Original Investigation

Longitudinal evaluation of smoke-free Scotland on pub and home drinking behavior: Findings from the International Tobacco Control Policy Evaluation Project

Sherry A. McKee, Cheryl Higbee, Stephanie O'Malley, Louise Hassan, Ron Borland, K. Michael Cummings, Gerard Hastings, Geoffrey T. Fong, & Andrew Hyland

Abstract

Introduction: On 26 March 2006, Scotland implemented a smoke-free policy prohibiting smoking in indoor public venues, including bars and pubs. Drinking and smoking are highly associated behaviors, so we evaluated whether the regulations would decrease drinking behavior among smokers in public venues. We further assessed whether this effect would be more pronounced in heavier drinkers and whether decreases in drinking behavior in pubs would be offset by increased drinking in the home.

Methods: Participants ($N=1,059$) were adult smokers and non-smokers from Scotland and from the rest of the United Kingdom, which did not have comprehensive smoke-free policies during the study period. Data were collected using a random-digit-dialed telephone survey from February to March 2006, just prior to the policy implementation in Scotland. Follow-up surveys were conducted in March 2007. Using baseline data, we categorized participants as abstainers, moderate drinkers, or heavy drinkers.

Results: Overall, results demonstrated that drinking behavior did not change significantly in Scotland compared with the rest of the United Kingdom following implementation of the smoke-free policy in Scotland. However, planned comparisons examining mean changes in drinks consumed in pubs or bars following the legislation demonstrated that the smoke-free legislation was associated with reduced drinking behavior in pubs and bars among moderate- and heavy-drinking smokers in Scotland. These moderate- and heavy-drinking Scottish smokers also reduced their pub attendance following policy implementation.

Discussion: The smoke-free Scottish law did not increase drinking in the home. These findings suggest that smoke-free policies may have additional public health benefits for those at greater risk for alcohol-related health problems.

Introduction

On 26 March 2006, Scotland implemented a smoke-free policy prohibiting smoking in indoor public venues, including bars and pubs. Evidence supporting the public health significance of smoke-free policies is clear. Exposure of nonsmokers to passive smoke is reduced, as is their risk of respiratory symptoms (Eisner, Smith, & Blanc, 1998; Farrelly et al., 2005; Heloma, Jaakkola, Kahkonen, & Reijula, 2001; Menzies et al., 2006). Evidence suggests that smoke-free policies reduce the rate of coronary heart disease in the population (Barnoya & Glantz, 2006; Juster et al., 2007; Sargent, Shepard, & Glantz, 2004). Moreover, such policies may reduce overall levels of smoking (Fichtenberg & Glantz, 2002) and motivate smokers to make their homes smoke free (Borland et al., 2006; Fong et al., 2006). In addition to the smoking-related benefits accrued by smoke-free pub policies, additional public health benefits may result, including concomitant reductions in drinking behavior.

It is well established that alcohol consumption and tobacco use are highly correlated in both clinical and nonclinical samples. Among those with alcohol use disorders, 34.5% are nicotine dependent (Grant et al., 2004). Smokers have a 4- to 10-fold increased risk for alcohol use disorders (DiFranza & Guerrera, 1990; Grant

Sherry McKee, Ph.D., *Department of Psychiatry, Yale University School of Medicine, New Haven, CT*

Cheryl Higbee, M.P.H., *Roswell Park Cancer Institute, Buffalo, NY*

Stephanie O'Malley, Ph.D., *Department of Psychiatry, Yale University School of Medicine, New Haven, CT*

Louise Hassan, Ph.D., *School of Management, University of St. Andrews, Scotland, UK*

Ron Borland Ph.D., *Cancer Control Institute, Victoria, Australia*

K. Michael Cummings, Ph.D., M.P.H., *Roswell Park Cancer Institute, Buffalo, NY*

Gerard Hastings, Ph.D., *Institute for Social Marketing and the Center for Tobacco Control Research, University of Stirling and the Open University, Scotland, UK*

Geoffrey T. Fong, Ph.D., *Department of Psychology, University of Waterloo, Ontario Institute for Cancer Research, Ontario, Canada*

Andrew Hyland, Ph.D., *Roswell Park Cancer Institute, Buffalo, NY*

Corresponding Author:

Sherry A. McKee, Ph.D., *Department of Psychiatry, Yale University School of Medicine, 2 Church St. South, Suite 109, New Haven, CT 06519, USA. Telephone: 203-737-3529; Fax: 203-737-4243; E-mail: sherry.mckee@yale.edu*

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et al., 2004; Hurt et al., 1994; McKee, Falba, O'Malley, Sindelar, & O'Connor, 2007), and the severity of alcohol and tobacco dependence are positively correlated (Ellingstad, Sobell, Sobell, Cleland, & Agrawal, 1999; Gulliver et al., 1995). Smoking also is highly correlated with drinking in individuals who do not meet criteria for alcohol use disorders (Carmody, Brischetto, Matarazzo, O'Donnell, & Connor, 1985; Istvan & Matarazza, 1984), particularly among those who are heavy drinkers (Henningfield, Chait, & Griffiths, 1984; McKee et al., 2007; Mello, Mendelson, & Palmieri, 1987).

Laboratory studies and naturalistic observations have demonstrated that alcohol consumption is strongly associated with increased rates of smoking (e.g., Glautier, Clements, White, Taylor, & Stoleran, 1996; Griffiths, Bigelow, & Liebson, 1976; Mintz, Boyd, Rose, Charuvastra, & Jarvik, 1985; Mitchell, de Wit, & Zacny, 1995; Shiffman et al., 1994) and, conversely, that smoking increases alcohol consumption (Barrett, Tichauer, Leyton, & Pihl, 2006; Mello et al., 1987; Mello, Mendelson, Sellers, & Kuehne, 1980). Given that smoking can increase alcohol consumption during a drinking episode, we were interested in examining whether public health benefits associated with smoke-free policies would extend to reductions in drinking behavior, particularly among heavy drinkers. Heavy alcohol consumption is associated with significant health risk (i.e., hypertension, gastrointestinal bleeding, sleep disorders, major depression, hemorrhagic stroke, cirrhosis of the liver, and several cancers; Rehm et al., 2003) and is a leading cause of death (McGinnis & Foege, 1993; Meister, Whelan, & Kava, 2000). Additionally, concurrent alcohol and tobacco use is known to further exacerbate health risks associated with the singular use of each substance (Blot et al., 1988; Hurt et al., 1996; Klatsky & Armstrong, 1992; Rosengren, Wilhelmsen, & Wedel, 1993; Vaillant, Schnurr, Baron, & Gerber, 1991).

Few studies have examined the impact of smoking policies on alcohol consumption. Using longitudinal data from the U.S. Health and Retirement Survey (1992–2002), Picone, Sloan, and Trogon (2004) found that smoking regulations reduced alcohol consumption in females. However, this generalized population effect neither considered when specific state policies were enacted nor evaluated reductions in alcohol consumption as a function of smoking status or of heavy-drinking status.

The primary aim of the current study was to prospectively evaluate the impact of Scotland's smoke-free policy (prohibiting smoking in indoor public venues, including bars and pubs) on drinking behavior. As drinking and smoking are highly associated behaviors, we evaluated whether the regulations would decrease drinking behavior in public venues among smokers in Scotland. The rest of the United Kingdom (England, Wales, and Northern Ireland), which did not have comprehensive smoke-free policies during the study period, served as the comparison group. We further assessed whether this effect would be most pronounced in heavier drinkers and whether changes in drinking behavior would be reflected in changes to pub attendance. Finally, we assessed whether any decreases in drinking behavior in public venues would be offset by increased drinking in the home. While some have expressed concern that smoke-free policies may reduce drinking in pubs by increasing drinking in the home (see Reid, 2005), we did not find support for this effect using a cross-sectional design (Hyland et al., 2008). The present study examined the effect of smoke-free policies on changes in drinking behavior and location, using a more rigorous longitudinal design.

Methods

Sample

To evaluate the impact of Scotland's smoke-free policy on pub and home drinking behavior, we examined drinking behavior just prior to and 1 year after policy implementation, with the rest of the United Kingdom serving as the comparison group. Respondents were adult smokers and nonsmokers from Scotland ($n=525$; smokers = 309, nonsmokers = 216) and the rest of the United Kingdom ($n=534$; smokers = 305, nonsmokers = 229) who were surveyed on both occasions (retention rate = 66%). Data were collected by random-digit-dialed telephone survey from February to March 2006, just prior to implementation of the smoke-free law in Scotland on 26 March 2006. Follow-up surveys were collected in March 2007, 1 year after policy implementation.

The survey fieldwork was conducted by Roy Morgan Research (Melbourne, Australia), using computer-assisted telephone interviewing software. Surveys took an average of 40 min to complete and were conducted by trained interviewers. These respondents were part of a larger cohort study conducted as part of the International Tobacco Control (ITC) Policy Evaluation Project that has been described previously (for a complete description of survey and data management procedures, see Fong et al., 2006).

Respondents were recruited using probability sampling methods with telephone numbers selected at random from the population of each country, within strata defined by geographic region and community size. List-assisted numbers were obtained from Survey Sampling International. Eligible households were defined as residential homes containing at least one adult. A household informant was asked to provide the number of adult smokers in the home. Smokers received a £7 voucher to a health and beauty retailer (Boots) as an incentive to take part; nonsmokers received a smaller £4 Boots voucher commensurate with the shorter duration of the nonsmoker survey. The study protocol was standardized across the two regions and was reviewed and cleared by the research ethics board or institutional review board of the University of Waterloo, the University of Stirling, and Roswell Park Cancer Institute.

Measures

The measures included in the ITC Scotland/U.K. Survey were originally adapted from the ITC Four Country Survey, a cohort telephone survey of more than 2,000 adult smokers in each of four countries (Canada, United States, United Kingdom, and Australia), conducted annually since 2002 (Fong et al., 2006).

Drinking patterns. Given that our primary outcome was quantity of drinks consumed per week (drinks per day and beverage type were not available), we used the National Institute on Alcohol Abuse and Alcoholism (NIAAA) weekly guidelines to determine moderate- and heavy-drinking status (U.S. Department of Health and Human Services [USDHHS], 2005). NIAAA defines heavy or hazardous drinking as those exceeding gender-specific weekly limits (males, more than 14 drinks/week; females, more than 7 drinks/week). To determine participants' drinking status, we used the question, "In a typical week when you do drink alcohol, how many alcoholic drinks do you usually consume?" A typical drink was defined as a small glass of wine, a half pint of beer,

Table 1. Demographic characteristics by region and drinking status at pre-legislation baseline

Characteristics	Scotland				Rest of the United Kingdom			
	All (<i>n</i> = 525)	Abstainers (<i>n</i> = 121) 23.1%	Moderate drinkers (<i>n</i> = 253) 48.1%	Heavy ^a drinkers (<i>n</i> = 146) 27.7%	All (<i>n</i> = 534)	Abstainers (<i>n</i> = 102) 19.0%	Moderate drinkers (<i>n</i> = 321) 60.0%	Heavy drinkers (<i>n</i> = 109) 20.4%
Sex								
Female	260, 49.5	67, 26.0	123, 47.7	68, 26.4	270, 50.5	71, 26.5	146, 54.5	51, 19.0*
Male	265, 50.5	54, 20.6	130, 49.6	78, 29.8	264, 49.5	31, 11.7	175, 66.3	58, 22.0
Age (years)								
18–24	60, 11.5	8, 13.8	10, 17.2	40, 69.0*	69, 12.9	10, 14.5	41, 59.4	18, 26.1
25–39	129, 24.6	18, 14.0	71, 55.0	40, 31.0	161, 30.2	29, 18.1	97, 60.6	34, 21.3
40–54	171, 32.6	36, 21.3	94, 55.6	39, 23.1	149, 28.0	25, 16.8	87, 58.4	37, 24.8
55+	164, 31.3	58, 35.8	78, 48.1	26, 16.0	155, 29.0	38, 24.8	95, 62.1	20, 13.1
Ethnicity								
White	500, 95.3	107, 21.6	244, 49.3	144, 29.1*	475, 88.9	78, 16.6	289, 61.4	104, 22.1*
Other	23, 4.4	14, 60.9	8, 34.8	1, 4.3	57, 10.7	23, 40.4	30, 52.6	4, 7.0
Education ^b								
Low	272, 51.9	77, 28.6	134, 49.8	58, 21.6 *	275, 51.4	71, 26.1	156, 57.4	45, 16.5*
Moderate	157, 29.9	28, 18.2	68, 44.2	58, 37.7	154, 28.9	19, 12.4	95, 62.1	39, 25.5
High	94, 18.0	16, 17.0	49, 52.1	29, 30.9	104, 19.4	11, 10.6	68, 65.4	25, 24.0
Income ^c								
Low	184, 35.1	60, 32.8	81, 44.3	42, 23.0*	141, 26.5	40, 28.4	82, 58.2	19, 13.5*
Moderate	146, 27.8	36, 25.0	63, 43.8	45, 31.3	150, 28.1	32, 21.6	91, 61.5	25, 16.9
High	155, 29.6	18, 11.7	96, 62.3	40, 26.0	207, 38.7	23, 11.2	125, 60.7	58, 28.2
Smoking status								
Smoker ^d	309, 58.9	82, 27.1	123, 40.6	98, 32.3*	305, 57.1	58, 19.1	163, 53.6	83, 27.3*
Nonsmoker	216, 41.1	39, 18.1	129, 59.7	48, 22.2	229, 42.9	43, 18.9	158, 69.6	26, 11.5
Cigarettes per day ^e								
1–20	247, 80.1	58, 23.8	105, 43.0	81, 33.2*	251, 82.4	49, 19.6	134, 53.6	67, 26.8
21+	62, 19.9	24, 41.4	18, 31.0	16, 27.6	54, 17.6	9, 17.0	28, 52.8	16, 30.2

Note. All values are numbers of subjects with percentages calculated within country and within characteristic.

^aDrinking status was calculated from the total number of drinks of alcoholic beverages consumed in a typical week at baseline. For males, 0 drinks = abstainers; 1–14 drinks = moderate; and 15+ drinks = heavy. For females, 0 drinks = abstainers; 1–7 drinks = moderate; and 8+ drinks = heavy.

^bEducation: low = secondary/vocational level 3 or less; moderate = college/university (no degree); and high = completed university or postgraduate.

^cIncome: low = 30,000 or under; moderate = 30,000–44,999; and high = 45,000 and over (€ in Ireland, £ in the the United Kingdom).

^dSmoking was defined as any cigarette smoking in the past 30 days.

^eIn the subset of smokers.

**p* < .05 for chi-square test of each variable by drinking status level.

or a standard measure of spirits. Using drinking data obtained prior to implementation of the smoke-free policy, we coded as abstainers those participants who reported consuming no alcohol on a weekly basis (*n* = 222). Those consuming alcohol but not exceeding the gender-specific weekly limits were coded as moderate drinkers (*n* = 573), which also included low or minimal drinkers. Participants who exceeded the gender-specific weekly drinking limits were coded as heavy drinkers (*n* = 254).

The measure that we used to assess changes in drinking across different locations was adapted from Treno, Alaniz, and Gruenewald (2000). Across both waves, respondents were asked, “In the past week, approximately how many alcoholic beverages have you consumed *over the entire week* at each of the following places? At home, at the homes of others, at parties or events in a

social venue, at pubs or bars, at restaurants, or somewhere else?” Changes in drinking were calculated as post-legislation drinking quantities minus pre-legislation drinking quantities across home, pub, and all locations.

Smoking patterns. A smoker was defined as an individual who reported lifetime smoking of at least 100 cigarettes and who also reported currently smoking at least once per month. A nonsmoker was defined as an individual who reported no smoking in the past month. Participants were asked, “How often have you allowed yourself a cigarette?” The following responses indicated current smoking: “daily,” “less than daily but at least once per week,” and “less than weekly but at least once per month.” Participants also reported the mean number of cigarettes smoked per day.

Table 2. Mean (SE) alcoholic beverages consumed in a typical week at pre-legislation baseline by smoking status, drinking status, and region (among those who reported alcohol consumption at baseline and completed both survey waves, $n=828$)

Smoking status ^a	Drinking status ^b	Region	Alcoholic beverages consumed in a typical week at baseline (M, SE)		
			All ^c	At home	In pubs/bars
Smoker	Moderate ($n=286$)	Rest of the United Kingdom	5.00 (0.24)*	2.78 (0.36)	2.67 (0.36)
		Scotland	5.91 (0.32)	3.11 (0.42)	1.79 (0.31)
	Heavy ($n=181$)	Rest of the United Kingdom	23.45 (1.52)	11.00 (1.44)	7.66 (0.91)
		Scotland	25.47 (2.02)	8.64 (1.26)	12.02 (1.89)
Nonsmoker	Moderate ($n=287$)	Rest of the United Kingdom	4.44 (0.24)	2.26 (0.24)	1.00 (0.17)
		Scotland	4.30 (0.25)	1.92 (0.24)	1.47 (0.34)
	Heavy ($n=74$)	Rest of the United Kingdom	17.05 (1.80)	10.66 (2.10)*	4.22 (1.34)
		Scotland	17.59 (1.13)	6.73 (0.81)	6.88 (1.23)

Note. ^aSmoking was defined as any cigarette smoking in the past 30 days.

^bDrinking status was calculated from the total number of drinks of alcoholic beverages consumed in a typical week at baseline. For males, 1–14 drinkers = moderate; 15+ drinks = heavy. For females, 1–7 drinks = moderate; 8+ drinks = heavy.

^cFrom a general question about the number of alcoholic drinks consumed in the past 7 days.

* $p < .05$, mean comparison of United Kingdom versus Scotland, within smoking and drinking status.

Pub attendance. At the 1-year follow-up assessment, participants were asked, “Do you now visit pubs more often than a year ago, less often, or about the same amount?” Responses for pub attendance were categorized as “the same,” “more often,” or “less often.”

Data analyses

Chi-square analyses were conducted to evaluate the absolute and relative frequencies of drinking status by region (Scotland and United Kingdom) across demographic variables and smoking status. For drinking locations (all, home, and pub), we conducted separate baseline mean comparisons of drinking amounts across regions (Scotland and United Kingdom), within smoking status (smoker and nonsmoker), and within drinking status (moderate and heavy drinker). Separate linear regressions, controlling for demographic variables, were used to evaluate main and interactive changes in drinking amounts (post-legislation minus pre-legislation values) by smoking status (smoker and nonsmoker), drinking status (moderate and heavy), and region (Scotland and United Kingdom). To further test our hypotheses, a priori mean comparisons of changes in drinks consumed in pubs and homes pre- to post-legislation across region (Scotland, United Kingdom) were conducted within smoking status (smoker and nonsmoker) and drinking status (moderate and heavy drinker). Chi-square analyses were conducted to examine changes in pub attendance (same or more vs. less) by drinking status (abstainer, moderate, and heavy), within smoking status (smoker and nonsmoker), and region (Scotland and United Kingdom) categories. Results were weighted to be nationally representative of the smoker demographics within each country.

Results

Baseline characteristics

Demographic characteristics and smoking status for each region (Scotland and United Kingdom) by drinking status at baseline

are presented in Table 1. Drinking status was associated with sex, age, ethnicity, education, income, and smoking status. Given these results, we included the demographic variables as control variables in the primary regression analyses assessing changes in drinking behavior.

Baseline drinking behavior is presented in Table 2. Overall, smokers consumed more alcohol than did nonsmokers, and baseline drinking was equivalent between Scotland and the United Kingdom, with two exceptions. Mean comparisons demonstrated that drinking across all locations in moderate-drinking smokers was greater in Scotland than in the United Kingdom. Heavy-drinking nonsmokers consumed more drinks in the home in the United Kingdom than in Scotland.

Changes in drinking behavior pre- to post-legislation

Regression analyses of changes in overall drinking behavior across all drinking locations demonstrated no main or interactive effects of drinking status, smoking status, or region on changes in drinking behavior pre- to post-legislation in the home or in pubs (data not shown). However, a priori comparisons of changes in drinking behavior demonstrated significant effects of region and within smoking and drinking status (see Figure 1a–c). Figure 1a shows that significant decreases in the total number of weekly drinks consumed were observed in Scottish moderate drinkers compared with moderate drinkers in the rest of the United Kingdom but that small increases in total weekly consumption were observed among Scottish nonsmokers. When the results were stratified by the location in which drinks were consumed, strong and consistent associations were observed such that Scottish smokers had decreased their weekly drink consumption in pubs by about 4 drinks/week relative to U.K. smokers (Figure 1b). Specifically, Scottish heavy-drinking smokers demonstrated the greatest reductions in pub drinking behavior pre- (12.02 drinks/week) to post-legislation (6.31 drinks/week, 47.5% reduction) compared with heavy-drinking

Figure 1. (a) Mean change in drinks consumed per week (post-legislation minus pre-legislation) among smokers across all locations by drinking status and region. (b) Mean change in drinks consumed per week (post-legislation minus pre-legislation) among smokers in pubs or bars by drinking status and region. (c) Mean change in drinks consumed per week (post-legislation minus pre-legislation) among smokers in the home by drinking status and region. * $p < .05$.

smokers in the United Kingdom (7.66 drinks/week pre-legislation to 5.72 drinks/week post-legislation). No differences were observed in the number of drinks consumed at home (Figure 1c).

Changes in pub attendance

We found, during the post-legislation period, no overall differences in pub attendance between smokers in Scotland and the United Kingdom (see Table 3). However, when drinking status was considered, heavy- and moderate-drinking smokers in Scotland were less likely to frequent pubs or bars compared with moderate- and heavy-drinking smokers in the rest of the United Kingdom, but fewer Scottish smokers who abstained from alcohol reported going to pubs less often compared with the rest of the U.K. smokers who abstained. Also, fewer Scottish nonsmokers reported going to pubs less often compared with nonsmokers in the rest of the United Kingdom, regardless of their level of alcohol consumption.

Discussion

When we considered overall alcohol consumption, we found no statistical differences in drinking among Scottish participants compared with those in the rest of the United Kingdom. However, in subset analyses, we observed significant decreases in alcohol consumption in pubs among both moderate- and heavy-drinking Scottish smokers compared with smokers in the rest of the United Kingdom. We observed no commensurate increase in home drinking. Consistent with these findings, we observed decreases in self-reported pub patronage among Scottish smokers who consumed alcohol compared with smokers in the rest of the United Kingdom. However, Scottish nonsmokers reported more pub patronage after the smoke-free law, which is consistent with another report showing no overall change in the frequency of pub patronage but some increases among non-smokers and some decreases among smokers (Hyland et al., 2008). These empirical results from the present study are similar to those demonstrating that smoke-free policies do not have an adverse economic impact on the hospitality sector (Centers for Disease Control and Prevention, 2004; Cowling & Bond, 2005; Hirasuna, 2006; Ludbrook, Bird, & van Teijlingen, 2004; Scollo, Lal, Hyland, & Glantz, 2003; Smoke Free Europe Partnership, n.d.; Thomson & Wilson, 2006). Although some people may decrease their spending in pubs and restaurants, others may increase their spending, yielding no discernable net effect.

The finding that the heaviest drinking smokers in Scotland reduced their alcohol consumption in pubs by about 6 drinks/week (47.5% of baseline levels) is consistent with findings suggesting that alcohol and tobacco interactions appear to be most pronounced in heavier drinkers (Henningfield et al., 1984; McKee et al., 2007; Mello et al., 1987). Findings such as these indicate that smoking restrictions may have additional public health benefits as a result of lowered alcohol consumption among those at the greatest risk for negative alcohol-related consequences (Rehm et al., 2003). We also explored whether evidence indicated an interactive relationship between country and amount smoked and two demographic factors, gender and socioeconomic status. We observed no statistically significant associations, although the results trended toward seeing larger decreases in drinking behavior in heavier smokers and men who lived in Scotland. To examine how smoke-free policies affect various subpopulations, more detailed studies are needed that are designed expressly to address this question.

The present study shows that drinking behavior is not displaced from pubs to the home, a finding consistent with other studies that have shown that smoking inside the home does not increase following smoke-free pub legislation (Fong et al., 2006; Hyland et al., 2008). The theory that smoke-free policies somehow displace drinking and smoking behaviors from pubs into homes is not empirically supported by the current study.

We were unable to examine the effect of the smoke-free policy on the intensity of drinking during a drinking episode because of the way alcohol use was queried. Future investigations of the effect of smoke-free policies on alcohol consumption would benefit from collecting more detailed information concerning weekly frequency of consumption by location, and quantity of drinks consumed per episode for each location. Investigators could then disentangle the potential effects of smoke-free policies on frequency and quantity of alcohol consumption for each drinking location. Additionally, it would be beneficial to determine whether

Table 3. Pub attendance 1-year post-legislation by drinking status, smoking status, and region (n = 1,045)

Scotland					Rest of the United Kingdom				
Number of Subjects	All	Abstainers	Moderate Drinkers	Heavy Drinkers ^b	Number of Subjects	All	Abstainers	Moderate Drinkers	Heavy Drinkers
5	1.7%	0.0%	0.0%	5.2%	16	5.3%	3.6%	8.0%	1.2%
232	76.8%	93.9%	73.2%	67.0%	224	74.6%	78.6%	70.6%	79.8%
65	21.5%	6.1%	26.8%	27.8%*	61	20.1%	17.9%	21.5%	19.0%
33	15.3%	15.8%	14.0%	18.8%	9	4.0%	0.0%	3.8%	11.5%
176	81.9%	76.3%	83.7%	81.3%	176	77.5%	90.7%	74.7%	73.1%
6	2.8%	7.9%	2.3%	0.0%	42	18.5%	9.3%	21.5%	15.4%

Note. ^aSmoking was defined as any cigarette smoking in the past 30 days.

^bDrinking status was calculated from the total number of drinks of alcoholic beverages consumed in a typical week at baseline. For males, 0 drinks = abstainer; 1–14 drinkers = moderate; and 15+ drinks = heavy. For females, 0 drinks = abstainer; 1–7 drinks = moderate; and 8+ drinks = heavy.

* $p < .01$ for chi-square test of drinker status by pub attendance in Scottish smokers only.

daily drinking limits have been exceeded. NIAAA guidelines (US-DHHS, 2005) define excessive drinking as males who exceed five drinks in a day and females who exceed four drinks in a day at least once in the past year. These daily drinking limits are consistent with U.K. Department of Health (2007) guidelines for low-risk, single-occasion drinking, which suggest that men not consume more than 3–4 units/day (8 g of pure alcohol per unit) and females not consume more than 2–3 units/day. Exceeding daily drinking limits has been shown to be more predictive of negative alcohol-related consequences than exceeding weekly drinking limits (Dawson, Grant, & Li, 2005).

Strengths of the present study include the longitudinal cohort design, evaluation of smoking status and drinking behavior across locations in Scotland, and a matched control group in the rest of the United Kingdom prior to and following implementation of the smoke-free legislation. Both alcohol and tobacco excise taxes are the same throughout the United Kingdom, ruling out this potential confounding influence. Potential limitations include a lack of biochemical or collateral confirmation of smoking and drinking behavior, respectively. However, we have no reason to think that there would be a difference in bias due to self-report in Scotland versus the rest of the United Kingdom.

Although 34% of the cohort was lost to follow-up between waves, drinking and country status were not significant predictors of being lost to follow-up. Smokers were less likely to complete the follow-up interview; however, because follow-up rates did not differ between countries, we do not expect this factor to alter the findings and conclusions. However, it is unknown whether these results will generalize to other countries.

One year after the implementation of the smoke-free policy in Scotland, the legislation had some effect on reducing drinking behavior in moderate- and heavy-drinking smokers in Scottish pubs without any increase in drinking in the home in Scotland. Although future studies should assess the longer term impact of smoke-free policies on drinking behavior using a more detailed assessment of alcohol use, this study provides some initial indications that the public health benefits of smoke-free policies may extend beyond smoking-related outcomes.

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Declaration of Interests

None declared.

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