

Evaluation of implementation, compliance and acceptance of partial smoking bans among hospitality workers before and after the Swiss Tobacco Control Act

Sarah Rajkumar^{1,2,†}, Susanne Hoffmann^{3,†}, Martin Rössli^{1,2}, Georg F. Bauer³

¹Swiss Tropical and Public Health Institute, Basel 4002, Switzerland

²University of Basel, Basel 4003, Switzerland

³Institute of Social and Preventive Medicine, University of Zürich and Center for Organizational and Occupational Sciences, ETH Zurich, Hirschengraben 84, Zurich 8001, Switzerland

Address correspondence to Georg Bauer, E-mail: gfbauer@ifspm.uzh.ch

ABSTRACT

Background The World Health Organization recommends uniform comprehensive smoking bans in public places. In Switzerland, regulations differ between various areas and are mostly incomplete for hospitality venues. As ambiguous regulations offer more leeway for implementation, we evaluated the Swiss regulations with respect to their effects on implementation, acceptance and compliance among hospitality workers.

Methods In our longitudinal study, a standardized, self-administered questionnaire was mailed to a sample of 185 hospitality workers before and 4–6 month after the smoking ban came into effect. The matched longitudinal sample comprised 71 participants (repeated response rate 38.4%). We developed a seven-item acceptance scale. Logistic regressions were performed to explore the factors associated with acceptance.

Results Acceptance of smoking bans was influenced by smoking status and perceived annoyance with second-hand smoke in private. Although not statistically significant ($P = 0.09$), we found some indications that post-ban acceptance increased in an area with strict regulations, whereas it decreased in two areas with less stringent regulations.

Conclusions Tobacco bans in Swiss hospitality venues are still in a period of consolidation. The incomplete nature of the law may also have had a negative impact on the development of greater acceptance.

Keywords acceptance, environmental tobacco smoke, implementation research, second-hand smoke, workplace health promotion

Introduction

Smoking policies, such as smoking restrictions in public areas, aim to (i) reduce second-hand smoke (SHS) for the purpose of protecting non-smokers, (ii) reduce tobacco consumption among smokers and (iii) encourage smoking cessation.¹ Thus, most effectiveness studies dealing with the impact of smoking bans focus either on medical issues, SHS exposure or changes in smoking behaviour.^{2–5} However, implementing a new regulation such as a smoking ban can only succeed if the target group accepts and complies with the new rule.^{5–8} This particularly applies to situations where partial bans allow for a variation in the degree of implementation, as is the case in Switzerland. After intense public debate, and disregarding the World Health Organization (WHO) recommendation for total smoking bans, the Swiss Federal Law on protection from

SHS partially banned smoking in closed public spaces, including hospitality venues, in May 2010. Small bars and restaurants up to 80 m² remain open to smokers if they are marked on the outside as smoking establishments and if the staff have agreed to work there. Larger venues have the option of providing designated smoking rooms with ventilation. The cantons—administrative zones in Switzerland—are allowed to tighten these regulations. As a consequence, numerous

[†]These authors contributed equally to this study.

Sarah Rajkumar, Post-Doctoral Researcher

Susanne Hoffmann, Post-Doctoral Researcher

Martin Rössli, Professor of Epidemiology

Georg F. Bauer, Head Division of Public and Organizational Health

regulations with different exceptions have been introduced in various cantons in Switzerland.

This situation raises the question as to the role of psychosocial factors such as acceptance and compliance in the implementation of smoking regulations. The few available research results on these issues are inconsistent due to heterogeneous concepts and operationalizations. Borland *et al.* (2006) report high compliance with smoking bans and greater support for total smoking bans by a smoking sample from the general population.⁹ They assessed attitudes to smoking restriction, asking whether smoking should be allowed in some areas. Thomson and Wilson (2006) report increasing public support 6 months after implementation of the New Zealand act, measuring attitudes to workers' rights to smoke-free workplaces and support for smoke-free hospitality venues.¹⁰ Other studies examined attitudes towards smoking regulations via an assessment of agreement versus disagreement in a sample of workers in the metal industry¹¹ or approval versus non-approval among the general population.¹²

For our study, we define acceptance as the expression of consent to and support of the current smoking bans. Compliance covers how smoking bans are respected and evaluated by both employees and guests. Hospitality workers are of particular interest in this context: first, they are significantly more exposed to SHS compared with other occupational groups.¹³ Thus, they benefit the most from complete bans. Several studies addressed the impact of a complete smoking ban in hospitality venues on the health of the employees and found a consistent decrease of self-reported respiratory symptoms after reduction of the exposure.^{14–19} Secondly, they are confronted with the implementation of bans directly as they have to enforce the bans among their guests. Thus, we assume acceptance of smoking bans among them as an important factor for a successful implementation of smoking restrictions.

Study aim and research questions

Our study aimed to evaluate the partial smoking regulations in hospitality venues introduced by the Swiss Tobacco Control Act with respect to the degree of their implementation, acceptance and compliance. The specific research questions were the following:

- (i) Did the smoking regulations in hospitality venues change after the ban came into effect?
- (ii) Did compliance and acceptance of smoking regulations change after the ban?
- (iii) Which factors are associated with acceptance of smoking regulations after the ban and are changes in acceptance related to the smoking regulation of the respective canton?

Methods

In our longitudinal study, a standardized, self-administered questionnaire was mailed to a convenience sample of hospitality workers in the Swiss cantons of Basel City (BS), Basel County (BL) and Zurich (ZH) before and after the law came into effect in May 2010.

Sample and response

From March to May 2010, study participants were recruited in their workplace either by site visits or letters sent to venues and by newspaper ads. These participants received the questionnaire by mail. Some participants also took part in a related medical study and completed the questionnaire by themselves during their medical examination or mailed it in afterwards. The follow-up survey was conducted 4–6 months after the law came into effect. Both surveys included reminder mailings to non-responders. The overall sample size was 185. In the first survey, 109 hospitality workers participated (response rate: 58.9%) and 83 in the second survey (response rate: 44.9%). The matched longitudinal sample consists of 71 participants (repeated response rate: 38.4%), working in 45 different venues. Table 1 shows the response rates split up for the four participating cantons as well as the proportion of participants recruited during the medical examination. Accordingly, in the canton BL, the response rate was higher than in the other cantons as a larger proportion of the participants had been recruited during the medical examination where people could be better motivated to participate in the survey than through mailing the questionnaires.

Questionnaire

A self-administered questionnaire was developed on the basis of an extensive literature review. The content of the questionnaire was guided by the above-listed research questions and by the availability of previously validated instruments. Items previously applied for oral interviews were adapted to a written survey. The questionnaire was conducted in German and contained 83 questions about current smoking regulations at the workplace and their compliance.^{5,6,20,21} Acceptance of smoking bans was assessed in the form of progressive support for bans in restaurants and bars. Based on previous operationalizations, acceptance was determined by 10-items on a 6-point Likert scale covering the range from complete agreement to no agreement at all plus a response option 'I do not know'.²² These items covered the three aspects of acceptance previously identified in the literature: cognitive acceptance issues (personal relevance, knowledge), social factors (perception of non-smoking as a social norm and perception of relevant peers) and proactive acceptance.^{6,23–26} Factors possibly associated with

Table 1 Overall sample size and response rates stratified for the different cantons

	Total (n = 185)		AG (n = 5)		BL (n = 18)		BS (n = 101)		ZH (n = 61)	
	All	Med only (n = 57)	All	Med only (n = 1)	All	Med only (n = 14)	All	Med only (n = 25)	All	Med only (n = 17)
Response rate baseline (%)	109 (58.9)	41 (71.9)	0 (0)	0 (0)	15 (83.3)	11 (78.6)	61 (60.4)	18 (72)	33 (54.1)	12 (70.6)
Response rate follow-up (%)	83 (44.9)	43 (75.4)	0 (0)	0 (0)	14 (77.8)	12 (85.7)	43 (42.6)	18 (72)	26 (42.6)	13 (76.5)
Response rate matched sample (%)	71 (38.4)	35 (61.4)	0 (0)	0 (0)	13 (72.2)	11 (78.6)	36 (35.6)	14 (56)	22 (36.1)	10 (58.9)

AG, Aargau; BL, Basel-Land; BS, Basel-Stadt; ZH, Zurich.

acceptance were self-reported exposure to SHS at work and in private²⁷ and perceived annoyance at the workplace and as a guest. Smoking status and behaviour (smokers only) were assessed according to the WHO definition.²⁸ Cardio-respiratory health and allergies were surveyed with a selection of questions adapted from the Sapaldia II questionnaire.²⁹

Refinement of the acceptance scale

The newly developed acceptance scale was initially tested with all baseline data. For the 10-item acceptance scale, we found a Cronbach's $\alpha = 0.80$ ($n = 100$). The normally distributed 10-item scale correlates significantly with the independent item 'attitude to the law' ($r = 0.647$). Nevertheless, three items reduced the reliability of the scale: perception of non-smoking as a social norm (Cronbach's α if item deleted = 0.83, $n = 103$), information about cantonal smoking bans (Cronbach's α if item deleted = 0.85, $n = 105$) and proactive acceptance (Cronbach's α if item deleted = 0.87, $n = 112$). Since all three items have many missing values, they were excluded from further analyses. As exploratory factor analysis found no consistent factor structure, we used the one-factorial, normally distributed seven-item acceptance scale (Cronbach's $\alpha = 0.87$, Table 2) for further analysis. To include as many cases as possible, we used a mean scale with at least six of seven valid items. Within our longitudinal sample ($n = 71$), the seven-item acceptance scale yields a Cronbach's $\alpha = 0.85$ at baseline and a Cronbach's $\alpha = 0.82$ at follow-up.

Data analysis

Statistical analysis was performed using SPSS (Version 19.0.0, IBM). We applied the chi-square hypothesis test to compare baseline to follow-up. To explore which factors were associated with acceptance we applied logistic regression with follow-up data in a forward selection procedure. The final model contains apart from sex, age and smoking

Table 2 Items chosen for seven-item acceptance scale rated on a six-point Likert-scale

No.	Item
1	It is important to protect staff and guests from SHS
2	Public smoking bans infringe personal freedom
3	Non-smokers are harmed by SHS
4	Non-smokers are bothered by SHS
5	Most of our guests agree to smoking bans in bars and restaurants
6	Most of my colleagues agree to smoking bans in bars and restaurants
7	The head of our venue agrees to smoking bans in bars and restaurants

Original German items are translated into English. Item 2 was inversely coded. Each six-point item ranged from 'I completely agree' to 'I do not agree at all' plus a response option 'I do not know'.

status perceived annoyance at the workplace and feeling annoyed as a guest in a hospitality venue as independent variables.

Results

In the matched longitudinal sample ($n = 71$) 49.3% were non-smokers (including ex-smokers) and 64.8% were women. The average age was 40.0 [95% confidence interval (CI): 36.9–43.2]. For 85.5% working in the hospitality sector was the main employment and 85.5% were permanently employed.

Implementation of smoking regulations in hospitality venues

The smoking regulations for guests and employees before and after implementation of the law are shown in Fig. 1.

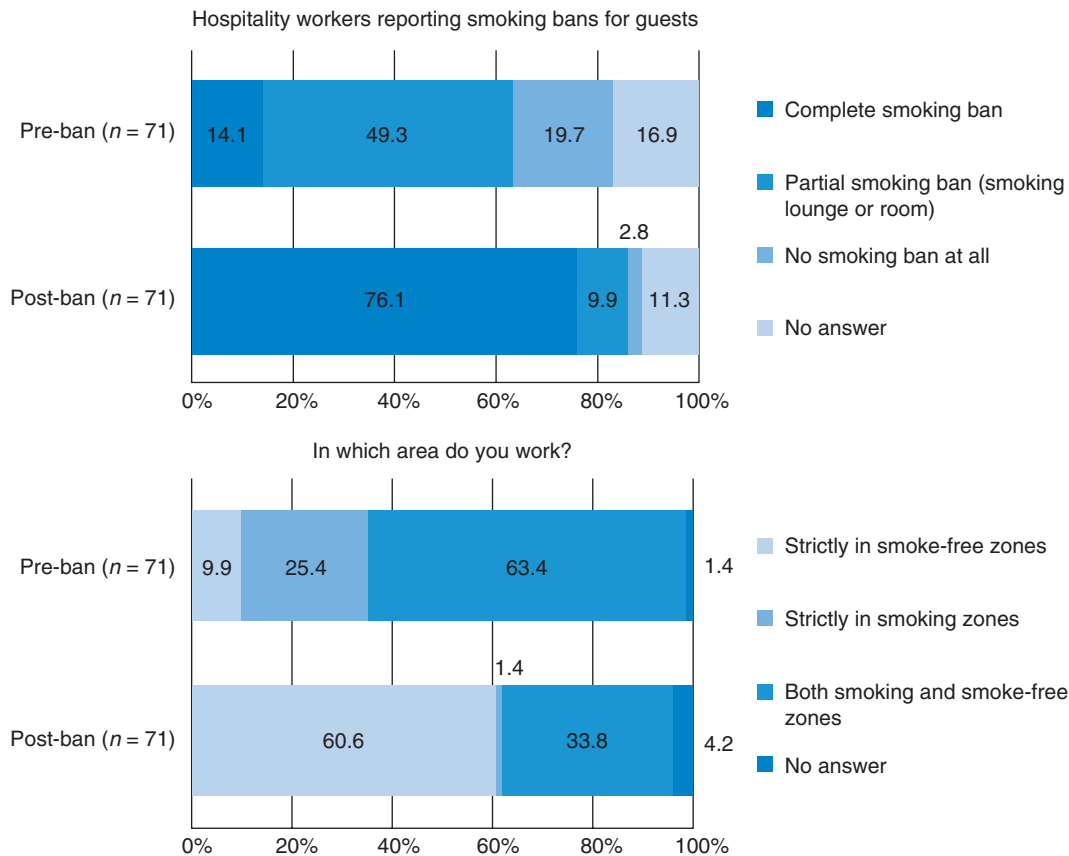


Fig. 1 Implementation of smoking regulations in hospitality venues before and after the Swiss Tobacco Control Act ($n = 71$).

Compared with 14.1% before the law, 76.1% of the hospitality workers reported a complete smoking ban after implementation ($P < 0.001$). More than half of the employees exclusively worked in strictly smoke-free areas (60.6%) after the ban came into effect, while only 1.4% reported still working in smoking sections only ($P < 0.001$).

Changes in compliance and acceptance

Figure 2 shows changes in compliance with smoking regulations in the venues. The majority of hospitality workers considered the prevailing smoking regulations for both guests and employees to be adequate—both before and after the new law. After it came into force, more persons considered the current smoking ban as too strict both for guests (plus 12.6%; $P = 0.013$) and employees (plus 8.5%; $P = 0.25$). Nevertheless, regulations were more often reported to be respected by guests ($P = 0.001$) and employees ($P = 0.16$). From baseline to follow-up, the percentage of study participants who felt annoyed by SHS at work dropped from 52.9 to 13.4% ($P < 0.001$). From baseline to follow-up, the percentage of study participants who felt annoyed by SHS as a guest dropped from 50.0 to 42.4% ($p = 0.628$). In addition, Fig. 2

shows that there was no bias when comparing way of recruitment for the study (during medical examination or via mail) and when comparing baseline results for baseline only versus longitudinal participants.

Figure 3 shows similar changes of the acceptance in relation to the stringency of the cantonal law for both smokers and non-smokers: in ZH and BS, two cantons that allowed exceptions, acceptance had decreased 6 months after the law. In BL where a complete smoking ban was implemented, acceptance increased for both non-smokers and smokers ($P = 0.09$ for interaction between canton and pre/post-acceptance).

Factors associated with acceptance

In our longitudinal sample, follow-up-acceptance correlates significantly with perceived annoyance at the workplace ($r = 0.71$) and as a guest in private ($r = 0.74$). Figure 3 shows that non-smokers had a higher acceptance score than smokers at all times ($P < 0.001$). Among non-smokers the acceptance score changed from 3.55 (95% CI: 3.24–3.87) at baseline to 3.43 (95% CI: 3.12–3.73) at follow-up, in smokers the score dropped from 2.11 (95% CI: 1.71–2.52) to 1.87 (95% CI: 1.47–2.72). A multiple regression analysis showed that

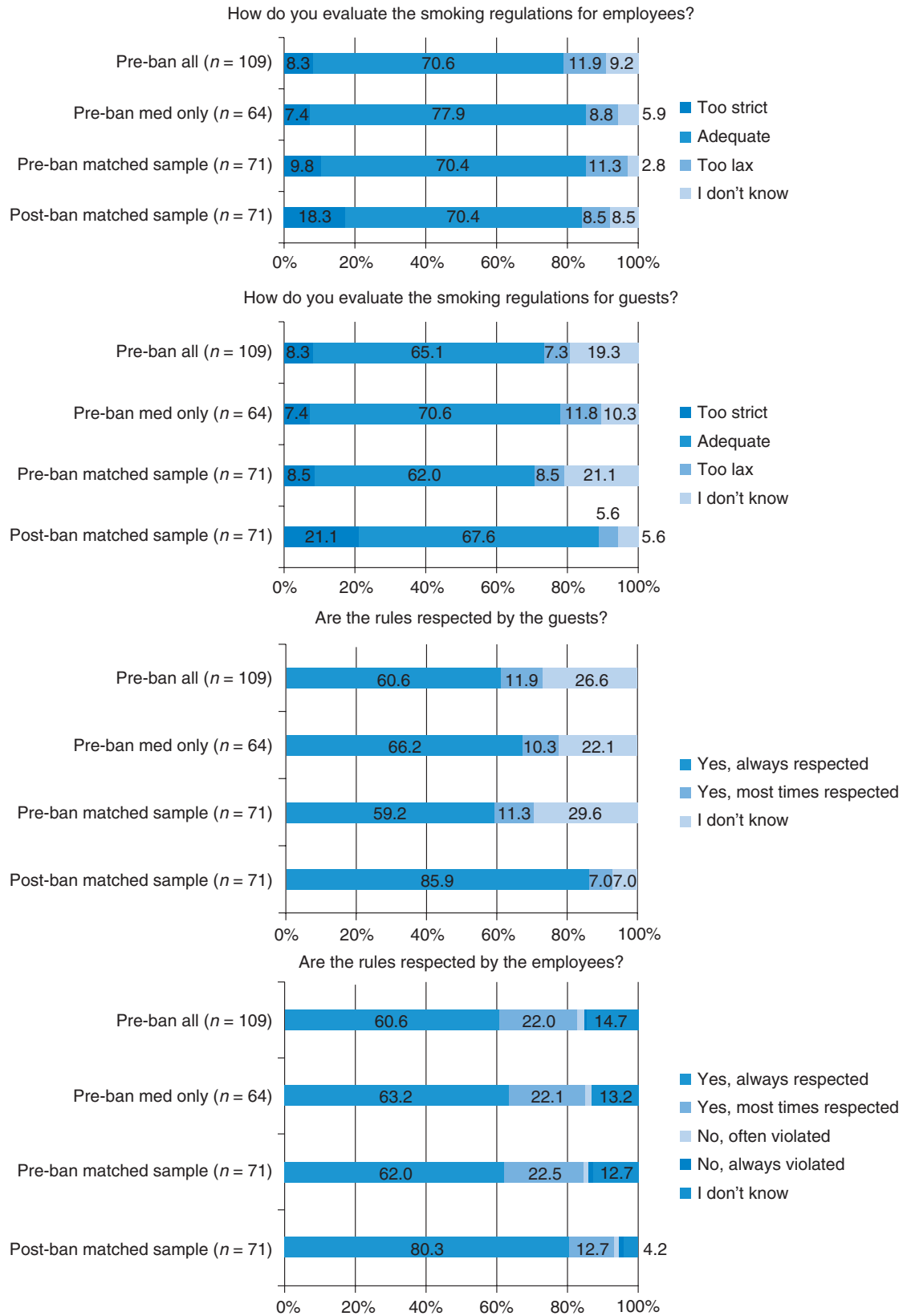


Fig. 2 Compliance with smoking regulations in hospitality venues before and after the Swiss Tobacco Control Act. Pre-ban all: all baseline respondents. Pre-ban med only: all baseline respondents who participated in the medical examination (not covered in this article). Pre-Ban matched sample: all respondents who participated twice, at baseline. Post-ban matched sample: all respondents who participated twice, at follow-up.

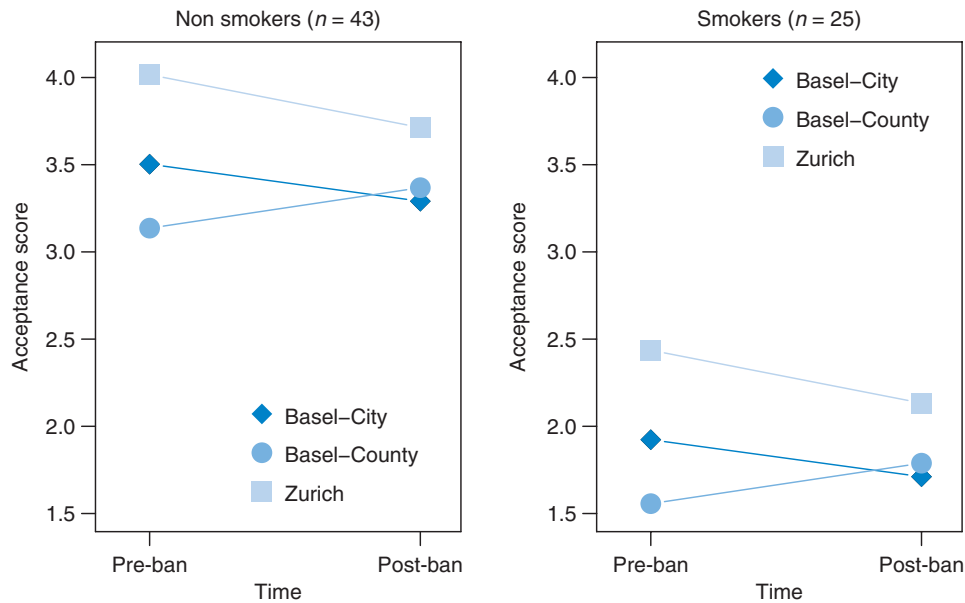


Fig. 3 Changes in acceptance of smoking ban in Basel City (BS), Basel County (BL) and Zurich (ZH).

Table 3 Linear regression analysis predicting follow-up acceptance of smoking regulations ($N = 63$)

Variables	Coefficient (95% CI)	P
Constant	2.07 (0.72 to 3.43)	0.003
Age	-0.01 (-0.29 to 0.01)	0.385
Sex (female)	0.18 (-0.34 to 0.71)	0.491
Being a smoker	-0.83 (-1.45 to -0.21)	0.009
Feeling annoyed by SHS in private (as a guest)	0.36 (0.19 to 0.54)	<0.001
Feeling annoyed by SHS at work	0.08 (-0.13 to 0.29)	0.431

Total $R^2 = 0.51$.

perceived annoyance as a guest in private and smoking status affects acceptance, whereas age, sex and perceived annoyance in the workplace were not significantly correlated with acceptance (Table 3).

Discussion

Main findings of this study

This longitudinal study evaluated heterogeneous smoking regulations in hospitality venues in Switzerland implemented via a national Tobacco Control Act in May 2010. Our results show that smoking regulations were considerably tightened after the law came into effect, leading to a complete smoking ban in most of the hospitality venues investigated (82.5%).

The implementation also improved self-reported SHS exposure, as more hospitality workers worked in less exposed areas after the law.

Hospitality workers reported better compliance of the guest and the employees with the smoking regulation after the regulations have been tightened, although the proportion of hospitality workers who evaluated the newly introduced smoking bans as too strict for the guests and themselves has increased. Regarding the factors influencing acceptance after implementation of the law, the current smoking status (non-smokers versus smokers) and perceived annoyance with SHS as a guest in private proved to be significant, explaining a large part of the variance.

What is already known

A large population survey found a marked reduction of SHS exposure in Swiss restaurants at the end of 2010³⁰ that was also confirmed with measurements in our study.³¹ Earlier international studies observed an increase of the overall level of acceptance after implementation of statutory smoking regulations, a finding we consistently only could confirm for the canton that introduced a strict smoking regulation.^{5,32} Previous studies also showed that such smoking restrictions are accepted by both non-smokers and smokers,^{9,11} although acceptance is highly influenced by personal relevance^{23,25}—as exemplified by our finding that feeling annoyed by SHS in private as a guest predicts follow-up acceptance of smoking regulations. The finding that none of the other examined factors (sex, age, perceived annoyance with SHS in the

workplace) were related to acceptance is in line with the results of general acceptance research.

What this study adds

This study provided the rare opportunity for a comparative, longitudinal study of the differential impact of different smoking regulations between cantons within the comparable cultural context of a single country. Our observation that tightened regulations are better complied with may indicate that stricter rules are more current and thus better followed. An alternative explanation may be social desirability—that employees did not want to risk any problems by admitting that rules are not respected at the time of the interview.

Contextual factors may explain the relatively small change of acceptance after the introduction of the ban compared with other countries.^{5,32} Due to the political system of basic democracy in Switzerland, the pros and cons of the new law were heavily discussed in the media and in public long before the law came into effect. Such a public discourse can stabilize the formation of opinions and consequently individual acceptance of the law before its implementation.⁶

We found a striking pattern with respect to the type of smoking regulation. In the canton that implemented a comprehensive ban, acceptance in both smokers and non-smokers was lowest prior to the introduction of the ban and increased afterwards, whereas in the two other cantons with incomplete smoking bans acceptance score decreased between baseline and follow-up.

Although not statistically significant in our small sample, this suggests that a complete ban without exceptions is the least contended. In contrast, implementation of an incomplete law does not have the same positive effect on increasing acceptance as a clear, unambiguous regulation. This provides additional support for the WHO recommendation of complete smoking bans.

Limitations of this study

Due to the intense and emotional public debate on the smoking ban, it was difficult to recruit hospitality workers for the study, leading to a small sample size and potentially to a selection bias towards workers who already had a higher acceptance of the law compared with non-participants. Further, our sample mainly consisted of German-speaking hospitality workers. This indicates that non-participants may not have completed our survey due to language problems and that one should not generalize the results to non-German-speaking hospitality workers. Thus, we assume there to be more smokers and lower acceptance among non-participants.

At study-follow-up, we did not observe a selection bias as the respondents who participated twice did not significantly differ in acceptance at baseline from the sample who only responded once. Also, as the follow-up observations were carried out within 4–6 months after implementation of the law, long-term effects of the smoking ban cannot be assessed.

Acknowledgements

The authors are grateful to Melisa Calabrese, Vicki Schweigler and Rebecca Patuto for their support in the data collection. We would also like to thank Dr Frithjof Müller for his excellent support in data analysis.

Funding

This work was supported by the Swiss Tobacco Prevention Fund (grant number 09.002032).

References

- Rose A, Fagan P, Lawrence D *et al.* The role of worksite and home smoking bans in smoking cessation among U.S. employed adult female smokers. *Am J Health Promot* 2011;**26**:26–36.
- Deutsches Krebsforschungszentrum. *Nichtraucherchutz wirkt—eine Bestandesaufnahme der internationalen und der deutschen Erfahrungen.* Heidelberg: Deutsches Krebsforschungszentrum, 2010.
- Bauer JE, Hyland A, Li Q *et al.* A longitudinal assessment of the impact of smoke-free worksite policies on tobacco use. *Am J Public Health* 2005;**95**:1024–9.
- Eriksen MP, Gottlieb NH. A review of the health impact of smoking control at the workplace. *Am J Health Promot* 1998;**13**:83–104.
- Fong GT, Hyland A, Borland R *et al.* Reductions in tobacco smoke pollution and increases in support for smoke-free public places following the implementation of comprehensive smoke-free workplace legislation in the Republic of Ireland: findings from the ITC Ireland/UK Survey. *Tob Control* 2006;**15**:iii51–8.
- Schulz PJ, Hartung U, Fiordelli M *et al.* *Raucherbot in öffentlichen Räumen—Monitoring im Tessin. Schlussbericht über die Befragungswellen 1–3 sowie die Inhaltsanalyse für die Zeit bis zum Referendum.* Lugano: Università della Svizzera italiana, 2007.
- Grewe A. *Implementierung Neuer Anreizsysteme.* München: Mering, 2000.
- Eco U. *Die Bibliothek.* München: Hanser, 1987.
- Borland R, Yong HH, Siahpush M *et al.* Support for and reported compliance with smoke-free restaurants and bars by smokers in four countries: findings from the International Tobacco Control (ITC) Four Country Survey. *Tob Control* 2006;**15**(Suppl. 3):iii34–41.
- Thomson G, Wilson N. Persisting loopholes in New Zealand's smoke-free law on tobacco marketing. *N Z Med J* 2007;**120**:U2597.

- 11 Brenner H, Born J, Novak P *et al.* Smoking behavior and attitude toward smoking regulations and passive smoking in the workplace. *Prev Med* 1997;**26**:138–43.
- 12 Passivrauchen in der Schweizer Bevölkerung 2009. Tabakmonitoring—Schweizerische Umfrage zum Tabakkonsum [database on the Internet]. Psychologisches Institut der Universität Zürich, 2010.
- 13 Deutsches Krebsforschungszentrum. Erhöhtes Gesundheitsrisiko für Beschäftigte in der Gastronomie durch Passivrauchen am Arbeitsplatz. Heidelberg, 2007.
- 14 Allwright S, Paul G, Greiner B *et al.* Legislation for smoke-free workplaces and health of bar workers in Ireland: before and after study. *BMJ* 2005;**331**:1117.
- 15 Eagan TM, Hetland J, Aaro LE. Decline in respiratory symptoms in service workers five months after a public smoking ban. *Tob Control* 2006;**15**:242–6.
- 16 Eisner MD, Smith AK, Blanc PD. Bartenders' respiratory health after establishment of smoke-free bars and taverns. *JAMA* 1998;**280**:1909–14.
- 17 Farrelly MC, Pechacek TF, Chaloupka FJ. The impact of tobacco control program expenditures on aggregate cigarette sales: 1981–2000. *J Health Econ* 2003;**22**:843–59.
- 18 Goodman P, Agnew M, McCaffrey M *et al.* Effects of the Irish smoking ban on respiratory health of bar workers and air quality in Dublin pubs. *Am J Resp Crit Care Med* 2007;**175**:840–5.
- 19 Larsson M, Boethius G, Axelsson S *et al.* Exposure to environmental tobacco smoke and health effects among hospitality workers in Sweden—before and after the implementation of a smoke-free law. *Scand J Work Environ Health* 2008;**34**:267–77.
- 20 Bauer GF, Brügger A, Deplazes S *et al.* *Konzeption und Evaluation von Tabakprävention als Integrierte Strategie des Betrieblichen Gesundheitsmanagements—Ergebnisse Eines Forschungs-Praxisprojekts zur Verbreitung von Massnahmen des Betrieblichen Gesundheitsmanagements im Kanton Zürich. Zürcher Beiträge zur Arbeits- und Organisationspsychologie.* Heft 1/2011. Zürich: ZOA, 2011.
- 21 Schulze A, Lampert T. *Bundesgesundheitsurvey: Soziale Unterschiede im Rauchverhalten und in der Passivrauchbelastung in Deutschland.* Berlin: Robert Koch-Institut, 2006.
- 22 Rost J. *Lehrbuch Testtheorie, Testkonstruktion.* Bern: Huber, 1996.
- 23 Lucke D. *Akzeptanz, Legitimität in der "Abstimmungsgesellschaft".* Opladen: Leske + Budrich, 1995.
- 24 Schade J, Baum M. Reactance or acceptance? Reactions towards the introduction of road pricing. *Trans Res* 2007;(Part A)**41**:41–8.
- 25 Schade J, Teubel U. Public acceptability of transport pricing. *LATSS Res* 1997;**21**:134–42.
- 26 Dailey RM, Richards AA, Kluever Romo L. Communication with significant others about weight management: The role of confirmation in weight management attitudes and behaviors. *Commun Res* 2010;**37**:644–73.
- 27 Passivrauchen in der Schweizer Bevölkerung 2006. Tabakmonitoring—Schweizerische Umfrage zum Tabakkonsum [database on the Internet]. Psychologisches Institut der Universität Zürich, 2007.
- 28 WHO. *Guidelines for Controlling and Monitoring the Tobacco Epidemic.* Geneva: World Health Organization, 1998.
- 29 Sisteck D, Tschopp JM, Schindler C *et al.* Clinical diagnosis of current asthma: predictive value of respiratory symptoms in the SAPALDIA study. Swiss Study on Air Pollution and Lung Diseases in Adults. *TEur Respir J* 2001;**17**:214–9.
- 30 Der Tabakkonsum der Schweizer Wohnbevölkerung in den Jahren 2001 bis 2010. Tabakmonitoring—Schweizerische Umfrage zum Tabakkonsum [database on the Internet]. Psychologisches Institut der Universität Zürich, Zurich, 2011.
- 31 Rajkumar S, Huynh CK, Bauer GF *et al.* Impact of a smoking ban in hospitality venues on second hand smoke exposure: a comparison of exposure assessment methods. *BMC Pub Health* 2013;**13**:536.
- 32 Borland R, Owen N, Hill D *et al.* Changes in acceptance of workplace smoking bans following their implementation: a prospective study. *Prev Med* 1990;**19**:314–22.