

Youth Tobacco Product Use in the United States

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abstract

BACKGROUND: Noncigarette tobacco products are increasingly popular among youth, especially cigarette smokers. Understanding multiple tobacco product use is necessary to assess the effects of tobacco products on population health. This study examines multiple tobacco product use and associated risk factors among US youth.

METHODS: Estimates of current use were calculated for cigarettes, cigars, smokeless tobacco, hookah, e-cigarettes, pipes, bidis, kreteks, snus, and dissolvable tobacco by using data from the 2012 National Youth Tobacco Survey ($n = 24\,658$), a nationally representative sample of US middle and high school students. Associations between use patterns and demographic characteristics were examined by using multinomial logistic regression.

RESULTS: Among youth, 14.7% currently use 1 or more tobacco products. Of these, 2.8% use cigarettes exclusively, and 4% use 1 noncigarette product exclusively; 2.7% use cigarettes with another product (dual use), and 4.3% use 3 or more products (polytobacco use). Twice as many youth use e-cigarettes alone than dual use with cigarettes. Among smokers, polytobacco use was significantly associated with male gender (adjusted relative risk ratio [aRRR] = 3.71), by using flavored products (aRRR = 6.09), nicotine dependence (aRRR = 1.91), tobacco marketing receptivity (aRRR = 2.52), and perceived prevalence of peer use of tobacco products (aRRR = 3.61, 5.73).

CONCLUSIONS: More than twice as many youth in the United States currently use 2 or more tobacco products than cigarettes alone. Continued monitoring of tobacco use patterns is warranted, especially for e-cigarettes. Youth rates of multiple product use involving combustible products underscore needs for research assessing potential harms associated with these patterns.

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Dr Lee conceptualized and designed the study, and drafted the initial manuscript; Ms Hebert carried out the initial analyses, contributed to the manuscript draft, and reviewed and revised the manuscript; Drs Nonnemaker and Kim substantially contributed to the conceptualization and design of the study, and reviewed and revised the manuscript; and all authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

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WHAT'S KNOWN ON THIS SUBJECT: Noncigarette tobacco products are increasingly popular among youth, especially youth who smoke cigarettes. Although youth use of conventional cigarettes is on the decline, use of other tobacco products is rising and multiple product use may be an escalating trend.

WHAT THIS STUDY ADDS: More than twice as many youth in the United States currently use 2 or more tobacco products than cigarettes alone. Youth multiple product use is associated with increased nicotine dependence, raising concerns about the additive harms of noncigarette tobacco products.

Youth tobacco use patterns are becoming more complex in the current marketplace where tobacco products are increasingly diverse. Although youth use of conventional cigarettes is on the decline, use of nonconventional products is rising, and there may be an escalating trend for dual (using cigarettes with another product) and polytobacco use (using any 3 or more products).¹⁻⁴ Between 2000 and 2012, the most significant overall decline in tobacco use for high school students was among those who reported using only conventional cigarettes.⁵ Over the same period, use of electronic cigarettes (e-cigarettes) and hookah (or water pipe) has grown. Youth prevalence of e-cigarette ever, current, and dual use (with traditional cigarettes) doubled between 2011 and 2012, with almost 10% of students who have used e-cigarettes having never used conventional cigarettes.⁶ Current use of hookah among high school students also increased during this time, whereas use of other products, including bidis (small brown cigarettes wrapped in a leaf), kreteks (clove cigarettes), and dissolvable tobacco products, significantly decreased.⁷ In 2012, more than one-fifth of high school students in the United States were current users of tobacco products (conventional cigarettes, cigars, smokeless tobacco, pipes, bidis, kreteks), and almost half of these students used 2 or more tobacco products.⁵

Differences in the level of nicotine dependence⁸ and health risks associated with these tobacco products make it important for policy makers and regulatory agencies interested in protecting the public health to understand how these products are used.^{9,10} Understanding multiple tobacco product use patterns among youth is particularly important because most individuals first experiment with and initiate into tobacco use during this period.¹¹

In addition to the health risks posed by combustible tobacco products, such as cigarettes, cigars, pipes, and hookah,¹²⁻¹⁴ adolescents may be uniquely vulnerable to the negative health effects of nicotine¹⁵ delivered by other noncombustible smokeless or vapor products, such as chew (chewing tobacco, snuff, or dip), snus (an oral moist snuff consumed in porous packets), and e-cigarettes. Concurrent use of multiple tobacco products could increase youth exposure to nicotine and risk of nicotine dependence.¹⁶

Disentangling the various factors that may drive youth multiple tobacco product use is complicated by the rapidly changing tobacco marketplace. Consumers are presented with an array of increasingly diverse products that deliver nicotine.^{9,17-19} Researchers are beginning to examine use patterns associated with various tobacco products among youth and adults,^{5,16,20-22} sometimes collectively referred to as "other tobacco products" or OTPs,²³ to understand their potential effects on individual and population health. Researchers have comparatively examined exclusive and multiple tobacco product use among youth²⁴⁻²⁷; however, studies often use data collected before some of these products were introduced into the market or gained popularity. Most existing findings related to multiple product use among youth include a relatively limited number of OTPs. For example, Agaku and colleagues,²⁸ Dutra and Glantz,²⁹ and Arrazola and colleagues⁵ exclude some products covered by the 2012 National Youth Tobacco Survey (NYTS) in their analyses. We are aware of 1 article focused on a wider range of products that includes e-cigarettes, hookah, and dissolvables, by Wang and colleagues²; however, they do not report prevalence for specific patterns of use, such as exclusive single-product use or dual-use types. Further analysis is needed to

understand the various tobacco product use patterns that youth engage in and to assess the potential risk and protective factors of these patterns.¹

The purpose of this study was to assess the prevalence of exclusive and concurrent use patterns of tobacco and e-cigarette products among 6th- through 12th-grade students in the United States. In addition, demographic characteristics, tobacco use factors (conventional cigarette use characteristics, nicotine dependence, tobacco cessation), and attitudinal characteristics (harm perception, tobacco marketing receptivity, perceived prevalence) that may be associated with patterns of tobacco product use among youth cigarette smokers are examined.

METHODS

Data

The NYTS is a nationally representative dataset covering tobacco-related beliefs, attitudes, and behaviors of all middle and high school students in the 50 states and the District of Columbia. The NYTS is publicly available through the Centers for Disease Control and Prevention. The 2012 NYTS was collected in spring 2012 by using a stratified 3-stage cluster sample design with an oversample of non-Hispanic black and Hispanic students. The final sample consisted of 284 schools, of which 228 participated, for a school participation rate of 80.3%. The survey resulted in 24 658 completed student questionnaires of a sample of 26 873 students for a student participation rate of 91.7%, giving an overall participation rate of 73.6%.³⁰

Measures

Current Use

Current use of tobacco products was defined as using the product on at least 1 of the past 30 days. Current use was measured for cigarettes, roll-your-own cigarettes, cigars,

smokeless tobacco, pipes, hookah, e-cigarettes, bidis, kreteks, snus, and dissolvables. From these indicators, an exhaustive, mutually exclusive variable was created for current use of any tobacco product. Pipes, bidis, and kreteks were combined into the category "other combustible products," and snus and dissolvables were combined into the category "other noncombustible products." Analysis of current tobacco use was limited to participants who responded to all current tobacco use questions. A total of 1687 cases (6.8%) were excluded from the sample of 24 658 students because of missing responses on ≥ 1 current tobacco use items or inconsistency in responses. For example, respondents who indicated both that they had never used a tobacco product and that they had used the product on at least 1 of the past 30 days were excluded from analysis because of inconsistency in their responses.

Current tobacco users were categorized based on their reported combination of current product use: current exclusive product use, current use of cigarettes with 1 other product, current use of 2 other combustible products, current use of 2 other noncombustible products or a combination of 1 other combustible and 1 other noncombustible product, current use of 3 or more tobacco products, and no current tobacco use. When examining cigarette smokers, we distinguished 2 types: dual users and polytobacco users. For the regression analyses focused on current cigarette users, cigarette smokers who reported using 1 other tobacco product were categorized as dual users, and current cigarette smokers who reported using 2 or more other tobacco products were categorized as polytobacco users.

Demographics

Self-reported age, gender, and race/ethnicity were included to control for demographic characteristics. Self-reported age was categorized

into 3 categories: 9 to 14, 15 to 17, and ≥ 18 . Race/ethnicity was measured by using 2 items asking respondents to report their race (American Indian or Alaska Native, Asian, black or African American, Native Hawaiian or Other Pacific Islander, or white) and whether they identify as Hispanic (Mexican, Puerto Rican, Cuban, or some other Hispanic or Latino identity not listed). The following race/ethnicity categories were used for analysis: "white, non-Hispanic," "black, non-Hispanic," "Hispanic," and "other, non-Hispanic." Non-Hispanic multiracial participants were included in the "other, non-Hispanic" race/ethnicity category.

Tobacco Use Factors

To control for other tobacco-related influences, indicators were included for trying cigarettes for the first time before age 12,³¹ living with a current tobacco user (cigarettes, chew, snuff, dip or snus, cigars, cigarillos, or little cigars, or any other form of tobacco), nondaily versus daily smoking (in the past 30 days), using flavored tobacco products in the past 30 days (menthol [mint], clove, spice, alcohol [wine, cognac], candy, fruit, chocolate, or other sweets), nicotine dependence (time to first tobacco product use within 30 minutes of waking), and having made a quit attempt in the past 12 months.

Attitudinal Characteristics

Attitudinal characteristics included harm perceptions measured by survey items asking if respondents "agree" or "strongly agree" with the statement "all tobacco products are dangerous," and believing that breathing smoke from other people's cigarettes or other tobacco products causes "some" or "a lot of harm" (versus no or little harm). Tobacco marketing receptivity was created by using the question "How likely is it that you would ever use or wear something, such as a lighter, T-shirt, hat, or sunglasses, that has a tobacco brand name, logo, or picture on it?"

Participants who responded "very likely" or "somewhat likely" versus "somewhat unlikely" or "very unlikely" were categorized as being receptive to tobacco marketing. Perceived prevalence of peer tobacco use was created using the questions "Out of every 10 students in your grade at school, how many do you think use tobacco products other than cigarettes?" Responses were grouped into categories of "None," "1 to 4," and "5 to 10."

Analysis

Weighted estimates of the prevalence of exclusive product use and multiple product use categories were calculated. Associations between multiple product use and all other characteristics were examined among current cigarette smokers by using multinomial logistic regression. Unadjusted and adjusted relative risk ratios (RRR) were calculated in reference to exclusive cigarette use. Adjusted results were calculated by using a model that included all variables. All analyses were completed by using Stata version 13 (Stata Corp, College Station, TX) in 2014. Results with a relative SE of $>30\%$ were determined to be statistically unstable and are not reported.⁵

RESULTS

Current Tobacco Product Use

Results show that more youth reported currently using OTPs than exclusively using cigarettes. Among US youth, 14.7% currently used at least 1 tobacco product. These included 6.7% exclusively used only 1 product, 3.6% used 2 products, and 4.3% used ≥ 3 products. Cigarettes (2.8%) and cigars (2.0%) were the most popular products used exclusively by youth, and use of these products increased with age. Among 9- to 14-year-olds and 15- to 17-year-olds, exclusive cigarette use was most popular (1.3% and 4.1%), but exclusive cigar use was more popular

than exclusive cigarette use (5.6% vs 4.5%) among those aged ≥ 18 . Cigars and cigarettes were the most popular 2-product combination currently used by older youth (3.5% among those aged ≥ 18). The use of 2 other noncigarette combustible products was also more popular with age, increasing from 0.2% among 9- to 14-year-olds to 2.1% among those aged ≥ 18 (Table 1).

The prevalence of exclusive smokeless tobacco use (0.6%) was higher than smokeless/cigarette dual use (0.2%). Similarly, the prevalence of exclusive e-cigarette use (0.9%) was higher than that of e-cigarette/cigarette dual use (0.4%).

Factors Associated With Dual Use

Table 2 presents factors associated with dual use among current smokers relative to exclusive cigarette smokers. Overall, we find that age, gender, race/ethnicity, use of flavored tobacco products, nicotine

dependence, tobacco marketing receptivity, and perceived prevalence of peers using tobacco were significantly associated with dual use. Youth 15 to 17 years of age (RRR = 1.69) and ≥ 18 (RRR = 2.32) were significantly more likely to be dual users than youth 9 to 14 years of age ($P < .01$, $P < .001$, respectively). Male youth (RRR = 1.38, $P < .05$) and black, non-Hispanic youth (relative to white, non-Hispanic youth) were significantly more likely to be dual users (RRR = 1.46, $P < .05$) in the unadjusted model. In addition to these demographic characteristics, use of flavored tobacco products (RRR = 2.05, $P < .001$), nicotine dependence (RRR = 1.65, $P < .01$), tobacco marketing receptivity (RRR = 1.44, $P < .01$), and perceived prevalence of peers using tobacco (1–4 students of 10, RRR = 2.13, $P < .05$, and 5–10 students of 10, RRR = 2.46, $P < .05$, relative to none of 10) were significantly associated

with dual use in unadjusted results. However, only male gender (adjusted RRR [aRRR] = 1.59, $P < .05$), use of flavored tobacco products (aRRR=2.08, $P < .01$), and tobacco marketing receptivity (aRRR=1.71, $P < .01$) were significantly associated with dual use in the adjusted model.

Factors Associated Polytobacco Use

Factors associated with polytobacco use are summarized in Table 2. Overall, we find that age, gender, race/ethnicity, age first tried cigarette smoking, living with someone who uses tobacco, daily cigarette smoking, use of flavored products, nicotine dependence, harm perceptions, tobacco marketing receptivity, and perceived prevalence were significantly associated with polytobacco use relative to exclusive cigarette use. Similar to dual users, youth ≥ 18 (RRR = 1.76, $P > .01$) were significantly more likely to be polytobacco users than youth 9 to

TABLE 1 Current Tobacco Product Use Among US Youth, NYTS 2012 ($n = 24\ 658$)

Current Tobacco Product Use	Overall		Ages 9–14		Ages 15–17		Ages ≥ 18	
	<i>n</i>	Weighted % (95% CI)	<i>n</i>	Weighted % (95% CI)	<i>n</i>	Weighted % (95% CI)	<i>n</i>	Weighted % (95% CI)
Exclusive single-product use	1517	6.7 (6.1–7.5)	374	3.2 (2.7–3.6)	867	9.5 (8.4–10.6)	274	13.8 (11.8–16.0)
Cigarette	633	2.8 (2.4–3.2)	160	1.3 (1.0–1.7)	379	4.1 (3.5–4.8)	93	4.5 (3.4–5.8)
Cigar	444	2.0 (1.7–2.4)	75	0.7 (0.5–1.0)	262	2.8 (2.3–3.5)	107	5.6 (4.4–7.1)
Smokeless tobacco	132	0.6 (0.4–0.7)	17	0.2 ^a (0.1–0.3)	78	0.7 (0.5–1.0)	37	1.9 (1.1–3.1)
Hookah	41	0.2 (0.1–0.3)	20	0.2 (0.1–0.3)	19	0.3 (0.2–0.4)	2	0.1 ^a (0.0–0.2)
E-cigarette	197	0.9 (0.7–1.3)	66	0.5 (0.3–0.7)	105	1.4 (0.9–2.1)	25	1.3 (0.8–2.1)
Other combustible (pipe, bidis, or kreteks)	48	0.2 (0.1–0.3)	25	0.2 (0.1–0.3)	16	0.2 (0.1–0.3)	7	0.4 ^a (0.2–0.9)
Other noncombustible (snus or dissolvable)	22	0.1 (0.0–0.1)	11	0.1 ^a (0.0–0.2)	8	0.1 ^a (0.0–0.1)	3	0.2 ^a (0.1–0.5)
Two-product use	817	3.6 (3.2–4.2)	142	1.2 (0.9–1.4)	501	5.4 (4.7–6.3)	173	9.0 (7.5–10.6)
Cigar and cigarettes	319	1.4 (1.1–1.8)	44	0.3 (0.2–0.4)	204	2.3 (1.8–2.9)	70	3.5 (2.7–4.5)
Smokeless tobacco and cigarettes	53	0.2 (0.2–0.3)	5	0.1 ^a (0.0–0.2)	35	0.4 (0.2–0.6)	13	0.5 ^a (0.3–1.0)
Hookah and cigarettes	65	0.3 (0.2–0.4)	17	0.2 (0.1–0.3)	41	0.4 (0.3–0.6)	7	0.3 ^a (0.1–0.7)
E-cigarette and cigarettes	78	0.4 (0.3–0.5)	12	0.1 ^a (0.0–0.3)	48	0.6 (0.4–0.8)	18	1.1 (0.7–1.9)
One other combustible product (pipe, bidis, or kreteks) and cigarettes	44	0.2 (0.1–0.3)	10	0.1 ^a (0.0–0.2)	27	0.3 (0.2–0.4)	7	0.4 ^a (0.2–0.8)
One other noncombustible product (snus or dissolvable) and cigarettes	36	0.2 (0.1–0.2)	11	0.1 ^a (0.0–0.2)	19	0.2 (0.1–0.3)	6	0.3 ^a (0.2–0.8)
Two other combustible products	119	0.5 (0.4–0.7)	21	0.2 (0.1–0.3)	61	0.6 (0.5–0.8)	37	2.1 (1.5–3.0)
Two other noncombustible products	43	0.2 (0.1–0.2)	8	0.1 ^a (0.0–0.1)	29	0.3 (0.2–0.4)	6	0.2 ^a (0.1–0.6)
One other combustible product and 1 other noncombustible product	60	0.3 (0.2–0.4)	14	0.1 ^a (0.1–0.2)	37	0.4 (0.3–0.7)	9	0.4 ^a (0.2–0.9)
Three or more product use	968	4.3 (3.7–4.9)	205	1.7 (1.3–2.1)	564	6.0 (5.1–7.1)	197	10.3 (8.6–12.4)
Including cigarettes	856	3.7 (3.2–4.3)	181	1.5 (1.2–1.9)	504	5.3 (4.4–6.3)	169	8.8 (7.2–10.7)
Not including cigarettes	112	0.5 (0.4–0.7)	24	0.2 (0.1–0.3)	60	0.7 (0.5–1.0)	28	1.5 (1.0–2.4)
No current tobacco use	19654	85.3 (83.9–86.6)	11 061	94.0 (93.2–94.7)	7232	79.1 (77.0–81.0)	1306	66.9 (63.8–69.9)

CI, confidence interval.

^a Data are statistically unstable (relative SE >30%).

TABLE 2 Associations Between Tobacco Product Use Types and Key Characteristics Among US Current Smokers (Youth), NYTS 2012 (*n* = 2093)

Characteristics	Dual Use (Cigarettes and 1 Other Product)		Polytobacco Use (Cigarettes and ≥2 Other Products)	
	Unadjusted RRR	aRRR	Unadjusted RRR	aRRR
Age, y				
9–14	REF	REF	REF	REF
15–17	1.69**	0.96	1.16	0.78
≥18	2.32***	1.35	1.76**	1.20
Gender				
Female	REF	REF	REF	REF
Male	1.38*	1.59*	2.59***	3.71***
Race/ethnicity				
White, non-Hispanic	REF	REF	REF	REF
Black, non-Hispanic	1.46*	1.27	0.41**	0.23*
Hispanic	0.89	0.81	1.09	1.31
Other, non-Hispanic (includes multiracial, non-Hispanic)	1.01	0.70	0.82	0.68
Age first tried cigarette smoking, y				
<12	0.86	0.77	1.75***	1.18
≥12	REF	REF	REF	REF
Live with someone who uses tobacco products				
No	REF	REF	REF	REF
Yes	0.90	0.81	1.01	0.63*
Smoker type				
Daily	1.45	1.21	3.08***	1.62
Nondaily	REF	REF	REF	REF
Use flavored tobacco products				
No	REF	REF	REF	REF
Yes	2.05***	2.08**	6.03***	6.09***
Dependence (how soon after waking), min				
≥30	REF	REF	REF	REF
<30	1.65**	1.42	3.22***	1.91*
Quit attempt				
No	REF	REF	REF	REF
Yes	0.99	0.96	0.76	0.78
Agree that “all tobacco products are dangerous”				
No	REF	REF	REF	REF
Yes	0.69	1.19	0.40***	0.96
Think breathing smoke from tobacco products causes harm				
No	REF	REF	REF	REF
Yes	0.77	0.73	0.55***	0.58**
Receptivity (would ever use or wear something with tobacco company name on it)				
No (somewhat or very unlikely)	REF	REF	REF	REF
Yes (very or somewhat likely)	1.44**	1.71**	2.43***	2.52***
Perceived prevalence (“Out of 10 students in your grade, how many do you think use other tobacco products?”)				
None	REF	REF	REF	REF
1–4	2.13*	2.36	4.17***	3.61*
5–10	2.46*	2.82	5.63***	5.73*

RRRs for dual and polytobacco use are in reference to exclusive cigarette use.

P* < .05; ** *P* < .01; * *P* < .001.

14 years of age in the unadjusted model. Like dual users, male youth were significantly more likely to be polytobacco users in both the unadjusted model (RRR = 2.59,

P < .001) and adjusted model (aRRR = 3.71, *P* < .001 adjusting for all variables); however, unlike for dual use, black, non-Hispanic youth were less likely than white, non-Hispanic

youth to be polytobacco users in both the unadjusted model (RRR = 0.41, *P* < .01) and the adjusted model (aRRR = 0.23, *P* < .05).

In addition to these demographic characteristics, initiating before the age of 12 (RRR = 1.75, *P* < .001), smoking cigarettes daily (RRR = 3.08, *P* < .001), use of flavored tobacco products (RRR = 6.03, *P* < .001), nicotine dependence (RRR = 3.22, *P* < .001), harm perceptions (agreeing “all tobacco products are dangerous,” RRR = 0.40, *P* < .001, and breathing smoke from tobacco products causes harm, RRR = 0.55, *P* < .001), tobacco marketing receptivity (RRR = 2.43, *P* < .001), and perceived prevalence of peers using tobacco (1–4 of 10 students, RRR = 4.17, *P* < .05, and 5–10 of 10 students, RRR = 5.63, *P* < .05, relative to none of 10) were significantly associated with dual use in unadjusted results. However, in the adjusted model, only male gender (aRRR = 3.71, *P* < .001), black, non-Hispanic ethnicity (aRRR = 0.23, *P* < .05 relative to white, non-Hispanic), living with someone who uses tobacco (aRRR = 0.63, *P* < .05), use of flavored products (aRRR = 6.09, *P* < .001), nicotine dependence (aRRR = 1.91, *P* < .05), agreeing breathing smoke from tobacco products causes harm (aRRR = 0.58, *P* < .01), tobacco marketing receptivity (aRRR = 2.52, *P* < .001), and perceived prevalence of peers using tobacco (1–4 of 10 students, aRRR = 3.61, *P* < .05, and 5–10 of 10 students, aRRR = 5.73, *P* < .05, relative to none of 10) were significantly associated with polytobacco use.

DISCUSSION

We found that, among youth who used tobacco products in grades 6 to 12, the use of OTPs was more prevalent than the exclusive use of cigarettes. We also found that most of the respondents who used tobacco products used 2 or more tobacco products. These findings are

consistent with reports of increasing sales and use of OTPs.^{6,7,32–34} Youth may be uniquely at risk for use of some OTPs, particularly those that feature candylike flavors (eg, cigars, smokeless tobacco, hookah, and e-cigarettes).³⁵ OTPs, such as e-cigarettes, are often not subject to advertising restrictions that limit the marketing exposure to youth.³⁶ In addition, we found that prevalence of exclusive use of e-cigarettes was twice as high as dual use of e-cigarettes and conventional cigarettes. This raises concerns that e-cigarettes may be attractive to nonsmoking youth and not likely used for cessation among youth smokers. However, subsequent research and monitoring is needed to assess whether e-cigarettes attract youth who might otherwise never use tobacco products or whether e-cigarettes are associated with subsequent use of combustible tobacco products.

We found that 4.3% of youth in the United States report current past 30-day polytobacco use of 3 or more products, compared with 2.4% of adults in the same year,²⁰ suggesting that youth may be at greater risk for current polytobacco use than adults. It is unclear whether youth multiple tobacco product use may be due to a temporary period of experimentation with tobacco products, a cohort effect disproportionately affecting the current cohort of students, or some other combination of influences.

Approximately half of youth who use tobacco concurrently use conventional cigarettes with OTPs, suggesting that youth are using OTPs in addition to cigarettes rather than as substitute forms of tobacco in place of cigarettes. Furthermore, using tobacco within 30 minutes of waking was positively associated with polytobacco use, suggesting increased nicotine dependence among polytobacco users. Our findings are consistent with a view that OTP use

among youth does not represent harm reduction. Notably, having made an attempt to quit using tobacco was not associated with dual or polytobacco use compared with using cigarettes alone. Our results suggest that youth dual and polytobacco users are not using the OTPs as part of strategies to reduce or quit using tobacco products and may more likely be initiating into tobacco use or experimenting with OTPs.

We show that risk factors for multiple product use compared with cigarette use alone include male gender, use of flavored tobacco products, use of tobacco within the first 30 minutes of waking, receptivity to tobacco company marketing, and perception of higher rates of tobacco use among their peers. These differences highlight the distinctive nature of multiple product use, suggesting that existing prevention intervention efforts to curb cigarette smoking may not adequately address youth at risk for multiproduct use.

These data are from a recent, large, nationally representative dataset. However, there are several limitations that should be noted. The NYTS is cross-sectional and did not collect data on the use history of participants, therefore we cannot assess use trajectories. There are concerns about the need for improved measures for OTPs, particularly emerging products such as e-cigarettes that are marketed by using a variety of names. The items used to measure OTP use in the NYTS may not capture the full extent of OTP use. The NYTS is also a school-based sample of youth and may not adequately represent all youth, especially older students who have graduated or dropped out of enrollment.

CONCLUSIONS

In this study, we show that significant numbers of teens in the United States are using tobacco products

concurrently. This concurrent use should be of concern to the health community because of the potential additive harms posed by increased use of these products and the potential for increased exposure to nicotine and nicotine addiction. Researchers have yet to understand how new and emerging products, such as e-cigarettes and hookah, might affect youth tobacco product use patterns. Policy makers also have yet to understand how tobacco control policies for cigarettes, such as the ban on characterizing flavors, may affect use of OTPs. Those working in the interests of public health should be concerned with monitoring dual and polytobacco use patterns among youth to understand the potential harm OTPs pose to the public health. Researchers should include a wide range of OTPs in their surveillance efforts, including e-cigarettes and hookah, to better reflect the changing marketplace and provide more accurate and comprehensive estimates of youth tobacco use.

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