

Supplementary Materials

Awareness, trial, and use of heated tobacco products among adult cigarette smokers and e-cigarette users: findings from the 2018 ITC Four Country Smoking & Vaping Survey

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Supplemental Table S1. ITC 4CV2 nomenclature for the classification of other nicotine use status.

Smoking status definitions										
Daily smoker*	Weekly smoker*	Monthly smoker*	Current smoker†	< Monthly smoker*	Recent quitter*	Long-term quitter*	Non-smoker*	Non-smoker†		
Currently smokes cigarettes daily	Currently smokes cigarettes less than daily, but at least once a week	Currently smokes cigarettes less than weekly, but at least once a month AND has smoked 100+ cigarettes in their lifetime	Daily smoker* OR Weekly smoker* OR Monthly smoker*	Currently smokes cigarettes less than monthly, but occasionally AND has smoked 100+ cigarettes in their lifetime	Quit smoking in the past 2 years AND has smoked 100+ cigarettes in their lifetime	Quit smoking more than 2 years ago AND has smoked 100+ cigarettes in their lifetime	Never has been a smoker OR has not smoked 100+ cigarettes in their lifetime	< Monthly smoker* OR Recent quitter* OR Long-term quitter* OR Non-smoker*		
Vaping status definitions										
Daily vaper*	Weekly vaper*	Monthly vaper*	Current vaper†	< Monthly vaper*	Former vaper*	Past experimenter*	Past trier*	Never trier*	Unaware*	Non-vaper†
Currently uses vaping devices daily	Currently uses vaping devices less than daily, but at least once a week	Currently uses vaping devices less than weekly, but at least once a month	Daily vaper* OR Weekly vaper* OR Monthly vaper* AND uses nicotine-based vaping products	Currently uses vaping devices less than monthly, but occasionally	Does not currently use vaping devices AND previously used vaping devices at least once a week	Does not currently use vaping devices AND previously used vaping devices less than weekly, but more than once	Does not currently use vaping devices AND previously has used vaping devices one time	Does not currently use vaping devices AND never has tried vaping devices	Does not currently use vaping devices AND never has heard of vaping devices	< Monthly vaper* OR Former vaper* OR Past experimenter* OR Past trier* OR Never trier* OR Unaware* OR exclusively uses non-nicotine vaping products
Other nicotine use status										
Non-current smoker/vaper†			'Exclusive' vaper†			'Exclusive' smoker†		Concurrent smoker/vaper†		

Non-smoker† AND
non-vaper†

Non-smoker† AND
current vaper†

Current smoker† AND
non-vaper†

Current smoker† AND
current vaper†

* Derived variable definition from ITC 4CV2.

† Definition derived for use in present study.

Supplemental Table S2. Smoking and vaping status of non-current smoker/vapers in the analytic sample (n=1,619).

Vaping Status	Smoking Status				Total
	< Monthly smoker	Recent quitter	Long-term quitter	Non smoker	
At-least-monthly vaper of non-nicotine substances*	2 (0.1%)	23 (1.4%)	20 (1.2%)	8 (0.5%)	53 (3.3%)
< Monthly Vaper	81 (5.0%)	135 (8.3%)	20 (1.2%)	3 (0.2%)	239 (14.8%)
Former vaper	7 (0.4%)	233 (14.4%)	80 (4.9%)	0 (0.0%)	320 (19.8%)
Past experimenter	22 (1.4%)	179 (11.1%)	53 (3.3%)	0 (0.0%)	254 (15.7%)
Past trier	20 (1.2%)	73 (4.5%)	38 (2.3%)	0 (0.0%)	131 (8.1%)
Never trier	71 (4.4%)	393 (24.3%)	149 (9.2%)	0 (0.0%)	613 (37.9%)
Unaware	2 (0.1%)	7 (0.4%)	0 (0.0%)	0 (0.0%)	9 (0.6%)
Total	205 (12.7%)	1043 (64.4%)	360 (22.2%)	11 (0.7%)	1,619 (100%)

*row contains respondents were re-classified from the 'exclusive' vaper category due to responding *no nicotine - 0 mg/ml (0%)* when asked 'What is the nicotine strength of the e-liquid you [currently use most† / last used‡] (often written on the package or cartridges)?'

†asked to daily vapers & weekly vapers.

‡asked to monthly vapers, less-than-monthly vapers, former vapers, & past experimenters (of vaping).

Supplemental Table S3. Proportions of (a) HTP-aware respondents who have ever tried HTPs and (b) HTP-ever users who are current HTP users, for the overall analytic sample and according to country of residence.

Variables	Overall	Canada	England	United States	Australia	Rao-Scott χ^2 p value
Ever tried HTPs (among HTP-aware)	<i>n</i> =4,252	<i>n</i> =1,237	<i>n</i> =1,789	<i>n</i> =853	<i>n</i> =373	
Yes	8.0 (6.9-9.1)	11.0 (8.8-13.2)	7.8 (6.1-9.5)	6.7 (4.3-9.1)	3.4 (0.8-6.0)	0.002
No	92.0 (90.9-93.1)	89.0 (86.8-91.2)	92.2 (90.5-93.9)	93.3 (90.9-95.7)	96.6 (94.0-99.2)	
Current HTP user (among HTP-ever users)	<i>n</i> =697	<i>n</i> =211	<i>n</i> =360	<i>n</i> =112	<i>n</i> =14	
Yes	36.2 (30.3-42.2)	25.3 (17.4-33.2)	51.3 (40.2-62.4)	33.6 (19.5-47.6)	19.8 (0.0-40.8)	0.001
No	63.8 (57.8-69.7)	74.7 (66.8-82.6)	48.7 (37.6-59.8)	66.4 (52.4-80.5)	80.2 (59.2-100.0)	

Values represent weighted % (95% CI) unless otherwise indicated.

HTP=heated tobacco product; CI=confidence interval.

Supplemental Table S4. Frequency of HTP use among current HTP users and prevalence of current WEEKLY and current DAILY use of HTPs, in the overall sample and according to country of residence.

Variable	Overall	Canada	England	United States	Australia	Rao-Scott χ^2 p value
Frequency of HTP use*	<i>n</i> =443	<i>n</i> =95	<i>n</i> =272	<i>n</i> =68	<i>n</i> =8	
Daily	179 (40.4)	28 (29.5)	119 (43.8)	29 (42.7)	3 (37.5)	---
Less than daily, but at least once a week	167 (37.7)	44 (46.3)	95 (34.9)	25 (36.8)	3 (37.5)	---
Less than weekly, but at least once a month	97 (21.9)	23 (24.2)	58 (21.3)	14 (20.5)	2 (25.0)	---
HTP Prevalence measures†	<i>n</i> =12,987	<i>n</i> =3,778	<i>n</i> =4,848	<i>n</i> =2,846	<i>n</i> =1,515	
Current WEEKLY user ‡	0.7 (0.5-0.8)	0.6 (0.4-0.8)	1.0 (0.7-1.3)	0.6 (0.3-0.8)	0.2 (0.0-0.3)	<0.001
Current DAILY user §	0.3 (0.2-0.4)	0.3 (0.1-0.5)	0.5 (0.3-0.7)	0.2 (0.1-0.4)	0.0 (0.0-0.1)	0.068

*Values are unweighted and represent n (column %).

†Values are weighted and represent % (95% CI).

‡ Those who responded *daily* or *less than daily, but at least once a week* to the question, "How often, if at all, do you CURRENTLY use heat-not-burn products?" and selected a known HTP brand when asked the question "Which heat-not-burn products have you ever used?".

§ Those who responded *daily* to the question, "How often, if at all, do you CURRENTLY use heat-not-burn products?" and selected a known HTP brand when asked the question "Which heat-not-burn products have you ever used?".

|| due to limited cell sizes (n<5), Australia was excluded from chi square test.

Supplemental Table S5. Current WEEKLY use of HTPs according to other nicotine use status.

Analytic sample & Outcome of interest	Non-current smoker/vaper	'Exclusive' vaper	'Exclusive' smoker	Concurrent smoker-vaper	Rao-Scott χ^2 p value
Overall sample (n=12,987)	n=1,619	n=1,087	n=6,753	n=3,528	
Current weekly HTP user	0.0 (0.0-0.1)	0.7 (0.0-1.4)	0.3 (0.1-0.4)	6.8 (5.7-7.8)	<0.001*
CA respondents (n=3,778)	n=705	n=251	n=1,948	n=874	
Current weekly HTP user	0.1 (0.0-0.3)	0.7 (0.0-1.3)	0.3 (0.0-0.5)	7.9 (5.3-10.5)	N/A
EN respondents (n=4,848)	n=301	n=398	n=2,358	n=1,791	
Current weekly HTP user	0.0 (0.0-0.0)	0.7 (0.0-1.7)	0.4 (0.0-0.8)	6.9 (5.6-8.3)	<0.001*
US respondents (n=2,846)	n=422	n=358	n=1,361	n=705	
Current weekly HTP user	0.0 (0.0-0.0)	1.4 (0.0-3.0)	0.2 (0.0-0.4)	5.1 (2.9-7.3)	N/A
AU respondents (n=1,515)	n=191	n=80	n=1,086	n=158	
Current weekly HTP user	0.0 (0.0-0.0)	0.7 (0.0-1.7)	0.4 (0.0-0.8)	6.9 (5.6-8.3)	N/A

Values represent weighted % (95% CI) unless otherwise indicated.

* due to limited cell sizes (n<5), non-current smoker/vaper category excluded from χ^2 test.

HTP=heated tobacco product; CI=confidence interval.

Supplemental Table S6. Multivariable logistic regression of current WEEKLY use of HTPs in the overall sample.

Characteristics	Current HTP user	
	(n=12,987)*	(n=697)†
Age		
55+ years	REF	REF
40-54 years	3.07 (1.34-7.07)	1.23 (0.32-4.81)
25-39 years	5.41 (2.46-11.90)	1.30 (0.37-4.63)
18-24 years	6.23 (2.84-13.66)	0.95 (0.26-3.47)
Sex		
Female	REF	REF
Male	1.56 (1.02-2.38)	0.75 (0.39-1.46)
Ethnicity		
Majority	REF	REF
Minority	1.45 (0.95-2.22)	0.86 (0.44-1.67)
Socioeconomic status		
Low	REF	REF
Moderate	0.65 (0.35-1.22)	0.54 (0.22-1.33)
High	1.55 (0.98-2.45)	1.08 (0.53-2.17)
Country of residence		
Canada	REF	REF
England	1.02 (0.61-1.70)	1.92 (0.90-4.10)
United States	0.73 (0.41-1.30)	1.45 (0.65-3.25)
Australia	0.28 (0.09-0.86)	0.68 (0.17-2.77)
Other nicotine use status		
Non-current smoker/vaper	0.13 (0.02-1.00)	0.21 (0.02-1.91)
'Exclusive' vaper	2.03 (0.59-6.98)	3.55 (0.90-14.01)
'Exclusive' smoker	REF	REF
Dual smoker-vaper	23.05 (11.43-46.48)	10.78 (5.14-22.58)

Values represent aOR (95% CI) unless otherwise indicated.

aORs represent results of multivariable logistic regression analysis adjusted for all variables in the table.

* All respondents (n=12,987) included in analytic sample.

† Only HTP ever users (n=697) included in analytic sample.

HTP=heated tobacco product; aOR=adjusted odds ratio; CI=confidence interval.

Supplemental Table S7. Multivariable associations of HTP regulatory environment with current WEEKLY use of HTPs, within the overall sample and among concurrent smoker-vapers.

Outcome variable & HTP regulatory environment	Overall sample*	Concurrent smoker-vapers†
	aOR (95% CI)	aOR (95% CI)
Current weekly HTP use ‡	<i>n</i> =12,987	<i>n</i> =3,528
HTP-unavailable countries	REF	REF
HTP-available countries	1.70 (1.04-2.79)	1.61 (1.02-2.53)
Current weekly HTP use 	<i>n</i> =697	<i>n</i> =527
HTP-unavailable countries	REF	REF
HTP-available countries	1.11 (0.55-2.24)	0.96 (0.49-1.91)

* Adjusted for age, sex, ethnicity, SES, & other nicotine use status; † Adjusted for age, sex, ethnicity, & SES.

‡ All respondents included in analysis; || Only HTP ever users included in analysis.

HTP-available: respondents from CA or EN; HTP-unavailable: respondents from the US or AU.

HTP=heated tobacco product; aOR=adjusted odds ratio; CI=confidence interval.

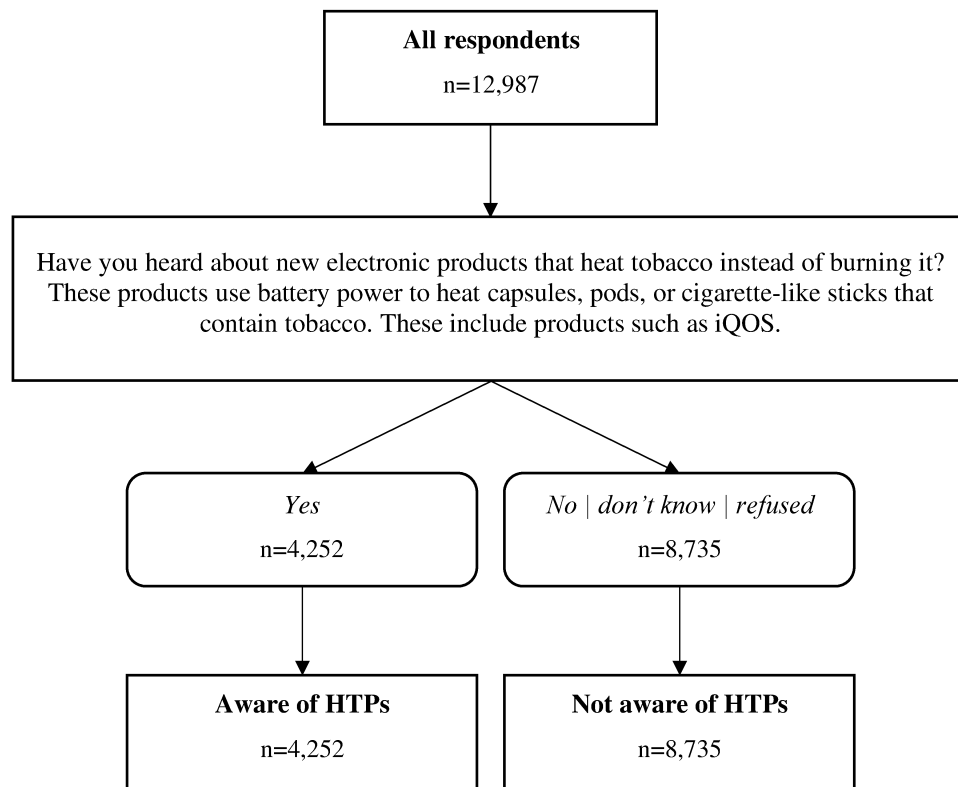
Supplemental Table S8. HTP prevalence measures among non-current smoker/vapers and exclusive vapers, across 4 categories of smoking status.

Vaping status	Current < monthly smoker	Recent quitter (of smoking)	Long-term quitters	Never smokers	Fisher's exact test p value
	n (unweighted %)	n (unweighted %)	n (unweighted %)	n (unweighted %)	
Non-current smoker/vapers	<i>n=204</i>	<i>n=1,042</i>	<i>n=358</i>	<i>n=11</i>	
HTP awareness	69 (33.8%)	271 (26.0%)	82 (22.9%)	1 (9.1%)	0.022
HTP trial	5 (2.5%)	16 (1.5%)	3 (0.8%)	0 (0.0%)	0.405
HTP current use	1 (0.5%)	1 (0.1%)	0 (0.0%)	0 (0.0%)	0.298
Exclusive vapers	<i>n=122</i>	<i>n=520</i>	<i>n=372</i>	<i>n=72</i>	
HTP awareness	37 (30.3%)	150 (28.9%)	101 (27.2%)	15 (20.8%)	0.484
HTP trial	14 (11.5%)	13 (2.5%)	3 (0.8%)	4 (5.6%)	<0.001
HTP current use	10 (0.9%)	7 (1.4%)	0 (0.0%)	2 (2.8%)	<0.001

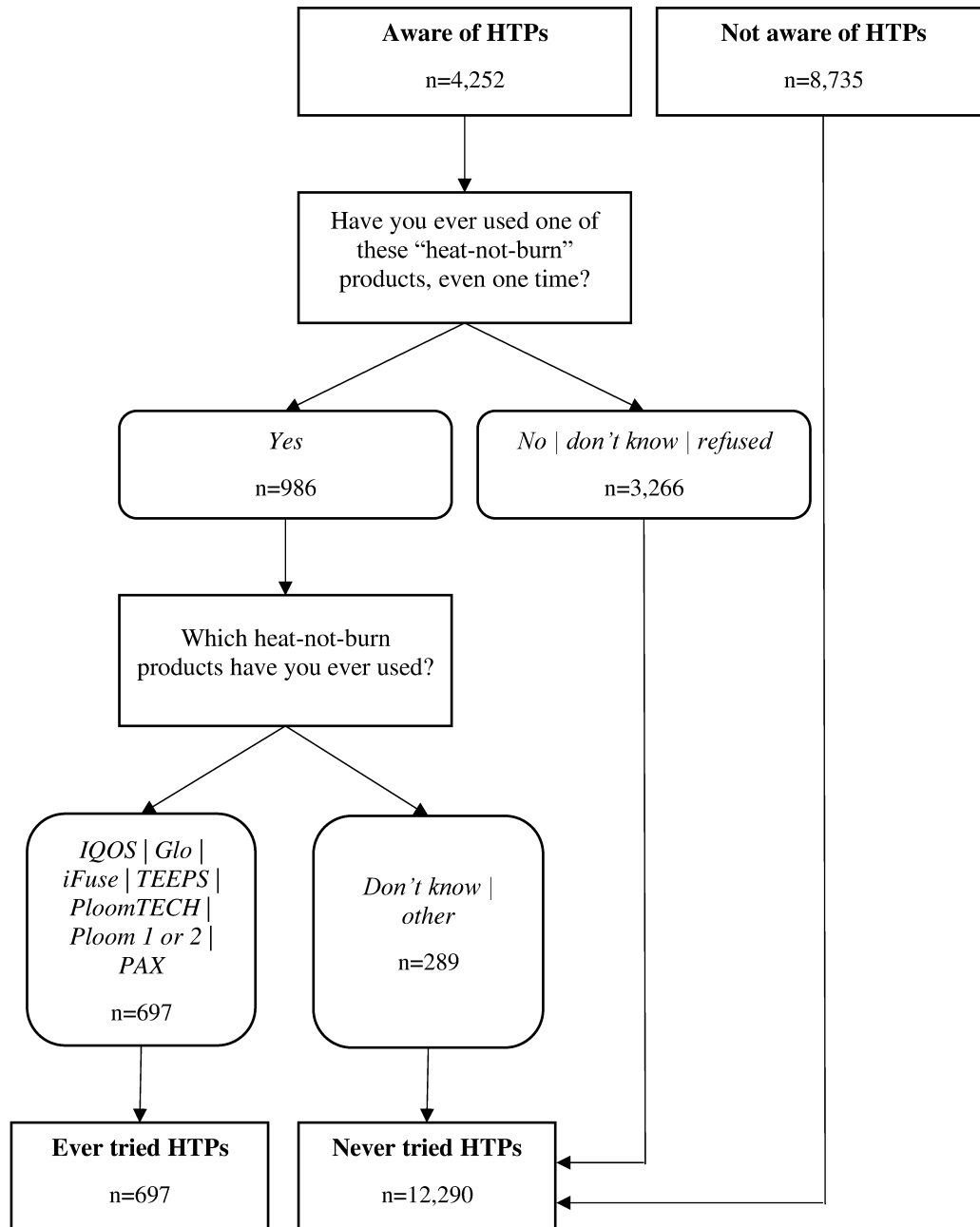
Supplemental Table S9. Prevalence of HTP trial, counting 'don't know' brand respondents as ever users, for (a) the overall sample, (b) stratified by country, and (c) stratified by other nicotine use status.

Overall (n=12,987)	Canada (n=3,778)	England (n=4,848)	United States (n=2,846)	Australia (n=1,515)
2.7 (2.3-3.1)	3.8 (3.0-4.5)	2.7 (2.1-3.2)	2.2 (1.4-2.9)	1.0 (0.3-1.8)
Overall (n=12,987)	Non-current smoker/vaper (n=1,619)	'Exclusive' vaper (n=1,087)	'Exclusive' smoker (n=6,753)	Concurrent smoker-vaper (n=3,528)
2.7 (2.3-3.1)	1.5 (0.9-2.2)	3.0 (1.6-4.5)	2.1 (1.7-2.6)	11.4 (10.1-12.8)

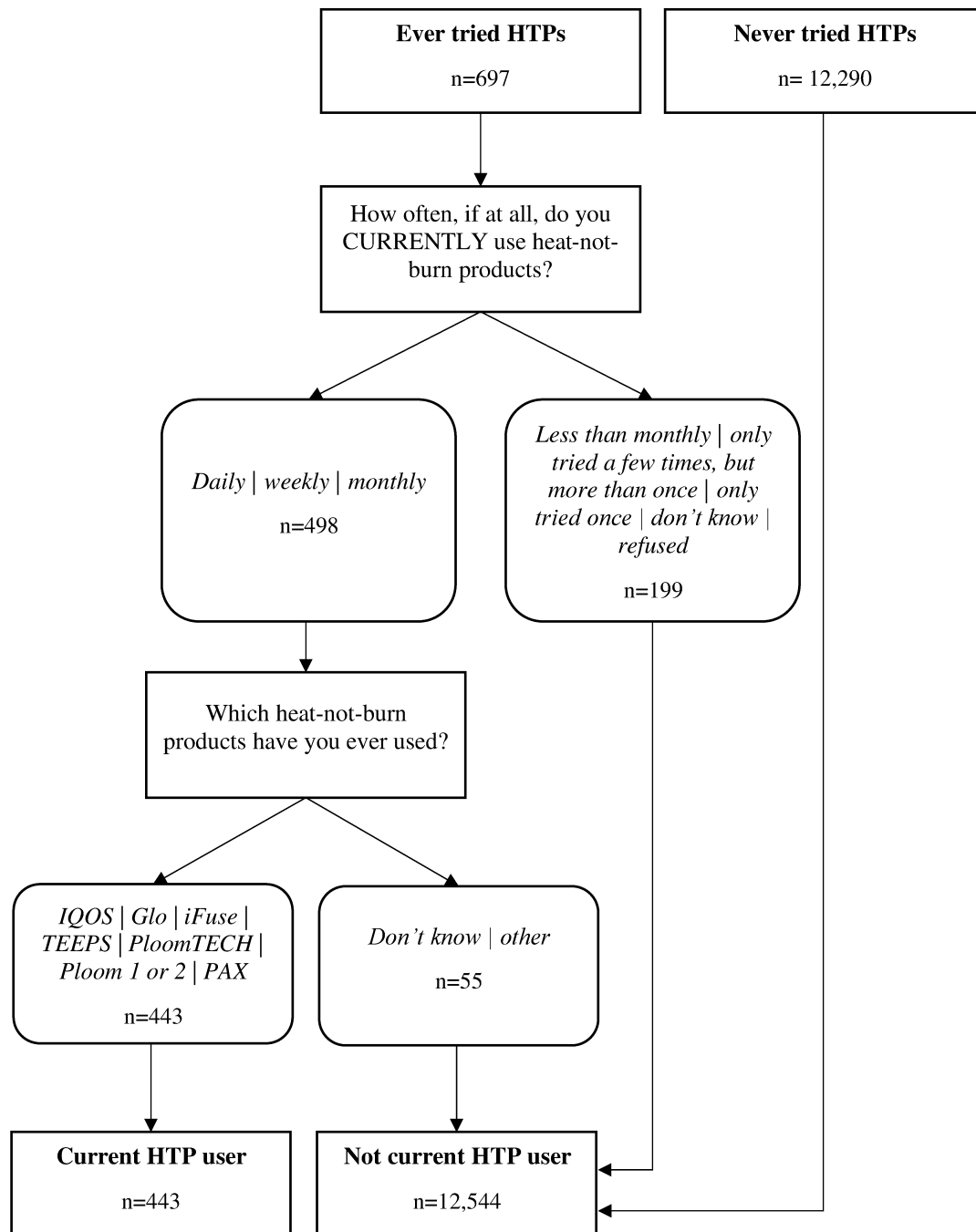
Values represent weighted % (95% confidence intervals) unless otherwise indicated.



Supplement Figure S1. Details of the HTP awareness definition.



Supplement Figure S2. Details of the HTP trial definition.



Supplement Figure S3. Details of the HTP current use definition.