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Racial/Ethnic Disparities in Health Insurance and Differences in Visit Type for a Population of Patients with Diabetes after Medicaid Expansion

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Abstract

This quasi-experimental study evaluated racial/ethnic disparities in health insurance and differences in visits post- versus pre- Affordable Care Act (ACA) Medicaid expansion. We utilized electronic health record data from a population of patients with diabetes aged 19–64 seen in community health centers (CHCs). We used generalized estimating equation Poisson models to estimate incidence rates of insurance type and visits post- (1/1/2014– 12/31/2015) versus pre- (1/1/13–12/31/13) ACA, stratified by racial/ethnic group. We assessed difference-in-differences (DD) and difference-in-difference-in-differences (DDD). The relative disparity in uninsured visits increased between Hispanic and non-Hispanic Whites in expansion states (DD=1.93; 95% CI=1.41, 2.64); the magnitude was greater in expansion compared with non-expansion states (DDD=1.84, 95% CI=1.32, 2.56), yet uninsured rates were lower in expansion compared with non-expansion states. We found few changes in visits. Results suggest that the ACA Medicaid expansion increased health insurance coverage and that while some racial/ethnic disparities were improved, some remained.

Keywords

Health care reform; Affordable Care Act; diabetes; health care disparities; health policy

Diabetes is one of the most prevalent chronic diseases, affecting over 29 million people in the United States (U.S.).[1] The number of people with diabetes is expected to increase to 48 million in 2050.[2] Diabetes can lower life expectancy by up to 19 years and increase lifetime health care expenditures.[3] Health insurance is particularly important for individuals with

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diabetes, as it increases access to needed health care services, and those with health insurance are more likely to receive diabetes-related preventive care compared with those without coverage.[4–6] With historically lower insurance prevalence rates than non-Hispanic Whites, racial and ethnic minorities have experienced more of the negative effects of being uninsured.[7] For example, racial and ethnic minorities are disproportionately affected by diabetes, are more likely to have poorly-controlled diabetes, and are at a significantly greater risk of experiencing poor diabetes-related outcomes than are Whites.[8]

The Affordable Care Act (ACA) was designed to increase health care access, improve health, and mitigate health care disparities.[9] To help low-income populations gain health insurance, the ACA called for Medicaid expansions to individuals earning 138% or less of the federal poverty level (FPL), and as of September 2018, 33 states and the District of Columbia had implemented expansions while 17 states had not.[10] After the ACA Medicaid expansion, there was a dramatic decrease in uninsured rates,[11,12] yet some racial/ethnic disparities in coverage persist.[13,14] The gap between uninsured Whites (11.7%) and Hispanics (33.4%) remained post-ACA likely due to citizenship considerations, as only legal U.S. residents and citizens were eligible for Medicaid, tax breaks, and insurance subsidies. Indeed, one study found 57% of Hispanic non-citizens were uninsured post-ACA compared with 21% of Hispanic citizens.[14]

Although there is some information about the effects of non-ACA coverage changes on patients with diabetes,[15] little is known about the impact of ACA Medicaid expansion on health care access and utilization for different racial/ethnic subgroups with diabetes and/or whether health care disparities remain. In addition, it is unknown if the impact on racial/ethnic minorities with diabetes was similar to overall changes seen post-ACA in the community health center (CHC) setting.[16,17] Many people directly affected by Medicaid expansion are seen in CHCs as 71% of the patients they serve have incomes at or below 100% FPL. Additionally, 62% of CHC patients are members of racial and ethnic minority groups.18 Patients seen in CHCs also have a higher prevalence of diabetes than the national average (15% vs. 9%, respectively).[8,18] Since patients are seen at CHCs even if uninsured (both before and after ACA Medicaid expansion), CHC data provide a robust picture of insurance coverage and health care visit changes following the ACA.

Therefore, to understand the impact of the ACA Medicaid expansion on racial/ethnic health insurance disparities and differences in visit type for a population of patients with diabetes seen in CHCs, this study assessed changes pre- versus post-ACA in expansion compared with non-expansion states. We hypothesized that racial/ethnic health insurance disparities would decrease after the ACA, especially in states that expanded Medicaid. We also hypothesized that new patient visits and preventive service visits would increase post-ACA differentially based on race/ethnicity. Results describe changes in health insurance disparities and differences in visits post-ACA Medicaid expansion for a population of patients with diabetes seen in CHCs.

Methods

Data source.

This quasi-experimental, observational study used electronic health record (EHR) data from the ADVANCE (Accelerating Data Value Across a National Community Health Center Network) clinical data research network (CDRN) of CHCs.[19] Briefly, the ADVANCE CDRN combines data from three health networks into one database using the PCORnet common data model structure.

Study time period and population.

The three-year study period included one year pre-ACA (1/1/13–12/31/13) and two years post-ACA (1/1/2014–12/31/2015). We included all CHCs in the ADVANCE network that were *live* on their EHR as of January 1, 2013 in 10 states that expanded Medicaid as of 1/1/2014 (California, Hawaii, Maryland, Minnesota, New Mexico, Ohio, Oregon, Rhode Island, Washington, and Wisconsin) and in six states that did not expand Medicaid (Florida, Kansas, Missouri, North Carolina, Texas, Montana).10 We considered Wisconsin an expansion state, even though they did not expand to 138% or less FPL because they opened enrollment to adults earning 100% or less FPL on 1/1/2014 and therefore behaved more like an expansion state than a non-expansion state.

We limited our analyses to the population of patients with diabetes at any time during the study period. We defined the population of patients with diabetes using a modified SUrveillance, PREvention, and ManagEment of Diabetes Mellitus (SUPREMEDM) definition,[20] which required two of any of the following *events* within two years: diabetes-related medications prescribed (not prescriptions dispensed to patients) (e.g., insulin, sulfonylurea), hemoglobin A1c or glucose laboratory test results, and/or a diabetes diagnosis on the outpatient problem list. The original definition included inpatient diagnosis and dispensed medications, which we did not have in our dataset.

We excluded pregnant women from our study population [n= 2,154 (1.9%)] since gestational diabetes is a transient condition and because pregnant women have very different visit behavior from non-pregnant people.

Analyses included all ambulatory visits among the population of patients with diabetes at some point during the study period who were aged 19 or older at the beginning of the study period and 64 or younger by the end. We chose this age range as this was the group most likely to be affected by the ACA Medicaid expansion (uninsured, lowincome children under 19 could qualify for public health insurance from the Children's Health Insurance Program and most Americans over 64 are eligible to receive Medicare; few public health insurance programs existed for those aged 19–64 prior to the ACA Medicaid expansion).[21,22]

Variables.

We assessed the following dependent variables: health insurance at visits (uninsured, Medicaid-insured, and privately-insured) and health care visits (total and type) for a CHC population of patients with diabetes post- versus pre-ACA expansion stratified by race/

ethnicity across the three-year study period. Health insurance was based on primary payer and categorized as Medicaid, private, uninsured, or other. Private coverage included all non-public health insurance. In CHCs, private coverage likely refers to individually purchased plans, as nationally less than 40% of adults with less than 250% FPL had employer-sponsored coverage and the employer-sponsored insurance rate increased by less than 1% in 2014.[23,24] Other coverage was excluded.

Total visits included all ambulatory care visits (i.e., health care visits in an outpatient clinic) to a CHC in the ADVANCE network. Types of visits were classified as new patient, established patient, and preventive service visit based on CPT code: new patient visits included CPT 99201–99205. Established patient visits were defined as: CPT 99212–99215; and preventive service visits included the following: CPT 99385–99387, 99395–99397. Preventive service codes were specific to visits where the main objective of the visit was preventive service receipt and not chronic or acute condition care.

Racial/ethnic groups were categorized as non-Hispanic White, non-Hispanic Black, non-Hispanic other races, and Hispanic any race (referred to as Hispanic). We excluded the category of non-Hispanic other races, as it made up only 6.9% of the total diabetic population (n=7,821) and was too heterogeneous to provide adequate information. A patient was considered Hispanic if they were identified as Hispanic or had Spanish listed as their primary language. The ADVANCE CDRN contains a single response option for each patient's primary race, ethnicity, and language.

To account for differences in medical complexity, Enhanced Charlson Comorbidity Index scores were calculated as of December 31, 2015 using active conditions in the problem list supplemented with encounter diagnoses. Patients were determined to have a condition under each of 36 Enhanced Charlson Comorbidity Index categories, when there was an active condition in the problem list, (2) the problem list diagnosis was resolved but there was a subsequent encounter diagnosis after the (latest) resolve date, or (3) there was no diagnosis in the problem list but there was an encounter diagnosis in that category.[25] We categorized the Enhanced Charlson Comorbidity Index as the percent of each racial/ethnic group with a score greater than or equal to six (following Charlson et al.).[25]

The primary independent variable was an indicator variable denoting whether or not the clinic was in a state that expanded Medicaid eligibility as of January 1, 2014.[10]

Analysis.

We present clinic population demographic characteristics by racial/ethnic group, stratified by expansion status. When estimating health insurance and health care visit incidence rates for this population, we divided the number of visits in a given interval (numerator) by the total number of patients seen at a given clinic across the three-year study period (denominator) in each racial/ethnic category. These incidence rates were scaled to 1,000 patients per month to aid in interpretation.

Using generalized estimating equation (GEE) Poisson models, we estimated the health insurance and visit incidence rate (referred to as rates) changes in the post- relative to pre-

ACA periods between racial/ethnic groups and expansion vs. non-expansion states. The GEE models included interaction terms between the aforementioned variables (i.e., pre-post; racial/ethnic groups; expansion-non-expansion). We clustered by CHC and accounted for within-facility temporal correlation using an autoregressive covariance structure. We also accounted for possible variance-covariance misspecification using a robust sandwich variance estimator. All models were adjusted for CHC patient population demographics [i.e., clinic-level distribution of sex, age, FPL, and Charlson Comorbidity Index score (% of non-Hispanic Whites with a score ≥6, % of Hispanics with a score ≥6, % of non-Hispanic Blacks with a score ≥6,)] and state-level factors including: state marketplace type,[26] 2014 minimum wage[27] and unemployment rate,[28] and 2013 uninsured rate.[29]

Using difference-in-difference (DD) comparisons, we evaluated changes: 1) in post- vs. pre-expansion rate ratios between racial/ethnic groups within their own expansion group, 2) within racial/ethnic groups between expansion and non-expansion states, and 3) between racial/ethnic groups within expansion and non-expansion states. We also evaluated post- vs. pre-expansion between racial/ethnic groups comparing expansion versus non-expansion across ACA implementation using difference-in-difference- in-differences (DDD) comparisons. For DDD estimates, the reference groups were pre-period, non-Hispanic White, and non-expansion states.

Statistical testing was two-sided and significance set at $p<.05$. All analyses were completed using R version 3.3.3 and SAS software, Version 9.4 (SAS Institute Inc., Cary, NC, USA). This study was approved by the Oregon Health & Science University Institutional Review Board.

Results

Demographic characteristics.

Our analysis included over one million visits in the three-year study period (377,123 visits from 46,438 patients in 122 CHCs in six nonexpansion states and 634,058 visits from 56,559 patients in 217 CHCs in 10 expansion states). The majority of the population of patients with diabetes in our study sample in all racial/ethnic groups and in both expansion and non-expansion states were female, aged 40–64, and had incomes 138% or less FPL. Non-Hispanic White patients had a higher proportion of Charlson Comorbidity Index scores greater than 6 in both expansion and non-expansion states than the other racial/ethnic groups, Table 1.

Post- vs. pre-ACA within racial/ethnic groups in expansion states.

In expansion states, Medicaid-insured visit rates increased significantly for all racial/ethnic groups post-ACA; Hispanics saw an 82% increase [rate ratio (RR)=1.82; 95% confidence interval (CI)=1.59, 2.09], while the increase was 56% for non-Hispanic Whites (RR=1.56; 95% CI=1.42, 1.72) and 37% for non-Hispanic Blacks (RR=1.37; 95% CI= 1.17, 1.60), Table 2. Uninsured visit rates significantly decreased for all racial/ethnic groups post- ACA; non-Hispanic White and non-Hispanic Black uninsured rates decreased by 67% (RR=0.33; 95% CI=0.24, 0.44) and 64% (RR=0.36; 95% CI=0.30, 0.44), respectively, while uninsured

visit rates for Hispanics saw a 36% decrease (RR=0.64; 95% CI=0.57, 0.71). Across all racial/ethnic groups, there was one significant change in total visit rates post-ACA for Hispanics in expansion states (RR=1.14; 95% CI=1.02, 1.28). The rate of new patient visits declined 13% among non-Hispanic Whites (RR=0.87; 95% CI=0.77, 0.98) and 29% for non-Hispanic Blacks (RR=0.71; 95% CI=0.60, 0.85) post- ACA, whereas new patient visit rates for Hispanics did not change. Rates of established patient and preventive care visits both increased 15% among Hispanics, however, there were not significant changes for non-Hispanic Blacks or non-Hispanic Whites in CHCs.

Post- vs. pre-ACA within racial/ethnic group comparison in non-expansion states.

In non-expansion states, Medicaid-insured visit rates did not change significantly for any racial/ethnic group post-ACA. Uninsured visit rates decreased for all racial/ethnic groups—16% for non-Hispanic Whites (RR=0.84; 95% CI=0.75, 0.94), 12% for Hispanics (RR=0.88; 95% CI=0.79, 0.98), and 19% for non-Hispanic Blacks (RR=0.81; 95% CI=0.68, 0.97). The biggest change in non-expansion states after the ACA was a 193% increase of privately-insured visit rates among Hispanics (RR=2.93; 95% CI=2.03, 4.23), 91% for non-Hispanic Whites (RR=1.91; 95% CI=1.52, 2.41), and 84% for non-Hispanic Blacks (RR=1.84; 95% CI=1.36, 2.47). There were no significant changes post-ACA in total or established patient visit rates for any racial/ethnic group. Rates of preventive care visits increased by 29% among Hispanics post-ACA (RR=1.29; 95% CI=1.02, 1.63), yet non-Hispanic Black and non-Hispanic Whites did not see a significant change.

Difference-in-difference (DD) estimates of post- vs. pre-ACA comparing racial/ ethnic groups, stratified by expansion status.

Relative to non-Hispanic Whites, Medicaid-insured visits were 17% higher for Hispanics in expansion states (DD=1.17; 95% CI=1.01, 1.35) and privately-insured visits were 53% higher in non-expansion states (DD=1.53; 95% CI=1.03, 2.28) post-ACA, Table 3. However, while uninsured visit rates decreased for Hispanic and for non-Hispanic Whites, the relative disparity of uninsured visit rates between Hispanic and non-Hispanic Whites increased 94% in expansion states [DD=1.94; 95% CI=1.41, 2.66].

Difference-in-difference-in-difference (DDD) estimates comparing racial/ethnic groups post- vs. pre-ACA and expansion versus non-expansion status.

The widening disparity in uninsured visit rates between Hispanics and non-Hispanic Whites was significantly greater in expansion states than in non-expansion states (DDD=1.84, 95% CI=1.32, 2.58). No other DDD estimates were significantly different.

Discussion

Among visits for the population of patients with diabetes, we found similar health insurance changes after the ACA Medicaid expansion compared with total CHC population estimates.[13,30] Specifically, Medicaid-insured visit rates increased in expansion states, privately-insured visit rates increased in non-expansion states, while uninsured visit rates in both expansion and non-expansion states decreased for all racial/ethnic groups. Although Medicaid-insured visit rates increased most for Hispanic patients in expansion states and

privately-insured visit rates in non-expansion states, they had the smallest decrease in uninsured visit rates of all racial/ethnic groups.

The widening disparity in uninsured visit rates for Hispanics was more pronounced in expansion states than in non-expansion states, although importantly the rates of uninsured visits in non-expansion states were higher than in expansion states. In other words, in expansion states uninsured visit rates for Hispanics decreased substantially, but the rates decreased about twice as much for non-Hispanic Whites, whereas in non-expansion states uninsured visit rates changed by a small amount and more equally across all racial/ethnic groups post-ACA. This phenomenon is likely explained by the greater impact Medicaid expansion had on patients gaining insurance than did the private marketplace and that a larger proportion of the uninsured Hispanic population of patients with diabetes were unable to gain coverage due to ineligibility (e.g., immigration status). Indeed, overall there were fewer uninsured patients in expansion states compared with non-expansion states yet, notably the vast the majority who remain uninsured nationwide post-ACA are U.S. citizens (78%).[31]

New patient visits decreased for non-Hispanic Whites and non-Hispanic Blacks, while they remained stable for the Hispanic population of patients with diabetes in both expansion and non-expansion states. Previous research, however, reported new patient visits increased for the overall CHC population post-ACA.[12] Our findings may be because new patients were not diagnosed with diabetes during the study period and therefore not included in the population for this study.

Diabetes-related preventive service rates are better when a clinic's panel of patients includes more insured patients than when the clinic has fewer insured patients,[32] so with increases in coverage post-ACA we would expect CHCs to increase preventive services. Previous research found an increase in preventive care visits in expansion states;[12] we found an increase in preventive care visits for the Hispanic population of patients with diabetes, but not for the other racial/ethnic groups. A possible explanation is that the insured visit increases for the Hispanic population of patients with diabetes improved access to preventive services. It is also possible that no changes were seen for the other racial/ethnic groups because most visits revolved around managing diabetes and not preventive service receipt, as CHCs exceed Medicaid performance benchmarks for diabetes control.[18] However, previous research at the patient level highlighted that when a patient with diabetes is uninsured at a CHC visit, he or she is less likely to receive preventive care services compared with someone who is insured at a visit.[6] Therefore, the high uninsured visit rates and increased disparity in uninsured visits for the Hispanic population of patients with diabetes is a matter for concern, as it is possible that this population is not receiving appropriate preventive services. Thus, CHCs may want to consider outreach efforts to their uninsured Hispanic population of patients with diabetes.

Based on these findings, any future repeal of Medicaid expansion and the current removal of the individual mandate penalty will likely widen the disparities that were narrowed by the ACA, especially as premiums rise.[33] For additional evidence of the impact of ACA expansion, future research should explore secondary diabetes preventive service receipt,

such as eye and foot examinations, and changes in diabetes-related biomarkers. It is also important to study how coverage changes influence patients with diabetes at the individual level, as this study is at the visit level and provides information about the population of patients with diabetes seen in CHCs.

Limitations.

This study is based on data from CHCs in 16 states and may not be generalizable to all CHCs. However, the profile of patients in the ADVANCE CDRN is comparable to national estimates of CHC patient characteristics.[16] As the United States Health Resources and Services Administration requires CHCs to collect and report race, ethnicity, and language data, these data are captured for nearly every patient. Yet, information regarding Hispanic origin (e.g., Mexican, Puerto Rican, Cuban) or immigration status is not available. This study is at the visit level and does not describe individual patient coverage or type of care. In addition, we did not include any categories for diabetes diagnosis duration or control in our analyses.

Conclusion.

Health insurance changes for the CHC population of patients with diabetes were similar to those seen in the overall CHC population: Medicaid-insured visit rates increased in expansion states, privately-insured visit rates increased in non-expansion states, and uninsured visit rates decreased in both expansion and non-expansion states for all racial/ethnic groups (less so for Hispanics). These results suggest that the ACA Medicaid expansion increased health insurance coverage and that while some racial/ethnic disparities were improved, some remained.

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Table 1.

CHARACTERISTICS OF A POPULATION OF PATIENTS WITH DIABETES SEEN IN COMMUNITY HEALTH CENTERS IN EXPANSION AND NON-EXPANSION STATES BY RACIAL/ETHNIC GROUP, 2013–2015

	Non-Expansion States (6 states: FL, KS, MO, MT, NC, TX)			Expansion States (10 states: CA, HI, MD, MN, NM, OH, OR, RI, WA, WI)		
Community Health Centers, N	122			217		
Total Population of Patients with Diabetes, N	46,438			56,559		
Total Visits for the Population of Patients with Diabetes, N	377,123			634,058		
Demographics	**Non-Hispanic white**	**Hispanic**	**Non-Hispanic black**	**Non-Hispanic white**	**Hispanic**	**Non-Hispanic black**
Visits/Year, N						
2013	31,192	36,566	38,496	80,727	62,601	23,838
2014	30,053	37,216	37,529	85,342	69,418	23,486
2015	27,017	37,416	35,091	77,677	73,212	21,952
Patients, N	12,848	17,944	15,646	24,784	23,838	7,937
2013[a]	8,495	11,143	10,872	17,937	15,960	5,853
2014[a]	8,676	11,982	10,938	18,479	17,789	5,868
2015[a]	7,815	11,809	10,336	17,714	18,505	5,579
Sex, N (%)						
Female	6,915 (53.8)	10,079 (56.2)	9,569 (61.2)	13,134 (53.0)	13,399 (56.2)	4,028 (50.7)
Male	5,932 (46.2)	7,865 (43.8)	6,077 (38.8)	11,639 (47.0)	10,434 (43.8)	3,908 (49.2)
Other/unknown	1 (0.0)	0 (0.0)	0 (0.0)	11 (0.0)	5 (0.0)	1 (0.0)
Age group, as of 1/1/2014, N (%)						
19–26 y	319 (2.5)	308 (1.7)	373 (2.4)	620 (2.5)	514 (2.2)	213 (2.7)
27–39 y	1,716 (13.4)	2,566 (14.3)	2,176 (13.9)	3,712 (15.0)	4,044 (17.0)	1,269 (16.0)
40–64 y	10,813 (84.2)	15,070 (84.0)	13,097 (83.7)	20,452 (82.5)	19,280 (80.9)	6,455 (81.3)
Primary Language, N (%)						
English	12,652 (98.5)	6,186 (34.5)	14,989 (95.8)	23,933 (96.6)	7,608 (31.9)	7,213 (90.9)
Spanish	0 (0.0)	11,629 (64.8)	0 (0.0)	0 (0.0)	16,164 (67.8)	0 (0.0)
Other/unknown	196 (1.5)	129 (0.7)	657 (4.2)	851 (3.4)	66 (0.3)	724 (9.1)
Federal Poverty Level (last recorded), N (%)						
≤138%	9,479 (73.8)	14,773 (82.3)	12,213 (78.1)	16,337 (65.9)	17,564 (73.7)	17,564 (73.7)
>138%	1,718 (13.4)	2,084 (11.6)	2,009 (12.8)	4,197 (16.9)	2,765 (11.6)	530 (6.7)
Unknown	1,651 (12.9)	1,087 (6.1)	1,424 (9.1)	4,250 (17.1)	3,509 (14.7)	1,003 (12.6)
Enhanced Charlson						

	Non-Expansion States (6 states: FL, KS, MO, MT, NC, TX)			Expansion States (10 states: CA, HI, MD, MN, NM, OH, OR, RI, WA, WI)		
Comorbidity Index (as of 12/31/2015), N (%)						
% ≥6	2,710 (21.1)	1,900 (10.6)	2,681 (17.1)	4,735 (19.1)	1,285 (5.4)	1,047 (13.2)

Notes

[a] Patients per year are not mutually exclusive and will not sum to total patients.

Data source: ADVANCE CDRN

Table 2.

ADJUSTED INCIDENCE RATE AND RATE RATIOS OF HEALTH INSURANCE AND HEALTHCARE VISITS BY POST- VERSUS PRE-AFFORDABLE CARE ACT PERIODS WITHIN SPECIFIC RACIAL/ETHNIC GROUPS FOR A POPULATION OF PATIENTS WITH DIABETES, 2013–2015[a]

	Non-Expansion			Expansion		
	Pre-ACA	**Post-ACA**	**Within-racial/ethnic group Post vs. pre**	**Pre-ACA**	**Post-ACA**	**Within-racial/ethnic group Post vs. pre**
Medicaid-insured	Rate[b]	Rate[b]	RR (95% CI)	Rate[b]	Rate[b]	RR (95% CI)
Non-Hispanic white	72.20	66.77	0.92 (0.83, 1.03)	62.64	97.83	1.56 (1.42, 1.72)*
Hispanic	48.23	47.19	0.98 (0.88, 1.09)	52.85	96.27	1.82 (1.59, 2.09)*
Non-Hispanic black	73.38	71.41	0.97 (0.91, 1.04)	82.41	113.02	1.37 (1.17, 1.60)*
Uninsured						
Non-Hispanic white	73.70	61.74	0.84 (0.75, 0.94)*	64.31	21.08	0.33 (0.24, 0.44)*
Hispanic	83.07	73.11	0.88 (0.79, 0.98)*	99.94	63.47	0.64 (0.57, 0.71)*
Non-Hispanic black	70.70	57.20	0.81 (0.68, 0.97)*	77.86	28.15	0.36 (0.30, 0.44)*
Privately-insured						
Non-Hispanic white	24.70	47.27	1.91 (1.52, 2.41)*	31.47	31.70	1.01 (0.86, 1.18)
Hispanic	16.60	48.65	2.93 (2.03, 4.23)*	31.74	36.35	1.15 (0.92, 1.42)
Non-Hispanic black	26.05	47.83	1.84 (1.36, 2.47)*	22.32	25.97	1.16 (0.92, 1.48)
Total Visits						
Non-Hispanic white	261.02	249.67	0.96 (0.89, 1.03)	223.16	233.39	1.05 (0.98, 1.11)
Hispanic	211.57	219.91	1.04 (0.97, 1.12)	175.97	201.00	1.14 (1.02, 1.28)*
Non-Hispanic black	275.91	258.32	0.94 (0.87, 1.01)	231.11	221.57	0.96 (0.88, 1.05)
New Patient						
Non-Hispanic white	10.19	8.21	0.81 (0.70, 0.93)*	11.22	9.74	0.87 (0.77, 0.98)*
Hispanic	8.05	7.05	0.88 (0.77, 1.00)	7.14	7.08	0.99 (0.87, 1.12)
Non-Hispanic black	9.11	7.46	0.82 (0.74, 0.90)*	10.49	7.49	0.71 (0.60, 0.85)*
Established Patient						
Non-Hispanic white	204.04	192.92	0.95 (0.88, 1.02)	167.56	174.73	1.04 (0.98, 1.11)

	Non-Expansion			Expansion		
	Pre-ACA	**Post-ACA**	**Within-racial/ethnic group Post vs. pre**	**Pre-ACA**	**Post-ACA**	**Within-racial/ethnic group Post vs. pre**
Hispanic	191.07	193.38	1.01 (0.94, 1.09)	183.57	211.62	1.15 (1.02, 1.30) *
Non-Hispanic black	219.25	205.93	0.94 (0.88, 1.01)	184.25	171.08	0.93 (0.85, 1.01)
Preventive Service Visit						
Non-Hispanic white	7.81	8.93	1.14 (0.95, 1.37)	3.56	3.84	1.08 (0.94, 1.24)
Hispanic	9.01	11.59	1.29 (1.02, 1.63) *	4.61	5.29	1.15 (1.03, 1.28) *
Non-Hispanic black	8.06	9.55	1.18 (0.95, 1.48)	4.38	5.06	1.16 (0.86, 1.56)

Notes

[a] Models were adjusted for CHC patient population demographics [i.e., clinic-level distribution of sex, age, FPL, and Charlson Comorbidity Index score as of 12/ 31/2018 (% of non-Hispanic whites with a score ≥6, % of Hispanics with a score ≥6, % of non-Hispanic blacks with a score ≥6)], and state-level factors including state marketplace type,(21) 2014 minimum wage(22) and unemployment rate,(23) and 2013 uninsured rate.(24)

[b] Incidence Rate/1,000 patients

* Statistically significant p<.05

ACA=Affordable Care Act Medicaid expansion

RR= Rate Ratio

Data source: ADVANCE CDRN

Table 3.

DIFFERENCE-IN-DIFFERENCE AND DIFFERENCE-IN- DIFFERENCE-IN-DIFFERENCES ESTIMATES OF HEALTH INSURANCE AND HEALTHCARE VISITS AMONG A POPULATION OF PATIENTS WITH DIABETES, 2013–2015[a]

	Non- Expansion Post- vs pre- ACA between racial/ ethnic group	Expansion Post- vs pre- ACA between racial/ ethnic group	Expansion vs. Non- Expansion Postvs pre- ACA between racial/ethnic group
Medicaid-insured	DD[b] (95% CI)	DD[b] (95% CI)	DDD[c] (95% CI)
Non-Hispanic white	ref	ref	ref
Hispanic	1.06 (0.94, 1.19)	1.17 (1.01, 1.35)*	1.10 (0.91, 1.33)
Non-Hispanic black	1.05 (0.94, 1.17)	0.88 (0.74, 1.05)	0.83 (0.68, 1.02)
Uninsured			
Non-Hispanic white	ref	Ref	ref
Hispanic	1.05 (0.94, 1.17)	1.94 (1.41, 2.66)*	1.84 (1.32, 2.58)*
Non-Hispanic black	0.97 (0.81, 1.15)	1.10 (0.79, 1.54)	1.14 (0.78, 1.67)
Privately-insured			
Non-Hispanic white	ref	ref	Ref
Hispanic	1.53 (1.03, 2.28)*	1.14 (0.89, 1.46)	0.74 (0.46, 1.19)
Non-Hispanic black	0.96 (0.79, 1.17)	1.16 (0.89, 1.50)	1.20 (0.87, 1.67)
Total Visits			
Non-Hispanic white	ref	ref	Ref
Hispanic	1.09 (1.00, 1.18)	1.09 (0.97, 1.24)	1.01 (0.87, 1.17)
Non-Hispanic black	0.98 (0.89, 1.07)	0.92 (0.82, 1.02)	0.94 (0.81, 1.08)
New Patient			
Non-Hispanic white	ref	ref	ref
Hispanic	1.09 (0.92, 1.29)	1.14 (0.98, 1.33)	1.05 (0.83, 1.32)
Non-Hispanic black	1.02 (0.88, 1.18)	0.82 (0.68, 1.00)	0.81 (0.63, 1.04)
Established Patient			
Non-Hispanic white	ref	ref	ref
Hispanic	1.07 (0.99, 1.16)	1.11 (0.97, 1.26)	1.03 (0.89, 1.20)
Non-Hispanic black	0.99 (0.91, 1.09)	0.89 (0.80, 0.99)*	0.90 (0.78, 1.03)
Preventive Service Visit			
Non-Hispanic white	ref	ref	ref
Hispanic	1.12 (0.87, 1.45)	1.07 (0.92, 1.23)	0.95 (0.71, 1.27)
Non-Hispanic black	1.04 (0.82, 1.31)	1.07 (0.78, 1.48)	1.04 (0.70, 1.54)

Notes

[a]Models were adjusted for CHC patient population demograpics [i.e., clinic-level distribution of sex, age, FPL, and Charlson Comorbidity Index score as of 12/31/2018 (% of non-Hispanic whites with a score ≥6, % of Hispanics with a score ≥6, % of non-Hispanic blacks with a score ≥6,)], and state-level factors including state marketplace type,(21) 2014 minimum wage(22) and unemployment rate,(23) and 2013 uninsured rate.(24)

[b]DD estimates of post vs. pre rate ratios between race/ethnic groups stratified by expansion status.

[c]DDD estimates of post vs. pre rate ratios between race/ethnic groups comparing expansion versus non-expansion.

*Statistically significant p<.05.

ACA=Affordable Care Act Medicaid expansion

DD=Difference-in-difference

DDD=Difference-in-difference in difference

Data source: ADVANCE CDRN