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Correlates of household smoking bans among Chinese Americans

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Abstract

No population-based data are available on the degree to which Chinese Americans have adopted smoke-free household policies and whether these policies are effective in reducing environmental tobacco smoke (ETS) exposure. The present study examines the prevalence of smoke-free home rules among Chinese Americans living in New York City, describes predictors of adopting full smoking bans in the home, and explores the association between household smoking restrictions and ETS exposure at home. In-person interviews using a comprehensive household-based survey were conducted with 2,537 adults aged 18–74 years. Interviews were conducted in Mandarin, Cantonese, and other Chinese dialects. A total of 66% of respondents reported that smoking was not allowed inside the home, 22% reported a partial ban on smoking in the home, and 12% reported no smoking ban. Among current smokers, 38% reported a full household smoking ban. Current smoking status was the strongest predictor of less restrictive household smoking policies. Knowledge of the dangers of ETS, support of smoke-free air legislation, years in the United States, gender, income, and marital status also were associated with household smoking bans. Those living with a total household smoking ban were significantly less likely to report 30-day exposure to ETS than were those living in homes with a partial ban or no ban (7% vs. 68% and 73%, respectively). In homes of smokers and nonsmokers alike, exposure to ETS remains high. Smoke-free home rules and interventions among smokers and nonsmokers to raise awareness of the dangers of ETS have the potential to significantly reduce exposure to household ETS among this immigrant population.

Introduction

According to the U.S. Environmental Protection Agency (1992), environmental tobacco smoke (ETS) is a group A carcinogen responsible for an estimated 3,000 lung cancer deaths annually in U.S. nonsmokers. ETS exposure is also a risk factor for heart disease in nonsmoking adults and for bronchitis, pneumonia, asthma, and sudden infant death syndrome in children (National Cancer Institute, 1999). A growing awareness of the dangers of ETS has led to increased efforts to restrict smoking in public places and workplaces. This awareness—together with the changes in social norms that accompany the implementation of these restrictions as well as declines in adult smoking prevalence—has also contributed to an increase in voluntary smoke-free home rules. Annual surveillance studies indicate that adults are increasingly adopting household smoking bans. In California, the percentage of homes that were smoke free increased from 37.6% in 1992 to 73.7% in 1999 (Gilpin, Farkas, Emery, Ake, & Pierce, 2002). Data from the National Health Interview Survey (NHIS) demonstrate that, from 1992 to 2000, ETS

exposure in homes with children declined significantly from 35.6% to 25.1% (Soliman, Pollack, & Warner, 2004).

Several factors are associated with household smoking bans. Nonsmokers and individuals who agree that ETS is a health hazard are more likely to report a full household smoking ban (Ashley et al., 1998; Gilpin et al., 2002; Pizacani et al., 2003), compared with current smokers and those less aware of the health effects of ETS. Among smokers, number of cigarettes smoked per day and a history of at least one quit attempt in the past year are associated with household smoking bans (Kegler & Malcoe, 2002).

The prevalence of household smoking bans also differs by ethnicity. The California Tobacco Survey (CTS) found that in 1992 Asian Americans or Pacific Islanders (AAPIs) were more likely to have a smoke-free home (43.2%) than were Hispanics (39.5%), Blacks (32.6%), or non-Hispanic Whites (37.4%). By 1999, Hispanics were more likely to report household smoking restrictions than were other racial/ethnic groups, but all groups, including AAPIs, reported large increases in the prevalence of smoke-free homes (Gilpin et al., 2002). Among AAPIs living in California, the percentage of those living in smoke-free homes increased from 43.2% in 1992 to 82.9% in 1999 (Gilpin et al., 2002). In contrast, stratification of NHIS national data by ethnicity suggested that between 1992 and 1999 the prevalence of exposure to household ETS increased from 11.9% to 13.8% among Asian Americans (Soliman et al., 2004). The discrepancy between the CTS and NHIS data may be explained by the small sample sizes of Asian Americans in the NHIS and demonstrates the need to conduct surveys in larger numbers of AAPI subpopulations.

AAPIs are proportionally the fastest growing immigrant group in the United States, increasing by 72% from over 7 million in 1990 to almost 12 million in 2000 (U.S. Census Bureau, 2001). Chinese Americans are the single largest Asian subgroup in the United States, with a population of over 2.4 million in 2000. In New York City, Chinese Americans number almost 400,000, 78% of whom are foreign born (U.S. Census Bureau, 2000).

Regional surveys conducted in Asian languages indicate that Chinese males are at high risk for excess tobacco-related morbidity and mortality; smoking prevalence rates in this population range from 28% to 36% (Ma, Shive, Tan, & Toubbeh, 2002; Shelley et al., 2004; Yu, Chen, Kim, & Abdulrahim, 2002). These rates are higher than those reported in the Behavioral Risk Factor Surveillance System, which presents aggregated data for Asian Americans and therefore may underestimate risk for specific AAPI subgroups, such as Chinese Americans (Centers for Disease Control and Prevention [CDC], 1992, 2004; U.S. Department of Health and Human Services, 1998). These regional surveys of Asian subgroups demonstrate the importance of subgroup surveillance regarding tobacco use (Ma et al., 2002; Ma, Shive, Tan, & Feeley, 2004). Yet, to date, no population-based studies have analyzed correlates of home ETS exposure or smoke-free home rules among Asian American subgroups. In a survey of individuals affiliated with community-based organizations, Ma and colleagues (2004) found that Chinese were significantly less likely to be exposed to ETS at home than were Koreans, Cambodians, and Vietnamese. This study, however, did not specifically address household smoking rules or the association between such rules and self-reported exposure to indoor household smoking.

In 2003, legislation enacted by New York City and the state of New York banned smoking in almost all enclosed workplaces and public places. Smoking in the home, however, remains an important source of exposure, particularly among children. In the present study, we took advantage of a new data source, a representative population-based sample of Chinese American households in two New York City communities, to determine the prevalence and predictors of

household smoking bans among Chinese Americans, and whether household bans reduce exposure to ETS in this population.

Methods

Study design

This cross-sectional study used data from a multistage probability sample of Chinese American residents in two communities in New York City.

Data sources and sample selection

From September 2002 to February 2003, in-person household-based and telephone interviews were conducted with 2,537 representative adults aged 18–74 years living in two New York City communities: Sunset Park, Brooklyn; and Flushing, Queens. Some 77% of the surveys ($n=1,955$) were completed as in-person interviews and 23% by telephone. Trained bilingual interviewers from the community conducted interviews in English, Mandarin, Cantonese, Fukinese, and other dialects. Questionnaire development was informed by focus groups. Questions were adapted from validated national tobacco and health survey instruments, translated into Chinese and backtranslated, and pilot-tested among 50 Chinese Americans (California Department of Health Services, n.d.; CDC, 1999; Royce, Corbett, Sorensen, & Ockene 1997). The survey included 110 items that addressed the following topics: Smoking behavior, knowledge and attitudes toward tobacco use, household and workplace smoking policies, acculturation, and health care access and utilization.

The sampling frame consisted of 12,279 Chinese surname telephone numbers for Flushing and 16,298 for Sunset Park. Eligible households were obtained from the Flushing and Sunset Park white pages, using a list of 867 unique Chinese surname spellings identified in consultation with Chinese linguists. The Wade-Giles (e.g., Hsiao) and pinyin (e.g., Xiao) representations of the original Chinese characters were used because both are represented in the white page listings. The final sample selection and baseline survey were implemented in three stages. First the list of Chinese surnames was ordered by ZIP code and by street name within ZIP code for the targeted communities. (Seven ZIP codes were chosen for sample selection, in consultation with the New York City Department of Health: 11354, 11355, 11204, 11214, 11219, 11220, and 11223.) Second, a representative sample cohort of Chinese American households was identified through a screening questionnaire. After obtaining informed consent, we gathered data on the age, gender, and smoking habits of all adults within the selected households. Third, we disproportionately sampled based on gender and smoking status. Three sample groups of adults aged 18–64 years were selected for an extended interview: (a) Current male smokers, (b) male nonsmokers, and (c) women. Up to two persons were selected per eligible household, with no more than one person from each of the three subgroups of interest.

The final sample for the baseline survey was divided into six waves of data collection. The first two waves for both Flushing and Sunset Park were contacted in person, for the initial household screening process and the extended interview. The remaining waves were contacted initially by telephone, with wave 3 sample units interviewed in-person for the extended interview, and wave 4–6 sample units screened and interviewed by telephone. The change in mode from in-person to telephone survey was tested as a fixed effect in the analysis and had an insignificant effect on the statistical models reported in this paper.

The data have been weighted to account for unequal probabilities of sample selection and non-response. The unit of analysis is the individual, and the final individual weight is a product of two components: A household-level (screener) weight component and a within-household person-weight component. To account for the change in survey mode for early and later sample

waves, we implemented the weighting procedure separately for waves 1 and 2 and for waves 3–6. The overall response rate was 45.5%, computed as a product of the screener response rate and the extended interview response rate.

Survey items analyzed

Smoking status and behavior—Smokers were identified by a positive response to two questions: “Have you smoked at least 100 cigarettes in your entire life?” and “Do you now smoke cigarettes everyday, some days, or not at all?” Nonsmokers were those who answered no to the first question. Former smokers were those who answered “not at all” to the second question but who had smoked at least 100 cigarettes in their lifetime.

Household smoking restrictions—Household smoking restrictions were measured with the following question: “Some households have rules about when and where people may smoke. Which statement best describes the rules about smoking inside your home?” Response choices were as follows: “Smoking is not allowed anywhere,” “Smoking is allowed in some places or at some times,” or “Smoking is allowed everywhere inside the home.” Those reporting that smoking was not allowed anywhere were assumed to have a total household smoking ban. Respondents were also asked whether household smoking rules applied to visitors: “Sometimes household rules do not apply to visitors. When you have visitors who smoke, are they allowed to smoke inside your home?” Responses were coded as “yes,” “no,” or “sometimes.”

To estimate household exposure to ETS in the previous month we asked the following question: “On how many of the past 30 days has someone including yourself smoked cigarettes anywhere inside your home?” The information was coded as a dichotomous outcome of “no days” or “1 or more days.”

Knowledge and attitudes—To measure knowledge about the dangers of ETS and attitudes toward smoke-free air policies in public spaces, respondents were asked their level of agreement or disagreement on a four-point scale (strongly agree, somewhat agree, somewhat disagree, strongly disagree) with the following statements: “Inhaling smoke from someone else’s cigarette may cause lung cancer in a nonsmoker,” and “All indoor workplaces including restaurants, bars, and cafeterias should be smoke-free.”

Data analyses

We used STATA 8.0 to analyze data, with methods appropriate to a complex survey design. Standard descriptive statistics were used to summarize data collected for demographics, smoking-related characteristics, and household smoking policies. The chi-square test for independence was used to examine the relationship between the dependent variable of household smoking ban and significant differences by demographics, smoking status, and other factors.

Logistic regression analyses were used to estimate predictors of smoking policies at home. The final regression model estimated predictors of a full household smoking ban versus a partial ban or no ban, because of the lack of significant differences between predictors of partial and no bans.

Independent variables for the model included age, educational attainment, income, gender, smoking status, employment status, marital status, knowledge of ETS risks, attitudes toward smoking bans in public spaces, years in the United States, and acculturation. Variables were included in the model if they were significant at a *p* value of .05 or less in the bivariate analysis. The model controls for income and employment, although these variables were not significant

on bivariate analysis. Education was not included in the final model because it was highly correlated with income at 0.42, using a Pearson's correlation coefficient.

Acculturation, also not significant in the bivariate analysis, was included because of its theoretical importance in affecting immigrant behavior. Acculturation was measured by a composite of two categorical variables: Speaks English in the home and/or reads English newspapers most or all days.

Results

Total sample characteristics

Demographics—Table 1 presents demographic and smoking characteristics of the sample. The overall sample of 2,537 respondents consisted of 62% men and 38% women. Some 42% had less than a high school education, 23% graduated from high school but had no further education, and 35% had additional education beyond high school. Over 90% of respondents were foreign born: 80% from Mainland China, 10% from Hong Kong, and 4% from Taiwan. A large proportion of respondents (77%) reported incomes of less than US\$40,000. Most respondents were married (78%) and employed (67%). Males were significantly more likely to report current smoking than were women (30% vs. 2%). Over 85% of men and women did not speak English at home. We found no gender differences in level of acculturation. Women were more likely than men to report that ETS was a health hazard (93% vs. 89%).

Household smoking restrictions—Table 2 shows the distribution of home smoking restrictions according to demographic and smoking-related characteristics of respondents. Overall, 66% of respondents reported living in a home with a total smoking ban, 22% reported a partial ban, and 12% reported no ban. In bivariate analyses, household bans were significantly associated with gender, age, smoking status, knowledge regarding the effect of ETS, support of smoking restrictions in public spaces, years in the United States, and marital status.

A total of 67% of women reported a full household smoking ban, compared with 65% of men. Conversely, 10% of women and 14% of men reported no smoking restrictions in the home. Similar results were found for age. Among those aged 18–34 years, 62% reported a total ban, compared with 76% among those older than 55 years. In contrast, 6% of those over age 55 reported having no household smoking restrictions, compared with 11%–15% in the other age groups. In addition, level of household smoking restriction varied by marital status and years in the United States. Some 69% of married respondents reported a total smoking ban, compared with 57% of those who were not married. However, only 11% of married respondents reported no smoking restrictions in the home, compared with 15% of unmarried respondents. Among those in the United States for less than 5 years, 63% reported a full ban, compared with 72% of those in the United States more than 15 years.

Knowledge regarding the consequences of ETS exposure and attitudes toward smoking restrictions in public places also were associated with household smoking policies. Some 68% of respondents (smokers and nonsmokers) who strongly or somewhat agreed that ETS was harmful to the health of nonsmokers reported a total household smoking ban, 22% reported a partial ban, and 11% no ban. In contrast, only 50% of those who strongly or somewhat disagreed that exposure to ETS was a health risk to nonsmokers reported a total household ban; 31% reported a partial ban and 19% no ban. Similarly, 67% of those who expressed support for smoking bans in public places reported total household bans, 22% a partial ban, and 11% no ban. In contrast, 45% of those who did not support smoking restrictions in public spaces reported a complete household ban, 35% a partial ban, and 21% no household smoking restriction.

Among current smokers, 38% reported a complete household ban. In contrast, 79% of former smokers and 71% of never-smokers reported the presence of such a ban. However, among smokers, knowledge of the dangers of ETS was positively and significantly associated with living in a home with a total smoking ban (data not shown).

Enforcement of household smoking bans—Table 3 shows the relationship between household smoking bans and two variables: (a) Exposure to household smoking in the past 30 days, and (b) whether smoking policies applied to visitors who smoke. Exposure to household ETS in the previous month was significantly associated with household smoking policies ($p \geq .001$). Overall 72% of respondents reported no exposure to ETS in the home in the past 30 days. Among respondents with a full ban, only 7% reported that someone had smoked in the home in the past 30 days, compared with 68% of those reporting a partial ban and 73% with no smoking restrictions. Household smoking restrictions also were significantly associated with whether the no-smoking rule applied to visitors ($p \geq .001$). Among those living in homes with a complete smoking ban, 18% reported that visitors were allowed to smoke. In contrast, 64% of those living in homes with a partial ban and 88% of those reporting no smoking restrictions reported that visitors were allowed to smoke in the home.

Current smokers who reported living in a home with a total smoking ban were significantly less likely to report smoking at home in the past 30 days, compared with those who reported partial or no household smoking restriction (data not shown). Among current smokers who reported living in a household with a complete smoking ban, 88% reported not smoking in the home in the past 30 days. In contrast, only 9% of smokers who lived in a home with a partial ban and 4% of smokers living in a home with no smoking restrictions reported not smoking in the home during the past 30 days (data not shown).

Multivariate associations with household smoking restrictions

We estimated a multivariate model for household smoking restrictions (Table 4). Smoking status had the most predictive power in the model ($OR=0.19$; $p \geq .001$). Smokers were significantly less likely to report a complete household smoking ban than were never-smokers and former smokers. Knowledge of the harmful effects of ETS and being married remained significantly associated with a full household smoking ban. In contrast to results of the bivariate analysis, when we controlled for all other variables, men were significantly more likely to report a household smoking ban ($OR=1.93$, $p \geq .001$). Agreeing with a complete ban on smoking in indoor places and high income ($> \$40,000$) were each positively correlated with the presence of a household smoking ban and significant at an alpha of .1 ($p \geq .09$). Years in the United States also was significantly and positively associated with a complete ban on smoking in the home ($p \geq .05$).

Discussion

Among this representative sample of Chinese Americans in two New York City communities, 66% of adults reported a complete household ban and 22% a partial ban. Although these percentages are lower than reports of household smoking bans among Asian Americans in California, the prevalence of smoking restrictions is comparable with recent data from the New York City Community Health Survey (Gilpin et al., 2002; Gilpin, White, Farkas, & Pierce, 1999; New York City Department of Health, 2002). In a 2002 survey of approximately 10,000 New York City residents conducted by the city's Department of Health and Mental Hygiene, 62% of Asian Americans reported a complete household ban, compared with 58% Whites, 63% Blacks, and 69% Hispanics (New York City Department of Health, 2002). Subgroup analysis was not available from the Community Health Survey; however, a recent study of ETS exposure among several populations of Asian Americans living in the Delaware Valley

found that Chinese Americans reported lower exposure to ETS at home (29.7%), compared with Vietnamese (44.9%) and Koreans (42%) (Ma et al., 2004).

Meaningful comparisons with other studies are difficult because the questions used differ. However, as an aggregated group, Asian Americans consistently report higher rates of smoking bans at home compared with all other ethnic groups, except for Hispanics, despite high smoking prevalence among Asian American men (Gilpin, Lee, & Pierce, 2004; Gilpin et al., 1999, 2002; Soliman et al., 2004). A qualitative analysis of values surrounding tobacco use among Chinese Americans living in Boston indicates that Chinese attribute a high level of importance to protecting their family's health (Brugge et al., 2002). We did not explore family influence in the present survey, although it may explain the discrepancy between smoking prevalence and smoking bans at home.

In the present study of Chinese Americans, household smoking restrictions were associated with gender, attitudes toward smoke-free air policies in public spaces, knowledge of the harmful health effects of ETS, smoking status, years in the United States, income, and marital status. Men were significantly more likely than women to be current smokers (30% vs. 2%). However, when we controlled for smoking status, men were more likely than women to live in households with complete bans. Given the gender distribution of smoking prevalence among Chinese Americans, female nonsmokers are more likely than male nonsmokers to live with a smoker. Cultural norms may dictate that women have less control over setting this type of policy in the home. This finding requires further exploration but suggests that interventions need to be developed and tested that are considerate of cultural norms and at the same time empower women to advocate for an environment free of the harmful effects of ETS. This area of inquiry will require the use of qualitative methods in collaboration with community-based organizations using the framework of community-based participatory research.

Some 91% of respondents in the present sample were aware that ETS is harmful to the health of nonsmokers. Smokers were significantly less likely than nonsmokers to agree with this statement, and as expected, they were significantly less likely than never-smokers and former smokers to live in a home with a complete smoking ban. However, as in previous studies, heightened awareness of the harmful health effects of ETS was associated with household smoking bans (Kegler, & Malcoe, 2002; Pizacani et al., 2003) among both smokers and nonsmokers. Support of smoking bans in public places also was associated with household smoking bans, based on a one-tailed *t* test. Although it is not possible to attribute a causal relationship between knowledge, attitudes, and home smoking policies using cross-sectional data, surveillance data from California demonstrate an association between shifts in social norms and trends in home smoking bans among both smokers and nonsmokers and across ethnic groups (Gilpin et al., 2002). Further, a recent evaluation of the California tobacco control program found a relationship between program exposures and increased smoke-free home policies (Rohrbach et al., 2002).

California has led the nation in smoke-free air legislation. New York City has implemented similar initiatives, such as the 1995 Smoke Free Air Act and the city and state legislation that took effect in 2003, which extended previous smoking restrictions to make most enclosed public places and workplaces, including restaurants and bars, smoke free. These initiatives may have translated into changes in household smoking policies and changes in social acceptance of smoking at home even among non-English-speaking immigrant populations that may not have been exposed to citywide educational campaigns. The implementation of workplace smoking bans is correlated with household smoking bans; the association is mediated in part through changes in the social acceptability of smoking and understanding of the dangers of ETS (Beiner, 2004; Gilpin et al., 2004; Rohrbach et al., 2002). An analysis of respondents before and after the 2003 New York City law took effect indicated a significant increase in

household smoking bans subsequent to the implementation of the law (M. Fahs, unpublished manuscript). Recently implemented tobacco surveillance systems in New York and a follow-up survey of the present cohort will provide insights into the impact of these workplace policies and other tobacco control interventions on household smoking policies among this immigrant population.

Interestingly, we did not find an association between acculturation and household smoking bans, but we did find that the longer the respondent lived in the United States, the more likely he or she was to report the presence of such a ban. Ma et al.'s (2004) recent analysis of Asian American subgroups also failed to find a significant link between acculturation and smoking bans at home but similarly found that living in the United States for more than 6 years predicted less exposure to household smoke in the home. Together, these findings suggest that U.S. social norms surrounding tobacco use, which have shifted so dramatically over the past decade, are likely internalized over time by immigrants, even when they retain native language and other native cultural norms. This interpretation is further supported by data from China (Yang et al., 1999).

According to a 1996 national survey of smoking in China, 71% of respondents reported ETS exposure in the home, defined as exposure for 15 min or more (Yang et al., 1999). In contrast, we found that 72% of those surveyed reported no smoking in the home over the past 30 days. The questions asked to elicit household exposure differed, as did the time frame of the surveys. However, the apparent contrast in exposure between the two populations is notable for two reasons. First, over 90% of the Chinese Americans surveyed were foreign born; with 80% reporting being born in mainland China. Second, based on our acculturation index, the population we surveyed was not highly acculturated. China is not a country with widespread smoking bans in public places. Thus the contrasting findings on home ETS exposure among Chinese in China and Chinese Americans in New York City provide further evidence that tobacco control public policies may affect immigrant population behavior related to tobacco through changes in the social acceptability of tobacco use.

We also explored the enforcement of household smoking policies and the effectiveness of these policies in reducing household ETS exposure. In homes with complete household bans, the policy was largely enforced among visitors and was significantly associated with decreased exposure to household ETS. Partial bans were markedly less effective than complete bans in reducing household ETS exposure. Among respondents with a partial ban or no ban, 68% and 73%, respectively, reported that someone had smoked in the home during the past 30 days. Similarly, visitors were significantly less likely to be allowed to smoke in homes with a complete smoking ban (15%) compared with those with a partial ban (59%) or no smoking restrictions (86%). Studies of workplace smoking bans demonstrated the same diminishing impact of partial bans as compared with full bans; more restrictive workplace smoking policies were associated with a lower proportion of nonsmokers exposed to ETS (Farrelly, Evans, & Sfeekas, 1999; Marcus et al., 1992).

Partial home smoking bans may indicate conflicting preferences between household members or an inability of the nonsmokers to negotiate a complete smoking ban. Partial home smoking bans may also reflect the resident smoker's level of addiction (Gilpin et al., 1999). Smokers living in a home with a total ban reported high rates of compliance with the smoking policy. In contrast, those smokers living in homes with a partial ban were as likely to smoke in the home in the past 30 days as were those living in homes with no smoking restrictions. These findings confirm a need to create educational messages for smokers and nonsmokers that clearly emphasize the importance of implementing a total smoking ban in the home and enforcing that ban among visitors to ensure the health and safety of household members.

The present study had several limitations. First, data were based on self-reports. However, we analyzed responses from adults living in the same household to determine if answers were concordant. In the 207 households with more than one respondent, the responses were concordant in 78% of cases. Among the remaining 22% of cases, the main discrepancy was between reporting a partial household smoking ban or no smoking ban. When inconsistent responses were eliminated from the analysis shown in Table 2, the results did not change. Moreover, in the regression analysis these two categories of household smoking policies, partial ban and no ban, were combined into one variable, therefore removing any effect of the discrepancies on the main findings. Second, we did not report on the presence of children in the household, a factor that previous studies have found to be strongly correlated with household smoking policies. Third, as mentioned earlier, the cross-sectional baseline analysis only allowed us to propose associations between specific variables and household smoking policies. The longitudinal follow-up will provide an opportunity to study mediating factors involved in decisions regarding household smoking rules. Finally, reading or speaking in a native language may not accurately capture the complex nature of the acculturation process.

Several areas of research are needed to further elucidate those factors associated with household smoking bans in this population. Areas for additional analysis include the investigation of self-reported reasons for implementing smoke-free home rules; the impact of smoke-free home policies in reducing actual second-hand smoke exposure levels, using rigorous measures of environmental exposure such as cotinine levels; and the impact of smoke-free home policies in increasing quit attempts, reducing cigarette consumption, and increasing cessation rates. Moreover, given the potential public health benefit of widespread smoke-free home policies, interventions that promote the adoption of household smoking bans need to be designed and their effectiveness tested.

The present survey was conducted as part of a baseline analysis that preceded an ongoing community-based multilevel intervention in a Chinese American community in New York City. Two findings in particular provide guidance for this and future interventions and research. First, 34% of Chinese Americans surveyed did not report a complete household smoking ban and therefore are at risk for exposure to ETS in the home. Given the importance of knowledge and attitudes among smokers and nonsmokers in influencing the adoption of household smoking policies, the implementation of language-specific educational interventions could be expected to lead to even higher rates of smoke-free home rules in this population. Innovative campaigns are needed that take into account cultural norms, including norms regarding assertive behavior by women, and that explore possibilities for empowering Chinese American women to advocate for smoke-free home rules. Second, effective educational efforts and interventions that empower nonsmokers to advocate for smoke-free rules at home and smoke-free policies in workplaces should include smokers. Smokers who were aware that ETS is harmful were more likely to take interim steps, short of cessation, to enhance the health of family members. Finally, continued research is needed on the ways in which tobacco control public policies and other tobacco control interventions affect immigrant populations.

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Table 1
Demographic and smoking-related characteristics of study sample, by gender (percentages with 95% confidence intervals).

Variable	Male (n=1,581)	Female (n=956)	Total (N=2,537)
Age (years)			
18–34	32.11 (29.0–35.4)	31.87 (27.7–36.4)	32.00 (29.2–34.9)
35–44	24.61 (22.1–27.3)	26.18 (22.7–30.0)	25.31 (23.0–27.8)
45–55	23.55 (21.1–26.2)	23.76 (20.1–27.8)	23.65 (21.3–26.2)
>55	19.73 (17.4–22.2)	18.19 (15.1–21.7)	19.04 (16.9–21.3)
Education *			
<12 years	39.19 (36.1–42.4)	44.92 (40.5–49.4)	41.8 (39.0–44.6)
High school	23.07 (20.5–25.9)	23.39 (20.0–27.2)	23.2 (21.1–25.5)
>12 years **	37.74 (34.6–41.0)	31.69 (27.6–36.0)	35.0 (32.3–37.9)
Marital status			
Married	74.01 (70.9–76.9)	82.22 (78.3–85.6)	77.7 (75.2–80.0)
Not married ***	25.99 (23.1–29.1)	17.78 (14.4–21.7)	22.3 (20.0–24.8)
Employment			
Yes	74.65 (71.7–77.4)	57.04 (52.7–61.4)	66.73 (64.2–69.2)
No	25.35 (22.6–28.3)	42.96 (38.6–47.4)	33.27 (30.8–35.8)
Income			
<\$10,000	12.99 (11.0–15.3)	17.09 (13.9–20.8)	14.78 (12.8–17.0)
\$10,000–\$20,000	33.20 (29.9–36.7)	36.89 (32.2–41.9)	34.82 (31.8–38.0)
\$21,000–\$40,000	30.06 (27.0–33.4)	23.93 (20.1–28.2)	27.37 (24.7–30.2)
>\$40,000	23.75 (20.9–26.9)	22.10 (18.5–26.2)	23.03 (20.4–25.9)
Years in United States			
<5 year	19.89 (17.3–22.7)	4.39 (2.6–28.7)	21.92 (19.5–24.6)
6–15	48.91 (45.6–52.2)	46.80 (42.3–51.3)	47.96 (44.9–51.0)
>15	31.20 (28.1–34.5)	28.81 (24.8–33.1)	30.12 (27.3–33.1)
English language in home			
Yes	11.05 (9.3–13.1)	2.96 (10.2–16.3)	11.91 (10.3–13.8)
No	88.95 (86.9–90.7)	87.04 (83.7–89.8)	88.09 (86.2–89.8)
Country of birth			
Mainland China	79.95 (77.1–82.6)	79.34 (75.4–82.8)	79.67 (77.1–82.1)
Hong Kong	9.52 (7.5–12.0)	9.85 (7.3–13.1)	9.67 (7.9–11.8)
Taiwan	3.33 (2.5–4.4)	4.91 (3.4–7.0)	4.04 (3.1–5.2)
United States	3.72 (2.6–5.3)	2.16 (1.0–4.4)	3.01 (2.1–4.3)
Other **	3.49 (2.5–4.8)	3.75 (2.5–5.7)	3.61 (2.7–4.8)
Smoking status			
Current	30.29 (27.7–33.0)	2.19 (1.3–3.7)	17.67 (16.1–19.4)
Former	21.38 (18.9–24.1)	1.26 (0.60–2.6)	12.35 (10.9–14.0)
Never	48.33 (45.2–51.5)	96.55 (94.8–97.8)	69.98 (67.8–72.1)
Acculturation ^a			
Yes	22.42 (20.0–25.1)	21.44 (17.9–25.4)	21.98 (19.7–24.4)
No	77.58 (74.9–80.1)	78.56 (74.6–82.1)	78.02 (75.6–80.3)
ETS harmful *			
Agree ^b	88.94 (86.9–90.7)	93.03 (90.1–95.1)	90.79 (89.2–92.2)
Disagree	11.06 (9.3–13.1)	6.97 (4.9–9.9)	9.21 (7.8–10.8)

Note. ETS, environmental tobacco smoke.

^a Acculturation is a composite of two categorical variables regarding language and media: speaks English in the home and/or reads English newspapers most or all days.

^b „Agree” represents the categories “strongly agree” and “somewhat agree”; “disagree” represents the categories “strongly disagree” and “somewhat disagree.”

* $p \geq .05$.
 ** $p \geq .001$.

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Table 2

Household smoking restrictions, by demographics and smoking-related characteristics (percentages with 95% confidence intervals).

Variable	Full ban	Partial ban	No ban
Overall *	65.96 (63.09–68.72)	22.14 (19.91–24.54)	11.9 (10.08–14)
Gender *			
Male	65.09 (61.9–68.1)	21.17 (18.8–23.7)	13.74 (11.6–16.2)
Female **	67.05 (62.7–71.2)	23.34 (19.8–27.3)	9.61 (7.1–12.8)
Age (years) **			
18–34	62.49 (57.0–67.7)	26.73 (22.2–31.8)	10.79 (8.0–14.3)
35–44	65.20 (60.2–69.9)	20.39 (16.7–24.6)	14.41 (11.0–18.6)
45–55	64.66 (58.7–70.2)	20.29 (16.4–24.8)	15.05 (10.9–20.5)
>55	75.54 (70.6–79.9)	18.35 (14.6–22.8)	6.12 (4.3–8.6)
Education			
<12 years	66.68 (62.2–70.9)	20.55 (17.3–24.17)	12.77 (9.8–16.5)
High school	63.17 (57.7–68.3)	25.48 (21.0–30.6)	11.35 (8.5–15.0)
>12 years **	66.95 (62.3–71.3)	21.72 (18.12–25.8)	11.34 (8.6–14.8)
Marital status **			
Married	68.6 (65.5–71.5)	20.36 (18.0–22.9)	11.04 (9.1–13.3)
Not married	56.54 (50.3–62.6)	28.41 (23.3–34.2)	15.05 (11.4–19.7)
Employment			
Yes	64.33 (61.0–67.5)	22.31 (19.8–25.1)	13.36 (11.1–16.0)
No	68.77 (64.0–73.2)	22.13 (18.3–26.5)	9.0 (6.7–12.3)
Income			
<\$10,000	61.67 (54.4–68.4)	26.84 (20.9–33.8)	11.50 (8.2–16.0)
\$10,000–\$20,000	64.75 (59.2–69.9)	22.36 (18.2–27.2)	12.89 (9.6–17.2)
\$21,000–\$40,000	64.44 (59.0–69.5)	23.88 (19.7–28.7)	11.68 (8.8–15.4)
>\$40,000	72.26 (66.4–77.5)	18.53 (14.4–23.6)	9.21 (6.1–13.6)
Years in the United States *			
<5 years	62.81 (56.5–68.7)	21.63 (17.2–26.9)	15.56 (11.7–20.4)
6–15	64.44 (60.4–68.3)	24.25 (21.0–27.9)	11.3 (8.9–14.2)
>15	71.94 (66.7–76.6)	17.49 (14.1–21.5)	10.57 (7.4–15.0)
Country of birth			
Mainland China	65.44 (62.3–68.5)	21.96 (19.6–24.6)	12.6 (10.4–15.1)
Hong Kong	73.03 (63.3–80.9)	20.26 (13.3–29.6)	6.71 (3.8–11.7)
Taiwan	65.53 (52.2–76.8)	19.20 (9.7–34.4)	15.27 (9.3–24.1)
United States	58.01 (39.9–74.2)	33.6 (18.6–52.8)	8.39 (3.3–19.8)
Other **	65.63 (50.9–77.8)	24.44 (13.8–39.4)	9.93 (4.8–19.5)
Smoking status			
Current	37.58 (32.9–42.4)	37.23 (32.8–41.9)	25.18 (21.1–29.8)
Former	78.64 (72.6–83.6)	12.02 (8.6–16.6)	9.34 (5.8–14.6)
Never	71.15 (67.8–74.3)	19.97 (17.4–22.9)	8.88 (7.0–11.2)
Acculturation ^a			
Yes	65.52 (62.3–68.6)	21.76 (19.3–24.4)	12.72 (10.6–15.2)
No	67.50 (61.5–73.0)	23.47 (18.8–28.9)	9.03 (6.1–13.1)
ETS harmful **			
Agree	67.91 (64.9–70.8)	21.52 (19.1–24.1)	10.57 (8.8–12.7)
Disagree	50.41 (41.8–59.0)	30.68 (23.74–38.6)	18.91 (12.9–26.8)
Attitude toward smoking bans in public places **			
Agree ^b	67.15 (64.2–70.0)	21.49 (19.2–24.0)	11.36 (9.5–13.5)
Disagree	44.63 (32.9–57.0)	34.80 (24.7–46.5)	20.57 (13.5–30.1)

Note. ETS, environmental tobacco smoke.

^a Acculturation is a composite of two categorical variables regarding language and media: speaks English in the home and/or reads English newspapers most or all days.

b “Agree” represents the categories “strongly agree” and “somewhat agree”; “disagree” represents the categories “strongly disagree” and “somewhat disagree.”

* $p \geq .05$.

** $p \geq .001$.

Percentages (with 95% confidence intervals) of respondents reporting exposure to household ETS in the past 30 days and of respondents reporting that visitors are allowed to smoke in the home, by household smoking policy.

Table 3

Variable	Full ban	Partial ban	No ban
Exposed to household ETS in past 30 days [*]			
Yes	6.57 (5.1–8.4)	68.32 (62.8–73.4)	73.23 (65.3–80.0)
No	93.44 (91.6–94.9)	31.68 (26.6–37.2)	26.77 (20.1–34.8)
Visitors allowed to smoke [*]			
Yes	18.30 (15.8–21.1)	63.98 (58.4–69.2)	87.65 (81.8–91.8)
No	81.70 (78.9–8.2)	36.02 (30.8–41.6)	12.35 (8.19–18.2)

Note. ETS, environmental tobacco smoke.

^{*} $p \geq .001$.

Table 4

Independent predictors of full household smoking ban vs. partial or no ban: Odds ratios and 95% confidence intervals based on multiple logistic regression analysis.

Characteristic	Odds ratio	p value	95% Confidence interval
Gender			
Female	1.0		Referent
Male	1.93	.00	(1.41–2.64)
Age ^d	0.99	.88	(0.92–1.07)
Marital status			
Not married	1.0		Referent
Married	1.62	.037	(1.03–2.54)
Employment			
No	1.0		Referent
Yes	0.81	.24	(0.57–1.14)
Income			
Low (<\$40,000)	1.0		Referent
High (>\$40,000)	1.39	.09	(0.95–2.04)
Years in the United States ^d	1.02	.05	(1.0–1.04)
Smoking status			
Never and former	1.0		Referent
Current	0.19	.00	(0.13–0.26)
Acculturation ^b			
No	1.0		Referent
Yes	0.95	.82	(0.64–1.42)
ETS harmful			
No	1.0		Referent
Yes	1.61	.04	(1.01–2.54)
Attitude toward smoking bans in public places			
Disagree ^c	1.0		Referent
Agree	1.85	.08	(0.92–3.73)

Note. ETS, environmental tobacco smoke.

^aContinuous variables.

^bAcculturation is a composite of two categorical variables regarding language and media: speaks English in the home and/or reads English newspapers most or all days.

^c“Agree” represents the categories “strongly agree” and “somewhat agree”; “disagree” represents the categories “strongly disagree” and “somewhat disagree.”