RESEARCH ARTICLE

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Residence in a Medicaid-expansion state and receipt of alcohol screening and brief counseling by adults with lower incomes: Is increased access to primary care enough?

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Abstract

Background: We investigate whether living in a state that expanded Medicaid eligibility is associated with receiving alcohol screening and brief counseling among nonelderly, low-income adults and a subgroup with chronic health conditions caused or exacerbated by alcohol use.

Method: Data are from the 2017 and 2019 Behavioral Risk Factor Surveillance System ($N = 15,743$ low-income adults; $n = 7062$ with a chronic condition). We used propensity score-weighted, covariate-adjusted, modified Poisson regression to estimate associations between residence in a Medicaid-expansion state and receipt of alcohol screening and brief counseling. Models estimated associations in the overall sample and chronic conditions subsample, as well as differential associations across sex, race, and ethnicity using interaction terms.

Results: Living in a state that expanded Medicaid eligibility was associated with being asked whether one drank (prevalence ratio (PR) = 1.15, 95% confidence interval (CI) = 1.08, 1.22), but not with further alcohol screening, guidance about harmful drinking, or advice to reduce drinking. Among individuals with alcohol-related chronic conditions, expansion state residence was associated with being asked about drinking (PR = 1.13, 95% CI = 1.05, 1.20) and, among past 30-day drinkers with chronic conditions, being asked how much one drank (PR = 1.28, 95% CI = 1.04, 1.59) and about binge drinking (PR = 1.43, 95% CI = 1.03, 1.99). Interaction terms suggest that some associations differ by race and ethnicity.

Conclusions: Living in a state that expanded Medicaid is associated with a higher prevalence of receiving some alcohol screening at a check-up in the past 2 years among low-income residents, particularly among individuals with alcohol-related chronic conditions, but not with the receipt of high-quality screening and brief counseling. Policies may have to address provider barriers to delivery of these services in addition to access to care.

KEYWORDS
alcohol screening and brief counseling, alcohol-related conditions, Medicaid expansion, primary care

INTRODUCTION

The U.S. Patient Protection and Affordable Care Act (ACA) was enacted in March 2010, aiming to make affordable health insurance available to more people and to lower patient costs of care. As one of its provisions, federal subsidies were offered to states to expand eligibility for Medicaid, the public insurance program for individuals with lower incomes, to include all nonelderly adults with incomes up to 138% of the federal poverty level (Patient protection and affordable care act, 2010). Prior to the ACA, eligibility varied by state and was considerably more restrictive, often limited to parents and their dependent children, pregnant women, and individuals with disabilities (Medicaid and CHIP Payment and Access Commission, 2023). Twenty-four states and D.C. opted to expand Medicaid eligibility beginning January 1, 2014, and another 15 states later followed suit (Kaiser Family Foundation, 2022). There is some evidence that expansion of Medicaid eligibility increased access to primary care among those newly eligible. Expansion was associated with an increase in the likelihood of having a personal doctor or usual source of care and a decrease in avoiding care due to cost (Griffith et al., 2017; Lee et al., 2021; Simon et al., 2017; Singh & Wilk, 2019; Sommers et al., 2015, 2017; Winkelman & Chang, 2018; Yue et al., 2018).

It is unclear, however, how Medicaid expansion influenced receipt of alcohol screening and brief intervention (ASBI) in primary care. Excessive alcohol use is a leading cause of preventable death and morbidity in the United States (Esser et al., 2020), and its reduction is a prominent public health goal (Healthy People 2030, 2020). Given consistent evidence that brief intervention in primary care is associated with reduction in alcohol consumption among at-risk drinkers (Jonas et al., 2012; Whitlock et al., 2004), the United States Preventive Services Task Force recommends that primary care clinicians screen all patients over age 18 for unhealthy alcohol use and provide those who report "risky or hazardous drinking" with brief behavioral counseling interventions (US Preventive Services Task Force et al., 2018). If Medicaid expansion has resulted in more individuals receiving primary care, then such an increase should translate into higher rates of ASBI in the lower-income population. However, there are considerable provider and organizational-level barriers to offering ASBI, including limited provider training, time constraints during appointments, and lack of resources for referral (Johnson et al., 2011; McNeely et al., 2018; Rosário et al., 2021; Vendetti et al., 2017). Thus, it is possible that increased health care access may not be sufficient to improve receipt of ASBI at the population level.

Here we investigate associations of living in a state that expanded Medicaid eligibility with receipt of alcohol screening and brief counseling in primary care among nonelderly adults with lower incomes. We also investigate its association with receipt of these services among those with elevated need: individuals who have chronic conditions caused or exacerbated by moderate or heavy alcohol use (high blood pressure, diabetes, etc.). Because such drinking can cause or accelerate these conditions and decrease engagement in self-management (e.g., medication adherence, health monitoring,

dietary and exercise regimens), individuals with such conditions are at higher risk of alcohol-related adverse health outcomes and stand to benefit considerably from screening and brief counseling (Timko et al., 2016). Finally, we explore whether associations differ by sex and by race and ethnicity, in light of mixed evidence regarding Medicaid expansion's influence on disparities in access to care (Lee et al., 2021; Singh & Wilk, 2019; Yue et al., 2018).

MATERIALS AND METHODS

Data

This study used data from the Behavioral Risk Factor Surveillance System (BRFSS) from 2017 and 2019. BRFSS is an annual survey conducted by the U.S. Centers for Disease Control and Prevention that gathers data on health-related risk behaviors, chronic health conditions, and use of preventive services. It is administered at the state level and consists of a core survey and additional optional modules (Centers for Disease Control and Prevention, 2015). Weighted samples are representative of each state's population in terms of sex, age, race, education, marital status, home ownership, and phone ownership. We used data from 22 states and the District of Columbia that incorporated the optional ASBI module in 2017 or in 2019. These states include 14 that expanded Medicaid eligibility prior to 2017 (AK, AZ, AR, CA, CO, CT, DC, IL, MD, MN, MT, NV, NH, and RI) and nine that did not (AL, GA, KS, NE, NC, OK, SC, TN, and UT). The only state that completed this module that was excluded from analysis was Wisconsin, which did not expand Medicaid eligibility but includes childless adults with incomes up to 100% of the federal poverty level in its Medicaid program, which is more inclusive than most non-expansion states. Individual-level data from BRFSS were linked with state-level contextual data on unemployment, primary care physicians per population, and binge drinking from the American Community Survey and the Area Health Resource File.

Analyses were limited to individuals who would be eligible for Medicaid after expansion: adults ages 18 to 64 with household incomes less than 138% of the poverty level (Assistant Secretary for Planning and Evaluation, 2017, 2019). Because BRFSS reports income in categories (<$10,000, $10,000 to 14,999, $15,000 to 19,999, $20,000 to 24,999, $25,000 to 34,999, $35,000 to 49,999, $50,000 to 74,999, >$75,000), respondents' income was set to the midpoint of the category to which their reported income belonged (Koma et al., 2017; Winkelman & Chang, 2018). Calculations to determine whether respondents fell below 138% of the poverty level were adjusted for household size.

The combined dataset contained 190,583 respondents. Of these, 36,317 respondents (19% of weighted sample) responded "don't know," refused, or were missing data on eligibility criteria (age, income, number of household residents, and time since their last check-up). Of the remaining 154,266 respondents, 22,878 were eligible for inclusion (age 18 to 64 with household income less than 138% of poverty level). After excluding 7135 respondents

with missing data on the outcomes and covariates under study (described below), the analytic sample contained 15,743 respondents ($n = 9419$ in states that expanded Medicaid and 6324 in states that did not). Additional detail on missing data by variable is provided in the Supplementary Material.

Outcomes

Outcomes were whether respondents received several aspects of high-quality alcohol screening and counseling at a check-up within the last 2 years. Respondents who reported having been to the doctor for a routine check-up within the last 2 years were asked: (1) at that check-up, were you asked in person or on a form if you drink alcohol? (2) did the healthcare provider ask you in person or on a form how much you drink? (3) did the healthcare provider specifically ask whether you drank [five for men/four for women] or more alcoholic drinks on one occasion? and (4) were you offered advice about what level of drinking is harmful or risky for your health? Respondents who answered affirmatively to at least one of the first three questions were additionally asked (5) were you advised to reduce or quit your drinking?

Each question was operationalized as a unique dichotomous outcome for which respondents received a value of one if they reported receiving the service and a value of zero if they reported that they had not received the service. Respondents who reported that the last time they had a routine check-up was more than 2 years ago (or never) also received values of zero; this classification aligns with our research question of whether policy aimed at increasing access to primary care is sufficient to improve alcohol screening and brief counseling receipt at the *population* level. In addition, for the question regarding receiving advice to reduce or quit drinking, respondents who answered negatively to the first three questions (i.e., had not been asked about their drinking, how much they drink, nor about binge drinking) also received a value of zero assuming that, if not asked these prior services, they also would not have been advised to reduce or quit drinking.

Statistical analyses

First, due to considerable differences in the populations of states that expanded Medicaid eligibility and those that did not, we used propensity score methods to weight individuals residing in states that did not expand eligibility to better resemble individuals residing in states that did expand eligibility on observed covariates. Propensity scores for living in an expansion state were generated using survey weighted logistic regression (Ridgeway et al., 2015) including the following variables: age (indicators for being 18 to 34 years old and 35 to 49 years old), female sex, non-Hispanic White race, non-Hispanic Black race, Hispanic ethnicity, highest level of educational attainment (indicators for having less than high school education, having graduated from high school, and having attended

some college or technical school), being currently employed, having an annual household income of less than $20,000, being married or in a couple, having ever been diagnosed with a depressive disorder, and the number of chronic conditions they have that can be impacted by moderate or heavy alcohol use. These conditions included high blood pressure, diabetes, myocardial infarction, stroke, cancer, chronic obstructive pulmonary disease, emphysema or chronic bronchitis, and kidney disease (Joo et al., 2020; Shield et al., 2013; Sisson, 2007). Propensity scores were used to generate inverse probability of treatment weights (IPTW), which were then multiplied by the survey weight (Ridgeway et al., 2015).

We then used IPTW and covariate-adjusted modified Poisson models with robust standard errors to estimate associations between living in a state that expanded Medicaid eligibility (vs. not) with receipt of each of the screening and brief counseling services. First, we estimated models among all respondents, assessing whether individuals were asked during a check-up in the past 2 years if they drink alcohol. Next, among respondents who reported drinking within the past 30 days ($n = 6068$), we estimated models assessing whether they were asked how much they drink and whether they were asked whether they drank [five for men/four for women] or more alcoholic drinks on one occasion (hereafter referred to as binge drinking; Substance Abuse and Mental Health Services Administration, 2018). For respondents who reported heavy drinking as defined by the National Institute on Alcohol Abuse and Alcoholism (either 5+ drinks/day or >14 drinks/week for men and either 4+ drinks/day or >7 drinks/week for women) within the past 30 days ($n = 2345$), we estimated a model assessing whether they were offered advice about what level of drinking was harmful for their health and another assessing whether they were advised to reduce or quit drinking. All models controlled for age (categories for 18 to 34 years old, 35 to 49 years old, and 50 to 64 years old), sex (categories for male and female), race and ethnicity (mutually exclusive categories for non-Hispanic White, non-Hispanic Black, American Indian or Native Alaskan, Asian or Pacific Islander, Other or Multiracial, and Hispanic), a previous diagnosis of a depressive disorder (McHugh, 2019), the number of alcohol-related chronic conditions with which a respondent was previously diagnosed, as well as the state-level unemployment rate, number of primary care physicians per population, and percent who report engaging in binge drinking. Models also included indicators for survey year to account for trends over time. These models accounted for the complex survey design of BRFSS and included state as an additional first stage sampling unit, given the nesting of individuals within states.

We repeated these analyses among respondents who had been told by a doctor they have at least one alcohol-related chronic condition. The first model assessing whether respondents were asked about drinking was estimated among all respondents with at least one such condition ($n = 7062$). The remaining models (screening about how much one drinks and binge drinking, being offered information about harmful drinking, and advice to reduce drinking) were estimated among respondents who had at least one chronic condition *and* who reported some alcohol consumption in the past

30 days ($n = 2384$). Analyses of the provision of information about harmful drinking and advice to reduce drinking were not limited to individuals with heavy drinking, as all individuals with chronic conditions affected by alcohol use who consume alcohol should ideally be provided advice about what constitutes risky consumption for their particular conditions.

Finally, we investigated differences in associations of living in an expansion state with each outcome by sex and by race and ethnicity. We first re-estimated propensity scores additionally including interactions of each covariate with sex and, separately, with race and ethnicity, in logistic regression models (Green & Stuart, 2014) and recalculated weights. We then re-estimated outcome models with an interaction term of expansion state residence with sex and, in separate models, with race and ethnicity. Models assessing race and ethnicity were limited to non-Hispanic White, non-Hispanic Black, and Hispanic respondents due to small sample sizes and heterogeneity of the other race groups. Given race and ethnicity was a three-level variable, we also performed joint tests (with two degrees of freedom) that all coefficients associated with the interactions were equal to zero following these models.

Sensitivity analyses

We conducted additional analyses to assess robustness of findings to modeling specifications. First, we used the upper endpoint of the BRFSS-provided income categories to determine poverty level rather than the midpoint (Koma et al., 2017; Winkelman & Chang, 2018); use of the midpoint retained a larger sample size but may overestimate the number of respondents living below 138% of the poverty level. Second, we re-estimated the models assessing receipt of advice to reduce or quit drinking excluding individuals who were not asked the question due to previous negative answers rather than assigning zero values, as our assumption that they also would have a negative response on this question may not be accurate.

RESULTS

Table 1 presents characteristics of the sample. Among respondents, 44% were between ages 18 and 34, 30% were ages 35 and 49, and 27% were ages 50 and 64. Over half (57%) were female. Hispanic respondents constituted a sizeable percentage of the sample (49%), reflecting the subset of states under study. Non-Hispanic White respondents made up 29% and non-Hispanic Black respondents 11% of the sample. Over one-third of respondents (36%) had at least one alcohol-related chronic condition, most commonly high blood pressure or diabetes. Approximately one quarter of respondents consumed any alcohol in the past 30 days and 16% reported heavy drinking in the past 30 days.

Rates of screening and counseling receipt were low across the sample. Only 59% reported being asked whether they drink, and among past 30-day drinkers, only 52% were asked how much they

drink and 33% about binge drinking. Among respondents who drank heavily in the past 30 days, only 28% had been offered advice about what level of drinking is risky and only 18% had been advised to reduce or quit drinking.

Table 2 shows the standardized mean differences of covariates between residents of states that expanded and did not expand Medicaid eligibility, both prior to and after propensity score weighting. Using only survey weights, there was considerable imbalance in race and ethnicity, educational attainment, marital status, the number of alcohol-related chronic conditions, and depression diagnosis. Applying propensity score weighting substantially reduced these differences, bringing nearly all below the suggested threshold of 0.10 (Austin, 2009; Cannas & Arpino, 2019; Normand et al., 2001). In the full sample, 18 respondents were excluded from analysis because they were off the common support (i.e., outside the range of propensity scores common to both groups and therefore without comparable counterparts in the alternate group (Garrido et al., 2014)). For the sample of respondents with chronic conditions, 12 such respondents were excluded.

In the IPTW and covariate adjusted models (Table 3), living in a state that expanded Medicaid eligibility was associated with higher prevalence of general alcohol screening within the 2 years prior to being surveyed; that is, being asked at a check-up in the past 2 years whether one drank alcohol (prevalence ratio (PR) = 1.15, 95% confidence interval (CI) = 1.08, 1.22). However, among past 30-day drinkers, living in a state that expanded Medicaid eligibility was not significantly associated with being asked about how much one drank or about binge drinking. It also was not associated with being offered advice about what level of drinking is harmful nor with being advised to reduce or quit drinking among past 30-day heavy drinkers.

Among respondents with at least one alcohol-related condition (Table 4), living in a state that expanded Medicaid eligibility was similarly associated with higher prevalence of being asked whether one drank (PR = 1.13, 95% CI = 1,05, 1.20) and, among past 30-day drinkers, also with being asked how much one drank (PR = 1.28, 95% CI = 1.04, 1.59) and being asked about binge drinking (PR = 1.43, 95% CI = 1.03, 1.99) within the past 2 years. However, models did not identify significant relationships of residence in a Medicaid expansion state with being offered advice about what is harmful drinking or being advised to reduce or quit drinking.

Models incorporating interaction terms did not identify significant differences by sex in the associations of Medicaid expansion state residence with any of the outcomes in this sample (results not shown); however, significant differences by race and ethnicity were observed (Table 5). In states that did not expand Medicaid, the prevalence ratios for many services were higher among non-Hispanic Black respondents compared with non-Hispanic White respondents. Significant interactions with prevalence ratios less than 1.0 were identified between Medicaid expansion state residence and non-Hispanic Black race for two of the outcomes. These interactions suggest that associations of expansion state residence with the outcomes were in opposite directions among Black and White respondents; residence in a Medicaid expansion

TABLE 1 Sociodemographic characteristics of nonelderly low-income adults by Medicaid expansion state residence, 2017 and 2019, n = 15,743.

	Total		Live in states that expanded Medicaid		Live in states that did not expand Medicaid	
	n	%	*n*	%	*n*	%
Age						
18 to 34	5116	43.9	3016	44.0	2100	43.5
35 to 49	4817	29.7	2889	29.9	1928	29.0
50 to 64	5810	26.5	3514	26.1	2296	27.5
Sex						
Female	9308	57.1	5431	56.3	3877	59.5
Male	6435	42.9	3988	43.7	2447	40.5
Race and ethnicity						
American Indian/Alaska Native	692	1.4	502	1.2	190	2.2
Asian/Pacific Island	411	6.9	334	8.6	77	1.9
Black	1944	11.4	970	7.5	974	23.2
Hispanic	4606	48.9	3568	59.0	1038	18.3
White	7561	29.4	3709	22.1	3852	51.6
Other	529	1.9	336	1.6	193	2.7
Educational attainment						
Less than high school	3403	35.5	2184	37.5	1219	29.5
High school/GED	5689	31.3	3342	30.1	2347	34.9
Some college	4533	25.9	2539	25.0	1994	28.8
College+	2118	7.2	1354	7.4	764	6.7
Employment status						
Employed	7173	50.2	4335	51.1	2838	47.4
Unemployed	5470	26.3	3101	23.7	2369	34.3
Student	1022	8.6	631	9.2	391	6.8
Other	2078	14.9	1352	15.9	726	11.5
Average household income						
<$20,000	9826	60.4	5934	61.2	3892	58.0
$20,000 to 49,999	5917	39.6	3485	38.8	2432	42.0
Marital status						
Married/In couple	6284	45.0	3809	46.5	2475	40.4
Divorced/separated/widowed	4512	19.2	2459	17.1	2053	25.4
Never married	4947	35.9	3151	36.4	1796	34.2
Alcohol-related chronic condition						
0	8681	63.9	5413	66.5	3268	55.9
1+	7062	36.1	4006	33.5	3056	44.1
Diagnosed with depression						
No	10,703	76	6698	79.2	4005	66.2
Yes	5040	24	2721	20.8	2319	33.8
Any alcohol consumption in the past 30 days	3723	24.6	2401	25.4	1322	22.1
Heavy drinking in the past 30 days	2345	16	1458	16.3	887	15

TABLE 1 (Continued)

	Total		Live in states that expanded Medicaid		Live in states that did not expand Medicaid	
	n	%	*n*	%	*n*	%
Alcohol screening and brief counseling[a]						
Asked at last routine check-up whether you drink	9310	59.3	5768	60.6	3542	55.3
Among past 30-day drinkers, *n* = 6092						
Asked how much you drink	3171	51.7	2115	53.5	1056	45.5
Asked whether you binge drank	2033	32.7	1362	33.3	671	30.5
Among past 30-day heavy drinkers[b], *n* = 2344						
Offered advice about what level of drinking is harmful to health	656	28.0	439	29.5	217	23.0
Advised to reduce or quit drinking	402	18.1	276	19.8	126	12.4

Note: Table presents unweighted counts (*n*) and survey-weighted percentages.

Expansion states: AK, AZ, AR, CA, CO, CT, DC, IL, MD, MN, MT, NV, NH, RI.

Nonexpansion sates: AL, GA, KS, NE, NC, OK, SC, TN, UT.

[a]ASBI questions asked of respondents who said they had a routine check-up within the past 2 years.

[b]Heavy drinking: 5+ drinks/day or >14 drinks/week for men and 4+ drinks/day or >7 drinks/week for women.

TABLE 2 Covariate balance before and after inverse probability of treatment weighting.

Variable	All respondents		Respondents with 1+ alcohol-related chronic condition	
	Standardized mean difference, survey sampling weights only	Standardized mean difference, IPTW	Standardized mean difference, survey sampling weights only	Standardized mean difference, IPTW
Age 18 to 34	0.012	−0.024	−0.088	−0.071
Age 35 to 49	0.019	−0.032	−0.002	−0.010
Female	−0.064	0.011	−0.128	−0.056
Black	−0.470	0.003	−0.404	−0.011
White	−0.605	0.008	−0.601	−0.091
Hispanic	0.942	−0.029	1.114	0.233
Less than high school degree	0.197	0.082	0.196	0.146
Completed high school or GED	−0.100	−0.049	−0.122	−0.058
Some college	−0.085	−0.014	−0.074	−0.075
Employed	0.075	−0.031	0.157	0.034
Household income <$20,000	0.067	0.025	−0.006	−0.025
Married/in couple	0.125	0.023	0.174	0.045
# of alcohol-related chronic conditions	−0.246	0.031	−0.236	−0.049
Been diagnosed with depression	−0.277	−0.002	−0.277	−0.079

Abbreviation: IPTW, inverse probability of treatment weights.

TABLE 3 Association of Medicaid expansion state residence with receipt of alcohol screening and brief counseling at a routine check-up within past 2 years among nonelderly low-income adults.

	Asked by doctor whether you drink (all respondents) n = 15,725 — Prevalence ratio (95% CI) p-value	Asked how much you drink (past 30-day drinkers) n = 6062 — Prevalence ratio (95% CI) p-value	Asked about binge drinking (past 30-day drinkers) n = 6062 — Prevalence ratio (95% CI) p-value	Offered advice about what level of drinking is harmful to health (past 30-day heavy drinkers) n = 2344 — Prevalence ratio (95% CI) p-value	Advised to reduce or quit drinking (past 30-day heavy drinkers) n = 2344 — Prevalence ratio (95% CI) p-value
Live in expansion state that expanded Medicaid	1.150*** (1.081 to 1.222) <0.001	1.150 (0.981 to 1.348) 0.081	1.144 (0.914 to 1.433) 0.227	1.085 (0.768 to 1.531) 0.630	1.264 (0.787 to 2.029) 0.316
Age (reference: 18 to 34)					
35 to 49	0.990 (0.926 to 1.059) 0.769	1.023 (0.895 to 1.169) 0.729	1.001 (0.838 to 1.196) 0.993	0.738* (0.559 to 0.974) 0.033	1.396* (1.034 to 1.885) 0.031
50 to 64	1.059 (0.998 to 1.123) 0.057	1.121* (1.019 to 1.234) 0.021	1.159 (0.990 to 1.357) 0.066	1.507* (1.110 to 2.045) 0.011	2.310*** (1.651 to 3.232) <0.001
Sex (ref: male)					
Female	1.224*** (1.134 to 1.322) <0.001	1.232*** (1.106 to 1.373) <0.001	1.150* (1.006 to 1.316) 0.041	0.974 (0.733 to 1.295) 0.852	0.715* (0.532 to 0.959) 0.027
Race and ethnicity (ref: non-Hispanic White)					
Non-Hispanic Black	1.203*** (1.148 to 1.260) <0.001	1.141** (1.052 to 1.238) 0.003	1.315** (1.121 to 1.542) 0.002	1.553** (1.137 to 2.121) 0.008	1.280 (0.920 to 1.782) 0.136
AI/AN	1.061 (0.953 to 1.181) 0.268	1.067 (0.769 to 1.481) 0.684	1.392 (0.909 to 2.132) 0.122	1.071 (0.609 to 1.885) 0.802	1.041 (0.378 to 2.871) 0.935
Asian/PI	0.923 (0.841 to 1.013) 0.089	1.312* (1.028 to 1.676) 0.031	1.003 (0.757 to 1.330) 0.981	1.893*** (1.403 to 2.556) <0.001	1.307 (0.757 to 2.257) 0.320
Other	1.079 (0.961 to 1.211) 0.187	0.897 (0.654 to 1.231) 0.484	1.014 (0.709 to 1.450) 0.937	0.926 (0.585 to 1.467) 0.733	0.648 (0.265 to 1.588) 0.327

TABLE 3 (Continued)

	Asked by doctor whether you drink (all respondents) n = 15,725 Prevalence ratio (95% CI) p-value	Asked how much you drink (past 30-day drinkers) n = 6062 Prevalence ratio (95% CI) p-value	Asked about binge drinking (past 30-day drinkers) n = 6062 Prevalence ratio (95% CI) p-value	Offered advice about what level of drinking is harmful to health (past 30-day heavy drinkers) n = 2344 Prevalence ratio (95% CI) p-value	Advised to reduce or quit drinking (past 30-day heavy drinkers) n = 2344 Prevalence ratio (95% CI) p-value
Hispanic	1.065 (0.962 to 1.179) 0.213	1.034 (0.881 to 1.213) 0.668	1.214 (0.890 to 1.655) 0.209	1.181 (0.827 to 1.685) 0.343	1.523* (1.029 to 2.252) 0.037
No. of alcohol-related chronic conditions	1.080*** (1.056 to 1.104) <0.001	1.171*** (1.119 to 1.226) <0.001	1.193** (1.072 to 1.329) 0.002	1.215* (1.045 to 1.413) 0.013	1.338 (0.993 to 1.803) 0.054
Ever been diagnosed with depression	1.031 (0.972 to 1.093) 0.293	1.042 (0.923 to 1.176) 0.493	1.135 (0.966 to 1.333) 0.118	0.970 (0.557 to 1.690) 0.910	0.976 (0.467 to 2.041) 0.946
State-level unemployment rate	0.970 (0.938 to 1.002) 0.067	0.960 (0.893 to 1.033) 0.260	0.924 (0.828 to 1.031) 0.147	1.004 (0.848 to 1.189) 0.957	1.036 (0.864 to 1.242) 0.692
State-level primary care physicians per population	1.004 (1.000 to 1.008) 0.082	1.009** (1.002 to 1.016) 0.010	1.008 (0.998 to 1.018) 0.093	1.003 (0.982 to 1.025) 0.773	1.013 (0.987 to 1.040) 0.303
State-level binge drinking	1.005 (0.996 to 1.015) 0.264	1.005 (0.983 to 1.028) 0.628	1.008 (0.973 to 1.044) 0.658	1.063 (0.961 to 1.175) 0.221	0.986 (0.892 to 1.091) 0.778

Note: Table presents estimates (prevalence ratios), 95% confidence intervals (CI), and *p*-values from inverse probability of weighted modified Poisson regression. Standard errors are clustered at the state level. Models also include survey year fixed effects.

Abbreviations: AI/AN, American Indian/Alaska Native; PI, Pacific Islander.

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

TABLE 4 Association of Medicaid expansion state residence with receipt of alcohol screening and brief counseling at a routine check-up within past 2 years among nonelderly low-income adults with 1+ alcohol-related chronic condition.

	Asked by doctor whether you drink (all respondents) n = 7050 Prevalence ratio (95% CI) p-value	Asked how much you drink (past 30-day drinkers) n = 2382 Prevalence ratio (95% CI) p-value	Asked about binge drinking (past 30-day drinkers) n = 2382 Prevalence ratio (95% CI) p-value	Offered advice about what level of drinking is harmful to health (past 30-day drinkers) n = 2382 Prevalence ratio (95% CI) p-value	Advised to reduce or quit drinking (past 30-day drinkers) n = 2382 Prevalence ratio (95% CI) p-value
Live in expansion state that expanded Medicaid	1.125** (1.050 to 1.204) 0.002	1.284* (1.040 to 1.585) 0.022	1.430* (1.027 to 1.991) 0.035	1.172 (0.932 to 1.474) 0.165	1.258 (0.861 to 1.838) 0.223
Age (reference: 18 to 34)					
35 to 49	1.103 (0.929 to 1.311) 0.248	1.117 (0.924 to 1.352) 0.239	1.000 (0.748 to 1.338) 1.000	0.874 (0.690 to 1.107) 0.249	1.311 (0.863 to 1.992) 0.193
50 to 64	1.183* (1.037 to 1.350) 0.015	1.216* (1.004 to 1.473) 0.046	1.299* (1.038 to 1.626) 0.025	1.202 (0.954 to 1.514) 0.112	1.679* (1.017 to 2.772) 0.043
Sex (ref: male)					
Female	1.075 (0.960 to 1.204) 0.196	1.124 (0.946 to 1.335) 0.175	0.960 (0.717 to 1.286) 0.776	0.783 (0.569 to 1.077) 0.126	0.716 (0.462 to 1.107) 0.126
Race & ethnicity (ref: non-Hispanic White)					
Non-Hispanic Black	1.148*** (1.081 to 1.219) <0.001	1.125 (0.955 to 1.326) 0.150	1.406*** (1.184 to 1.670) <0.001	1.560** (1.217 to 2.000) 0.001	1.462** (1.122 to 1.907) 0.007
AI/AN	1.004 (0.866 to 1.164) 0.958	1.007 (0.751 to 1.350) 0.963	1.314 (0.867 to 1.991) 0.187	1.349 (0.934 to 1.948) 0.106	1.241 (0.617 to 2.497) 0.528
Asian/PI	0.901 (0.702 to 1.156) 0.394	0.916 (0.620 to 1.353) 0.646	1.452 (0.995 to 2.120) 0.053	1.376 (0.815 to 2.324) 0.219	1.783 (0.955 to 3.330) 0.068
Other	1.031 (0.837 to 1.270) 0.764	1.017 (0.720 to 1.436) 0.920	1.024 (0.611 to 1.717) 0.924	0.964 (0.594 to 1.564) 0.877	1.073 (0.474 to 2.426) 0.860

TABLE 4 (Continued)

	Asked by doctor whether you drink (all respondents)	Asked how much you drink (past 30-day drinkers)	Asked about binge drinking (past 30-day drinkers)	Offered advice about what level of drinking is harmful to health (past 30-day drinkers)	Advised to reduce or quit drinking (past 30-day drinkers)
	n = 7050	n = 2382	n = 2382	n = 2382	n = 2382
	Prevalence ratio (95% CI) p-value	Prevalence ratio (95% CI) p-value	Prevalence ratio (95% CI) p-value	Prevalence ratio (95% CI) p-value	Prevalence ratio (95% CI) p-value
Hispanic	1.010 (0.869 to 1.173) 0.897	0.964 (0.845 to 1.101) 0.574	1.254 (0.871 to 1.804) 0.211	0.982 (0.723 to 1.334) 0.904	1.751** (1.206 to 2.543) 0.0051
No. of alcohol-related chronic conditions	1.067*** (1.046 to 1.089) <0.001	1.166*** (1.079 to 1.259) <0.001	1.084* (1.016 to 1.156) 0.018	1.189*** (1.086 to 1.301) 0.001	1.330* (1.017 to 1.739) 0.038
Ever been diagnosed with depression	0.931 (0.855 to 1.014) 0.096	0.981 (0.864 to 1.114) 0.757	0.945 (0.785 to 1.138) 0.537	0.895 (0.761 to 1.053) 0.172	1.015 (0.779 to 1.323) 0.907
State-level unemployment rate	0.964 (0.925 to 1.005) 0.081	0.942 (0.852 to 1.042) 0.234	0.917 (0.784 to 1.073) 0.266	0.977 (0.853 to 1.120) 0.732	1.039 (0.782 to 1.380) 0.782
State-level primary care physicians per population	1.002 (0.997 to 1.007) 0.481	1.006 (0.997 to 1.014) 0.200	0.996 (0.976 to 1.016) 0.693	0.996 (0.984 to 1.008) 0.486	0.993 (0.974 to 1.011) 0.421
State-level binge drinking	1.018* (1.002 to 1.034) 0.028	0.989 (0.955 to 1.024) 0.517	1.001 (0.948 to 1.058) 0.956	1.033 (0.994 to 1.075) 0.094	1.021 (0.942 to 1.106) 0.606

Note: Table presents estimates (prevalence ratios), 95% confidence intervals (CI), and *p*-values from inverse probability of treatment weighted modified Poisson regression. Standard errors are clustered at the state level. Models also include survey year fixed effects.

Abbreviations: AI/AN, American Indian/Alaska Native; PI, Pacific Islander.

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

state was negatively associated with receipt of the service among Black respondents and positively associated with receipt of service among White respondents. With the higher prevalence of service receipt in the past 2 years among Black respondents in states that did not expand eligibility, these associations result in prevalence ratios being more comparable in states that expanded eligibility (Figure 1). In addition, for being asked whether one drinks among all respondents and several of the outcomes among respondents with alcohol-related conditions, we observed significant interaction terms with prevalence ratios greater than 1.0 between Hispanic ethnicity and expansion state residence. These results suggest associations of expansion state residence were larger in magnitude among Hispanic respondents than among non-Hispanic White respondents (Figure 2). Joint tests were significant for all of the significant interactions identified except the interaction between Hispanic ethnicity and expansion state residence for being asked about binge drinking among respondents with chronic conditions (see Table 5).

Sensitivity analyses using the end point of the income categories and the more restrictive sample for the question about receiving advice were consistent with the main models and for respondents with alcohol-related chronic conditions (results available upon request).

DISCUSSION

In this study, we found that, among nonelderly adults with lower incomes, living in a state that expanded Medicaid eligibility was associated with greater prevalence of receiving general alcohol screening (i.e., being asked whether one drinks) at a check-up within the 2 years prior to being interviewed compared to peers living in nonexpansion states. These findings suggest that expanding insurance eligibility can increase access to primary care and, subsequently, receipt of general screening among this population, although the effect size is small and merits replication. Our findings align with those of recent work that identified a small but insignificant increase in alcohol screening in expansion states relative to nonexpansion states between 2014 (just after expansion) and 2017 (Tummalapalli & Keyhani, 2020). Given Medicaid expansion exhibits geographic patterns, these findings may also help explain regional differences in alcohol screening (Chatterton et al., 2022). Further, some research has suggested greater positive effects of Medicaid expansion are observed with increasing time since expansion (Saloner & Maclean, 2020).

Unlike the finding for general screening, we did not observe any significant relationships between living in states that expanded Medicaid eligibility and receipt of quantity screening, advice about what constitutes harmful drinking, or advice to reduce or quit drinking. Thus, our results suggest that living in a state that expanded eligibility may not be linked with greater receipt of *high-quality, evidence-based* alcohol screening and brief counseling by low-income nonelderly adults. Most validated screening tools recommended by USPSTF, such as the Alcohol Use Disorders Identification Test-Consumption or the Single Alcohol Screening Question, require asking patients about binge drinking (US Preventive Services Task Force et al., 2018), but we did not find higher prevalence of receiving screening for binge drinking within the past 2 years among residents of expansion states. Previous literature has identified many provider and organizational-level barriers to the provision of quality screening and counseling in primary care, including limited provider training, lack of tools for screening and referral, and time constraints (Johnson et al., 2011; Rosário et al., 2021). This research adds to those findings in that it suggests that, in order to increase population-level receipt of quality screening and counseling, policies must do more than increase access to primary care. It is likely that these provider and organizational-level constraints must be addressed as well.

Among adults with at least one alcohol-related chronic condition, living in a state that expanded eligibility was associated with greater prevalence of receiving more thorough alcohol screening (i.e., being asked *how much* one drinks and being screened for binge drinking) within the past 2 years, and these associations were considerably larger in magnitude than for general screening. These results may indicate greater provider attention to alcohol use and adherence to validated alcohol screening tools with patients whose health conditions could be exacerbated by drinking. They may also reflect greater frequency of medical visits among individuals with chronic health conditions in expansion states and, thus, more provider time or comfort with asking these patients more detailed alcohol questions. While identifying the mechanism is beyond the scope of the current study, these findings are promising. Yet, it is important to note that the percent receiving both general and more thorough screening, even in expansion states, was suboptimal, and we found no association of expansion state residence with receipt of brief counseling, suggesting considerable room for improvement.

An unexpected finding for states that did not expand eligibility was that non-Hispanic Black respondents, both in the general population and among respondents with chronic conditions, reported higher prevalence of alcohol screening and brief counseling receipt within the past 2 years compared with White peers. This finding is similar to earlier studies showing higher rates of brief counseling receipt among Black patients compared to White patients at Veterans Affairs facilities (Dobscha et al., 2009; Williams et al., 2012) as well as in prior BRFSS surveys (Mukamal, 2007), but differs from some recent studies of patients within the same health care systems that show trends in the opposite direction (Chen et al., 2020; Lu et al., 2021). Ours and similar findings may reflect differences in where Black and White adults in the general population receive routine check-ups (e.g., private physician offices vs. community health centers), as different provider settings have been shown to vary in the preventive services provided (Earnshaw et al., 2013; Shi et al., 2013). Importantly, the findings may also reflect implicit bias among providers about which patients are more likely to drink or to have alcohol problems. Other work has found that Black survey respondents reported receiving counseling for alcohol use at higher

TABLE 5 Joint association of Medicaid expansion state residence and race and ethnicity with receipt of alcohol screening and brief counseling at a routine check-up within past 2 years among nonelderly low-income adults.

	All respondents					Respondents with 1+ alcohol-related chronic condition				
	Asked by doctor whether you drink (all respondents) n = 14,094 Prevalence ratio (95% CI) p-value	Asked how much you drink (past 30-day drinkers) n = 5500 Prevalence ratio (95% CI) p-value	Asked about binge drinking (past 30-day drinkers) n = 5500 Prevalence ratio (95% CI) p-value	Offered advice about what level of drinking is harmful to health (past 30-day heavy drinkers) n = 2108 Prevalence ratio (95% CI) p-value	Advised to reduce or quit drinking (past 30-day heavy drinkers) n = 2108 Prevalence ratio (95% CI) p-value	Asked by doctor whether you drink (all respondents) n = 6325 Prevalence ratio (95% CI) p-value	Asked how much you drink (past 30-day drinkers) n = 2159 Prevalence ratio (95% CI) p-value	Asked about binge drinking (past 30-day drinkers) n = 2159 Prevalence ratio (95% CI) p-value	Offered advice about what level of drinking is harmful to health (past 30-day drinkers) n = 2159 Prevalence ratio (95% CI) p-value	Advised to reduce or quit drinking (past 30-day drinkers) n = 2159 Prevalence ratio (95% CI) p-value
Live in expansion state that expanded Medicaid	1.057 (0.974 to 1.147) 0.175	1.050 (0.935 to 1.180) 0.393	0.952 (0.758 to 1.194) 0.655	1.126 (0.727 to 1.744) 0.579	1.167 (0.650 to 2.098) 0.589	1.032 (0.947 to 1.125) 0.451	1.191 (0.980 to 1.449) 0.077	1.043 (0.733 to 1.484) 0.808	0.813 (0.580 to 1.141) 0.219	0.992 (0.628 to 1.567) 0.970
Race and ethnicity (ref: non-Hispanic White)										
Non-Hispanic Black	1.248*** (1.170 to 1.331) <0.001	1.202** (1.070 to 1.349) 0.003	1.387*** (1.193 to 1.614) <0.001	2.067*** (1.401 to 3.050) <0.001	1.615 (0.954 to 2.734) 0.072	1.251*** (1.155 to 1.355) <0.001	1.268* (1.041 to 1.544) 0.021	1.301* (1.049 to 1.614) 0.019	1.438 (0.912 to 2.267) 0.112	1.523 (0.901 to 2.577) 0.111
Hispanic	0.978 (0.890 to 1.074) 0.626	0.883 (0.688 to 1.133) 0.310	0.951 (0.644 to 1.403) 0.789	1.143 (0.621 to 2.103) 0.654	1.400 (0.885 to 2.214) 0.143	0.944 (0.740 to 1.204) 0.629	0.800* (0.649 to 0.985) 0.037	0.915 (0.558 to 1.499) 0.712	0.767 (0.521 to 1.128) 0.168	1.397 (0.740 to 2.636) 0.287
Medicaid expansion state residence × Black race	0.933 (0.855 to 1.019) 0.118	0.895 (0.772 to 1.038) 0.134	0.880 (0.653 to 1.186) 0.383	0.613* (0.411 to 0.913) 0.018	0.661 (0.402 to 1.086) 0.098	0.854** (0.776 to 0.940) 0.003	0.772 (0.593 to 1.005) 0.054	1.054 (0.765 to 1.450) 0.738	1.111 (0.685 to 1.802) 0.656	0.869 (0.473 to 1.598) 0.638
Medicaid expansion state residence × Hispanic ethnicity	1.181** (1.067 to 1.307) 0.003	1.292 (0.980 to 1.704) 0.068	1.526 (0.975 to 2.390) 0.063	1.069 (0.527 to 2.168) 0.847	1.089 (0.651 to 1.821) 0.734	1.208 (0.942 to 1.551) 0.130	1.356** (1.099 to 1.675) 0.007	1.680* (1.007 to 2.803) 0.047	1.618* (1.114 to 2.351) 0.014	1.338 (0.781 to 2.291) 0.274
Joint test p-value	<0.001	0.120	0.143	0.037	0.156	<0.001	0.002	0.095	0.015	0.109

Note: Table presents estimates (prevalence ratios), 95% confidence intervals (CI), and p-values from inverse probability of treatment weighted modified Poisson regression. Standard errors are clustered at the state level. Models also are adjusted for age, sex, race and ethnicity, number of alcohol-related chronic conditions, depression, and state-level unemployment rate, primary care physicians per population, and percent reporting binge drinking and include survey year fixed effects. $*p < 0.05$; $**p < 0.01$; $***p < 0.001$.

Joint test p-value refers to p-value from two degrees of freedom test that all coefficients associated with the interaction are equal to zero.
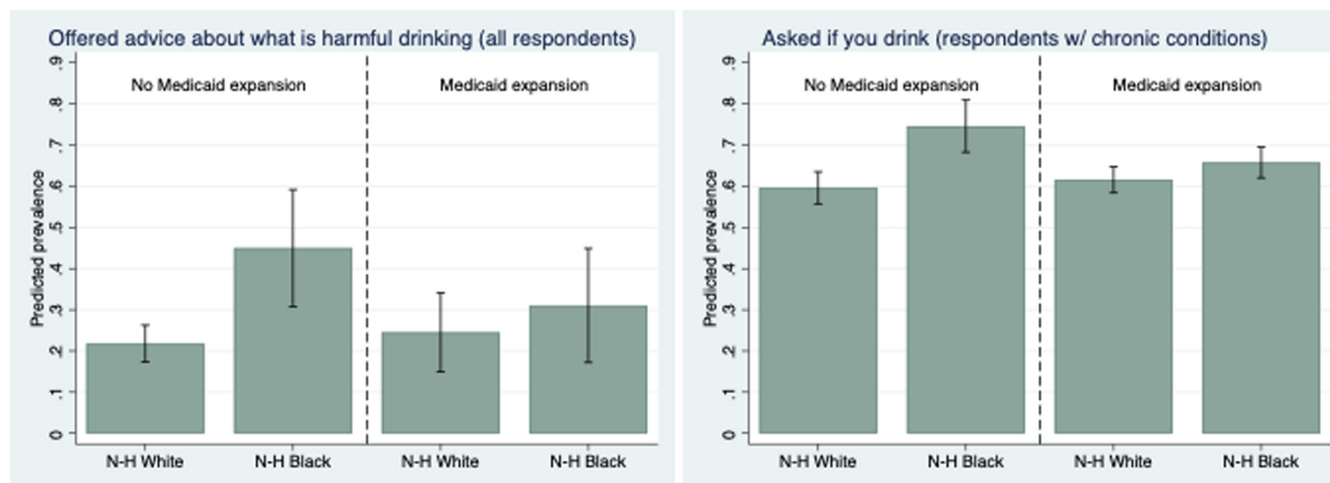
FIGURE 1 Predicted prevalence and 95% confidence intervals of significant differences in ASBI receipt among nonelderly, low-income, non-Hispanic Black and nonelderly, low-income, non-Hispanic White respondents in states that did and did not expand Medicaid eligibility.
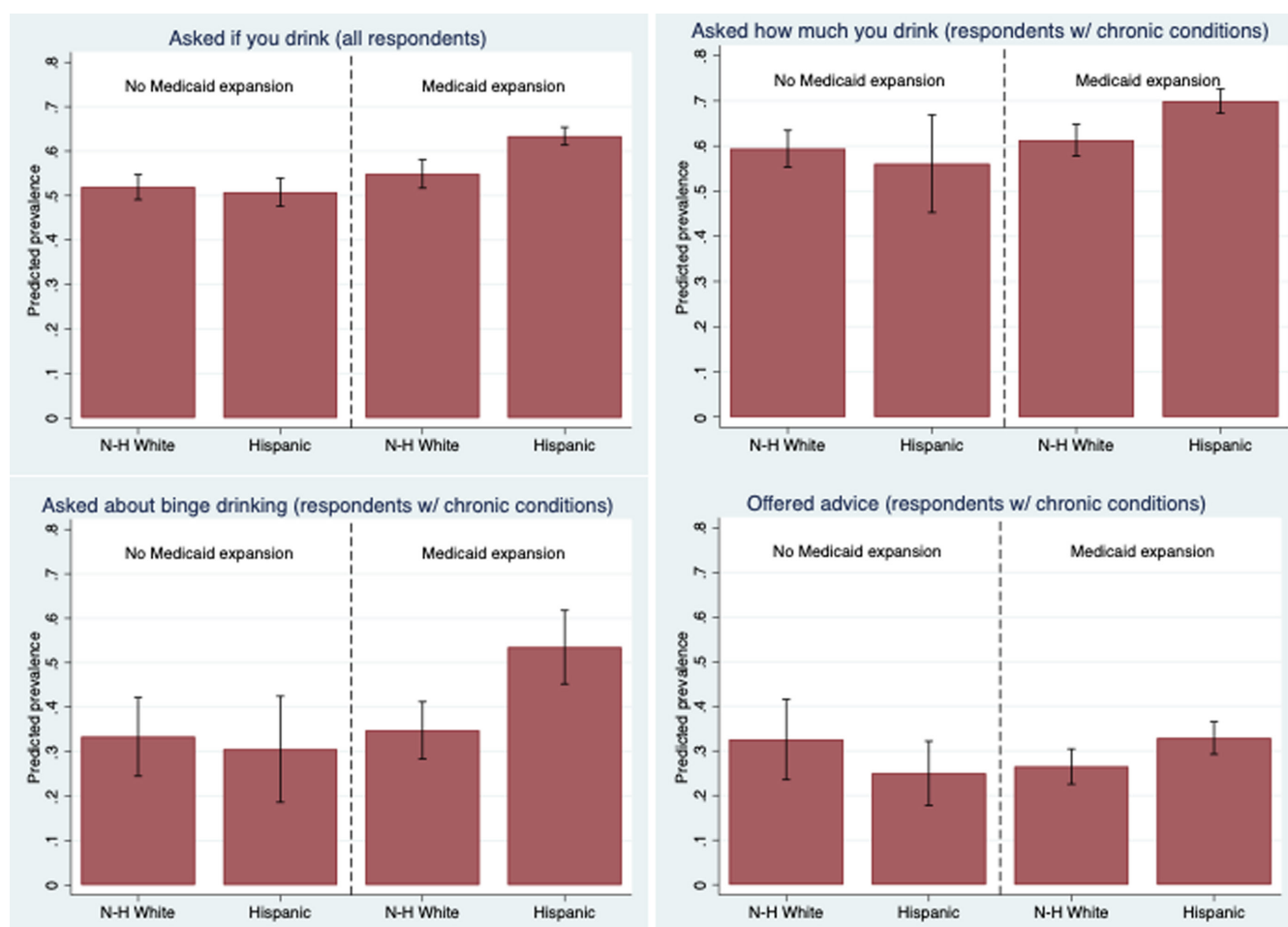

FIGURE 2 Predicted prevalence and 95% confidence intervals of significant differences in ASBI receipt among nonelderly, low-income, Hispanic and nonelderly, low-income, non-Hispanic White respondents in states that did and did not expand Medicaid eligibility.

rates than White respondents, even among abstainers and among drinkers without alcohol problems (Mukamal, 2007) and that Black veterans were more likely to receive a diagnosis of alcohol use disorder than White veterans at similar levels of drinking (Vickers-Smith et al., 2021). We did not observe the same result among Hispanic respondents, but further study is warranted.

Notably, the significant interactions we identified for non-Hispanic Black and Hispanic respondents suggest that expanded Medicaid eligibility may help reduce disparities in receipt of some aspects of alcohol screening and brief counseling at the population level. However, the number of outcomes for which we observed interactions was few and some effect sizes small, and thus, our findings should be corroborated with future studies of racial and ethnic differences among lower-income populations, including studies that can identify specific causal pathways contributing to differences between racial and ethnic groups. Regardless, coupled with previous literature, these findings indicate screening and counseling are not delivered to patients in a systematic manner, suggesting the need to develop more standardized procedures to achieve more equitable receipt and avoid stigmatizing certain groups. This is particularly true given there are already disparities in screening and brief counseling opportunities, as at-risk drinkers of racial and ethnic minoritized groups have been shown to receive primary care at lower rates than at-risk White drinkers (Mulia et al., 2011).

This study is the first to consider whether living in a state that expanded Medicaid eligibility is associated with differential receipt of alcohol screening and brief counseling among nonelderly low-income adults. However, it is subject to several limitations. First, it uses data from only a subset of states, since the BRFSS ASBI survey module is optional and not administered in all states. Thus, findings are not generalizable to residents of omitted states. Second, analyses rely on survey data. Patient perspectives of service receipt are subject to recall bias and may not reflect whether screening and counseling services actually were administered. Reliance on survey data also assumes respondents accurately reported their alcohol use to both BRFSS and their health care provider. However, any bias introduced by survey methods should not vary by state residence. Third, a considerable number of respondents were omitted from analysis due to missing data. Such missingness is not uncommon given the length of BRFSS and similar population surveys. We opted for case deletion over imputation, as much of the missingness was due to a lack of data on alcohol screening and brief counseling outcomes, which is likely missing not at random, and imputation can introduce bias under these circumstances (Hughes et al., 2019). However, it remains that deletion sacrifices a larger sample size, which may attenuate precision. Fourth, while our outcome models incorporate all aspects of BRFSS complex survey design, the models used to estimate propensity scores incorporate only the sampling weight (i.e., did not incorporate strata or clustering, as methods for doing so have yet to be established), which may influence estimation. However, we do observe a substantial improvement in covariate balance incorporating only the sampling weights. Finally, we are unable to compare receipt of screening and counseling prior to Medicaid expansion to receipt after expansion. The ASBI module is not offered every year, and questions asked in years prior to expansion are not comparable to questions asked in later years (McKnight-Eily et al., 2017). Future studies should assess causal impacts of Medicaid eligibility expansion on the receipt of these services, including any disparities in receipt.

CONCLUSION

We found that living in a state that expanded Medicaid eligibility is associated with slightly higher prevalence of being asked whether one drinks and, among individuals with alcohol-related chronic conditions, with receiving more thorough alcohol screening questions at a check-up in the past 2 years. While these findings are encouraging for nonelderly low-income adults living in Medicaid expansion states, it is concerning that there was no association with receipt of brief counseling, even among patients with alcohol-related conditions. Policies that increase access to primary care may not be sufficient to increase receipt of high-quality, evidence-based alcohol screening and brief counseling at the population level. Innovative strategies targeted at providers may be necessary to ensure optimal and equitable delivery of these recommended services.

CONFLICT OF INTEREST STATEMENT

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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