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What are the characteristics of disposable electronic cigarettes users in Switzerland? A quantitative study among 14–25 year olds

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ABSTRACT

Introduction Disposable electronic cigarettes (DEC) appeared in Switzerland in 2020. The aim of this study is to determine the prevalence of DEC use among youth (14–25 year olds) living in French-speaking Switzerland and their characteristics.

Methods Data were obtained from a web-based survey conducted in August 2022. Participants were divided into four DEC user groups according to and were compared on sociodemographic data, substance use, family substance use and advertising viewing. Additional questions such as purchase methods and motivations were asked to the user groups.

Results Among the 1362 participants, 41.2% had never used a DEC (NEVER), 14.4% once (ONCE), 15.1% several times but not in the last 30 days (PAST) and 29.2% several times in the last 30 days (CURRENT). At the multivariate level, compared with the NEVER group, participants in the CURRENT group were more likely to have used cigarettes and cannabis in the last 30 days, to report family electronic cigarettes use and to have seen online advertising for DEC. Among DEC users, compared with the ONCE group, those in the CURRENT group were less likely to be cisgender males, to have acquired their last DEC through peers or family and to use DEC out of curiosity.

Conclusions Although most youth do not consume DEC regularly, these results raise concerns about growing exposure of young people to highly addictive products. They underline the importance of monitoring products availability, marketing and prevalence. They also confirm the necessity to inform the public, denormalise use and strengthen regulations.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ New disposable electronic cigarettes (DEC) are attracting youth with fruity and sweety flavours and bright colours.
⇒ Switzerland has weak regulations on tobacco products and electronic cigarettes (e-cigs).

WHAT THIS STUDY ADDS

⇒ This study among young people is the first to provide information on DEC use in Switzerland.
⇒ DEC use is associated with cigarette and cannabis use, lower education, e-cig consumption within the family and having seen advertising online.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ A regular monitoring of products on the market and their prevalence is necessary.
⇒ For youth protection and public health, e-cigs must be regulated, notably regarding their packaging and advertising.

INTRODUCTION

Electronic cigarettes (e-cigs) have found a growing audience among young people, including non-consumers of conventional cigarettes.[1] Especially popular among youth are the disposable electronic cigarettes (DEC), with the first brand being *Puff Bar* marketed in Switzerland since 2020 and leading to the emergence of several product imitations.[2] While e-cigs have been the most used tobacco product among middle-school and high-school students in the USA since 2014,[3] DEC was the most used e-cig device among this population in 2022.[4] A study conducted in England showed an increase in DEC use between 2021 and 2022 from 0.1% to 11% among 18-year olds, and from 0.1% to 5% among 25-year olds. In the same line, a study led in Great Britain[5] among 11–17 year olds found that e-cig ever-use increased from 15.8% in 2022 to 20.5% in 2023. Among e-cig ever-users, disposable devices were used by 52% in 2022 and by 69% in 2023. A 2022 study led in France[6] showed that 13% of 13–16 year olds had already tried a DEC. The popularity of this product among youth could be partially explained by their presence on social media[7] and targeted marketing.[8] In addition to environmental issues and questions about the association between e-cigs

and smoking among youth, DEC have a high addictive potential, notably due to the presence of nicotine salts. These salts may allow a less irritating inhalation, facilitating the intake of nicotine.[9] The maximum level of nicotine allowed in the European Union and Switzerland for these products is 20 mg/mL.[2]

In Switzerland, there is currently no age limit for their purchase at national level (less than half of the counties prohibit sales to people under 18).[10] A federal law on tobacco products and e-cigs is due to come into force in 2024. Among other things, it will ban the sale and advertising of tobacco products and e-cigs to people under the age of 18.[11]

Given the recent emergence of DEC, scientific studies are still scarce, while the prevention and health communities call for empirical data to base their interventions on. Similarly, knowing the prevalence and the context of DEC use among adolescents is necessary for public health policies. The aim of this study is to determine the prevalence of DEC use among youth (14–25 year olds) living in the French-speaking part of Switzerland and their characteristics in terms of sociodemographic data, substance use, family substance use, advertising, purchase methods and motivations.

MATERIALS AND METHODS

Data

Data were obtained from a web-based survey (5–10 min to fill in the questionnaire) conducted in French-speaking Switzerland in August 2022.[12] The survey was disseminated through a website dedicated to student jobs and ads, including sponsored ones, on social media (Instagram, Facebook, Twitter and LinkedIn). The ad called on young people aged between 14 and 25, living in French-speaking Switzerland, inviting them to take part in a questionnaire on disposable e-cigarettes (*Puff Bars*), whether they used them or not. Professionals from the youth field and four Swiss influencers also shared the link. Collecting data through social networks has known advantages already highlighted in literature.[13–15]

A total of 1963 participants began answering the questionnaire. Among them, 20 did not live in Switzerland, 98 were out of age range, 11 did not answer honestly and 472 did not complete the questionnaire. The final sample included 1362 participants (69% of the initial sample) (figure 1). We compared participants who gave complete answers (n=1362) with those who did not. Participants differed in terms of gender and age with older cisgender females being more represented in the complete answers. These differences could be reduced through the calculation of weights (see below). No differences were found in terms of residence (rural/urban), country of birth, current activity and perceived socioeconomic status.

Measures

Respondents were asked whether they had ever used a DEC, with four possible answers: never (NEVER group)/yes, once (ONCE group)/yes, several times but not in the last 30 days (PAST group)/yes, several times in the last 30 days (CURRENT group). Respondents in the CURRENT group were asked how many times they had used a DEC in the past 30 days, with four possible answers: 1–2 days/3–5 days/6–9 days/10 days or more.

In the first part of the analysis, the four groups were compared on sociodemographic variables including age, gender (cisgender female/cisgender male/trans—combining the question on sex assigned at birth and self-reported gender identity), country of birth (Switzerland/other), current activity (mandatory school/high-school or vocational school/university or higher education/other), amount of monthly pocket money/income (quartiles: <160/160–400/401–1239/>1239), perceived socioeconomic status compared with other families in Switzerland (below average/average/above average) and if they were currently living with at least one parent (yes/no). Since family tobacco use is known as influencing tobacco use among youths,[16 17] we asked participants whether family members used cigarettes or e-cigs. Since the dual use of e-cig and tobacco products or cannabis by youths has been reported in studies,[18 19] we compared participants on their current (last 30 days) smoking and/or cannabis use. To assess whether advertising may influence DEC use, we asked participants whether they had ever seen advertising for DEC in kiosks, on the Internet and/or on social networks.

In the second part of the analysis, we only compared the three groups who had already used DEC (ONCE, PAST and CURRENT). We asked them how they had acquired their last DEC (peers/family (parents, siblings, other)/kiosk/other (Internet, resale, theft, other store)), the nicotine content of their usual DEC (no nicotine/2% or less (≤20 mg/mL)/more than 2% (>20 mg/mL)/I do not know). Finally, they were asked about the reasons that led them to use a DEC (maximum three choices: design/make me cool/good taste/practical/less irritating than cigarettes/less visible than cigarettes/cheap/do not smell of tobacco/give me pleasure or destress me/to reduce smoking/to stop smoking/curiosity/no or little nicotine).

Statistical analysis

As the sample was not constructed according to probabilistic principles, the distribution of the raw data collected was not sufficiently representative of the populations of young people aged 14–25 residing in French-speaking Switzerland. As a result, weights were calculated to adjust the sample. The statistical power is not artificially improved by this procedure. Only the structure of the sample is modified, with each participant being given greater or lesser importance. Three criteria were identified, for which the exact distribution calculated on the entire French-speaking population studied was available and known through official statistics:[20] sex assigned at birth, age and canton of residence. Each age from 14 to 25 years was considered separately. All calculations

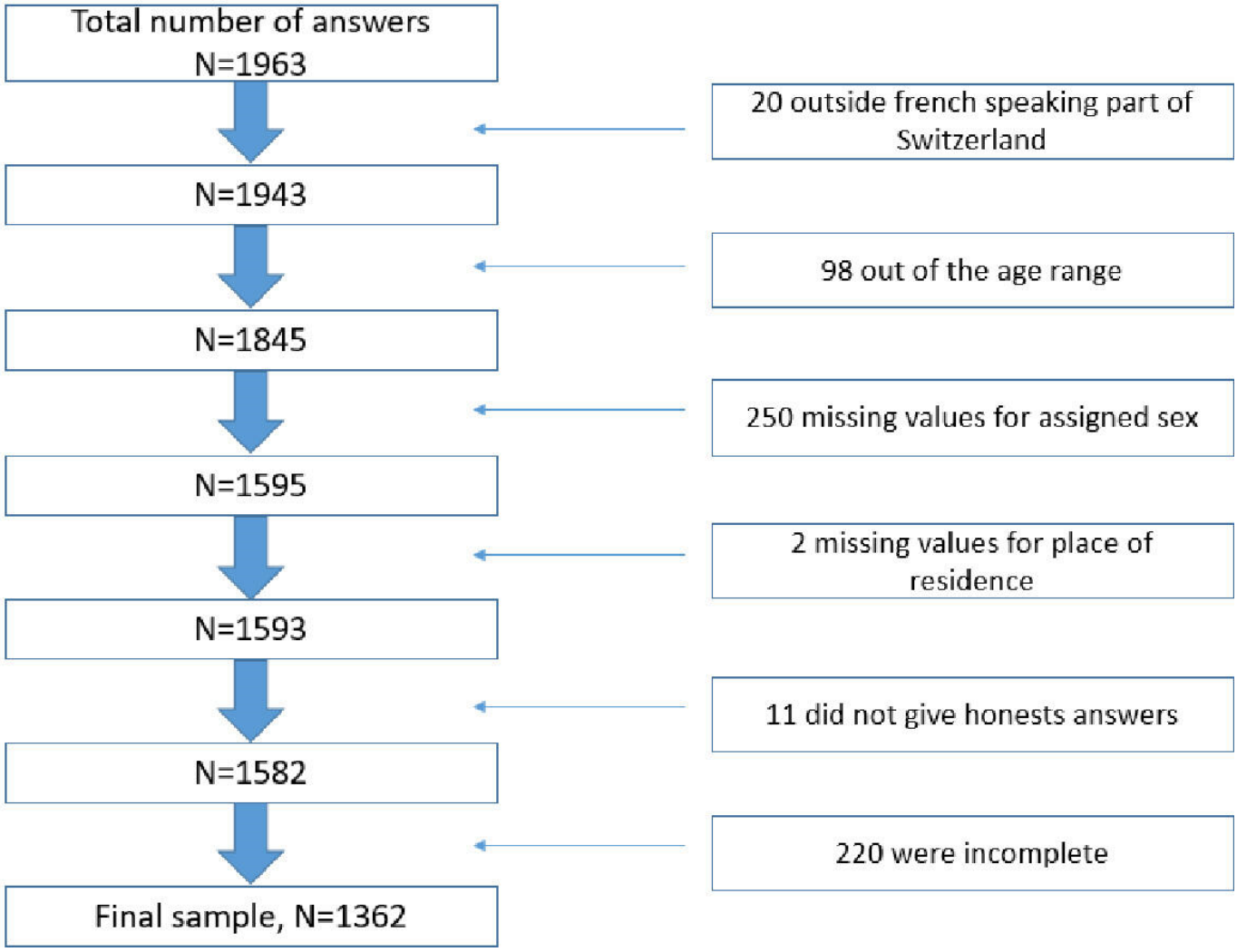

Figure 1 Participants' flow chart.

were based on the final sample of 1362 respondents with weights.

In the first part of the analysis, the four groups (NEVER, ONCE, PAST and CURRENT) were compared on the above-mentioned variables. For the bivariate analyses, we used χ^2 tests to identify the characteristics associated with DEC use. Statistically significant variables at the bivariate level were entered into a multinomial regression analysis using the NEVER group as the reference category. In the second part of the analysis, the three user groups (ONCE, PAST and CURRENT) were compared. At the multivariate level, the ONCE group was the reference category. P values<5% were considered statistically significant and results are presented as relative risk ratio (RRR) controlled for gender and age. We used STATA (SE V.17) for all the analyses.

PATIENTS and public involvement

Patients or the public were not involved in the design, or conduct, or reporting or dissemination plans of our research.

RESULTS

Overall, 90.9% of the 1362 participants reported knowing DEC (data not shown), 41.2% had never used this device (NEVER group), 14.4% once (ONCE group), 15.1% several times but not in the last 30 days (PAST group, potentially including occasional users too) and 29.2% several times in the last 30 days (CURRENT group). Among the CURRENT respondents, 41% said they had used it ≥10 days in the last 30 days. As a result, 12% of the final sample reported having used a DEC several times in the last 30 days. Among them, 59% also report having smoked conventional cigarettes in the last 30 days, that is 7% of the total sample (data not shown). When separated by age, 37.7% of the 14–17 year olds and 42.2% of the 18–25 year olds had never used a DEC. Less than a third of the 14–17 (29.7%) and the 18–25 year olds (29.6%) said they had used a DEC several times in the last 30 days (among them, 31.6% of the 14–17 and 44.8% of the 18–25 year olds reported having used DEC≥10 days over this period (data not shown)). As a result, 9% of 14–17 and 13% of 18–25 year olds reported having used

Table 1 Bivariate analysis comparing the four groups among 14–25 year olds (NEVER users, ONCE users, PAST users and CURRENT users)

	Total % or mean (n=1362)	NEVER % or mean (n=556)	ONCE % or mean (n=194)	PAST % or mean (n=209)	CURRENT % or mean (n=403)	P value
Age (mean±SE)	19.7±0.13	20.0±0.22	19.6±0.40	19.1±0.25	19.6±0.22	0.13
Gender						<0.05
Cisgender male	44.9	49.1	53.1	43.8	35.8	
Cisgender female	50.7	47.6	43.5	50.4	58.6	
Trans*	4.4	3.3	3.3	5.8	5.6	
Swiss-born (yes)	88.0	86.9	87.0	89.3	89.3	0.77
Residence (urban)	60.0	58.8	54.2	60.5	64.0	0.33
Living with parent(s) (yes)	73.4	68.5	78.0	79.6	74.6	<0.05
Parents living together (yes)	60.1	59.7	68.2	57.8	57.8	0.29
Socioeconomic status						0.11
Above average	19.7	15.4	7.4	17.8	14.3	
Average	66.0	63.1	74.4	60.2	68.8	
Below average	14.3	21.5	18.1	22.0	16.9	
Main activity						<0.01
Mandatory school	10.1	10.4	16.0	8.2	8.0	
Postmandatory school	33.7	28.3	27.8	40.7	40.2	
Higher education	35.3	45.5	29.6	32.4	25.6	
Other	20.9	15.8	26.5	18.8	26.2	
Pocket money/income per month (quartile; in Swiss francs)						0.30
<160	28.9	30.6	31.2	28.2	25.9	
160–400	21.3	22.5	21.9	26.2	16.8	
401–1239	27.1	26.5	26.4	25.8	29.0	
<1239	22.6	20.4	20.4	19.7	28.4	
Substance use in the last 30 days (no)	42.8	79.2	43.2	27.4	0.3	<0.01
Tobacco in the last 30 days (yes)	34.1	14.0	27.7	55.3	54.0	<0.01
Cannabis in the last 30 days (yes)	16.6	7.5	12.7	26.3	26.1	<0.01
Family tobacco use (yes)	47.3	40.1	44.8	56.7	53.5	<0.01
Family e-cig use (yes)	23.0	15.4	23.7	26.3	31.6	<0.01
Advertising on social media (yes)	30.2	21.8	34.4	36.1	36.7	<0.01
Advertising on the Internet (yes)	27.2	21.4	25.8	31.3	33.9	<0.05
Advertising in kiosks (yes)	19.8	30.8	11.4	11.9	12.8	<0.01

a DEC more than 10 days in the last 30 days and can be considered as frequent DEC users.

Comparisons with non-users

At the bivariate level (table 1), significant differences were found in terms of gender, with cisgender females being over-represented in PAST and CURRENT groups. Participants who had already used a DEC, once or more, were less likely to be in a tertiary education and more likely to live with their parents. DEC use was associated with current cannabis and/or cigarette use, as well as family cigarette and/or e-cig use, with higher rates in PAST and CURRENT groups. Having seen advertising for DEC on the Internet and/or on social networks was associated with DEC use (ONCE, PAST or CURRENT) while participants in the NEVER group indicated being more exposed to kiosk advertising.

At the multivariate level (table 2), compared with the NEVER group, participants in the ONCE group were more likely to have used cigarettes in the past 30 days (RRR 2.22, 95% CI 1.26 to 3.91), to have seen advertising for DEC on social networks (RRR 1.78, 95% CI 1.04 to 3.04) and less likely to have seen advertising for DEC in kiosks (RRR 0.25, 95% CI 0.13 to 0.47).

Table 2 Multinomial logistic regression using NEVER as the reference category among the 14–25 year olds

	ONCE (n=194) RRR (95% CI)	PAST (n=209) RRR (95% CI)	CURRENT (n=403) RRR (95% CI)
Age	0.99 (0.88 to 1.12)	**0.89 (0.80 to 0.99)***	0.99 (0.89 to 1.11)
Gender			
Cisgender female	Ref	Ref	Ref
Cisgender male	1.43 (0.89 to 2.32)	1.01 (0.63 to 1.59)	0.69 (0.43 to 1.10)
Trans*	0.89 (0.29 to 2.77)	0.90 (0.33 to 2.46)	0.71 (0.24 to 2.11)
Living with parent(s) (yes)	**2.13 (1.16 to 3.93)***	**1.93 (1.09 to 3.42)***	**1.79 (1.04 to 3.08)***
Main activity			
Mandatory school	0.61 (0.18 to 2.10)	0.31 (0.09 to 1.03)	0.48 (0.18 to 1.29)
Postmandatory school	**0.35 (0.15 to 0.83)***	0.59 (0.29 to 1.20)	0.68 (0.33 to 1.39)
Higher education	**0.36 (0.19 to 0.67)†**	0.69 (0.38 to 1.26)	**0.39 (0.22 to 0.69)†**
Other	Ref	Ref	Ref
Tobacco in the last 30 days (yes)	**2.22 (1.26 to 3.91)†**	**6.37 (3.87 to 10.51)†**	**5.72 (3.58 to 9.13)†**
Cannabis in the last 30 days (yes)	1.44 (0.70 to 2.94)	**2.11 (1.12 to 3.96)***	**2.35 (1.31 to 4.18)†**
Family tobacco use (yes)	1.03 (0.63 to 1.68)	1.45 (0.92 to 2.29)	1.07 (0.72 to 1.60)
Family e-cig use (yes)	1.61 (0.87 to 3.00)	1.53 (0.87 to 2.68)	**2.19 (1.34 to 3.58)†**
Advertising on social media (yes)	**1.78 (1.04 to 3.04)***	**1.67 (1.04 to 2.67)***	1.56 (0.96 to 2.52)
Advertising on the Internet (yes)	1.30 (0.75 to 2.28)	**1.83 (1.10 to 3.02)***	**2.09 (1.24 to 3.50)†**
Advertising in kiosks (yes)	**0.25 (0.13 to 0.47)†**	**0.21 (0.11 to 0.40)†**	**0.23 (0.13 to 0.40)†**

Bold values indicate significance.
*p<0.05
†p<0.01
RRR, relative risk ratio.

Compared with the NEVER group, participants in the PAST group were more likely to be younger (RRR 0.89, 95% CI 0.80 to 0.99), to have used cigarettes (RRR 6.37, 95% CI 3.87 to 10.51) and cannabis (RRR 2.11, 95% CI 1.12 to 3.96) in the past 30 days, and to have seen advertising for DEC on social networks (RRR 1.67, 95% CI 1.04 to 2.67) and on the Internet (RRR 1.83, 95% CI 1.10 to 3.02), but less likely to have seen advertising in kiosks (RRR 0.21, 95% CI 0.11 to 0.40).

Compared with the NEVER group, participants in the CURRENT group were more likely to have used cigarettes (RRR 5.72, 95% CI 3.58 to 9.13) and cannabis (RRR 2.35, 95% CI 1.31 to 4.18) in the last 30 days, to report e-cig use in the family (RRR 2.19), to have seen advertising for DEC on the Internet (RRR 2.09, 95% CI 1.24 to 3.50) but less likely to have seen advertising for DEC in kiosks (OR 0.23, 95% CI 0.13 to 0.40).

Users of DEC

The second part of the analyses was limited to the DEC user groups (ONCE, PAST and CURRENT). Overall, among the 806 participants who reported DEC use, 54% bought their last DEC in a kiosk, 33% from friends, 5% from family and 8% by other means (Internet, resale, theft other store). The usual DEC consumed by 45% of users contained a level of nicotine≤20 mg/mL, 19% reported nicotine levels higher than 20 mg/mL and 17% used nicotine-free devices (19% did not know). The three main reasons for using DEC were flavour diversity (63%), the absence of tobacco smell (40%) and practicality (30%) (data not shown).

At the bivariate level (table 3), significant differences between the three groups were found in the way the last DEC was acquired, with peers and family being over-represented in the ONCE group, and kiosk being over-represented in the CURRENT group. Regarding nicotine content of their usual DEC, participants who answered *without nicotine* or *I do not know* were more likely to be in the ONCE group. Compared with the ONCE group, the other groups were more likely to report using DEC for their taste, practicality, difficulty of detecting them, pleasure and to reduce smoking. Participants who used DEC because they do not smell of tobacco were over-represented in the CURRENT group. Those who used them out of curiosity were more likely to be in the ONCE group.

At the multivariate level (table 4), compared with the ONCE group, those in the PAST group were more likely to have acquired their last DEC in a kiosk (RRR 2.39, 95% CI 1.32 to 4.31) and to have used DEC for pleasure (RRR 4.08, 95% CI 1.66 to 10.02). Compared with the ONCE group, those in the CURRENT group were more likely to be cisgender females (RRR 1.86, 95% CI

Table 3 Bivariate analysis comparing the three users groups (ONCE, PAST AND CURRENT) among the 14–25 year olds

	Total % or mean (n=806)	ONCE % or mean (n=194)	PAST % or mean (n=209)	CURRENT % or mean (n=403)	P value
Age (mean±SE)	19.5±0.16	19.6±0.40	19.1±0.25	19.6±0.22	0.73
Gender					<0.05
Cisgender male	42.0	53.1	43.8	35.8	
Cisgender female	52.9	43.5	50.4	58.6	
Trans*	5.1	3.3	5.8	5.6	
Acquired their last DEC through					<0.01
Peers	32.9	58.4	42.2	15.9	
Family (parents, siblings, other)	5.1	15.3	3.0	1.3	
Kiosk	53.9	21.6	46.2	73.4	
Other (Internet, resale, theft, other store)	8.1	4.8	8.6	9.3	
Nicotine content					<0.01
No nicotine	17.3	26.9	15.9	13.4	
2% or less	45.0	30.2	38.0	55.7	
More than 2%	19.3	7.1	20.0	24.9	
I do not know	18.4	35.7	26.3	6.0	
Reasons					
Design	7.6	7.9	4.7	8.9	0.44
Cool	1.6	2.7	2.3	0.6	0.11
Taste	62.7	54.0	57.1	69.7	<0.01
Practicality	30.1	17.5	31.3	35.5	<0.01
Less irritating	17.5	12.7	17.4	20.0	0.22
Less visible	8.2	2.4	9.2	10.4	<0.05
Cheap	5.1	5.4	3.5	5.7	0.66
Smell	39.9	30.0	32.6	48.3	<0.01
Pleasure	22.0	5.2	23.6	29.3	<0.01
Reduce smoking	10.7	3.2	12.1	13.6	<0.01
Stop smoking	3.7	0.8	3.8	5.1	0.08
Curiosity	27.1	57.0	33.6	9.4	<0.01
No or little nicotine	16.5	17.6	16.8	15.8	0.91

DEC, disposable electronic cigarettes.

1.03 to 3.33), to have acquired their last DEC in a kiosk (RRR 6.51, 95% CI 3.61 to 11.72) or by another mean (RRR 3.63, 1.21 to 10.92) and to report using DEC with ≤20 mg/mL (RRR 2.03, 95% CI 1.04 to 3.98) and >20 mg/mL (RRR 5.31, 95% CI 1.81 to 15.56) and to give pleasure as a reason for using DEC (RRR 4.78, 95% CI 1.80 to 12.74). They were less likely to use a DEC for curiosity (RRR 0.18, 95% CI 0.02 to 0.76) and to report family as a way to obtain DEC (RRR 0.32, 95% CI 0.12 to 0.80).

DISCUSSION

DEC use

To the best of our knowledge, these are the first data on DEC use in Switzerland. More than half of the participants (14–25 year olds) have ever used a DEC (59%). This rate is higher than those found in other countries: 13% of 13–16 year olds in France,[6] 8% of 11–17 year olds in the UK[5] and 9% of 11–18 year olds in the USA.[4] Apart from methodology differences in the design of the studies, this gap could be also explained by the absence of age limit to sell e-cigs and the fact that their advertisement has only little restriction in Switzerland.[21]

According to a 2018 review,[22] e-cig use increases with age. On the contrary, some of our results show a more widespread use of DEC among younger people. This could be due to the features inherent to DEC that may appeal to youth, such as their vibrant colours and fruity and sweet flavours.[7 23 24] This could also be explained by the marketing targeting youth, based for instance on cartoon images[25 26] and spread on social media.[8]

Table 4 Multinomial logistic regression using ONCE as the reference category among the 14–25 year olds

	PAST (n=209) RRR (95% CI)	CURRENT (n=403) RRR (95% CI)
Age (mean)	0.97 (0.89 to 1.06)	1.03 (0.94 to 1.13)
Gender		
Cisgender female	1.38 (0.77 to 2.49)	**1.86 (1.03 to 3.33)***
Cisgender man	Ref	Ref
Trans*	1.64 (0.48 to 5.55)	2.23 (0.49 to 10.23)
Acquired their last DEC through		
Peers	Ref	Ref
Family (parents, siblings, other)	0.31 (0.07 to 1.32)	**0.32 (0.12 to 0.80)***
Kiosk	**2.39 (1.32 to 4.31)†**	**6.51 (3.61 to 11.72)†**
Other (Internet, resale, theft, kebab)	1.74 (0.53 to 5.70)	**3.63 (1.21 to 10.92)***
Nicotine content		
No nicotine	Ref	Ref
2% or less	1.22 (0.57 to 2.62)	**2.03 (1.04 to 3.98)***
More than 2%	2.88 (0.93 to 8.92)	**5.31 (1.81 to 15.56)†**
I do not know	1.33 (0.63 to 2.83)	0.51 (0.23 to 1.14)
Reasons		
Taste	1.10 (0.63 to 1.93)	1.72 (0.98 to 3.02)
Practicality	1.40 (0.75 to 2.61)	1.43 (0.78 to 2.63)
Less visible	2.56 (0.51 to 12.80)	2.69 (0.59 to 12.31)
Smell	0.96 (0.54 to 1.70)	1.57 (0.91 to 2.70)
Pleasure	**4.08 (1.66 to 10.02)†**	**4.78 (1.80 to 12.74)†**
Reduce smoking	2.25 (0.65 to 7.78)	1.68 (0.51 to 5.53)
Curiosity	0.57 (0.31 to 1.03)	**0.18 (0.02 to 0.76)†**

Bold values indicate significance.
*P<0.05
†P<0.01
DEC, disposable electronic cigarettes; RRR, relative risk ratio.

Literature[22] also shows a greater e-cig use among males, contrary to our results. Regarding gender differences, the Health Behaviour in School-aged Children (HBSC) study found that e-cig users increased among 11–15 girls between 2018 and 2022 in Switzerland reaching the rates of boys.[27] Although the HBSC questionnaire did not allow a distinction between the different types of e-cigs (eg, refillable vs disposable device), it is possible to hypothesise that this increase may be due to the arrival of DEC in Switzerland in 2020. A 2017 review[28] on gender differences in e-cig use showed that, although e-cig use tends to be more widespread among teenage males, teenage girls may be at increased risk of using if they are specifically targeted by e-cig marketing. This may have been the case with recent advertising which used gender stereotypes such as pink colouring, soft design and good smell. Moreover, compared with males, females prefer sweet and fruity e-liquids[29 30] which are numerous and highlighted by DEC marketing.

In line with other studies,[31 32] having a family member who smokes and/or uses e-cig was a predictor of DEC use. Several explanations such as environment,[33] epigenetics[34] and imitation[35] may justify the association between tobacco use in parents and their children or among family members. Interestingly, at the multivariate level, only the association between e-cig (and not cigarettes) use in the family and current DEC use among the participants remains significant. This suggests that imitation could be a factor leading children to use e-cig if a household member uses it too. As previously reported,[36] it is also possible that some young people whose parent uses e-cig consider this product safer than cigarettes. Furthermore, substance use by parents may lead some adolescents to have favourable attitudes towards a substance.[37] Finally, young people whose siblings use e-cig may have tried their first DEC through them, as we asked a general question on family members.

In line with studies on e-cig use among youth,[38 39] curiosity and pleasure are major reasons leading them to trying e-cig devices. As for e-cig in other studies,[38 40] our results show that tastes would also be a major reason reported for DEC use. However, when the groups of users are compared and other reasons are added, taste does not distinguish the user groups. Indeed, pleasure seems to motivate a regular use. On the one hand, it is possible that youth who felt pleasure at initiation continued to do so, and thus became regular users. On the other hand, it could be that youth who frequently use DEC developed nicotine dependence and therefore feel stress of withdrawal and pleasure of satisfying their craving.[41] Indeed, our results show that two-thirds of participants used DEC with nicotine, leading to a risk of nicotine dependence (with one-fifth exceeding the legal maximum). Finally, it is also possible than users tried several flavours at the beginning and then chose the one they preferred for a regular use, becoming a secondary criterion.

Other products

As reported in other studies,[42–46] our results show an association between cigarettes and DEC use. However, according to a literature review,[47] there is no clear evidence that this association would be due to a gateway effect from e-cig to cigarette (hand-to-mouth actions and/or nicotine addiction), but rather because of shared common causes which lead to multiple substance use regardless of the order of initiation. For instance, a recent longitudinal study[48] showed that among US youths aged 12–17, the association between e-cig and cigarette use decreased when control variables were added in the analyses (eg, sociodemographic characteristics, exposure to

tobacco users), suggesting that there would be common risk factors leading to their dual or subsequent use.

Our results also show an association between DEC and cannabis use. Other studies already found an association between vaping and cannabis use among teenagers and young people.[49–53] Several hypotheses may explain this, such as the desire to seek new experiences with other substances after having used one, the gateway hypothesis, a favourable environment for having multiple risky behaviours or common causes.[53 54]

Advertising

Contrary to studies[55–57] that found a correlation between being exposed to retail e-cig and being a user, our results show that participants who never used a DEC were more likely to report advertising for DEC in kiosks. Conversely, the likelihood of reporting advertising for DEC on the Internet was higher among past and current users than among non-users. On one side, advertising is likely to impact DEC consumption. On the other side, it is possible that someone using a DEC will be more targeted online by DEC advertising than non-users who do not search for such information. Indeed, as previously reported,[58] audience may be targeted based on one or more criteria such as content consulted on the Internet, behaviours investigated over time (behavioural advertising) or information that people have transmitted (personalised advertising).

However, having seen advertising for DEC on social media was not significant among CURRENT group compared with the NEVER group. It is possible that the promotion on social media, which is sometimes made by influencers[23] or videos from friends but also through memes (humorous texts, images and videos)[59] are not perceived by current users as being advertising because of normalisation of such content.

Strengths and limitations

This study is the first to provide information on DEC use in Switzerland. This study could pave the way to research for more empirical data on tobacco and/or nicotine products, including disposable e-cigs. It may also inform discussions on preventive measures and legislation for youth protection and public health. However, this study presents some limitations. First, it does not assess the prevalence of DEC use among young people under 14 or above 25. Second, it is possible that some participants were influenced by the fact that the survey was carried out by public health institutions (social desirability bias). However, the fact that the questionnaire was confidential and participants not identifiable allowed to reduce this bias. Third, given that the ad with the link to the questionnaire announced the subject of the study, it is possible that it attracted more people who knew this product (selection bias). Fourth, as the questionnaire was mainly disseminated through social media, it mainly reached young people registered on these platforms. However, according to a 2022 Swiss study,[60] 98% of the 12–19 year olds are registered on at least one social network and the link was also shared through other networks. Fifth, the study was carried out on a sample of adolescents and young adults in the French-speaking part of Switzerland, which may limit the generalisability of the results. Sixth, regarding results on advertising, our rates are based on people who have been able to identify advertising for DEC, but we do not know if they considered other forms than traditional marketing as being advertising (for instance, promotion made by influencers). Finally, as this study is cross-sectional, we cannot determine the direction of causality.

CONCLUSION AND RECOMMENDATIONS

Our study showed that 91% of the 14–25 year-old participants knew DEC and 59% used them at least once. Among them, 12% reported having used it ≥10 days over in the last 30 days (9% among 14–17 year olds and 13% among 18–25 year olds). Similarly, the HBSC study shows in Switzerland an increase in the use of e-cig and snus (from 2018 to 2022), while cigarette consumption remains stable.[27]

Together, these results raise concerns about growing exposure of young people to highly addictive products. They underline the importance of monitoring products on the market and their prevalence, of informing population about risks[61] and of strengthening regulations[62 63] to make DEC less accessible to youth. Vaping prevention messages for adolescents can point out that the majority do not consume these products (denormalisation). They can also address nicotine addiction, draw parallels with smoking and mention the presence of unknown chemical substances.[64]

The higher prevalence of DEC among the youth in Switzerland may be due to the limited regulation on e-cigs and tobacco products. The future Swiss law on tobacco products and e-cigs should come into force mid-2024. It will set the selling age at 18, limit advertising, prohibit consumption of in public places and take over the regulations in the European Union on ingredients and labelling. The law will later be revised to both limit and ban all advertising that could reach minors.[65] Other regulatory measures to reduce the attractivity and accessibility of these products would include flavours limitations and ratification of the WHO Framework Convention on Tobacco Control (FCTC).

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