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# Smoke-Free Policies Among Asian-American Women

## Comparisons by Education Status

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**Background:** California has significantly decreased racial/ethnic and educational disparities in smoke-free home and indoor work policies. California's ethnic-specific surveys present an opportunity to disaggregate data and examine the impact of California's smoke-free social norm campaign for Asian-American women.

**Methods:** The California Tobacco Use Surveys for Chinese Americans and Korean Americans were conducted in 2003 and analyzed in 2008 to compare women with lower ( $\leq$  high school graduate) or higher education status for smoke-free policy adoption and enforcement.

**Results:** Lower-educated and higher-educated women had similar proportions of smoke-free policies at home (58%) or indoor work (90%). However, lower-educated women were more likely than higher-educated women to report anyone ever smoking at home (OR=1.62, 95% CI=1.06, 2.48,  $p=0.03$ ) and exposure during the past 2 weeks at an indoor workplace (OR=2.43, 95% CI= 1.30, 4.55,  $p=0.005$ ), even after controlling for ethnicity, smoke-free policy, knowledge about the health consequences of secondhand smoke exposure, and acculturation. There was no interaction between education and knowledge about secondhand smoke health harms.

**Conclusions:** The intended consequences of California's tobacco-control efforts have resulted in similar rates of smoke-free policies at home and in indoor work environments among Asian-American women across educational levels. However, an unintended consequence of this success is a disparity in enforcement by educational status, with lower-educated Asian-American women reporting greater smoke exposure despite similar rates of knowledge about the health consequences of secondhand smoke exposure. Besides establishing policies, lower-educated Asian-American women may need to be empowered to assert and enforce their right to smoke-free environments.

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### Background

The U.S. Surgeon General has concluded<sup>1</sup> there is no risk-free level of secondhand smoke (SHS) exposure, and that smoke-free environments are important policy approaches to encourage active smokers to quit or reduce consumption and protect nonsmokers from developing disease. California, which has had a tobacco-control program promoting smoke-free social norms since 1988, has high prevalence rates of smoke-free indoor workplace policies (95%) and smoke-free households (77%).<sup>2</sup> In California, disparities of race/ethnicity or educational status have significantly narrowed since 1992 in reporting a smoke-free indoor workplace, exposure of indoor workers to SHS in the

past 2 weeks, or a smoke-free home; interestingly, women are still more likely than men to report a smoke-free workplace and smoke-free home.<sup>2</sup>

Despite these apparent smoke-free policy successes in California and elsewhere, focusing on the population in aggregate may overlook the impact for subgroups, particularly Asian Americans. National data in aggregate suggest that Asian Americans have the lowest smoking prevalence rate,<sup>3</sup> but these rates are not reflected in state and national studies that oversample and disaggregate Asian-American groups of different national origin and include non-English-speaking participants.<sup>4,5</sup> Indeed, smoking prevalence is higher among Asian-American men with low acculturation than among their counterparts with high acculturation, but the reverse pattern is observed among Asian-American women.<sup>6</sup>

Although the smoking prevalence rate for most Asian-American women is low,<sup>6</sup> the higher smoking prevalence among Asian-American men makes SHS exposure an important risk factor for exposing nonsmokers to greater morbidity and mortality in their households. SHS expo-

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sure may be responsible for the increased risk of lung cancer among Chinese-American and Filipino-American women, compared with the expected risk for their non-Latino white counterparts with a similar proportion of cigarette consumption.<sup>7</sup> Asian-American subgroups have different cancer death rate smoking-attributable fractions, with Korean-American women significantly higher than their counterparts.<sup>8</sup>

Few studies have enough large diverse subgroups to assess the extent of SHS exposure for the Asian-American population.<sup>6</sup> In one cross-sectional study of 1374 various Asian Americans (Chinese, Korean, Vietnamese, and Cambodian) in Pennsylvania and New Jersey, Ma and colleagues<sup>9</sup> describe that about 38% of Asian Americans in the aggregate reported being exposed to SHS at home and 40% reported being exposed at work. The study also demonstrated that tolerance behavior toward SHS exposure (letting people smoke in the house or not asking people to put out their cigarettes) significantly differed by gender, education, knowledge that SHS is harmful, ethnicity, and smoking status.<sup>9</sup> In a related publication,<sup>10</sup> higher acculturated subjects from the same study were less likely to have had someone smoke in their house in the last week, or to allow someone to smoke.

The data used in this analysis constitute two large, ethnically specific samples of Asian Americans: the California tobacco-control program's first, in-language, statewide studies of Chinese Americans and Korean Americans.<sup>11,12</sup> These studies present an opportunity to examine the impact of California's smoke-free social norm campaign (established in 1988), which has been conducted in-language and culturally adapted with Asian media and community outreach,<sup>13</sup> for Asian-American women. Based on factors from the Ma study,<sup>9</sup> the primary objective of the current study was to compare how adoption and enforcement (as measured by self-reported smoke exposure) of smoke-free policies differ for Asian-American women by educational status. Because the Ma study<sup>9</sup> reported that knowledge was also important, confirming the Health Belief model<sup>14</sup> that individuals must believe they are susceptible to a perceived threat before taking a health-related action, the secondary objective of the current study was to determine whether greater knowledge about the harms of SHS was associated with less smoke exposure.

## Methods

### Data Sets

The California Chinese American Tobacco Use Survey (CCATUS)<sup>11</sup> and California Korean American Tobacco Use Survey (CKATUS)<sup>12</sup> were conducted in 2003 and commissioned by the Tobacco Control Section, California Department of Health Services. The survey methodology and questionnaire were largely based on the California Tobacco

Survey,<sup>2</sup> in use since 1990 and conducted every 3 years in English and Spanish. The survey was pre-tested for validity, reliability, linguistic appropriateness, and cultural competence.

The sample for the study was obtained from a list of telephone numbers registered to individuals with Chinese or Korean surnames residing in California.<sup>11,12</sup> Survey inclusion criteria involved age ( $\geq 18$  years) and ethnicity (Chinese, Korean, or mixed ethnicity). Only the first respondent in each household was eligible. To assure a representative, unbiased sample from all areas of the state, 2000 U.S. census data ([www.census.gov/main/www/cen2000.html](http://www.census.gov/main/www/cen2000.html)) were used to determine the number of individuals fitting specific criteria (based on gender and generational status) to be interviewed in each of the seven tobacco-control regions. Data were then weighted to represent the Chinese-American or Korean-American population characteristics in California, as well as number of adults and number of phone lines per household, to compensate for possible selection bias.

A professional survey research organization, Strategic Research Group, Inc., conducted the survey using a computer-assisted telephone interviewing (CATI) program. Interviews were conducted in English, Chinese and its various dialects, and Korean. A total of 2117 men and women respondents participated in the CCATUS and a total of 2545 men and women respondents participated in the CKATUS. These two surveys, the largest studies of their kind ever conducted among Chinese and Korean Americans, had similar cooperation rates. Overall, 52% of all Chinese households contacted participated in the CCATUS, and 48% of all Korean households contacted participated in the CKATUS; about 80% of women subjects responded in Chinese or Korean.

### Subjects and Measures

This study included only women from the CCATUS and CKATUS. The main socioeconomic variable of interest was education. Lower education was defined as any level of education up to high school graduate, and higher education as any post-high school education. Acculturation measures included years in the U.S. ( $<10$  years,  $\geq 10$  years, or born in U.S.), based on cut-offs from our previous analyses of Asian Americans,<sup>4,15</sup> and language used in the survey (English versus Chinese or Korean). Marital status, income, and insurance status were included to describe sociodemographic characteristics.

For tobacco-related measures, smoking status, smoke-free policies, self-reported exposure at different locations, knowledge about SHS and its health consequences, and household smoking-related behavior were included. Current and former smokers were defined in the survey as ever having smoked 100 cigarettes in their lifetime, with former smokers now not smoking at all. To determine knowledge about SHS and its health consequences, subjects were asked how strongly they agreed, on a 4-point Likert scale, about whether SHS could cause lung cancer, problems in pregnancy (with maternal smoking), and problems with children's health. Subject responses to causality being *strongly agree* and a combined score, where subjects *strongly agree* with at least one of the three questions, were used.

For smoke-free policies, a smoke-free home was defined as one where the subject reported smoking being completely prohibited. The smoke-free work policy question in the survey applied only to subjects who worked indoors (not in the

**Table 1.** Demographics and smoking-related exposure and knowledge of California Chinese-American and Korean-American women by ethnicity and education

	Total (N=1879)	Chinese women (n=879)	Korean women (n=1023)	<i>p</i> -value*	Lower education (n=795)	Higher education (n=1082)	<i>p</i> -value
<b>Age (years)</b>							
18–24	16.2	16.8	15.0	—	26.5	8.9	<0.001
25–44	41.5	42.0	40.3		21.8	56.4	
45–64	30.3	30.2	30.5		32.1	29.0	
≥65	12.0	11.1	14.3		19.6	5.7	
<b>Education<sup>a</sup></b>							
≤HS degree	43.5	42.9	45.3	—	N/A	N/A	N/A
>HS grad	56.5	57.1	54.7				
<b>Marital status</b>							
Married	68.2	69.4	64.9	0.007	59.0	74.7	<0.001
Wid/div/sep	9.0	7.8	12.6		12.2	6.7	
Single	22.7	22.8	22.5		28.8	18.7	
<b>Income (\$)</b>							
≤30,000	59.4	59.2	60.2	—	77.6	47.6	<0.001
30,001–80,000	20.4	19.6	22.7		14.4	25.0	
>80,000	20.2	21.2	17.2		11.1	27.4	
<b>Insurance</b>							
None	21.9	17.4	35.1	<0.001	30.1	16.1	<0.001
Medicaid/-cal	9.7	9.1	11.6		13.6	6.8	
Medicare	4.3	4.0	5.0		5.0	3.6	
Private	55.7	60.4	41.8		39.4	67.7	
Missing data	8.4	9.1	6.4		11.9	5.8	
<b>Survey language used</b>							
English	20.3	20.5	19.8	—	21.3	20.0	—
Chinese/Korean	79.7	79.5	80.2		78.7	80.0	
<b>Years in U.S.</b>							
Born in U.S.	13.3	14.5	9.7	0.003	15.6	11.9	—
10+ years	52.7	50.9	57.9		52.2	52.9	
<10 years	34.0	34.6	32.3		32.3	35.3	
<b>Smoking status</b>							
Never	93.9	95.0	90.7	0.009	93.3	94.3	—
Former	3.5	3.0	5.1		4.1	3.1	
Current	2.6	2.1	4.1		2.6	2.6	

<sup>a</sup>Population totals for education columns exclude subjects who did not report education information.

\**p*-values reflect *F*-test trends of significance at *p*<0.05

home); no outdoor work questions were included in the survey. As a result, questions and analyses related to work environments are a subsample of the study population. A smoke-free work policy was defined as one in which the subject reported the building to be completely smoke-free indoors. California has smoke-free regulations for indoor work environments, restaurants, bars, and indoor buildings except for casinos; recently, cars with children were added to the list of required smoke-free environments.<sup>2</sup>

Responses about SHS exposure were only by self-report. For homes, subjects were asked in the survey if anyone ever smokes inside the home. Other household smoking behavior questions in the survey included whether there were any other household smokers, and whether the subject or someone else set the home policy. For indoor work (not in the home), subjects were asked if anyone smoked during the past 2 weeks in the area in which the subject worked. For places outside of home or work, subjects were asked if they were often exposed to other people's smoke and, if so, the location of the last time of exposure. Subjects were also asked to quantify the minutes and hours of SHS exposure in all environments over the past week; time of exposure was categorized as none, ≤30 minutes (approximating previous

surveys asking if 15 minutes of exposure happened more than once a week<sup>16</sup>), 31–120 minutes, and >120 minutes.

### Statistical Analyses

All analyses were conducted in 2008. Women were compared by ethnicity (Chinese versus Korean) and education status (lower versus higher) for demographics and smoking status, using *F*-tests for trends of statistical significance at *p*<0.05. Respondents with missing education data were excluded from the main analyses comparing lower-educated and higher-educated women. Next, women were compared by education status for SHS policies and exposure in home, work, and other environments using chi-square or *F*-tests with the level of statistical significance at *p*<0.05.

Finally, multivariate logistic regressions were conducted to examine factors associated with exposure at home and work. Because the proportion of smoke-free policies was similar by education status, the authors began building study models around the hypothesis that a lower educational level would be associated with increased exposure. Modifications of this effect were explored (not shown) with variables that were significant in the bivariate analysis in Table 1 with ethnicity or

educational status, and in Table 2 with educational status alone. A more parsimonious model was developed by excluding variables that were correlated ( $r > 0.5$ , because many variables were dichotomized; for example [not shown]: income and insurance are highly correlated with education, years in U.S. are highly correlated with language used in survey) or were not significant in the model. Interpreting the relationship between age and lower educational level was complicated by the fact that the variables have a strong relationship, but it is not a linear or one-way direction, with greater representation among women aged 18–24 and >65 years; because including it in the model did not change results significantly, age was not used in the model. Potential mediating effects were investigated with interactions among education status and other variables, including knowledge about the health consequences of SHS, presence of other household smokers, and person who set household smoking policy. The two samples (Chinese-American and Korean-American women) were investigated separately for the two multivariate regression models to verify the outcomes from the analyses that pooled the samples.

Analyses were conducted using SAS statistical package version 9 for all descriptive analyses and multivariate regressions reported in the tables. SUDAAN version 9 was used for variance estimation. All percentages were weighted to reflect Chinese and Korean populations in California.

## Results

Table 1 displays demographic characteristics of the women by ethnicity and education. The survey had 879 Chinese-American women and 1023 Korean-American women, and 795 lower-educated and 1082 higher-educated Chinese- and Korean-American women. Education information was missing for 25 Chinese- and Korean-American women. The Chinese-American women were significantly more likely than Korean-American women to be married, have insurance, be born in the U.S., and be never smokers (Table 1).

For comparing women by lower versus higher education, the age structure of lower-educated women was more likely to represent the youngest and oldest extremes (Table 1). Lower-educated women were more likely to be not married than higher-educated women, although more than half the subjects in both groups were married. More than three quarters of lower-educated women reported income of  $\leq \$30,000$ , which was significantly different from higher-educated women. Less than one third of lower-educated women had no insurance, which was significantly higher than higher-educated women; more lower-educated women still had no insurance even if the missing insurance information for higher-educated women was re-categorized as no insurance. Considerably more than three quarters of the women, regardless of educational status, preferred to speak an Asian language in the survey. There was no statistical difference in years lived in the U.S. by education status, with about half of women being in the U.S. for 10+ years and about one third immigrating <10

years ago. The education groups did not differ by smoking status, with >90% being never smokers.

Table 2 documents that smoke-free policy enforcement, not prevalence, differs among women by education status. For smoke-free home policies, more than half of both education groups (58%) reported complete prohibition, which did not differ by education status. However, lower-educated women reported more people ever smoking inside the home. Of note, lower-educated women were also less likely to set the smoking policies in the household, and had more household members who smoke.

Because the survey asked about only the indoor workplace, the work exposure results in Table 2 reflect only 912 women who work indoors. Fewer lower-educated women worked indoors (outside of the home) than higher-educated women (38.8% vs 56.6%,  $p < 0.001$ ). About 90% of these women who worked indoors reported a smoke-free work building, and this did not differ by education status (Table 2). However, lower-educated women were more likely to report someone smoking in the area of work in the past 2 weeks (Table 2).

For SHS exposure in places other than home and work, lower-educated women tended to be more likely than higher-educated women to report being often exposed (Table 2). Of the women who reported frequent exposure at places other than home or work, there was no significant difference in the most recent location of exposure, except Chinese-American women reported more exposure at a school or campus than Korean-American women. The cumulative time estimated by the subject for SHS exposure in the past week did not differ among women by educational level.

Data in Table 3 indicate that lower education was associated with any exposure at home, even after controlling for smoke-free home policy, smoking status, presence of other household smokers, ethnicity, and acculturation. Other factors independently associated with any exposure at home included not having a smoke-free home, being a current smoker, living with other household smokers, and not strongly agreeing to any of the three questions about the health consequences of SHS exposure. Chinese subjects were more likely than Koreans to have any exposure at home, and to speak an Asian language. There was a trend for former smokers compared with never smokers to be associated with any exposure at home.

Lower education was also associated with recent exposure at an indoor workplace, even after controlling for smoke-free indoor work policy, smoking status, ethnicity, and acculturation (Table 3). Other factors in the survey independently associated with recent exposure at an indoor workplace included not having a smoke-free indoor work policy and speaking English.

No interactions were found between low education and knowledge about the health consequences of SHS for the home and work analyses. For the analysis about any home



exposure, no interactions were found between low education and presence of other household smokers, or low education and whether the subject set smoking policies in the household.

In analyzing the samples of Chinese-American and Korean-American women separately for the multivariate regression models (not shown), the point estimates that lower education is associated with home and work exposure are similar to the pooled analyses but no longer reach statistical significance with the smaller sample size, except for Chinese-American lower-educated women reporting more work exposure.

## Conclusion

This is the largest, in-language study of Chinese-American and Korean-American women that has examined tobacco-related behavior statewide. The intended consequences of California's tobacco-control efforts have resulted in similar rates of smoke-free policies at home and indoor work among Asian-American women across educational levels. However, an unintended consequence of this success is a disparity in enforcement by educational status, with lower-educated Asian-American women reporting greater smoke exposure than higher-educated Asian-American women. The association between lower education and greater SHS exposure at home or work persisted even after controlling for smoke-free policies (at home or work respectively), smoking status, knowledge about the health consequences of SHS exposure, presence of other household smokers (for home exposure), ethnicity, and acculturation. Unlike home exposure, neither smoking status nor knowledge about the health consequences of SHS were important in recent exposure at work. This difference may exist because people have less control over their work environment than their home environment, and individual behavior or knowledge therefore matter less. As for places other than

**Table 2.** Smoking-related exposure, status, and knowledge of Chinese-American and Korean-American women in California by educational status

	Lower education (n=795)	Higher education (n=1082)	p-value*
<b>Home</b>			
Smoke-free home	57.0	59.2	—
Anyone ever smoke inside home	22.5	14.5	0.004
Presence of household members who smoke	27.4	18.1	0.001
Sets smoking rules in household	42.7	57.3	<0.001
<b>Work (n=912)<sup>a</sup></b>			
Smoke-free indoor work building	88.5	92.0	—
Past 2 weeks anyone smoked in area of work	24.5	11.2	0.001
<b>Place other than home or work<sup>b</sup></b>			
Often exposed in place other than home and work	23.6	18.6	0.05
School or campus	14.9	3.5	<0.001
Restaurant, bar, pool hall, casino	29.4	40.5	—
Shopping mall, public park, community event, sports event	28.4	24.2	—
Other person's house or car	9.6	11.2	—
Street or outside building	9.2	9.2	—
Other place not listed	8.5	11.4	—
<b>Past week cumulative exposure</b>			
None	65.8	66.5	—
≤30 minutes	16.6	14.8	—
31–120 minutes	8.3	10.3	—
>120 minutes	9.2	8.4	—
<b>Knowledge about secondhand smoke</b>			
Lung cancer	92.8	94.8	—
Pregnancy	98.0	98.4	—
Children's health	97.9	99.3	—
Strongly agree to at least 1 of 3 questions above	94.7	97.0	—

<sup>a</sup>For all analyses except work exposure, all 1877 women who provided education information were analyzed. For the work exposure analysis, only 912 women who provided education information also worked indoors.

<sup>b</sup>Proportions for different places of exposure reflect the proportion of respondents who reported being often exposed, and not the entire sample. Respondents could list only one location for the most recent time of exposure.

\*p-values reflect  $\chi^2$  tests or *F*-test trends of significance at  $p<0.05$

home or work, the only trend was for lower-educated women to be exposed more often than higher-educated women, and the sample for place of being often exposed was too small to conduct further analyses for this variable.

The persistent association between lower-educated women and higher SHS exposure may result from less effective enforcement of smoke-free policies at home or work. Knowledge about the health consequences of SHS appears to be an insufficient explanation, because there was no interaction between knowledge and educational status in terms of exposure. Knowledge is still important as it was an independent predictor for not being exposed at home, but was not associated with exposure at work. Tolerance behavior toward SHS exposure (which has been associated with knowledge that SHS is harmful in the previous survey of Asian Americans<sup>17</sup>) might be a better measure to reflect the individual's relationship to exposure. Because California's smoke-free social norm campaign (with Asian community and in-language out-

**Table 3.** Multivariate regression of factors associated with secondhand smoke exposure for Chinese-American and Korean-American women in California at home or indoor work<sup>a</sup>

	Ever exposed at home (n=1877) OR (95% CI)	p-value	Exposure past 2 weeks at indoor work (n=912) OR (95% CI)	p-value
<b>Education</b>				
>HS degree <sup>b</sup>	—		—	
≤HS graduate	1.62 (1.06,2.48)	0.03	2.43 (1.30,4.55)	0.005
<b>Smoke-free policy</b>				
Smoke-free policy <sup>b</sup>	—		—	
No smoke-free home policy	2.85 (1.85,4.41)	<0.001	N/A	
No smoke-free work policy	N/A		7.76 (3.38,17.85)	<0.001
<b>Smoking status</b>				
Never <sup>b</sup>	—		—	
Current	3.44 (1.47,8.07)	0.005	1.07 (0.46,2.47)	0.88
Former	2.25 (0.99,5.11)	0.05	0.46 (0.16,1.30)	0.14
<b>Ethnicity</b>				
Korean <sup>b</sup>	—		—	
Chinese	2.03 (1.44,2.86)	<0.001	0.84 (0.50,1.42)	0.52
<b>Language used in survey</b>				
English <sup>b</sup>	—		—	
Chinese/Korean	1.68 (1.06,2.64)	0.03	0.38 (0.21,0.72)	0.003
<b>Health knowledge</b>				
Strongly agree to 1 of 3 secondhand smoke health questions <sup>b</sup>	—		—	
Not strongly agree to any secondhand smoke health questions	3.94 (1.78,8.73)	<0.001	2.69 (0.40,18.22)	0.31
<b>Living with smokers</b>				
No <sup>b</sup>	—		—	
Yes	3.54 (2.31,5.43)	<0.001	N/A	

<sup>a</sup>For the home exposure analysis, all 1877 women who provided education information are analyzed. For the work exposure analysis, only 912 women provided education information and worked indoors.

<sup>b</sup>= Reference group

\*p-values reflect trends of significance at  $p < 0.05$

reach) had been established over a decade before this survey was conducted,<sup>13</sup> attributing differences to a greater lag in educational outreach for lower educational groups may be less likely an explanation than poor regulatory enforcement for indoor work. The differences in exposure by educational level with smoke-free indoor work policies could also be influenced by the adoption and enforcement of smoke-free policies in the home, and vice versa. Future qualitative or longitudinal studies may help understanding of this interplay.

Differences in enforcement may be related to a perceived or real lack of empowerment in lower-educated Asian-American women. One explanation may be that traditional Asian families have been characterized by a system of hierarchical roles based on age, birth position, and gender; however, gender roles in California may differ at home, in private, at work, and in public.<sup>18</sup> Interestingly, in this study, women who responded in Chinese or Korean in the survey compared to women who responded in English were more likely to have any exposure at home, but less likely to be exposed recently at work. This might reflect a difference in place of employment based on language abilities. The difference

in exposure between Chinese-American and Korean-American women at home, but not work, needs to be further explored. Certainly these associations are complex and the situation of each Asian-American woman needs to be assessed on an individual basis.

Study findings may underestimate the effects of smoke-free policies for Chinese- and Korean-American women, particularly the lower-educated. As with the general California tobacco use survey,<sup>2</sup> these surveys<sup>11,12</sup> asked only about work exposure for subjects who work indoors. Higher-educated women were more likely than lower-educated women to report working indoors. It is highly likely that if outdoor work exposure were to be measured, the difference in work exposure among women by educational level would be even greater than reflected in this study. Furthermore, the methodology of a state-wide telephone interview

survey, even though conducted in-language, potentially may result in a lower representation of lower-educated or lower-aculturated participants, compared to the familiarity of an in-person or community-based survey. The most similar statewide random-digit-dial survey conducted in multiple languages (including Chinese and Korean) is the California Health Interview Survey, which reports a higher interview response rate of 60% (and overall response rate of 33.5%),<sup>19</sup> but this is a general health survey without ethnic-specific rates that would allow for comparisons. Declining response rates have already been observed in statewide tobacco surveys for the general population in California and Massachusetts, but there is no evidence that this has resulted in different representation of population subgroups and any less accurate or biased estimates of smoking behavior.<sup>20</sup>

Another important limitation of this study is that smoke-free policies, SHS exposure, and smoking status are all self-reported information. In this cross-sectional analysis, the timing is unclear between variables such as home exposure and the establishment of a home policy or home exposure and the presence of household

members smoking, but the multivariate analysis demonstrates that the association between lower educational status and home exposure remains even after adjusting for these other two factors. Differences in self-reported amounts of exposure may be due to recall bias, the lack of specificity about place of exposure in the question, or categorization of exposure time. For smoking status, Asian-American women may be more reluctant to reveal any smoking due to strong cultural taboos.<sup>6</sup> Biochemical validation of SHS exposure would be useful, although most cotinine measurements reflect only the past few days of exposure and may not be sensitive enough to detect levels of SHS exposure.<sup>21</sup>

Although educational campaigns about the health consequences of SHS are important, future support for lower-educated women, in the form of empowerment, may be needed. Public educational campaigns can be strengthened by incorporating an emphasis on action and for women to assert their roles as the family guardians of health for all household members, particularly those who may be vulnerable with their children: smoke-free educational efforts among pregnant passive smokers in China increased knowledge, changed attitudes toward stronger disapproval, and increased likelihood of taking assertive action when exposed to SHS in the family.<sup>22</sup> Learning how to implement a completely smoke-free environment is important: Chinese Americans in New York City who implemented a smoke-free home policy had significantly less self-reported 30-day SHS exposure compared with a partial or no ban (7% vs 70%).<sup>23</sup> These efforts can also benefit smokers: smoke-free home policies are associated with Asian Americans being a former smoker, particularly among recent immigrants (<10 years in the U.S.).<sup>15</sup> Support for lower-educated women may also need to come from community, business, health, and government resources.

Future evaluations of the impact of smoke-free policies on women, especially those with lower education, need to consider the dual strategies of empowerment and enforcement and not just the adoption of smoke-free policies. This study's findings highlight an unintended disparity, that of differential implementation of smoke-free environments among Asian-American women by educational status. Determining means to reduce this unintended disparity, and whether this disparity also occurs in other ethnic populations, should be considered.

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