



Smoking ban policies and their influence on smoking behaviors among current California smokers: A population-based study

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ABSTRACT

Objective. To assess whether smoking ban policies are associated with smoking reduction and quit attempts among California smokers.

Methods. Data were examined for 1718 current smokers from follow-up telephone interviews conducted in 2011 of persons previously identified as smokers in a representative sample of the adult population of California. Population weighted logistic regressions controlling for demographic and other variables were used to evaluate the association between smoking ban policies (home, work, and town) and changes in tobacco use (past year quit attempt or reduction in smoking rate).

Results. Living in a home with a total ban was significantly associated with smoking reduction (adjusted odds ratio, AOR: 2.4, 95% CI: 1.4–4.2) and making a quit attempt (AOR: 2.3, 95% CI: 1.3–3.9) compared to living in a home with no home ban. Self-reported perception of an outdoor ban in one's city/town was associated with smoking reduction (AOR: 1.7, 95% CI: 1.02–2.7) and making a quit attempt (AOR: 1.8, 95% CI: 1.05–2.9).

Conclusion. These results indicate that smoking bans not only protect nonsmokers from the harms of second-hand smoke, but are also associated with smoking reduction and cessation.

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Introduction

The health consequences of smoking and second-hand smoke (SHS) have been well documented and summarized (CDC Fact Sheets, 2011; CDC MMWR, 2011; USDHHS, 2007). Cigarettes are responsible for approximately one in every five deaths each year in the U.S. (USDHHS, 2010). Therefore, increasing the rate of successful smoking cessation has become a key strategy to improve the health of the population (Biener et al., 2010; Levy et al., 2000).

The immediate social environment of the smoker is presumed to play an important role in influencing smoking cessation (Biener et al., 2010). Considerable evidence suggests that having a smoke-free home may be associated with successful quitting and reduced daily consumption levels among adult smokers (Messer et al., 2008; Mills et al., 2009). Having children in the home (Borland et al., 2006) and the presence of workplace smoking restrictions (Farkas et al., 1999; Longo et al., 2001) have also been associated with increased cessation and decreased consumption in continuing smokers. Public smoking bans and home smoking bans are not isolated from each other. Borland et al. (2006)

found evidence that public policies that limit smoking may stimulate adoption of home bans. Total smoking ban (either public or home) promoted stronger and more consistent effects in smoking reduction and cessation than a partial smoking ban (Borland et al., 2006; Naiman et al., 2011; Pizacani et al., 2004).

In the U.S., the number of states with comprehensive smoke-free laws in effect increased from 0 to 26 states from the end of 2000 to the end of 2010 (CDC MMWR, 2011). California has been referred to as "America's Non-Smoking Section" because in 1994 it became the first state in the country to ban smoking in nearly every workplace and effectively banned smoking in indoor public spaces (California Environmental Protection Agency, 2011). While California's law is one of the most restrictive in the nation, it does have exceptions that allow smoking in designated areas and therefore there is still exposure to SHS in public places (CDC Tobacco Control State Highlights, 2010). In California more smokers attempt to quit now than in the past, and do so more than smokers in other states (Al-Delaimy et al., 2007; Messer et al., 2007; Tang et al., 2010). This change has been attributed to a shift towards anti-smoking social norms (Roeseler and Burns, 2010). The current analyses use a population-based sample to assess whether home smoking bans, workplace bans, and perceptions of outdoor and city smoking bans are associated with quit attempt rates and reduced

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cigarette consumption by smokers. We hypothesize that smoking bans, perceived or actual, are related to higher quit attempt rates and reduced cigarette consumption in a representative sample of California smokers.

Methods

The data used in the present study are from the 2011 California longitudinal smokers survey (CLSS). The CLSS is a follow-up survey of smokers who participated in the 2009 California health interview survey (CHIS), a population-based random sample (random digit dial telephone interview) of California residents. CHIS 2009 data collection spanned from December, 2009 through May, 2010 (CHIS, 2011). The CLSS follow-up telephone interview began in July, 2011 and concluded in December, 2011 (Wivagg, 2012). Only persons who were identified as smokers in CHIS 2009, who agreed to future contact, and who spoke English or Spanish were approached for follow-up by the CLSS. A total of 5530 smokers were identified in CHIS 2009, and 4837 agreed to follow-up, of whom 4717 were English/Spanish speakers. In total, 1961 of the eligible 2009 participants completed the follow-up survey (Wivagg and Norman, 2012): 1369 current daily smokers, 349 current non-daily smokers and 243 former smokers in 2011 CLSS. The 1718 current smokers are the subjects of this study. CLSS respondents were weighted to the age, gender, geographic place of residence, and ethnicity of the population of adult California smokers as previously described (Norman, 2012). Table 1 shows the demographic distribution of our study population.

Outcome variables

We chose two smoking behavior variables as outcomes in relation to smoking policies. Reduction in the number of cigarettes smoked and quit attempts represent important early-stage quitting behaviors among smokers. The recall period for both variables was one year.

Smoking Reduction: Self-reported smoking reduction was determined by response to the question: "Compared to last year at this time, would you say you're now smoking ...". The answer options were "The same as you were before", "More than you were before", or "Less than you were before". The first two choices were collapsed to create a dichotomous outcome in the analysis.

Quit Attempts: Self-reported quit attempts were assessed by response to the question: "During the past 12 months, have you quit smoking intentionally for one day or longer?"

Independent variables

The independent variables used in statistical modeling were grouped into 2 categories: demographic variables and smoking ban policies.

Demographic variables included: (1) Gender; (2) Age category (18–24 years 25–44 years 45–64 years and 65+ years); (3) Ethnicity (Hispanic, Non-Hispanic White and all others); (4) household annual income (<\$50,000 and ≥\$50,000); (5) Live with partner; (6) Education (High School or Less and Some College or More); and (7) Living with children younger than 18 years.

Table 1
Demographic distribution of California smokers (N^a = 1718).

Characteristics		Weighted % (±1.96 × SE)	N ^a
Age (years)	18–24	10.3 (±4.2)	40
	25–44	43.2 (±6.0)	243
	45–64	36.8 (±3.6)	915
	65+	9.7 (±1.6)	520
Gender	1 = Male	62.4 (±3.1)	784
	2 = Female	37.6 (±3.1)	934
Race	Hispanic	29.4 (±3.5)	199
	Non-Hispanic white	48.4 (±3.6)	1273
	All others	22.2 (±3.6)	246
Income	<\$50,000	53.6 (±5.4)	896
	≥ \$50,000	46.4 (±5.4)	648
Live with partner	Yes	55.3 (±5.9)	816
	No	44.7 (±5.9)	894
Education	High School or Less	40.6 (±5.0)	578
	Some college or more	59.4 (±5.0)	1140
Live with children under 18 year	Yes	39.4 (±6.0)	332
	No	60.6 (±6.0)	1386

^a Number of samples before weighting.

To assess home smoking bans, the CLSS questionnaire asked: "What are the current rules or restrictions about smoking inside your home?" The variable was coded in 3 levels: total home ban, partial home ban and no home ban. To assess indoor work smoking bans, interviewees were asked whether their workplace was completely smoke-free. Only respondents who reported working indoors were considered in analyses of this item. Perceived city/community smoking ban policies were assessed by four questions: "As far as you know, what are the rules about smoking in the city or town where you live: I. Is there a complete ban on smoking outside? II. Is smoking allowed in outdoor restaurant dining areas? III. Is smoking allowed in parks and playgrounds? IV. Is smoking allowed on beaches?" Responses were combined to derive a 2-level variable: complete or partial ban versus no ban. A YES to item I or NO to any other item was defined as "complete/partial ban"; a NO to item I and YES to all other items was defined as "no ban". In addition, home smoking ban and perceived city/community ban were combined to create a 3-level variable reflecting the extent of bans: home ban and perceived city ban, home ban or perceived city ban and no ban (work bans were excluded because these did not apply to all participants).

Statistical analysis

All parameter estimates reported were weighted to be representative of the population of adult California smokers. Standard errors (SE) were calculated by the paired unit jackknife method (JK2) using 80 jackknife samples (Norman, 2012). Descriptive statistics for both the outcome variables and the independent variables are reported with jackknife 95% confidence intervals (calculated as ± 1.96 × SE). Weighted logistic regression was performed for the 2 primary outcomes with demographic and smoking ban policy variables added in the model. Post-hoc analyses of associations between the smoking ban policies and the outcomes stratified by demographic variables were carried out to further evaluate the key demographic component that may modify these associations. Crude odds ratios (OR), adjusted odds ratios (AOR) and their 95% Confidence Intervals (CI) calculated from the weighted logistic regression model parameter estimates were summarized and compared. All parameter estimates and confidence intervals were calculated using survey statistics procedures in SAS version 9.3 (SAS Institute Inc., 2011).

Results

Table 2 shows the population-weighted estimates of home, workplace and perceived city/town smoking ban exposure of California smokers in 2011. A total of 68.9 ± 4.9% of the smokers lived in a home with a total home ban, 16.5 ± 4.6% a partial home ban and 14.5 ± 3.3% with no home ban. A total of 48.2 ± 4.9% of smokers worked indoors, of whom 94.4 ± 3.7% work in a completely smoke-free environment. When asked about perceived complete or partial outdoor smoking bans in their town/city, 75.3 ± 4.3% of the smokers reported such a ban.

The estimated distribution of smoking reduction and quit attempts among smokers by demographic and smoking ban policies is shown in Table 3. Overall, 44.0 ± 5.0% of smokers reported that they smoked

Table 2
Frequency of reported home, work or city smoking ban policies among California smokers (N^a = 1718).

Ban policies		Weighted % (±1.96 × SE)	N ^a
Home ban	Total home ban	68.9 (±4.9)	912
	Partial home ban	16.5 (±4.6)	363
	No home ban	14.5 (±3.3)	437
Work indoor ^b	Yes	48.2 (±4.9)	555
	No	51.8 (±4.9)	1152
Work ban ^c	Yes	94.4 (±3.7)	525
	No	5.6 (±3.7)	30
Perceived city ban	Complete/partial ban	75.3 (±4.3)	1119
	No ban	24.7 (±4.3)	557

^a Number of samples before weighting.

^b Work Indoor was defined as: currently work for money in an indoor setting outside of the home.

^c Indoor workers only.

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