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Racial/Ethnic Differences in Light of 100% Smoke-free State Laws: Evidence from Adults in the United States

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Abstract

This study estimates racial/ethnic differences in the association between 100% smoke-free state laws and smoking, as well as self-reported health, to facilitate policy aimed at reducing disparities. Data pertain to adults aged 18 years and older, obtained from the public-use Behavioral Risk Factor Surveillance System (2002–2014). The authors exploit variation in the timing of 100% smoke-free state laws using a difference-in-differences model. Examining heterogeneity across racial/ethnic minority groups, the authors consider the association between smoke-free laws and the probability of being: a daily smoker (versus occasional); an occasional smoker (versus former); and at the top of the self-reported health scale (versus the bottom). The authors find that 100% smoke-free state laws were not correlated with smoking among women. Moreover, racial/ethnic minority men who smoked occasionally were less likely to quit than white men, and results suggest that smoke-free laws did not reduce these disparities. However, there is evidence that smoke-free laws reduced the probability of being a daily smoker for Asian and Hispanic/Latinx men, but not the probability of quitting or being at the top of the self-reported health scale. More generally, smoke-free laws were not associated with self-reported health, except that there may have been an improvement among nonsmoking American Indian/Alaska Native women. These findings underscore the importance of looking beyond average effects to consider how 100% smoke-free state laws impact racial/ethnic minorities. There is evidence that they reduced smoking and improved self-reported health for some groups, but a suite of tobacco control policies is necessary to reduce racial/ethnic disparities more broadly.

Keywords: ethnicity, inequalities, health behavior, health policy, public health

Introduction

In general, past studies find that smoke-free laws do not affect smoking among adults. Is it possible that past findings, which typically condition on the mean, mask important differences across racial/ethnic minority groups, among whom tobacco-related disparities are pervasive? This article estimates the association between 100% smoke-free state laws and smoking, as well as self-reported health among adults in 5 racial/ethnic minority groups, including those who have been underrepresented in the literature (eg, American Indian/Alaska Native, Pacific Islander). A better understanding of racial/ethnic differences in the effect of 100% smoke-free state laws can facilitate policy aimed at reducing disparities.

In the United States, smoking is a leading cause of preventable death, including death from cancer, cardiovascular disease, and stroke. These conditions also are attributable to secondhand smoke.[1] However, there is evidence that smoke-free laws reduce secondhand exposure in public places, using both self-reported measures and those based on cotinine levels in body fluids.[2–7] For example, a 100% smoke-free law in New York significantly reduced the hours of secondhand exposure and saliva cotinine concentration among hospitality workers.[5] The same law also was associated with a reduction in saliva cotinine concentration among nonsmoking adults more broadly.[7] However, there is some question as to whether smoke-free laws displace secondhand exposure from public to private places. For example, Adda and Cornaglia find that smoke-free laws

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increase secondhand exposure in private places (based on cotinine levels in body fluids), especially among children and those living with smokers.[3] Alternatively, there is emerging evidence to support the ''social diffusion'' hypothesis that smoke-free laws change social norms, thus increasing smoke-free homes and reducing secondhand exposure in this context.[8–12] This is consistent with evidence that smoke-free laws improve self-reported health and subjective well-being, largely among nonsmokers and those who would like to quit.[13–15]

In addition to the effect on secondhand exposure, self-reported health, and subjective well-being, smoke-free laws are thought to be the most important deterrent of smoking, other than price.[16] Indeed, there is evidence that smoke-free laws reduce youth smoking.[17–20] For example, 100% smoke-free state laws are associated with a reduction in the youth smoking rate, as well as smoking frequency.[17] Moreover, there is evidence that smoke-free laws are particularly effective among boys and youth of high socioeconomic status.[20] In contrast, past studies find that smoke-free laws have little effect on smoking among adults.[2,21,22]

These past studies, which condition on the mean, do not reflect differences across racial/ethnic groups, among whom disparities in smoking are present. For example, from 2010 to 2013, the smoking rate was highest among American Indian/Alaska Native adults (38.9%), followed by black/African American (24.9%), white (24.9%), Pacific Islander (22.8%), Hispanic/Latinx (19.9%), and Asian (10.9%) adults.[23] These disparities may be associated with differences in metabolism, culture, price sensitivity, and access to treatment.[24] There also are racial/ethnic disparities in smoking-related morbidity and mortality and self-reported health.[1,25] Moreover, gender differences abound and vary across racial/ethnic groups.[23,26,27]

A Surgeon General's report identifies the reduction of tobacco-related disparities among racial/ethnic minority groups as a major goal.[28] Thus, it is important to understand the impact of tobacco control policies, which may mitigate or exacerbate disparities. Although there is some evidence that tobacco control policies have differential effects on smoking across racial/ethnic groups, past studies tend to focus on youth.[20,29] The literature on adults is limited, with emphasis on price sensitivity among a small number of racial/ethnic groups. For example, there is evidence that black/African American and Hispanic/Latinx adults are 2 and 6 times more sensitive to cigarette prices than white adults, respectively.[30] Looking beyond price, is it possible that past studies on smoke-free laws, which have focused on average effects, mask important differences across racial/ethnic groups? Although not well understood, this is important to the goal of reducing tobacco-related disparities.[28]

The objective of this study is to provide evidence regarding the impact of 100% smoke-free state laws on adults across 5 racial/ethnic minority groups, separately for men and women. In addition to smoking, this study extends the literature by considering racial/ethnic differences in the association between 100% smoke-free state laws and self-reported health. A past Surgeon General's report states that ''tobacco control efforts that are most effective, easiest to implement, and most cost-effective among racial/ethnic groups must be identified.''[31] Hence, this work facilitates policy aimed at reducing tobacco-related disparities by providing evidence regarding racial/ethnic differences in the intended and unintended consequences on smoking and self-reported health.

Methods

Data

Data on 100% smoke-free state laws were obtained from the American Nonsmokers' Rights Foundation.[32] These laws prohibit smoking in workplaces, restaurants, bars, and gambling facilities. There are no exemptions in attached structures or ventilated rooms, nor are there exemptions based on the size of the establishment, patrons' age, or time of day. During the study period (2002–2014), 36 states enacted 100% smoke-free laws, covering 81.9% of the US population, with considerable variation in the timing of the laws across states.[32]

Data on 100% smoke-free state laws were merged with microdata from the public-use Behavioral Risk Factor Surveillance System (BRFSS) – a nationally-representative, cross-sectional survey of those aged 18 years and older in the United States.[33] In addition to asking about risky health behaviors and chronic conditions, it contains information on respondents' sociodemographic characteristics, including race/ethnicity. Based on the individual's state of residence and year of interview, the authors added information on the average: unemployment rate, real cigarette price, and public attitudes toward smoking. Data on unemployment rates were obtained from the Bureau of Labor Statistics, while data on cigarette prices were obtained from a report by Orzechowski and Walker.[34,35] The latter is a historical compilation of the ''the tax burden on tobacco.'' The authors deflated cigarette prices to real terms using the Consumer Price Index for tobacco and smoking products, obtained from the Bureau of Labor Statistics.[36] Finally, public attitudes toward smoking were measured by the proportions of people who think smoking should be banned inside homes and workplaces, respectively. These data were obtained from the public-use BRFSS already described.[33]

Individuals who were missing data on smoking or self-reported health were excluded. Individuals who were missing relevant sociodemographic information, including race/ethnicity, also were excluded.

Subsamples and dependent variables

Two smoking subsamples were created, each with a different dependent variable to reflect smoking level. This is necessary to better understand ''tobacco dependence, the development of prevention and cessation strategies, and the applicability of harm-reduction techniques for racial/ethnic minorities.''[37 (p.203)] The first subsample consists of current smokers (daily and occasional) and includes 45,577 men and 58,302 women. A binary dependent variable was created to indicate whether the respondent was a daily (the variable takes a value of 1) or occasional smoker (the variable takes a value of zero). The second subsample consists of occasional and former smokers, of whom 97,313 are men and 105,339 are women. This binary dependent variable takes a value of 1 if the respondent was an occasional smoker and zero if he/she was a former smoker.

Another 2 subsamples were created for self-reported health, because 100% smoke-free state laws may have a

differential impact on smokers and nonsmokers.[13] The first consists of current smokers (daily and occasional) and includes 45,577 men and 58,302 women. The second subsample consists of nonsmokers (former and those who never smoked) and includes 202,244 men and 286,456 women. In terms of the dependent variable, respondents were asked: ''Would you say that in general your health is: excellent; very good; good; fair; poor.'' A binary dependent variable was derived from responses that equals 1 if the respondents were at the top of the scale (excellent, very good, good) or zero if they were at the bottom.

Empirical approach

As outlined in Equation 1, a difference-in-differences (DiD) model was used to estimate the association between 100% smoke-free state laws and the dependent variables, by exploiting variation in the timing of the laws across states. In doing so, the authors considered differences across 5 racial/ethnic minority groups.

$$Prob(Y_{ist}=1|\mathbf{X}) = \phi(\beta_0 + \beta_1 \boldsymbol{RaceEthnicity}_i + \beta_2 Law_{st} + \beta_3(\boldsymbol{RaceEthnicity}_i * Law_{st}) + \beta_4 \mathbf{W}_{it} + \beta_5 \mathbf{Z}_{st} + \boldsymbol{State}_s + \boldsymbol{Year}_t) \quad (1)$$

Y_{ist} denotes the dependent variable for individual i in state s during time period t. $\boldsymbol{RaceEthnicity}_i$ is a set of binary variables indicating whether the respondent is: Asian, American Indian/Alaska Native, Pacific Islander, black/African American, or Hispanic/Latinx. The reference category is white and those who reported multi- or other race/ethnicity. The latter 2 groups constitute 2% of the sample (compared to 75% white), so the reference category is referred to as white throughout. Moreover, dropping these 2 groups had a negligible impact on results. Law_{st} is a binary variable indicating whether the individual was exposed to a 100% smoke-free state law and $\mathbf{W}_{it}$ controls for individual sociodemographic characteristics – age and age-squared, marital status (divorced/separated, widowed, never married versus married/common law), education (high school, college 1–3 years, college ≥4 years versus less than high school) and real income ($15,000–$24,999, $25,000–$34,999, $35,000–$49,999, ≥$50,000 versus <$15,000). To proxy real income, the authors interacted nominal income categories with year dummy variables. $\mathbf{Z}_{st}$ controls for time-varying state characteristics – unemployment rates, real cigarette prices, and public attitudes toward smoking. State and year dummy variables, $\boldsymbol{State}_s$ and $\boldsymbol{Year}_t$, also were included.

β_j for $j=[0,5]$ are the parameters to be estimated and key estimates include β_1, β_2 and β_3. β_1 reflects differences in the dependent variable across racial/ethnic groups relative to those who are white. β_2 is the DiD estimator, which indicates the average association between 100% smoke-free state laws and the dependent variable. β_3 reflects differences in the association across racial/ethnic minority groups.

Equation 1 was estimated using probit regressions and presented in terms of average marginal effects. They can be interpreted as a change in the probability of the dependent variable being equal to 1. It is important to note that the estimates are not necessarily causal; they are correlational because the authors cannot control for confounding related to unobservables with cross-sectional data. Robust standard errors were clustered by state, and normalized sampling weights were applied to all analyses.

Results

Table 1 contains the percentage of racial/ethnic minority men and women in each subsample. For example, 0.2% of nonsmoking women were Pacific Islander, while 10.4% were black/African American. It is also interesting to note that proportions of American Indian/Alaska Native men and women were higher in the subsamples of smokers compared to nonsmokers, while the opposite was true for Asian men and women. Means/percentages of other characteristics by subsample and sex are available in Supplementary Table S1.

Table 2 presents key estimates from the DiD model of smoking. With the exception of Asian, racial/ethnic minority men were less likely to be daily smokers (more likely to be occasional smokers) relative to white men. However, they were more likely to be occasional (versus former) smokers. For example, the probability of daily smoking among

Table 1. Percentage of Racial/Ethnic Minority Men and Women in Each Subsample

Subsample	*Daily and occasional smokers*		*Occasional and former smokers*		*Nonsmokers*	
Sex	*Men*	*Women*	*Men*	*Women*	*Men*	*Women*
Asian	2.048 (0.161)	0.677 (0.066)	1.943 (0.105)	0.877 (0.060)	3.323 (0.100)	2.868 (0.078)
American Indian	1.957 (0.154)	1.505 (0.099)	1.236 (0.085)	1.078 (0.065)	0.810 (0.037)	0.846 (0.035)
Pacific Islander	0.423 (0.083)	0.218 (0.033)	0.259 (0.046)	0.177 (0.023)	0.228 (0.022)	0.206 (0.018)
Black	9.906 (0.303)	10.263 (0.256)	7.082 (0.203)	7.498 (0.170)	8.143 (0.150)	10.372 (0.132)
Hispanic	10.269 (0.371)	6.923 (0.254)	9.614 (0.260)	6.540 (0.200)	9.698 (0.175)	9.380 (0.139)
Reference category: White	75.396 (0.465)	80.414 (0.350)	79.867 (0.321)	83.830 (0.258)	77.798 (0.225)	76.327 (0.185)
Observations	45,577	58,302	97,313	105,339	202,244	286,456

Data pertain to adults aged 18 years and older, obtained from the public-use Behavioral Risk Factor Surveillance System (2002–2014). Standard errors are in parentheses. Normalized sampling weights were used in all analyses.

American Indian = American Indian/Alaska Native; Black = Black/African American; Hispanic = Hispanic/Latinx.

Table 2. Racial/Ethnic Differences in the Association Between 100% Smoke-Free State Laws and Smoking, Separately by Subsample and Sex: Key Estimates from the Difference-in-Differences Model

Dependent variable	*Smoking*			
Subsample	*Daily smoker (versus occasional)*		*Occasional smoker (versus former)*	
Sex	*Men*	*Women*	*Men*	*Women*
Asian	0.081 (0.045)	0.019 (0.069)	-0.011 (0.022)	0.005 (0.038)
American Indian	-0.135*** (0.035)	-0.052 (0.049)	0.103*** (0.026)	0.020 (0.032)
Pacific Islander	-0.225*** (0.068)	-0.095 (0.090)	0.187** (0.092)	-0.027 (0.067)
Black	-0.125*** (0.019)	-0.095*** (0.017)	0.095*** (0.014)	0.076*** (0.014)
Hispanic	-0.186*** (0.021)	-0.115*** (0.027)	0.060*** (0.018)	0.019 (0.019)
Law	0.034 (0.017)	0.007 (0.009)	0.004 (0.011)	0.004 (0.009)
Asian * Law	-0.114** (0.055)	0.007 (0.082)	0.041 (0.024)	-0.050 (0.053)
American Indian * Law	0.006 (0.061)	-0.041 (0.053)	-0.011 (0.033)	0.051 (0.034)
Pacific Islander * Law	0.341*** (0.076)	0.097 (0.093)	-0.265*** (0.095)	0.024 (0.101)
Black * Law	-0.008 (0.021)	0.014 (0.014)	-0.019 (0.019)	-0.014 (0.017)
Hispanic * Law	-0.037** (0.018)	0.015 (0.035)	-0.020 (0.022)	-0.020 (0.023)
Observations	45,577	58,302	97,313	105,339

Data pertain to adults aged 18 years and older, obtained from the public-use Behavioral Risk Factor Surveillance System (2002–2014). This table contains average marginal effects from probit regressions. Individual sociodemographic and state characteristics are included, as well as state and year dummy variables. Robust standard errors were clustered by state. They are in parentheses. Normalized sampling weights were used in all analyses.

American Indian = American Indian/Alaska Native; Black = Black/African American; Hispanic = Hispanic/Latinx. The reference category is white.

***$P < 0.01$; **$P < 0.05$.

American Indian/Alaska Native men was 13.5 points lower than white men, while the probability of being an occasional smoker was 10.3 points higher. Although a similar relationship exists for black/African American women, there were fewer racial/ethnic disparities among women; there were negligible differences in the probability of being a daily (versus occasional) or occasional (versus former) smoker among Asian, American Indian/Alaska Native, and Pacific Islander women compared to white women.

In terms of policy, Table 2 indicates that 100% smoke-free state laws were not correlated with smoking, on average. For both men and women, the DiD estimator was small and statistically insignificant. However, using white as the reference category, the results suggest that 100% smoke-free state laws reduced the probability of being a daily smoker by 11.4 points for Asian men and by 3.7 points for Hispanic/Latinx men. It also is interesting to note that, among Pacific Islander men, 100% smoke-free state laws were associated with occasional smokers either smoking more often or quitting. There was no evidence that the laws were associated with quitting among other racial/ethnic minority men who smoked occasionally. Likewise, there was no evidence that they were related to smoking among women, regardless of race/ethnicity or smoking level.

Instead of smoking less, the authors also considered the association between 100% smoke-free state laws and the major transition from daily to former smoker. Key estimates are available in Supplementary Table S2. The only statistically significant finding is that, on average, there was a small increase in the probability of daily smoking among men.

Table 3 contains key estimates of self-reported health from the DiD model. Among smokers, Asian men were more likely to be at the top of the scale (12.7 points) relative to white, while American Indian/Alaska Native women were less likely to be at the top (7.1 points). There were no other racial/ethnic differences in self-reported health among smokers. Among nonsmokers, however, American Indian/Alaska Native, black/African American, and Hispanic/Latinx men and women were less likely to be at the top of the self-reported health scale. For example, compared to white, the probabilities were lower for American Indian/Alaska Native men and women. Additionally, Asian women were less likely to be at the top of the self-reported health scale compared to white women.

In terms of policy, 100% smoke-free state laws were not correlated with self-reported health, on average. However, using white as the reference category, they were associated with an increase in the probability of being at the top of the scale for Pacific Islander men who smoked, as well as a reduction for Pacific Islander women who did not smoke. Likewise, 100% smoke-free state laws were associated with an increase in the probability of being at the top of the self-reported health scale for American Indian/Alaska Native women who did not smoke (Table 3).

As a falsification test, the authors used flu vaccination as a ''placebo'' dependent variable – equaling 1 if the respondent had a flu shot or spray in the past 12 months and zero otherwise. This placebo dependent variable was not expected to be associated with 100% smoke-free state laws. Rather, it was used to check the DiD design – to ensure that key estimates related to smoking and self-reported health were not merely artifacts of the data. This type of falsification test has been used in past studies. For example, Marcus and Siedler examine the relationship between a late-night ban on alcohol sales and alcohol-related hospitalizations.[38] As a falsification test, they estimated the effect on hospitalizations related to lower respiratory diseases. As expected, this placebo dependent variable was not associated with the late-night ban on alcohol sales.[38] Similarly, in the present study, key estimates from the DiD

Table 3. Racial/Ethnic Differences in the Association Between 100% Smoke-Free State Laws and Self-reported Health, Separately by Subsample and Sex: Key Estimates from the Difference-in-Differences Model

Dependent variable	*Self-reported health*			
Subsample	*Top of the scale (versus bottom) for smokers*		*Top of the scale (versus bottom) for nonsmokers*	
Sex	*Men*	*Women*	*Men*	*Women*
Asian	0.127*** (0.049)	0.056 (0.048)	0.034 (0.018)	-0.036** (0.014)
American Indian	-0.013 (0.038)	-0.071** (0.028)	-0.058*** (0.018)	-0.078*** (0.014)
Pacific Islander	-0.088 (0.051)	-0.054 (0.117)	0.016 (0.040)	0.051 (0.027)
Black	-0.009 (0.022)	-0.009 (0.014)	-0.028** (0.011)	-0.040*** (0.007)
Hispanic	-0.031 (0.020)	-0.042 (0.021)	-0.058*** (0.011)	-0.062*** (0.008)
Law	0.003 (0.013)	-0.001 (0.011)	-0.005 (0.006)	-0.003 (0.006)
Asian * Law	-0.077 (0.073)	-0.065 (0.085)	-0.029 (0.018)	0.004 (0.019)
American Indian * Law	-0.003 (0.064)	0.028 (0.043)	0.009 (0.026)	0.051*** (0.017)
Pacific Islander * Law	0.222*** (0.056)	-0.027 (0.073)	-0.097 (0.063)	-0.117*** (0.032)
Black * Law	-0.020 (0.024)	-0.011 (0.015)	0.020 (0.011)	0.007 (0.005)
Hispanic * Law	-0.014 (0.026)	-0.011 (0.027)	0.017 (0.010)	0.007 (0.008)
Observations	45,577	58,302	202,244	286,456

Data pertain to adults aged 18 years and older, obtained from the public-use Behavioral Risk Factor Surveillance System (2002–2014). This table contains average marginal effects from probit regressions. Individual sociodemographic and state characteristics are included, as well as state and year dummy variables. Robust standard errors were clustered by state. They are in parentheses. Normalized sampling weights were used in all analyses.

American Indian = American Indian/Alaska Native; Black = Black/African American; Hispanic = Hispanic/Latinx. The reference category is white. ''Top of the scale'' refers to excellent, very good, or good self-reported health. ''Bottom'' refers to fair or poor self-reported health.

***$P < 0.01$; **$P < 0.05$.

model were generally small and statistically insignificant when flu vaccination was used as a placebo dependent variable (Supplementary Table S3). This adds credibility to the smoking and self-reported health estimates. However, as noted, it remains possible that the estimates are confounded by unobservables given the cross-sectional nature of the data.

Discussion

The reduction of tobacco-related disparities is a major policy goal.[28] In support of this goal, there is evidence that smoke-free laws reduce secondhand exposure in public places.[2–7] Some past studies suggest that it is displaced to private places.[3] However, emerging evidence supports the ''social diffusion'' hypothesis that smoke-free laws change social norms, leading to more smoke-free homes and less secondhand exposure.[8–12] Similarly, smoke-free laws improve self-reported health and subjective well-being among nonsmokers and those who would like to quit.[13–15] In terms of the effect on smoking per se, past studies find that smoke-free laws are associated with reductions among youth, but have little effect on adults.[2,17–22] However, these studies tend to focus on the average effect, potentially masking differences across racial/ethnic groups.[2–4,13–15,21,22] Moreover, past studies on the differential effects of tobacco control policies tend to focus on youth and price sensitivity among adults.[20,29,30] Thus, the objective of the present study is to estimate racial/ethnic differences in the association between 100% smoke-free state laws and adult smoking, as well as self-reported health, to provide evidence regarding the intended and unintended consequences across groups.

Despite past evidence of high smoking rates, this study finds that American Indian/Alaska Native men were less likely to be daily smokers (more likely to be occasional smokers) compared to white men.[23] The same was true for Pacific Islander, black/African American, and Hispanic/Latinx men, as well as black/African American women. These results are consistent with past evidence that racial/ethnic minority groups are less likely to be heavy smokers.[37] However, this study also finds that these individuals had a lower probability of quitting (compared to white), and this tended to be more pertinent among men. This finding adds to the understanding of racial/ethnic disparities in smoking. It highlights differences by sex and smoking level, which are important for targeting and evaluating tobacco control policies aimed at reducing disparities, such as 100% smoke-free state laws.

Consistent with past literature, this study finds that 100% smoke-free state laws were not correlated with smoking among adults, on average.[2,21,22] Likewise, they were not correlated with smoking among women, regardless of race/ethnicity. However, 100% smoke-free state laws were associated with a lower probability of daily smoking among Asian and Hispanic/Latinx men, who already had a lower probability of daily smoking compared to white men. Moreover, results suggest that 100% smoke-free state laws were not related to the probability of quitting or being at the top of the self-reported health scale. More generally, there was no evidence that 100% smoke-free state laws addressed racial/ethnic disparities in self-reported health, except that they were associated with an improvement in the health of nonsmoking American Indian/Alaska Native women.

In terms of occasional smoking, racial/ethnic minority men had a lower probability of quitting (relative to white), and there was no evidence that 100% smoke-free state laws improved these disparities. One exception is that, among Pacific Islander men, the laws were associated with a higher

probability of being a daily or former smoker (versus occasional); this suggests they smoked more often or quit. This coincided with a higher probability of being at the top of the self-reported health scale. It is conceivable that Pacific Islander men who quit were feeling healthier, while those who continued to smoke had time-inconsistent preferences and expected the laws to serve as a self-control device.[14] It also is interesting to note that 100% smoke-free laws were associated with a lower probability of being at the top of the self-reported health scale among nonsmoking Pacific Islander women. This is consistent with Adda and Cornaglia, who find that smoke-free laws displace secondhand exposure from public to private places.[3] In other words, it is possible that Pacific Islander men who smoked more often were doing so at home, with negative health implications for others in the household (to the extent that Pacific Islander men and women resided in the same household). In terms of the social diffusion hypothesis, it remains possible that smoke-free laws affect social norms, leading to more smoke-free homes and less secondhand exposure.[8–12] However, these results suggest that social diffusion may be less salient in some circumstances, such as Pacific Islander households. This is consistent with evidence that, for some women, social position limits their ability to maintain smoke-free homes.[39]

Limitations

A few limitations should be noted. First, the authors do not observe whether American Indian/Alaska Native respondents live on reservations, many of which do not have 100% smoke-free laws.[32] Likewise, the authors do not observe whether individuals were affected by 100% smoke-free laws at lower spatial scales prior to statewide legislation, or whether they were affected by weaker laws prior to the 100% smoke-free laws considered in this paper. These issues likely attenuated the estimates regarding the association between 100% smoke-free state laws and smoking, as well as the relationship with self-reported health. Another limitation is that the authors cannot examine racial/ethnic groups at a more granular level (eg, Asian and Hispanic/Latinx subgroups). Likewise, multi-racial/ethnic adults were not considered. These issues are left for future work. Also, caution is suggested in interpreting the Pacific Islander results because of small samples. Better data are needed on this group; larger samples (such as the Native Hawaiian and Pacific Islander National Health Interview Survey) should be collected across time to enable analyses of tobacco control policies. Also with better data, future work should consider racial/ethnic heterogeneity in how 100% smoke-free state laws affect exposure to secondhand smoke, electronic cigarettes, and the long-term effects of such laws. Finally, the authors reiterate that the estimates are based on cross-sectional data. Thus, they are correlational (not necessarily causal) because confounding related to unobservable characteristics cannot be addressed.

Conclusions

The findings of this study underscore the importance of looking beyond average effects to consider how 100% smoke-free state laws impact racial/ethnic minorities. Policy makers should note that these laws were not correlated with smoking among women, regardless of race/ethnicity. Moreover, among men, 100% smoke-free state laws were not correlated with the probability of becoming a former (versus occasional) smoker, which is an important margin for most racial/ethnic minority groups. Finally, there was little evidence that 100% smoke-free state laws addressed racial/ethnic disparities in self-reported health. The authors conclude that 100% smoke-free state laws may be effective for certain groups, but a suite of tobacco control policies is needed to address racial/ethnic disparities more broadly.

Author Disclosure Statement

The authors declare that there are no conflicts of interest.

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Supplementary Material

Supplementary Table S1
Supplementary Table S2
Supplementary Table S3

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