TOBACCO USE AMONG HEALTH PROFESSIONALS: EXAMPLE OF ONE OF THE LARGEST CZECH HOSPITALS, 2012–2023

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SUMMARY

Objectives: The General University Hospital in Prague (GUH) is one of the largest hospitals in the Czech Republic. The prevalence of smoking among hospital staff is monitored as part of its Health Promoting Hospitals (HPH) network membership.

Methods: This study employed a cross-sectional design, utilizing anonymous questionnaires distributed to all hospital employees in the years 2012 and 2023 through the hospital's electronic system (response rates 25% and 28%, respectively). Data were analysed using chi-square tests to compare smoking prevalence across time and among subgroups based on profession, sex and age group.

Results: The total prevalence of smoking decreased from 38.4% in 2012 to 14.5% in 2023. Among all doctors, the rates fell from 15.86% to 6.75% ($p < 0.001$). For male doctors, the figures changed from 17.05% to 9.27% ($p = 0.012$), while for female doctors, the rates decreased from 15.22% to 5.24% ($p = 0.001$). Among nurses, the smoking prevalence declined from 44.59% to 17.64% ($p < 0.001$).

Conclusion: The statistically significant reduction in smoking rates ($p < 0.05$) among both doctors and nurses is encouraging; however, there remains room for improvement. An increase in the use of other tobacco products was observed, particularly among nurses.

INTRODUCTION

In the Czech Republic, 25% of the population aged 15 and older are smokers, with prevalence rates of 29% among men and 20% among women, according to data from 2023 (1). This figure is significantly higher than the global smoking prevalence, which stood at 17% in 2021 (2).

The smoking habits of health professionals are particularly concerning, as they are expected to serve as non-smoking role models for their patients. Research indicates that health professionals who smoke are less likely to provide effective interventions to help patients quit smoking (3, 4). Furthermore, the credibility of interventions aimed at promoting abstinence from smoking or the use of alternative tobacco products diminishes if the interveners themselves are smokers (5).

The main legislation change during the period was the adoption of smoking ban in healthcare facilities, with only limited exceptions for closed psychiatric and detox wards (Act No. 65/2017 Coll.).

Within the framework of the international project of Health Promoting Hospitals, the following steps have been implemented in the GUH: creation of a committee, smoke-free indoor environment, access to smoking cessation services (Tobacco Dependence Treatment Centre), tobacco (nicotine) use surveys among hospital staff, educating nurses and doctors in intervening with smokers, leaflets distributed both in paper and electronic form. A more detailed description of the global rules is on the website of the Health Promoting Hospitals*. Currently, data on smoking prevalence among health professionals in the Czech Republic is limited (6, 7), highlighting the need for further research in this area.

MATERIALS AND METHODS

This cross-sectional study was conducted at the General University Hospital in Prague. Anonymous electronic questionnaires were distributed via the hospital's intranet system to all staff members (physicians, nurses, and other personnel) in the years 2012 and 2023. The questionnaires included multiple closed-ended questions assessing smoking status, frequency, and use of other tobacco or nicotine products.

*https://www.hphnet.org/

The participants were classified into the categories: regular smokers (daily smokers), occasional smokers (non-daily), former smokers, and non-smokers (including those who never smoked or smoked fewer than 100 cigarettes in their lifetime). The distribution method remained the same in both waves.

Descriptive statistics were used to summarise responses. Comparative analysis between 2012 and 2023 was based on chi-square tests, and extended subgroup analyses were performed by sex, professional role (physicians, nurses, others), and age (grouped as 18–30, 31–40, 41–50, 51–60, 61+).

The chi-square test was selected due to the categorical nature of smoking status data. It is appropriate for detecting differences in the distribution of categorical variables across independent groups (e.g., year, sex, or professional category).

A p-value < 0.05 was considered statistically significant. All statistical analyses were conducted using R, version 4.4.2.

The chi-squared test results, including the chi-squared statistic and corresponding p-values, were reported for each group, including the overall sample, all doctors, male doctors, female doctors, and nurses. These analyses were performed using specific statistical software (e.g., SPSS, R), ensuring the robustness of the findings.

Data are presented as frequencies and percentages, allowing for a clear representation of trends in smoking habits over the specified period.

RESULTS

The response rate was similar in both years, with 25% (1,601 out of 6,400) in 2012 and 28% (1,595 out of 5,715) in 2023. The results indicate a significant decrease in smoking prevalence among health professionals. In 2012 and 2023, respectively, 38.4% vs. 14.5% of all employees smoked. Specifically, the prevalence among male doctors decreased from 17.05% to 9.27% (p=0.012), while for female doctors, it dropped from 15.22% to 5.24% (p=0.001). The overall smoking prevalence among all doctors decreased from 15.86% to 6.75%, and among nurses it fell from 44.59% to 17.64% (p<0.001).

Additionally, the use of other tobacco products increased from less than 1% to 9% in the total sample, with the most significant rise observed among nurses (Table 1, Table 2, Fig. 1).

In the 2023 dataset (N=1,595), we observed significant differences in smoking behaviour across occupational roles. Physicians reported the lowest rate of current smokers (7.8%), with 81.0% classified as non-smokers and 10.7% as former smokers. In contrast, nurses had a substantially higher prevalence of current smokers (17.5%), with 60.7% non-smokers and 21.8% former smokers. Other hospital staff fell between these two groups (15.4% smokers, 64.1% non-smokers, 18.4% former smokers).

Figure 2 shows the distribution of smoking status among physicians, nurses and other hospital staff, based on self-reported responses from the 2023 cross-sectional survey. The highest prevalence of current smokers was observed among nurses, while physicians showed the lowest smoking rates.

When stratified by age groups, the highest prevalence of current smoking was observed among those aged 18–30 (19.7%), followed by a gradual decrease in older age groups, reaching 7.1% among those aged 61 and above. These differences were statistically significant (p < 0.01).

Table 1. *Comparison of smoking habits among health professionals in 2012 and 2023*

Group		Smoker (regular + occasional) n (%)	Regular smoker n (%)	Occasional smoker n (%)	Non-smoker n (%)	Other tobacco products n (%)	Whole sample n (%)
Whole sample	2012	615 (38.4)	488 (30.5)	127 (7.9)	782 (48.8)	12 (0.7)	1,601 (100.0)
	2023	231 (14.5)	159 (10.0)	72 (4.5)	1078 (67.6)	146 (9.2)	1,595 (100.0)
All doctors	2012	36 (16.6)	20 (9.2)	16 (7.3)	150 (69.1)	7 (3.2)	217 (100.0)
	2023	27 (6.8)	11 (2.8)	16 (4.0)	335 (83.8)	12 (3.0)	400 (100.0)
Male doctors	2012	15 (6.9)	10 (4.6)	5 (2.3)	122 (56.2)	6 (2.8)	34 (100.0)
	2023	14 (3.5)	7 (1.8)	7 (1.8)	96 (24.0)	7 (1.8)	151 (100.0)
Female doctors	2012	21 (9.7)	10 (4.6)	11 (5.0)	212 (97.7)	1 (0.5)	135 (100.0)
	2023	13 (3.3)	4 (1.0)	9 (2.3)	353 (88.3)	5 (1.3)	248 (100.0)
Nurses	2012	375 (45.3)	297 (35.9)	78 (9.4)	353 (42.7)	1 (0.1)	828 (100.0)
	2023	91 (17.6)	65 (12.6)	26 (5.0)	516 (60.1)	57 (11.0)	516 (100.0)

**Table 2.** *Comparison of smoking prevalence among health professionals in 2012 and 2023*

| Group	2012 %	2023 %	Reduction p.p.	Chi²	p-value
Whole sample	38.4	14.5	23.9	233.86	<0.001
All doctors	15.86	6.75	9.11	13.80	<0.001
Male doctors	17.05	9.27	7.78	6.39	0.012
Female doctors	15.22	5.24	9.98	10.26	0.001
Nurses	44.59	17.64	26.95	106.11	<0.001

p.p. – percentage point
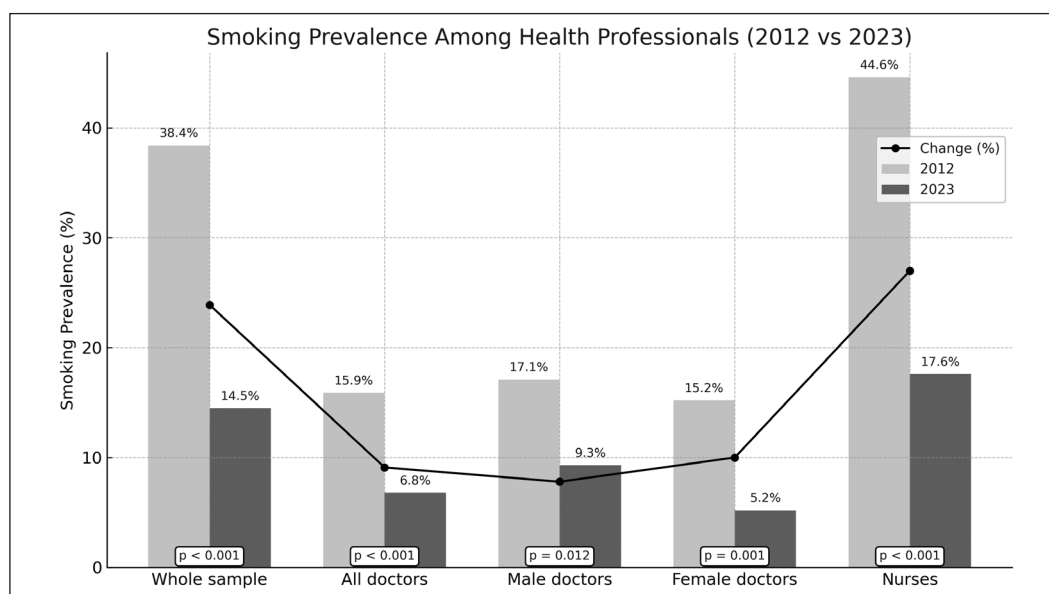
Fig. 1. *Smoking prevalence among physicians and nurses, 2012 and 2023.*

The light grey and dark grey bars represent smoking prevalence in 2012 and 2023 for each group. The solid line shows the percentage point reduction in smoking prevalence between 2012 and 2023.
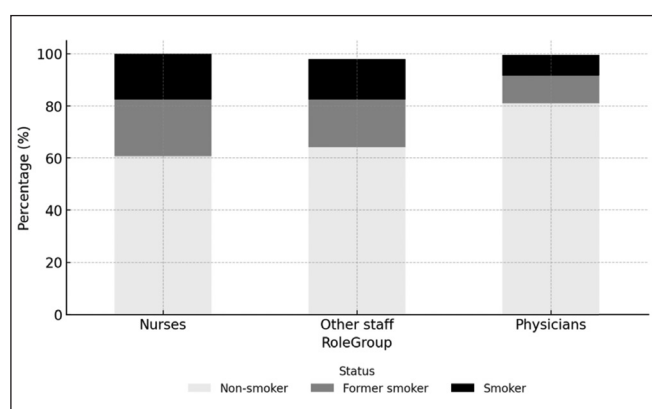
Fig. 2. *Smoking status by professional role in 2023.*

Figure 3 displays the percentage of current smokers, former smokers, and non-smokers across five age categories. The trend suggests generational differences, with younger staff less likely to smoke than their older colleagues. As percentages were rounded to one decimal place, slight deviations from 100% may occur.
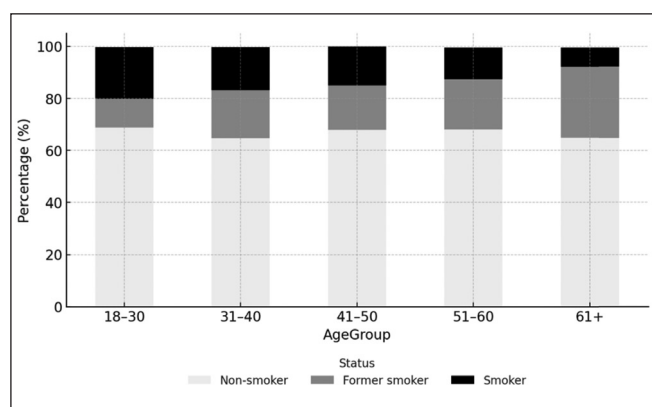
Fig. 3. *Smoking status by age groups in 2023.*

DISCUSSION

This study demonstrates a significant downward trend in smoking prevalence among Czech doctors and nurses. While we are encouraged by the substantial decline in smoking rates, it is noteworthy that the prevalence remains above 5% among health professionals. This figure is particularly concerning as it does not align with the long-term goals set forth by various initiatives, including the WHO's Tobacco Endgame strategy (8–10), which calls for a smoking prevalence in the population of less than 5%.

A systematic review published in 2021 reported a global smoking prevalence of 21% among physicians (11). This suggests that while our findings indicate progress in reducing smoking rates among Czech healthcare workers, there is still considerable work to be done to meet the ambitious targets established by health authorities. The disparity highlights the need for ongoing smoking cessation programmes specifically tailored for health professionals, who are expected to model healthy behaviours for their patients. The strengths of our study include a large sample size and the ability to track trends over a 10-year period within the same workplace under consistent conditions, utilising anonymous questionnaires. Such a design not only strengthens the reliability of our findings but also allows for a nuanced understanding of the changes in smoking behaviour over time.

However, it is important to acknowledge certain limitations. Although our samples are robust, they are not fully representative of the entire population of health professionals in the Czech Republic. The response rates of 25% in 2012 and 28% in 2023 indicate a similar level of bias in the results, yet the findings may not capture the full diversity of smoking behaviours among healthcare workers across different institutions. Future research should aim to include a more representative sample to enhance the generalisability of the results.

Moreover, the observed increase in the use of other tobacco products, particularly among nurses, raises concerns. This trend underscores the necessity for comprehensive tobacco control strategies

that encompass not only traditional smoking cessation efforts but also address the rising popularity of alternative tobacco products.

In conclusion, while the decline in smoking rates among Czech healthcare professionals is encouraging, sustained efforts are required to further reduce prevalence levels and ultimately achieve the public health goals set by national and international programmes.

The extended analysis confirms that smoking prevalence is strongly associated with both occupational role and age group. Physicians smoked less than other professional groups, while younger employees (aged 18–30) surprisingly had the highest prevalence of smoking. This finding contrasts with expectations and highlights the need for targeted prevention efforts even among younger staff. In contrast, nurses showed the highest prevalence of current smoking, which is consistent with previous findings and highlights their vulnerability as a high-risk group. These patterns are in line with data from other European countries, although there is no data available on the current prevalence among health professionals. In Poland, studies from 2018 among physicians showed 7.8% current smokers, another studies 13.2% of smoking dentists and 40% of smoking nurses (12). For Germany, Austria, and Slovakia current data are not available. Differences in age and profession should be considered when designing and implementing targeted cessation interventions and workplace health promotion strategies.

CONCLUSION

The prevalence of smokers has decreased across all groups from 2012 to 2023, accompanied by an increase in the number of ex-smokers. This trend indicates that more individuals have successfully quit smoking, which is a positive development. Additionally, there is a notable rise in the number of non-smokers.

These findings suggest an overall decline in smoking prevalence among both male and female physicians, as well as nurses, across all categories of regular and occasional smokers. Concurrently, the increase in the number of non-smokers and ex-smokers reinforces the effectiveness of smoking cessation efforts within these groups.

However, it is important to note the significant rise in the use of other tobacco products, particularly among nurses. This shift underscores the need for comprehensive tobacco control strategies that not only focus on smoking cessation but also address the growing use of alternative tobacco products.

In conclusion, while the decline in smoking rates is encouraging, continued efforts are required to further reduce tobacco use and promote healthier lifestyles among health professionals.

Authors' Contributions

EK – manuscript writing, manuscript revision; LS – distribution of questionnaires, manuscript revision; AH – statistical analyses, manuscript revision

REFERENCES

1. Csémy L, Dvořáková Z, Fialová A, Malý M, Skývová M. [National survey on tobacco and alcohol use in the Czech Republic 2023] [Internet]. Prague: NIPH; 2024 [cited 2025 Jun 17]. Available from: https://szu.cz/wp-content/uploads/2024/05/Narodni-vyzkum-uzivani-tabaku-a-alkoholu-v-Ceske-republice-2023.pdf. Czech.
2. Drope J, Hamill S, editors. The tobacco atlas [Internet]. New York: Vital Strategies and Economics for Health; 2025 [cited 2025 Jun 17]. Available from: https://tobaccoatlas.org/.
3. Duaso MJ, Bakhshi S, Mujika A, Purssell E, While AE. Nurses' smoking habits and their professional smoking cessation practices. A systematic review and meta-analysis. Int J Nurs Stud. 2017 Feb;67:3-11.
4. Králíková E, Felbrová V, Kulovaná S, Malá K, Nohavová I, Roubíčková E, et al. Nurses' attitudes toward intervening with smokers: their knowledge, opinion and e-learning impact. Cent Eur J Public Health. 2016 Dec;24(4):272-5.
5. Duaso MJ, McDermott MS, Mujika A, Purssell E, While A. Do doctors' smoking habits influence their smoking cessation practices? A systematic review and meta-analysis. Addiction. 2014 Nov;109(11):1811-23.
6. Schneidrová D, Herotová TK, Šustková M, Hynčica V. Smoking habits and attitudes in students of the Third Faculty of Medicine of Charles University in Prague. Cent Eur J Public Health. 2016 Jun;24(2):144-51.
7. Kaletová M, Sovová M, Nakládalová M, Benušová I, Doupalová P, Lukl J. [Smoking in nurses]. Pracov Lek. 2005;57(2):87-90.
8. Ruokolainen O, Ollila H, Laatikainen T, Pätsi SM, Carreras G, Gorini G, et al. Tobacco endgame measures and their adaptation in selected European countries: a narrative review synthesis. Tob Prev Cessat. 2024 Apr 18;10. doi: 10.18332/tpc/186402.
9. LeBlanc AG, Prince SA, Reid RD, Pipe AL, Mullen KA, Reed JL. Smoking behaviour among nurses in Ontario: cross-sectional results from the Champlain Nurses' Study. Can J Public Health. 2020;111(1):134-42.
10. González-Marrón A, Koprivnikar H, Tisza J, Cselkó Z, Lambrou A, Peruga A, et al. Tobacco endgame in the WHO European Region: feasibility in light of current tobacco control status. Tob Induc Dis. 2023 Nov 15;21:151. doi: 10.18332/tid/174360.
11. Besson A, Tarpin A, Flaudias V, Brousse G, Laporte C, Benson A, et al. Smoking prevalence among physicians: a systematic review and meta-analysis. Int J Environ Res Public Health. 2021 Dec 17;18(24):13328. doi: 10.3390/ijerph182413328.
12. Koczkodaj P, Cedzyńska M, Didkowska J. Smoking and SARS-CoV-2: are Polish health professionals at higher risk of infection? Tob Induc Dis. 2020 Jun 5;18:52. doi: 10.18332/tid/122760.