

# Implementation of a Smoke-Free Policy on School Premises and Tobacco Control as a Priority Among Municipal Health Promotion Activities: Nationwide Survey in Japan

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We conducted a nationwide survey to evaluate the effect of implementing a smoke-free policy in municipalities that forbid teachers to smoke on school premises. Questionnaires were mailed to 3207 municipalities throughout Japan. After we adjusted for population size and the standardized mortality ratio for male lung cancer, we found that assigning a high priority to tobacco control in municipal health promotion activities was significantly associated with implementation of school tobacco-control policies (odds ratio = 1.50, 95% confidence interval = 1.24, 1.81). (*Am J Public Health*. 2005;95:420–422. doi:10.2105/AJPH.2004.044503)

More than 80% of male smokers start smoking before age 20.<sup>1,2</sup> Therefore, any adolescent smoking prevention program needs to include implementation of a school smoking policy and programs about social influences on smoking.<sup>3,4</sup> Poulsen et al.<sup>5</sup> found that adolescent smoking behavior was influenced by teachers' smoking behavior during school hours. To our knowledge, few studies have evaluated the effect of muni-

cipalities' public health policies on the implementation of a complete smoke-free policy that prohibits anyone, including teachers, from smoking on school premises. We used data from a nationwide survey in Japan to report on the prevalence of complete smoke-free school policies in relation to the priority given to municipal tobacco-control activities.

## METHODS

The questionnaires were mailed to the health promotion sections of 3207 municipalities throughout Japan in July 2003. They included the following 3 items:

1. the respondent's profession;
2. whether a complete smoke-free policy on school premises was implemented in the elementary and junior high schools of the municipality (all schools, some schools, or no schools);
3. the priority of school tobacco-control policies within the municipality's health promotion activities (high, intermediate, or low).

## Data Analysis

Categorical variables were tested with the  $\chi^2$  test and the  $\chi^2$  test for linear trend. The *t* test or the Mann–Whitney test was used to compare continuous variables.

The population size (2000 census data) and the life expectancy for men, as well as the standardized mortality ratio (SMR) for male lung cancer in 1999 (estimated by the Ministry of Health, Labour, and Welfare), were examined as potential confounders. These variables were divided into quintiles for analysis.

Bivariate and multivariate logistic regression models were constructed to estimate the odds ratios with a 95% confidence interval. In the models, the implementation status (of a smoke-free policy on school premises) as a dependent variable was dichotomized to either "implemented" or "not implemented" by merging the responses "yes at all schools" and "yes at some schools" into "implemented." The priority levels also were dichotomized to a positive category ("high") or a negative category

("intermediate" or "low"). SMR quintiles were divided into 3 categories—(1) first, (2) second to fourth, and (3) fifth—because of a significant nonlinear association with the implementation status.

## RESULTS

Of the 3207 municipalities, 2570 (80.1%) responded. No statistically significant differences were observed in the life expectancy and the SMR for lung cancer for men between the municipalities that responded and those that did not, except for population size (median values: responding = 11 483, nonresponding = 8140;  $P < .001$ ). Public health nurses accounted for 80.5% of the respondents.

Valid answers for the questions on implementation of a smoke-free policy and the priority of tobacco-control activities were available from 2246 municipalities (87.4% of all municipalities responding). Three hundred twenty-two (14.3%) municipalities implemented a complete smoke-free policy in all elementary and junior high schools, 408 (18.2%) did so in some of the schools, and 1516 (67.5%) had not implemented any complete smoke-free policies. The proportions of these responses did not differ significantly by whether the respondent was a public health nurse.

Table 1 shows the prevalence of implementation of a smoke-free policy in schools in relation to other factors. A smoke-free policy was less likely to be implemented in municipalities that assigned a low priority to tobacco-control activities ( $P < .001$ ). The school smoke-free policy was more likely to be implemented in municipalities with a large population size ( $P < .001$ ) and in the first and fifth quintile of the SMR for male lung cancer ( $P < .005$ ). No significant relation between life expectancy and implementation was observed.

As indicated in Table 2, after we adjusted for the population size and the SMR for lung cancer in men, a high priority given to tobacco-control policy in municipal health promotion activities was significantly associated with the implementation of a complete smoke-free school policy (odds ratio = 1.50; 95% confidence interval = 1.24, 1.81).

**TABLE 1—Association of the Implementation of a Complete Smoke-Free Policy for School Premises With the Priority of Tobacco-Control Policy, Population Size, and Vital Statistics in Japanese Municipalities**

	Implementation Status of a Complete Smoke-Free Policy for School Premises				P for $\chi^2$ Test	P for Trend
	Implemented in All Schools	Implemented in Some Schools	No Implementation	Total <sup>a</sup>		
	n (%)	n (%)	n (%)	n (%)		
Priority given to tobacco-control policy in health promotion activities						
High	218 (16.4)	271 (20.4)	839 (63.2)	1328 (100)	< .001	< .001
Intermediate	93 (11.0)	129 (15.3)	620 (73.6)	842 (100)		
Low	5 (16.1)	3 (9.7)	23 (74.2)	31 (100)		
Population size						
<5000	71 (15.5)	47 (10.3)	340 (74.2)	458 (100)	< .001	< .001
5000–9999	83 (14.8)	75 (13.4)	403 (71.8)	561 (100)		
10 000–29 999	86 (12.9)	126 (18.9)	455 (68.1)	668 (100)		
≥30 000	82 (14.6)	160 (28.6)	318 (56.8)	560 (100)		
Life expectancy for men, y <sup>b</sup>						
<76.8	64 (13.3)	80 (16.6)	338 (70.1)	482 (100)	NS	NS
76.8–77.2	69 (16.4)	68 (16.2)	283 (67.4)	420 (100)		
77.3–77.7	71 (14.9)	79 (16.6)	325 (68.4)	475 (100)		
77.8–78.0	60 (14.9)	70 (17.4)	273 (67.7)	403 (100)		
≥78.1	58 (12.4)	111 (23.8)	297 (63.7)	466 (100)		
SMR for male lung cancer <sup>b</sup>						
<76	64 (15.2)	59 (14.0)	299 (70.9)	422 (100)	< .005	NS
76–91	65 (14.2)	99 (21.7)	293 (64.1)	457 (100)		
92–104	59 (13.1)	100 (22.2)	292 (64.7)	451 (100)		
104.1–120	66 (13.9)	92 (19.4)	317 (66.7)	475 (100)		
>120	68 (15.4)	58 (13.2)	315 (71.4)	441 (100)		

Note. NS = not statistically significant; SMR = standardized mortality ratio.

<sup>a</sup>Some numbers do not equal 2570 because of missing values.

<sup>b</sup>Each interval is defined by quintile.

## DISCUSSION

A complete smoke-free school policy was significantly more likely to be implemented in municipalities in which tobacco control had a high priority among health promotion activities. This finding appears to be compatible with the results of the Massachusetts survey of local restaurant smoking regulations<sup>6</sup> and may provide a clue to the problem of the limited efficacy of school-based smoking programs that do not include an enforced tobacco-control policy.<sup>7,8</sup> Our results could add weight to the concept of enforcing a stronger public health policy for tobacco control at the local level.

The first limitation of this study was its cross-sectional design. Second, data were

gathered through questionnaires that may have been biased by responders' attitudes and their social and cultural environments. Consequently, the prevalence of implementation could have been overestimated. Finally, these results do not address other current issues in tobacco control in schools.<sup>9</sup> Further studies are needed to elucidate the association between tobacco control in schools and municipalities' public health priorities. ■

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This brief was accepted July 14, 2004.

### Contributors

K. Kayaba wrote the brief with H. Yanagawa. K. Kayaba conducted the analyses with C. Wakabayashi, N. Kumisawa, and H. Shinmura. H. Yanagawa originated the study and supervised all aspects of its implementation.

### Acknowledgments

The study was supported by a grant from the Ministry of Health, Labour, and Welfare of Japan (grant H15-ganyobou-023).

The authors thank Yoshihiko Miura for his statistical advice and Michiko Kawashima for her computational assistance and database management.

### Human Participant Protection

No protocol approval was needed for this study.

**TABLE 2—Logistic Regression Predicting the Implementation of a Complete Smoke-Free Policy for School Premises, by the Priority of Tobacco-Control Policy in Municipalities, Population Size, and SMR for Male Lung Cancer**

	Bivariate Model	Multivariate Model
	OR (95% CI)	Adjusted OR (95% CI)
Priority given to tobacco-control policy in health promotion activities		
Low or intermediate	Reference	Reference
High	1.63 (1.35, 1.97*)	1.50 (1.24, 1.81*)
Population size		
<5000	Reference	Reference
5000–9999	1.13 (0.86, 1.49)	1.13 (0.85, 1.51)
10 000–29 999	1.34 (1.03, 1.75*)	1.26 (0.96, 1.66)
≥30 000	2.19 (1.68, 2.87*)	1.94 (1.46, 2.59*)
SMR for male lung cancer		
<76	0.77 (0.61, 0.98**)	0.97 (0.75, 1.24)
76–121	Reference	Reference
>121	0.75 (0.59, 0.95**)	0.86 (0.67, 1.10)

Note. SMR = standardized mortality ratio; OR = odds ratio; CI = confidence interval.

\* $P < .001$ ; \*\* $P < .05$ .

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