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# Sustainability of outdoor school ground smoking bans at secondary schools: a mixed-method study

A. D. Rozema,<sup>1</sup> J. J. P. Mathijssen,<sup>1</sup> M. W. J. Jansen,<sup>2,3</sup> J. A. M. van Oers<sup>1,4</sup>

1 Department Tranzo, Academic Collaborative Centre for Public Health Brabant, Tilburg University, Tilburg, The Netherlands

2 Academic Collaborative Centre for Public Health Limburg, Public Health Service South Limburg (GGD ZL), Geleen, The Netherlands

3 Department of Health Services Research, School for Public Health and Primary Care CAPHRI, Maastricht University, Maastricht, The Netherlands

4 National Institute for Public Health and the Environment (RIVM), Bilthoven, The Netherlands

**Correspondence:** A. D. Rozema, Department Tranzo, Tilburg University, P.O. Box 90153, 5000 LE Tilburg, The Netherlands, Tel: +31 (0) 13 4663136, e-mail: [a.d.rozema@tilburguniversity.edu](mailto:a.d.rozema@tilburguniversity.edu)

**Background:** Although increasing numbers of countries are implementing outdoor school ground smoking bans at secondary schools, less attention is paid to the post-implementation period even though sustainability of a policy is essential for long-term effectiveness. Therefore, this study assesses the level of sustainability and examines perceived barriers/facilitators related to the sustainability of an outdoor school ground smoking ban at secondary schools. **Methods:** A mixed-method design was used with a sequential explanatory approach. In phase I, 438 online surveys were conducted and in phase II, 15 semi-structured interviews were obtained from directors of relevant schools. ANOVA (phase I) and a thematic approach (phase II) were used to analyze data. **Results:** Level of sustainability of an outdoor school ground smoking ban was high at the 48% Dutch schools with an outdoor smoking ban. Furthermore, school size was significantly associated with sustainability. The perceived barriers/facilitators fell into three categories: (i) smoking ban implementation factors (side-effects, enforcement, communication, guidelines and collaboration), (ii) school factors (physical environment, school culture, education type and school policy) and (iii) community environment factors (legislation and social environment). **Conclusions:** Internationally, the spread of outdoor school ground smoking bans could be further promoted. Once implemented, the ban has become 'normal' practice and investments tend to endure. Moreover, involvement of all staff is important for sustainability as they function as role models, have an interrelationship with students, and share responsibility for enforcement. These findings are promising for the sustainability of future tobacco control initiatives to further protect against the morbidity/mortality associated with smoking.

## Introduction

Tobacco use is a leading cause of preventable death worldwide. Therefore, several countries have implemented a range of tobacco control policies to protect people from the harmful health effects of smoking.<sup>1</sup> Whereas implementation of tobacco control policies is growing, less attention is paid to what happens after the initial implementation. Generally, after implementation, the focus is on short-term outcomes and impact on smoking behavior, whilst sustainability is essential for the long-term effectiveness of such policies.<sup>2,3</sup>

According to Shediac-Rizkallah and Bone<sup>3</sup> sustainability refers to the continuation of intervention. Four levels of sustainability can be distinguished: (i) absence of sustainability (i.e. no intervention activity is maintained), (ii) precarious sustainability (i.e. some activities are pursued), (iii) weak sustainability (i.e. intervention is continued but activities are not routinized) and (iv) sustainability through routinization (i.e. intervention activities are routinized for the long term).<sup>4</sup> Factors influencing these levels of sustainability can be divided into three categories: (i) implementation factors, (ii) factors within the organizational setting and (iii) factors in the broader community environment.<sup>3</sup>

To achieve a high level of sustainability of tobacco control policies it is important that non-smoking becomes 'normal';<sup>5</sup> i.e. tobacco policies no longer require effort when everyone has adapted to the new pattern of non-smoking. In Europe, non-smoking is not yet the

norm and smoking rates are still a reason for concern, especially among adolescents.<sup>6</sup> Initiation of smoking generally starts during adolescence.<sup>6,7</sup> Although the Netherlands is relatively high ranked in the Tobacco Control Scale (9th) (i.e. a scale that quantifies implementation of tobacco control policies at country level in Europe),<sup>1</sup> more government measures could be taken targeting youth. For example it is not illegal for adolescents under 18 years to possess or to smoke cigarettes and taxes on tobacco could be raised. Moreover, since a smoke-free environment seems promising to reduce tobacco use among adolescents,<sup>8–11</sup> and due to the mandatory attendance of adolescents at schools, it seems feasible to focus on smoking bans at secondary schools.

Whereas *indoor* smoking bans at secondary schools are generally the standard internationally, *outdoor* smoking bans are less common. For example, only a few countries (e.g. Belgium, Finland and Australia) have banned, by law, outdoor smoking on school grounds at secondary schools.<sup>12</sup> Currently, in the Netherlands, only 48% of all secondary schools have implemented an outdoor school ground smoking ban.<sup>13</sup> In the Netherlands, guidelines for an outdoor school ground smoking ban state that: (i) the ban applies everywhere (i.e. the entire location/site), (ii) the ban applies to everyone (i.e. students, staff and visitors) and (iii) the ban should be clearly displayed (i.e. by signs and/or in the school regulations).<sup>14</sup>

Although sustainability has been examined in social interventions in general<sup>15,16</sup> and in school settings in particular,<sup>17–19</sup> to our knowledge no studies have investigated the sustainability of

tobacco control policies. Exploring sustainability of outdoor smoking bans is important for two reasons. First, the sustainability of new policies or interventions cannot simply be taken for granted.<sup>19</sup> Moreover, sustainability research may elucidate whether investments in outdoor smoking bans endure (or not) after initial implementation, and which factors may hinder/increase sustainability. For example, this might help policymakers in their decision-making concerning implementing the legislation. Second, sustainability is a complex phenomenon and literature emphasizes the urgency of both quantitative and qualitative research to improve its understanding.<sup>20,21</sup>

Therefore, this study aims to (i) assess the level of sustainability and (ii) elucidate the perceived barriers and facilitators to sustainability of an outdoor smoking ban at secondary schools.

## Methods

### Design

A mixed-method design was used: in this way the qualitative data could deepen our insight of the quantitative data, based on a sequential explanatory approach consisting of two phases.<sup>22,23</sup> In phase I quantitative data were collected via an online survey, and in phase II qualitative data were obtained by semi-structured interviews with directors of Dutch secondary schools that have an outdoor school ground smoking ban.

### Participants

In phase I, directors of all secondary schools in the Netherlands ( $n = 1727$ ) were contacted with the request to complete an online questionnaire about the current smoking policy of their school. Of these directors, 919 (response rate 53%) responded to this survey. Directors with an outdoor smoking ban ( $n = 438$ ) received an additional questionnaire about the sustainability of their outdoor smoking ban. Schools with a ban did not differ significantly from schools without a ban on education type ( $\chi^2(3) = 6.1, P = 0.1$ ). However, schools without a ban had more often 1000 students and less often 251–500 students than schools with a ban ( $\chi^2(3) = 14.24, P < 0.003$ ).

In phase II, 19 school directors were randomly selected out of a subset who expressed (in the additional questionnaire) their willingness to participate in the interviews (141 of 438), stratified by school size and education type. Of these 19 directors, 4 declined to participate for the following reasons: lack of time ( $n = 3$ ) and maternity leave ( $n = 1$ ). Participants were included until data saturation was reached, which was at a sample size of 15. Of the final 15 participants, 9 were male (60%) and 6 female (40%); 2 were current smokers (13%), 9 were non-smokers (60%) and 4 were ex-smokers (27%).

### Measures

In phase I, the following variables were noted: school size, type of education and implementation year of the smoking ban (table 1). Based on literature<sup>4,21,24–26</sup> a questionnaire was developed with 14 items assessing the presence of elements of sustainability (e.g. support, organizational capacity, communications) of an outdoor smoking ban; responses were given on a 7-point Likert scale, ranging from 1 (little or no extent) to 7 (very great extent) (see Supplementary Appendix S1).

In phase II, the following variables were also noted: school size, type of education and level of urbanization (table 2). Semi-structured interviews were conducted to assess the perceived barriers/facilitators of sustaining an outdoor school ground smoking ban. For example, questions asked during the interview were: ‘What are the barriers to maintain an outdoor smoking ban?’ and ‘What are the facilitators to maintain an outdoor smoking ban?’.

**Table 1** Phase I: Characteristics of the participating schools and level of sustainability relating to school characteristics

School characteristics	No. of schools		Level of sustainability	
	$n = 438$	%	Mean	SD
School size				
<250 students	105	24	6.05	0.66
251–500 students	120	27	5.66	0.99
501–1000 students	117	27	5.57	0.86
>1001 students	96	22	5.51	1.05
			5.70	0.92
Education type <sup>a,b</sup>				
Specialized education	51	12	6.12	0.72
Low-level education	134	33	5.61	0.93
Middle-level education	160	40	5.71	0.78
High-level education	59	15	5.20	1.24
			5.67	0.93
Year of implementation of outdoor smoking ban				
<2010 <sup>c</sup>	121	29	5.84	0.93
2011	28	7	5.85	0.87
2012	53	13	5.85	0.83
2013	61	14	5.60	1.06
2014	158	37	5.56	0.91
			5.70	0.93

a: Specialized education refers to schools providing education to students with learning difficulties only or in combination with pre-vocational secondary education; Low-level education refers to schools only providing pre-vocational secondary education; middle-level education refers to schools with the education levels pre-vocational secondary education, senior general secondary education and pre-university education; high-level education refers to schools only providing pre-university education.

b: In total 34 schools were enrolled in a type of education that does not fit within the four levels that the Dutch educational system offers and are therefore set as missings.

c: Implementation between 1975 and 2010; total numbers in row do not add up to 438 due to missing responses.

### Procedure

Both parts of the study were approved by the Psychological Ethics Committee of Tilburg University (EC-2014.37) and informed consent was obtained from all participants.

For phase I, in November 2014 all school directors in the Netherlands were contacted by email with a link to the questionnaire and the request to complete the online survey. A reminder was sent a few days later; in some cases, the adjunct director, vice-president, team leader or dean was requested to complete the survey if the director did not respond.

In phase II, an information letter explaining the aim of the research was sent to the 19 selected directors. These directors were contacted by telephone to schedule the interview with a researcher (ADR), resulting in 15 interviewees. Then, semi-structured interviews were conducted in May and June 2015. Data were audio-recorded and the interviews transcribed verbatim. Interviews lasted on average 53 (SD 10; range 33–67) min.

### Analysis

Phase I data were analyzed using SPSS, version 22. First, internal consistency between the 14 items was calculated. Second, descriptive statistics were generated to illustrate the level of and difference between the characteristics of sustainability in the schools. Third, ANOVA was conducted to determine the associations between the school characteristics (i.e. school size, education type and year of implementation) and sustainability. To determine the independence of the effects of the school characteristics, two-way ANOVA was performed.

**Table 2** Phase II: Characteristics of the participating schools

School characteristics	No. of schools <i>n</i> = 15	%
School size		
<250 students	3	20
250–500 students	5	33
501–1000 students	3	20
>1001 students	4	27
Education type <sup>a</sup>		
Specialized education	2	13
Low-level education	5	33
Middle-level education	5	33
High-level education	3	20
Urbanization of place of residence <sup>b</sup>		
Highly urbanized region (>2500)	2	13
Urbanized region (1500–2500)	6	40
Moderate urbanized region (1000–1500)	3	20
Rural region (500–1000)	3	20
Highly rural region (<500)	1	7

a: Specialized education refers to schools providing education to students with learning difficulties only or in combination with pre-vocational secondary education; Low-level education refers to schools only providing pre-vocational secondary education; middle-level education refers to schools with the education levels pre-vocational secondary education, senior general secondary education and pre-university education; high-level education refers to schools only providing pre-university education.

b: Density of addresses in surroundings per m<sup>2</sup>.

In phase II a thematic approach was used to analyze the transcripts.<sup>27</sup> First, one researcher (ADR) coded all transcripts. To determine inter-rater reliability, 33% of all transcripts were independently coded (in parallel) by another researcher (JJPM). Inconsistencies regarding codes were discussed until consensus was reached. Second, codes were refined and comparable codes were pooled, resulting in a final code list. Third, themes were developed based on the code list and themes were classified into the three overarching categories of the conceptual framework of Shediak-Rizkallah and Bone.<sup>3</sup> For the purpose of the present study the three categories were further specified in: ‘smoking ban implementation factors’, ‘school factors’ and ‘community environment factors’. The appropriateness and classification of the themes in the overarching categories were discussed with all authors until consensus was reached. Interpretive validation was strengthened by conducting member checks with all participants (i.e. sending participants a summary of their interview to confirm interpretation of their statements).<sup>28</sup> Data were analysed using Atlas-Ti 7.

## Results

### Phase I

Internal consistency between the 14 items was good (Cronbach’s  $\alpha = 0.89$ ). Results of the online survey showed that sustainability at schools with an outdoor smoking ban is high ( $M = 5.70$ ,  $SD = 0.92$ ): range 1–7. Significant differences were found for school size ( $F(3, 378) = 6.53$ ,  $P \leq 0.001$ ) and education type ( $F(3, 348) = 8.01$ ,  $P \leq 0.001$ ), whereas there was no significant difference for year of implementation ( $F(4, 362) = 1.96$ ,  $P \leq 0.10$ ) and sustainability. However, two-way ANOVA with school size and education type as independent variables, and sustainability as dependent variable, revealed that only school size ( $F(15, 348) = 2.53$ ,  $P < 0.057$ ), and not education type ( $F(15, 348) = 0.95$ ,  $P = 0.4$ ), was significantly associated with sustainability. Smaller schools were associated with a higher level of sustainability (table 1).

### Phase II

There was no substantial difference in sustainability between the schools in phase II ( $n = 15$ ,  $M = 5.80$ ,  $SD = 0.80$ ) and schools in phase I ( $n = 438$ ,  $M = 5.70$ ,  $SD = 0.92$ ): range 1–7. Eleven overarching themes of perceived barriers/facilitators regarding sustainability of an outdoor smoking ban were identified and could be classified into the three categories of the conceptual framework. Specific themes were considered to be both a barrier and a facilitator depending their absence or presence (i.e. enforcement, communication, guidelines, physical environment and social environment); this indicates that barriers and facilitators can be considered as two sides of the same coin. However, side-effects were only mentioned as a barrier, while collaboration, school culture, education type, school policy and legislation were mentioned as facilitators only (figure 1).

### Category 1: Smoking ban implementation factors

In this category, five overarching themes of perceived barriers and facilitators were distinguished.

First, side-effects could hinder sustainability of an outdoor smoking ban, e.g. students leaving the school premises to smoke a cigarette was mentioned as a negative side-effect, resulting in that students smoke near the school gate or disappear from teachers’ control sight, increasing the risk of unsafe or unfavorable situations such as drugs use, littering/cigarette butt pollution, nuisance in the neighborhood, conflicts between students and intimidating places with ‘loitering’ youth.

*‘The second thing we noticed is that when you prohibit students smoking on school grounds, they search for a place to smoke outside school grounds and they become very vulnerable to those who want to sell drugs to our students. Thus, students have become a very easy target for drug dealers.’ #13*

Second, strict enforcement was considered to be a facilitator, and lack of enforcement was reported as a barrier, resulting in non-compliance of students and staff during school hours, and visitors after school hours. For example, respondents reported that sustaining the smoking ban is difficult as enforcement cannot (always) be realized (e.g. due to increased workload, lack of manpower), especially when the staff is not motivated to enforce the ban.

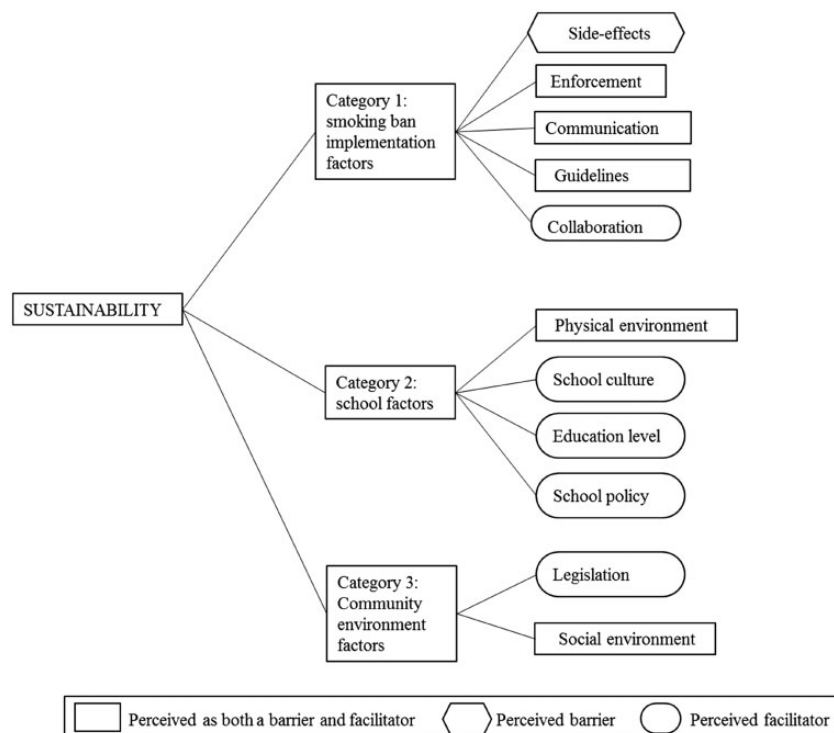
*‘... sometimes the staff think: “I’m just going to look the other way and drink my coffee ... it’s my break”. That’s a weak element when trying to sustain the outdoor school ground smoking ban.’ #13*

Respondents also reported that when students leave the school premises, enforcement of the school policy is more difficult due to lack of judicial authority beyond the premises.

Third, communication is considered both a facilitator and a barrier. According to respondents, focusing on the ban by providing information, argumentation and education, facilitates sustainability. Not communicating with and not explaining to all stakeholders why the school prohibits outdoor smoking is considered a barrier. In contrast, paying no attention to the smoking ban can facilitate sustainability, as the smoking ban has become common practice and communication is no longer needed.

Fourth, guidelines are both a facilitator and a barrier. The statement ‘The ban applies to everyone’ facilitates sustainability, because equity between staff and students is considered important by students. Moreover, staff smoking out of sight of the students, offering smoking cessation training, prohibiting smoking or assigning a smokers’ stand outside the school premises, and listing all students who have their parents’ permission to smoke outside the school premises, facilitates sustainability. In contrast, placing cameras and condoning the smoking of staff hinders sustainability.

Fifth, collaboration with stakeholders in the school is mentioned as a facilitator. For example, involving all stakeholders during the



**Figure 1** Perceived barriers and facilitators to the sustainability of an outdoor smoking ban

process of policy decision-making, the dedication of all staff and consensus between the entire managing board on the policy, fosters sustainability.

### Category 2: School factors

Four overarching themes were identified in the category of school factors. The first theme was the physical environment of the school, e.g. size and demarcation of the school premises. Whereas a large unclearly structured school ground is mentioned as a barrier, a clearly structured school ground and demarcation are considered facilitators. Additionally, the location of the school is considered a facilitator.

*'I'm aware of the fact that we were able to sustain the ban because of the school's geographical location ... the school is located in an industrial area and not in a residential area.'* #3

It is considered a barrier when a tobacco selling point is situated close to the school, and a facilitator when there is no tobacco selling point. Additionally, sustainability is facilitated when municipalities install bins outside the school premises (i.e. preventing littering of cigarette butts).

Second, the school culture is mentioned as a facilitator. Good interrelationships between students and staff are reported as a facilitator. Furthermore, a small school facilitates sustainability.

*'This school has 205 students and 40 employees, which is an ideal situation because you don't need cameras.'* #5

Social control at small schools is substantial, e.g. when non-compliance of the smoking ban is noticed, students often report this.

Third, education type is considered a facilitator. For example, respondents reported that schools are obliged to protect young students at schools with a low education level (aged 12–16 years) from the harmful effects of smoking. On the other hand, schools with a high education level generally show more compliance with the smoking ban, probably because they have more 'obedient' students, which facilitates sustainability.

Fourth, school policy is mentioned as a facilitator. For example, enforcement is easier when it is prohibited to leave the school

premises during school hours. Furthermore, when the school policy has always been smoke-free, the smoking ban is easier accepted. Additionally, schools should take their time and select a well-chosen moment for implementation. Finally, a stepwise implementation approach functions as a facilitator.

### Category 3: Community environment factors

Two themes were identified in the category of community environment factors. First, legislation functions as a facilitator. For example, increasing the price of tobacco, stricter reinforcement of the sale of tobacco products to adolescents, and prohibiting youth under the age of 18 years to smoke, facilitates sustainability. Moreover, respondents mentioned that existing legislation (e.g. minimum legal age of 18 years for sale of tobacco products) supports sustainability (i.e. the mindset of the population is changing due to laws on smoking).

Finally, the social environment is mentioned both as a barrier and facilitator. Smokers in a student's peer group, smoking staff and smoking parents are reported as barriers. Parents' support of the ban, and consensus between parents and school in communications about smoking, is considered a facilitator.

*'Smoking parents don't think it's dangerous for their child to smoke. Parents say: 'I allow my child to smoke at home, so I don't understand why it's forbidden to smoke at school' I consider this very problematic and prefer to have consensus about this between the parents and the school.'* #4

Furthermore, a low absolute number of smokers at the school is reported as a facilitator, as this generally involves little resistance. Moreover, nowadays, non-smoking is increasingly the norm at schools, as there is an increasing number of schools with an outdoor smoking ban, which also strengthens sustainability.

## Discussion

This study shows that sustainability is relatively high among Dutch schools with an outdoor smoking ban (i.e. 48%) and it seems that outdoor smoking bans at these schools have been fairly good

routinized.<sup>4</sup> The level of sustainability at schools is reflected by the identified barriers/facilitators. The present study highlights that, internationally, outdoor smoking bans could become more widespread, as investments tend to endure after policy implementation, and once implemented the ban has become 'normal'.

Closer analysis of the perceived barriers/facilitators revealed interesting insights. First, strict enforcement, and communication/collaboration with all stakeholders can strengthen sustainability. These findings are consistent with others reporting that involvement of all stakeholders at multiple levels is critical for sustainability, as this strengthens commitment to the intervention.<sup>29,30</sup> Moreover, based on the present study, outdoor smoking bans should apply to everyone (including staff, or staff should smoke out of sight of the students). Indeed, exemptions from the smoke-free tobacco control policies are counterproductive, as they can undermine the smoking ban.<sup>31</sup> Additionally, non-smoking staff (or who smoke but are unseen by students) are essential, as they function as role models.<sup>32</sup>

Second, the school culture facilitates sustainability, e.g. good interrelationship between students and staff. The effectiveness of the staff should not be underestimated in school-based interventions, as they know their students, can communicate with them, and can provide students with continuous support.<sup>33</sup>

Finally, results of the present study suggest that legislation discouraging youth smoking (e.g. price increase, prohibiting minors to smoke) should be introduced. A previous study has demonstrated that legislation for outdoor smoking bans in school settings is also perceived as important by stakeholders, as this might facilitate adoption and normalization of outdoor smoking bans in general.<sup>34</sup> Furthermore, the pedagogic role of the parents should be strengthened, as some anti-smoking parenting strategies decreases adolescent's engagement in smoking.<sup>35</sup>

In the present study, the relatively high level of sustainability might be explained by two factors. First, an outdoor smoking ban is a relatively inexpensive strategy (e.g. surveillance and placing signs) compared to comprehensive time-consuming classroom-based interventions (e.g. course material, training of teachers and lesson time). Schools can implement an outdoor smoking ban without funding, whereas cutting budgets is an important factor in decreasing sustainability.<sup>17</sup> Second, our findings show that dedication and support of both staff and students facilitates sustainability of an outdoor smoking ban; this is better than e.g. dependence on one person. For example, the situation can be vulnerable when sustainability depends on one person, such as a program champion, as sustainability might diminish when that person leaves the organization.<sup>18,21</sup>

Smaller schools show a higher level of sustainability, which is probably explained by the type of school premises. For example, smaller schools often have clearly structured school premises, fostering enforcement (i.e. staff can discern non-compliance more rapidly) and, in turn, sustainability. School culture is another explanation, as small schools generally display more social control and cohesion; this might strengthen enforcement, as non-compliance is immediately detected and seen by others. This probably helps to shift the norm to 'non-smoking' more rapidly, which is an important factor in achieving sustainability.<sup>5</sup> Additionally, small schools often have a low absolute number of smokers, resulting in less resistance to the ban and the ability of staff to communicate with the smokers individually. Furthermore, it should be noted that since schools without a ban in general had more students, it might be for them more difficult to reach a high level of sustainability.

### Strengths and limitations

Some limitations of our study need to be addressed. First, despite that sustaining an intervention is a process and that components of an intervention change over time,<sup>36</sup> sustainability was assessed at only one point in time. Nevertheless, the high level of sustainability

and the fact that the year of implementation was not associated with sustainability, suggest that sustainability of outdoor smoking bans in a school setting does not change over time. Second, the data represent only the Dutch situation, which limits generalizability to other countries. The Netherlands is relatively high ranked in the Tobacco Control Scale (9th),<sup>1</sup> and sustainability may be different in countries with less policy regulations. Third, social desirability bias might have occurred as directors may have been inclined to project a favorable image of their school. Fourth, as smoking prevalence was not measured it was not possible to evaluate differences in sustainability between schools with a low or high percentage smokers.

Despite these limitations, the response rate of the online survey was relatively high and a diverse range of schools were included in the interviews. Additionally, combining quantitative and qualitative research allows to deepen our insight in sustainability, a combination that is considered valuable and called for in the literature.<sup>20,21</sup>

### Conclusion

The present study shows that schools have the capacity to maintain and routinize an outdoor smoking ban. Internationally, the spread of outdoor smoking bans could be further promoted, as investments tend to endure after implementation. Strict enforcement and communication/collaboration with all stakeholders can also strengthen sustainability. Outdoor smoking bans should apply to everyone, without exceptions or staff should smoke out of sight of the students. Furthermore, a good interrelationship is needed between students and staff, and the pedagogic role of the parents could be strengthened. Overall, these findings are promising for the sustainability of future tobacco control initiatives to decrease the morbidity and mortality associated with smoking. Future studies could examine the relationship between the level of sustainability and long-term effectiveness of outdoor smoking bans at secondary schools, and their impact on smoking prevalence.

### Supplementary data

Supplementary data are available at *EURPUB* online.

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*Conflicts of interest:* None declared.

### Key points

- Schools have the capacity to maintain and routinize an outdoor smoking ban.
- Internationally, the spread of outdoor smoking bans could be further promoted.
- The findings are promising for sustainability of future tobacco control initiatives.

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