

BMJ Open Smoking prevalence and attitudes towards smoking among Estonian physicians: results from cross-sectional studies in 2002 and 2014

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ABSTRACT

Objectives To explore smoking prevalence and attitudes towards smoking among Estonian physicians in 2002 and 2014.

Design Two self-administered cross-sectional postal surveys were conducted among practising physicians in Estonia.

Participants Initial sample consisted of all practising physicians in Estonia. The corrected response rate was 67.8% in 2002 and 53.1% in 2014. Present study sample was restricted to physicians younger than 65 years (n=2549 in 2002, n=2339 in 2014).

Methods Age-standardised prevalence of smoking and prevalence of agreement with seven statements concerning attitudes towards smoking was determined. To analyse association of physicians' attitudes towards smoking with study year and smoking status, logistic regression analysis was used. Adjusted ORs of agreement with the seven statements were determined. Corresponding 95% CIs were calculated.

Results The age-standardised prevalence of current smoking among men was 26.8% in 2002 and 15.3% in 2014, among women 10.4% and 5.8%, respectively. Compared with the year 2002, in 2014, prevalence of agreement with statements declaring harmfulness of smoking was higher and prevalence of agreement with statements approving smoking was lower. Adjusted ORs showed that compared with 2002, physicians' attitudes towards smoking were less favourable in 2014, and physicians' attitudes towards smoking were associated with their smoking status.

Conclusions Compared with 2002, the age-standardised smoking prevalence among male and female physicians was lower, and attitudes towards smoking were less approving in 2014. The smoking physicians had more approving attitudes towards smoking than their non-smoking colleagues.

Strengths and limitations of this study

- The surveys were nationwide, initially involving all practising physicians in Estonia.
- Changes in smoking prevalence were easily comparable due to similar methods and questionnaires used in 2002 and 2014.
- The surveys relied on self-reported data and therefore the bias of self-representation should be considered.
- In terms of response rates, the possibility that smokers prevail among persistent non-respondents may have led to the underestimation of smoking prevalence rates.

and less diseases like lung cancer, heart diseases, stroke, chronic respiratory diseases and other conditions.²

Physicians are generally regarded as people from whom smokers would accept advice on smoking cessation.³ However, physicians' smoking status could affect their attitudes towards smoking and their enthusiasm in addressing patients' smoking.^{4,5}

Smoking behaviour among physicians has been studied for decades. British male doctors smoking cohort study is the most commonly known and began in 1951.⁶ In the developed countries (eg, USA, Australia, Finland and Denmark), smoking among physicians has declined during the last decades,⁷⁻⁹ being lower than in general population and thus reflecting the maturity of the country's tobacco epidemic. At the same time, in the developing countries (eg, Mexico and Philippines), smoking prevalence rates among physicians are much higher than in developed countries being in some cases even higher than in general population.^{10,11} In Estonia, smoking among physicians has declined since 1978.¹²⁻¹⁶ Despite being lower than in general



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INTRODUCTION

Smoking is among the leading preventable causes of death and is considered a major public health threat. According to WHO, among adults aged 30 years and over, 12% of all deaths are attributed to tobacco.¹ Reducing smoking will result in fewer deaths

population, smoking among doctors in Estonia is still higher than among physicians in neighbouring country Finland.¹⁴

As smoking physicians tend to underestimate smoking as a risk factor, it is important to analyse physicians' smoking and their attitudes towards smoking to involve them in patients' smoking cessation more effectively.

The objective of this study was to explore smoking prevalence and attitudes towards smoking among Estonian physicians in 2002 and 2014.

METHODS

Study design

The present study was based on two cross-sectional self-administered postal smoking surveys among Estonian physicians in 2002 and 2014. Initially, the surveys involved all practising physicians in Estonia. In 2002, physicians were drawn from the database of Estonian Health Insurance Fund. In 2014, sample was based on the data from the Estonian Health Care Professionals Registry. In 2002, the questionnaires were mailed to the physicians' workplace. Non-respondents received the questionnaire twice. In 2014, the survey materials were mailed to the physicians' home address. To receive home addresses, data from the Estonian Health Care Professionals Registry were linked with the Population Registry in Estonia. Non-respondents received a reminder letter in a month and another envelope containing survey materials in 2 months.

The questionnaire used in these surveys was originally developed by the WHO and modified according to the Estonian healthcare system.¹⁷ In 2014, the questions regarding nicotine dependence were added to the questionnaire. Questionnaires concerned individual characteristics, smoking behaviour, attitudes towards and knowledge about tobacco use but also attitudes towards patients' smoking.

The initial survey sample size of all practising physicians in Estonia was 4140 in 2002 and 5666 in 2014 (table 1). Number of respondents was 2747 and 2903, respectively. The crude response rate was 66.3% in 2002 and 52.0% in 2014. Corrected response rates (excluding the persons who were unavailable, retired, had wrong address, left Estonia or were dead) were 67.8% and 53.1%, respectively.

The sample for the present study was restricted to physicians who were younger than 65 years (n=2549 in 2002, n=2339 in 2014).

Study variables

The main outcomes were smoking status and physicians' attitudes towards smoking.

Smoking status was determined by combining answers to several questions concerning smoking and classified as following:

- ▶ daily smokers (those who currently smoke every day)
- ▶ occasional smokers (those who currently smoke but not every day)
- ▶ past smokers (those who have smoked regularly for at least a year but are currently non-smokers)
- ▶ never smokers (those who have smoked irregularly less than a year but are not current smokers or have never smoked at all).

For secondary data analysis, smoking status was dichotomised to current smokers (daily and occasional smokers) and non-smokers (past and never smokers). Smoking, in the present study, was defined as smoking cigarettes.

Statements concerning smoking

Attitudes towards smoking were determined with following seven statements:

- ▶ Smoking is very harmful to health.
- ▶ It is important to reduce smoking among the population.
- ▶ To stop smoking is very hard for many people, so it is better for their health to simply continue smoking.
- ▶ Smoking does not damage my health as long as I follow a healthy life style in other fields.
- ▶ As many people have smoked for their whole lives until old age and not become ill, smoking is not as dangerous as experts declare.
- ▶ To smoke or not to smoke, that is my personal choice.
- ▶ Smoking is only dangerous to my health if I smoke more than 10 cigarettes a day.

In the first statement physicians assessed the harmfulness of smoking using 10-point scale (10=very harmful). Those who had chosen 8–10 were considered as having agreed that smoking is very harmful to the health. Those who had chosen 1–7 were considered as disagreed. In all other statements, possible answers were completely agree/somewhat agree/rather disagree/completely disagree/cannot say. For secondary analysis, answers were dichotomised as agree (completely agree and somewhat agree) and disagree (rather disagree and completely disagree).

Table 1 Initial sample size, number and percentage of respondents, crude and corrected response rates by gender among Estonian physicians in 2002 and 2014

Study year	Initial sample size (n (%))			Number of respondents (n (%))			Response rate (%)	
	Men	Women	Total	Men	Women	Total	Crude	Corrected
2002	846 (20.4)	3294 (79.6)	4140	471 (17.1)	2276 (82.9)	2747	66.3	67.8
2014	1283 (22.6)	4383 (77.4)	5666	532 (18.3)	2371 (81.7)	2903	51.9	53.1

Background variables age, ethnicity, place of residence and medical specialty were considered as confounding factors.

Age was measured in full years.

Ethnicity referred to self-determined national identity and was classified as Estonian/non-Estonian (mainly Russian).

Place of residence was determined as Tallinn (capital of Estonia), other city and other (not urban) settlement.

Medical specialty was determined based on self-reported specialty and was analysed in three groups: family physician, specialist doctor and dentist.

The study methodology follows The Strengthening the Reporting of Observational Studies in Epidemiology Statement guidelines for reporting observational studies.

Data analysis

Data were analysed separately for men and women. Mean age of respondents with SD was calculated. Distribution (%) of respondents by background variables and by agreement with seven statements concerning attitudes towards smoking was calculated. χ^2 test was used to find differences in background variables and in attitudes towards smoking between 2002 and 2014. Significance level was set at 0.05. The age-standardised smoking prevalence with corresponding 95% CIs was calculated using European standard population.¹⁸

Multiple binary logistic regression models were used to analyse association of physicians' attitudes

towards smoking with study year and smoking status. The models used dichotomised approval (agreed vs disagreed) as a dependent variable and study year, smoking status, age, ethnicity, place of residence and medical specialty as explanatory variables. Fully adjusted ORs with corresponding 95% CIs were calculated.

Questionnaires with missing smoking status values (n=11) were excluded from the analysis. In total, 4877 questionnaires were included to the descriptive analysis (n=2539 in 2002, n=2338 in 2014). Questionnaires that lacked information concerning background variables and attitudes towards smoking or wherein the statements 'cannot say' was answered were excluded from the χ^2 tests and logistic regression models.

Data were analysed using statistical package Stata V.11.

RESULTS

Background variables

An overview of physicians' main background variables is provided in [table 2](#). The majority of participants were females (83.6% in 2002 and 82.5% in 2014). Among men 50.8% in 2002 and 38.1% in 2014 were younger than 45 years (P<0.001) and among women 45.4% in 2002 and 38.8% in 2014 were younger than 45 years old (P<0.001). Mean age of male physicians was 45.2±9.8 in 2002 and 46.9±10.9 in 2014 and of female physicians 46.4±10.2 in 2002 and 46.7±11.2 in 2014, respectively.

Table 2 Distribution (%) of respondents by background variables and corresponding p values by gender among Estonian physicians in 2002 and 2014

Variable	Men			Women		
	2002 (n=417)	2014 (n=409)	P value*	2002 (n=2132)	2014 (n=1930)	P value*
Age group			<0.001			<0.001
<45	50.8	38.1		45.4	38.8	
≥45	49.1	61.9		54.6	61.2	
Ethnicity			0.050			0.748
Estonians	79.4	75.1		84.1	83.8	
Non-Estonians	18.7	24.7		15.7	16.1	
Missing answer	1.9	0.2		0.3	0.1	
Place of residence			0.381			0.001
Tallinn	36.5	41.3		32.6	37.0	
Other city	47.0	44.0		46.0	40.6	
Other (rural)	15.8	14.4		20.7	22.1	
Missing answer	0.7	0.2		0.7	0.2	
Medical specialty			0.460			<0.001
Family physician	9.4	9.0		21.0	25.3	
Specialist doctor	77.5	74.6		53.8	48.2	
Dentist	9.6	12.2		23.3	24.7	
Missing answer	3.6	4.2		1.9	1.8	

*P values demonstrate significant differences (P<0.05) between study years.

Table 3 The age-standardised prevalence of daily, occasional, past and never smoking (n, %, 95% CI) by gender among Estonian physicians in 2002 and 2014

Smoking status	Men		Women	
	2002 n=417	2014 n=409	2002 n=2122	2014 n=1929
Daily	18.4 (14.5 to 22.3)	11.8 (8.6 to 15.0)	6.2 (5.1 to 7.3)	4.4 (3.5 to 5.3)
Occasional	8.4 (5.4 to 11.3)	3.5 (1.7 to 5.3)	4.2 (3.3 to 5.2)	1.4 (0.9 to 2.0)
Past	29.8 (25.3 to 34.3)	26.1 (22.1 to 30.0)	16.1 (14.5 to 17.8)	16.5 (14.9 to 18.2)
Never	43.4 (38.4 to 48.5)	58.6 (54.0 to 63.3)	73.4 (71.5 to 75.4)	77.7 (75.9 to 79.5)

Smoking status

The age-standardised prevalence of daily and occasional smoking was lower, but age-standardised prevalence of never smoking was higher in 2014 than in 2002 (table 3). Age-standardised prevalence of past smoking was similar in 2002 and 2014.

Attitudes towards smoking

Table 4 summarises physicians' responses regarding attitudes towards smoking in 2002 and 2014. Compared with 2002, in 2014, the attitudes towards smoking were less favourable among both male and female physicians.

Association of physicians' attitudes towards smoking with study year and their smoking status

Multiple binary logistic regression demonstrated less approving attitudes towards smoking in 2014 than in 2002 (table 5). Compared with 2002, in 2014, male and female physicians agreed significantly more with the statements:

- ▶ Smoking is very harmful.
- ▶ It is important to reduce smoking among the population.

Compared to 2002, in 2014, male and female physicians agreed significantly less with the statements:

- ▶ To stop smoking is very hard for many people, so it is better for their health to simply continue smoking.
- ▶ Smoking does not damage my health as long as I follow a healthy life style in other fields.

Compared to 2002, in 2014, only female physicians agreed significantly less with the statements:

- ▶ As many people have smoked for their whole lives until old age and not become ill, smoking is not as dangerous as experts declare.
- ▶ To smoke or not to smoke, that is my personal choice.
- ▶ Smoking is only dangerous to my health if I smoke more than 10 cigarettes a day.

Agreement with all seven statements was associated with smoking status of male and female physicians.

DISCUSSION

The study analysed smoking and attitudes towards smoking among less than 65-year-old Estonian physicians in 2002 and 2014. Compared with the first study year, smoking prevalence was lower, and attitudes towards smoking were less favourable in 2014. However, smoking

physicians had more approving attitudes towards smoking than their non-smoking colleagues.

Smoking status

The age-standardised prevalence of daily smoking decreased 1.6 times among male and 1.4 times among female physicians from 2002 to 2014 (the age-standardised prevalence of occasional smoking 2.3 and 3.0 times, respectively). This result was expected as smoking among physicians (aged between 23 and 86 years) in Estonia decreased between 1982 and 2014.^{19 20} Among these physicians, age-standardised daily smoking decreased 3.3 times among men and 2.6 times among women¹⁹ and current smoking 2.8 and 2.4 times,²⁰ respectively, over three decades. Smoking rates in Estonia have come down among general population as well. In 2002, daily smoking prevalence was 49.6% among men and 20.3% among women.²¹ In 2014, 31.4% of men and 15.8% of women were daily smokers. Although Estonia is considered to have reached the mature state in terms of smoking epidemic, the prevalence of daily smoking among physicians in 2014 was still comparable with the rates of daily smoking among Finnish doctors in 2002.¹⁴

Association between attitudes towards smoking and study year

The results of this study showed that attitudes towards smoking were less approving in 2014 compared with 2002.

Agreement with the four statements of seven was associated with study year and smoking among male and female physicians. Agreement with the statements that smoking is very harmful and that it is important to reduce smoking among the population was more prevalent in 2014 and less prevalent among smoking physicians. This finding is in accordance with previous international studies showing that compared with non-smokers, smoking physicians agree less that smoking is harmful.⁴

Agreement with the statements that to stop smoking is very hard for many people, so it is better for their health to simply continue smoking and that smoking does not damage my health as long as I follow a healthy life style in other fields was less prevalent in 2014.

Agreement with the three statements of seven was associated with study year among female physicians only. Association was found between study year and agreement with

Table 4 Attitudes towards smoking (%) and according p values by gender among Estonian physicians in 2002 and 2014

Statements	Men			Women		
	2002 n=417	2014 n=409	P value*	2002 n=2132	2014 n=1930	P value*
Smoking is very harmful to the health†			<0.001			<0.001
Agree	63.3	79.0		71.5	88.1	
Disagree	35.3	20.3		27.3	11.5	
Missing	1.4	0.7		1.2	0.4	
It is important to reduce smoking among the population			0.001			<0.001
Agree	89.0	96.3		93.3	97.8	
Disagree	7.2	2.2		3.1	1.0	
Cannot say	2.4	0.7		2.3	0.6	
Missing	1.4	0.7		1.4	0.6	
To stop smoking is very hard for many people, so it is better for their health to simply continue smoking			<0.001			<0.001
Agree	23.5	14.2		18.4	13.6	
Disagree	67.1	82.4		68.7	83.0	
Cannot say	7.4	1.2		10.8	2.4	
Missing	1.9	2.2		2.1	1.1	
Smoking does not damage my health as long as I follow a healthy lifestyle in other fields			0.011			<0.001
Agree	10.1	5.6		8.0	4.1	
Disagree	83.4	91.7		84.7	93.8	
Cannot say	4.1	0.5		5.4	1.2	
Missing	2.4	2.2		1.9	0.9	
As many people have smoked for their whole lives until old age and not become ill, smoking is not as dangerous as experts declare			0.415			<0.001
Agree	17.0	15.9		15.1	11.5	
Disagree	74.3	80.9		75.1	85.3	
Cannot say	6.5	1.0		7.9	2.2	
Missing	2.2	2.2		1.9	1.0	
To smoke or not to smoke, that is my personal choice			0.201			<0.001
Agree	53.5	51.1		47.9	42.6	
Disagree	40.0	46.0		46.6	56.2	
Cannot say	4.6	0.5		4.2	0.4	
Missing	1.9	2.4		1.4	0.8	
Smoking is only dangerous to my health if I smoke more than 10 cigarettes a day			0.017			<0.001
Agree	13.2	8.5		7.8	4.4	
Disagree	78.7	87.8		83.5	92.8	
Cannot say	6.2	1.2		7.0	1.9	
Missing	1.9	2.4		1.7	0.9	

*P values demonstrate significant differences ($p < 0.05$) between study years.

†Option 'Cannot say' was not available for this question in the questionnaire.

the statements that as many people have smoked for their whole lives until old age and not become ill, smoking is not as dangerous as experts declare, that to smoke or not to smoke, that is my personal choice and that smoking is only dangerous to my health if I smoke more than 10 cigarettes

a day among male physicians. This confirms results from previous studies, according to which smoking behaviour has different patterns among men and women.^{22 23} The difference in opinions between genders might be related to the fact that behaviour of men in general is considered to

Table 5 Association of physicians' attitudes towards smoking (agreed vs disagreed) with study year and smoking status (OR, 95% CI) by gender among Estonian physicians in 2002 and 2014

Agree	Men	Women
	OR* (95% CI)	OR* (95% CI)
Smoking is very harmful to the health		
2014 versus 2002	2.13 (1.51 to 3.01)	2.81 (2.35 to 3.36)
Smokers versus non-smokers	0.27 (0.19 to 0.39)	0.22 (0.17 to 0.27)
It is important to reduce smoking among the population		
2014 versus 2002	3.86 (1.69 to 8.80)	2.96 (1.75 to 5.03)
Smokers versus non-smokers	0.41 (0.20 to 0.84)	0.27 (0.16 to 0.45)
To stop smoking is very hard for many people, so it is better for their health to simply continue smoking		
2014 versus 2002	0.48 (0.32 to 0.72)	0.62 (0.52 to 0.74)
Smokers versus non-smokers	2.54 (1.67 to 3.86)	3.46 (2.67 to 4.49)
Smoking does not damage my health as long as I follow a healthy life style in other fields		
2014 versus 2002	0.43 (0.23 to 0.79)	0.48 (0.36 to 0.65)
Smokers versus non-smokers	6.86 (3.90 to 12.06)	4.56 (3.29 to 6.33)
As many people have smoked for their whole lives until old age and not become ill, smoking is not as dangerous as experts declare		
2014 versus 2002	0.96 (0.63 to 1.47)	0.72 (0.59 to 0.87)
Smokers versus non-smokers	5.88 (3.83 to 9.02)	3.75 (2.88 to 4.89)
To smoke or not to smoke, that is my personal choice		
2014 versus 2002	1.01 (0.74 to 1.38)	0.78 (0.68 to 0.89)
Smokers versus non-smokers	5.87 (3.70 to 9.30)	4.59 (3.47 to 6.08)
Smoking is only dangerous to my health if I smoke more than 10 cigarettes a day		
2014 versus 2002	0.60 (0.36 to 1.00)	0.51 (0.39 to 0.69)
Smokers versus non-smokers	4.77 (2.90 to 7.84)	4.32 (3.10 to 6.04)

*Adjusted for study year, smoking status, age, ethnicity, place of residence and medical specialty.

be more risk prone.²⁴ The findings of present study might support the notion that, in Estonia, social acceptability of smoking has decreased, and attention has turned towards prevention and health promotion.

Overall, Estonian physicians' attitudes towards smoking have improved from 2002 to 2014, and the developments concerning decline of smoking in Estonia have created a supportive environment for that. Estonian Tobacco Act, enforced in 2001, renewed in 2005 and amended since with several legal instruments, sets the requirements for creating a smoke-free environment, availability and pricing of tobacco products. Many of Estonian healthcare institutions have joined the network for tobacco-free health services,²⁵ and despite the fact that in healthcare institutions in Estonia, smoking is still allowed in designated smoking areas, many hospitals promote reducing smoking among staff, have prohibited smoking everywhere in the hospital area and have declared the hospital smoke-free.

Association between attitudes towards smoking and smoking status

Agreement with all seven statements described above was associated with smoking status of male and female physicians. Most drastically, compared with non-smokers, men who smoked, had six times higher odds to agree

that smoking is not as dangerous as experts declare and had seven times higher odds to agree that smoking does not damage health if the person leads an otherwise healthy lifestyle. For smokers, the beliefs that smoking is not dangerous to health might be based on the fact that not all persons who smoke will develop adverse effects of smoking like lung cancer or other smoking-related diseases.

The fact that compared with non-smokers, smoking physicians agreed less that it is important to reduce smoking and believe more that to smoke is person's own choice demonstrates that smoking physicians might feel the need for justification for their own behaviour, especially if they have not developed any smoking-related health problems. Opinions on that matter might also indicate that physicians lessen their role in reducing smoking in the population. According to the worldwide literature, attitudes towards smoking differ by region. In former studies among Italian physicians specialising in public health, 79.6% considered health professionals as behavioural models for patients, and 96.6% affirmed that health professionals have a role in giving advice or information about smoking cessation.²⁶ In Serbia, 60.7% of physicians agreed that healthcare professionals serve

as role models for their patients and public.²⁷ However, data from a focus group interview carried out among Armenian doctors revealed that the majority of doctors believed they have no role in patients' quitting.²⁸ Compared with Finnish physicians, Estonian physicians were less conscious of their role as healthy lifestyle exemplars in 2002.¹⁴ Authors then argued that there might be a fear to influence other people's behaviour in Estonia. Results of the present study indicate that the fear still exists.

Although it has been shown before that physicians' beliefs about smoking-related diseases were consistent with medical evidence,¹⁵ the results of present study showed that physicians who smoke may see smoking more favourably. These opinions can affect smoking cessation activities of the physicians as it has been shown that smokers might not anticipate health problems related to smoking.²⁹

Study limitations and strengths

Possible limitations of this study should be addressed. First, as the study relied on self-reported data, the bias of self-representation should be considered. Second, the corrected response rates of 67.8% in 2002 and 53.1% in 2014 should be taken into account. The possibility that smokers prevail among persistent non-respondents may have led to the underestimation of smoking prevalence rates. Third, limitations could be related to the cross-sectional nature of the study thus not providing the opportunity to investigate causal relationships. Also, as only two time points were used, merely a general tendency of smoking prevalence and attitudes towards smoking can be observed. Despite these shortcomings, the survey data provides an excellent opportunity to analyse changes in smoking status and attitudes towards smoking as both surveys were nationwide, the survey methods and questionnaires were similar and physicians are considered a very homogenous cohort in terms of their education.

CONCLUSIONS

Prevalence of smoking among Estonian physicians was lower in 2014 than in 2002. Although, compared with 2002, attitudes towards smoking were less approving in 2014, it was still apparent that doctors who smoked viewed smoking more favourably.

Continuing monitoring physicians' smoking and attitudes towards smoking will provide information that is useful in development of teaching of tobacco prevention in medical education programmes in Estonia.

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Contributors MP: performed the statistical analysis, interpretation of the data, drafted the manuscript and has been involved in revising the manuscript critically. KP: made a substantial contribution to the conception and the design of the study, interpretation of the data and has been involved in revising the manuscript critically. Both authors have read and approved the final manuscript.

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Data sharing statement The datasets of 2002 and 2014 are available on request.

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