

ORIGINAL ARTICLE

Mental Health, Racial Discrimination, and Tobacco Use Differences Across Rural-Urban California

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Abstract

Objective: Disparities in tobacco use persist despite successful policies reducing use within the United States. In particular, the prevalence of tobacco use in rural and certain minority communities is significantly higher compared to that of their counterparts. In this work, we examine the impact of rurality, mental health, and racial discrimination on tobacco use.

Methods: Data come from the 2003 California Health Interview Survey (n = 42,044). Modified Poisson regression models were adjusted for age, sex, race/ethnicity, birth origin, education, income, insurance, and marital status.

Results: Compared to urban residents, rural residents had a significantly higher risk for smoking after adjustment (RR = 1.10, 95% CI: 1.01-1.19). Those who reported having experienced racial discrimination also had a significantly greater risk for smoking compared to those who did not (RR = 1.17, 95% CI: 1.07-1.27). Additionally, those who reported higher stress had a significantly greater risk for smoking (RR = 1.61, 95% CI: 1.07-1.67). There was evidence of interaction between rurality and race/ethnicity, and rurality and gender ($P < .05$).

Conclusion: Residing in rural areas was associated with an increased risk for smoking, above and beyond sociodemographics. There were no significant differences across rural-urban environments for the relationship between stress and tobacco use—an indication that the impact of stress and discrimination is not buffered or exacerbated by environmental characteristics potentially found in either location. Mechanisms that explain rural-urban tobacco use disparities need to be explored, and smoking cessation programs and policies should be tailored to target these factors within rural communities.

Key words epidemiology, geography, health disparities, social determinants of health, tobacco use.

Tobacco use has declined significantly in the 50 years since the first Surgeon General's Report on Smoking and Health.^{1,2} However, despite many tobacco control achievements, tobacco use remains a persisting concern for certain populations in the United States.^{1,2} In particular, tobacco use and related harms disproportionately affect rural communities and minorities within the United States. The American Lung Association reported that in 2010, 27.8% of rural residents in the

United States smoked compared to 22.7% of urban residents.³ Significant differences in tobacco use have also been reported for certain racial and ethnic groups, with high smoking rates, cancer prevalence, and low tobacco cessation rates disproportionately impacting minority populations.⁴⁻⁹ American Indian/Alaskan Natives (AI/AN) and multiracial individuals have the highest tobacco use prevalence in the United States, with 21.8% of AI/AN and 26.1% of multiracial adults reporting

current smoking compared to 19.7% of whites and 12.5% of Latinos.¹⁰

The gaps in smoking prevalence between races are even more substantial within some US states. For example, in California, AI/ANs have reported smoking rates that range from 23.7% to 40% compared to 13% of Latinos and 15% of whites in 2007.¹¹ African Americans in California reported smoking rates of close to 19.8% compared to 15.1% in whites in 2011.¹² Disparities by race and ethnicity have been observed in other states, with high tobacco use and low cessation rates affecting primarily AI/AN, African American, and Latino communities.¹³⁻¹⁶ The CDC reports that while most AI/AN and African American adult cigarette smokers want to quit smoking, they are the least successful at quitting compared to whites and Latinos.¹⁷ The low cessation might be attributed to lower use of and access to cessation treatments such as counseling and medication.¹⁷ While overall national trends point to declines in tobacco use, further investigation reveals disparities in tobacco use and related burden of disease by racial/ethnic groups with geographic variability across the United States.

Research examining these issues within the rural context is sparse. Extensive literature on urban health has shown how “place” matters: within the urban context, factors such as neighborhood cohesion and walkability have been shown to impact a range of health outcomes.¹⁸⁻²⁰ However, little has been done to examine place effects within the rural context. Factors that have been proposed as possible determinants of rural health disparities include differential access to tobacco prevention and cessation resources, economic structures, social norms, transportation barriers, proximity to tobacco farming, and limited media resources on tobacco prevention.^{21,22} Low access to health care facilities, lack of diversity among health professionals, distance to health care facilities, cultural and socioeconomic barriers to health, racial discrimination, and stressors may also contribute to minority disparities in rural areas.²³⁻²⁵ Furthermore, the low number of minorities within the rural setting might impede the social and political visibility required to affect change to meet the health care needs of these populations.²⁴ We sought to understand this intersection between “place and race” as having a possible multi-determinant impact on health.²⁶

Additionally, much of the current literature on rural-urban tobacco use differences fails to address potential factors that might explain these differences, beyond prevalence reports. In this article, we focus on characterizing how socio-environmental factors, such as stress and discrimination, may vary across rural-urban environments and may be linked to tobacco use be-

haviors. There is substantial evidence that greater smoking initiation, increased smoking prevalence, and lower smoking cessation attempts are strongly associated with high levels of perceived stress and poor mental health.²⁷⁻³⁸ Occupations within the rural environment, such as manual labor, and the higher prevalence of poverty within rural contexts are associated with disproportionate amounts of psychological stressors such as lack of control, lack of predictability and daily hassles.³⁹⁻⁴² Additionally, stress from racial discrimination may also contribute to rural-urban tobacco use differences. Defined as the differential treatment that social institutions and individuals impose on minority racial groups,⁴³ racial discrimination imposes more social pressure and stress on oppressed groups, resulting in poorer health outcomes.⁴⁴⁻⁴⁶ Rural minorities may experience higher levels of psychological stressors due to racial discrimination compared to urban minorities if there are higher levels of cultural intolerance and lower social support within the rural environment.⁴⁷⁻⁵¹

It is unclear from the existing literature as to whether these factors differentially impact smoking within rural and urban settings. The persistence of health disparities observed among minorities and among rural populations provides a compelling motivation to integrate these distinct bodies of research to better understand the experience of racial and ethnic minority populations living in rural settings. Accordingly, the objective of this paper was to determine the impact of rurality on tobacco use, to characterize the impact of mental health and racial discrimination on tobacco use across rural-urban environments, and to determine the presence of racial/ethnic disparities by rurality. Our primary aim was to assess whether living in the rural environment was associated with a greater risk of smoking and decreased cessation. Then we aimed to examine the impact of racial discrimination and mental health stress on smoking and cessation, and how this relationship might vary across rural-urban environments. Finally, we focused particularly on whether there were differences in tobacco use for racial ethnic groups across rural-urban environments.

Methods

Data Source

The data to study these research questions came from the California Health Interview Survey (CHIS) 2003.⁵² As a collaborative project between the University of California, Los Angeles (UCLA) Center for Health Policy Research, the California Department of Health Services, and the Public Health Institute, CHIS is the largest state

telephone survey conducted on public health in the United States. It includes one of the most ethnically diverse samples of Asians, Hispanics, AI/AN, multiracial persons, Native Hawaiians and Other Pacific Islanders, as well as non-Hispanic whites and blacks.⁵² CHIS is a multistage (by county and household), population-based random-digit dial telephone survey conducted every 2 years that collects information on health status, health conditions, health-related behaviors, health insurance coverage, access to health care services, and other health and development issues for all age groups in California. The 2003 survey included 42,044 adults (response rate = 59.9%), 8,526 children (response rate = 81.4%), and 4,010 adolescents (response rate = 57.3%). Smoking status was available for 41,873 randomly selected adults. There were 6,827 rural participants, and 26,373 were white, 4,019 were Asian/Hawaiian-Pacific Islander, 2,679 were African American, 577 were AI/AN, and 7,122 were Latino.

Measures

The primary measure of interest for our analyses was tobacco use. Specifically, the outcome measures included current smoker and former smoker. These measures were derived from the following questions:

1. Altogether, have you smoked at least 100 or more cigarettes in your entire lifetime? (Response: Yes, No)
2. Do you now smoke cigarettes every day, some days or not at all? (Response: Every day, Some days, Not at all)

A participant was categorized as a current smoker if he or she answered “yes” to the first question, and either “every day” or “some days” to the second question ($n = 6,628$). All other participants were categorized as not a current smoker ($n = 35,245$). A participant was categorized as a former smoker if they answered “yes” to the first question, and “not at all” to the second question ($n = 11,545$). Former smokers were compared to current smokers ($n = 6,628$), and participants who never smoked ($N = 23,700$) were excluded from cessation analyses. Predictors of tobacco use included status of living within rural or urban environment. Rurality was determined from respondents’ county and ZIP code information, operationalized by the rural-urban classifications designated by the federal Office of Rural Health Policy (ORHP). The ORHP classifies counties that have a population less than 10,000 as being rural based on the same criteria used by the Office of Management and Budget. The ORHP also includes rural areas that meet the Rural-Urban Commuting Area codes of 4 and above, based on measures of

urbanization, population density and daily commuting. This method addresses the undercount often produced from the OMB estimates and overcount by the Census Bureau estimates of rurality.⁵³

We also examined mental health in the past month (“Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?”), and racial discrimination (“Thinking about your race or ethnicity, how often have you felt treated badly or unfairly because of your race or ethnicity?”). The mental health stress measure utilized the validated CDC Healthy Days questions, also a health-related quality of life measure, which has previously been shown to have acceptable construct validity, criterion validity, reliability, and responsiveness.^{54,55} We dichotomized this measure based on the distribution skew into less than 7 days and greater than 7 days. For racial discrimination, participants responded with “never,” “rarely,” “sometimes,” “often,” or “all the time.” Based on previous research^{56,57} and due to distribution skew, we dichotomized this measure into: never/rarely or sometimes/often/all the time. Demographic measures previously found to be associated with tobacco use included standard measures of sex, age, race/ethnicity, educational level, income, insurance status, work status, and marital status.

Statistical Analyses

Descriptive analyses were conducted to characterize tobacco use patterns among California residents and to characterize rural-urban environments. Stratified analyses for racial/ethnic gaps were examined separately for rural and urban residents for tobacco use, stress, and racial discrimination to contextualize these outcomes. Modified Poisson regression analyses were conducted to assess the relationship between rurality and tobacco use (risk ratios were reported due to the high prevalence of tobacco use⁵⁸), adjusted for age, sex, race/ethnicity, education, income, insurance status, and marital status. Latinos were selected as the reference group, because they reported the lowest smoking rates in this sample. This relationship was also tested to determine differences across racial and ethnic strata comparing, for example, rural Latinos versus urban Latinos. To reduce selection bias, general weights were used to produce population-based estimates and, to account for clustering within strata, replicate weights using the jackknife estimation method were utilized. Analyses were conducted using Stata MP Parallel Edition 13.0 and R 3.29-5 (StataCorp LP, College Station, TX, USA).

Table 1 Sociodemographics by Rurality (N = 41,873)

Covariate (n)	Rurality	
	Rural (%) (n = 6,827)	Urban (%) (n = 35,046)
Sex***		
Female (24,496)	50.6	51.1
Male (17,377)	49.4	48.9
Age***		
18-24 (3,444)	13.4	13.7
25-39 (10,402)	27.2	31.1
40-64 (19,520)	43.2	41.1
65-79 (6,402)	12.5	10.4
≥80 (2,105)	3.7	3.7
Race/ethnicity***		
Latino (7,122)	25.3	26.2
White (26,373)	64.7	50.2
American Indian/Alaskan Native (577)	2.8	1.0
Asian (4,019)	2.7	13.1
African American (2,679)	2.1	6.7
Multiracial (1,103)	2.4	2.8
US born***		
Yes (31,477)	77.0	65.4
No (10,396)	23.0	34.6
Marital status***		
Married (21,372)	62.0	54.0
Divorced/widowed/separated/living with partner (12,835)	23.3	23.1
Never been married (7,666)	14.7	22.9
Education***		
No formal training (247)	0.9	1.1
<High school (5,007)	22.6	18.8
High school (10,024)	29.9	23.1
College (20,326)	39.4	44.3
Graduate school + (6,269)	7.2	12.7
Income, \$***		
≤25,000 (12,406)	37.4	31.1
25,001-35,000 (4,593)	12.9	10.5
35,001-50,000 (6,466)	15.5	14.5
50,001-75,000 (6,773)	15.6	15.4
≥75,001 (11,635)	18.6	28.5
Employed***		
Yes (24,888)	60.7	62.5
No (16,985)	39.3	37.5
Health insurance***		
Yes (36,784)	82.9	83.4
No (5,089)	17.1	16.6
Current smoking***		
Yes (6,628)	19.8	16.2
No (35,245)	80.2	83.8
Racial discrimination***		
Yes (8,401)	18.8	22.6
No (33,472)	81.2	77.4
Stress***		
≥7 d in past month (7,300)	19.0	17.2
≤6 d in past month (34,573)	81.0	82.8

**P* < .05.

***P* < .01.

****P* < .001.

Percentages account for weighting. *P* values are from *X*² analyses.

Results

Sociodemographics are presented by rurality in Table 1; they were also computed for tobacco use (not shown). Rural California residents ($n = 6,827$) were significantly less educated, less employed, had lower income, and were less insured compared to urban Californians ($n = 35,046$). Rural residents reported significantly higher smoking (19.8% vs 16.2%), lower exposure to racial discrimination (18.8% vs 22.6%), and higher rates of stress (19.0% vs 17.2%) compared to urban residents. Current smokers ($n = 6,628$) were significantly more likely to be male, between the ages of 25 and 64, white, US-born, not married, less educated, less insured, have lower income, more likely to be employed, and more likely to be rural compared to former/never smokers ($n = 35,245$; data not shown). Current smokers were significantly more likely to report having experienced racial discrimination than those who were not current smokers (27.6% vs 21.2%) and to have been exposed to significantly more stress compared to those who were not current smokers (28.1% vs 15.2%).

Impact of Rurality and Mental Health on Tobacco Use

Compared with urban residents, rural residents had a significantly higher risk for smoking after adjustment for age, gender, race, marital status, education, income, and insurance (RR = 1.10, 95% CI: 1.01-1.19) (Table 2). As expected, there was an educational gradient predicting current smoking, with those having less education reporting significantly higher smoking. Tobacco disparities were also observed by race/ethnicity. Compared to Latinos, AI/ANs had a significantly greater risk of smoking (RR = 1.97, 95% CI: 1.60-2.41), along with Asians (RR = 1.70, 95% CI: 1.50-1.93), African Americans (RR = 1.52, 95% CI: 1.30-1.78), whites (RR = 1.81, 95% CI: 1.61-2.02), and multiracial participants (RR = 1.35, 95% CI: 1.11-1.65). Those who were uninsured (vs insured), not married (vs married), male (vs female), younger (vs ≥ 80 years old), and reported lower income (vs $\geq \$75,000$) also had significantly higher risk of current smoking. There was no significant difference in risk of smoking between unemployed and employed participants (RR = 1.06, 95% CI: 0.97-1.17); therefore, employment was dropped out of the final model.

Model B includes risk ratios of current smoking associated with racial discrimination and mental health (Table 2). After adjustment, those who reported being treated differently due to their race had a significantly greater risk of current smoking compared to those who did not report having experienced racial discrimination

Table 2 Risk Ratios for Smoking Using CHIS 2003 (N = 41,873)

	Unadjusted RR (95% CI)	Adjusted RR (95% CI)
Rurality (urban)	1.23 (1.13-1.33)***	1.10 (1.01-1.19)*
Age (18-24)		
25-39		1.39 (1.23-1.58)***
40-64		1.30 (1.14-1.47)***
65-79		0.64 (0.55-0.76)***
≥ 80		0.30 (0.22-0.39)***
Gender (Female)		
Male		1.69 (1.58-1.80)***
Race (Latino)		
AI/AN		1.97 (1.60-2.41)***
Asian		1.70 (1.50-1.93)***
African American		1.52 (1.30-1.78)***
White		1.81 (1.61-2.02)***
Multiracial		1.35 (1.11-1.65)**
Marital status (married)		
Sep/Div/Wid/Living W/partner		1.72 (1.61-1.83)***
Never married		1.52 (1.38-1.67)***
US born (Yes)		
No		0.83 (0.75-0.91)***
Education (graduate school +)		
No formal education		2.22 (1.57-3.13)***
<High school		2.88 (2.51-3.30)***
High school		2.52 (2.23-2.84)***
College		1.88 (1.67-2.11)***
Income (>75,000)		
<25,000		1.38 (1.26-1.53)***
25,001-35,000		1.40 (1.25-1.56)***
35,001-50,000		1.28 (1.16-1.42)***
50,001-75,000		1.18 (1.08-1.30)***
Health insurance (insured)		
Currently uninsured		1.20 (1.10-1.30)***
Stress indicator (low stress)		
High stress		1.61 (1.07-1.67)***
Racial discrimination (not experienced)		
Experienced		1.17 (1.07-1.27)**

* $P < .05$.

** $P < .01$.

*** $P < .001$.

Adjustment was made for age, sex, race, education, income, marital status, birth origin, and health insurance status.

(RR = 1.17, 95% CI: 1.07-1.27). Additionally, those who reported a high number of stressful days (vs those who reported ≤ 6 days of stress per month) had a significantly greater risk of current smoking (RR = 1.61, 95% CI: 1.07-1.67). There was evidence of effect modification by rurality for the relationship between race/ethnicity and smoking ($P = .048$). In particular, differences in smoking between rural AI/ANs and rural Latinos were greater than what was found between AI/ANs and Latinos within the urban environment. There was a significant interaction between rurality and gender ($P = .003$),

Table 3 Risk Ratios for Quitting Smoking Using CHIS 2003 (N = 18,173)

	Unadjusted RR ^a (95% CI)	Adjusted RR ^a (95% CI)
Rurality (Urban)	0.89 (0.79-0.99)*	0.95 (0.90-0.99)*
Age (18-24)		
25-39		1.37 (1.16- 1.61)***
40-64		1.73 (1.47-2.03)***
65-79		2.26 (1.93-2.64)***
≥80		2.55 (2.15-3.01)***
Gender (female)		
Male		0.95 (0.92-0.98)**
Race (Latino)		
AI/AN		0.76 (0.70-0.83)***
Asian		0.80 (0.67-0.96)*
African American		0.83 (0.76-0.90)***
White		0.90 (0.85-0.95)**
Multiracial		0.91 (0.81-1.03)
Marital status (married)		
Sep/Div/Wid/Living with partner		0.83 (0.80-0.87)***
Never married		0.70 (0.65-0.75)***
Education (graduate school +)		
No formal education		0.68 (0.54-0.84)**
<High school		0.80 (0.74-0.85)***
High school		0.82 (0.78-0.85)***
College		0.88 (0.85-0.91)***
Income (>75,000)		
<25,000		0.88 (0.84-0.93)***
25,001-35,000		0.91 (0.86-0.97)**
35,001-50,000		0.94 (0.90-0.99)*
50,001-75,000		0.96 (0.92-1.00)
Health insurance (insured)		
Currently uninsured		0.87 (0.81-0.94)**
Racial discrimination (Not Experienced)		
Experienced		0.95 (0.90-1.01)
Stress (≤6 d of stress in past month)		
≥7 d of stress in past month		0.85 (0.82-0.88)***

*P < .05.

**P < .01.

***P < .001.

Adjustment was made for age, sex, race, education, income, marital status, and health insurance status.

^aRisk ratios estimate the likelihood of cessation vs. smoking.

with rural women having a significantly higher risk of smoking than urban women (RR = 1.15, 95% CI: 1.05-1.27). There was no significant interaction between rurality and stress or discrimination. While rural residents reported higher risk of stress, after adjustment this association was no longer significant (data not shown).

Table 3 shows cessation status as the outcome. Rural residents were significantly less likely to quit smoking compared to their urban counterparts, even after adjustment (RR = 0.95, 95% CI: 0.90-0.99). Stress was also found to be significantly associated with a lower likelihood to quit smoking (RR = 0.85, 95% CI: 0.82-

Table 4 Risk Ratios of Tobacco Use, Stress, and Racial Discrimination Outcomes for Racial/Ethnic Subgroups Stratified by Rural-Urban Location

Race/Ethnicity (reference: Latino)	Rural RR (95% CI)	Urban RR (95% CI)
American Indian/Alaskan Native		
Current smoking	2.58 (1.74-3.81)***	1.87 (1.48-2.37)***
Quit smoking ^a	0.89 (0.81-0.98)*	0.95 (0.89-1.01)
Stress	1.08 (0.99-1.17)	1.05 (1.01-1.09)*
Racial discrimination	1.07 (0.98-1.18)	1.00 (0.95-1.05)
Asian		
Current smoking	1.41 (0.51-3.92)	1.71 (1.50-1.94)***
Quit smoking	0.92 (0.80-1.07)	0.91 (0.88-0.94)***
Stress	1.01 (0.93-1.09)	1.00 (0.98-1.02)
Racial discrimination	1.04 (0.95-1.14)	1.00 (0.98-1.02)
African American		
Current smoking	0.96 (0.48-1.89)	1.62 (1.39-1.88)***
Quit smoking	0.95 (0.83-1.09)	0.94 (0.91-0.97)***
Stress	1.02 (0.93-1.11)	1.01 (0.99-1.04)
Racial discrimination	1.22 (1.10-1.36)***	1.20 (1.17-1.22)***
White		
Current smoking	1.88 (1.36-2.59)***	1.80 (1.60-2.02)***
Quit smoking	0.94 (0.89-1.00)*	0.97 (0.95-1.00)*
Stress	1.05 (1.00-1.10)*	1.01 (1.00-1.03)
Racial discrimination	0.88 (0.84-0.93)***	0.87 (0.85-0.88)***
Multiracial		
Current smoking	1.84 (1.26-2.68)**	1.33 (1.06-1.67)*
Quit smoking	0.88 (0.81-0.95)**	0.98 (0.94-1.03)
Stress	1.07 (0.98-1.16)	1.02 (0.98-1.05)
Racial discrimination	1.12 (1.03-1.20)***	0.97 (0.95-1.00)

*P < .05.

**P < .01.

***P < .001.

All models were adjusted for age, sex, education, income, marital status, employment status, birth origin, and health insurance status.

^aThe sample size used to model quit smoking was 18,173, whereas for all other outcomes, the sample size was 41,873.

0.88). Cessation was significantly lower among younger respondents compared to older respondents, and it was also lower among AI/ANs, Asians, African Americans, whites, and multiracial respondents compared to Latinos. Those who were married had higher cessation compared to those who were divorced, living together, or who had never been married. Those with higher education, income, and health insurance also had significantly higher cessation. No interactions between rurality and race, stress, discrimination, or gender were found.

The association between race/ethnicity and outcomes is further explored by rurality in Table 4. Rural AI/ANs, whites, and multiracial persons had a significantly higher risk of smoking compared to rural Latinos and a significantly lower likelihood of cessation compared to rural Latinos. Whites report a significantly higher risk of stress in rural areas compared with Latinos. African Americans

and multiracial participants report higher risk of racial discrimination in rural settings compared to rural Latinos.

For urban participants, AI/ANs, whites, Asians, African Americans, and multiracial participants had a significantly higher risk of smoking compared to urban Latinos, and they had a lower likelihood of cessation compared to their urban Latino counterparts. Urban African Americans reported higher risk of racial discrimination compared to urban Latinos. There were no other reported significant differences in stress or racial discrimination for urban participants.

Discussion

National reports indicate a persistent divide in health outcomes between rural and urban areas. Our analyses indicate that living in rural California impacts tobacco behavior above and beyond sociodemographic indicators, suggesting that living in a rural environment may have implications for health behaviors. As reported in these data, the rural environment was characterized by significantly lower education, lower income, lower employment, and lower insurance compared to the urban environment. Rurality was significantly associated with increased risk of being a current smoker and lower cessation, even after adjustment for socioeconomic predictors of tobacco use, such as education. These results confirm other studies which have argued that rural residence is associated with a deleterious pattern of behaviors linked with health.²² The absolute differences in tobacco use across rural-urban environments, however, were relatively small; a possible outcome impacted by an overall reduction in tobacco use risk.

Our particular focus in this study was the intersection between “place and race.” Research suggests that the rural context compounds racial/ethnic disparities, making minorities especially vulnerable. Consistent with the literature, our study found disparities across racial/ethnic groups, with AI/ANs having the highest tobacco use overall and the lowest cessation rates. Then, our results also showed that there was an interaction between rurality and race, for smoking. Rural AI/ANs and rural multiracial participants appeared to have a significantly higher burden of tobacco use, stress, and racial discrimination, while the gaps between these urban subgroups and urban Latinos were smaller. AI/ANs, and particularly multiracial populations are understudied, and little is known about what might cause these rural-urban differences. African Americans report the highest exposure to racial discrimination across both rural-urban environments, and urban African Americans have significantly greater disadvantage in smoking and cessation than within the rural

setting. Urban Asians reported a significantly higher risk of smoking and lower risk of cessation compared to urban Latinos, but this significant disparity was not seen in the rural context.

These results may suggest a “double disadvantage”: disparities due to residing in rural areas *and* belonging to a minority race/ethnic group, and in particular for our work, specifically for AI/AN populations. Williams et al emphasized the complexity of the influence of race and place on health; the combined effects of a dual disadvantage due to one’s race compounded by neighborhood disparities have an additive negative impact on health outcomes.⁶⁰ This double disadvantage should be taken into consideration when developing cessation interventions and policies that aim to reduce smoking in AI/AN or other minority populations. Due to the smaller numbers of minorities in rural communities, health disparities between racial/ethnic subgroups continue to go unnoticed in the political and social arenas, but the health needs of rural minorities must be prioritized to actually reach the Healthy People 2020 goals.^{24,61}

Studies have suggested that lack of cultural competency in health promotion along with racial discrimination towards marginalized groups may contribute to these disparities.²⁴ Racial discrimination has been shown to have an impact on multiple health outcomes. Our study confirmed that racial discrimination was significantly associated with tobacco use. Racial discrimination and stress were both significantly associated with higher risk of being a current smoker and less likelihood of quitting smoking for different racial/ethnic subgroups. Our findings are also consistent with previous work on stress and health.^{28,62-65}

Our examination of stress and rurality revealed that overall, rural residents had a higher risk of reporting stress compared to urban residents. This association was explained by socioeconomic factors such as education, income, and employment. Rural-urban differences in stress might help characterize the tobacco disparities that are present in rural populations. In a patient survey of rural Americans, Lovelace identified key stressors that rural Americans faced: financial strain, personal illness, inadequate social institutions (like schools and recreation areas), generational/family pressures, occupational unpredictability and hazards, lack of privacy, lack of health insurance and access to medical systems.³⁹ In addressing tobacco control within rural communities, it is essential to target these particular stressors that may lead to or exacerbate tobacco use. Additionally, coping mechanisms that relate to these stressors will be important to consider.

While this study is limited due to the data coming from a cross-sectional survey, the data examined are

from the largest state telephone survey conducted on public health in the United States, and it includes one of the most ethnically diverse samples of Asians, Hispanics, American Indians, multiracial persons, Native Hawaiians and Other Pacific Islanders, as well as non-Hispanic whites and blacks.⁵² Cross-sectional data are limited in addressing causal relationships and may be prone to issues in temporality, such as determining the directional relationship between rurality and smoking. Additionally, while the data were collected in 2003, there are limited datasets that examine racial discrimination across a large racial/ethnic population, and these findings may highlight the need to collect more recent data on racial discrimination as it may pertain to tobacco disparities in disadvantaged populations, such as rural communities. This data set allows for the examination of the relationship between discrimination and tobacco use, and it provides sufficient evidence that future studies should consider discrimination as a risk factor for health behaviors in rural and urban settings. Furthermore, there is concern about self-reported data being subjective when it comes to describing racial discrimination, and our measure on stress was limited to 1 question, rather than a number of items on a scale. Finally, it should also be noted that the statistical significance found in these results may be impacted by the substantial statistical power in this data.

The importance of this work, however, is highlighted by the rural-urban and racial disparities found in these data. California has one of the lowest reported smoking prevalences in the nation, yet these gaps reveal much needed attention for tobacco control efforts within at-risk populations, particularly those living in rural areas. Additionally, the results of this study indicated that there were no significant differences in the effect of rurality on the relationship between stressors and tobacco use, a surprising finding. This may be an indication that the impact of stress and discrimination is not buffered or exacerbated by environmental characteristics potentially found in either location.

Important questions still remain. Future work should be aimed at explaining what mechanisms lead to these disparities, to better inform tobacco control efforts within rural communities. With emerging trends in the use of new and smokeless tobacco products, such as e-cigarettes, it will be important to address these mechanisms and tobacco determinants aggressively and proactively within vulnerable populations to avoid persisting disparities.

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