

# Social Acceptance of Smoking Restrictions During 10 Years of Policy Implementation, Reversal, and Reenactment in the Netherlands

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Original investigation

# Social Acceptance of Smoking Restrictions During 10 Years of Policy Implementation, Reversal, and Reenactment in the Netherlands: Findings From a National Population Survey

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## Abstract

**Introduction:** Little is known about the extent to which smoking restrictions are socially accepted in a country such as the Netherlands where smoking restrictions have been implemented and reversed several times. The current study assessed trends as well as factors associated with two indicators of social acceptance of smoking restrictions in the Netherlands: acceptance of smoking in public places and implementation of home smoking bans.

**Methods:** We used data from the Dutch Continuous Survey of Smoking Habits (DCSSH) between 2005 and 2014 ( $n = 182826$ ). The DCSH is a national population survey with a cross-sectional design in which respondents aged 15 years and older are surveyed weekly.

**Results:** Acceptance of smoking in public places decreased for six out of eight included venues, with the largest decrease for smoking in restaurants. The decrease in acceptance was larger among younger respondents and smokers. Smoking on terraces was an exception: decrease in acceptance there was larger among older respondents and ex-smokers. Implementation of home smoking bans increased over time. Having implemented a home smoking ban was associated with being male, being younger, having a high socioeconomic status, and being ex- or never smoker.

**Conclusions:** Social acceptance of smoking restrictions has increased in the Netherlands, despite a suboptimal implementation process of smoking restrictions. However, there is still potential for improvement as acceptance of smoking is still quite high for some public venues like bars. It is important to strengthen smoking restrictions in order to further denormalize smoking in the Netherlands.

**Implications:** We examined the extent to which smoking restrictions are socially accepted in the Netherlands where smoking restrictions have been implemented and reversed several times. Acceptance of smoking in public places decreased and implementation of home smoking bans increased between 2005 and 2014. Social acceptance of smoking restrictions increased in the Netherlands despite a suboptimal implementation process of smoking restrictions. However, acceptance of smoking in bars remains relatively high.

## Introduction

Secondhand smoke can have severe health consequences for non-smokers such as cancer, asthma, chronic obstructive pulmonary disease, and various heart diseases.<sup>1</sup> Therefore, implementation of smoking restrictions to protect people from exposure to tobacco smoke was incorporated into Article 8 of the Framework Convention of Tobacco Control (FCTC) by the World Health Organization.<sup>2</sup> Smoking restrictions have been implemented by many countries that ratified the FCTC although a recent study indicated that the adoption rate of smoking restrictions was highest immediately after the ratification of the FCTC, and that this effect of the FCTC decayed within several years.<sup>3</sup> Previous research showed that compliance with smoking restrictions is relatively high in most developed countries.<sup>4-7</sup> Smoking restrictions that are complied with are effective in reducing secondhand tobacco smoke exposure.<sup>6,8,9</sup>

However, little is known about the social acceptance of smoking restrictions. It is possible that smokers comply with the restrictions simply because they have to, but that they would resume smoking if it was allowed again. High acceptance of smoking in public places would indicate that people are not aware or do not agree with the need and benefits of smoking restrictions, which increases the risk of noncompliance. Smokers could defy smoking restrictions or could pressure owners of public venues to allow them to smoke. For example, in the Netherlands, smoking is tolerated late at night in some bars when bar owners think that chances of compliance checks are low.<sup>10</sup> Furthermore, some concerns have been voiced suggesting an increase in smoking at home after implementation of smoking restrictions in public places. These concerns include that if smokers would comply with those smoking restrictions, they would compensate the lack of smoking opportunities in the public sphere by more smoking in the private sphere. According to the “last refuge” model, especially restrictions at recreational venues would lead to more smoking at home and therefore more exposure to secondhand smoke to other family members.<sup>11</sup> Whereas smokers may have to show public commitment to smoking bans, they still could lack private commitment, leading to no personal acceptance of smoking restrictions. The installment of smoking bans at home is a reflection of such personal acceptance of nonsmoking. We therefore examined both acceptance of smoking in public places and implementation of home smoking bans in the current study. An increase in unacceptance of smoking in public places as well as at home would be an indicator that smoking restrictions might lead to denormalization of smoking instead of merely obeying the law. Other studies showed that smoking restrictions can indeed increase smokers’ feelings of being stigmatized and change social norms about smoking.<sup>12,13</sup>

Previous studies showed decreases over time in acceptance of smoking in public places and increases in support of smoking bans.<sup>9,14-16</sup> Moreover, previous research indicates that implementation of smoking restrictions in public places probably does not result in an increase of smoking at home but may even lead to a decrease.<sup>7,17-19</sup> However, most previous studies focused on smoking restrictions at one venue and did not examine long-term trends. Acceptance of smoking in public places and implementing home smoking bans may differ within certain groups. Previous studies found mixed results regarding sociodemographic differences but did find that nonsmokers were more supportive of smoking restrictions and more likely to implement home smoking bans than smokers.<sup>15,16,18,19</sup> Further information about whether subgroup differences can be found could be important to develop targeted interventions

in order to increase social acceptance of smoking restrictions, for example by educational campaigns.

## Smoking Restrictions in the Netherlands

Smoke-free workplaces including public transportation were implemented in January 2004 in the Netherlands, and this legislation has not changed since. Implementation of a smoke-free hospitality sector, however, did not proceed that straightforward.<sup>20-23</sup> In July 2008, a smoking ban for the hospitality sector was implemented. Comparable to other workplaces, owners of hospitality venues were allowed to create designated smoking rooms but personnel was not allowed to serve there. Several owners of small bars were unwilling to comply with this legislation and joined the organization “Save the small hospitality industry entrepreneur” that was set up to fight the smoking ban and that had ties with the tobacco industry.<sup>20</sup> After lawsuits by bar owners against the State, the smoking restrictions were reversed in July 2009 for owner-only bars with no further employees, and smoking was allowed there again. In February 2010, the Supreme Court overruled this decision and determined that smoking restrictions should apply to all hospitality venues as originally intended. In June 2010, a general election took place in the Netherlands which resulted in the formation of a new government. The decision of the former government to apply smoking restrictions to all hospitality venues was reversed again for small bars (<70 m<sup>2</sup>) without employees in November 2010 by the newly elected government.<sup>22</sup> In February 2013, a voting about hospitality industry smoking restrictions took place within the government that resulted in the decision to apply the smoking ban to all hospitality venues again, which was realized in October 2014. However, owners of hospitality venues were still allowed to have designated rooms where smoking was allowed.

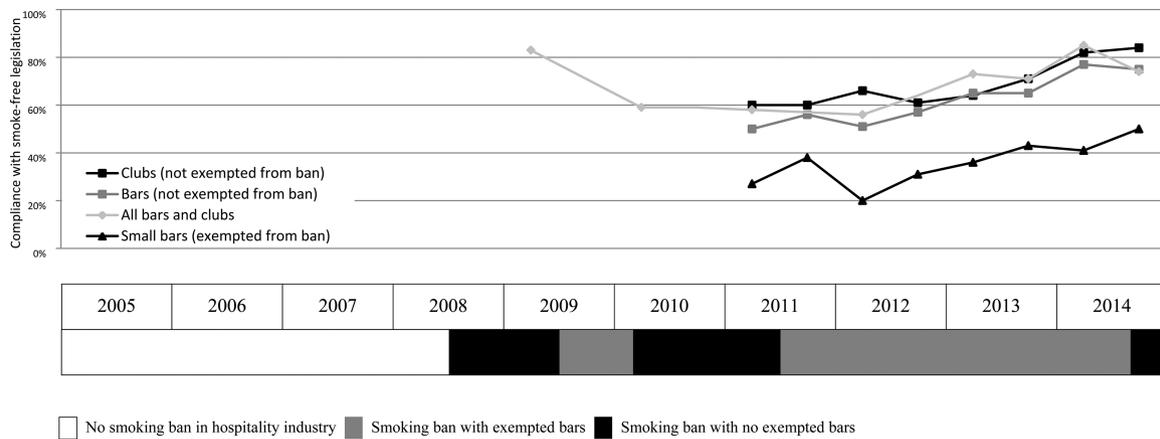
The Netherlands Food and Consumer Product Safety Authority investigated compliance with smoking restrictions at various hospitality venues. This research was done by observations of the venues and reporting the number of venues where no smokers were seen.<sup>24,25</sup> Figure 1 gives an overview of the various policy changes and compliance with smoking restrictions in bars and clubs in the Netherlands from 2005 to 2014. It shows that compliance decreased when smoking restrictions were partially reversed, but later increased again.

The aim of the current study was to investigate trends in social acceptance of smoking restrictions during 10 years of implementation, reversal, and reenactment of smoking restrictions in the Netherlands. In addition, we examined which sociodemographic factors were associated with social acceptance of smoking restrictions and whether these associations changed over time.

## Methods

### Design and Sample

We used data from the Dutch Continuous Survey of Smoking Habits (DCSSH). The DCSSH is a national population survey with a cross-sectional design in which respondents aged 15 years and older are surveyed weekly. Respondents of the DCSSH are randomly selected from a nationally representative panel of marketing research agency TNS NIPO. This panel includes more than 140 000 potential respondents who regularly participate in internet-based research and who are actively recruited by TNS NIPO via mail and telephone. For the current study, we used data from 2005 to 2014 ( $n = 182\,826$ ). Between 2005 and 2008, surveys were conducted using household web interviewing; as of 2009, personal-level web interviewing was



**Figure 1.** Overview of the implementation (white, gray, and black blocks) and compliance (gray and black lines; measured in percentage of hospitality venues where no smokers were observed; only available as of 2009<sup>24,25</sup>) with smoke-free hospitality industry legislation in the Netherlands.

used. Approximately 18 000 respondents participated in the survey each year (response rate = 68% in 2014).

## Measurements

### Acceptance of Smoking in Public Places

To assess acceptance of smoking in public places, we asked six questions on a 5-point scale about whether respondents found it acceptable to smoke in places where smoking was not allowed, that is, in a restaurant, in a bar, in public transportation, and at schools, as well as in places where smoking is still allowed, that is, in the car with nonsmokers, and on the street (1 = absolutely unacceptable, 2 = unacceptable, 3 = neutral, 4 = acceptable, 5 = absolutely acceptable). As of 2008, also data from two additional venues were available: acceptance of smoking at workplaces (where smoking is prohibited) and smoking on terraces of restaurants and bars (where smoking is allowed). To investigate trends of acceptance, we used mean values of these variables from each included survey year. To examine associations of acceptance with other factors, we combined all items except smoking at workplaces and smoking on terraces into one scale (Cronbach's  $\alpha = 0.80$ ).

### Home Smoking Bans

To measure the rules about smoking at respondents' homes, we asked respondents who were living with at least one young child in their home: "Do people smoke at your home? 1 = always, 2 = regularly, 3 = sometimes, 4 = never." The first three answers were combined, indicating having implemented no home smoking ban (0), while the last option indicated having a complete smoking ban inside a respondent's house (1).

### Covariates

Covariates were sex, age, gross yearly household income, level of completed education, and smoking status (smoker, ex-smoker, never smoker). Age was categorized into: 15–24 years, 25–39 years, 40–54 years, and 55 years and older. Income was categorized into three groups: low (<28 500 euro), moderate (between 28 500 and 45 000 euro), and high (>45 000 euro). Level of education was also categorized into three groups: low (primary education and lower prevocational secondary education), moderate (middle prevocational secondary education and secondary vocational education), and high (senior general secondary education, (pre-) university education, and

higher professional education). To determine the smoking status, all respondents were asked: "Do you (ever) smoke or do you not smoke at all?" Respondents who answered that they smoked were defined as current smokers. Respondents who answered that they did not smoke were asked: "Have you smoked in the past?" Respondents who answered that they had smoked in the past were defined as ex-smokers and respondents who answered that they had not smoked in the past as never smokers.<sup>26,27</sup>

## Analyses

First, we plotted trends of acceptance of smoking at all included venues and of having implemented a complete home smoking ban. Next, we tested whether these trends changed significantly between the first and the last year of measurement using independent-samples *t* tests (acceptance) and Pearson chi-square tests (home smoking bans), stratified by smoking status. We furthermore conducted hierarchical linear and logistic regression analyses with three steps using the "Enter" method. The dependent variable was the scale for acceptance of smoking in the linear regression analysis, and whether or not respondents had implemented a complete home smoking ban in the logistic regression analysis. In the first step, we tested whether acceptance of smoking and having a home smoking ban changed significantly between 2005 and 2014 by specifying "survey year" (trend) as continuous variable. In the second step, we added the above outlined covariates to identify factors associated with acceptance of smoking and having a home smoking ban. In the third step, we included interaction terms on top of the main effects for all covariates by survey year to examine whether associations changed over time. We performed sensitivity analyses with each interaction included separately into the third model of both regression analyses, and the pattern of results remained the same compared to the models with all interactions included. To get more specific information about trends at the different venues, we performed secondary analyses with acceptance of smoking for each venue as separate outcome measures.

Respondents had the opportunity to refuse answering the income question or to answer with "don't know." These responses were recoded as missing values and excluded from the analyses ( $n = 40\,743$ ), resulting in a sample size of 142 083 respondents for the regression analyses. In all analyses, sampling weights for age, sex, educational level, working hours, geographic region, urbanization,

and household size were applied to make the data representative for the Dutch population. We used an alpha level for significant differences of less than 0.05. All analyses were conducted with SPSS version 21.

## Results

### Sample Description

Table 1 shows the sociodemographic characteristics and the smoking status of the included respondents. Due to the different method of data collection as of 2009 (as described in the “Methods”), the distribution of scores before and after 2009 changed for age, income, and education. The proportion of participants who were categorized as smokers decreased between 2005 (27.8%) and 2014 (23.2%), while the proportion of ex-smokers slightly increased (from 33.9% to 35.2%), as did the proportion of never smokers (from 38.3% to 41.6%).

### Trends in Acceptance of Smoking in Public Places and Home Smoking Bans

Figure 2A shows the trends of acceptance of smoking at all included venues. Acceptance of smoking in public transportation, in the car with nonsmokers, and at schools was quite low, ranging from 1.4 (on a scale from 1–5 with a higher score indicating higher acceptance) to 1.6 between 2005 and 2014. Acceptance of smoking in public transportation, at schools, in restaurants, and in bars decreased significantly between 2005 and 2014 among smokers, ex-smokers, and never smokers (see Supplementary Table S1 for the stratified results). The largest decrease was observed regarding smoking in restaurants among all three groups. Acceptance of smoking in cars with nonsmokers increased slightly but statistically significantly among all three groups (from 1.27 to 2.03 for all groups combined), and acceptance of smoking on the street increased significantly among smokers (from 3.84 to 4.11) and never smokers (from 2.94 to 3.08). Acceptance of smoking at workplaces decreased significantly between 2008 and 2014 among all three groups (from 2.74 to 1.55 for all groups combined), as did acceptance of smoking on terraces (from 4.45 to 2.54 for all groups combined).

We additionally analyzed the trends of unacceptance (score 1 and 2) and of acceptance (score 4 and 5) (not shown in tables). Acceptance of smoking increased for all venues, but only slightly. Unacceptance of smoking decreased for smoking on the street, on terraces, and in cars with nonsmokers, remained stable for smoking in public transportation, and increased for smoking in bars, at work, in restaurants, and at schools. The largest decrease in unacceptance was found for smoking on the street, and the largest increase for smoking in restaurants.

Figure 2B displays the trends of having implemented a complete home smoking ban separately for smokers, ex-smokers, and never smokers. Smokers were least likely to have implemented a home smoking ban compared to ex-smokers and never smokers. Having a complete home smoking ban increased significantly between 2005 and 2014 among all three groups (see Supplementary Table S1 for the stratified results). In 2005, 42.5% of the smokers, 65.5% of the ex-smokers, and 77.9% of the never smokers had a smoking ban at home. In 2014, this had increased to 55.1% of smokers, 85.2% of ex-smokers, and 90.8% of never smokers.

### Factors Associated With Acceptance of Smoking in Public Places and Home Smoking Bans

Table 2 shows which factors were associated with acceptance of smoking at all venues (except workplaces and terraces) combined. Acceptance of smoking decreased significantly between 2005 and 2014, indicating that respondents found smoking at all included venues less acceptable over time. Furthermore, more acceptance of smoking was associated with being male, being young, having low income and education, and being smoker. All interaction terms that were added into step 3 were statistically significant. The largest effect sizes were found for trend \* age ( $\beta = 0.13$ ) and for trend \* smoking status ( $\beta = 0.15$ ). Results of stratified analyses (not shown in tables) revealed that the decrease of acceptance over time among respondents who were categorized into the younger age groups was larger compared to respondents from the older age groups. Furthermore, acceptance of smoking decreased more over time among smokers than among ex-smokers and never smokers.

In secondary analyses (not shown in tables), we examined the acceptance of smoking for each venue separately. The same factors were associated with acceptance of smoking in these secondary analyses as in the analyses with all venues combined into one scale. We also analyzed the interactions between trend \* age and trend \* smoking status for each venue separately. These analyses revealed that the decrease over time regarding acceptance of smoking at schools, in public transportation, in bars, in restaurants, and at work was larger among respondents with a young than a high age, but the decrease was larger regarding smoking on terraces among respondents with a high than a young age. The increase regarding smoking in the car with nonsmokers and smoking on the street was largest among middle-aged respondents. Furthermore, the decrease over time regarding acceptance of smoking at schools, in bars, in restaurants, and at work was largest among smokers while the decrease regarding smoking in public transportation and on terraces was largest among ex-smokers. The increase regarding smoking in the car with nonsmokers was largest among smokers and regarding smoking on the street among ex-smokers.

Table 2 also shows the factors associated with having implemented a complete home smoking ban. First of all, the odds of having a home smoking ban increased over time. Furthermore, women were less likely to report having implemented a home smoking ban than men. Respondents aged 25–39 years were more likely to report a home smoking ban than respondents aged 55 years and older. Respondents with low income and education were less likely to have implemented a complete home smoking ban than respondents with high income and education. Smokers were finally less likely to have a home smoking ban than never smokers. None of the interaction terms for trend by covariate was statistically significant, indicating that the factors associated with having implemented home smoking bans did not change significantly over time.

## Discussion

The aim of the current study was to investigate changes in social acceptance of smoking restrictions during a decade of inconsistent smoking restrictions in the Netherlands. We used acceptance of smoking in public places and having implemented home smoking bans as indicators of social acceptance of smoking restrictions. Smoking in public transportation, at schools, in restaurants, in bars, and at workplaces became less acceptable over time. At all these

Table 1. Sample Descriptions From 2005 to 2014 (Weighted Data)

	2005 ( <i>n</i> = 19,344)	2006 ( <i>n</i> = 18,031)	2007 ( <i>n</i> = 14,730)	2008 ( <i>n</i> = 18,627)	2009 ( <i>n</i> = 19,716)	2010 ( <i>n</i> = 18,784)	2011 ( <i>n</i> = 18,615)	2012 ( <i>n</i> = 18,299)	2013 ( <i>n</i> = 18,396)	2014 ( <i>n</i> = 18,284)
Sex										
Male (%)	49.1	49.1	49.1	49.0	49.3	49.3	49.2	49.3	49.3	49.3
Age										
15–24 (%)	14.7	14.7	14.7	14.7	14.7	14.9	14.8	14.8	14.9	14.8
25–39 (%)	30.3	30.3	30.7	30.8	25.3	24.5	23.7	23.1	22.7	22.7
40–54 (%)	26.4	26.5	26.1	26.0	27.6	27.9	28.1	28.1	28.0	27.5
55 and older (%)	28.6	28.5	28.5	28.6	32.4	32.8	33.5	34.0	34.4	34.9
Income										
Low (%)	36.0	35.7	36.2	34.6	32.4	33.7	33.6	36.0	35.6	35.3
Moderate (%)	34.7	37.3	35.5	36.3	32.6	31.2	32.2	32.0	31.9	32.5
High (%)	29.2	27.0	28.3	29.2	35.0	35.1	34.2	32.1	32.4	32.2
Education										
Low (%)	44.4	44.5	44.5	44.5	29.7	28.3	29.3	28.0	26.5	26.1
Moderate (%)	33.6	33.6	33.6	33.6	41.8	41.7	40.3	40.3	41.7	41.7
High (%)	21.9	21.9	21.9	21.9	28.6	29.9	30.4	31.7	31.8	32.2
Smoking status										
Smoker (%)	27.8	28.2	27.5	26.7	27.7	27.2	24.7	25.9	25.0	23.2
Ex-smoker (%)	33.9	32.8	32.4	32.0	34.4	34.8	36.0	34.6	35.1	35.2
Never smoker (%)	38.3	39.0	40.1	41.2	37.9	38.0	39.4	39.4	39.9	41.6

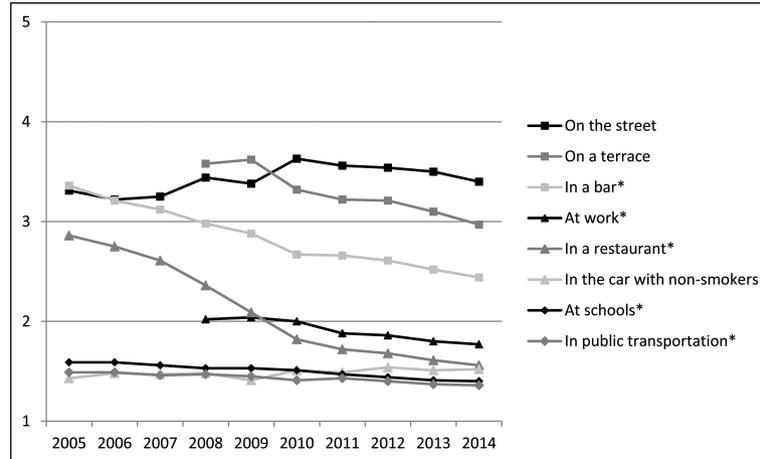
venues, smoking was not allowed by law in 2014 in the Netherlands. It is notable that the largest decrease was found at venues where smoking restrictions were implemented during or immediately before the study period: at workplaces and at the hospitality sector. Yet, the acceptance of smoking in bars remained quite high compared to smoking in restaurants. The gap between these two venues only became wider from 2005 to 2014. It is likely that the frequent changes in legislation and the exemptions for small bars affected the acceptance of smoking. Previous research from the Netherlands as well as other European countries showed that compliance with smoking restrictions was also lower at venues with partial compared to comprehensive policies.<sup>25,28–31</sup> A smoother implementation of smoking restrictions in the Netherlands might have led to lower acceptance of smoking in bars and higher compliance with the smoking ban in bars, at levels comparable to restaurants.

We furthermore found a decrease regarding acceptance of smoking on terraces of hospitality venues, and an increase regarding smoking on the street and regarding smoking in the car with nonsmokers. At all three venues, smoking was allowed by law in 2014 in the Netherlands. Acceptance of smoking in cars with nonsmokers was already quite low in 2005 and remained low up to 2014. These findings indicate that high support from the population could be expected if smoking restrictions in cars with nonsmokers would be implemented. For the time being, implementation of a smoking ban on terraces of hospitality venues will probably not get a lot of support by the Dutch population.

Regarding home smoking bans, we found that the Dutch population increasingly implemented complete bans. The concerns that the implementation of smoking restrictions in public places would be related to a displacement to smoking at home were not supported in the current study. Ex-smokers as well as never smokers implemented consistently more home smoking bans than smokers between 2005 and 2014. The implementation of home smoking bans by smokers did decrease at first between 2007 and 2008, when the smoke-free hospitality sector was implemented in the Netherlands. However, as of 2008, the percentage of smokers who implemented home smoking bans increased again to levels much higher than 2007. The general increase could be an indicator of increasing personal acceptance and commitment to smoking bans. We furthermore found that men, people aged 25–39 years, people with a high socioeconomic background, and never smokers were most likely to have implemented a complete home smoking ban. These findings are in line with several previous studies.<sup>19,32,33</sup> Future research should investigate how acceptance of smoking in public places and the implementation of home smoking bans interact or are causally related to each other. We found in our study that public smoking restrictions did not lead to compensation by more smoking at home, but rather added to denormalization of smoking by a decrease in smoking at home. Therefore, it is possible that tightening of public smoking bans leads to more home smoking bans.

We found a number of subgroup differences regarding acceptance of smoking in public places and implementing home smoking bans. A low level of social acceptance of smoking restrictions was in particular observed among people with a low socioeconomic background and smokers. Measures to increase this acceptance, for example campaigns to increase knowledge and awareness of the harm of secondhand smoke, should therefore be targeted at these groups. A notable finding of the current study was that the decrease of acceptance of smoking in public places over time was largest for younger respondents and smokers. This is reassuring because the long-term

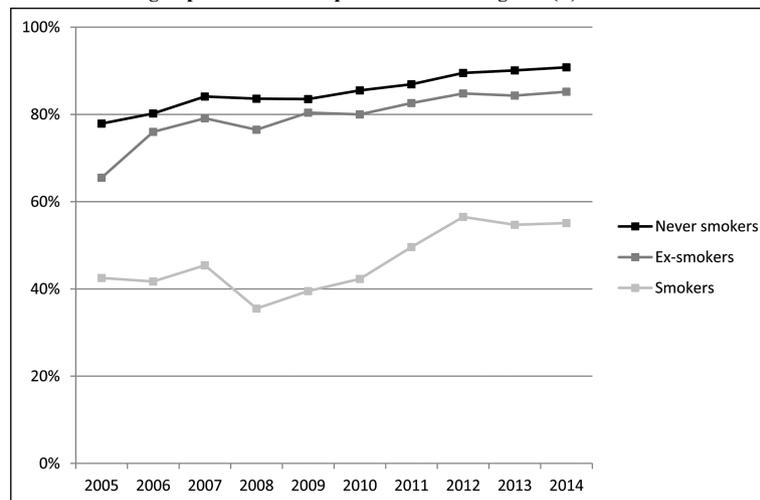
Trends of mean acceptance (1=absolutely unacceptable, 5=absolutely acceptable) (A) †



\*Venues where smoking was restricted in 2014

† All trends between 2005 and 2014 were statistically significant

Trends of having implemented a complete home smoking ban (B) †



† All trends between 2005 and 2014 were statistically significant

**Figure 2.** Trends of acceptance of smoking (A) and having implemented a complete home smoking ban (B).

effects regarding secondhand smoke exposure are probably largest if acceptance further decreases among these groups compared to other groups. For example, smokers who find smoking in bars decreasingly acceptable are more likely to not smoke there anymore.

### Limitations and Strengths

One limitation of the current study is the change in survey methodology as of 2009 that led to changes in the sample composition. Therefore, it might be possible that our results are not fully generalizable to the entire Dutch population. Another limitation is that we could only include data from the Netherlands. It would be interesting to compare the findings of the current study with data from other countries to get information about whether the Dutch trends can also be observed elsewhere, for example in countries that implemented comprehensive smoking restrictions all at once. Moreover, our design was cross-sectional and therefore not suitable to draw conclusions about causality. Future research could measure social acceptance of smoking restrictions longitudinally to track individual changes over time. Strengths of the current study are the

large sample size, and that we could analyze data from quite a long period of time with many changes in the smoking restrictions which gives valuable insight into long-term developments and trends.

### Conclusion

Social acceptance of smoking restrictions increased among the Dutch population between 2005 and 2014, despite a suboptimal implementation process of smoking restrictions in bars. However, acceptance of smoking remains quite high for some public places, especially for bars. Higher successes could probably have been obtained with a smoother policy implementation process. The Dutch population increasingly implemented home smoking bans, indicating that the implementation of smoking restrictions in public places was not related to a displacement to smoking at home.

### Supplementary Material

Supplementary Table S1 can be found online at <http://www.ntr.oxfordjournals.org>

**Table 2.** Linear Regression Analysis Showing Factors Associated With Acceptance of Smoking (Range: 1 = Absolutely Unacceptable, 5 = Absolutely Acceptable) and Logistic Regression Analysis Showing Factors Associated With Having Implemented a Complete Home Smoking Ban (Yes/No)

	Acceptance of smoking	Home smoking ban
	B (SE), $\beta$	OR (95% CI)
Step 1:		
Trend (2005–2014)	–0.05 (0.00), –0.13***	1.12 (1.10 to 1.13)***
Step 2:		
Trend (2005–2014)	–0.03 (0.00), –0.10***	1.11 (1.09 to 1.13)***
Sex		
Female	–0.06 (0.01), –0.04***	0.67 (0.62 to 0.73)***
Male	Ref.	Ref.
Age		
15–24	0.41 (0.01), 0.16***	1.88 (1.16 to 3.04)**
25–39	0.32 (0.01), 0.17***	2.18 (1.65 to 2.89)***
40–54	0.20 (0.01), 0.10***	1.48 (1.12 to 1.96)**
55 and older	Ref.	Ref.
Income		
Low	0.09 (0.01), 0.05***	0.63 (0.56 to 0.71)***
Moderate	0.05 (0.01), 0.03***	0.81 (0.73 to 0.90)***
High	Ref.	Ref.
Education		
Low	0.14 (0.01), 0.08***	0.32 (0.28 to 0.37)***
Moderate	0.06 (0.01), 0.04***	0.55 (0.49 to 0.61)***
High	Ref.	Ref.
Smoking status		
Smoker	0.92 (0.01), 0.48***	0.16 (0.14 to 0.18)***
Ex-smoker	0.20 (0.01), 0.11***	0.74 (0.66 to 0.83)***
Never smoker	Ref.	Ref.
Step 3*:		
Trend * sex	0.01 (0.00), 0.03**	1.02 (0.98 to 1.05)
Trend * age	0.01 (0.00), 0.13***	1.02 (0.99 to 1.06)
Trend * income	–0.00 (0.00), –0.02*	1.01 (0.98 to 1.03)
Trend * education	–0.01 (0.00), –0.05***	0.98 (0.95 to 1.01)
Trend * smoking status	0.02 (0.00), 0.15***	1.02 (0.99 to 1.04)

\*Step 3 also includes all main effects from step 2.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < 0.001$ .

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## Declaration of Interests

None declared.

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