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## Awareness of Heated Tobacco Products Among US Adults - Health Information National Trends Survey, 2020

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### Abstract

**Introduction:** Heated Tobacco Products (HTP) have the potential to attain high uptake in the US. The current study estimated the prevalence of awareness, prevalence of use and the factors associated with awareness of HTP among US adults.

**Methods:** This study included 3201 respondents from the Health Information National Trends Survey (HINTS) 5 cycle 4 (2020). The prevalence of awareness of HTP and ever use of HTP among US adults were estimated. Multivariable logistic regression was conducted to identify the factors associated with awareness of HTP.

**Results:** About 15% of the adult US population were aware of HTP, while 2.2% had ever used HTP. Age between 35–49 years (aOR, 1.9; 95% CI, 1.3–2.9; *p*-value = 0.003), male sex (aOR, 1.7; 95% CI, 1.0–2.7; *p*-value = 0.04), lower income (\$0 to \$9,999) (aOR, 3.0; 95% CI, 1.3–6.9; *p*-value = 0.01), smoking on some days (aOR, 3.4; 95% CI, 1.2–9.4; *p*-value = 0.02) and moderately or extremely worrying about getting cancer (aOR, 1.7; 95% CI, 1.1–2.7; *p*-value = 0.03) were associated with higher odds of being aware of HTP; whereas, belief that there are so

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many cancer prevention recommendations, it's hard to know which ones to follow (aOR, 0.5; 95% CI, 0.3–0.8;  $p$ -value = 0.009) was associated with lower odds of being aware of HTP.

**Conclusions:** A significant proportion of US adult population were aware of HTP in 2020. Given the recent high proliferation of e-cigarettes, potential health effects of the HTP products should be monitored by the regulators closely. Adequate surveillance and policy interventions are warranted in this regard.

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## INTRODUCTION

Heated Tobacco Products (HTP) are electronic smoking devices that use tobacco leaf and generate inhalable aerosol by applying heat to the tobacco, instead of burning it.<sup>1</sup> Despite the tobacco industry's effort to market HTP as safer alternative to traditional cigarettes for last three decades,<sup>2</sup> these products gained little success in the US.<sup>3</sup> The US Food and Drug Administration (FDA) permitted the sale of a new HTP device, iQOS by Philip Morris International (PMI) in 2019,<sup>4</sup> and granted it a modified risk tobacco product (MRTP) designation in 2020.<sup>5</sup> This 'exposure modification' MRTP has raised concern, because this may be misconstrued; especially by the younger population, leading to the belief that HTPs are less harmful smoking devices.<sup>6, 7</sup>

Although, tobacco companies have promoted HTP devices as safe smoking alternatives,<sup>1</sup> these devices are not risk free; as smokers are still exposed to toxins, as well as the addictive potentials of nicotine.<sup>8–10</sup> In vitro tests have shown these products to have adverse effects on the respiratory tract—including higher cytotoxicity against bronchial epithelial cells compared to e-cigarettes<sup>11</sup> and impairment of airway cells homeostasis.<sup>12</sup> While some studies mention a reduced carcinogenicity with HTP compared to traditional cigarettes, they acknowledge that robust prospective epidemiologic studies are required to make this determination decisively.<sup>13</sup> These devices also pose risk of increasing the number of dual users who use HTP while continuing to smoke cigarettes,<sup>14</sup> thus undermining tobacco control efforts. Furthermore, these devices have also been promoted as an alternate strategy to smoking cessation, however, these are neither FDA recommended nor approved<sup>15</sup> for this purpose.<sup>16</sup>

Even before the introduction of iQOS, the awareness and use of HTP in the US was on the rise.<sup>17</sup> The mass market penetration potential of the newer HTP devices, such as iQOS, are concerning, given the recent meteoric success of an e-cigarette brand—JUUL—in the US.<sup>18</sup> JUUL, an electronic nicotine delivery systems (ENDS) device, which uses a different technology than HTP, captured more than half of the US e-cigarettes market within three years of its launch.<sup>18</sup> Additionally, the large user base of ENDS, including the current- and ever-users, may be more vulnerable to HTP utilization.<sup>17</sup>

Evidence on the population-level awareness of HTP in the US are sparse. Two online survey studies conducted before the US launch of iQOS reported 5.2%<sup>19</sup> to 12.4%<sup>17</sup> awareness of HTP among US adult population in 2017. A study using the Tobacco Use Supplement to the Current Population Survey (TUS-CPS) found that 8.6% of the US adults were aware of HTP in 2019.<sup>20</sup> Similarly, HTP appears to be gaining popularity amongst youth; a study of the 2019 National Youth Tobacco Survey found 12.8% of the middle and high school students to

be aware of HTP.<sup>21</sup> Given the perceived appeal of HTP products—the sleek look,<sup>22</sup> polished appearance of the stores,<sup>23</sup> and better respiratory satisfaction compared to ENDS<sup>24</sup>—there is potential for quick increase in users of these devices in the US. To assess the impact of HTP on tobacco control efforts, it is important to closely monitor the awareness and use of these devices among US population. In the current study we used the most recent (2020) nationally representative data to estimate the prevalence of awareness and ever use of HTP among US adult population using Health Information National Trends Survey (HINTS) data.<sup>25</sup> HINTS is a nationally representative survey of civilian, non-institutionalized US adults conducted by the National Cancer Institute (NCI).<sup>26</sup> HINTS 5 cycle 4 is the most recent iteration of the survey, which collected information on respondents' access to and use of cancer prevention, early detection, diagnosis, treatment, and survivorship related information.<sup>26</sup>

Previous studies<sup>17, 19–21</sup> examined the sociodemographic factors associated with the awareness of HTP, however, to date, no study has evaluated the relationship between beliefs about cancer and awareness of HTP. Because health beliefs may affect health awareness<sup>27</sup> and health behavior,<sup>28</sup> we examined how beliefs about cancer are associated with the awareness of HTP among US adults. Previous studies have demonstrated that there is association between cigarette use and lung cancer worry among current smokers.<sup>29,30</sup> Consequently, investigation of association between newer smoking devices, like HTP, is warranted to identify whether use of these devices have similar association with cancer worry. In the current study we examined the association between HTP awareness and cancer worry, which can complement and inform future studies investigating how HTP use is associated with cancer worry. An often-missing demographic factor in the HTP literature, sexual orientation, was also included in our analyses because of the high prevalence of smoking in this population.<sup>31</sup> Thus, the overall objective of our study was to investigate the association between socio-demographic factors, worry about getting cancer and cancer-related beliefs with the awareness of HTP among general population in the USA.

## METHODS

### Study Population, Design, and Setting

We obtained data for this study from the Health Information National Trends Survey (HINTS) 5, Cycle 4 (2020), which is a nationally representative survey administered by the National Cancer Institute (NCI) on US adults (≥ 18 years).<sup>25</sup> HINTS focuses on access and use of health information and engagement to health behaviors, with special emphasis on cancer control and prevention.<sup>32</sup> Originally, HINTS selected the survey instruments using HINTS conceptual framework as a guide, and reviewing other existing surveys.<sup>33</sup> Survey questions were finalized based on pretesting and expert review.<sup>33</sup> In the pretesting stage two rounds of cognitive testing were performed to test between-subjects reliability, clarity and participants understanding of the survey questions.<sup>33</sup> Finally, initially-selected survey instruments were modified based on the results of these pretesting.<sup>34</sup> Surveys in subsequent cycles iterated psychometric analyses including test of variability in responses, correlation among sub-items and lead items, and correlation among various items.<sup>35, 36</sup>

HINTS employed a complex survey design where sampling weights were calculated to ensure population level estimates that adjusted for non-response and noncoverage bias. Weights were calculated in several steps.<sup>26</sup> First, the inverse of the probability of selecting a household was assigned as the household weight and these weights were adjusted for household non-response using a quasi-randomization approach.<sup>26</sup> The individual level weight was obtained by multiplying the adjusted household weight by sampled person's within household selection probability.<sup>26</sup> Finally, raking was performed using six demographic characteristics variables from American Community Survey and two health related factors from National Health Information Survey to obtain the final adjusted person level weight.<sup>26</sup>

HINTS 5 Cycle 4 was conducted via mail between February 24 and June 2020.<sup>26</sup> The survey sampling frame of HINTS 5 Cycle 4 was based on Marketing Systems Group (MSG) database, which was stratified based on the concentration of minority population: addresses in census-tracts with Hispanics or African American population constituting 34 or higher percent of the total population were allocated to the high-minority stratum, and the rest of the addresses were allocated to the low-minority stratum. Through oversampling of the high-minority strata, accuracy of estimates for the minority groups were ensured.<sup>26</sup> In the stratified sampling frame, first, addresses were selected within each stratum using the equal probability method and then a single adult individual was randomly selected within each household using the Next Birthday Method.<sup>26</sup> Survey responses were received through postal mail and the final response rate for HINTS 5 Cycle 4 was 37%.<sup>26</sup> Details on the survey procedure and data collection is reported elsewhere.<sup>26</sup> HINTS study has been approved by the Westat IRB and is exempt by the US NIH Office of Human Subjects Research Protection. HINTS data were deidentified and publicly available (<https://hints.cancer.gov/data/download-data.aspx>), our secondary data analysis was exempt from institutional review board approval. This study followed STROBE reporting guideline for cross sectional studies.<sup>37</sup> Data analysis was performed in April 2021.

### Outcome measure

A dichotomized variable representing whether or not a respondent was aware of the HTP products was the main outcome measure in our study. HINTS respondents were provided with a brief introduction of HTP products: "Heated tobacco products, also known as heat-not-burn tobacco products, use a technology that heats tobacco instead of burning it. These are NOT the same as e-cigarettes. Some brands of heated tobacco products include iQOS and Eclipse". Then they were asked the question, "Thinking about heated tobacco products, which of the following statements BEST applies to you?". Respondents who chose the response option: "I have never heard of heated tobacco products" were categorized as not aware of HTP products; whereas those selecting: "I have heard of heated tobacco products but have never tried them", or "I have tried heated tobacco products but do not use them anymore", or "I currently use heated tobacco products" were categorized as being aware of HTP products.

Furthermore, HTP use was defined using the same survey question where those selecting the response option "I have tried heated tobacco products but do not use them anymore", or "I

currently use heated tobacco products” were categorized as ever users of HTP, while, those selecting the remaining response options were categorized as never users.

### Covariates

The sociodemographic factors in our adjusted models included age, sex, sexual orientation, race/ethnicity, educational attainment, income level and urban/rural status.

We hypothesized that awareness of HTP will vary by socio-demographic factors such as age, sex, sexual orientation, race/ethnicity, educational attainment, income level and urban/rural status. Additionally, among available data, we chose covariates that we hypothesized to be potentially associated with outcome, which were: cigarette smoking, e-cigarette use, alcohol use, and factors representing respondent’s beliefs about cancer. All the covariates we investigated are listed in Table 1. We did not conduct any variable selection as such strategies typically lead to higher false positives.<sup>38</sup> Thus, our covariates were *a priori* determined.

To construct the ‘cigarette smoking status’ variable, never smokers were identified from the negative response to the question: “Have you smoked at least 100 cigarettes in your entire life?”. Those responding ‘yes’ to the question were then asked, “How often do you now smoke cigarettes?”. Based on the answer to this second question, the frequency of smoking (i.e. former, every day or some days) was identified. Similarly, the ‘e-cigarette use status’ variable was constructed by combining the responses to the questions: “Have you ever used an e-cigarette, even one or two times?” and “Do you now use an e-cigarette every day, some days, or not at all?”. The ‘alcohol use status’ variable was constructed using the responses to the question: “During the past 30 days, how many days per week did you have at least one drink of any alcoholic beverage?”. Moreover, we included several covariates representing respondent’s beliefs about cancer, which were: response to the question “How worried are you about getting cancer?”, agree or disagree with the statement “It seems like everything causes cancer”, agree or disagree with the statement “There’s not much you can do to lower your chances of getting cancer”, agree or disagree with the statement “There are so many different recommendations about preventing cancer, it’s hard to know which ones to follow” and agree or disagree with the statement “If I found out from a genetic test that I was at high risk of cancer, I would change my behaviors such as diet, exercise and getting routine medical tests”.

### Statistical Analysis

We analyzed the study sample adjusting for the complex survey design of HINTS. Survey weighted prevalence of the awareness and utilization of HTP were estimated overall and by sociodemographic factors (i.e. age, sex, sexual orientation, race/ethnicity, educational attainment and income), cigarette smoking status, e-cigarette use status, alcohol use status and cancer-related worry, beliefs and behavior.

The outcome variable in our main analysis was dichotomized to represent being aware vs not aware of HTP. To identify the factors associated with awareness of HTP, a survey weighted logistic regression was conducted. Since our outcome variable was dichotomous, logistic regression method was appropriate, and to account for the complex survey design

of HINTS, survey weighted logistic regression was implemented. The survey weighted analyses produced nationally representative estimates.<sup>36</sup> All the sociodemographic factors (i.e. age, sex, sexual orientation, race/ethnicity, educational attainment and income), cigarette smoking status, e-cigarette use status, alcohol use status and cancer-related worry, beliefs and behavior served as covariates in the logistic model. Additionally, subset analyses were conducted to evaluate the factors associated with HTP awareness among those without a history of cancer. All tests were 2-tailed and  $p$ -value  $\leq 0.05$  was considered as statistically significant. All analyses were performed using the R software (version 4.0)<sup>39</sup> and the 'survey' package in R.<sup>40</sup>

## RESULTS

### Respondent Characteristics

This study included 3201 respondents, of whom 1847 (weighted percentage = 51.8%) were female, 2870 (93.4%) identified as Heterosexual, or straight and 1892 (66.1%) were Non-Hispanic White (Table 1). In terms of socioeconomic status, higher percentage of respondents had some college education ( $n = 1461$ ; 40.6%) and earned \$75,000 or more ( $n = 1261$ ; 43.8%). Of the respondents, 62.9% ( $n = 1995$ ) were never smokers, and 79.8% ( $n = 2751$ ) never used e-cigarettes. In response to the question, "How worried are you about getting cancer?", 29.1% ( $n = 925$ ) selected "Moderately/Extremely". In response to the question that inquired about how much the respondents agree or disagree with the following statement, "There are so many different recommendations about preventing cancer, it's hard to know which ones to follow", 73.7% ( $n = 2281$ ) selected "Somewhat agree/Strongly agree".

### Awareness of HTP

Overall, 14.8% (95% CI, 12.6%–17.2%) of US adults were aware of HTP. Awareness of HTP were higher among male respondents (17.6%; 95% CI, 13.4%–22.7%) than females (12.2%; 95% CI, 9.7%–15.4%). With respect to race/ethnicity, Non-Hispanic Asians had higher awareness (27.2%; 95% CI, 14.9%–44.4%) than Non-Hispanic Whites (13.2%; 95% CI, 10.7%–16.3%), Non-Hispanic Blacks (14.6%; 95% CI, 9.4%–21.9%) and Hispanics (17.4%; 95% CI, 9.6%–29.4%). Across sexual orientation, Heterosexual, or straight respondents (14.9%; 95% CI 12.5%–17.6%) had the highest prevalence of awareness, followed by Bisexual (13.3%; 95% CI, 5.6%–28.3%) and Homosexual, or gay or lesbian (12.2%; 95% CI, 4.6%–28.3%) respondents. Additionally, in terms of educational attainment and income level, the respondents with some college education (16.6%; 95% CI, 12.4%–21.9%) and those with income between \$0 to \$9,999 (26.9%; 95% CI, 15.6%–42.2%) reported highest prevalence of awareness, respectively. With respect to cigarette smoking status, HTP awareness was highest among some days smokers (35.6%; 95% CI, 18.9%–56.8%) followed by current everyday smokers (17.9%; 95% CI, 10.5%–28.7%); whereas, with respect to e-cigarette use status, awareness was highest among current e-cigarette users (23.8%; 95% CI, 10.9%–44.2%), followed by former e-cigarette users (19.2%; 95% CI, 14.1%–25.5%). With respect to alcohol use status, the awareness of HTP was similar among never drinkers (14.7%; 95% CI, 11.0%–19.5%) and drinkers (14.7%; 95% CI, 11.9%–18.1%).

## Factors Associated with Awareness of HTP

In the adjusted logistic regression model (Table 2), higher odds of awareness of HTP were found amongst respondents aged 35–49 years (aOR, 1.9; 95% CI, 1.3–2.9;  $p$ -value = 0.003) vs those aged  $\geq$  50 years, male respondents (aOR, 1.7; 95% CI, 1.0–2.7;  $p$ -value = 0.04) vs female respondents, among those who earned between \$0 to \$9,999 (aOR, 3.0; 95% CI, 1.3–6.9;  $p$ -value = 0.01) vs those who earned between \$35,000 to \$74,999, those who smoked cigarette on some days (aOR, 3.4; 95% CI, 1.2–9.4;  $p$ -value = 0.02) vs never smokers, and, those who responded “Moderately/Extremely” to the question “How worried are you about getting cancer?” (aOR, 1.7; 95% CI, 1.1–2.7;  $p$ -value = 0.03) vs those who responded “Not at all/Slightly”. On the other hand, those responding “Somewhat agree/Strongly agree” to the statement “There are so many different recommendations about preventing cancer, it’s hard to know which ones to follow” had lower odds (aOR, 0.5; 95% CI, 0.3–0.8;  $p$ -value = 0.009) of awareness of HTP compared to those responding “Somewhat disagree/Strongly disagree” (Table 2). We also evaluated the factors associated with HTP awareness in a subset of adults without history of cancer, the results were qualitatively similar to the full cohort analyses (Appendix Table 1). To complement these results, we also conducted analysis investigating whether worrying about cancer was associated with cigarette smoking status, no such association was found (Appendix Table 2).

Finally, among the study participants 2.2% (95% CI, 1.3%–3.7%) were ever users of HTP. Among the respondents, the proportion reporting ever use of HTP was higher among individuals moderately or extremely worried about cancer (2.6%) compared to the individuals slightly or not at all worried about cancer (2.1%) (Appendix Table 3).

## DISCUSSION

To the best of our knowledge, this is the first study that investigated the association between HTP awareness and beliefs about cancer. Using most recent national level survey data,<sup>26</sup> we found that 14.8% of US adults were aware of HTP. This percentage is higher than the awareness reported in previous studies.<sup>17, 19, 20</sup> Age between 35 and 49 years, male sex, lower income (\$0 to \$9,999), smoking on some days and moderately/extremely worrying about getting cancer were associated with higher odds of being aware of HTP; whereas, belief that there are too many recommendations about preventing cancer was associated with lower odds of being aware of HTP.

In terms of demographic factors, our findings of adults aged between 35 and 49 years and males being more likely to be aware of HTP were consistent with previous reports.<sup>17, 19, 20</sup> There has been much concern about uptake of HTP among US school-age youth.<sup>6, 41</sup> However, the high awareness among adults aged 18–34 years and 35–49 years revealed in our study underscores the susceptibility of young and middle-aged adults to HTP marketing exposure and potential HTP uptake.

In the current study we provide information on more specific type of current smokers who report higher likelihood of HTP awareness. Existing studies have shown that current smokers are more likely to be aware of HTP,<sup>19, 20</sup> however, subclassification of current smokers into someday and every day smokers was not previously investigated. We found

that some days smokers were more likely to be aware of HTP compared to never smokers. This finding is likely linked to the smoking cessation of non-daily smokers. Studies have shown non-daily smokers to be more likely to attempt smoking cessation compared to daily smokers.<sup>42, 43</sup> Our finding highlights that further research is necessary to investigate the association between HTP awareness and perception of its health hazards vs benefits. One implication of our finding is the possible need to deliver directed messages to someday smokers, highlighting the potential health effects of HTP,<sup>11, 12</sup> and directing them toward FDA approved cessation methods.<sup>15</sup>

A key finding in our study is that worrying about getting cancer is significantly associated with HTP awareness, although worrying about cancer was not associated with smoking status (Appendix Table 2). Those who worried moderately or extremely about getting cancer were almost two times more likely to be aware of HTP than those who did not worry at all or were slightly worried. Earlier studies have examined the association of cancer-related worry with cancer preventive behaviors (such as, screening and exercise);<sup>44, 45</sup> however, none has examined the association between cancer-related worry with awareness of smoking devices, including HTP. Consequently, our finding provides newer insights in HTP awareness. One possible interpretation of our finding is that there is interest on HTP among individuals who worry about getting cancer and these devices may not be viewed as negatively by them. This provides possible hypothesis that HTP can be misconstrued as a safer smoking alternative<sup>7, 46</sup> and a viable quitting method.<sup>47</sup> Due to the deceptive marketing practices of the tobacco companies,<sup>3</sup> individuals may become aware of HTP without fully realizing the harmful effects of these products;<sup>11, 12, 48</sup> leading to adoption of HTP despite being worried about cancer. This is supported by our ever use analysis finding, which showed that the proportion of respondents reporting ever use of HTP was higher among individuals moderately or extremely worried about cancer compared to those slightly or not at all worried about cancer (Appendix Table 3). The higher awareness and use of HTP among individuals with moderate or extreme cancer worry implies a lack of understanding of the harmful effects of HTP among these individuals. Taking this context into consideration, intervention strategies can be developed to inhibit HTP uptake. Studies have reported cancer worry to be associated with receipt of cancer screening, such as mammography, sigmoidoscopy and colonoscopy,<sup>44</sup> and health protective behavior, such as regular exercise.<sup>45</sup> Implementing the association between cancer worry and cancer-protective behavior<sup>44, 45</sup> in practice, messaging strategies can be designed to highlight the link between HTP use and its physiological harms.<sup>11, 12, 48</sup>

Another significant finding of our study was that those agreeing with the statement “There are so many different recommendations about preventing cancer, it’s hard to know which ones to follow” were significantly less likely to be aware of HTP. A possible explanation for this may be the effect of message fatigue.<sup>49</sup> Message fatigue has been observed in context of anti-tobacco messaging, where repeated anti-tobacco messages reduce recipient’s sensitivity.<sup>49</sup> Our finding may imply that individuals experiencing message fatigue to cancer prevention recommendations may experience fatigue to HTP marketing messages as well. Fatigue toward HTP prevention messaging may pose reasons for concern because high frequency of messages may reduce their effectiveness.<sup>49</sup> HTP prevention messaging should be designed keeping this possibility in consideration; less frequent but more persuasive



message may prove more effective. Further research is warranted to investigate the relation between messaging frequency and messaging effectiveness in context of HTP uptake prevention.

Since it has been observed in a previous study that sexual and gender minorities are more likely to report higher tobacco and e-cigarette use,<sup>31</sup> we examined whether there is variations in HTP awareness across sexual orientation (see also Appendix Table 4). Interestingly, we did not find any significant difference in likelihood of HTP awareness across sexual orientation. Underrepresentation and misclassification of sexual minorities in national surveys may be a possible explanation for this finding.<sup>50</sup> Although HINTS oversamples racial/ethnic minorities,<sup>26</sup> no such oversampling is done for the sexual minorities. Given the higher susceptibility of sexual minority population to smoking,<sup>31</sup> they may be susceptible to HTP uptake. For possible future investigation of HTP awareness and use among sexual minorities, oversampling of these subgroups should be considered in future waves of HINTS and appropriate classification should be ensured.

## LIMITATIONS

Despite many strengths to the study, including our use of most recent nationally representative HTP awareness data for US adults, the study has some limitations. First, the survey data of HINTS may be prone to non-response bias;<sup>26</sup> however, HINTS employs appropriate weighting techniques to account for these biases.<sup>51</sup> In HINTS, first the household-levels weights are determined and are adjusted for household non-response, then based on these weights, person-level weights are calculated and calibrated to population count.<sup>26</sup> Adjusting for these weights in the analytic procedure ensures population level estimates corrected for non-response bias, which has been adopted in this current study. Second, sensitive survey questions may be subject to social desirability bias.<sup>52</sup> This was observed in previous waves of HINTS where likelihood of reporting cancer worry were lower in interviewer administered mode compared to self-reported mode of the survey.<sup>53</sup> The HINTS 5 cycle 4 was exclusively conducted via postal mail as a self-reported survey,<sup>26</sup> which is expected to reduce the social desirability bias. Third, due to the cross sectional nature of our data,<sup>25</sup> we could not conduct longitudinal analysis, which would provide directionality to our findings. Fourth, although a brief description of HTP was provided during the survey, the respondents were not shown any picture of the devices. This might have affected the respondents' understanding of HTP, as these products are not yet common in all states in the USA. Lastly, number of observations with ever HTP use was too small to examine the outcome using regression methods.

## CONCLUSION

Newer HTP devices have the potential to become the dominant smoking devices used by US smokers. In this nationally representative study, we found that a significant portion of the adult US population (14.8%) were aware of HTP devices. Several sociodemographic factors and beliefs about cancer, including cancer-related worry and belief about cancer prevention recommendations, were associated with HTP awareness. In light of the recent proliferation of the e-cigarette devices, cautious attention is required to monitor the uptake of HTP

among both smokers and non-smokers in the US and preemptive regulatory initiatives are warranted.

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## Appendix

### Appendix

**Appendix Table 1.**

Factors Associated with Awareness of Heated Tobacco Products (HTP) Among subset of US Adults with No Previous History of Cancer - Health Information National Trends Survey (HINTS) 5, Cycle 4, 2020

Variable	aOR (95% CI)	p-value
Age group		
18–34 years	1.8 (1.0–3.3)	0.06
35–49 years	<b>1.9 (1.2–3.0)</b>	<b>0.01</b>
50 years	ref	
Sex		
Female	ref	
Male	<b>1.8 (1.1–3.0)</b>	<b>0.02</b>
Sexual orientation		
Heterosexual, or straight	ref	
Homosexual, or gay or lesbian	0.5 (0.2–1.5)	0.21
Bisexual	0.8 (0.2–2.5)	0.65
Something else	0.6 (0.1–6.2)	0.65
Race/ethnicity		
Non-Hispanic White	ref	
Non-Hispanic Black or African American	1.6 (0.8–3.2)	0.19
Hispanic	1.4 (0.7–2.7)	0.29
Non-Hispanic Asian	2.8 (0.9–8.5)	0.07
Non-Hispanic Other	1.5 (0.5–4.8)	0.46
Educational attainment		
<High school	ref	
High school graduate	0.7 (0.2–2.5)	0.55
Some college	1.1 (0.4–3.4)	0.82
College graduate	0.8 (0.3–2.4)	0.70
Income level		

Variable	aOR (95% CI)	p-value
\$0 to \$9,999	<b>3.2 (1.3–7.9)</b>	<b>0.01</b>
\$10,000 to \$34,999	1.0 (0.6–1.7)	0.90
\$35,000 to \$74,999	ref	
\$75,000	1.4 (0.8–2.7)	0.26
Urban/rural status		
Rural	ref	
Urban	0.7 (0.3–1.4)	0.32
Cigarette smoking status		
Never smoker	ref	
Former smoker	0.9 (0.5–1.8)	0.83
Some days smoker	<b>3.0 (1.1–8.5)</b>	<b>0.04</b>
Current everyday smoker	1.2 (0.5–2.8)	0.67
E-cigarette use status		
Never	ref	
Former e-cigarette user	1.3 (0.8–2.2)	0.30
Current e-cigarette user	1.7 (0.6–4.5)	0.30
Alcohol use status		
Never drinker	ref	
Drinker	1.0 (0.6–1.5)	0.91
Response to the question “How worried are you about getting cancer?”		
Not at all/Slightly	ref	
Somewhat	1.5 (0.8–2.6)	0.20
Moderately/Extremely	<b>1.8 (1.1–2.8)</b>	<b>0.02</b>
Agree or disagree with the statement “It seems like everything causes cancer”		
Somewhat disagree/Strongly disagree	ref	
Somewhat agree/Strongly agree	1.1 (0.7–1.8)	0.73
Agree or disagree with the statement “There’s not much you can do to lower your chances of getting cancer”		
Somewhat disagree/Strongly disagree	ref	
Somewhat agree/Strongly agree	1.0 (0.6–1.7)	0.99
Agree or disagree with the statement “There are so many different recommendations about preventing cancer, it’s hard to know which ones to follow”		
Somewhat disagree/Strongly disagree	ref	
Somewhat agree/Strongly agree	<b>0.4 (0.3–0.8)</b>	<b>0.004</b>
Agree or disagree with the statement “If I found out from a genetic test that I was at high risk of cancer, I would change my behaviors such as diet, exercise and getting routine medical tests”		
Somewhat disagree/Strongly disagree	ref	
Somewhat agree/Strongly agree	1.9 (0.9–3.8)	0.08

Note: Boldface indicates statistical significance ( $p$ -value<0.05).

**Appendix Table 2.**

Factors Associated with Cigarette Smoking Status Among US Adults - Health Information National Trends Survey (HINTS) 5, Cycle 4, 2020

Variable	Cigarette smoking status					
	Everyday smoker vs Never smoker		Some days smoker vs Never smoker		Former smoker vs Never smoker	
	aOR (95% CI)	p-value	aOR (95% CI)	p-value	aOR (95% CI)	p-value
Age group						
18–34 years	<b>0.2 (0.1– 1.0)</b>	<b>0.05</b>	0.4 (0.1– 1.6)	0.19	<b>0.2 (0.1– 0.4)</b>	<b>&lt;0.001</b>
35–49 years	1.2 (0.6– 2.3)	0.64	1.7 (0.5– 5.1)	0.36	0.7 (0.4– 1.3)	0.23
50 years	ref		ref		ref	
Sex						
Female	ref		ref		ref	
Male	1.6 (0.9– 2.9)	0.13	<b>2.8 (1.3– 6.2)</b>	<b>0.01</b>	<b>1.7 (1.0– 2.9)</b>	<b>0.05</b>
Sexual orientation						
Heterosexual, or straight	ref		ref		ref	
Homosexual, or gay or lesbian	2.5 (0.3– 20.3)	0.38	1.1 (0.1–19.8)	0.94	0.6 (0.2– 1.7)	0.36
Bisexual	0.3 (0.1– 1.6)	0.16	1.6 (0.3– 8.5)	0.59	0.5 (0.1– 1.7)	0.26
Something else	0.9 (0.0– 31.4)	0.93	1.4 (0.0– 462.9)	0.90	2.0 (0.2– 26.9)	0.57
Race/ethnicity						
Non-Hispanic White	ref		ref		ref	
Non-Hispanic Black or African American	1.2 (0.4– 3.3)	0.77	1.2 (0.3– 5.2)	0.83	<b>0.4 (0.2– 0.7)</b>	<b>0.005</b>
Hispanic	0.5 (0.1– 1.7)	0.26	0.8 (0.2– 2.5)	0.67	<b>0.4 (0.2– 0.7)</b>	<b>0.002</b>
Non-Hispanic Asian	0.6 (0.1– 2.8)	0.49	3.0 (0.3–31.2)	0.35	0.3 (0.1– 1.5)	0.14
Non-Hispanic Other	0.6 (0.0– 6.9)	0.64	0.4 (0.1– 2.7)	0.33	0.5 (0.1– 1.8)	0.27
Educational attainment						
<High school	ref		ref		ref	
High school graduate	0.4 (0.1– 1.6)	0.20	4.0 (0.5–30.9)	0.17	1.0 (0.3– 3.2)	0.94
Some college	0.5 (0.1– 2.2)	0.37	3.2 (0.5–19.8)	0.20	0.8 (0.2– 2.9)	0.76
College graduate	<b>0.1 (0.0– 0.4)</b>	<b>0.003</b>	1.2 (0.2– 9.3)	0.83	0.5 (0.1– 1.6)	0.22
Income level						
\$0 to \$9,999	1.6 (0.5– 5.0)	0.38	2.7 (0.6–11.3)	0.17	0.9 (0.3– 2.4)	0.79
\$10,000 to \$34,999	1.1 (0.5– 2.5)	0.79	1.1 (0.3– 3.3)	0.92	0.9 (0.5– 1.7)	0.74
\$35,000 to \$74,999	ref		ref		ref	
\$75,000	0.5 (0.2– 1.1)	0.09	0.6 (0.2– 2.2)	0.42	0.9 (0.6– 1.3)	0.47
Urban/rural status						
Rural	ref		ref		ref	
Urban	0.8 (0.2– 2.8)	0.72	0.7 (0.1– 6.4)	0.73	1.0 (0.5– 2.1)	0.96
E-cigarette use status						

Cigarette smoking status						
Variable	Everyday smoker vs Never smoker		Some days smoker vs Never smoker		Former smoker vs Never smoker	
	aOR (95% CI)	p-value	aOR (95% CI)	p-value	aOR (95% CI)	p-value
Never	ref		ref		ref	
Former e-cigarette user	<b>17.7 (6.5–47.9)</b>	<b>&lt;0.001</b>	<b>13.2 (3.3–52.0)</b>	<b>&lt;0.001</b>	<b>5.6 (3.0–10.2)</b>	<b>&lt;0.001</b>
Current e-cigarette user	<b>11.4 (2.1–62.1)</b>	<b>0.007</b>	<b>26.6 (5.2–135.6)</b>	<b>&lt;0.001</b>	<b>5.0 (1.2–20.4)</b>	<b>0.03</b>
Alcohol use status						
Never drinker	ref		ref		ref	
Drinker	1.4 (0.8–2.6)	0.22	1.8 (0.7–4.3)	0.18	1.1 (0.7–1.8)	0.68
Response to the question “How worried are you about getting cancer?”						
Not at all/Slightly	ref		ref		ref	
Somewhat	1.3 (0.5–3.1)	0.58	0.5 (0.1–1.7)	0.24	1.1 (0.7–1.8)	0.70
Moderately/Extremely	1.8 (0.8–3.8)	0.12	0.7 (0.3–1.9)	0.46	1.0 (0.6–1.5)	0.94

Note: Adjusted odds ratio estimated from a multinomial logistic regression model were ‘Never smoker’ status was the reference category in the outcome variable. Boldface indicates statistical significance ( $p$ -value<0.05).

**Appendix Table 3.**

Ever Use of Heated Tobacco Products (HTP) Among US Adults - Health Information National Trends Survey (HINTS) 5, Cycle 4, 2020

Variable	n	Weighted n	Ever used HTP, weighted % (95% CI)	Never used HTP, weighted % (95% CI)
Total	3201	216416925	2.2 (1.3–3.7)	97.8 (96.3–98.7)
Age group				
18–34 years	443	59500684	3.2 (1.1–8.8)	96.8 (91.2–98.9)
35–49 years	593	52584317	2.3 (0.9–5.5)	97.7 (94.5–99.1)
50 years	2085	100065693	1.7 (0.8–3.8)	98.3 (96.2–99.2)
Sex				
Female	1847	110181544	1.7 (0.9–3.3)	98.3 (96.7–99.1)
Male	1293	102638450	2.8 (1.3–6.0)	97.2 (94.0–98.7)
Sexual orientation				
Heterosexual, or straight	2870	194875989	2.1 (1.1–3.7)	97.9 (96.3–98.9)
Homosexual, or gay or lesbian	74	5492629	4.5 (0.7–23.7)	95.5 (76.3–99.3)
Bisexual	76	5748450	3.5 (0.6–19.1)	96.5 (80.9–99.4)
Something else	40	2633453	0.0 (0.0–0.0)	100.0 (100.0–100.0)
Race/ethnicity				
Non-Hispanic White	1892	134362256	1.9 (0.8–4.2)	98.1 (95.8–99.2)
Non-Hispanic Black or African American	373	21248875	1.0 (0.3–2.8)	99.0 (97.2–99.7)
Hispanic	463	31860009	2.1 (0.8–5.1)	97.9 (94.9–99.2)

Variable	n	Weighted n	Ever used HTP, weighted % (95% CI)	Never used HTP, weighted % (95% CI)
Non-Hispanic Asian	121	8940041	2.0 (0.3–13.6)	98.0 (86.4–99.7)
Non-Hispanic Other	102	6899408	10.3 (2.5–34.1)	89.7 (65.9–97.5)
Educational attainment				
<High school	182	13629171	0.8 (0.2–4.1)	99.2 (95.9–99.8)
High school graduate	549	45158892	2.0 (0.6–6.4)	98.0 (93.6–99.4)
Some college	917	86000312	3.5 (1.7–7.2)	96.5 (92.8–98.3)
College graduate	1461	66944523	1.0 (0.5–2.1)	99.0 (97.9–99.5)
Income level				
\$0 to \$9,999	189	10647579	3.0 (0.8–10.3)	97.0 (89.7–99.2)
\$10,000 to \$34,999	753	44992583	2.4 (0.9–6.2)	97.6 (93.8–99.1)
\$35,000 to \$74,999	985	65286732	1.8 (0.9–3.9)	98.2 (96.1–99.1)
\$75,000	1261	94341161	2.3 (0.9–6.0)	97.7 (94.0–99.1)
Urban/rural status				
Rural	362	26899470	1.2 (0.2–7.3)	98.8 (92.7–99.8)
Urban	2839	189517455	2.4 (1.4–4.0)	97.6 (96.0–98.6)
Cigarette smoking status				
Never smoker	1995	135211813	0.6 (0.2–1.5)	99.4 (98.5–99.8)
Former smoker	807	49534548	1.5 (0.6–3.6)	98.5 (96.4–99.4)
Some days smoker	103	8190211	19.7 (6.3–47.2)	80.3 (52.8–93.7)
Current everyday smoker	273	21965226	6.4 (2.5–15.4)	93.6 (84.6–97.5)
E-cigarette use status				
Never	2751	172023361	0.9 (0.4–2.0)	99.1 (98.0–99.6)
Former e-cigarette user	340	28938591	7.1 (4.0–12.5)	92.9 (87.5–96.0)
Current e-cigarette user	103	14625618	8.5 (1.9–30.5)	91.5 (69.5–98.1)
Alcohol use status				
Never drinker	1519	102637047	1.3 (0.6–2.6)	98.7 (97.4–99.4)
Drinker	1406	98808396	2.9 (1.3–6.1)	97.1 (93.9–98.7)
Response to the question “How worried are you about getting cancer?”				
Not at all/Slightly	1343	86581346	2.1 (0.7–6.0)	97.9 (94.0–99.3)
Somewhat	899	65220592	2.1 (0.9–4.9)	97.9 (95.1–99.1)
Moderately/Extremely	925	62254665	2.6 (1.3–5.1)	97.4 (94.9–98.7)
Agree or disagree with the statement “It seems like everything causes cancer”				
Somewhat disagree/Strongly disagree	1003	62041496	2.0 (0.8–5.1)	98.0 (94.9–99.2)
Somewhat agree/Strongly agree	2146	152070106	2.3 (1.2–4.4)	97.7 (95.6–98.8)
Agree or disagree with the statement “There’s not much you can do to lower your chances of getting cancer”				
Somewhat disagree/Strongly disagree	2297	150448636	2.6 (1.4–4.7)	97.4 (95.3–98.6)
Somewhat agree/Strongly agree	847	63126955	1.3 (0.6–3.1)	98.7 (96.9–99.4)
Agree or disagree with the statement “There are so many different recommendations				

Variable	n	Weighted n	Ever used HTP, weighted % (95% CI)	Never used HTP, weighted % (95% CI)
about preventing cancer, it's hard to know which ones to follow"				
Somewhat disagree/Strongly disagree	865	56167227	2.1 (0.8–5.4)	97.9 (94.6–99.2)
Somewhat agree/Strongly agree	2281	157399401	2.3 (1.2–4.2)	97.7 (95.8–98.8)
Agree or disagree with the statement "If I found out from a genetic test that I was at high risk of cancer, I would change my behaviors such as diet, exercise and getting routine medical tests"				
Somewhat disagree/Strongly disagree	329	20919774	2.6 (0.9–7.4)	97.4 (92.6–99.1)
Somewhat agree/Strongly agree	2819	192230953	2.2 (1.3–3.9)	97.8 (96.1–98.7)

**Appendix Table 4.**

E-cigarette Use Across Sexual Orientation - Health Information National Trends Survey (HINTS) 5, Cycle 4, 2020

Variable	n	Weighted n	Never e-cigarette user % (95% CI)	Former e-cigarette user % (95% CI)	Current e-cigarette user % (95% CI)
Sexual orientation					
Heterosexual, or straight	3353	221446088	81.9 (78.6–84.7)	11.8 (9.5–14.7)	6.3 (4.6– 8.7)
Homosexual, or gay or lesbian	80	6226191	65.3 (48.3–79.2)	27.5 (15.7–43.8)	7.1 (1.6–26.7)
Bisexual	81	6014439	43.1 (29.0–58.5)	36.7 (21.5–55.0)	20.2 (8.7–40.5)
Something else	58	3886613	76.9 (53.1–90.7)	19.8 (6.8–45.5)	3.3 (1.3– 8.5)

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**Table 1.** Awareness of Heated Tobacco Products (HTP) Among US Adults - Health Information National Trends Survey (HINTS) 5, Cycle 4, 2020

Variable	n	Weighted n	Aware of HTP, weighted % (95% CI)	Not aware of HTP, weighted % (95% CI)
Total	3201	216416925	14.8 (12.6–17.2)	85.2 (82.8–87.4)
Age group				
18–34 years	443	59500684	18.7 (12.2–27.7)	81.3 (72.3–87.8)
35–49 years	593	52584317	19.3 (15.5–23.7)	80.7 (76.3–84.5)
50 years	2085	100065693	10.4 (8.3–13.0)	89.6 (87.0–91.7)
Sex				
Female	1847	110181544	12.2 (9.7–15.4)	87.8 (84.6–90.3)
Male	1293	102638450	17.6 (13.4–22.7)	82.4 (77.3–86.6)
Sexual orientation				
Heterosexual, or straight	2870	194875989	14.9 (12.5–17.6)	85.1 (82.4–87.5)
Homosexual, or gay or lesbian	74	5492629	12.2 (4.6–28.3)	87.8 (71.7–95.4)
Bisexual	76	5748450	13.3 (5.6–28.3)	86.7 (71.7–94.4)
Something else	40	2633453	14.9 (4.9–37.4)	85.1 (62.6–95.1)
Race/ethnicity				
Non-Hispanic White	1892	134362256	13.2 (10.7–16.3)	86.8 (83.7–89.3)
Non-Hispanic Black or African American	373	21248875	14.6 (9.4–21.9)	85.4 (78.1–90.6)
Hispanic	463	31860009	17.4 (9.6–29.4)	82.6 (70.6–90.4)
Non-Hispanic Asian	121	8940041	27.2 (14.9–44.4)	72.8 (55.6–85.1)
Non-Hispanic Other	102	6899408	21.7 (10.2–40.3)	78.3 (59.7–89.8)
Educational attainment				
<High school	182	13629171	15.0 (7.6–27.5)	85.0 (72.5–92.4)
High school graduate	549	45158892	12.5 (7.9–19.4)	87.5 (80.6–92.1)
Some college	917	86000312	16.6 (12.4–21.9)	83.4 (78.1–87.6)
College graduate	1461	66944523	14.1 (11.5–17.2)	85.9 (82.8–88.5)
Income level				
\$0 to \$9,999	189	10647579	26.9 (15.6–42.2)	73.1 (57.8–84.4)
\$10,000 to \$34,999	753	44992583	14.1 (10.2–19.0)	85.9 (81.0–89.8)
\$35,000 to \$74,999	985	65286732	11.1 (8.2–15.0)	88.9 (85.0–91.8)

Variable	n	Weighted n	Aware of HTP, weighted % (95% CI)	Not aware of HTP, weighted % (95% CI)
\$75,000	1261	94341161	16.4 (12.3–21.4)	83.6 (78.6–87.7)
Urban/rural status				
Rural	362	26899470	14.6 (9.0–22.9)	85.4 (77.1–91.0)
Urban	2839	189517455	14.8 (12.4–17.6)	85.2 (82.4–87.6)
Cigarette smoking status				
Never smoker	1995	135211813	13.7 (10.8–17.2)	86.3 (82.8–89.2)
Former smoker	807	49534548	12.0 (8.7–16.3)	88.0 (83.7–91.3)
Some days smoker	103	8190211	35.6 (18.9–56.8)	64.4 (43.2–81.1)
Current everyday smoker	273	21965226	17.9 (10.5–28.7)	82.1 (71.3–89.5)
E-cigarette use status				
Never	2751	172023361	13.0 (10.9–15.4)	87.0 (84.6–89.1)
Former e-cigarette user	340	28938591	19.2 (14.1–25.5)	80.8 (74.5–85.9)
Current e-cigarette user	103	14625618	23.8 (10.9–44.2)	76.2 (55.8–89.1)
Alcohol use status				
Never drinker	1519	102637047	14.7 (11.0–19.5)	85.3 (80.5–89.0)
Drinker	1406	98808396	14.7 (11.9–18.1)	85.3 (81.9–88.1)
Response to the question “How worried are you about getting cancer?”				
Not at all/Slightly	1343	86581346	12.1 (8.6–16.9)	87.9 (83.1–91.4)
Somewhat	899	65220592	14.8 (10.9–19.8)	85.2 (80.2–89.1)
Moderately/Extremely	925	62254665	17.7 (13.1–23.6)	82.3 (76.4–86.9)
Agree or disagree with the statement “It seems like everything causes cancer”				
Somewhat disagree/Strongly disagree	1003	62041496	15.2 (10.9–20.8)	84.8 (79.2–89.1)
Somewhat agree/Strongly agree	2146	152070106	14.6 (12.0–17.8)	85.4 (82.2–88.0)
Agree or disagree with the statement “There’s not much you can do to lower your chances of getting cancer”				
Somewhat disagree/Strongly disagree	2297	150448636	14.5 (12.0–17.5)	85.5 (82.5–88.0)
Somewhat agree/Strongly agree	847	63126955	15.5 (10.5–22.3)	84.5 (77.7–89.5)
Agree or disagree with the statement “There are so many different recommendations about preventing cancer, it’s hard to know which ones to follow”				
Somewhat disagree/Strongly disagree	865	56167227	19.5 (13.6–27.2)	80.5 (72.8–86.4)
Somewhat agree/Strongly agree	2281	157399401	13.1 (10.9–15.7)	86.9 (84.3–89.1)

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Variable	n	Weighted n	Aware of HTP, weighted % (95% CI)	Not aware of HTP, weighted % (95% CI)
Agree or disagree with the statement "If I found out from a genetic test that I was at high risk of cancer, I would change my behaviors such as diet, exercise and getting routine medical tests."				
Somewhat disagree/Strongly disagree	329	20919774	12.0 (8.0–17.7)	88.0 (82.3–92.0)
Somewhat agree/Strongly agree	2819	192230953	15.2 (12.8–17.9)	84.8 (82.1–87.2)

**Table 2.** Factors Associated with Awareness of Heated Tobacco Products (HTP) Among US Adults

Variable	aOR (95% CI)	p-value
Age group		
18–34 years	1.8 (1.0–3.1)	0.06
35–49 years	<b>1.9 (1.3–2.9)</b>	<b>0.003</b>
50 years	ref	
Sex		
Female	ref	
Male	<b>1.7 (1.0–2.7)</b>	<b>0.04</b>
Sexual orientation		
Heterosexual, or straight	ref	
Homosexual, or gay or lesbian	0.5 (0.2–1.3)	0.17
Bisexual	0.8 (0.3–2.4)	0.67
Something else	1.0 (0.1–6.9)	0.99
Race/ethnicity		
Non-Hispanic White	ref	
Non-Hispanic Black or African American	1.4 (0.7–2.7)	0.30
Hispanic	1.4 (0.7–2.6)	0.33
Non-Hispanic Asian	2.6 (0.9–7.6)	0.10
Non-Hispanic Other	1.5 (0.5–4.4)	0.49
Educational attainment		
<High school	ref	
High school graduate	0.7 (0.2–2.4)	0.59
Some college	1.2 (0.4–3.4)	0.72
College graduate	0.9 (0.3–2.6)	0.91
Income level		
\$0 to \$9,999	<b>3.0 (1.3–6.9)</b>	<b>0.01</b>
\$10,000 to \$34,999	1.1 (0.7–1.9)	0.65
\$35,000 to \$74,999	ref	
\$75,000	1.5 (0.8–2.6)	0.20

Variable	aOR (95% CI)	p-value
Urban/rural status		
Rural	ref	
Urban	0.7 (0.4–1.4)	0.33
Cigarette smoking status		
Never smoker	ref	
Former smoker	1.0 (0.6–1.9)	0.90
Some days smoker	<b>3.4 (1.2–9.4)</b>	<b>0.02</b>
Current everyday smoker	1.2 (0.6–2.7)	0.57
E-cigarette use status		
Never	ref	
Former e-cigarette user	1.3 (0.8–2.0)	0.32
Current e-cigarette user	1.7 (0.7–4.2)	0.28
Alcohol use status		
Never drinker	ref	
Drinker	0.9 (0.6–1.4)	0.76
Response to the question “How worried are you about getting cancer?”		
Not at all/Slightly	ref	
Somewhat	1.4 (0.8–2.4)	0.28
Moderately/Extremely	<b>1.7 (1.1–2.7)</b>	<b>0.03</b>
Agree or disagree with the statement “It seems like everything causes cancer.”		
Somewhat disagree/Strongly disagree	ref	
Somewhat agree/Strongly agree	1.0 (0.6–1.6)	0.96
Agree or disagree with the statement “There’s not much you can do to lower your chances of getting cancer.”		
Somewhat disagree/Strongly disagree	ref	
Somewhat agree/Strongly agree	1.0 (0.6–1.7)	0.94
Agree or disagree with the statement “There are so many different recommendations about preventing cancer, it’s hard to know which ones to follow.”		
Somewhat disagree/Strongly disagree	ref	
Somewhat agree/Strongly agree	<b>0.5 (0.3–0.8)</b>	<b>0.009</b>
Agree or disagree with the statement “If I found out from a genetic test that I was at high risk of cancer, I would change my behaviors such as diet, exercise and getting routine medical tests.”		
Somewhat disagree/Strongly disagree	ref	

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Variable	aOR (95% CI)	p-value
Somewhat agree/Strongly agree	1.8 (0.9–3.4)	0.10

Note: Boldface indicates statistical significance ( $p$ -value<0.05).