

Flavored E-cigarette Use among Adults: Results from Two US Surveys

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Disclosures

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Dr. Shiffman and Mr. Sembower consult on tobacco harm minimization (including nicotine replacement therapy and vapor products) to Nicotivum USA, RJ Reynolds Vapor Company and RAIS, all subsidiaries of Reynolds American Inc. Dr. Shiffman also owns an interest in intellectual property for a novel nicotine medication.

Drs. Kim and Curtin are employed by RAIS, a wholly owned subsidiary of Reynolds American Inc., now part of British American Tobacco.

Background and Objectives

BACKGROUND

- The use of e-cigarettes is an important recent development relevant to tobacco control.
- There has been controversy regarding use of flavored e-cigarettes, especially among youth, but adult use of flavored e-cigarettes may be important in transitioning smokers away from cigarettes.

Background and Objectives

Objectives

- We assess adult use of flavored e-cigarettes in two national surveys:
- **PATH** (Population Assessment of Tobacco and Health), a large nationally representative survey sponsored by the Center for Tobacco Products (FDA) to address regulatory needs. (Fielded by Westat)
- **NTBM** (National Tobacco Behavior Monitor), a large national survey sponsored by RAI Services company to address regulatory needs. (Fielded by GfK)

To examine:

- Patterns and correlates of flavored e-cigarette use among US adult users.
- Degree of agreement between the PATH and NTBM survey estimates.

Data Sources

NATIONAL TOBACCO BEHAVIOR MONITOR (NTBM)

- Provides data from a weighted sample of 46,637 adults
- 4,845 past-30-day e-cigarette users;
- Surveyed online from January 2014 to June 2015.

POPULATION ASSESSMENT OF TOBACCO AND HEALTH (PATH)

- Provides data from a representative weighted sample of 32,320 adults
- 1,575 current 'established' e-cigarette users;
- Surveyed in-person from September 2013 to December 2014.

Survey Methodology

	NTBM	PATH
Dates	January 2014 to June 2015	September 2013 to December 2014
Sampling	Five opt-in online panels (Opinionology, SurveySpot, Toluna, Critical Mix, and GfK) plus a probability-based online panel (Knowledge Panel®).	Representative US survey using a four-stage stratified area probability sample
Weighting	Invitations balanced and survey weighted to US Census (2013 and 2014 Current Population Survey)	Weighted using 2013 US Census Bureau's American Community Survey
Overall N	46,637 adults, 18+*	32,320 adults (18+)
Data collection	Online survey	In-person interviews using computer-assisted personal interviewing and audio computer-assisted self-interviewing

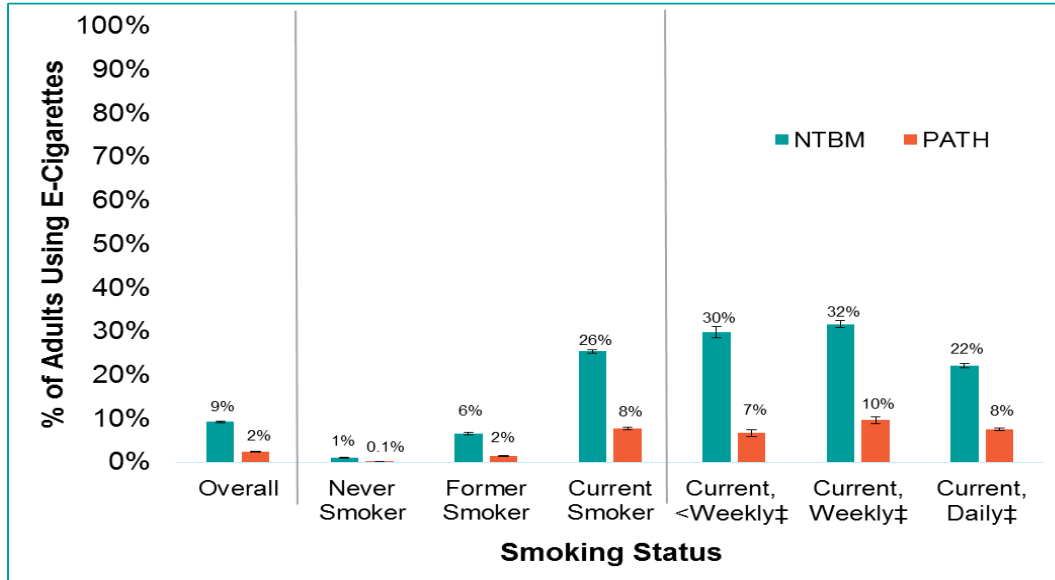
*Minimum age was based on minimum age to purchase tobacco, according to local regulations (19 or 21 in some jurisdictions).

Survey Methodology

	NTBM	PATH
Definition of e-cigarettes	“E-cigarettes use an electrical device to produce an inhalable mist of flavor and nicotine, providing a similar experience to smoking regular cigarettes (such as Blu, NJOY, Cig2o, FIN and Metro).”**	“E-cigarettes look like regular cigarettes, but are battery-powered and produce vapor instead of smoke. There are many types of e-cigarettes. Some common brands include NJOY, Blu and Smoking Everywhere.”
Definition of e-cigarette users	Past-30-day e-cigarette users	Current established e-cigarette users (“used fairly regularly,” uses every day, and some days) – only these respondents were asked the flavor questions
Definition of flavored e-cigarettes	“And what flavor of e-cigarettes do you use most often?” (specific flavors): Original/Tobacco, Regular, or Straight flavors classified non-flavored; other flavors (including menthol) classified flavored	“Is your regular brand you use flavored to taste like menthol, mint, clove, spice, candy, fruit, chocolate, alcohol (such as wine or cognac), or other sweets?” (specific flavors were not queried)

**In June 2015, the last month of this data series, the NTBM e-cigarette item was split into three separate items – cigalikes, tanks, and other vapor products – to provide greater detail on type used.

Analytic Results



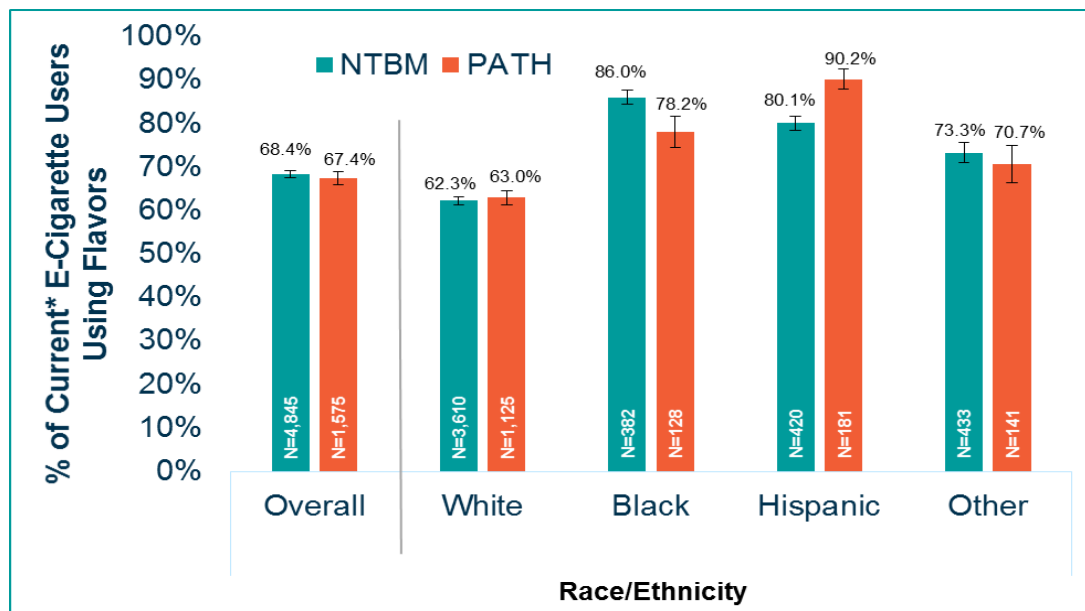
* Past 30-day use in NTBM. Current established use in PATH

‡ Current, <Weekly = 1-4 days per month (DPM); Current, Weekly = 5-26 DPM; Current, Daily = 27+ DPM

PATH and NTBM defined e-cigarette use differently and yielded different prevalence estimates.

- NTBM estimates were consistently and considerably higher (9.3% overall) than PATH estimates (2.4% overall)
- Patterns across smoking status were very similar, suggesting similarity in associations, if not in absolute prevalence estimates.
- Never smokers had the lowest prevalence in both surveys.

Analytic Results

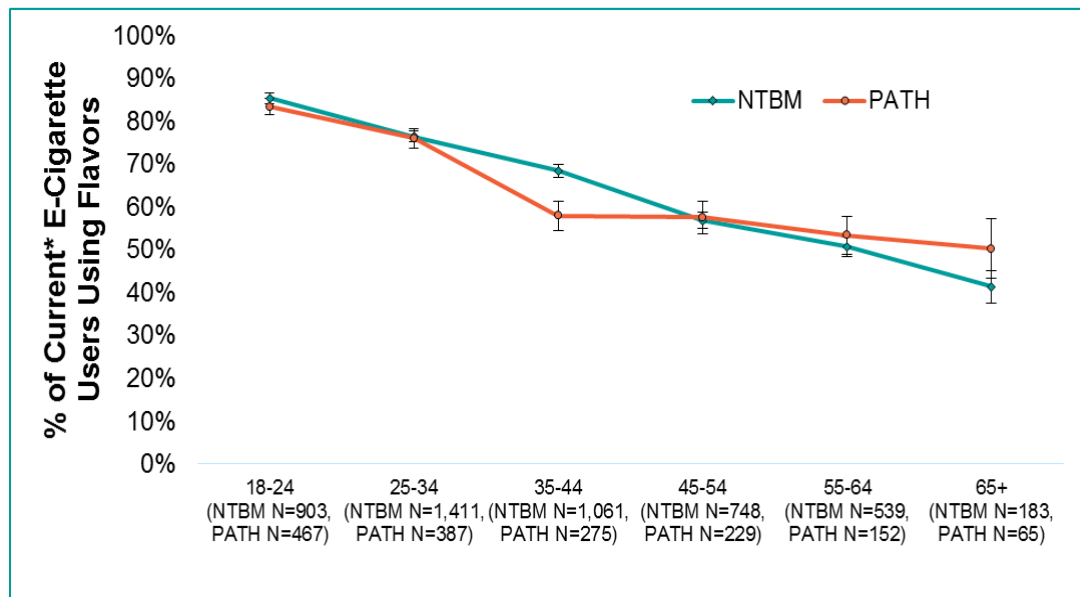


Past 30-day use in NTBM. Current established use in PATH
N=unweighted base size (denominator)
Error bars represent standard errors of the mean.

In both surveys, roughly two-thirds of e-cigarette users reported using flavored varieties.

- Flavored e-cigarette use was lowest among Whites.
- In NTBM, Blacks reported the highest rate of flavor use, due to a high percentage using menthol e-cigarettes (45.8%).
 - PATH did not identify the flavor used.

Analytic Results

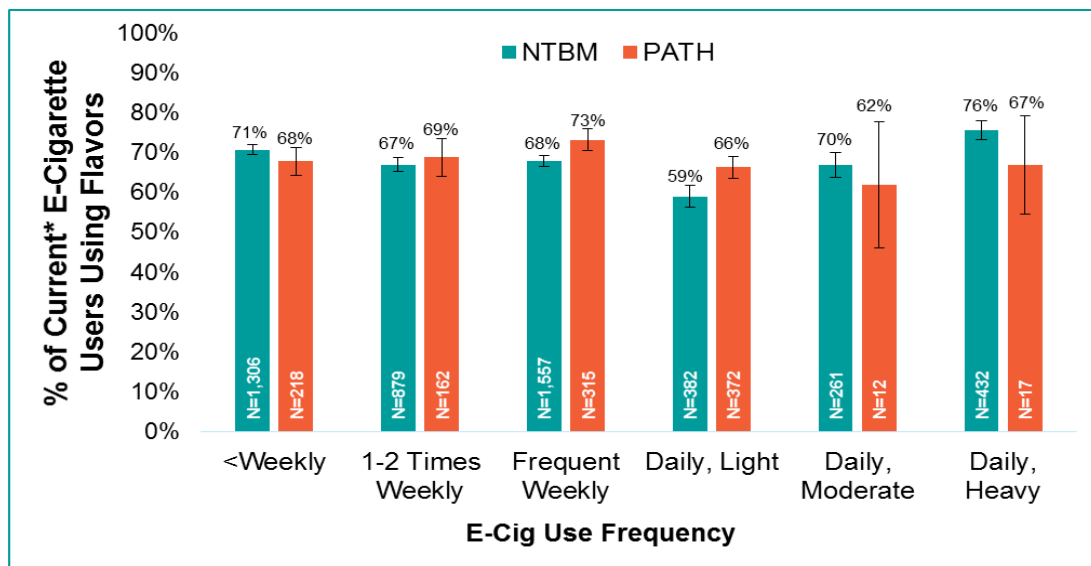


* Past 30-day use in NTBM. Current established use in PATH
N=unweighted base size (denominator)

Flavor use declined with age in both surveys.

- Despite decline (linear trend, $p < 0.0001$), users of flavored e-cigarettes still constituted a majority of e-cigarette users in nearly all age groups.

Analytic Results



*Past 30-day use in NTBM. Current established use in PATH

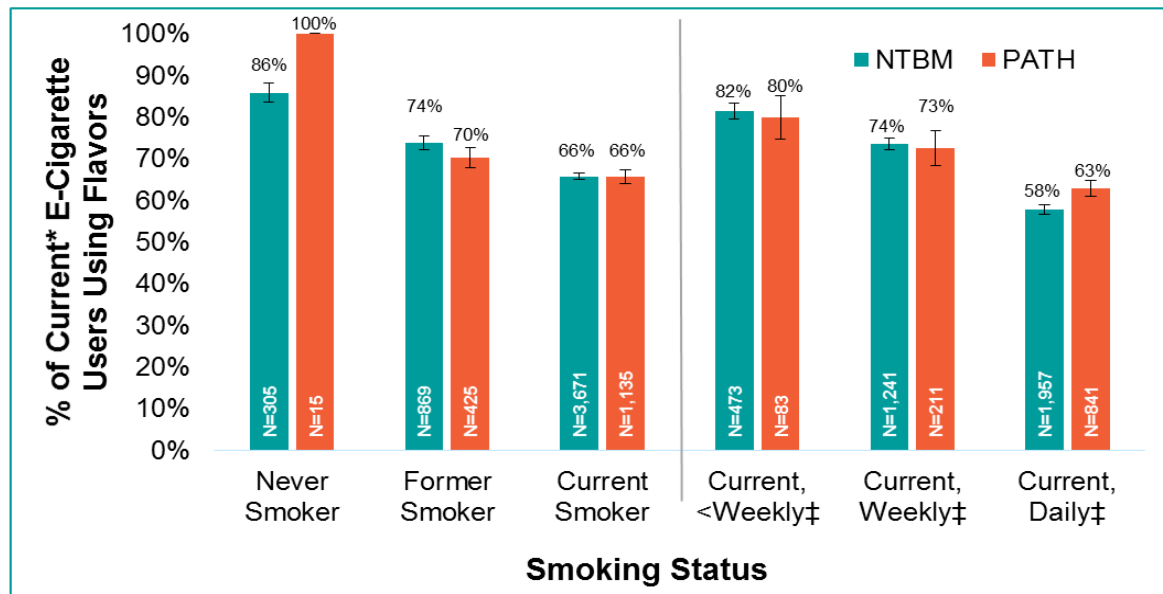
N=unweighted base size (denominator)

<Weekly = 1-4 days per month (DPM); 1-2 Times Weekly = 5-8 DPM; Frequent Weekly = 9-26 DPM; Daily, Light = 27+ DPM, ≤5 uses per day (UPD); Daily, Moderate = 27+ DPM; 6-10 UPD; Daily, Heavy = 27+ DPM, >10 UPD

The relationship between e-cigarette use frequency and use of flavors was modest and not directionally consistent.

- PATH: heavy daily users did not differ from other daily users (OR=1.04, 0.32-3.34).
- NTBM: heavy daily users (10+ uses/day) were more likely to use flavors (OR=1.88, 1.39-2.54, vs. other daily).

Analytic Results



N=unweighted base size (denominator)

* Past 30-day use in NTBM. Current established use in PATH

‡ Current, <Weekly = 1-4 days per month (DPM); Current, Weekly = 5-26 DPM; Current, Daily = 27+ DPM

Former smokers tended to be more likely to use flavors than current smokers.

- PATH: non-significant, OR=1.23, 0.96-1.59
- NTBM: significant, OR=1.47, 1.22-1.76
- Among current smokers, the use of flavored e-cigarettes was greatest among those who smoked less frequently (both surveys, linear trend $p < 0.001$).

Analytic Results

Both surveys addressed the sequence of adoption of smoking and e-cigarette use among those who engaged in both.

- PATH: 89.5% initiated smoking first. Only 3 e-cigarette users reported starting e-cigarettes first, precluding analyses of flavors.
- NTBM: 84.9% initiated smoking first. Flavor use was less common in the smoking-first group (OR=0.29, 0.21-0.40).

Analytic Results

COMPARISON between surveys:

- PATH and NTBM yielded remarkably consistent results, especially given different sampling and survey methods and different definitions and estimates of e-cigarette prevalence.
- Some associations that were not significant in PATH were significant in NTBM, perhaps because of NTBM's larger sample (4,845 e-cigarette users vs. 1,575 in PATH).

Implications

- Among US adult e-cigarette users, use of flavored e-cigarettes was more common among:
 - Black and Hispanic compared to non-Hispanic White e-cigarette users;
 - Younger (vs. older) adult e-cigarette users;
 - Former (vs. current) cigarette smokers;
 - Less (vs. more) frequent smokers;
 - Heavy daily compared to less frequent daily e-cigarette users (10+ uses/day) – NTBM only;
 - E-cigarette users who did not engage in regular cigarette use first – NTBM only.
- Negative correlations with smoking suggest that adoption of flavors in e-cigarette users increases with decreasing smoking, consistent with prior reports that adult smokers' shifts toward flavored e-cigarette use can be part of a transition away from smoking.
- Flavored e-cigarette use is complex and worthy of further systematic quantitative research.

Implications

Methodology:

- Results from NTBM were concordant with those from PATH, despite the differences in sampling, survey methodology, question wording, definition of constructs, (including current e-cigarette use), and overall prevalence estimates of e-cigarette use.
- Diverse survey methods, including online surveys of online research panels, can validly assess patterns of e-cigarette use.