control group in the OHIE experienced a substantially higher rate of ED visits (0.68 visits per person-year) compared with the national average of age group 18–64 years (0.40 visits per person-year).[4,5,33]

Our study has limitations. First, our study might not have had sufficient power to detect a small change in the number of PCP and ED visits. However, our sample size was large (17,803 participants) and our estimated minimum detectable difference suggests that we were able to detect an approximately 12% change in the number of PCP visits and 17% change in the number of ED visits. Even if the Medicaid expansions, in fact, had an impact on the utilization of PCP or ED visits (and our study was underpowered to detect a very small difference), the magnitude of change is arguably small and of limited clinical significance. Second, although we used a quasi-experimental difference-in-differences approach to account for both measured and unmeasured confounders, it is still possible that expansion and non-expansion states differ in a way that could not be captured by this approach. However, observed parallel trends in outcome variables between expanded and non-expanded states before the Medicaid expansions support the validity of our study design. Third, we could not completely eliminate the possibility of biases due to the difference between people who responded to the survey and those who did not (i.e., "non-response bias"). In general, non-response does not cause biases unless the response rates differ between the treatment and control groups. In our study, non-response could bias our estimates, for example, if high utilizers of PCPs/EDs in the post-expansion states were more or less likely to be non-respondent (although we have no evidence to support or refute this hypothesis). Finally, we analyzed the impact of the ACA Medicaid expansions in states that actually expanded Medicaid under the ACA. Therefore our findings may not be generalizable to the remaining non-expansion states if they were to expand their Medicaid programs in the future.

In conclusion, using a nationally representative sample of low-income non-elderly adults, we found that the ACA Medicaid expansions were associated with a modest increase in PCP utilization but did not affect the utilization of EDs during the first 3 years of the implementation. These findings provide important information regarding the impact of the ACA Medicaid expansions on health care utilization and warrant further studies to better understand how we can make sure Medicaid beneficiaries receive care from appropriate healthcare providers.

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Corresponding Author: *Hiroshi Gotanda, MD; Geriatric Research Education and Clinical Center, VA Greater Los Angeles Healthcare System, Los Angeles, CA, USA (e-mail: hgotanda@ucla.edu).*

Compliance with Ethical Standards:

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

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