

# PERCEIVED RELATIVE HARM OF E-CIGARETTES AMONG UKRAINIAN ADULTS

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## SUMMARY

**Objectives:** Emerging evidence suggests that the use of safer nicotine products (SNPs), such as e-cigarettes and heated tobacco products (HTPs) poses significantly lower health risks than continued smoking, particularly over the short and medium term. However, it remains uncertain whether the public has been adequately informed about these relative risks. This study assesses the perceived relative harm of e-cigarettes compared to conventional cigarettes in Ukraine.

**Methods:** Two nationally representative surveys were conducted in February 2021 and December 2022. Participants, irrespective of their smoking status, were asked whether they agreed with the statement that “using e-cigarettes is more harmful than smoking conventional cigarettes”. The surveys also included questions about tobacco product usage, the most dangerous substances in cigarettes, and smoking cessation methods. The data were statistically analysed by deriving design-based weighted point estimates and 95% confidence intervals for the proportions within each response category.

**Results:** In 2022, 38.1% (95% CI: 35.3–40.9) of adults believed that e-cigarettes were more harmful than cigarettes and the perception of relative harm remained relatively unchanged between the two surveys. Furthermore, 56.2% (95% CI: 50.0–62.2) of current cigarette smokers agreed with this statement, while only a small percentage of vapers (e-cigarette users) 7.4% (95% CI: 1.5–30.0) perceived e-cigarettes as more harmful than conventional cigarettes. Among non-smokers and dual users the share was 33.4% (95% CI: 30.0–36.9) and 32.7% (95% CI: 25.1–41.5), respectively.

**Conclusion:** Our findings indicate that in Ukraine the perception that e-cigarettes are more harmful than cigarettes, or the lack of knowledge regarding relative risks, prevails. This highlights the importance of accurate risk communication to promote a harm reduction approach to tobacco use.

**Key words:** smoking, e-cigarettes, tobacco harm reduction, SNPs, perceived harm

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## INTRODUCTION

The rise in e-cigarette use has sparked renewed interest in the tobacco harm reduction approach, which aims to combat the smoking epidemic by encouraging smokers to transition to low-risk tobacco products. The potential role of safer nicotine products (SNPs) in reducing the harm caused by tobacco is a subject of intense debate. However, a growing body of evidence suggests that completely switching to e-cigarettes may pose significantly lower short-term health risks for adults who are unable or unwilling to quit smoking (1, 2). A comprehensive review of the health consequences of smoking and vaping has concluded that adult smokers who completely switch to e-cigarettes would experience substantially less harm than those who continue smoking conventional cigarettes, which remain the most lethal tobacco product (3, 4). Recent research indicates that vaping is associated with significantly lower health risks and reduced negative effects on overall and oral health compared to smoking (5–7). Furthermore, a clinical study conducted in Italy demonstrated that vaping could assist smokers in reducing tobacco intake and improving lung health (8). Simulation studies also suggest that e-cigarettes have the potential to save lives by reducing the number of years lost due to smoking (9, 10). A 2022 study analys-

ing the health risks of 15 nicotine-containing products found that vaping accounted for only 3% of the risks associated with cigarette smoking, while the corresponding figure for HTP use was 5% (11).

It is important to note that e-cigarettes and HTPs are not without risks, especially for non-smokers. Current evidence suggesting that vaping is less harmful than traditional smoking is mostly limited to short- and medium-term effects. There is a significant lack of long-term studies specifically on individuals who vape but have never smoked. This gap in research is crucial, as it limits the understanding of the potential health impacts of tar-free, nicotine-containing products.

Despite the growing scientific evidence, it remains unclear whether the relative health risks of e-cigarette use compared to conventional smoking have been effectively communicated to the public. Some researchers have criticized the prevailing public health message, which still emphasizes the absolute risks of using tobacco products rather than the relative health risks between SNPs and cigarettes (12). This situation is similarly observed in Ukraine, where public health authorities prioritize a communication strategy that emphasizes the absolute risk of e-cigarettes while downplaying their significantly lower relative harm compared to conventional cigarettes (13).

Prior studies have established that risk perception plays a crucial role in determining tobacco use (14, 15). Specifically, research has shown that concerns about the health risks associated with smoking are among the primary reasons why current and former smokers quit (16, 17). Similarly, perceptions of the risks associated with SNPs can significantly influence usage patterns. For instance, a prevalent reason cited for e-cigarette use is the belief that they are less harmful than conventional cigarettes (18, 19). An extensive analysis of consumers' relative risk perceptions regarding various tobacco products found that a majority of vapers perceive e-cigarettes as less harmful than conventional cigarettes (20). Moreover, some studies have indicated that certain groups' perception of e-cigarettes as less hazardous is associated with a higher likelihood of future e-cigarette use (21).

Although research on the relative risk perception between e-cigarettes and conventional cigarettes is growing, studies mainly focus on perception in developed countries, such as the US or UK. Little is known about the overall risk perception of e-cigarettes in developing countries. In this study, we present what is the relative risk perception of e-cigarettes compared with conventional cigarettes in Ukraine and to what extent these perceptions have changed between 2021 and 2022.

## MATERIALS AND METHODS

We conducted two nationally representative surveys in Ukraine, one in February 2021 and the other one in December 2022. The surveys were administered by the Kyiv International Institute of Sociology (KIIS) (22).

The 2021 survey took place from February 5 to 7, while the 2022 survey was conducted from December 5 to January 3. The sample consisted of adult citizens of Ukraine, aged 18 years and older, residing in the territory of Ukraine controlled by the Ukrainian Government until February 24, 2022. Individuals residing in territories temporarily not controlled by the Ukrainian government until February 24, 2022 (such as AR Crimea, the city of Sevastopol, and separate areas of Donetsk and Luhansk regions) were not included in the sample. Moreover, citizens who had left the country after February 24, 2022, were not included in the 2022 survey.

Both surveys utilized computer-assisted telephone interviews conducted on a random sample of mobile phone numbers. According to a KIIS survey conducted through face-to-face interviews with a random sample in February 2020, 96% of adult residents of Ukraine owned personal mobile phones. For surveys conducted in February 2021 and December 2022, mobile phone numbers were randomly generated for all major mobile operators in Ukraine at the initial stage. The proportion of numbers generated for each operator was proportional to their overall market share of mobile numbers, as per previous KIIS surveys. To eliminate invalid numbers from this generated list, an SMS message was sent to each number. Subsequently, interviewers called these numbers and asked respondents who answered to participate in the survey.

After completing the planned number of interviews, the distribution of respondents in the sample by macro-region of residence (West, Centre, South, East), type of settlement (urban or rural), gender, and age was compared with official statistical sources. The overall adult population distribution by macro-regions and settlement type was based on data from the Central Election

Commission regarding the 2019 parliamentary elections (by the number of registered voters). The gender and age structure were determined using data from the State Statistics Service as of January 1, 2021. Special statistical weights were applied to align the sample structure with the overall population structure of Ukraine.

A total of 2,005 respondents were interviewed in 2021, and 2,001 respondents were interviewed in 2022. The statistical sampling error, with a probability of 0.95 and a design effect of 1.1, did not exceed 2.4% for indicators close to 50%, 2.1% for indicators close to 25%, 1.5% for indicators close to 10%, and 1.1% for indicators close to 5%.

The data from the study were compiled using IBM SPSS Statistics software, version 26. Subsequently, they were statistically analysed with Stata software, version 14.2, to obtain design-based (weighted) point estimates and 95% confidence intervals for the proportions of the response categories.

Both surveys assessed the perceived harm of e-cigarettes compared to conventional cigarettes using a single question. Respondents, irrespective of their smoking status, were asked whether they agreed with the statement "using e-cigarettes is more harmful than smoking conventional cigarettes". The response options provided were: "I agree", "I do not agree", and "I do not know". Additional questions about tobacco product use, the most dangerous chemicals in cigarettes, and smoking cessation methods were included in both surveys.

The surveys also gathered basic socio-demographic information. Table 1 presents key demographic characteristics and detailed survey results.

## Ethical Approval

The formal ethical approval for this study was not acquired since the surveys conducted in this study were administered by the KIIS as part of their Omnibus survey. The KIIS Omnibus survey is a regular multi-targeted population survey that combines questions from various clients, including ours. The nature of our study involved our specific question in the KIIS Omnibus survey, without directly collecting any personally identifying information or sensitive data from the participants. The collected raw data and the results presented in this article are completely anonymized and do not disclose any personal information.

## RESULTS

While conventional cigarettes continue to dominate the tobacco market in Ukraine, the global emergence and rapid growth of safer nicotine products (SNPs), including e-cigarettes and heated tobacco products (HTPs) have gradually influenced the Ukrainian tobacco market, leading to an increased use of these products. Between February 2021 and December 2022, the proportion of vapers (e-cigarette users) in the total adult population tripled from 1.2% (95% CI: 0.8–0.9) to 3.6% (95% CI: 2.8–4.7), and the share of HTP users increased from 2.3% (95% CI: 1.8–3.1) to 3.6% (95% CI: 2.8–4.7) (Fig. 1).

Notably, during the same period, not only did the use of e-cigarettes and HTPs increase, but also the prevalence of smoking – daily smoking rates rose from 22.4% (95% CI: 20.3–24.6) to 24.7% (95% CI: 22.3–27.2). This increase in smoking prevalence

**Table 1. Descriptive statistics for 2021 and 2022 surveys**

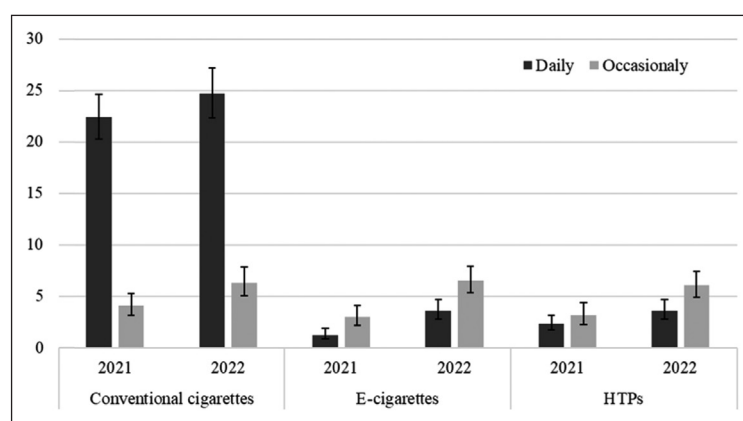
		2021		2022	
		Weighted (%)	95% CI	Weighted (%)	95% CI
Sex	Men	45.3	42.8–47.8	45.3	42.5–48.1
	Women	54.7	52.2–57.2	54.7	51.9–57.5
Age	18–29	17.3	15.3–19.5	16.1	14.0–18.4
	30–39	20.2	18.2–22.3	20.3	18.0–22.8
	40–49	17.2	15.5–19.1	18.0	15.9–20.3
	50–59	17.2	15.5–19.1	16.6	14.8–18.6
	60–69	14.9	13.5–16.4	15.3	13.7–17.1
	70+	13.2	11.6–14.9	13.7	11.6–16.0
Settlement type	Urban	67.1	64.4–69.7	66.2	63.0–69.3
	Rural	32.9	30.3–35.6	33.8	30.7–37.0
Cigarette smoking	Daily	22.4	20.3–24.6	24.7	22.3–27.2
	Occasionally	4.1	3.2–5.3	6.3	5.0–7.8
E-cigarette use	Daily	1.2	0.8–1.9	3.6	2.8–4.7
	Occasionally	3.0	2.2–4.1	6.5	5.3–7.9
Heated tobacco products use	Daily	2.3	1.8–3.1	3.6	2.8–4.7
	Occasionally	3.2	2.3–4.4	6.1	4.9–7.4
E-cigarettes are more harmful than conventional cigarettes	Yes	35.1	32.8–37.5	38.1	35.3–40.9
	No	25.9	23.8–28.2	24.2	21.9–26.8
	Don't know	38.9	36.6–41.3	37.7	35.1–40.4
Most harmful substance for health	Nicotine	16.6	14.8–18.6	16.3	14.2–18.5
	Tar	14.7	13.0–16.5	15.9	14.0–18.0
	Heavy metals	10.2	8.8–11.8	9.8	8.2–11.6
	Chemical additives	8.6	7.3–10.0	8.8	7.1–10.8
	Toxic substances	4.4	3.5–5.4	6.5	5.2–8.1
	Tobacco	3.2	2.4–4.2	3.8	2.8–5.1
	Smoke	2.6	1.9–3.5	4.2	3.0–5.9
	Carbon dioxide	1.0	0.6–1.8	0.8	0.5–1.4
	Other substances	18.2	16.3–20.2	17.0	15.1–19.2
	Don't know	20.6	18.7–22.7	16.9	15.1–18.9
Methods used for quitting smoking	Only willpower	33.4	27.8, 39.6	31.0	26.4–36.0
	Nicotine replacement therapy	2.3	1.2–4.4	1.6	0.8–3.0
	Switching to e-cigarettes or HTP	7.0	4.7–10.2	5.5	3.7–7.9
	Other medical devices/medications	1.5	0.6–3.3	1.9	1.0–3.6
	Consultation in healthcare facilities	0.0	0.0–0.0	0.9	0.4–2.0
	Other	3.6	2.1–6.0	6.4	4.3–9.4
	Don't know	0.4	0.1–2.6	1.4	0.7–2.8
	Did not try to quit smoking	54.5	48.5–60.4	54.8	4.3–9.4

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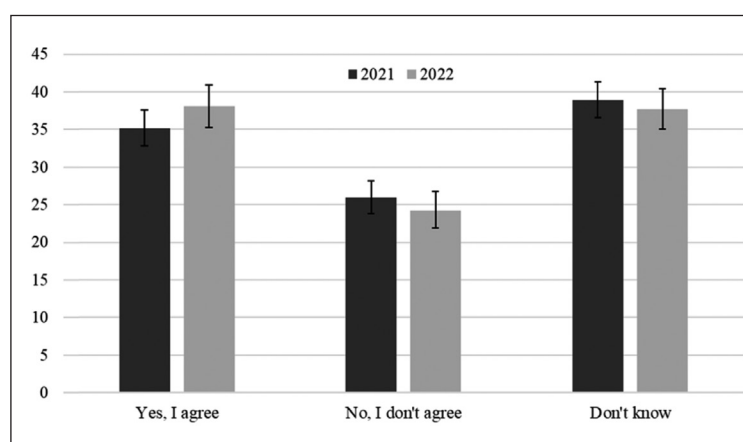
		2021		2022	
		Weighted (%)	95% CI	Weighted (%)	95% CI
Impact of e-cigarette prices on the decision of consumer to use them	1 Does not affect at all	42.6	36.8–48.5	41.7	37.2–46.4
	2	2.5	0.9–6.5	2.1	0.8–5.4
	3	3.0	0.9–9.8	1.8	0.9–3.5
	4	2.6	1.3–5.1	1.2	0.6–2.5
	5	5.4	3.5–8.3	8.9	6.5–12.1
	6	1.0	0.4–2.8	1.9	0.9–4.2
	7	3.8	2.2–6.3	1.4	0.7–2.8
	8	4.0	2.4–6.6	4.1	2.5–6.8
	9	1.1	0.3–3.4	0.2	0.1–1.0
	10 Affects a lot	15.1	11.3–20.0	16.8	13.4–20.9
	Don't know	18.9	14.9–23.6	19.7	15.7–24.5

Source: Healthy Initiatives' 2021 and 2022 surveys administered by KIIS.



**Fig. 1. Smoking prevalence and use of SNPs in Ukraine (%).**

Percentages are weighted. Error bars indicate 95% confidence intervals.  
Source: Healthy Initiatives' 2021 and 2022 surveys administered by KIIS.



**Fig. 2. Perceived harm of e-cigarettes relative to conventional cigarettes groups (“Do you agree that e-cigarettes are more harmful than conventional cigarettes?”) (%).**

Percentages are weighted. Error bars indicate 95% confidence intervals.  
Source: Healthy Initiatives' 2021 and 2022 surveys administered by KIIS.

**Table 2. Perceived harm of e-cigarettes relative to conventional cigarettes by demographic groups (“Do you agree that e-cigarettes are more harmful than conventional cigarettes?”)**

		Healthy Initiative's Survey 2021						Healthy Initiative's Survey 2022					
		Yes		No		Don't know		Yes		No		Don't know	
		Weighted (%)	95% CI	Weighted (%)	95% CI	Weighted (%)	95% CI	Weighted (%)	95% CI	Weighted (%)	95% CI	Weighted (%)	95% CI
Sex	Men	39.2	35.6–42.9	25.6	22.4–29.0	35.3	31.8–38.9	38.5	34.4–42.9	26.1	22.7–29.8	35.4	31.5–39.5
	Women	31.8	28.8–34.9	26.3	23.4–29.3	41.9	38.8–45.2	37.7	34.0–41.5	22.7	19.6–26.2	39.6	36.1–43.2
Age	18–29	39.0	32.3–46.1	42.5	35.9–49.5	18.5	14.1–23.8	36.7	29.6–44.4	42.7	35.6–50.0	20.6	15.4–27.0
	30–39	32.3	27.3–37.8	37.0	31.6–42.7	30.7	25.5–36.6	40.8	34.4–47.5	33.9	27.8–40.5	25.4	20.2–31.3
	40–49	38.6	33.2–44.4	19.3	15.3–24.1	42.1	36.4–47.9	41.3	34.5–48.4	21.1	16.8–26.2	37.6	31.5–44.1
	50–59	36.4	31.2–41.9	19.7	15.4–24.9	43.9	38.3–49.7	40.5	34.6–46.8	15.8	11.6–21.2	43.6	37.7–49.7
	60–69	36.6	31.8–41.6	14.1	11.1–17.8	49.3	44.2–54.4	34.0	28.8–39.6	12.4	9.2–16.5	53.6	47.9–59.3
	70+	26.6	21.3–32.8	17.5	13.0–23.1	55.9	49.3–62.2	33.0	24.9–42.3	16.0	10.0–24.7	51.0	42.2–59.7
Settlement type	Urban	34.9	32.5–37.4	27.1	24.9–29.5	38.0	35.5–40.5	35.6	33.1–38.2	25.5	23.2–27.9	38.9	36.4–41.6
	Rural	35.6	30.6–41.0	23.5	19.0–28.7	40.9	35.7–46.2	42.9	36.5–49.6	21.8	16.8–27.8	35.2	29.6–41.3
Regions	Western	34.6	29.8–39.8	24.2	19.8–29.3	41.1	36.1–46.4	46.5	39.3–53.7	22.9	17.4–29.6	30.6	24.9–36.9
	Central	34.7	31.0–38.6	27.6	24.2–31.3	37.7	34.0–41.5	36.9	32.9–41.1	22.8	19.4–26.6	40.3	36.2–44.5
	Southern	35.7	31.3–40.4	26.5	22.3–31.2	37.7	33.3–42.4	32.7	28.4–37.3	26.7	22.8–31.1	40.6	36.0–45.4
	Eastern	36.2	30.2–42.6	24.0	19.0–29.9	39.8	33.6–46.5	33.9	28.7–39.4	26.1	21.1–31.8	40.0	34.3–46.0

Source: Healthy Initiatives' 2021 and 2022 surveys administered by KHS

and the use of other nicotine or tobacco products might be associated with wartime conditions, heightened stress, and reduced enforcement of tobacco control legislation.

Figure 2 illustrates the perceived harm of e-cigarettes relative to conventional cigarettes based on the collected data. The proportion of adults who perceived e-cigarettes as more harmful increased from 35.1% (95% CI: 32.8–37.5) in 2021 to 38.1% (95% CI: 35.3–40.9) in 2022. In parallel, the proportion of adults who did not perceive e-cigarettes to be more harmful than cigarettes declined from 25.9% (95% CI: 23.8–28.2) in 2021 to 24.2% (95% CI: 21.9–26.8%) in 2022. During the same period, the proportion of adults forming opinions about the risk of e-cigarettes relative to conventional cigarettes increased, as evidenced by the decline in the “I don’t know” category from 38.9% (95% CI: 36.6–41.3) in 2021 to 37.7% (95% CI: 35.1–40.4) in 2022. However, based on the Wilcoxon-Mann-Whitney test, the year-on-year differences were not statistically significant ( $z = 0.378$ ,  $\text{prob} > |z| = 0.7057$ ).

An analysis of the responses, segmented by sex, age, settlement type, and region, offers a more detailed view of public perception of the relative harm of e-cigarettes (Table 2).

In 2021, younger adults (18–29 years) were more likely to view e-cigarettes as more harmful – 39.0% (95% CI: 32.3–46.1), compared to older age groups, such as those aged 70 and above – 26.6% (95% CI: 21.3–32.8). In 2022, however, there was a slight shift in this trend, with an increased perception of harm among the younger adults.

Regarding settlement types, both urban and rural populations showed similar trends over the two years, with a slight increase in the belief that e-cigarettes are more harmful from 2021 to 2022. Regionally, the Western macro-region exhibited the most significant rise in the perception of harm from e-cigarettes.

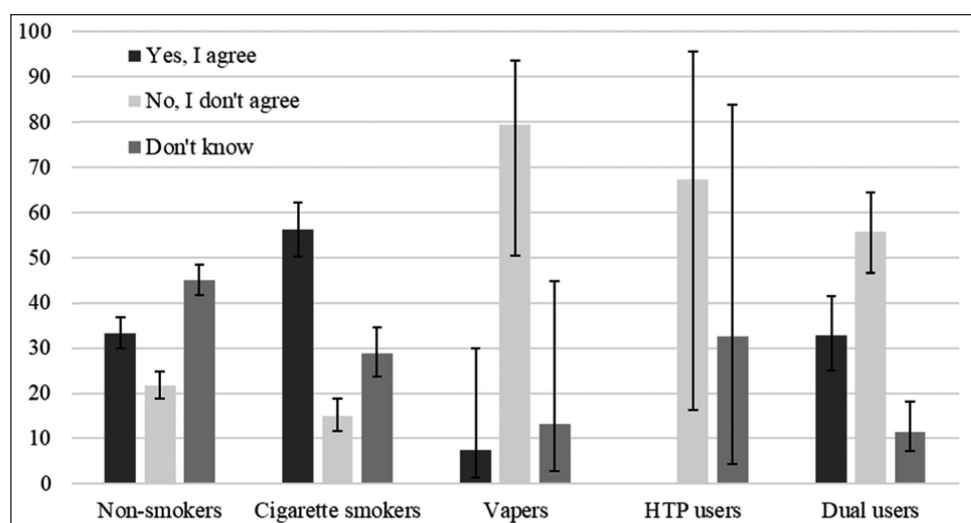
These demographic insights are in line with the broader trend observed in the overall data. The year-on-year differences within these demographic groups, similar to the general population trend, were not statistically significant. This consistency across different demographic segments highlights a uniformly evolving public opinion on the relative harm of e-cigarettes.

Figure 3 presents the perceived harm of e-cigarettes relative to conventional cigarettes by tobacco use status. Among current smokers, a notably higher percentage perceived e-cigarettes as more harmful than conventional cigarettes compared to non-smokers, vapers, HTP users, or dual users. In 2022, 56.2% (95% CI: 50.0–62.2) of current cigarette smokers agreed with the statement that e-cigarettes are more harmful than smoking conventional cigarettes. Among non-smokers, the percentage was 33.4% (95% CI: 30.0–36.9), and among dual users, it was 32.7% (95% CI: 25.1–41.5). Only a small proportion of vapers perceived e-cigarettes as more harmful than conventional cigarettes, at 7.4% (95% CI: 1.5–30.0), while among HTP users, this perception was 0%.

Figure 4 shows the perceived harm of e-cigarettes relative to conventional cigarettes based on respondents’ perception of the most dangerous substance in conventional smoking. According to the 2022 survey results, respondents who believed that chemical additives posed the highest health risk for smokers had the strongest belief that e-cigarettes are more harmful than conventional cigarettes, at 55.4% (95% CI: 44.4–65.9). Among respondents who identified smoke as the most hazardous element of smoking, 50.5% (95% CI: 33.9–67.0) perceived e-cigarettes as more harmful than conventional cigarettes. The perception of relative risks of e-cigarettes was lowest among those who had no answer to this question, at 20.5% (95% CI: 16.1–25.7). However, 66.0% of them (95% CI: 60.2–71.3) had no opinion on the relative harm of e-cigarettes.

## DISCUSSION

The present study uncovered three main findings. Firstly, a significant portion of the adult population in Ukraine perceives e-cigarettes as more harmful than conventional cigarettes or is uncertain about the relative risks of e-cigarettes. Secondly, the perception of the relative harm of e-cigarettes compared to conventional cigarettes among Ukrainian adults has not changed



**Fig. 3.** Perceived harm of e-cigarettes relative to conventional cigarettes by smoking status (%).

Percentages are weighted. Error bars indicate 95% confidence intervals.  
Source: Healthy Initiatives' 2021 and 2022 surveys administered by KIIS.

significantly between February 2021 and December 2022. Thirdly, e-cigarette and HTP users were more inclined to consider e-cigarettes as less harmful compared to conventional cigarettes in comparison to current smokers.

These findings align with previous studies conducted in the United States, six European Union Member States (Germany, Greece, Hungary, Poland, Romania, and Spain), and Georgia, which have demonstrated that a substantial proportion of the adult population remains unsure about the health risks associated with e-cigarettes or views them as more harmful than conventional cigarettes (23–25). However, in countries that have implemented more liberal regulations for e-cigarettes or even utilize them as smoking cessation tools, such as Canada, New Zealand and the United Kingdom, a larger proportion of the population perceives e-cigarettes as less harmful compared to conventional cigarettes (26–28).

Studies have indicated that a lower perceived harm of e-cigarettes is associated with individuals trying them or currently using them among adults and cigarette smokers (29). A high perception of relative risk for e-cigarette harm may discourage current smokers from transitioning to e-cigarettes. Therefore, the substantial proportion of adults in Ukraine who perceive e-cigarettes as more harmful than conventional cigarettes or remain uncertain about the relative risks needs attention from public health authorities.

The high prevalence of adults in Ukraine perceiving e-cigarettes as more harmful than conventional cigarettes may be attributed to evidence of the absolute health risks associated with e-cigarette use (30–32), as well as numerous reports in the Ukrainian media highlighting serious injuries and health-related problems linked to e-cigarettes (33–36). It is possible that the population's confusion between the relative and absolute health risks of e-cigarettes may stem from these reports, which tend to exaggerate the absolute harm of e-cigarettes while downplaying their relative harm compared to conventional smoking. The lack of accurate, consistent, and proactive risk communication from public health authorities to the public may also contribute to this confusion.

## CONCLUSION

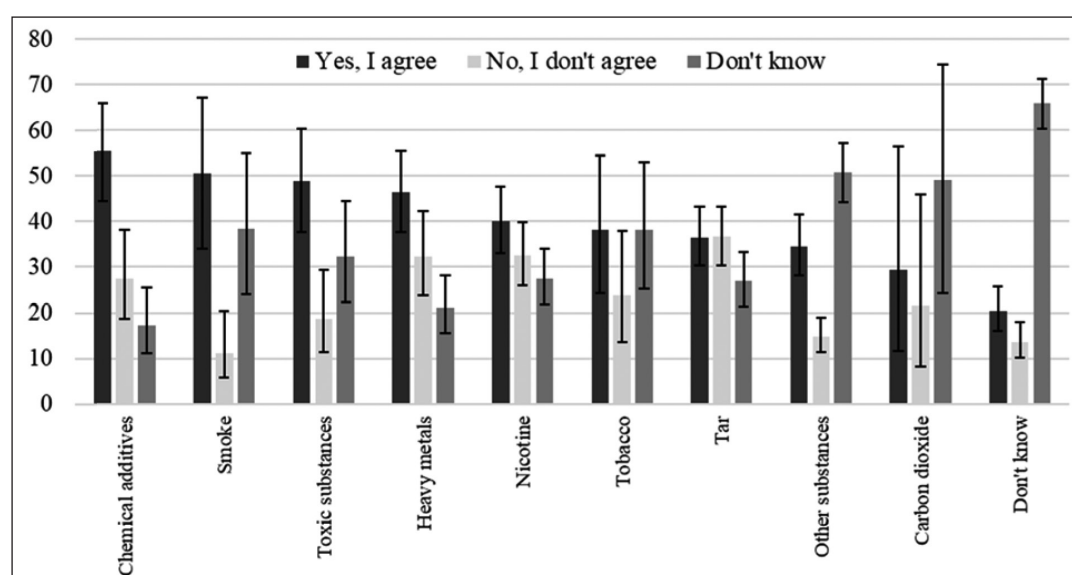
Recent literature has demonstrated that for adult smokers, switching to e-cigarettes would entail significantly less harm than continuing to smoke conventional cigarettes, at least in the short and medium term. However, despite the growing scientific evidence, the responsibility of risk communication of different tobacco and nicotine products has largely been left to the media and public health authorities, with a greater focus on the absolute harm rather than the relative harm of e-cigarettes. The perception of the relative risks associated with the use of novel tobacco and nicotine products, such as e-cigarettes, can greatly influence usage patterns and smoking cessation efforts. Therefore, it is crucial to comprehend the relative risk perception of e-cigarettes compared to conventional cigarettes.

This study investigates whether and to what extent the perceived relative harm of e-cigarettes compared with conventional cigarettes has changed between February 2021 and December 2022 in Ukraine. The results of this nationally representative study indicate that the perception of e-cigarettes as more harmful than conventional cigarettes or a lack of knowledge regarding the relative risks predominates in Ukraine; 38.1% of adults believed that e-cigarettes were more harmful than conventional cigarettes, and this perception remained relatively unchanged over time. Importantly, only a small percentage of e-cigarette users (7.4%) perceived vaping as more harmful.

Our findings underscore the importance of providing accurate information about the risks of e-cigarettes to the public, particularly to adult smokers who stand to benefit the most from transitioning from smoking to vaping. Furthermore, it is essential to differentiate between the absolute harm and relative harm of e-cigarettes when communicating with smokers.

## Conflicts of Interest

None declared



**Fig. 4.** Perceived harm of e-cigarettes relative to conventional cigarettes by perception of the most dangerous substance for human health (%).

Percentages are weighted. Error bars indicate 95% confidence intervals.  
Source: Healthy Initiatives' 2021 and 2022 surveys administered by KIIS.

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