TRENDS IN E-CIGARETTE AND HEATED TOBACCO PRODUCT USE IN URBAN SOUTH AFRICA

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Executive Summary

This report presents results from the South African E-cigarette Survey 2022 which forms part of the Tobacco Control Data Initiative (TCDI). The survey aims to provide data related to the use of electronic nicotine and non-nicotine delivery systems (ENDS/ENNDS) and heated tobacco products (HTPs) (collectively termed "novel products" in this report) amongst adults in urban South Africa. The survey also aims to understand how use of these products relates to smoking combustible cigarettes (referred to as "cigarettes" in this report). The survey was specifically designed to estimate the prevalence of novel product use, to describe the demographics of novel product users, and to understand the sequence of use between cigarette smoking and novel product use. By analysing the sequence of use we explore some of the biggest issues around novel products, namely whether (1) novel products might be a gateway to cigarette smoking (on-ramping devices), and (2) if they might be a tool for smoking cessation (off-ramping devices). We present results across four themes – prevalence, sequence of use, patterns of use, and beliefs. The high-level findings from each theme are:

Prevalence

- More than one in ten adults in South African urban areas (11.3%) had ever tried novel products.
    - 4.0% were current regular users of novel products.
    - 1.5% had used novel products regularly in the past.
    - 5.8% had experimented with novel products.
- More than half (58%) of all current regular novel product users were also current regular cigarette smokers. The overall prevalence of dual users was 2.3%.
- Experimentation with novel products or cigarettes was followed by regular use for many users. Of those who had ever tried novel products, approximately half (49%) started using them regularly. For comparison, nearly two thirds (64%) of those who had ever tried cigarettes started smoking them regularly.
- Men were significantly more likely than women to use novel products.
- Regular novel product use was most popular among the younger age groups.

Sequence of Use

- On-Ramping: One in five (19%) novel product users who had never regularly smoked cigarettes started smoking cigarettes after using novel products.
    - Among novel product users, this behaviour was more likely among those who were young, male, unemployed, lived in low-income areas and self-identified as Black.
- Off-Ramping: One in eight (13%) cigarette smokers who began using novel products after smoking cigarettes later quit smoking cigarettes.
    - Most clinical trials characterise lifetime smoking cessation for those who have quit smoking cigarettes for at least 12 months. If this standard were applied, the percentage of lifetime off-rampers would be 7% (or one in fourteen).
    - This behaviour was more likely among those who were young, employed, lived in high-income areas, and self-identified as White, Coloured, or Indian/Asian.

Patterns of Use

- To stop or avoid smoking cigarettes (or other tobacco smoking) was the most commonly cited reason for novel product use (30% of users).
- More than one third (36%) of novel product users did not know the nicotine strength of the novel products they typically used.
- Daily smoking was more common among current cigarette smokers (90%) than daily novel product use was among current novel product users (62%).
- Many novel product users did not know the brand of the novel products they usually used, and amongst those that did, a wide variety of brands were cited. The most common brands mentioned were Twisp (17%), Vuse (15%), and Smok (13%).

Beliefs

- Dual users believed that novel products were less addictive and had less health risks than cigarettes, while their beliefs about whether novel products were cheaper or more expensive than cigarettes varied widely.

Introduction

A major barrier to the policy debate around novel products is the paucity of evidence on their health consequences but also on their consumption patterns. Nationally representative and publicly available surveys measuring novel product use in South Africa are limited. The 2021 South African Global Adult Tobacco Survey (GATS) estimated that 2.2% of South Africans were using novel products in 2021 (SAMRC 2022). However, national estimates tend to mask high consumption trends in specific sub-groups. For instance, a 2022 pilot study in nine high schools in the Western Cape, Gauteng, and KwaZulu Natal found that over 1 in 4 grade 12 pupils had used a novel product in the last 30 days (Kahn 2022). Therefore, we need to track novel product consumption patterns in South Africa to support policy formation.

The South African E-cigarette Survey 2022 was coordinated by the Tobacco Control Data Initiative (TCDI), a program led by Development Gateway: an IREX Venture in partnership with the Research Unit on the Economics of Excisable Products (REEP) and funded by the Bill and Melinda Gates Foundation. The study contributes to pressing research and policy questions by estimating consumption patterns of electronic nicotine and non-nicotine delivery systems and heated tobacco products (henceforth defined as "novel products" in this report). The survey was specifically designed to estimate the prevalence of novel product use in urban South Africa, to describe the demographics of novel product users, and to understand the interaction between combustible cigarette smoking and novel product use. We surveyed a sample of respondents aged 18 years and older residing in non-metro and metro urban South Africa. This report presents results across four main focus areas:

Prevalence: Prevalence figures for novel product use, cigarette smoking, and "dual use" (using both novel products and cigarettes at the same time) are presented.

Sequence of Use: Results on the sequence of use of novel products and combustible cigarettes are presented. Specifically: (1) what proportion of novel product users go on to smoke cigarettes ("on-ramp"), and (2) what proportion of cigarette smokers started using novel products, then quit cigarettes ("off-ramp"). These trends are important as they speak to some of the biggest issues around novel products, namely whether (1) novel products are a gateway to combustible cigarette smoking and (2) if they are a tool for smoking cessation.

Patterns of Use: We compare novel product users and cigarette smokers in terms of their frequency of use and how soon after waking up they use their respective products. Further descriptive statistics show the nicotine strength of novel products used, the reasons why novel product users started to use novel products, and the main brands of novel products used.

Beliefs: We present dual users' beliefs about the addictiveness, health risks, and costs of novel products relative to cigarette smoking. In the health sciences individual's beliefs about the harm, addictiveness, and cost of products are shown to be important predictors of whether an individual decides to use them (Case et al., 2016).

All categorical differences presented in this report are statistically different from zero at the 5% level, unless otherwise stated.

Data

Nationally representative data from urban South Africa were collected in 2022 (14 January–1 September) using a telephone survey of adults (18 years and older) residing in metro and non-metro urban areas. The final sample consists of 21,263 respondents (Figure 1). Detailed information regarding the data collection process and survey design can be found in the User Manual. The final sample used for our (weighted) analysis displays racial, gender, and income diversity (Figure 1).

- 73.2% of the sample self-identify as Black, 9.9% Coloured, 3.6% Asian/Indian, and 13% White. In comparison, national population estimates show that 80.7% of South Africans self-identify as Black, 8.8% Coloured, 2.6% Asian/Indian, and 7.9% White (StatsSA, 2020).
- The sample was equally split between those identifying as men and women.
- The income areas sampled include lower (60.6%), middle (25.1%), and upper (14.2%) income areas (comparisons with national population estimates are not possible given the way income classifications are calculated).

Figure 1: Demographic Breakdown of Final Sample
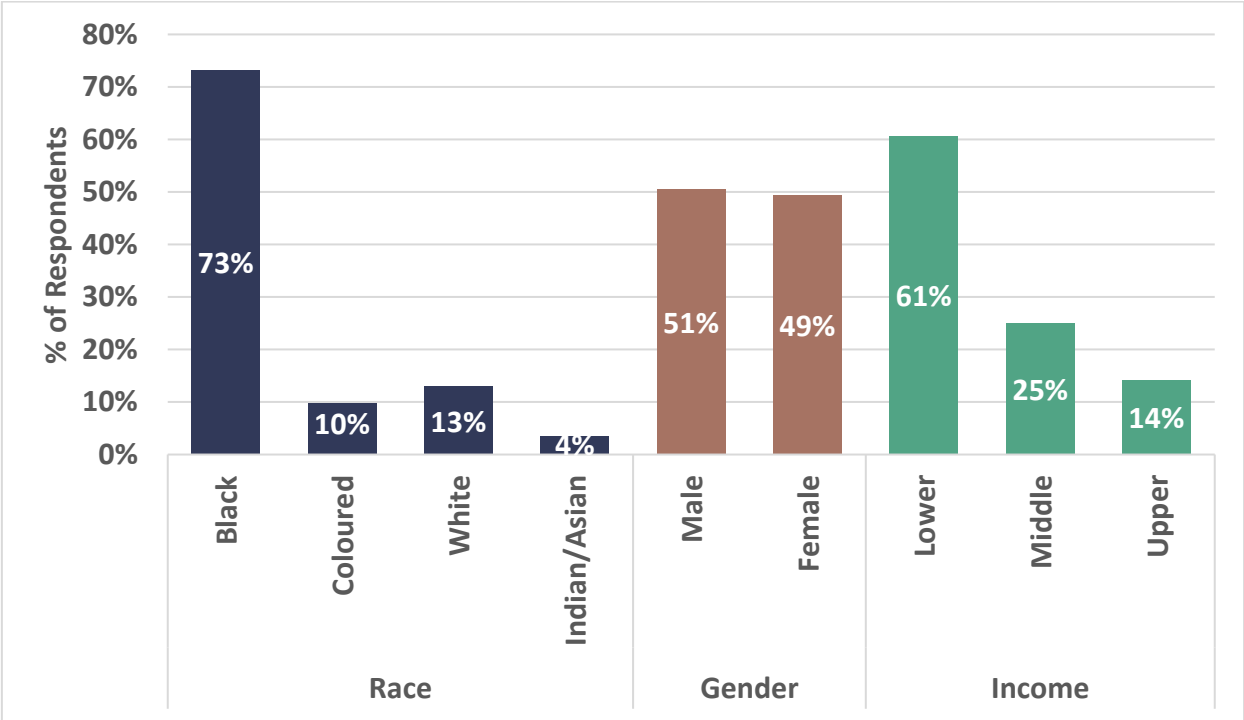
Results

1. Prevalence

1.1 Prevalence

More than one out of every 10 South African adults in urban areas (11.3%) had ever tried novel products (Figure 2).

- o 4.0% currently used novel products (defined as at least once a week).
- o 1.5% regularly used novel products in the past (used at least weekly in a typical month in the past).
- o 5.8% had experimented with novel products (at least one puff but never as regularly as weekly in a typical month).
- o More than half (58%) of all current novel product users were also current cigarette smokers. The overall prevalence of dual users was therefore 2.3%.

There are concerns in the international literature that the prevalence of novel product use will increase significantly in the future (ASH, 2022; Baokye et al., 2022). Reasons for this include curiosity, the fact that novel products come in pleasant flavours/tastes, their low perceived harm, and the use and impact of social media (NCCDPHP, 2016; Sapru et al., 2020; Baokye et al., 2022).

Figure 2: Prevalence of Novel Product Users, Cigarette Smokers, and Dual users, 2022[1]

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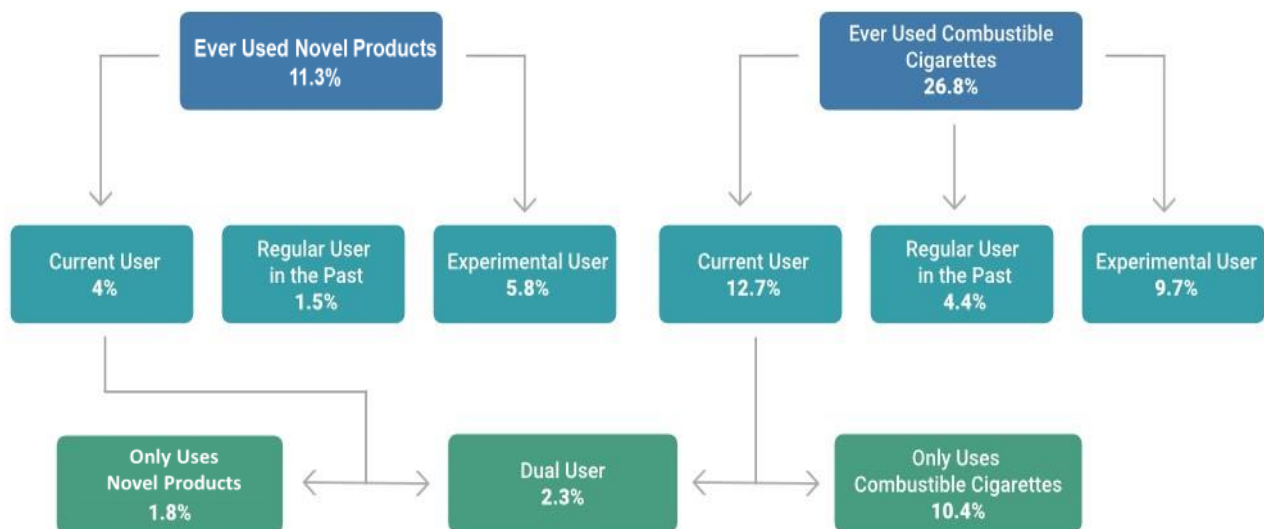
[1] The prevalence statistics for cigarette smokers reported in Figure 2 differ from the statistics reported by the Global Adult Tobacco Survey (GATS) for South Africa. This is because our survey was specifically designed to estimate novel product prevalence, with combustible cigarette smoking prevalence only being secondary. In addition, this might be because GATS used a different definition for cigarette smokers to the one used in the South African E-cigarette Survey 2022. In our survey, we defined a "current smoker" as a respondent who smoked over 100 cigarettes in their life and currently smokes at least weekly. The GATS definition for current cigarette smokers differed as it did not limit current cigarette smokers to those who have 1) smoked at least 100 cigarettes in their lifetime and 2) currently smoked cigarettes at least once a week. In addition, the GATS definition included both hand rolled and manufactured cigarettes, while the South African E-cigarette Survey 2022 only included manufactured cigarettes.

1.2 Demographic Breakdown of Regular Novel Product Users

Men were significantly more likely than women to regularly use novel products (Figure 3).

- o 5.4% of men currently regularly used novel products (3.1% were dual users), compared to 2.6% of women (1.4% were dual users).

Regular novel product use was least common among those who self-identified as Black (2.7%) and most common among those who identified as Coloured (8.3%), White (7.7%), and Indian/Asian (6.7%). The prevalence among the latter three population groups was not statistically different from each other.

Regular novel product use was most popular among the younger age groups.

- o Prevalence was 7.7% for those aged 18-24 years old and 6.2% for those aged 25–34 years (these two age groups were not statistically different from each other).
- o Novel products were less popular with middle-aged people and dropped significantly for those over 65 years (1.5%).

Figure 3: Regular Novel Product Prevalence by Gender, Race, and Age Category
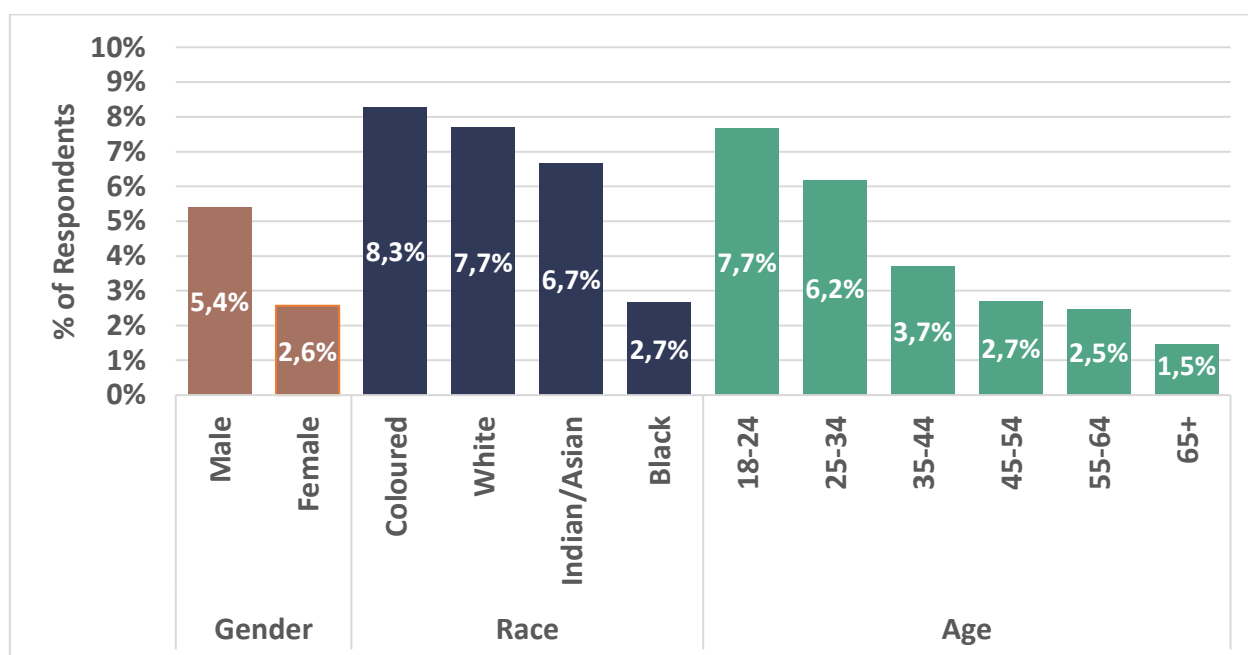
1.3 Types of Users

1.3.1 Ever Users

Experimentation with novel products or cigarettes was followed by regular use for many users. Of those who had ever tried novel products, approximately half (49%) started using them regularly (and either were still using them or had since quit). For comparison, nearly two thirds (64%) of those who had ever tried cigarettes started using them regularly (and either were still using them or had since quit).

1.3.2 Dual Users

2.3% of urban adult South Africans were dual users (Figure 2).[2] The prevalence trends of dual users by demographic category were very similar to novel product users.

o Dual use was least prevalent among those who self-identified as Black (1.4%) relative to other race groups, more prevalent among males (3.1%) than females (1.4%), and more prevalent among young individuals (3.2% for those younger than 34 years) than those over 65 years (0.9%).

Dual use was most common among those residing in higher income areas, with prevalence in high-income areas at 3.3%, middle-income areas at 2.9%, and low-income areas at 1.8%, although the difference in prevalence between the high- and middle-income groups was not statistically significant.

2. Sequence of Use

Dual users were analysed to explore the order in which they started using novel products and smoking cigarettes. We explored two sets of users:

- On-ramper: Someone who used novel products, with no history of smoking cigarettes, and then started smoking cigarettes.
- Off-ramper: Someone who smoked cigarettes, with no history of novel product use, then started using novel products and later quit smoking cigarettes.

Importantly, we do not infer causality for these types of behaviour. Further exploration is required to determine exactly why on-rampers started smoking cigarettes, and why off-rampers quit smoking cigarettes. In addition to exploring the sequence of use, we analysed the factors associated with on and off-ramping behaviour.

2.1 On-Rampers

One in five (19%) novel product users who had not regularly smoked cigarettes started smoking them after using novel products (on-rampers) (Figure 4)**.**
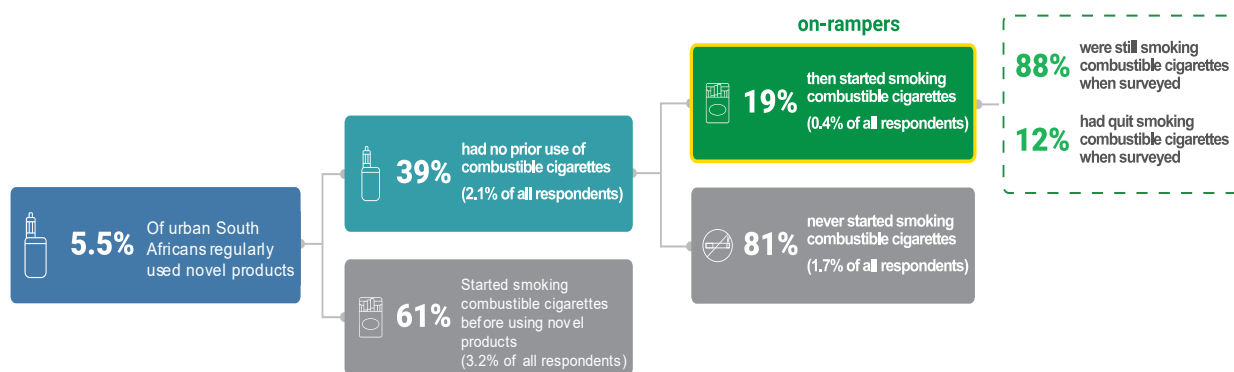
o Among on-rampers, most (88%) were still smoking cigarettes at the time of the survey. This 88% is equivalent to 6.5% of all novel product users and 0.3% of people in urban South Africa.
o Further exploration is recommended to understand exactly why on-rampers started smoking cigarettes.

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[2] Dual users are individuals who currently used both novel products and smoked cigarettes.

Figure 4: Sequence of Use: Those using Novel Products First

2.2 Off-Rampers

One in eight (13%) cigarette smokers who began using novel products after smoking cigarettes later quit smoking cigarettes (off-rampers) (Figure 5). Most (79%), however, were still smoking cigarettes at the time of the survey.

- o For many smokers, quitting cigarettes is difficult and relapse is common. Most clinical trials thus only proxy lifetime smoking cessation for those who have quit smoking cigarettes for at least 6 or 12 months (Hughes et al., 2008; Lee et al., 2021). In our study, 56% of off-rampers had quit cigarettes more than one year prior to being surveyed (73% had quit more than 6 months prior to being surveyed). This means that one should only assume that 7%[3] of those who began using novel products after smoking cigarettes later quit cigarette smoking (off-ramped).
- o Further exploration is recommended to understand exactly why the off-rampers quit smoking cigarettes.

Figure 5: Sequence of Use: Regular Cigarettes Smokers

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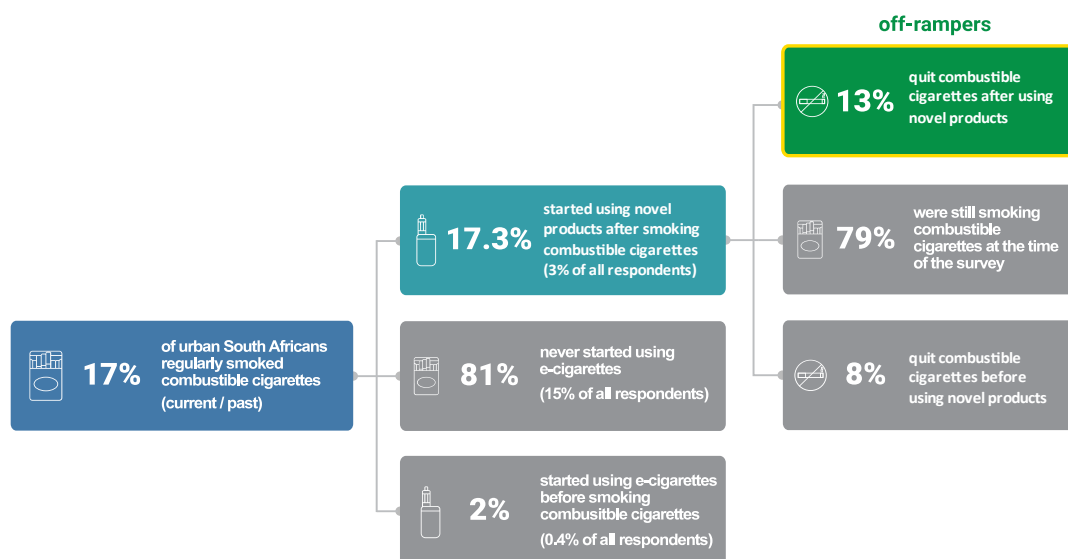
[3] 56% multiplied by 13% = 7%.

2.3 Factors Associated with On-Ramping and Off-Ramping

Two Probit models were estimated to determine the factors associated with on-ramping amongst novel product users and off-ramping amongst cigarette smokers, respectively. All Probit model outcomes reported in this section were statistically significant at the 5% level (p-value<0.05). The full Probit model outputs are available upon request.

2.3.1 On-Ramping

In comparison to other novel product users, on-rampers (i.e. those who started smoking cigarettes after using novel products) were most likely to:

- Be young[4]
- Self-identify as black
- Live in low-income areas
- Be employed

The beliefs of novel product users were significantly associated with whether they were on-rampers. Those who thought novel products were equally or more harmful than cigarettes were more likely to be on-rampers than those who thought novel products were less harmful. Similarly, those who thought novel products were more expensive than cigarettes were more likely to be on-rampers than those who thought novel products were cheaper. Novel product users who used novel products which contained nicotine were also significantly more likely to be on-rampers than those who used nicotine free novel products.

Table 1: Factors Associated with On-Ramping

Less Likely to On-Ramp	More Likely to On-Ramp
Socio-Economic Characteristics	
Older	Younger
Females	Males
Coloured, White, and Indian/Asian	Black
Middle and Upper Income	Low-income
Employed	Unemployed
Beliefs	
Novel products less addictive	Novel products equally addictive
Novel products less harmful	Novel products equally or more harmful
Novel products less expensive	Novel products equally or more expensive
Novel Product Nicotine Strength	
No nicotine	Contained nicotine

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[4] The fact that younger individuals were more likely to be on-rampers may be because novel products are relatively new products. Older cigarette smokers would thus have had less chance to use them before they started smoking.

2.3.2   Factors Associated with Off-Ramping

In comparison to other cigarette smokers, off-rampers (i.e. those who quit smoking cigarettes after starting to use novel products) were most likely to:

- Self-identify as White, Coloured, or Indian/Asia
- Live in middle- and upper-income areas
- Be employed

Cigarette smokers who believed novel products were less addictive or less harmful than cigarettes were more likely to be off-rampers than those who believed the opposite. The factors associated with off-ramping were therefore mostly opposite to those associated with on-ramping.

Table 2: Factors Associated with Off-Ramping

Less Likely to Off-Ramp	More Likely to Off-Ramp
Socio-Economic Characteristics	
Old	Young
Black	White, Coloured, and Indian/Asian
Low-income	Middle and Upper income
Unemployed	Employed
Beliefs	
Novel products more addictive	Novel products less or equally addictive
Novel products equally and more harmful	Novel products less harmful

3. Comparing Patterns of Use of Novel Product Users and Cigarette Smokers

3.1 Frequency of Use

Regular cigarette smokers were either daily users, or less than daily users (but at least once a week). Regular novel product users could also either be daily or less than daily users (but at least once a week). We compared the occurrence of daily versus non-daily use between the products. Daily smoking was more common among current cigarette smokers (90%) than daily novel product use was among current novel product users (62%).[5] The likelihood of daily use was higher for those living in high income areas than low-income areas for both novel products and cigarettes. In low-income areas 56% of novel product users and 89% of smokers were using or smoking daily, relative to 72% of novel product users and 92% of smokers in upper income areas. The differences for cigarette smokers were not statistically significant.

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[5] Current cigarette smokers were those who had smoked at least 100 cigarettes in their lifetime, and currently smoked at least weekly. Current novel product users were those that currently used a novel product at least once a week.

3.2 Time until First Use/Puff of the Day

Novel product users were less likely to use a novel product soon after waking up (within 5 minutes) compared to cigarette smokers who smoked a cigarette soon after waking up (Figure 6). 19% of novel product users used within 5 minutes of waking compared with 32% of cigarette smokers. Nonetheless, 42% of novel product users used their devices within the first hour of being awake.

Figure 6: Time until First Use/Puff of the Day
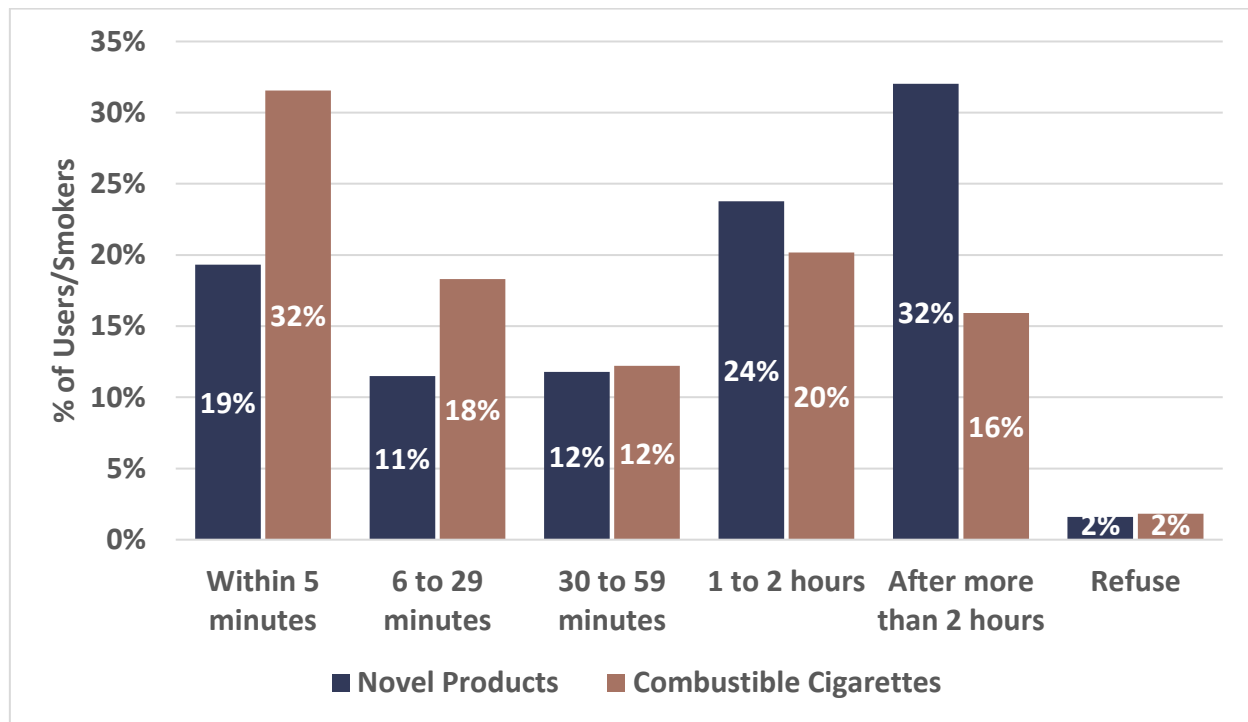

3.3 Nicotine Strength of Novel Products

More than one third (36%) of novel product users did not know the nicotine strength of the novel products they typically used. Among users who knew the nicotine strength, three quarters (75%) typically used novel products with less nicotine than the average cigarette (<8mg)[6].

3.4 Reasons for Starting to Use Novel Products

The most cited reason for initiating novel product use was to stop or avoid smoking cigarettes or other tobacco (30% of users) (Figure 7). Other reasons included curiosity (13%), enjoyment (11%), due to a friend or family member using them (9%), and because it came in nice flavours/smells (6%). The 'Other' category included a wide variety of reasons such as the Covid-19 lockdown, addiction, and because novel products could be used in places where cigarettes could not be used, although none of the reasons in this category were given by more than 2% of novel product users.

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[6] The average cigarette contains 8-20 mg of nicotine (Taghavi. Et al., 2012).

Figure 7: Reasons for Starting to Use Novel Products
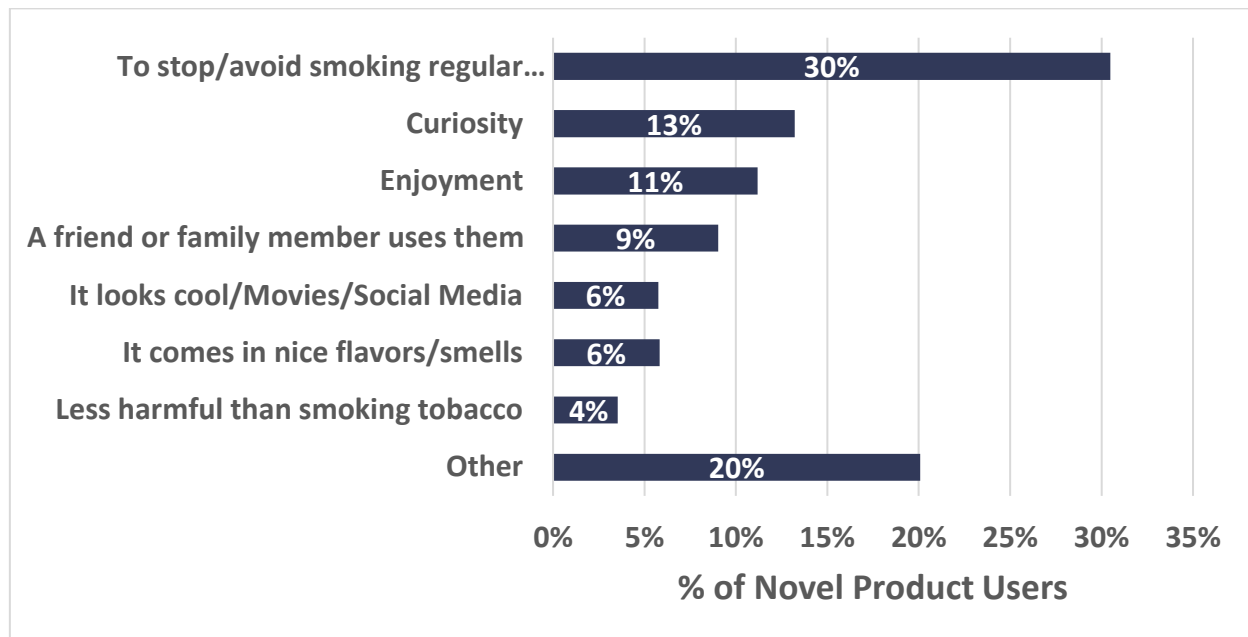
3.5 Novel Product Brands Used

Nearly half (47%) of all novel product users did not know the brand of novel product they usually used. Amongst users who knew their novel product brand, the most common brands were Twisp (17%), Vuse (15%), and Smok (13%). Somewhat less popular were Voopoo, Airs pops, and Vaporesso (used by 4-6% of the users), with all other brands used by less than 2.5% of the users.

4. Beliefs about Novel Products

Dual users were asked about their beliefs regarding the addictiveness, health consequences, and cost of novel products in comparison to combustible cigarettes. These beliefs can be important predictors of whether an individual decides to use a particular product (Case et al., 2016). We explore their beliefs in the sub-sections below.

Figure 8: Dual Users' Beliefs about Novel Products compared to Cigarettes
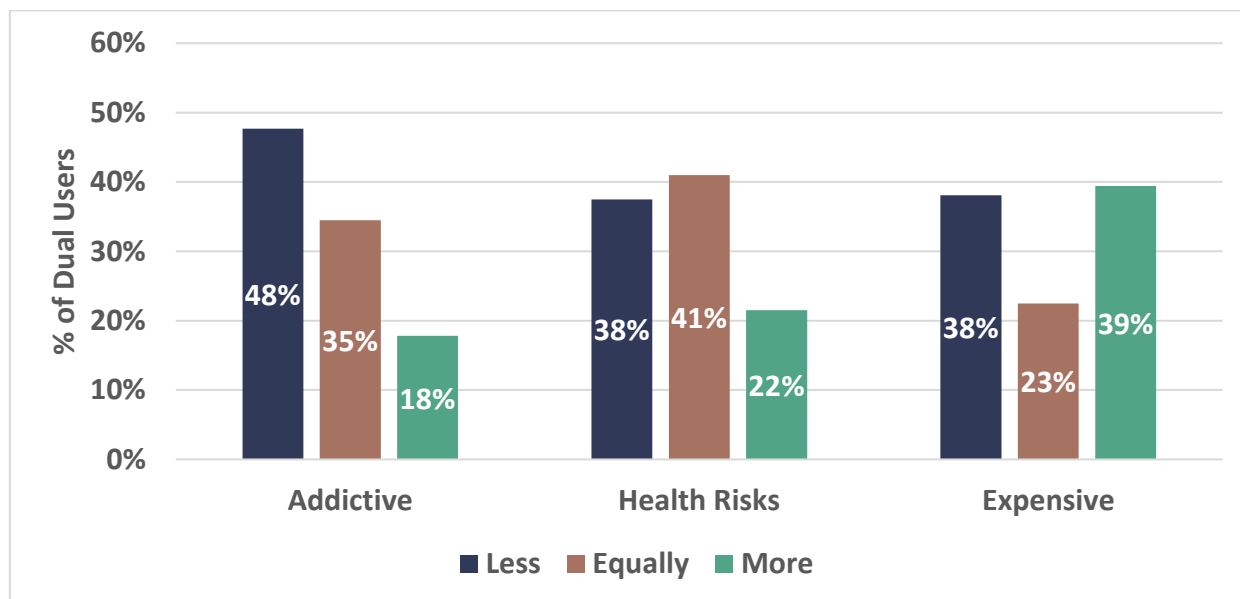
4.1 Addictiveness

Dual users commonly believed that novel products were less addictive than cigarettes (Figure 8). Almost half (48%) believed that novel products were less addictive than cigarettes, 34.5% believed they were equally addictive, although these two proportions were not statistically different, and 17.8% believed they were more addictive than cigarettes.

4.2 Health Risks

Most dual users believed that novel products were equally harmful or less harmful than cigarettes (Figure 7). 41% believed the products had equal health risks and 38% believed cigarettes were less harmful, although these proportions were not statistically different. 22% of dual users believed novel products were more harmful than cigarettes.

4.3 Cost

Dual users' beliefs about the cost of novel products relative to cigarettes varied widely. 39.4% of dual users believed that novel products were more expensive than cigarettes, while 38.1% believed novel products were less expensive, although there was no statistically significant difference between the proportions (Figure 7).

Conclusion

In 2022, more than one in ten adults in South African urban areas (11.3%) had ever tried novel products, with use most popular among men and younger age groups. Experimentation with novel products was often followed by regular use and dual use of novel products and combustible cigarettes was common. The use of novel products among young people, especially those that do not smoke combustible cigarettes, should be particularly strongly discouraged and novel products should be strictly regulated. The Control of Tobacco Products and Electronic Delivery Systems Bill aims to do exactly that and hence we support its implementation.

In urban South Africa, one in five (19%) novel product users who had never regularly smoked cigarettes started smoking cigarettes after using novel products ("on-ramping"). This behaviour is detrimental to public health given the well documented health risks associated with smoking. In June 2023, the National Treasury introduced an excise tax on e-liquid at the rate of R2.90 per millilitre, irrespective of the nicotine content. This is a step in the right direction. However, the tax has been criticised for being ill-targeted (Vellios and Van Walbeek, 2023). This is because the tax burden is lower on products commonly bought by young people and higher on products commonly bought by older people, who are more likely to use novel products to help quit smoking cigarettes. On-ramping behaviour was more likely among those who were male, unemployed, lived in low-income areas, and self-identified as Black.

Many people regret starting smoking cigarettes and want to quit (Nayak et al., 2017). Novel products are marketed as a less harmful alternative to combustible cigarettes. For smokers who want to quit, but are seemingly unable to do so, switching to novel products seems like a sensible harm-reduction strategy. This is highlighted by the fact that, in urban South Africa a third of adults using novel products said their main reason for doing so was to stop or avoid smoking cigarettes. Amongst cigarette smokers who began using novel products after smoking, one in eight (13%) later quit smoking ("off-rampers"), while 79% continued smoking. About half these users (7%) were defined as long-term quitters (i.e. had quit cigarettes more than a year prior to the survey). Off-ramping was more likely among those who were young, employed, lived in high-income areas and self-identified as White, Coloured, or Indian/Asian.

The first line of defence against smoking should not be the advocation of novel product use, it should be to support people to quit. There are, however, some population groups where, despite all the interventions, smoking prevalence remains high (Dai et al., 2022). In this case the last line of defence should be a harm reduction strategy that could involve novel products as this could offer significant health (specifically harm-reduction) benefits. In a country with a relatively high prevalence of cigarette smoking, like South Africa, a strategy of banning novel products would likely be counterproductive, because some of the harm-reducing benefits of novel products would be lost. The South African government should recognise this in their novel product regulation policies.

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