Sociodemographic Disparities in Local Smoke-Free Law Coverage in 10 States

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Exposure to secondhand smoke (SHS) from burning tobacco products causes premature death and disease in nonsmokers.[1,2] Despite reductions in SHS exposure over the past 25 years, millions of US nonsmokers continue to be exposed, particularly certain population groups such as African Americans and those with lower socioeconomic status.[3,4] The Surgeon General has concluded that there is no risk-free level of SHS, and that eliminating smoking in indoor areas is the only effective way to fully protect nonsmokers from exposure.[1] When coupled with adequate planning, education, and enforcement, comprehensive smoke-free laws that prohibit smoking in all indoor areas of workplaces, restaurants, and bars can effectively protect nonsmokers from SHS in these settings while helping smokers quit.[1,2,5] Although statewide smoking restrictions provide greater population coverage than local restrictions, the strongest SHS protections have traditionally originated at the local level.[1] These laws have typically spread to multiple communities throughout a state and, in many cases, lay the groundwork for statewide comprehensive smoke-free laws.[1,6]

According to the American Nonsmokers' Rights Foundation (ANRF), as of January 2015, 24 states, the District of Columbia, and the territories of Puerto Rico and Virgin Islands had comprehensive smoke-free laws in effect.[7] In addition, 697 municipalities had local comprehensive smoke-free laws.[7] Following progress during 2002 to 2010, statewide comprehensive smoke-free law adoption has stalled.[5] Communities in several states continue to adopt such laws, although local progress has also slowed in recent years.[8]

Although local comprehensive smoke-free laws provide protection from SHS among nonsmokers in communities that have implemented such laws, they may inadvertently lead to sociodemographic disparities in SHS exposure, which could widen disparities in SHS-attributable health effects. Studies suggest

Objectives. We assessed sociodemographic disparities in local 100% smoke-free laws prohibiting smoking in all indoor areas of nonhospitality worksites, restaurants, and bars in 10 states.

Methods. We obtained data on local 100% smoke-free laws (US Tobacco Control Laws Database) and subcounty characteristics (2006–2010 American Community Survey) for Alabama, Alaska, Indiana, Kentucky, Mississippi, Missouri, North Dakota, South Carolina, Texas, and West Virginia. Outcomes included (1) 100% smoke-free law covering restaurants, bars, *and* workplaces; (2) 100% smoke-free law covering restaurants, bars, *or* workplaces; and (3) number of venue types covered by 100% smoke-free laws (0–3). Sociodemographics included total population, urban status, percentage racial/ethnic minority, per capita income, percentage with high-school diploma, percentage with blue-collar jobs, and percentage of workers who live and work in the same locality.

Results. Across states, localities with less-educated residents, smaller proportions of workers living and working in the same locality, or both generally had lower odds of being covered by 100% smoke-free laws. Coverage varied across states for other sociodemographics.

Conclusions. Disparities exist in local smoke-free law coverage. Identifying patterns in coverage can inform state efforts to address related disparities. (*Am J Public Health*. Published online ahead of print July 16, 2015: e1–e8. doi:10.2105/AJPH.2015.302655)

that smoke-free laws are not evenly distributed across communities with different population characteristics.[9–13] For example, communities with high income and education are more likely to be covered by smoke-free laws, and communities with higher unemployment and more blue-collar workers are less likely to be covered.[9–12]

The association between smoke-free law coverage and race/ethnicity appears to vary by region and a state's progress in adopting local smoke-free laws. In Massachusetts, racial/ethnic minorities were less likely to be covered by a local smoke-free restaurant law than non-Hispanic Whites during 1993 to 2003; this disparity reversed after the implementation of Boston's smoke-free law in 2004.[12] By contrast, in Texas, large urban areas with high minority populations were more likely to be covered by local smoke-free laws.[13] A study that examined smoke-free law coverage at the national level found that more Hispanics and

non-Hispanic Asians were covered by state or local smoke-free restaurant and bar laws than non-Hispanic Whites and non-Hispanic Blacks during 2000 to 2009.[14] These studies suggest that demographic characteristics may affect the likelihood of being protected by a local smoke-free law.

Most studies on sociodemographic disparities in local smoke-free law coverage have focused on a single state or region.[9–13] Because patterns in local smoke-free coverage may vary by geography and may change as states progress through local smoke-free law adoption, these findings may not be generalizable elsewhere. In addition, most studies have assessed a limited number of sociodemographic factors. For example, although Gonzalez et al. estimated population coverage patterns by state and local smoke-free laws at the national level, they only assessed race/ethnicity.[14] Some existing studies have also not considered subcounty level smoke-free laws or accounted for

county laws that only apply to unincorporated areas. To address these gaps in the literature, we investigated the sociodemographic characteristics of residents covered by local smoke-free laws as of July 2011, compared with those not covered by such laws, in 10 states.

METHODS

We obtained data on 100% local smoke-free laws from the US Tobacco Control Laws Database.[15] We obtained data on subcounty locality characteristics from the 2006–2010 American Community Survey (ACS) 5-Year Estimates data file.[16] We obtained data for 10 states: Alabama, Alaska, Indiana, Kentucky, Mississippi, Missouri, North Dakota, South Carolina, Texas, and West Virginia. We selected these states on the basis of 2 criteria: (1) they lacked a statewide 100% smoke-free law covering nonhospitality workplaces, restaurants, and bars through July 2011, and (2) they had at least 8 localities with such laws. These 10 states are the only states meeting both of these criteria, with the exception of California, Colorado, and New Mexico. We excluded these 3 states from the analysis because patterns of local smoke-free law adoption might differ in these states, where substantial statewide smoking restrictions have been enacted that fall short of the established criteria for being classified as comprehensive.[7]

Measures

Local smoke-free law coverage. The ANRF's US Tobacco Control Laws Database tracks US municipal, county, and state tobacco control laws.[15] Laws are identified through multiple methods, including systematic scanning of tobacco control publications, Web sites, and e-mail discussion lists; solicitation from tobacco control professionals; and partnerships with the National Association of County and City Health Officials and the National Association of Local Boards of Health. Senior ANRF staff members use standardized guidelines and codebooks to code the laws.

We constructed the local smoke-free law measure based on 100% smoke-free laws covering nonhospitality workplaces, restaurants, and freestanding bars through July 1, 2011; nonhospitality workplaces exclude restaurants, bars, and other hospitality venues

such as hotels. We defined a 100% smoke-free law as an ordinance or regulation that prohibits smoking in all indoor areas of these venues, including attached bars or separately ventilated rooms, and that does not include a size exemption. We assessed 3 outcomes: (1) 100% smoke-free law covering restaurants, bars, *and* workplaces (yes or no); (2) 100% smoke-free law covering restaurants, bars, *or* workplaces (yes or no); and (3) the number of these 3 venue types covered by a 100% smoke-free law (0–3). We chose these 3 outcomes because they reflect varying degrees of smoke-free law adoption commonly seen across states, including those prohibiting smoking in 1, 2, or all 3 of these venue types.[5]

We matched each locality with the US Tobacco Control Laws Database[15] by using state, county, and federal Information Processing Standard codes,[16] and locality names. In addition, we used ArcGIS version 10.2 geographic information systems software (Esri, Redlands, CA) to ensure accuracy of the matching process and correct matching of subcounty level laws. To be consistent with the subcounty level definition in the ACS data file, the definition of a locality varied slightly across states. In Indiana, Missouri, and North Dakota, a locality was defined as part of a city, town, village, Census designated place, township, or remainder of a township within a county. In Alabama, Kentucky, South Carolina, and Texas, a locality was defined as part of a city, town, village, Census designated place, Census county division, or remainder of a Census county division. In Alaska, a locality was defined as part of a city, Census designated place, Census subarea, or remainder of a Census subarea. In Mississippi and West Virginia, a locality was defined as part of a city, town, village, Census designated place, district, or remainder of a district. Our locality definition was consistent with the subcounty level definition in the ACS data file.[17] With the exception of tribal-owned land, the localities in the database cover the entire state geography and each locality can be uniquely matched with local laws in the ANRF database.

Sociodemographic characteristics. We obtained population characteristic data from the ACS. We used 5-year estimates (2006–2010) to enhance validity and reliability in assessing areas with small populations. The assessed

characteristics included total population in a locality, geography (urban area),[18] percentage racial/ethnic minority (i.e., not non-Hispanic White), per capita income in past 12 months (2010 inflation-adjusted dollars), percentage of the population without a high-school diploma (population aged ≥ 25 years), percentage of the population who work in blue-collar jobs (population aged ≥16 years),[19] and percentage of workers who both live and work in the same locality (population aged ≥16 years). We constructed the race/ethnicity, live–work, education, and occupation variables by using state-specific quartiles. We log-transformed the total population and per capita income variables to account for the skewed distribution.

Analysis

We analyzed data with Stata version 13.1 (StataCorp LP, College Station, TX). We used state-specific logit models to assess binary dependent variables, and we used a state-specific ordered logit model to assess the 4-level dependent variable for the number of covered venues. We used 2 variations of each model type. The first estimated the presence of a local smoke-free law as a function of total population, urban status, race/ethnicity, education, per capita income, occupation, and the live–work indicator. The second included the same indicators and an interaction term for race/ethnicity and urban status. We considered this interaction term because some racial/ethnic populations are more concentrated in urban areas in some states. Because of high collinearity between the race/ethnicity and income–education variables, we did not assess interactions between those variables. We assessed statistical significance for all models at $\alpha = .01$ and $\alpha = .05$.

RESULTS

Descriptive statistics for key variables are presented in Table 1. The proportion of localities that had comprehensive smoke-free laws varied widely across states. The proportion of localities covered by local comprehensive smoke-free laws was minimal in North Dakota (0.5%), Alabama (2%), Missouri (2%), Alaska (3%), Texas (3%), Indiana (4%), and Mississippi (6%), but greater than one third in West Virginia (37%). Kentucky and South Carolina

TABLE 1—Descriptive Statistics for Key Study Measures and 100% Smoke-Free Laws as of July 2011 by State: US Tobacco Control Laws Database and 2006–2010 American Community Survey

Sociodemographic Characteristics	Alabama		Alaska		Indiana		Kentucky		Mississippi		Missouri		North Dakota		South Carolina		Texas		West Virginia	
	No.	Mean (SD)	No.	Mean (SD)	No.	Mean (SD)	No.	Mean (SD)	No.	Mean (SD)	No.	Mean (SD)	No.	Mean (SD)	No.	Mean (SD)	No.	Mean (SD)	No.	Mean (SD)
Dependent variables																				
100% smoke-free laws in all 3 venues	1 166	0.02 (0.14)	353	0.03 (0.17)	1 867	0.04 (0.19)	1 086	0.14 (0.35)	1 090	0.06 (0.25)	2 662	0.02 (0.13)	1 732	0.005 (0.06)	762	0.15 (0.35)	2 857	0.03 (0.17)	723	0.37 (0.48)
100% smoke-free laws in any of the 3 venues	1 166	0.06 (0.23)	353	0.05 (0.21)	1 867	0.12 (0.32)	1 086	0.20 (0.40)	1 090	0.11 (0.32)	2 662	0.09 (0.29)	1 732	0.005 (0.07)	762	0.17 (0.37)	2 857	0.05 (0.23)	723	0.81 (0.39)
No. of venue types with 100% smoke-free laws	1 166	0.12 (0.52)	353	0.12 (0.56)	1 867	0.25 (0.72)	1 086	0.48 (1.05)	1 090	0.28 (0.81)	2 662	0.19 (0.63)	1 732	0.01 (0.19)	762	0.48 (1.08)	2 857	0.12 (0.54)	723	1.74 (1.14)
Explanatory variables																				
Urban status	1 166	0.52 (0.50)	353	0.11 (0.31)	1 867	0.36 (0.48)	1 086	0.53 (0.50)	1 090	0.35 (0.48)	2 662	0.33 (0.47)	1 732	0.04 (0.19)	762	0.61 (0.49)	2 857	0.66 (0.47)	723	0.56 (0.50)
Total population	1 166	4 042 (12 068)	353	1 958 (15 376)	1 867	3 437 (9 806)	1 086	3 946 (8 044)	1 090	2 699 (4 060)	2 662	2 225 (9 183)	1 732	381 (3 416)	762	5 921 (9 952)	2 857	8 510 (52 498)	723	2 546 (3 729)
% racial/ethnic minority	1 166	0.25 (0.27)	353	0.55 (0.39)	1 867	0.06 (0.09)	1 086	0.07 (0.10)	1 090	0.44 (0.30)	2 662	0.08 (0.16)	1 732	0.04 (0.14)	762	0.38 (0.25)	2 857	0.38 (0.31)	723	0.05 (0.10)
% living and working in same locality	1 144	0.14 (0.21)	341	0.59 (0.39)	1 856	0.10 (0.19)	1 071	0.13 (0.22)	1 090	0.22 (0.26)	2 634	0.10 (0.18)	1 657	0.08 (0.19)	759	0.12 (0.18)	2 821	0.18 (0.23)	712	0.13 (0.20)
% with < high-school diploma	1 164	0.22 (0.14)	353	0.17 (0.16)	1 866	0.14 (0.10)	1 085	0.22 (0.14)	1 084	0.24 (0.13)	2 660	0.17 (0.12)	1 732	0.12 (0.16)	762	0.21 (0.12)	2 855	0.22 (0.18)	722	0.20 (0.12)
% working in blue-collar occupations	1 144	0.73 (0.16)	343	0.66 (0.20)	1 858	0.73 (0.13)	1 072	0.71 (0.15)	1 089	0.74 (0.13)	2 636	0.72 (0.16)	1 665	0.58 (0.27)	759	0.73 (0.15)	2 820	0.70 (0.16)	712	0.73 (0.16)
Per capita income in past 12 mo	1 140	21 123 (8813)	335	22 409 (11 997)	1 857	23 832 (12 383)	1 066	21 746 (12 446)	1 084	17 651 (6 752)	2 625	21 852 (10 075)	1 604	29 018 (20 237)	754	21 039 (10 164)	2 819	23 643 (13 524)	711	19 200 (6 484)

Note. A 100% smoke-free law was defined as an ordinance or regulation that prohibits smoking in all indoor areas of these venues, including attached bars or separately ventilated rooms, and that does not include a size exemption. The study assessed 3 outcomes: (1) 100% smoke-free law covering restaurants, bars, *and* workplaces (yes or no); (2) 100% smoke-free law covering restaurants, bars, *or* workplaces (yes or no); and (3) the number of these 3 venue types covered by a 100% smoke-free law (0–3).

lay between these extremes, with 14% and 15% of localities covered by comprehensive laws, respectively.

In Alabama, Indiana, Kentucky, and South Carolina, localities in urban areas had consistently greater odds of having 100% smoke-free laws, irrespective of the smoke-free law measure used (Tables 2, 3, and 4). Urban areas in Mississippi also had greater odds of having 100% smoke-free laws in any of the 3 venue types and having more venue types covered (Tables 3 and 4). In West Virginia, localities in urban areas had lower odds of having 100% smoke-free laws in all 3 venue types and having more venue types covered (Tables 2 and 4). Estimates of urban status were not reported for Missouri and Texas for some smoke-free law measures because almost all localities with smoke-free laws in these states were located in urban areas. We observed no significant findings by urban status for Alaska or North Dakota.

For all 3 smoke-free law measures, localities with larger populations in Indiana, Missouri, Mississippi, North Dakota, South Carolina, and Texas had greater odds of having 100% smoke-free laws. In Kentucky, the larger a locality's population, the lower the odds it was covered by a smoke-free law in any of the 3 venues and the lower the number of venue types covered (Tables 3 and 4). No significant findings were observed by population size for Alabama, Alaska, or West Virginia for any smoke-free law measure.

Localities with greater racial/ethnic minority populations had greater odds of being covered by smoke-free laws in Kentucky and Texas, irrespective of the smoke-free law measure used. Missouri showed a similar pattern, but the results were significant only for smoke-free laws in any of the 3 venues and for the number of venue types covered (Tables 3 and 4). We observed no significant findings by race/ethnicity for the remaining states for any of the 3 smoke-free law measures.

Across all 10 states, localities where a large proportion of workers live and work in the same locality consistently had greater odds of having smoke-free laws, irrespective of the specific smoke-free law measure. The results were significant for Alabama, Kentucky, Missouri, Mississippi, and Texas across all 3 smoke-free law measures (Tables 2, 3, and 4).

TABLE 2—State-Specific Logit Models Assessing Binary Dependent Variable for 100% Smoke-Free Laws as of July 2011 in Worksites, Restaurants, *and* Bars: US Tobacco Control Laws Database and 2006–2010 American Community Survey

Sociodemographic Characteristics	Alabama (n=1130), OR (95% CI)	Alaska (n=330), OR (95% CI)	Indiana (n=1851), OR (95% CI)	Kentucky (n=1061), OR (95% CI)	Mississippi (n=1081), OR (95% CI)	Missouri (n=2616), OR (95% CI)	North Dakota (n=1587), OR (95% CI)	South Carolina (n=753), OR (95% CI)	Texas (n=2797), OR (95% CI)	West Virginia (n=704), OR (95% CI)
Logit model[a]										
Urban status	9.080** (1.985, 41.54)	0.798 (0.214, 2.971)	2.045* (1.133, 3.688)	8.489** (3.427, 21.03)	1.993 (0.727, 5.467)	. . .b	0.458 (0.0493, 4.253)	2.181* (1.193, 3.987)	. . .b	0.508** (0.360, 0.715)
Total population (log)	1.084 (0.841, 1.397)	1.232 (0.778, 1.951)	1.442** (1.142, 1.821)	0.815* (0.687, 0.967)	1.616** (1.225, 2.131)	1.654** (1.280, 2.137)	4.693** (1.408, 15.640)	1.174* (1.004, 1.373)	1.434** (1.228, 1.675)	1.104 (0.973, 1.252)
% racial/ethnic minority	0.820 (0.545, 1.234)	0.593 (0.255, 1.378)	1.011 (0.766, 1.336)	1.797** (1.419, 2.275)	1.116 (0.806, 1.544)	1.895 (0.953, 3.768)	0.634 (0.035, 11.400)	1.113 (0.873, 1.419)	1.955** (1.348, 2.836)	0.945 (0.807, 1.106)
% living and working in same locality	4.567** (2.496, 8.355)	1.310 (0.610, 2.814)	1.064 (0.842, 1.345)	1.411** (1.148, 1.735)	2.902** (1.978, 4.258)	5.477** (2.976, 10.08)	1.950 (0.412, 9.225)	1.080 (0.893, 1.308)	3.253** (2.296, 4.608)	1.062 (0.922, 1.222)
% with < high-school diploma	0.852 (0.484, 1.497)	0.565 (0.277, 1.152)	0.834 (0.619, 1.123)	0.567** (0.409, 0.786)	0.802 (0.607, 1.061)	0.542* (0.333, 0.884)	0.963 (0.121, 7.697)	0.511** (0.381, 0.684)	0.558** (0.387, 0.804)	0.836* (0.713, 0.980)
Per capita income in past 12 mo	0.384 (0.090, 1.636)	1.714 (0.500, 5.875)	1.158 (0.572, 2.341)	5.239** (2.274, 12.070)	0.810 (0.328, 2.002)	4.008** (1.556, 10.32)	1.806 (0.020, 160.200)	1.262 (0.608, 2.621)	2.329 (0.949, 5.720)	0.737 (0.423, 1.285)
% working in blue-collar occupations	1.263 (0.715, 2.231)	1.223 (0.684, 2.188)	0.650* (0.466, 0.908)	0.846 (0.631, 1.136)	0.901 (0.676, 1.200)	0.628 (0.349, 1.131)	3.045 (0.871, 10.65)	1.053 (0.791, 1.402)	0.750 (0.523, 1.076)	0.824* (0.700, 0.969)
Logit model with interaction[a] (racial/ethnic minority and urban status)	0.760 (0.495, 1.166)	2.275 (0.721, 7.173)	2.130** (1.236, 3.671)	1.698 (0.916, 3.147)	0.977 (0.495, 1.929)	. . .b	. . .b	1.288 (0.786, 2.109)	. . .b	1.102 (0.821, 1.478)

Note. CI = confidence interval; OR = odds ratio.
[a]The reported results are ORs from the Logit model. An OR of > 1 implies that an explanatory variable is associated with higher odds of the outcome. An OR of < 1 implies that an explanatory variable does not affect the odds of the outcome. An OR = 1 implies that an explanatory variable is associated with lower odds of the outcome. An OR = 1 implies that an explanatory variable does not affect the odds of the outcome. For example, the OR for the variable "urban status" in Alabama is 9.080; this implies that, everything else being constant, the odds that an urban locality in Alabama has a comprehensive smoke-free law in worksites, restaurants, and bars are 9.080 times higher than that for a nonurban locality in Alabama.
[b]Urban status was dropped from the model for Missouri and Texas because of the complete determination in maximum likelihood estimation. The indicator for the interaction between percentage racial/ethnic minority and urban status was dropped from the model for Missouri, North Dakota, and Texas for the same reason.
*P < .05; **P < .01.

Across all states, localities with larger proportions of population lacking a high-school degree had lower odds of having smoke-free laws, irrespective of which smoke-free law measure was used; however, the results were only significant for Kentucky, Missouri, South Carolina, and Texas across all 3 measures. For the remaining states, the results were either significant for some smoke-free law measures (West Virginia) or not significant for any of these measures (Alabama, Alaska, and Indiana; Tables 2, 3, and 4).

In Indiana and West Virginia, localities with a large proportion of blue-collar workers had lower odds of having smoke-free laws across all 3 smoke-free law measures (Tables 2, 3, and 4). For Kentucky and Missouri, the same pattern was evident, but the results were significant only for smoke-free laws in any of the 3 venues and for the number of venue types covered (Tables 3 and 4). For the other states, the occupation variable was not significant (Tables 2, 3, and 4).

With the exception of West Virginia, localities with higher per capita income generally had greater odds of being covered by smoke-free laws. However, the positive association was only significant across all smoke-free law measures for Kentucky and Missouri. For West Virginia, localities with higher per capita income tended to have fewer types of venues covered (Table 4).

Because the estimated associations between noninteraction terms and smoke-free laws did not change in the models with interaction terms, only the estimated odds ratios for the interaction term between race/ethnicity and urban status are presented in the lower panel of Tables 2, 3, and 4. Except for Alabama, Mississippi, and West Virginia, localities in urban areas with a large proportion of minority residents had greater odds of having smoke-free laws. The results were significant across all 3 smoke-free law measures in Indiana, and for some measures for Alaska, Kentucky, South Carolina, and Texas. For Missouri and North Dakota, we removed the interaction term from the analysis because it closely predicted the outcome variables. Though not presented, the odds ratios for the race/ethnicity variable became less than 1 in Kentucky and Texas when we added the interaction term into the analysis of smoke-free laws in any of the 3

Sociodemographic Characteristics	Alabama (n = 1130), OR (95% CI)	Alaska (n = 330), OR (95% CI)	Indiana (n = 1851), OR (95% CI)	Kentucky (n = 1061), OR (95% CI)	Mississippi (n = 1081), OR (95% CI)	Missouri (n = 2616), OR (95% CI)	North Dakota (n = 1587), OR (95% CI)	South Carolina (n = 753), OR (95% CI)	Texas (n = 2797), OR (95% CI)	West Virginia (n = 704), OR (95% CI)
Logit model[a]										
Urban status	8.700** (2.797, 27.070)	2.948 (0.696, 12.48)	1.460* (1.024, 2.083)	4.951** (2.817, 8.702)	5.680** (2.511, 12.840)	. . .[b]	1.321 (0.139, 12.520)	2.134* (1.178, 3.864)	27.260** (3.555, 209.000)	0.763 (0.495, 1.176)
Total population (log)	1.093 (0.911, 1.311)	1.242 (0.873, 1.768)	1.214** (1.061, 1.388)	0.878 (0.755, 1.021)	1.386** (1.101, 1.746)	1.604** (1.408, 1.828)	3.140** (1.321, 7.463)	1.248** (1.067, 1.458)	1.353** (1.184, 1.548)	1.066 (0.920, 1.236)
% racial/ethnic minority	1.103 (0.809, 1.503)	0.769 (0.371, 1.594)	1.072 (0.900, 1.277)	1.450* (1.192, 1.762)	0.850 (0.651, 1.110)	3.601** (2.714, 4.778)	1.078 (0.095, 12.29)	1.058 (0.834, 1.342)	1.725** (1.343, 2.216)	1.073 (0.884, 1.303)
% living and working in same locality	3.488** (2.473, 4.918)	1.752 (0.995, 3.085)	1.512** (1.323, 1.729)	1.447** (1.227, 1.708)	2.678** (2.003, 3.581)	1.180* (1.024, 1.361)	2.282 (0.536, 9.718)	1.279** (1.067, 1.533)	3.701** (2.875, 4.764)	1.052 (0.881, 1.256)
% with < high-school diploma	0.719 (0.457, 1.133)	0.780 (0.351, 1.737)	0.872 (0.734, 1.037)	0.683** (0.522, 0.894)	0.915 (0.712, 1.176)	0.654** (0.536, 0.798)	1.035 (0.195, 5.481)	0.511** (0.382, 0.682)	0.573* (0.422, 0.777)	1.009 (0.838, 1.215)
Per capita income in past 12 mo	1.282 (0.340, 4.839)	3.814 (0.946, 15.380)	2.615** (1.591, 4.297)	4.531** (2.085, 9.848)	1.365 (0.645, 2.889)	3.495** (1.693, 7.212)	2.101 (0.0190, 232.1)	1.521 (0.693, 3.338)	2.294* (1.190, 4.425)	0.457 (0.202, 1.032)
% working in blue-collar occupations	1.260 (0.822, 1.933)	1.172 (0.692, 1.988)	0.723** (0.605, 0.864)	0.714** (0.564, 0.904)	0.906 (0.709, 1.159)	0.778* (0.632, 0.957)	2.006 (0.547, 7.356)	1.048 (0.792, 1.388)	0.810 (0.614, 1.069)	0.759** (0.616, 0.935)
Logit model with interaction[a] (racial/ethnic minority and urban status)	0.663 (0.380, 1.157)	6.709* (1.067, 42.170)	1.387* (1.000, 1.923)	2.580** (1.613, 4.128)	0.810 (0.452, 1.451)	. . .[b]	. . .[b]	1.094 (0.679, 1.763)	2.362** (1.825, 3.057)	1.431 (0.994, 2.059)

Note. CI = confidence interval; OR = odds ratio.
aThe reported results are ORs from the Logit model. An OR of >1 implies that an explanatory variable is associated with higher odds of the outcome. An OR of <1 implies that an explanatory variable is associated with lower odds of the outcome. An OR = 1 implies that an explanatory variable does not affect the odds of the outcome. For example, the OR for the variable "urban status" in Alabama is 8.700; this implies that, everything else being constant, the odds that an urban locality in Alabama has a comprehensive smoke-free law in worksites, restaurants, or bars are 8.700 times higher than that for a nonurban locality in Alabama.
bUrban status was dropped from the model for Missouri because of the complete determination in maximum likelihood estimation. The indicator for the interaction between percentage racial/ethnic minority and urban status was dropped from the model for Missouri and North Dakota for the same reason.
*P < .05; **P < .01.

venues and of the number of venue types covered.

DISCUSSION

The findings from this study reveal that, across several states, communities with less-educated and lower-income residents generally had lower odds of having 100% smoke-free laws. In addition, localities with a high proportion of workers living and working in the same locality had greater odds of having 100% smoke-free laws. Taken as a whole, these findings are consistent with those from previous studies suggesting that certain populations, including persons with less education and income, are less likely than others to be covered by local smoke-free laws.[9–13]

However, patterns of local smoke-free law coverage varied across states for other population characteristics, including population size, per capita income, and occupation distribution. For example, whereas localities with large populations in Kentucky had lower odds of having strong smoke-free laws for 2 of the assessed measures, localities with large populations in 6 other states had greater odds of being covered by such laws. In Kentucky and Missouri, localities with higher per capita income had significantly greater odds of being covered by smoke-free laws; however, the relationship between per capita income and smoke-free law coverage was reversed in West Virginia for the number of venues covered. Across all 3 measures, localities with a large proportion of blue-collar workers in Indiana and West Virginia had lower odds of being covered by smoke-free laws.

We also observed varying patterns of smoke-free law coverage across race/ethnicity. In Kentucky and Texas, localities with a large proportion of minority residents had greater odds of being covered by smoke-free laws, consistent with the findings of Gingiss et al.[13] However, when we added the interaction term between urban status and race/ethnicity, the positive relationship between race/ethnicity and smoke-free protection either disappeared or reversed. This suggests that the advantage in smoke-free protection for racial/ethnic minorities in those 2 states was attributable to minorities having greater odds of living in large

TABLE 4—State-Specific Logit Models Assessing Ordinal Dependent Variable for Number of Venue Types (Worksites, Restaurants, Bars) Covered by a 100% Smoke-Free Law as of July 2011: US Tobacco Control Laws Database and 2006–2010 American Community Survey

Sociodemographic Characteristics	Alabama (n = 1130), OR (95% CI)	Alaska (n = 330), OR (95% CI)	Indiana (n = 1851), OR (95% CI)	Kentucky (n = 1061), OR (95% CI)	Mississippi (n = 1081), OR (95% CI)	Missouri (n = 2616), OR (95% CI)	North Dakota (n = 1587), OR (95% CI)	South Carolina (n = 753), OR (95% CI)	Texas (n = 2797), OR (95% CI)	West Virginia (n = 704), OR (95% CI)
Logit model[a]										
Urban status	8.861** (2.783, 28.220)	2.587 (0.674, 9.922)	1.485* (1.040, 2.121)	5.170** (2.939, 9.097)	5.178** (2.245, 11.940)	. . .[b]	1.162 (0.148, 9.110)	2.199** (1.213, 3.989)	28.540** (3.791, 214.800)	0.656** (0.485, 0.887)
Total population (log)	1.096 (0.920, 1.305)	1.256 (0.880, 1.794)	1.230** (1.086, 1.393)	0.838* (0.723, 0.972)	1.402** (1.117, 1.761)	1.618** (1.415, 1.850)	3.343** (1.470, 7.599)	1.209* (1.042, 1.403)	1.322** (1.165, 1.501)	1.085 (0.976, 1.207)
% racial/ethnic minority	1.053 (0.779, 1.424)	0.750 (0.363, 1.551)	1.064 (0.901, 1.258)	1.548** (1.281, 1.871)	0.933 (0.726, 1.199)	3.558** (2.681, 4.720)	1.041 (0.088, 12.36)	1.088 (0.860, 1.376)	1.718** (1.331, 2.219)	1.028 (0.902, 1.171)
% living and working in same locality	3.570** (2.511, 5.076)	1.724 (0.977, 3.044)	1.450** (1.268, 1.658)	1.406** (1.196, 1.652)	2.647** (1.995, 3.514)	1.266** (1.103, 1.453)	2.222 (0.511, 9.669)	1.196* (1.004, 1.426)	3.695** (2.863, 4.768)	1.061 (0.943, 1.195)
% with < high-school diploma	0.705 (0.459, 1.083)	0.784 (0.358, 1.717)	0.854 (0.719, 1.015)	0.672** (0.517, 0.874)	0.901 (0.709, 1.146)	0.653** (0.538, 0.793)	0.995 (0.179, 5.533)	0.508** (0.381, 0.678)	0.593** (0.444, 0.792)	0.890 (0.777, 1.020)
Per capita income in past 12 mo	1.155 (0.289, 4.616)	3.789 (0.934, 15.370)	2.050** (1.396, 3.009)	4.382** (2.097, 9.156)	1.314 (0.629, 2.749)	3.123** (1.672, 5.836)	2.068 (0.017, 255.4)	1.374 (0.677, 2.790)	2.369** (1.237, 4.537)	0.572* (0.336, 0.973)
% working in blue-collar occupations	1.287 (0.819, 2.025)	1.173 (0.698, 1.973)	0.717** (0.601, 0.855)	0.722** (0.569, 0.918)	0.895 (0.707, 1.132)	0.766* (0.622, 0.942)	2.066 (0.577, 7.393)	1.040 (0.787, 1.375)	0.797 (0.607, 1.045)	0.801** (0.693, 0.925)
Logit model with interaction (racial/ethnic minority and urban status)	0.642 (0.371, 1.111)	5.684* (1.286, 25.120)	1.369* (1.002, 1.872)	2.643** (1.663, 4.202)	0.898 (0.497, 1.623)	. . .[b]	. . .[b]	1.166 (0.723, 1.881)	2.356** (1.819, 3.050)	1.175 (0.903, 1.528)

Note. CI = confidence interval; OR = odds ratio.

[a]The reported results are ORs from the Logit model. An OR of > 1 implies that an explanatory variable is associated with higher odds of the outcome. An OR of < 1 implies that an explanatory variable is associated with lower odds of the outcome. An OR = 1 implies that an explanatory variable does not affect the odds of the outcome. For example, the OR for the variable "urban status" in Alabama is 8.861; this implies that, everything else being constant, the odds that an urban locality in Alabama has a comprehensive smoke-free law in a greater number of venue types are 8.861 times higher than that for a nonurban locality in Alabama.

[b]Urban status was dropped from the model for Missouri because of the complete determination in maximum likelihood estimation. The indicator for the interaction between percentage racial/ethnic minority and urban status was dropped from the model for Missouri and North Dakota for the same reason.

*P < .05; **P < .01.

urban areas. By contrast, nonurban localities with a large proportion of minority residents in these states had lower odds of having strong smoke-free protections than nonurban localities with a smaller proportion of racial/ethnic minorities.

The findings from this study suggest that patterns of smoke-free law coverage and related disparities may evolve over time as more localities in a state adopt smoke-free laws, and highlight the importance of accounting for a state's progress in adopting local smoke-free laws when one is assessing these patterns and disparities. For example, although in most states localities in urban areas and with high per capita income generally had higher odds of having strong smoke-free laws, the reverse was observed for West Virginia. This may be attributable to the fact that almost all local smoke-free laws in West Virginia were adopted at the county level, and that a significant proportion of counties in West Virginia have implemented 100% smoke-free laws. West Virginia localities were therefore at a different stage of progress in implementing local smoke-free laws than localities in the other 9 states, where a smaller proportion of localities had adopted such laws. Similarly, in states where comprehensive local smoke-free laws are just beginning to be adopted, these laws may be primarily confined to a few affluent suburban communities. This could potentially result in population disparities, with lower-income and less-educated residents and racial/ethnic minorities who are generally less likely to live in such communities, being less likely to be protected by such laws. In states where the process of adopting comprehensive local smoke-free laws has been under way for some time, these laws may be increasingly common in large cities, which may remove or even reverse the disparities in coverage for minority residents as some minority groups are often concentrated in large cities. Finally, in states where such laws have been adopted for many years, a sizeable proportion of a state's population may be covered by comprehensive local smoke-free laws, yielding fewer differences in coverage.

These findings have important implications for public health practice. Comprehensive smoke-free laws reduce SHS exposure, improve health outcomes, reduce smoking among

employees of smoke-free workplaces, and increase adoption of voluntary smoke-free home rules.[1,2,20,21] Americans of lower socioeconomic status are more likely to be exposed to SHS.[1,3] The present finding that persons with less education and lower income had lower odds of being covered by local smoke-free laws would be expected to contribute to this disparity. The finding that localities with a greater proportion of blue-collar workers had lower odds of being protected by local smoke-free laws in certain states would also be expected to contribute to this disparity. Taken as a whole, these findings highlight the importance of state tobacco control programs and coalitions engaging in ongoing efforts to identify patterns and gaps in local smoke-free law coverage.[1,2] The resulting information can be used to guide efforts to secure greater SHS protections in communities and populations that are lagging in smoke-free law coverage. Statewide smoke-free laws can play an important role in closing local gaps and related disparities in local smoke-free law coverage. This is especially true if these laws are comprehensive, are enforced in a consistent manner, and do not preempt local governments from enacting smoking restrictions that are more stringent than the state standard.[1,5] Conversely, if efforts to secure statewide SHS protections are initiated before adequate education and preparation have occurred to ensure that these protections are comprehensive, the resulting laws may contain exemptions that create additional disparities.[1,22,23]

The findings in this study are subject to at least 3 limitations. First, we focused on local smoke-free laws at 1 point in time. Therefore, it was not possible to specifically examine trajectories of local smoke-free law adoption over time. Second, because we did not include tribal-owned land, our findings cannot be applied to tribal-owned areas. Third, we did not examine smoke-free law coverage separately for worksites, restaurants, and bars, or other venue types. Patterns of sociodemographic disparities in smoke-free law coverage may differ for smoke-free laws in other venues. Though not a limitation, it should also be noted that we only considered local laws and regulations restricting smoking and did not consider voluntary smoking restrictions introduced by business owners in these settings. We also did not consider laws or voluntary policies restricting smoking in other settings such as multiunit housing. A sizeable proportion of lower-income persons live in multiunit housing, and most multiunit housing residents are unprotected by smoke-free building policies[24,25]; therefore, we may have underestimated disparities in smoke-free protections.

Despite these limitations, we identified patterns of local smoke-free law coverage and highlighted several potential disparities in local smoke-free protections. Specifically, across a number of states, residents with less education and lower incomes generally had lower odds of being protected by smoke-free laws. This finding is consistent with previous studies suggesting that the benefits of comprehensive local smoke-free laws are not distributed equally.[9–13] Rather, where one lives and certain sociodemographic characteristics appear to shape one's chances of experiencing these benefits. This situation would be expected to compound existing disparities in SHS exposure. Ultimately, comprehensive statewide smoke-free laws have the potential to eliminate sociodemographic disparities in local smoke-free law coverage. In states that are not prepared to adopt such laws, it is important for state tobacco control programs to track patterns of local smoke-free law coverage, identify related disparities, and take steps to address these disparities. ∎

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This article was accepted February 24, 2015.

Note. The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Contributors

J. Huang, B. A. King, S. D. Babb, and C. Hallett originated the study. J. Huang conducted the analysis. All authors developed the study design, drafted the article, and approved the final version for submission.

Human Participant Protection

No protocol approval was required because the study involved the secondary analysis of existing data.

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