

Young adults using mod (vs. pen-like) e-cigarette devices at baseline smoked more than 6 times as many cigarettes in the past 30 days at follow-up.

E-Cigarette Product Characteristics and Subsequent Frequency of Cigarette Smoking

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1 Introduction

Evidence that use of **e-cigarettes** with certain product characteristics may **increase** adolescent and young adult risk of unhealthy tobacco use patterns—such as frequency of combustible cigarette smoking—can inform regulation of e-cigarettes.

2 Methods

- Data were collected via online survey from participants in the Southern California Children’s Health Study in 2015–2016 (baseline) and 2016–2017 (follow-up) (**N=1312**).
- We evaluated the association of binary categories of three non-mutually exclusive characteristics of the e-cigarette used most frequently with number of cigarettes smoked in the past 30 days at 1-year follow-up.
- Product characteristics included **device** (pen-like/mod [modifiable device]), use of **nicotine** in eliquid solutions (yes/no), and use for **dripping** (directly dripping eliquid onto the device for high levels of nicotine; yes/no).

3 Results

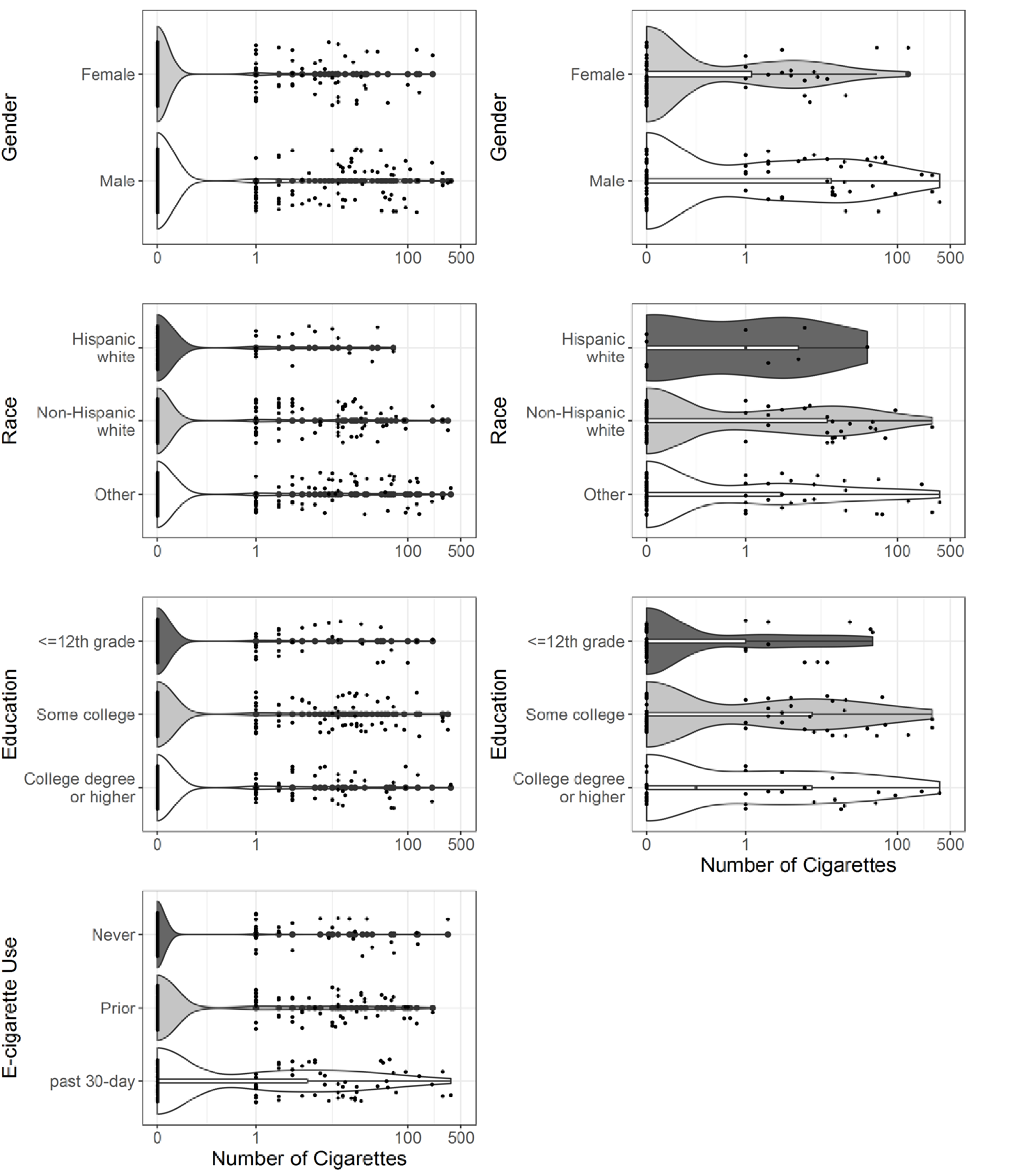


Figure 3.1: The distribution of past-30-day cigarette use at follow-up for the (L) overall sample, and (R) sample of past 30-day e-cigarette users, by demographics.

Table 3.1: Participant characteristics at baseline and association of each characteristic with number of cigarettes smoked in the past 30 days at follow-up; N = 1312.

	Total, N (%)	Mean number of cigarettes smoked at follow-up (SD)	RR (95% CI)
Gender			
Female	685 (52.2)	5.40 (82.0)	Ref
Male	627 (47.8)	7.11 (42.7)	1.55 [1.10, 2.17]
Race/ethnicity			
Non-Hispanic white	171 (13.0)	13.1 (156)	1.00 [0.59, 1.70]
Hispanic white	635 (48.4)	3.79 (32.0)	0.88 [0.51, 1.53]
Other	506 (38.6)	6.94 (43.7)	Ref
Education (highest parental)			
12th grade	391 (29.8)	1.95 (14.5)	Ref
Some college	459 (35.0)	8.24 (53.1)	2.45 [1.53, 3.90]
College degree or higher	386 (29.4)	3.70 (24.3)	2.38 [1.45, 3.88]
E-cigarette use			
Never	828 (63.1)	1.86 (25.4)	Ref
Prior	346 (26.4)	13.0 (118)	3.35 [2.16, 5.18]
Past 30-day	138 (10.5)	15.4 (51.6)	5.84 [3.51, 9.71]

- The number of cigarettes smoked in the past 30 days at follow-up was higher for males (vs. females) and for those with parents who had some college or a college degree or **higher** (vs. a high school degree or less).

- No differences** were observed by ethnicity. Similar patterns emerged in the sample restricted to past 30-day e-cigarette users.

- Participants who reported prior or past 30-day e-cigarette use at baseline reported **a higher average number** of cigarettes smoked in the past 30 days at follow-up.

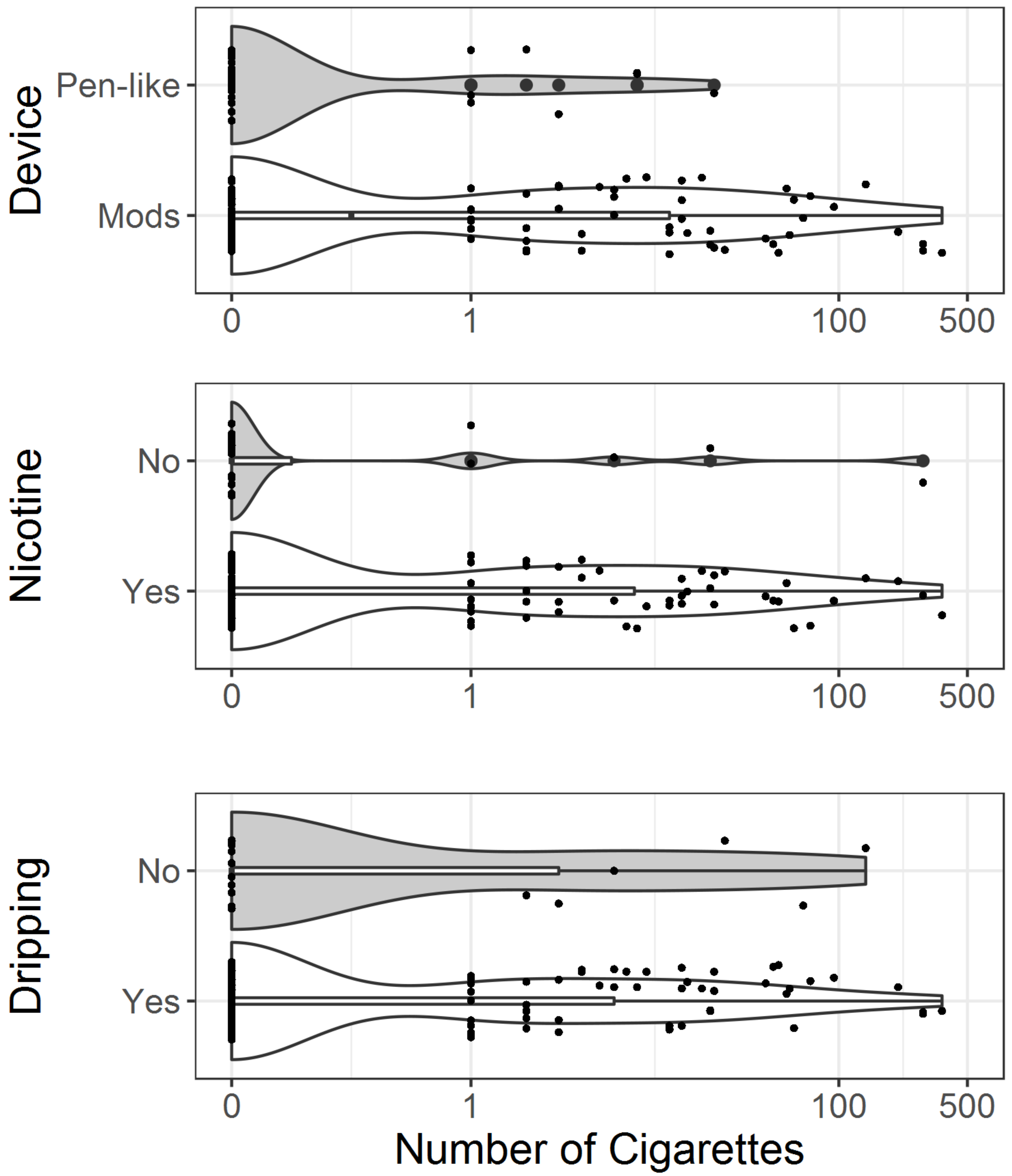


Figure 3.2: The distribution of past-30-day cigarette use at follow-up by four e-cigarette characteristics of current e-cigarette at baseline.

- Adolescents using a pen-like device (N=36; 26.5% of past 30-day e-cigarette users) **smoked on average very few cigarettes** in the past 30 days at follow-up (mean number of cigarettes smoked [SD] = 1.3 [3.89]), compared to those using a mod device (N=100; 73.5%; mean number of cigarettes smoked at follow-up [SD]=20.8 [59.8]).

Table 3.2: Association between e-cigarette characteristics at baseline and number of cigarettes smoked in the past 30 days at follow-up; N=1312

	Mean Number of Cigarettes Smoked at Follow-up (SD)	Association with Number of Cigarettes Smoked in Past 30 Days at Follow-up		
		Model 1, RR (95% CI)	Model 2, RR (95% CI)	Model 3, RR (95% CI)
No e-cigarette use (N=828)	1.9 (25.4)	Ref	–	–
Device type				
Pen-like (N=36)	1.3 (3.89)	2.83 (1.27, 6.35)	Ref	Ref
Mods (N=100)	20.8 (59.8)	8.38 (4.87, 14.4)	5.11 (1.74, 15.0)	6.33 (1.64, 24.5)
Nicotine				
No (N=20)	15.8 (64.0)	3.90 (1.56, 9.74)	Ref	Ref
Yes (N=94)	17.7 (54.7)	6.52 (3.65, 11.6)	3.69 (0.99, 13.7)	1.65 (0.47, 5.71)
Dripping				
No (N=17)	14.1 (36.2)	4.64 (1.97, 10.9)	Ref	
Yes (N=109)	17.1 (56.2)	6.83 (3.98, 11.7)	1.07 (0.35, 3.20)	

- Participants using a pen-like e-cigarette device smoked **2.83** times (95%CI: 1.26, 6.35) as many cigarettes in the past 30 days at follow-up as those who had never used e-cigarettes, and participants using a mod device smoked 8.38 times (95%CI: 4.87, 14.4) as many cigarettes in the past 30 days at follow-up.

- In analyses restricted to participants reporting past 30 day use of e-cigarettes, adolescents using mods smoked an average of **5.11** (95% CI: 1.74, 15.0) times as many cigarettes in the past 30 days at follow-up relative to adolescents using a pen-like e-cigarette device at baseline.

4 Conclusion

Use of mods (vs. pen-like) e-cigarette devices was **strongly, positively associated** with the number of cigarettes smoked approximately 1 year later at follow-up. Additional research is needed to explore **causal pathways for the observed associations**. If these associations were causal, device type and characteristics may be a target for regulation to reduce the burden of tobacco related disease that may result from adolescent and young adult vaping.

5 Disclosures

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