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Brief Report
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Brief Report

Patterns of Non-Cigarette Tobacco and Nicotine Use Among Current Cigarette Smokers and Recent Quitters: Findings From the 2020 ITC Four Country Smoking and Vaping Survey

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Abstract

Introduction: This study explores patterns of use of non-cigarette tobacco and nicotine products among adult cigarette smokers and recent ex-smokers. Along with cigarette smoking status we explore differences as a function of countries with different product regulations, gender, and age.
Methods: Data came from the ITC Four Country Smoking and Vaping Wave 3 Survey conducted between February–June 2020. The analytic sample consisted of 9112 current cigarette smokers (at least monthly) and 1184 recent ex-smokers (quit cigarettes ≤ 2 years) from Australia, Canada, England, and the United States. Respondents were asked about their cigarette smoking and current use of the following non-cigarette products: combustible tobacco (cigars, cigarillos, pipe, waterpipe); noncombustible tobacco (smokeless tobacco, and heated tobacco products [HTPs]); and non-tobacco nicotine products (nicotine vaping products [NVPs], nicotine replacement therapy [NRT], and nicotine pouches).
Results: Overall, NVPs (13.7%) and NRT (10.9%) were the most reported nicotine products used, followed by cigars (5.3%), cigarillos (4.2%), and HTPs (3.5%). More than 21% current and recent ex-smokers of cigarettes reported using a non-tobacco nicotine product and noncombustible product, with respondents in England reporting the highest levels of use (>26%). Males, younger respondents, and current non-daily cigarette smokers were more likely to use non-cigarette nicotine products. Notably, 11.6% of ex-cigarette smokers were using other combustible tobacco.
Conclusion: Considerable percentages of current cigarette smokers and ex-smokers use non-cigarette nicotine products, and there are unexpectedly high levels of use of other combustible products by those recent ex-smokers of cigarettes which is concerning and has important implications for definitions of smoking cessation.

Implications: The tobacco product market has evolved to include new products which add to existing non-cigarette tobacco products creating a much more diverse nicotine market. This brief report provides a snapshot of use of various combustible and noncombustible nicotine-containing products among current cigarette smokers and recent ex-smokers in four western countries. Our results indicate that use of non-cigarette tobacco and nicotine products among these cigarette smokers and recent ex-smokers is not low, particularly among males, younger and non-daily cigarette smokers. Use of other combustible tobacco among respondents that recently quit cigarette smoking is concerning and has important implications for definitions of smoking cessation. Increased emphasis on researching non-cigarette nicotine product use is warranted in tobacco control generally and smoking cessation in particular.

Introduction

In the past decade, the tobacco and nicotine product market has evolved to include new products such as heated tobacco products (HTPs) and nicotine vaping products (NVPs, or electronic cigarettes), which add to existing non-cigarette tobacco products creating a much more diverse nicotine market. This article focuses on use of other tobacco and nicotine products by current cigarette smokers and recent ex-smokers. By using the most recent population data (collected in the first half of 2020), this study aims to shed new lights on the discussions of the potential effects of various newly introduced and existing non-cigarette products on cigarette smoking and quitting (or transition to quitting).

Earlier population data from the United States indicates that multiple product use (ie, using two or more products) is common among adult cigarette/tobacco users.[1] Some research has showed that over half of current cigar users and chewing tobacco users reported multiple product use.[2] Concurrent use of vaping products with cigarettes also appears to be common, although perhaps declining.[1,3] A study looked into the dual use of combustible tobacco, smokeless tobacco, and NVPs, and found that dual use was an unstable state with users being more likely to transition to exclusive combustible use than to remain in the dual use categories.[4] In Japan, the introduction of HTPs is associated with a lot of concurrent use with smoking.[5] As these and other novel products are introduced into western countries, it may be that there will be more concurrent product use. This paper is designed to provide a snapshot of use among both current cigarette smokers and those who have recently quit smoking cigarettes, the focal population group for the International Tobacco Control (ITC) Project.[6] There are potential health-related consequences of use of the various other types of products if use was sustained. In particular, there is likely no benefit in switching to other combustible products, particularly when higher levels of consumption of such combustible products are involved, and indeed any ex-cigarette smoker using other combustible tobacco could not reasonably be considered an ex-smoker.

We aimed to describe the use of various types of combustible and noncombustible tobacco products and non-tobacco nicotine products among current cigarette smokers and recent ex-smokers. We compared the self-reported use of these tobacco and nicotine products by country, sex, age, cigarette smoking status, and frequency of product use.

Methods

Data Source and Participants

Data came from the ITC Four Country Smoking and Vaping Wave 3 (4CV3) Survey conducted in Australia, Canada, England, and United States between February and June 2020. There were 10 296 adult respondents (Australia: n = 1353; Canada: n = 3302; England: n = 3548; United States: n = 2093), who were current cigarette smokers and recent ex-smokers (quit cigarettes ≤ 2 years). Survey weights were designed to ensure sample generalizability to smokers, recent ex-smokers, and vapers in each country. More details about the ITC 4CV Surveys have been reported elsewhere.[6,7]

Measures

Reported Use of Various Types of Tobacco and Nicotine Products

Respondents were asked about current use (at least monthly/in the last 30 days) of a wide range of tobacco and nicotine products, in some cases after screening for ever-use (and in the case for HTPs, awareness), with never or past use being coded as "no current use." For cigarettes, HTPs, and NVPs, the key question was "*How often, if at all, do you currently use [the product]?*" (daily | less than daily, but at least once a week | less than weekly, but at least once a month | less than once a month, but occasionally | not at all | don't know). This was recoded into current use (at least monthly) compared to all other categories, except for cigarettes where we also differentiate daily from weekly/monthly use.

For the following products, the key question for the current users was "*How often, do you use/have you used [the product]*": non-cigarette combustible tobacco (ie, cigar, cigarillo, pipe, and waterpipe tobacco), smokeless tobacco products (including smokeless tobacco and chewing tobacco/oral snuff), and tobacco-free oral nicotine pouches (daily | less than daily, but at least once a week | less than weekly | not at all | don't know); and nicotine replacement therapy (NRT) products (every day | 4–6 days a week | 1–3 days a week | less than once a week | not at all | don't know). For these products, "daily/every day," "weekly/1–6 days a week" and "less than weekly" were combined to compare to "not at all" and "don"t know'.

Additionally, composite measures were computed of "*any non-cigarette combustible tobacco product*" (cigar, cigarillo, pipe or water pipe tobacco); "*any noncombustible tobacco product*" (oral/smokeless tobacco or HTP); "*any non-tobacco nicotine product*" (oral nicotine pouch, NVP or NRT); "*any noncombustible product,*" and "*only noncombustible products.*" In some analyses, comparisons were made between those using only one type of product versus those using two or more products in addition to smoking cigarettes.

Demographic Measures

Demographic measures used were age (18–24, 25–39, 40–54, and 55 and older) and sex (male and female).

Data Analysis

Cross-sectional sampling weights were used to generate population estimates. Tobacco and nicotine product use prevalence measures were estimated for the overall sample, by country of residence, sex, age, and cigarette smoking status and frequency (daily vs.

non-daily). Sub-group differences in product use were assessed/compared using logistic regression. In all analyses, a *p*-value < .05 was considered statistically significant. All analyses were conducted using Stata SE 16.0.[8]

Results

Table 1 shows the current use (monthly or at least "less than weekly") of various non-cigarette tobacco and nicotine products overall and broken out by country, sex, and age among the total sample. Overall, NVPs (13.7%) and NRT (10.9%) were the most used non-cigarette nicotine products reported, followed by cigars (5.3%), cigarillos (4.2%), HTPs (3.5%), and smokeless/oral tobacco (3.2%). Tobacco-free nicotine pouches were least reported product (0.8%). Overall, 12.2% reported using a non-cigarette combustible tobacco product (cigar, cigarillo, pipe, or waterpipe tobacco), 5.7% a noncombustible tobacco product (smokeless/oral tobacco, or HTPs), 21.1% a non-tobacco nicotine product (nicotine pouch, NVPs, or NRT), and 22.1% a noncombustible product (noncombustible tobacco and/or non-tobacco nicotine) including13.1% who only used a noncombustible product(s).

Overall, Australians were least likely to use both combustible (except for waterpipes) and noncombustible tobacco products, but were similarly likely to use nicotine products overall, although less for NVPs. The odds of using "any non-tobacco nicotine product" were 70% higher in England versus Australia (26.2% vs. 17.0%, odds ratio [OR] = 1.7, 95% confidence interval [CI] 1.4–2.2, $p < .01$), and similarly, the odds of using "any noncombustible product" were 80% higher in England versus Australia (27.0% vs. 17.4%, OR = 1.8, 95% CI 1.4–2.3, $p < .01$, also see Table 1). When we restricted the analyses to current cigarette smokers, the country differences remained essentially the same.

Males were systematically more likely to use all the non-cigarette products than females, but were no more likely to use only noncombustible products. Similarly, younger respondents reported higher use of all products than the older groups, but again there was no clear pattern in exclusive noncombustible use. The above differences in use remained essentially the same when the analyses were restricted only to current cigarette smokers.

Table 2 shows the reporting of use of non-cigarette tobacco and nicotine products by cigarette smoking status and frequency. It is notable that recent ex-smokers of cigarettes (11.6%) were no less likely to use other combustible tobacco products than current cigarette smokers (12.3%), and they were also similar in use of noncombustible tobacco. In summary, most cigarette smokers (74.3%) did not use any other nicotine-containing product. Of the 25.7% of cigarette smokers who used other products, another 5.7% used noncombustible tobacco, and 18.1% some form of nicotine product, including 14.2% who only use a nicotine product. Among the recent ex-cigarette smokers, 32.7% used any product, including 21.9% who only used noncombustible tobacco or nicotine.

Compared to current cigarette smokers, recent ex-smokers' odds of using HTPs were 50% lower (2.0% vs. 3.9%, OR = 0.5, 95% CI 0.3–0.8, $p < .01$) but their odds of using NVPs were 110% higher (21.3% vs. 11.5%, OR = 2.1, 95% CI 1.7–2.5, $p < .01$), and their odds of using NRT were marginally higher (13.4% vs. 10.1%, OR = 1.4, 95% CI 1.04–1.8, $p < .05$).

Among current cigarette smokers, daily smokers were less likely to use all types of non-cigarette products than non-daily smokers.

Discussion

Among adult current smokers and recent ex-smokers in ITC 4CV3 Survey, use of nicotine products other than cigarettes was considerable, with over one-fifth of the sample having reported using a non-tobacco nicotine product or a noncombustible product. Males, younger respondents, and current non-daily cigarette smokers were more likely to use them.

Of particular note were the unexpected levels of use of other combustible products by those reporting they had quit cigarette smoking. Any use of combusted tobacco in this group is a cause for concern as it demonstrates that cessation of cigarettes smoking cannot be assumed to be cessation of combustible tobacco products. There is a need to review studies that have taken cessation of cigarette smoking as the criterion for being an ex-smoker to see if it affects the conclusions they draw.

There were some potentially informative country differences. Overall, in Australia, where smokeless tobacco, HTPs, and vaping products with nicotine have been banned for commercial sale under preexisting legislation,[9] the levels of use of these products were the lowest among the four countries. However, use was also lower for pipes and cigars where there is no legislative barrier to use. The use of non-tobacco nicotine products and noncombustible products were highest in England, where NVPs and other non-tobacco nicotine products are more widely encouraged by health authorities, and compared with Australia at least, more accessible. This suggests that policies and regulations have an impact on use, but other factors, such as social acceptability of products,[10] are also clearly important as many of the observed differences are not explicable in policy terms.

The finding that HTPs were used more by current cigarette smokers than ex-smokers may be a function of it still being a novel class of product. The early years of NVP use also found most users were current smokers,[11,12] but this has changed. For example, in England the proportion of adult vapers who also smoke has halved between 2012 and 2020.[13] This suggests, like for NVPs, any transition away from smoking to these products can take time with a period of experimental use common before any complete switch, or abandonment of it as a viable alternative. It will be important to monitor trends in HTP use by smoking status, as has been done for NVPs.

The higher levels of reporting in the use of non-cigarette products in younger respondents[14] and by non-daily cigarette smokers is likely related. Some of it may be exploratory around what product to use or to simply experience the variation, and is likely due to youthful exploration, perhaps encouraged by industry marketing where it is allowed. We think experimental use is likely, although we cannot rule out some at least being due to the other product being the primary use product and non-daily smoking being secondary. Longer term studies are needed as to whether use of non-cigarette products is a risk factor for later regular smoking, or indeed whether some forms of use might be protective, most plausibly concurrent use of noncombustibles.

Strengths of the study include the multi-country design and reasonably large sample that allowed us to explore the prevalence of nicotine product use across various jurisdictions with different policies and regulations, and by different demographic and smoking characteristics. There are also some limitations to this study that should be acknowledged. First, the sampling frame for this study was of current or recent cigarette smokers and current vapers, so we can say nothing about use of other products among

Table 1. Reported Current Use of Various Types of Tobacco and Nicotine Products Among Current Cigarette Smokers and Recent Ex-Smokers in ITC 4CV Wave 3 Survey (2020), by Country, Sex, and Age (n = 10 296[a], Weighted Data)

	Overall	Country				Sex		Age			
	n = 10 296[a]	Canada	United States	England	Australia	Male	Female	18–24	25–39	40–54	55+
	%	n = 3302	n = 2093	n = 3548	n = 1353	n = 5108	n = 5188	n = 2346	n = 2101	n = 2461	n = 3388
Types of Nicotine Product[b]		%	%	%	%	%	%	%	%	%	%
Non-cigarette combustible tobacco product											
Cigar	5.3	6.4**	7.3***	4.1	2.8 (Ref)	8.1***	2.1 (Ref)	10.5***	6.7***	3.9	3.1 (Ref)
Cigarillos	4.2	4.9***	6.6***	3.1*	1.3 (Ref)	5.3***	2.8 (Ref)	7.1***	5.5***	3.0	2.6 (Ref)
Pipe	2.5	2.3	2.3	3.2*	1.2 (Ref)	3.3**	1.5 (Ref)	7.0***	3.0***	1.3	1.2 (Ref)
Waterpipe	2.9	2.7	2.3	3.2	3.6 (Ref)	3.6**	2.1 (Ref)	11.1***	3.7***	1.3***	0.4 (Ref)
Any non-cigarette combustible tobacco product[c]	12.2	13.8***	13.8***	11.5**	7.5 (Ref)	16.5***	7.2 (Ref)	28.8***	14.5***	8.0	7.0 (Ref)
Other noncombustible tobacco product											
Smokeless/oral tobacco	3.2	2.6**	3.7***	4.2***	0.7 (Ref)	4.2***	1.9 (Ref)	10.4***	4.3***	1.6***	0.6 (Ref)
Heated tobacco product (HTPs)	3.5	4.2***	2.7***	4.2***	1.1 (Ref)	4.2***	2.6 (Ref)	5.5***	5.1***	3.4***	1.1 (Ref)
Any noncombustible tobacco[d]	5.7	5.6***	5.5***	7.4***	1.6 (Ref)	7.2***	3.3 (Ref)	14.4***	7.6***	4.4***	1.5 (Ref)
Non-tobacco nicotine product											
Tobacco-free nicotine pouch	0.8	0.9***	0.7**	1.1***	0.1 (Ref)	1.1***	0.5 (Ref)	2.3***	1.4***	0.4***	0.1 (Ref)
Nicotine vaping product (NVP[e])	13.7	12.8***	11.4***	18.2***	7.5 (Ref)	15.2***	12.0 (Ref)	23.0***	15.6***	13.4***	8.4 (Ref)
NRT	10.9	10.0	8.8	12.8	11.1 (Ref)	12.4**	9.1 (Ref)	22.2***	11.6***	8.9	7.4 (Ref)
Any non-tobacco nicotine product[f]	21.1	19.2	17.8	26.2***	17.0 (Ref)	23.2***	18.6 (Ref)	37.8***	21.9***	19.9***	14.8 (Ref)
Other combinations											
Any noncombustible product	22.1	20.0	20.2	27.0***	17.4 (Ref)	24.5***	19.3 (Ref)	40.1***	23.0***	21.1***	15.2 (Ref)
Only noncombustible products[g]	13.1	10.9*	12.5	15.1	13.7 (Ref)	13.0	13.1 (Ref)	14.8	11.4	15.1*	12.4 (Ref)

[a]In some analyses, the sample size was smaller than the total due to missing cases.

[b]Current use is defined as using a product at least monthly at the time of survey. This applies to cigarettes, HTPs and NVPs. For the other products, current use is defined as using the product "less than weekly" or more frequently.

[c]This composite measure was defined as using any non-cigarette smoked products (ie, using any of cigar, cigarillos, pipe, water pipe, or "other" smoked tobacco product).

[d]Using any of smokeless/oral tobacco or heated tobacco product (HTP, at least monthly).

[e]Using NVP at least monthly. NRT: Nicotine replacement therapy.

[f]Using any of nicotine pouch, NVP or NRT.

[g]This identifies those who use low-risk products separate from any use of smoked. That is those who can be considered quit (if they do not smoke cigarettes).

*Significantly different from the reference (ref) value at $p < .05$, **at $p < .01$, ***at $p < .001$, based on logistic regressions.

Table 2. Reported Current Use of Various Types of Tobacco and Nicotine Products Among Current Cigarette Smokers and Recent Ex-Smokers in ITC 4CV Wave 3 Survey (2020), by Cigarette Smoking Status and Frequency (Weighted Data)

	Cigarette Smoking Status (n = 10 296[a])		Levels of Use Among Current Cigarette Smokers (n = 9112[a])	
	Recent Ex-smokers	Current Smokers	Daily	Non-daily
	n = 1184	n = 9112	n = 7298	n = 1814
Types of Nicotine Product[b]	%	%		
Non-cigarette combustible tobacco product				
Cigar	4.2	5.7 (Ref)	4.8***	10.7 (ref)
Cigarillos	2.7	4.6 (Ref)	4.0***	7.9 (ref)
Pipe	3.0	2.3 (Ref)	1.9***	4.7 (ref)
Waterpipe	3.8	2.6 (Ref)	2.2***	5.4 (ref)
Any non-cigarette combustible tobacco product[c]	11.6	12.3 (Ref)	10.5***	22.8 (ref)
Other noncombustible tobacco product				
Smokeless/oral tobacco	4.0	2.9 (Ref)	2.3***	6.8 (ref)
Heated tobacco product (HTPs)	2.0**	3.9 (Ref)	3.4***	6.9 (ref)
Any noncombustible tobacco[d]	5.6	5.7 (Ref)	4.7***	11.5 (ref)
Non-tobacco nicotine product				
Tobacco-free nicotine pouch	0.2**	1.0 (Ref)	0.8***	2.3 (ref)
Nicotine vaping product (NVP[e])	21.3***	11.5 (Ref)	9.9***	20.6 (ref)
NRT	13.4*	10.1 (Ref)	7.9***	22.7 (ref)
Any non-tobacco nicotine product[f]	31.2***	18.1 (Ref)	15.2***	35.0 (ref)
Other combinations				
Any noncombustible product	32.7***	19.0 (Ref)	16.1***	35.9 (ref)
Only noncombustible products[g]	21.9***	10.6 (Ref)	9.7***	15.6 (ref)

[a]In some analyses, the sample size was smaller than the total due to missing cases.
[b]Current use is defined as using a product at least monthly at the time of survey. This applies to cigarettes, HTPs, and NVPs. For the other products, current use is defined as using the product "less than weekly" or more frequently.
[c]This composite measure was defined as using any non-cigarette smoked products (ie, using any of cigar, cigarillos, pipe, water pipe, or "other" smoked tobacco product).
[d]Using any of smokeless/oral tobacco or heated tobacco product (HTP, at least monthly).
[e]Using NVP at least monthly. NRT: Nicotine replacement therapy.
[f]Using any of nicotine pouch, NVP or NRT.
[g]This identifies those who use low-risk products separate from any use of smoked. That is those who can be considered quit (if they do not smoke cigarettes).
*Significantly different from the reference (ref) value at $p < .05$, **at $p < .01$, ***at $p < .001$, based on logistic regressions.

any who do not use either of these products. Second, the samples are not fully representative and although we weighted back to population estimates, this weighting may not truly reflect characteristics of the underlying population on measures not weighted, so caution should be taken in the accuracy of the estimates. However, we are confident the broad patterns we have identified are robust. Third, the study relied on self-report of product use; however, we cannot see any reason why there would be differential misreporting among the respondents.

Overall, the data show that use of non-cigarette tobacco and nicotine products among current cigarette smokers and recent ex-smokers is at levels that mean it needs to be considered in studies of smoking. This is particularly so among males, younger people and non-daily cigarette smokers. Use of other combustible tobacco among respondents that recently quit cigarette smoking is concerning and has important implications for definitions of smoking cessation. Increased emphasis on researching non-cigarette nicotine product use is warranted in tobacco control generally and smoking cessation in particular.

Supplementary Material

A Contributorship Form detailing each author's specific involvement with this content, as well as any supplementary data, are available online at https://academic.oup.com/ntr.

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Declaration of Interests

KMC has served as paid expert witness in litigation filed against cigarette manufacturers. GTF has served as expert witnesses on behalf of governments in litigation involving the tobacco industry. MLG received research grant from Pfizer, Inc. and served as a member of scientific advisory board to Johnson & Johnson. AM is a UK National Institute for Health Research (NIHR) Senior Investigator. The views expressed in this article are those of the authors and not necessarily those of the NIHR, or the UK Department of Health and Social Care. All other authors have no conflicts of interest to declare.

Ethics Approval

Study questionnaires and materials were reviewed and provided clearance by Research Ethics Committees at the following institutions: University of

Waterloo (Canada, ORE#20803/30570, ORE#21609/30878), King's College London, UK (RESCM-17/18–2240), Cancer Council Victoria, Australia (HREC1603), University of Queensland, Australia (2016000330/HREC1603); and Medical University of South Carolina (waived due to minimal risk). All participants provided consent to participate.

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