

Original Investigation

Attitudes and beliefs about secondhand smoke and smoke-free policies in four countries: Findings from the International Tobacco Control Four Country Survey

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Abstract

Introduction: This paper describes the varying levels of smoking policies in nationally representative samples of smokers in four countries and examines how these policies are associated with changes in attitudes and beliefs about secondhand smoke over time.

Methods: We report data on 5,788 respondents to Wave 1 of the International Tobacco Control Four Country Survey who were employed at the time of the survey. A cohort of these respondents was followed up with two additional survey waves approximately 12 months apart. Respondents' attitudes and beliefs about secondhand smoke as well as self-reported policies in their workplace and in bars and restaurants in their community were assessed at all waves.

Results: The level of comprehensive smoke-free policies in workplaces, restaurants, and bars increased over the study period for all countries combined and was highest in Canada (30%) and lowest in the United Kingdom (0%) in 2004. In both cross-sectional and longitudinal analyses, stronger secondhand smoke policies were associated with more favorable attitudes and support for comprehensive regulations. The associations were the strongest for smokers who reported comprehensive policies in restaurants, bars, and their workplace for all three survey waves.

Discussion: Comprehensive smoke-free policies are increasing over time, and stronger policies and the public education opportunities surrounding their passage are associated with more favorable attitudes toward secondhand smoke regulations. The implication for policy makers is that, although the initial debate over

smoke-free policies may be tumultuous, once people understand the rationale for implementing smoke-free policies and experience their benefits, public support increases even among smokers, and compliance with smoke-free regulations increases over time.

Introduction

Article 8 of the Framework Convention on Tobacco Control requires ratifying nations to expand local and national regulations to protect people from secondhand smoke (World Health Organization, 2003). If the social norms change, the community may create an environment in which policy levels can increase. In the United States, for example, the model of policy adoption has generally been for local efforts to generate support for smoke-free rules, leading local decision makers to implement stronger secondhand smoke protection policies. The tobacco industry has countered local tobacco control efforts by pressuring state officials to adopt weaker smoke-free regulations, which preempt localities from adopting stronger local regulations (Givel & Glantz, 2001).

Increasing levels of support for smoke-free policies appear to be essential to the success of such policies. However, the transition from smoking being permitted indoors to its being restricted is often perceived as tumultuous, with predictions that smokers will eventually rebel and compliance with the smoke-free regulations will dwindle over time. Others have suggested that as people become accustomed to a smoke-free indoor environment at work, in restaurants, and in other public places, they become less tolerant of exposure to secondhand smoke (Albers, Siegel, Cheng, Biener, & Rigotti, 2004; Thomson & Wilson,

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2006). Cross-sectional evidence indicates that smokers who live in places where smoking is prohibited in bars and restaurants are more likely to support these policies (Borland et al., 2006) and that the level of support increases the longer the policies are in effect (Brooks & Mucci, 2001; Tang et al., 2003). Evidence from longitudinal research indicates that, among smokers and nonsmokers, support for smoke-free workplaces increases, and attitudes toward such restrictions improve, after implementation (Hocking, Borland, Owen, & Kemp, 1991).

Some observers were surprised that Ireland became the first country to implement comprehensive nationwide smoke-free regulations because of the high prevalence of smoking and the perception that smoking was an important component of Irish culture (CBS News, 2003; Mulcahy et al., 2006); yet once this policy was implemented, the level of support among smokers increased (Fong et al., 2006). Less is known about how policies in one area, such as work-sites, affect attitudes in other domains, such as smoke-free restaurants.

It is important to better understand how secondhand smoke policy implementation may change public attitudes because the Framework Convention on Tobacco Control (FCTC) gives countries a relatively short time period during which to implement such regulations. Countries generally have neither the time nor the resources to build a broad-based grassroots effort designed to increase public support, nor will this necessarily be required if national governments are already committed to addressing this issue solely on the basis of the public health benefits and regardless of any short-term debate.

The present study examined the relationship among smoke-free policies in work-sites, bars, and restaurants as a longitudinal predictor of changes in smokers' attitudes about secondhand smoke in four countries. We tested the hypothesis that implementation of a smoke-free policy would result in more support for smoking regulations in these public places, in general. We report both cross-sectional and longitudinal data on the varying levels of smoking policies and how these policies are associated with attitudes and beliefs about secondhand smoke in nationally representative samples of smokers from four countries involved in the International Tobacco Control Four Country Survey (ITC-4).

Methods

Data source

Participants in Wave 1 of the ITC-4, conducted from October to December 2002, were 9,058 current adult (18 years of age or older) smokers (defined as having smoked at least 100 cigarettes in their lifetime and currently smoking at least once per month) from Australia, Canada, the United Kingdom, and the United States. The survey fieldwork was conducted using computer-assisted telephone interviews. It was conducted in English or in French if desired in the Francophone areas of Canada. Strict protocols were developed and implemented to ensure equivalence of methods across the four countries. A stratified random-digit dialing procedure was used to contact households and screen for adult smokers with the next birthday who would agree to participate in the study. Those who agreed were scheduled for an in-depth 40-min phone survey a week later and were sent a check to compensate them for their time. These partici-

pants were asked to respond to questions related to tobacco control policies, smoking behavior, and associated psychosocial predictors. The sample used for cross-sectional analyses in the present study includes participants who were employed at the time of the survey: 5,788 participants in Wave 1 (2002), 5,049 participants in Wave 2 (2003), and 4,803 participants in Wave 3 (2004). In addition, 4,705 employed participants in the longitudinal sample completed Wave 1, Wave 2, and Wave 3 and are used for cohort analyses. The analyses included in this paper were restricted to those who were employed at the time of the survey because the survey items about smoke-free policies in the workplace were asked only of these respondents.

Cooperation rates (the proportion of eligible respondents who completed the survey; Cooperation Rate #4 from the American Association for Public Opinion Research, 2008) from the baseline survey wave were high for a survey of this kind: United States = 77%, Canada = 79%, United Kingdom = 79%, and Australia = 79%, and the overall response rates by country were 26% for the United States, 50% for Canada, 38% for the United Kingdom, and 46% for Australia. A comparison of the descriptive statistics for these three waves of ITC-4 data with other nationally representative surveys of smokers in each of the four ITC-4 countries included showed that respondent demographics and principal responses were comparable. Moreover, comparisons of smoking-relevant statistics from the ITC-4 samples and those from other nationally representative surveys demonstrated that the deviations between ITC-4 samples and other surveys were about the same as the deviations between the two previously existing nationally representative surveys themselves, in the three countries in which there are two nationally representative surveys of smokers (the exception is the United States, which has only one such survey that covers these questions; Thompson et al., 2006). A full description of the ITC methodology, sample profile, and survey rates, including comparisons with national benchmarks, is available at <http://www.itcproject.org>.

The study protocol was cleared for ethics by the institutional review boards or research ethics boards in each of the countries: Cancer Council Victoria (Australia), the University of Waterloo (Canada), University of Strathclyde (United Kingdom), Roswell Park Cancer Institute (United States), and the University of Illinois-Chicago (United States).

Measures of smoke-free policies and attitudes about secondhand smoke

Smoke-free policy measures. In each wave, to measure current smoking policies in restaurants, bars, and work-sites, smokers were asked the following questions: (a) "Which of the following best describes the rules about smoking in restaurants and cafes where you live? ... in bars/pubs where you live?" (response options: "Smoking is not allowed in any indoor area," "Smoking is allowed only in some indoor areas," "Smoking is allowed in all indoor areas," or "Every restaurant, café has its own rules") and (b) "Which of the following best describes the smoking policy where you work?" (response options: "Smoking is not allowed in any indoor area," "Smoking is allowed only in some indoor areas," or "Smoking is allowed in any indoor areas").

Support for smoke-free policies. In each wave, respondents' support for smoke-free policies was assessed with the

following question: "For each of the following public places, please tell me if you think smoking should be allowed in all indoor areas, in some indoor areas, or not allowed indoors at all? (Workplaces, Bars, Restaurants)." Subjects who responded that smoking should not be allowed at all in any given public place were defined as supporting a total smoking ban in that place.

Secondhand smoke attitudes. Attitudes about secondhand smoke were measured with two items: "Please tell me whether you strongly agree, agree, neither agree nor disagree, disagree, or strongly disagree with each of the following statements: Cigarette smoke is dangerous to nonsmokers. Society disapproves of smoking."

Other control variables

Demographic variables were collected, including age (18–24, 25–39, 40–54 years, 55 years or older), sex (male or female), race/ethnicity or language spoken at home (White/English or all others), time to first cigarette of the day (1 = more than 60 min, 2 = 31–60 min, 3 = 6–30 min, 4 = 5 min or less), number of cigarettes smoked per day (1 = 10 or fewer, 2 = 11–20, 3 = 21–30, 4 = more than 30), previous attempts to quit smoking (yes or no), educational attainment (low, moderate, and high), and income levels (low, moderate, and high). We used the primary means of identifying minorities used in official surveys conducted in each nation, which was racial/ethnic group in the United States, Canada, and the United Kingdom and language other than English spoken at home in Australia. Respondents were classified as being in the majority group if they were White (United States, Canada, and United Kingdom) or if they spoke English in the home (Australia) and were defined in the identified minority group otherwise. Due to differences in education and monetary systems, the distinct variables for education and income for each country were combined into one variable for each so that comparisons could be made between countries. A heaviness of smoking index (range = 0–6, where 6 is the heaviest smoker) was created as the sum of two measures: number of cigarettes per day and time to first cigarette, using the category codes for those two measures listed above.

Data analyses

Analyses were conducted using SPSS version 14.0. Descriptive statistics by country are presented and differences assessed using the chi-square test for independence. The change in policy over time was used to predict the level of support for smoke-free policies using logistic regression. For cross-sectional analyses presented in Table 2, Wave 3 data were used and logistic regression models were developed to estimate correlates of support for smoke-free policies and secondhand smoke attitudes. For longitudinal analyses, Table 3 used data on changes in secondhand smoke policies from Wave 1 to Wave 2 to predict support and attitudes at Wave 3 while controlling for other factors, and Table 4 used secondhand smoke policies in all three waves to predict attitudes and support at Wave 3. For Tables 2–4, the interaction between country and each predictor listed in each table was examined to assess whether a differential relationship existed between countries. However, because no statistically significant interactions were observed, the aggregated data are presented. Percentages reported in tables for country-specific, cross-sectional estimates of the levels of variables were weighted for age and gender for each country. All longitudinal analyses were conducted on unweighted data.

Results

Table 1 presents changes in smoking policies in work-sites, restaurants, and bars, as well as support for smoke-free policies and attitudes about secondhand smoke for each survey wave overall and by country. The percentage of smokers who reported that smoking was not allowed in their work-sites or in restaurants and bars in their community increased from 7% to 14% overall from 2002 to 2004, but this change was found only in Canada and the United States, where some subnational jurisdictions imposed restrictions over that period. The percentage of smokers who reported that none of these locations prohibited smoking decreased from 36% to 22% overall and decreased in each country. Support for smoke-free workplaces, bars, and restaurants increased overall and for each country from Wave 1 to Wave 3, although some of these differences were not statistically significant. The large majority of smokers agreed with the statements that secondhand smoke is dangerous to others and that society disapproves of smoking; agreement with the latter statement increased significantly over time, particularly in the United Kingdom.

Table 2 shows the cross-sectional relationship between the level of smoking policy reported at Wave 3 and the level of support for clean indoor air rules at Wave 3. As the level of reported smoking policies increased, the level of support for clean indoor air rules increased for all measures and generally in a dose-dependent manner, even after adjusting for demographic and smoking variables. The largest increases in the odds ratios (ORs) for supporting total smoking bans in a given public place were observed when respondents reported that the public place was smoke free where they lived. For example, the OR for supporting total smoking bans in bars increased from 3.2 among those who reported that their work-site and restaurants but not bars were smoke free to 10.0 among those who reported that all three of these locations were smoke free. Similarly, the OR for supporting a total smoking ban in workplaces was 8.6 among those who reported that either their work-site or restaurants were smoke free, compared with those who reported that smoking was allowed in these locations.

The relationship between smoking policy and individual attitudes about secondhand smoke was statistically significant, although the magnitude of the association was smaller than the magnitude of the association between smoke-free policies and self-reported support for total smoking bans in these locations.

As shown in Table 3, those who reported that the rules about smoking where they live became stronger from Wave 1 to Wave 2 were more likely to report at Wave 3 that they supported a total smoking ban in workplaces ($OR = 1.4, p < .05$) and bars ($OR = 1.6, p < .05$) among those who did not support total smoking bans in these places at Wave 1. Other results were not statistically significant, although point estimates were in the predicted direction.

Table 4 compares the level of support for total smoking bans in different public places and attitudes about secondhand smoke in Wave 3 by different levels of reported smoking bans in Waves 1 to 3. Those who reported comprehensive smoking bans in bars, restaurants, and their work-site in each survey wave were far more likely in subsequent waves to indicate support for a

Table 1. Level of smoking policy in work-sites, restaurants, and bars 2002, 2003, and 2004 in nationally representative samples of employed smokers in Canada, the United States, the United Kingdom, and Australia

	Overall			Canada			United States			United Kingdom			Australia		
	2002	2003	2004	2002	2003	2004	2002	2003	2004	2002	2003	2004	2002	2003	2004
Sample size	5,788	5,049	4,803	1,434	1,336	1,258	1,344	1,206	1,177	1,538	1,230	1,167	1,472	1,277	1,201
Smoking policy (%)															
No smoking policies	36	26	22	35	22	14	35	28	23	49	46	42	14	8	8
Policy in one place only, either work-sites or restaurants	48	45	42	46	48	35	49	49	41	49	51	55	39	31	38
Policy in both work-sites and restaurants, but no bars	9	19	22	12	14	21	8	8	16	2	3	3	42	52	48
Policy in all three places, work-sites, restaurants, and bars	7	10	14	7	16	30	8	16	20	0	1	0	6	9	6
Support a total smoking ban (%)															
Work-sites	40	46	50	43	48	53	40	42	45	31	33	37	64	62	67
Bars	8	9	12	8	11	17	9	10	10	3	3	6	13	13	17
Restaurants	30	40	46	29	36	42	28	30	34	25	22	32	71	70	76
Agree with the statement (%)															
Secondhand smoke is dangerous to others	84	79	85	88	85	87	84	79	82	84	73	84	84	79	85
Society disapproves of smoking	78	82	85	88	87	90	77	80	82	76	80	83	81	82	86

Note. The sample size for each wave is derived from respondents to the main survey who were employed. These cross-sectional samples are weighted. The differences within each country are all statistically significant ($p < .01$) for each survey wave.

Table 2. Level of smoking policies at Wave 3 and attitudes and beliefs about secondhand smoke at Wave 3 (N = 4,803)

	Wave 3 smoking policies			
	No smoking policies (n = 1,057) (%)	Policy in either work-sites or restaurants (n = 2,017) (%)	Policy in both work-sites and restaurants (n = 1,057) (%)	Policy in work-sites, restaurants, and bars (n = 672) (%)
Crude results				
Wave 3—support a total smoking ban in				
Workplaces	17	55	72	73
Restaurants	26	38	74	64
Bars	5	7	15	35
Wave 3—agree with the statement				
Secondhand smoke is dangerous to others	81	85	85	89
Society disapproves of smoking	83	87	89	89
Adjusted logistic regression model results				
	No smoking policies (OR)	Policy in either work-sites or restaurants (OR)	Policy in both work-sites and restaurants (OR)	Policy in work-sites, restaurants, and bars (OR)
Wave 3—support a total smoking ban in:				
Workplaces	1.0	8.6*	20.1*	20.9*
Restaurants	1.0	1.5*	4.9*	6.0*
Bars	1.0	1.6	3.2*	10.0*
Wave 3—agree with the statement:				
Secondhand smoke is dangerous to others	1.0	1.2	1.4	2.3*
Society disapproves of smoking	1.0	1.3	1.7*	1.4

Note. OR, odds ratio. Results from logistic regression models for the support of total smoking bans in different public places and agreement with secondhand smoke attitudinal measures while controlling for policy level at Wave 3 (OR shown in the table above), age, gender, income, ethnicity, country, and heaviness of smoking Index. There are no interactions of smoking ban level at Wave 3 by country.

*p < .05.

Table 3. Attitude and belief outcomes at Wave 3 as a function of increase in policy level from Wave 1 to Wave 2, restricted to those who did not support at Wave 1

	Change in smoking policy wave 1 to wave 2	
	No increase in policy level (n = 1,492) (%)	Increase in policy level Wave 1 to Wave 2 (n = 397) (%)
Crude results		
Wave 3—support a total smoking ban in		
Workplaces	25.9	35.2
Restaurants	22.5	30.5
Bars	8.0	13.3
Wave 3—agree with the statement		
Secondhand smoke is dangerous to others	53.1	62.2
Society disapproves of smoking	66.5	78.6
Adjusted logistic regression model results		
	No increase in policy level (OR)	Increase in policy level Wave 1 to Wave 2 (OR)
Wave 3—support a total smoking ban in		
Workplaces	1.0	1.4*
Restaurants	1.0	1.3
Bars	1.0	1.6*
Wave 3—agree with the statement		
Secondhand smoke is dangerous to others	1.0	1.6
Society disapproves of smoking	1.0	1.8

Note. OR, odds ratio. Results from logistic regression models controlling for change in policy level from Wave 1 to Wave 2, age, gender, income, ethnicity, country, and heaviness of smoking index.

*p < .05.

Table 4. Attitude and belief outcomes at Wave 3 as a function of policy level at all three survey waves (N = 2,200 respondents to all three survey waves who were employed)

	Policy level at all three survey waves		
	No bans at any wave (n = 236) (%)	Some smoking bans at some time (n = 1,905) (%)	Comprehensive ban - all 3 waves (n = 59) (%)
Unadjusted results			
Wave 3—support a total smoking ban in			
Workplaces	10.2	56.4	89.8
Restaurants	21.3	49.6	84.7
Bars	3.8	12.6	45.8
Wave 3—agree with the statement			
Secondhand smoke is dangerous to others	80.3	83.7	94.8
Society disapproves of smoking	82.1	87.9	94.9
Adjusted logistic regression model results			
	No bans at any wave (n = 236) (OR)	Some smoking bans at some time (n = 1,905) (OR)	Comprehensive ban - all 3 waves (n = 59) (OR)
Wave 3—support a total smoking ban in			
Workplaces	1.0 ^{a,b,c}	8.5	49.8
Restaurants	1.0 ^{a,b,c}	2.1	14.7
Bars	1.0 ^{a,b,c}	2.3	11.2
Wave 3—agree with the statement			
Secondhand smoke is dangerous to others	1.0 ^b	1.2	3.8
Society disapproves of smoking	1.0 ^a	1.6	3.2

Note. OR, odds ratio. Results from logistic regression models controlling for age, gender, income, ethnicity, country, and heaviness of smoking index.

^aThose reporting no bans at any wave differ from those reporting some smoking bans at some time at the .05 level.

^bThose reporting no bans at any wave differ from those reporting comprehensive bans at the .05 level.

^cThose reporting some smoking bans at some times differ from those reporting comprehensive bans at the .05 level.

comprehensive smoking ban, compared with those who reported only partial bans where they live and work. Further, those who reported smoking allowed in restaurants, bars, and their work-site during all three waves were significantly less likely to support smoke-free policies. A similar relationship was observed for the attitudinal measures (agreeing that secondhand smoke is dangerous and that society disapproves of smoking), although the magnitude of the association was much less and not consistently statistically significant.

Discussion

As stronger secondhand smoke policies are enacted; attitudes and compliance in support of such policies among smokers increase over time. The relationship was seen in both cross-sectional and longitudinal analyses and for smokers in four different countries. The effect for social norms was not as strong and consistent, but it trended in the hypothesized direction for change. The implication of this finding is that the policy process itself can change societal norms and attitudes to be more accepting of secondhand smoke regulations over time, which makes them less controversial and more beneficial for public health as people become accustomed to the new rules.

These findings are similar to data reported on the longitudinal association between community-wide smoke-free regulations and home smoking policies from the ITC study (Borland et al., 2006). Smokers who reported total bans on smoking in bars where they lived were 1.8 times more likely to adopt a completely smoke-free home policy approximately 1 year later, compared with smokers who lived in communities where smok-

ing was permitted in bars. These results suggest that secondhand smoke attitudes diffuse fairly rapidly not only through public environments, as shown in the present study, but also through personal environments.

The most dramatic increases in smoke-free public places and work-sites were observed in Canada and the United States, with lower levels of change in the United Kingdom and Australia. Since the 2004 survey, most of the United Kingdom has adopted smoke-free legislation. As a result, we expect huge future changes in that country. Australia has had the most extensive set of smoke-free regulations among the four countries for some time, so the more modest rate of change observed in Australia for the three survey waves was not surprising; however, all Australian states have now made their policies comprehensive by extending them to bars, and nearly all others are committed to following suit, so we expect the trend toward more restrictive policies to continue.

Like the data showing increases in smoke-free bars, restaurants, and workplaces, the support for total bans in these places has increased over time. The rate of the increase in support for total smoking bans in bars and restaurants is comparable, although the overall support rate for smoke-free bars is still quite low among smokers (only 12% overall in 2004).

The findings that support for a specific policy in workplaces, restaurants, or bars dramatically increases when the respondent reports that the specific location is smoke free where they live (as observed in Table 2) provides compelling evidence that support for these policies increases once individuals are given an opportunity to experience them. In addition, the longer the

smoke-free policies have been in effect (i.e., for all three waves empirically in this study), the stronger the support (as observed in Table 4), which suggests that initial negative reactions to the law may lessen over time. For example, the *OR* for supporting total smoking bans in workplaces, restaurants, and bars are an order of magnitude greater among those with comprehensive policies in all these locations for all three survey waves, compared with those smokers who reported smoking was allowed in these locations in all three survey waves. Because of these more favorable attitudes and beliefs over time, it is expected that it will become easier to implement and enforce smoke-free regulations as time progresses.

A key point to consider is whether the smoke-free policies are driving the observed changes in attitudes or whether the associated media and educational opportunities about secondhand smoke and the policies are responsible for the changes. Typically, smoke-free policies are accompanied by spirited and often prolonged debate about the dangers of secondhand smoke. The findings observed in the present study may be more of a media effect than the effect of the policies per se. To test this possibility empirically, one would need data on the level of associated secondhand smoke-related educational efforts in places that did and not pass smoke-free policies. Because these data are not available for the present study, the causal partitioning between these two factors is unknown.

An unanswered question in this study is whether a minimum threshold of support is needed for smoke-free regulations before such policies can be adequately implemented and enforced. For example, if a comprehensive smoke-free regulation is passed in a location where 90% of the population opposes it, it is not likely to be enforced. In the United States, the Americans for Nonsmokers' Rights Foundation (2003) recommends that a majority of the population should support smoke-free regulations before advocates push for the policy change. The present results suggest that an initial lower level of community support may be sufficient to adopt the policy change because support levels will increase over time; however, the minimum threshold of support is unknown.

Another striking finding is that the results were consistent across each country, which adds to the robustness of the findings and suggests that the results are generalizable to other Western-style countries. Although it remains unknown if the results generalize to non-Western or developing countries, the analyses presented here provide a framework for testing this empirically.

Some limitations to this study should be noted. First, self-reported data were used to define smoke-free restaurants, bars, and workplaces. We felt that the individuals' reports were more predictive of their attitudes and beliefs about smoke-free policies and secondhand smoke, compared with a regional measure of the written policies in the home jurisdictions. Borland et al. (2006) found that respondent reports were correlated with known rules and that they have the same set of predictors, which suggests they are measuring a common underlying construct (Borland et al., 2006). Second, for cohort analyses, a large fraction of the sample was lost to attrition. To address this, we weighted the Wave 2 and Wave 3 data to match the demographic characteristics of the original Wave 1 data in additional models, and the results were virtually the same with the weighted data. Therefore, for the cohort analyses, we relied on the

unweighted data. Third, we examined a population consisting only of smokers. The association between smoke-free policies and attitudes may be less pronounced with nonsmokers, although opposition to smoke-free regulations typically comes predominantly from smokers.

In summary, the processes involved in implementing comprehensive smoke-free policies push public attitudes and opinions to be more favorable of these policies over time, and these results are consistent across all four countries studied. The implication for policy makers is that, although the initial debate over smoke-free policies may be tumultuous, once people experience the benefits of smoke-free regulations, public support increases and implementation of and compliance with smoke-free regulations ease as time passes.

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Declaration of Interests

None declared.

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