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# Youth and Young Adult Blunt Use Predicts Progression to Other Nicotine Product Use in the United States

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## ABSTRACT

*Background:* Little cigars or cigarillos (LCCs) are frequently modified to smoke cannabis ("blunts") by youth and young adults. This study investigated whether young blunt users who are otherwise nicotine-naïve are more likely to initiate other tobacco products compared to never blunt users.
*Methods and Materials:* Data were from four waves of the Truth Longitudinal Cohort (TLC), a national probability-based sample of youth and young adults (aged 15-24 years) in the United States (Wave 1: January—April 2017; Wave 2: February—May 2018; Wave 3: February—May 2019; Wave 4: September—December 2019). The sample was restricted to nicotine naïve respondents at Wave 1 with possible ever use of blunts ($N=5,284$). Logistic regression analyses tested whether ever blunt use at Wave 1 predicted initiation of nicotine products by Wave 4, controlling for established risk factors.
*Results:* Compared to never-blunt users, ever users of blunts at Wave 1 had significantly higher odds of ever using cigars (OR: 4.74; 95% CI: 1.80-12.47; $p=0.002$), e-cigarettes (OR: 4.66; 95% CI: 2.42-8.95; $p<0.001$), cigarettes (OR: 3.02; 95% CI: 1.17-7.84, $p=0.023$), or hookah (OR: 3.47; 95% CI: 1.07-11.29, $p=0.039$) by Wave 4. Cannabis (never blunt) use by Wave 1 predicted ever use of e-cigarettes (OR: 3.45, 95% CI: 2.38-5.02, $p<0.001$), cigarettes (OR: 3.81; 95% CI: 2.26-6.43, $p<0.001$), or hookah (OR: 2.13; 95% CI: 1.12-4.05, $p=0.021$) by Wave 4.
*Discussion:* Blunts are a point of nicotine initiation that places users at increased risk of progression to cigars, while the same relationship was not found for cannabis alone.

## Introduction

Little cigars and cigarillos (LCCs) can be repurposed for marijuana use by removing the tobacco and refilling the cigar casing with cannabis, or a mixture of cannabis and tobacco. Cigar wrappers are constructed from tobacco leaves, which presents opportunities for exposure to nicotine even when the tobacco filling is removed (Peters et al., 2016). Blunts may not be readily considered as a tobacco product by youth and young adults (Giovenco et al., 2017), thus presenting concerns about users' risk perceptions and susceptibility to progression to continued use of cigars and other tobacco products following initiation of nicotine through blunts.

Experimentation with blunts is reported among a substantial proportion of youth and young adults in the United States. In 2019, over one-third (38.5%) of U.S. young adults aged 18 to 25 years reported ever using blunts, as did 11.3% of youth aged 12 to 17 years. The prevalence of past 30-day blunt use was 11.7% among young adults and 3.7% among youth in 2019 (U.S. Department of Health & Human Services, Substance Abuse & Mental Health Services Administration, 2019). Blunt use is more frequently reported by residents of metropolitan areas, male and/or Black respondents (Delnevo & Hrywna, 2006; Golub et al., 2005; Soldz et al., 2003).

Cigar use has not declined to the same extent as cigarette use in the United States (Wang et al., 2016). Since 2016, cigar use has been as common or more common than cigarette use among youth (Substance Abuse & Mental Health Services Administration, 2019). In 2021, nearly one-quarter (23.7%) of young adults aged 18 to 25 years reported ever use of cigars, as did 3.4% of youth aged 12 to 17 years. The prevalence of past 30-day cigar use was 5.3% among young adults and 0.7% among youth in 2021 (Substance Abuse and Mental Health Services Administration, 2021). One 2016 survey across 8 high schools in Connecticut found 40% of LCC users reported that they had ever modified an LCC for blunt use (Kong et al., 2017). A probability-based survey of high school students in one Ohio county found that nearly two-thirds (64.3%) of current LCC users also reported current blunt use (Trapl et al., 2018). However, nearly half (48.9%) of blunt users in that sample did not identify as LCC users, despite the fact that blunt users were, by definition, using LCCs.

Polyuse of cannabis and tobacco is common among young people (Huh & Leventhal, 2016). In fact, one study could not model a single-substance trajectory of use because its occurrence was so rare in the study's sample of Los Angeles, California-area adolescents and young adults (Lanza et al., 2021). A 2012 systematic review of cannabis and tobacco use among youth and young adults concluded that each substance consistently predicts subsequent use of the other (Ramo et al., 2012). Less clear is whether use of blunts, which combine cannabis and tobacco in a single product, is a stronger predictor of progression to other nicotine product use than cannabis consumption alone. While multiple ethnographic studies describe concurrent use of blunts and other tobacco products among young people across a diverse communities in the United States (i.e., New York City, Northern California), as well as internationally (i.e., Switzerland) (Akre et al., 2010; Dunlap et al., 2006; Lee et al., 2010; Sifaneck et al., 2005), longitudinal research that isolates the role of blunts (separate from other cannabis use) in predicting experimentation and use of other nicotine products is more limited. One 2019 longitudinal study of adolescents in Philadelphia, Pennsylvania found a positive association between blunt use and progression to current cigar use in a longitudinal design that followed respondents over two years (Audrain-McGovern et al., 2019).

Cigar advertising, particularly for LCCs, commonly depicts cigars as being used for blunts. One study of YouTube videos portraying blunt use found that nearly half mentioned specific cigar brands (Montgomery & Yockey, 2018). Ads for Executive Branch cigars have featured overt imagery of cannabis alongside the cigars (Richardson et al.). A content analysis of another LCC brand (Backwoods) Instagram images found that nearly three-quarters of images had blunt-related hashtags (Kim et al., 2021). A separate analysis of TikTok videos that include hashtags for two LCC brands (Swisher Sweets and Backwoods) found over ten percent of videos featured blunt rolling (Vassey et al., 2022). In qualitative interviews, youth and young adult respondents describe LCC designs that facilitate their adaptation to blunt use, including perforations and simplified wrapping (Giovenco et al., 2017).

The purpose of this study is to determine whether adolescent and young adult blunt users who are otherwise nicotine-naïve are more likely to progress to reporting cigar and other nicotine product use over time compared to those who have never used blunts.

## Methods

### Data collection

Data were drawn from the Truth Longitudinal Cohort (TLC), a probability-based survey of youth and young adults in the United States. TLC respondents are recruited using an address-based sampling frame based on the US Postal Service Computerized Delivery Sequence File, which is estimated to cover nearly 100% of US households. Respondents in the waves used for this study were aged 15 to 24 years at their baseline. The surveys are administered online. A detailed description of the TLC sampling design and methodology is

provided elsewhere (Cantrell et al., 2018). The analysis spanned four waves (Wave 1: January—April 2017; Wave 2: February—May 2018; Wave 3: February—May 2019; Wave 4: September—December 2019). The study sample ($N=5,284$) was limited to respondents who had never used any nicotine products (i.e., cigars, combustible cigarettes, hookah, pipes, e-cigarettes, or smokeless tobacco), with the exception of possible reported blunts use, at baseline. Data were weighted using demographic benchmarks for age, race/ethnicity and sex from the United States Census. To provide additional information on patterns of product polyuse by blunt users, a secondary cross-sectional analysis was conducted on data from all respondents (not limited to nicotine-naïve) at Wave 1 ($N=11,263$) and Wave 4 ($N=9,557$). It was necessary to expand the secondary analysis to the full cohort because polyuse was not present at baseline in the nicotine-naïve analytic sample used for the larger study.

### Measures

#### Tobacco or nicotine product use

Ever use of each of the following products was measured separately at each wave of data collection for all respondents who had not reported use of that product in a previous wave: cigarettes, cigars, e-cigarettes, and hookah (i.e., waterpipes used to smoke tobacco that comes in different flavors, also referred to as "shisha"). No respondents in the analytic sample had initiated smokeless tobacco use by Wave 4, so this outcome was not included in the analysis. The survey items for every product except for blunts followed a similar format: "Have you ever tried [smoking/using] [a cigarette/a cigar/an e-cigarette/hookah, shisha or waterpipe] (even 1 or 2 puffs)?" Responses were dichotomous (0=no, 1=yes). Respondents who had responded "no" on previous waves were asked, "Since [last survey date], have you ever tried [a cigarette/a cigar/an e-cigarette/vape/hookah] (even 1 or 2 puffs) for the first time?" Respondents who answered "yes" were classified as ever users of that product and the item was not presented on subsequent waves. Cigars were defined for respondents as follows: "The next few questions ask about cigars. This refers to large cigars, little cigars, or cigarillos (like Winchester, Swisher Sweets, Phillies Blunts, Dutch Masters, Black & Mild, or White Owl)." Prior to asking about ever use of e-cigarettes, these products were defined for respondents as follows: "The next few questions are about e-cigarettes/vapes. This refers to any e-cigarette or vape device, pod mod, e-hookah, hookah pen, or tank system/box mod vaporizer." A question was added at the final wave of data collection to determine what liquid(s) current e-cigarette users were using in their e-cigarette/vape: nicotine (flavored or unflavored); flavors only (no nicotine); marijuana, THC, CBD, or hash oil; some other liquid. Images of unbranded products were presented alongside the corresponding questions about that product.

#### Blunt use

The main predictor in this study was coded as a 3-level variable: 0=never cannabis or blunt use; 1=ever cannabis use but never blunt use; 2=ever blunt use. The survey item

about blunt use was presented after items measuring use of all other tobacco products (including cigars) were asked on the survey, and limited to respondents who had responded affirmatively to ever cannabis use in a previous question. Rather than using the term "blunt," the survey item presented respondents with the following definition: "Sometimes people take some tobacco out of a cigar, cigarillo or filtered cigar and replace it with marijuana. Have you ever smoked part or all of a cigar, cigarillo, or filtered cigar with marijuana in it?" Responses were dichotomous (0 = no, 1 = yes).

## Covariates

Models controlled for other known risk factors for nicotine use as reported at Wave 1, including sensation seeking (analyzed as a continuous variable; measured with the 8-item Brief Sensation Seeking Scale, with higher scores indicating higher sensation seeking (Hoyle et al., 2002)), internalizing mental health symptoms (analyzed as a continuous variable, with higher scores indicating poorer mental health (Achenbach & Ruffle, 2000)), and a dichotomous variable indicating whether the respondent lives with someone who uses e-cigarettes/vapes, cigars and/or cigarettes. The following demographic variables were also included in the analyses as covariates: age in years (0 = 15-17, 1 = 18-20, 2 = 21-25), binary gender (0 = female, 1 = male), race/ethnicity (0 = non-Hispanic white, 1 = non-Hispanic Black, 2 = Hispanic, 3 = non-Hispanic other, a collapsed measure of all racial categories besides white and Black that were not of Hispanic ethnicity), and a subjective measure of respondents' financial situation (0 = live comfortably, 1 = meet needs with a little left over, 2 = just meet basic expenses, 3 = don't meet basic expenses) (Williams et al., 2017).

## Statistical analysis

All analyses were conducted in Stata 17. Separate multivariable logistic regression models were constructed for each outcome. The predictor variable was ever blunt use by Wave 1. Outcomes were ever use of a product (cigarettes, e-cigarettes, cigars, hookah) by Wave 4. Covariates included race/ethnicity (reference group: white, non-Hispanic), age category (reference group: age 21-24), household tobacco use, perceived financial situation (reference group: lives comfortably), sensation-seeking (range: 1-5), and mental health (range: 1-4). The secondary cross-sectional analysis of current blunt users in Wave 1 and Wave 4 calculated the prevalence of past 30-day use of other products (cigarettes, e-cigarettes, cigars, hookah) by past 30-day blunt users.

## Results

### Sample description

Of the 5,284 youth and young adults in the analytic sample, 2.7% (n = 151) had ever used blunts but otherwise reported never using any tobacco or nicotine product by Wave 1 (Table 1). Ten percent (10.2%, or n = 642) were nicotine naïve and had used cannabis, but never blunts, by Wave 1, and the remainder (86.7%, or n = 4,481) were nicotine-naïve and had never used cannabis in any form. Most (86.2%)

**Table 1.** Sample descriptives among youth and young adults who were nicotine-naïve with the exception of possible ever blunt use at initial wave (N = 5,284).

| | n (weighted %) |
|---|---|
| Age | |
| 15-17 | 905 (42.0) |
| 18-20 | 2,337 (29.3) |
| 21-25 | 2,042 (28.7) |
| Race/ethnicity | |
| White, non-Hispanic | 3,635 (58.6) |
| Black, non-Hispanic | 441 (12.7) |
| Hispanic | 600 (18.8) |
| Other, non-Hispanic | 606 (9.9) |
| Sex | |
| Female | 3,010 (51.2) |
| Male | 2,273 (48.8) |
| Perceived financial situation | |
| Lives comfortably | 2,146 (43.4) |
| Meets needs with a little left over | 2,014 (37.0) |
| Meets basic expenses | 881 (14.8) |
| Doesn't meet basic expenses | 221 (4.4) |
| Household tobacco use | |
| Yes | 663 (13.8) |
| None | 4,621 (86.2) |
| Sensation-seeking traits (Mean, SE) | 2.69 (0.023) |
| Mental health issues (Mean, SE) | 2.26 (0.022) |
| Ever blunt use at Wave 1 | |
| Ever blunts | 151 (2.7) |
| Ever cannabis, never blunts | 642 (10.2) |
| Never cannabis or blunts | 4,481 (86.7) |
| Ever e-cigarette use by Wave 4 | |
| Yes | 524 (17.8) |
| No | 2,690 (82.2) |
| Ever cigar use by Wave 4 | |
| Yes | 195 (5.8) |
| No | 3019 (94.2) |
| Ever cigarette use by Wave 4 | |
| Yes | 189 (7.6) |
| No | 3,025 (92.4) |
| Ever hookah use by Wave 4 | |
| Yes | 142 (4.4) |
| No | 3,072 (95.6) |

reported no tobacco use in their households. The majority (80.4%) reported their financial situation as meeting their needs with a little left over or living comfortably. The plurality of the sample (42.0%) were aged 15 to 17 years at Wave 1, 29.3% were aged 18 to 20 years and 28.7% were aged 21 to 25 years. The majority of participants (58.6%) were white and non-Hispanic; an additional 12.7% were Black and non-Hispanic; 9.9% were another race and non-Hispanic, and 18.8% were Hispanic. Half of respondents (51.2%) identified as female. By Wave 4, 17.7% of the analytic sample reported ever use of an e-cigarette, 7.6% reported ever use of a cigarette, 5.8% reported ever use of a cigar, and 4.4% reported ever use of hookah.

### Blunt use and progression to other nicotine product use

Compared to those who had never used blunts at Wave 1, otherwise nicotine-naive respondents who had ever used blunts had significantly higher odds of reporting ever use of cigars (OR: 4.74, 95% CI: 1.80, 12.47; p = 0.002), cigarettes (OR: 3.02, 95% CI: 1.17, 7,84; p = 0.022), e-cigarettes (OR: 4.66, 95% CI: 2.42, 8.95; p < 0.001), and hookah (OR: 3.47, 95% CI: 1.07, 11.29; p = 0.039) by Wave 4 (Table 2). Ever cannabis (but never blunt use) at Wave 1 predicted ever use of

Table 2. Odds of youth and young adult initiation of tobacco or nicotine products by the final wave according to previous experience using blunts (N=5,284).

| | Cigars | | Cigarettes | | E-Cigarettes | | Hookah | |
|---|---|---|---|---|---|---|---|---|
| | OR (95% CI) | p | OR (95% CI) | P | OR (95% CI) | p | OR (95% CI) | p |
| Never cannabis or blunt use | REF | | REF | | REF | | REF | |
| Ever cannabis (no blunt) use | 1.43 (0.82, 2.50) | 0.205 | 3.81 (2.26, 6.43) | <0.001 | 3.45 (2.38, 5.02) | <0.001 | 2.13 (1.12, 4.05) | 0.021 |
| Ever blunt use | 4.74 (1.80, 12.47) | 0.002 | 3.02 (1.17, 7.84) | 0.023 | 4.66 (2.42, 8.95) | <0.001 | 3.47 (1.07, 11.29) | 0.039 |
| Age | | | | | | | | |
| 15-17 | 2.26 (1.24, 4.13) | 0.008 | 4.23 (2.19, 8.17) | <0.001 | 5.24 (3.27, 8.39) | <0.001 | 1.75 (0.78, 3.90) | 0.173 |
| 18-20 | 2.18 (1.28, 3.71) | 0.004 | 1.68 (0.91, 3.08) | 0.095 | 2.58 (1.69, 3.93) | <0.001 | 1.42 (0.69, 2.90) | 0.340 |
| 21-25 | REF | REF | REF | REF | REF | REF | REF | REF |
| Race/ethnicity | | | | | | | | |
| White, non-Hispanic | REF | REF | REF | REF | REF | REF | REF | REF |
| Black, non-Hispanic | 1.63 (0.72, 3.70) | 0.238 | 1.19 (0.48, 2.95) | 0.714 | 1.31 (0.74, 2.32) | 0.352 | 4.12 (2.02, 8.40) | <0.001 |
| Hispanic | 0.97 (0.52, 1.81) | 0.928 | 1.18 (0.64, 2.19) | 0.593 | 0.81 (0.52, 1.26) | 0.320 | 3.21 (1.65, 6.26) | <0.001 |
| Other, non-Hispanic | 0.67 (0.34, 1.33) | 0.255 | 0.64 (0.27, 1.52) | 0.307 | 0.95 (0.58, 1.55) | 0.728 | 2.16 (0.83, 5.60) | 0.112 |
| Sex | | | | | | | | |
| Female | 0.72 (0.46, 1.13) | 0.149 | 1.03 (0.66, 1.62) | 0.894 | 0.93 (0.69, 1.26) | 0.693 | 1.19 (0.69, 2.05) | 0.527 |
| Male | REF | REF | REF | REF | REF | REF | REF | REF |
| Perceived financial situation | | | | | | | | |
| Lives comfortably | REF | REF | REF | REF | REF | REF | REF | REF |
| Meets needs with a little left over | 0.58 (0.35, 0.97) | 0.038 | 1.65 (0.99, 2.74) | 0.416 | 0.85 (0.61, 1.21) | 0.380 | 1.07 (0.57, 2.00) | 0.841 |
| Meets basic expenses | 0.61 (0.34, 1.09) | 0.097 | 1.17 (0.55, 2.50) | 0.055 | 0.51 (0.31, 0.86) | 0.011 | 1.97 (0.92, 4.19) | 0.079 |
| Doesn't meet basic expenses | 0.99 (0.29, 3.38) | 0.985 | 1.34 (0.34, 5.27) | 0.679 | 0.62 (0.25, 1.53) | 0.299 | 0.36 (0.08, 1.63) | 0.185 |
| Household tobacco use | 1.39 (0.74, 2.62) | 0.306 | 1.31 (0.68, 2.51) | 0.004 | 1.00 (0.64, 1.55) | 0.999 | 1.41 (0.66, 3.00) | 0.373 |
| Mental health score | 1.11 (0.83, 1.48) | 0.483 | 1.25 (0.90, 1.75) | 0.178 | 1.41 (1.14, 1.76) | 0.002 | 1.17 (0.80, 1.70) | 0.421 |
| Sensation-seeking traits | 1.57 (1.18, 2.09) | 0.001 | 1.56 (1.15, 2.11) | 0.004 | 1.41 (1.14, 1.76) | 0.001 | 1.50 (1.06, 2.13) | 0.022 |

cigarettes (OR: 3.81, 95% CI: 2.26, 6.43; $p < 0.001$), e-cigarettes (OR: 3.45; 95% CI: 2.38, 5.02; $p < 0.001$) and hookah use (OR: 2.13; 95% CI: 1.12, 4.05; $p = 0.021$) by Wave 4. There was no significant association between ever cannabis use (but never blunt use) by Wave 1 and cigar use by Wave 4.

## Patterns of dual use of blunts and other nicotine products

The secondary analysis of all cohort respondents (not limited to nicotine-naïve) at Wave 1 ($N = 11,263$) and Wave 4 ($N = 9,557$) provides information on blunt users' concurrent use of other products (Supplemental Table 1). At Wave 1,742 respondents were past 30-day users of blunts, yet only 41.5% of these respondents reported past 30-day use of cigars. Similarly, at Wave 4, while 553 respondents reported past 30-day blunt use, slightly more than one-third (35.5%) of current blunt users reported having used a cigar in the past 30 days. Current use of e-cigarettes rose from 40.6% to 59.1% of current blunt users between Wave 1 and Wave 4, and current use of hookah declined from 28.2% at Wave 1 to 16.6% of current blunt users at Wave 4. At both Waves 1 and 4, 45.5% of current blunt users reported current use of cigarettes. Among the 302 current blunt users in Wave 4 who also reported current use of e-cigarettes/vapes, one-quarter used their devices to vape nicotine only (25.2%), another one-third vaped a combination of nicotine and cannabis (including tetrahydrocannabinol or THC, which produces the psychoactive effect found in cannabis; cannabidiol or CBD, a chemical in cannabis with no psychoactive effects; or hash oil) (34.6%). Nearly one-third reported using e-cigarettes to vape cannabis only (32.2%), and a smaller proportion (8.1%) reported vaping only flavors (no nicotine or cannabis).

## Discussion

The results of this study indicate that blunts are a point of nicotine initiation that place youth and young adults at increased risk of progression to all forms of tobacco and nicotine use. For the blunt users in our sample, a blunt tobacco leaf wrapper was their first exposure to nicotine. These respondents were significantly more likely to progress to newly reported use of cigars, as well as use of e-cigarettes, cigarettes, and hookah, compared to nicotine-naïve respondents who had not used blunts at the start of the study period. Interestingly, no predictive relationship was found between non-blunt cannabis use at baseline and progression to cigar use.

Blunts utilize cigars as the delivery device for cannabis, and therefore we would expect high overlap between reports of current blunt and cigar use. However, most of the blunt users in this cohort did not consider themselves to be cigar users. Two-thirds of the cross-sectional sample of respondents who were currently using blunts at the final wave did not report current use of cigars, suggesting that blunt users make a distinction between these products. These results are consistent with a previous study by Trapl et al. (2018) that found high discordance between self-reported blunt and cigar use. Such findings suggest that cigar use is underestimated in population-based surveillance efforts if they do not include questions on blunt use or do not define cigar use as inclusive of blunts, thus improvements in surveillance and measurement approaches may be required. LCCs users may instead describe their product as a vehicle for cannabis, rather nicotine, delivery (Giovenco et al., 2017). It is unclear whether youth and young adult blunt users are effectively reached by health communication efforts targeting current users of tobacco or nicotine products, and may not consider themselves to be at risk of nicotine dependence.

Previous research found a positive association between blunt use and progression to current cigar use in a longitudinal design that followed respondents over two years (Audrain-McGovern et al., 2019). The current study used a longitudinal design to examine initiation (i.e., ever use) of cigars as well as other nicotine products. To our knowledge, ours is the first study to demonstrate a predictive relationship between blunts use, particularly when distinguished from other cannabis use, and likelihood of future new reports of cigar use and other nicotine products.

A strength of this study is that it controlled for sensation-seeking tendencies, as well as certain mental health indicators, among our sample's respondents. Youth and young adults who engage in substance use and other risky behaviors are at greater risk of using tobacco, and vice versa (Behrendt et al., 2012; Mathers et al., 2006; Patton et al., 2005). We would expect that those who express higher sensation-seeking tendencies to be more likely to progress to multiple risk behaviors regardless of which product they used to initiate substance use. By controlling for respondents' sensation-seeking personality characteristics, as well as certain mental health indicators (e.g., difficulty sleeping or concentrating), we are better able to ascertain the independent effect of blunt use on future initiation of other products.

This study is further strengthened by its ability to distinguish baseline cannabis users from blunt users. We were able to determine the independent effect of using blunts, which provides otherwise nicotine-naive users with their first exposure to nicotine, from those who had only used cannabis. As expected, we did find significant associations between ever cannabis use at baseline and most tobacco and nicotine products (with the exception of cigars) by the final wave. However, blunt use at baseline predicted all forms of tobacco use the observed relationship was stronger between blunt use and progression to e-cigarette, cigar and hookah use than for cannabis use.

Despite its strengths, this study has limitations. E-cigarettes may be used to vape cannabis and/or nicotine, and we could not control for vaping cannabis vs. nicotine in the models concerning initiation of e-cigarette use. The survey measured cannabis or nicotine liquid use only among current (i.e., past-30 day) users of e-cigarettes at the final wave, rather than those who had ever used over the course of the study. Despite this limitation, we were able to examine data among current dual users of blunts and e-cigarettes at the final wave. Vaping with nicotine (alone or in combination with cannabis) was reported by more than half of current blunt users, compared to one-third who used vapes for cannabis exclusively. The same pattern was observed among ever blunt users at baseline who were currently using e-cigarettes by the final wave. Thus, many of the blunt users in our sample who progressed to e-cigarettes/vapes were using them as a nicotine delivery device.

## Conclusions

Blunts are a point of nicotine initiation that places users at increased risk of progression to cigars and other nicotine products. Targeted health education and health communication efforts are needed to reach youth and young adult blunt users to address risks of nicotine exposure and future use of tobacco products.

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## References

Achenbach, T. M., & Ruffle, T. M. (2000). The Child Behavior Checklist and related forms for assessing behavioral/emotional problems and competencies. *Pediatrics in Review*, *21*(8), 265–271. https://doi.org/10.1542/pir.21-8-265

Akre, C., Michaud, P.-A., Berchtold, A., & Suris, J.-C. (2010). Cannabis and tobacco use: Where are the boundaries? A qualitative study on cannabis consumption modes among adolescents. *Health Education Research*, *25*(1), 74–82. https://doi.org/10.1093/her/cyp027

Audrain-McGovern, J., Rodriguez, D., Alexander, E., Pianin, S., & Sterling, K. L. (2019). Association between adolescent blunt use and the uptake of cigars. *JAMA Network Open*, *2*(12), e1917001. https://doi.org/10.1001/jamanetworkopen.2019.17001

Behrendt, S., Beesdo-Baum, K., Höfler, M., Perkonigg, A., Bühringer, G., Lieb, R., & Wittchen, H.-U. (2012). The relevance of age at first alcohol and nicotine use for initiation of cannabis use and progression to cannabis use disorders. *Drug and Alcohol Dependence*, *123*(1-3), 48–56. https://doi.org/10.1016/j.drugalcdep.2011.10.013

Cantrell, J., Hair, E. C., Smith, A., Bennett, M., Rath, J. M., Thomas, R. K., Fahimi, M., Dennis, J. M., & Vallone, D. (2018). Recruiting and retaining youth and young adults: Challenges and opportunities in survey research for tobacco control. *Tobacco Control*, *27*(2), 147–154. https://doi.org/10.1136/tobaccocontrol-2016-053504

Delnevo, C. D., & Hrywna, M. (2006). The relationship of cigars, marijuana, and blunts to adolescent bidi use. *Public Health Reports (Washington, D.C.: 1974)*, *121*(5), 603–608. https://doi.org/10.1177/003335490612100516

Dunlap, E., Benoit, E., Sifaneck, S. J., & Johnson, B. D. (2006). Social constructions of dependency by blunts smokers: Qualitative reports. *The International Journal on Drug Policy*, *17*(3), 171–182. https://doi.org/10.1016/j.drugpo.2006.01.004

Giovenco, D. P., Miller Lo, E. J., Lewis, M. J., & Delnevo, C. D. (2017). They're Pretty Much Made for Blunts": Product features that facilitate marijuana use among young adult cigarillo users in the United States. *Nicotine & Tobacco Research*, *19*(11), 1359–1364. https://doi.org/10.1093/ntr/ntw182

Golub, A., Johnson, B. D., & Dunlap, E. (2005). The growth in marijuana use among American youths during the 1990s and the extent of blunt smoking. *Journal of Ethnicity in Substance Abuse*, *4*(3-4), 1–21. https://doi.org/10.1300/J233v04n03_01

Hoyle, R. H., Stephenson, M. T., Palmgreen, P., Lorch, E. P., & Donohew, R. L. (2002). Reliability and validity of a brief measure of sensation seeking. *Personality and Individual Differences*, *32*(3), 401–414. https://doi.org/10.1016/S0191-8869(01)00032-0

Huh, J., & Leventhal, A. M. (2016). Progression of poly-tobacco product use patterns in adolescents. *American Journal of Preventive Medicine*, *51*(4), 513–517. https://doi.org/10.1016/j.amepre.2016.04.004

Kim, S., Mourali, A., Allem, J.-P., Unger, J. B., Boley Cruz, T., & Smiley, S. L. (2021). Instagram posts related to Backwoods Cigarillo Blunts: Content analysis. *JMIR Public Health and Surveillance*, *7*(2), e22946. https://doi.org/10.2196/22946

Kong, G., Bold, K. W., Simon, P., Camenga, D. R., Cavallo, D. A., & Krishnan-Sarin, S. (2017). Reasons for Cigarillo Initiation and Cigarillo Manipulation Methods among Adolescents. *Tobacco Regulatory Science*, *3*(2 Suppl 1), S48–S58. https://doi.org/10.18001/TRS.3.2(Suppl1).6

Lanza, H. I., Bello, M. S., Cho, J., Barrington-Trimis, J. L., McConnell, R., Braymiller, J. L., Krueger, E. A., & Leventhal, A. M. (2021). Tobacco and cannabis poly-substance and poly-product use trajectories across adolescence and young adulthood. *Preventive Medicine*, *148*, 106545. https://doi.org/10.1016/j.ypmed.2021.106545

Lee, J. P., Battle, R. S., Lipton, R., & Soller, B. (2010). 'Smoking': Use of cigarettes, cigars and blunts among Southeast Asian American youth and young adults. *Health Education Research*, *25*(1), 83–96. https://doi.org/10.1093/her/cyp066

Mathers, M., Toumbourou, J. W., Catalano, R. F., Williams, J., & Patton, G. C. (2006). Consequences of youth tobacco use: A review of prospective behavioural studies. *Addiction (Abingdon, England)*, *101*(7), 948–958. https://doi.org/10.1111/j.1360-0443.2006.01438.x

Montgomery, L., & Yockey, A. (2018). Rolling and scrolling: The portrayal of marijuana cigars (blunts) on YouTube. *Journal of Substance Use*, *23*(4), 436–440. https://doi.org/10.1080/14659891.2018.1444108

Patton, G. C., Coffey, C., Carlin, J. B., Sawyer, S. M., & Lynskey, M. (2005). Reverse gateways? Frequent cannabis use as a predictor of tobacco initiation and nicotine dependence. *Addiction (Abingdon, England)*, *100*(10), 1518–1525. https://doi.org/10.1111/j.1360-0443.2005.01220.x

Peters, E. N., Schauer, G. L., Rosenberry, Z. R., & Pickworth, W. B. (2016). Does marijuana "blunt" smoking contribute to nicotine exposure?: Preliminary product testing of nicotine content in wrappers of cigars commonly used for blunt smoking. *Drug and Alcohol Dependence*, *168*, 119–122. https://doi.org/10.1016/j.drugalcdep.2016.09.007

Ramo, D. E., Liu, H., & Prochaska, J. J. (2012). Tobacco and marijuana use among adolescents and young adults: A systematic review of their co-use. *Clinical Psychology Review*, *32*(2), 105–121. https://doi.org/10.1016/j.cpr.2011.12.002

Richardson, A., & Vallone, D. M. (2014). YouTube: A promotional vehicle for little cigars and cigarillos? *Tobacco Control*, *23*(1), 21–26. https://doi.org/10.1136/tobaccocontrol-2012-050562

Sifaneck, S. J., Johnson, B. D., & Dunlap, E. (2005). Cigars-for-blunts: Choice of tobacco products by blunt smokers. *Journal of Ethnicity in Substance Abuse*, *4*(3-4), 23–42. https://doi.org/10.1300/J233v04n03_02

Soldz, S., Huyser, D. J., & Dorsey, E. (2003). The cigar as a drug delivery device: Youth use of blunts. *Addiction (Abingdon, England)*, *98*(10), 1379–1386. https://doi.org/10.1046/j.1360-0443.2003.00492.x

Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality. (2019). *National survey on drug use and health 2019*. https://www.datafiles.samhsa.gov/dataset/national-survey-drug-use-and-health-2019-nsduh-2019-ds0001

Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality. (2021). *National survey on drug use and health*. https://www.samhsa.gov/data/sites/default/files/reports/rpt39441/NSDUHDetailedTabs2021/NSDUHDetailedTabs2021/NSDUHDetTabsSect2pe2021.htm

Trapl, E. S., Koopman Gonzalez, S. J., Cofie, L., Yoder, L. D., Frank, J., & Sterling, K. L. (2018). Cigar product modification among high school youth. *Nicotine & Tobacco Research*, *20*(3), 370–376. https://doi.org/10.1093/ntr/ntw328

Vassey, J., Donaldson, S. I., Dormanesh, A., & Allem, J.-P. (2022). Themes in TikTok videos featuring little cigars and cigarillos: Content analysis. *Journal of Medical Internet Research*, *24*(11), e42441. https://doi.org/10.2196/42441

Wang, T. W., Kenemer, B., Tynan, M. A., Singh, T., & King, B. (2016). Consumption of combustible and smokeless tobacco – United States, 2000-2015. *MMWR. Morbidity and Mortality Weekly Report*, *65*(48), 1357–1363. https://doi.org/10.15585/mmwr.mm6548a1

Williams, V. F., Smith, A. A., Villanti, A. C., Rath, J. M., Hair, E. C., Cantrell, J., Teplitskaya, L., & Vallone, D. M. (2017). Validity of a subjective financial situation measure to assess socioeconomic status in US young adults. *Journal of Public Health Management and Practice : JPHMP*, *23*(5), 487–495. https://doi.org/10.1097/PHH.0000000000000468