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## Reporting of Cigar Use Among Adolescent Tobacco Smokers

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**INTRODUCTION:** With the changing landscape of tobacco products, the divide between cigarettes and cigars is obscured, so understanding adolescent reporting of cigar use is needed to improve best practices for surveillance, screening, and prevention/intervention. This study examined adolescents' reported cigar use and correlates of use.

**METHODS:** Participants (N=186) were 13-17 years old tobacco users participating in a prospective study of adolescent smoking behaviors. Measurement occurred at baseline and 24-months, and included demographics, nicotine dependence, tobacco use, and quit attempts. Cigar use was assessed as, "have you smoked a cigar in the last 30 days" and by brand specific use in the past 30 days.

**FINDINGS:** Cigar use was reported by 51 adolescents (27%), and increased to 76 (41%) when identifying by brand name. African Americans (32%) were more likely to smoke cigars than Whites (10%,  $p < .01$ ), Asian/Pacific Islanders (3%,  $p = .04$ ), and multiracial participants (24%,  $p = .05$ ). Cigarette-only users smoked more per day ( $p = .04$ ) and had higher cotinine levels ( $p = .05$ ) than cigar users. Number of prior quit attempts ( $p = .84$ ) did not differ by group. Group differences in addiction were found between cigar users and cigarette only users ( $p < .01$ ). At 24 months, more baseline cigar users were tobacco abstinent than cigarette only users (16% versus 7%,  $p < 0.01$ , respectively).

**CONCLUSIONS:** Assessment of brand-specific cigars nearly doubled reporting among adolescent users. Cigar users differed from cigarette-only users in consumption and likelihood of abstinence at 24-months. For more accurate surveillance and to inform treatment considerations, surveys of adolescent tobacco use should include cigars, including brand names, in the assessment strategy.

**Key Words:** Cigar use, Adolescent, Tobacco, Black & Mild

A cigar is defined as a cylinder of tobacco rolled in tobacco leaves for smoking (1). Cigars come in several different sizes, called by different names. Cigarillos, which are longer and slimmer cigars, typically without a filter and sometimes with wood or plastic tips are particularly popular among adolescents. Brands include Black & Mild, Swisher Sweets and Phillies (2).

Though distinguished from cigarettes, which are rolled in paper, only by their casing, regulatory policies have differed greatly. Regulations and taxation have been more lax for cigars, leading to product offshoots and manipulations which appeal to adolescents. For example, in the United States (US) bans on flavorings (other than menthol) in cigarettes and individual sales of cigarettes (3) do *not* apply to cigars. As a consequence, chocolate and fruit flavored cigars are available for individual purchase for as little as \$0.69 in corner stores (4).

Total consumption of cigars in the US doubled from 2000-2012 with notable increases seen among youth (5). While adolescent cigarette smoking prevalence in the US shows a decline over time, cigar use remains high with as many as 13% of high school students smoking cigars nationally (6). What's more, the shrinking size of cigars is blurring the line with cigarettes with the potential of obfuscating product differentiation among users. One study found that when a brand specific item such as Black & Mild was added to surveys asking about cigar smoking, reported past month use among high school students increased to 21% (7). Further, several studies have found that youth, especially those who also smoke cigarettes, do not identify themselves as "cigar smokers" despite using them (8-10).

The published literature on adolescent tobacco use has centered on cigarettes, though cigar smoking also is associated with many negative health consequences including lung, oral, and esophageal cancer (11-13). Notably, cigars/cigarillos contain more tobacco and higher levels of carcinogens per gram of tobacco than cigarettes (11). Several studies have found that adolescents who use cigars are more likely to be male, use alcohol and other tobacco products (14), and be Caucasian (13). Concurrent use of cigars with cigarettes also is common, as shown by Brooks and colleagues (15) who found that among adolescents who tried cigarettes and cigars during the same time period, 41% used both cigarettes and cigars regularly. In addition, individuals who smoked multiple tobacco products smoked cigars more frequently than did individuals who only smoked cigars (15). Also common among certain groups of adolescents is co-use with marijuana filled and smoked within a hollowed out cigar (i.e., blunt) (13, 16).

With the changing landscape of tobacco products and specifically the obscuring of the divide between cigarettes and cigars, understanding adolescent reporting of cigar use, as well as the correlates of use including self-reported dependence, is needed to improve best practices for surveillance, screening, and prevention/intervention. This study aimed to examine adolescents' reporting of cigar use in response to different question types and their co-use of cigars with cigarettes, alcohol, and marijuana.

## **Methods**

### **Sample, Recruitment, and Informed Consent**

Adolescents, aged 13-17, were recruited between December 2009 and June 2012 for a 36-month longitudinal observational study examining the influence of the rate of nicotine metabolism on the development of nicotine addiction in adolescence (17). Study involvement consisted of one

baseline visit and 6 follow-up contacts of 30-minute duration to complete surveys of smoking behaviors and dependence scales; participants were compensated \$100 for their time at the baseline visit and \$20 for each follow-up survey. Interested individuals contacted the study via phone, e-mail, text messaging, the study's website, or Facebook and were screened by study staff for inclusion and exclusion criteria. Eligibility criteria were English fluency, smoking 1 to 5 cigarettes a week, residing in the San Francisco Bay Area, and access to transportation to the study site. Informed, written assent from the adolescent subject and consent from one parent was obtained for each subject before data collection. The University of California, San Francisco Institutional Review Board approved the study procedures.

## **Measures**

At baseline, participants reported their age, gender, race/ethnicity, and the highest level of their mother's completed education. Cigarette use was assessed as the number of cigarettes smoked on each day of the past week. Participants were also asked if they smoked a cigarette in the last 30 days (yes/no). Cigar use was asked in two ways. First, participants were asked to select all options for smoked tobacco with choices of regular cigarettes, light, ultra-light, menthol, hand-rolled, or Black & Mild. In addition to the listed choices, participants were encouraged to write in any other types and brands of tobacco products they used. Second, participants were asked if they smoked a cigar in the last 30 days (yes/no). Severity of nicotine dependence was assessed using the Hooked on Nicotine Checklist (HONC)(18) and the modified Fagerström Tolerance Questionnaire (mFTQ)(19). Number of lifetime tobacco cessation attempts was assessed. Participants were also queried about their alcohol and smoked marijuana use during the past 3 months, with response options of "Never/0 times," "Once a month or less," "More than once a

month, but less than once a week,” “One or more times a week but not every day,” “Every day,” and “I don’t want to answer.” The same questions were asked at 24 months. Participants who were smoking at baseline and reported no smoking in the prior 30 days at 24-month follow-up were considered to be tobacco abstinent.

Saliva samples were obtained at baseline and the 24-month follow-up to examine salivary cotinine levels using liquid chromatography-tandem mass spectrometry (20). Cotinine is a metabolite of nicotine and can be used as a proxy for nicotine measurement.

## **Data Analyses**

Mean cigarettes smoked per day was calculated using the sum of usual number of cigarettes smoked during each day of the week and dividing by seven. Descriptive univariate analyses of all variables were performed using means and standard deviations. Comparisons between cigar and cigarette only users were made using t-tests and chi-square tests. Nonparametric testing on medians was performed on cotinine values since the means were not evenly distributed.

Similarly, non-parametric correlations were calculated using Spearman’s rho to determine correlations between salivary cotinine levels and reported mean cigarettes smoked per day.

## **Results**

### **Frequency and Correlates of Cigar/Cigarillo Use**

Of the 186 participants in this study, 76 (41%) reported smoking Black & Mild or wrote in another cigar brand (e.g. Swisher) as the type of cigarette they usually smoke. The remaining 110

participants reported cigarette use only. Of the 76 participants who reported smoking Black & Mild or wrote in another cigar brand by name, 25 (33%) answered “no” when asked if they had smoked a cigar in the last 30 days. Of those who reported smoking cigars, all answered yes to Back & Mild or listed another cigar brand by name.

Table 1 shows the demographic characteristics for cigar users and cigarette-only users. There was no difference in cigar use by gender or age. Group differences were found for maternal education, with cigar smokers reporting lower levels of maternal education. African Americans were more likely to smoke cigars compared with non-Hispanic whites, Asian/Pacific Islanders, and those who identified as multiracial. There was no other group difference based on race or ethnicity.

**Table 1. Baseline Demographics and Tobacco Use Characteristics of Adolescent Cigarette Smokers Who Do and Do Not Smoke Cigars**

	<b>Cigar Users</b> N=76	<b>Cigarette-only Users</b> N=110	<b>p-value</b>
	N (%)	N (%)	
Age	16 (.97)	16 (.94)	0.58
Female Sex	47 (62%)	74 (67%)	0.53
Mother's Education			
Less than 9 <sup>th</sup> Grade <sup>¶</sup>	5 (7%)	5 (5%)	
Some High School	16 (21%)	18 (16%)	0.87
Graduated High School	19 (25%)	12 (11%)	0.53
Some College	14 (18%)	15 (14%)	0.92
Graduated College	10 (8%)	27 (25%)	0.17
Graduate/Professional	3 (4%)	15 (14%)	0.06
Don't Know	9 (11%)	18 (16%)	0.28
Race / Ethnicity			
African American <sup>§</sup>	24 (32%)	16 (15%)	



Non-Hispanic Caucasian	15 (10%)	35 (32%)	<.001
Hispanic/Latino	15 (20%)	20 (18%)	.14
Asian/Pacific Islander	2 (3%)	7 (6%)	.04
Other	2 (3%)	4 (4%)	.22
More than One	18 (24%)	28 (26%)	.05
Age at first cigarette use (years)	13.7 (1.8)	13.8 (2.1)	0.12
Cigarettes/Cigars smoked per day	2.3 (2.7)	3.2 (3.1)	0.05
Number of quit attempts (median, IQR) *	2.0 (1.0, 5.0)	2.0 (0, 4.5)	0.84
mFTQ <sup>a</sup>	2.1 (1.3)	2.7 (1.5)	0.01
HONC <sup>b</sup>	4.0 (3.3)	4.5 (3.2)	0.35
Baseline cotinine (ng/ml; median, IQR)*	10 (0, 71)	25 (1, 110)	0.05
Weekly or greater alcohol use	28 (37%)	35 (32%)	0.35
Weekly or greater marijuana use	45 (59%)	65 (59%)	0.88

<sup>¶</sup>Education less than 9<sup>th</sup> grade was the reference group

<sup>§</sup> African American was the reference group

\* Nonparametric testing on medians.

<sup>a</sup> modified Fagerström Tolerance Questionnaire

<sup>b</sup> Hooked On Nicotine Checklist

On the measures of addiction, HONC scores did not differ by cigar use status, while mFTQ scores did, though mean scores for both groups fell below the threshold for addiction. Individual mFTQ items were examined and group differences were found on 2 of the 7 items: cigarettes per day and inhalation; cigar users reported smoking less per day ( $p=.01$ ) and were less likely to inhale ( $p<.01$ ). No between group difference was found for other substance use. As a group,

cigarette only users had twofold greater baseline salivary cotinine levels compared to dual users and cotinine was highly correlated with mean cigarettes per day for both cigarette only users and cigar users ( $r=.48$ ,  $p<.001$ ) with no appreciable difference by group.

At 24 months, 158 (85%) of participants completed follow-up questionnaires. Among cigar users at baseline, by the 24-month follow-up, 40% continued their cigar use, 45% reported smoking only cigarettes; and 16% reported abstinence from all tobacco products (of these eleven, six provided salivary cotinine samples with all values  $< 12$  ng/ml, indicating abstinence). Among cigarette-only users at baseline, by the 24-month follow-up, 23% reported now using cigars, 69% reported smoking only cigarettes, and 7% reported abstinence from all tobacco products (of these seven, six provided salivary cotinine samples, one of whom had a level of 226 ng/ml indicative of recent tobacco use). As such, at 24 months, more baseline cigar users were tobacco abstinent than cigarette only users (16% versus 7%,  $p < 0.01$ , respectively).

## **Discussion**

In the current sample, 4 in 10 adolescent smokers were cigar users. Had we only assessed generic use rather than asking about specific brands (i.e., Black & Mild), we would have misclassified a third of cigar users. Though with limited investigation in the field, the findings are consistent with recent research. Specifically, similar to this study, other studies have found that by asking about the use of cigar products by brand name increases the reported rate of use (8). The misclassification may be that teens do not understand what constitutes a cigar.

We found cigar use highest among African Americans, which contrasts with prior studies in adolescents and young adults that have reported cigar use as more common among non-Hispanic

whites (13, 21, 22). From 2011 to 2012, cigar smoking increased among African American students in the National Youth Tobacco Survey, from 19.5% to 27.8%; whereas, usage rates changed by less than 1% among white and Hispanic students (23). Research has demonstrated racial/ethnic targeting by the tobacco industry for certain products with point-of-sale marketing in predominantly African American communities and with lower pricing (24).

We did not find a sex difference in cigar use, in contrast to other studies that have found boys more likely than girls to smoke cigars (13, 21, 22, 25, 26). One possibility is cigar use among female adolescents has increased. Data from the National Youth Tobacco Survey indicated 15.2% of females used cigars in 2011 (27), increased to 17.1% in 2012, while cigar use prevalence remained at 25% for males for the same years (27). African American females reported the largest increase in use, from 15.5% in 2011 to 27.7% in 2012 (27).

At baseline, cigar users reported smoking less per day, and were less likely to inhale relative to cigarette-only users. Most cigars contain nicotine in quantities equivalent to several cigarettes, and though inhalation is not as common with cigars due to higher alkalinity of the smoke, the higher pH enables greater availability of non-ionized nicotine through the oral mucosa (11, 28). We observed lower scores among cigar users on the mFTQ relative to cigarette-only users due to the items on consumption and inhalation. It may be that the mFTQ is a less valid measure of nicotine dependence for cigar smokers (11).

Scores on the HONC, which assesses perceived addiction, urges and cravings to use, were comparable for cigar and cigarette-only users. This suggests that although smoking less, these two groups of adolescents perceived similar levels of lost autonomy over their use.

We did not find any between group differences in alcohol or marijuana use. This was unexpected as other studies have found that cigar smoking is associated with both alcohol (14) and marijuana use (13, 29). Since cigars can be used to smoke marijuana as blunts, we expected greater marijuana co-use among the cigar smokers. However, use of alcohol and marijuana was common overall, reported by a majority in this sample of adolescent smokers.

At baseline, number of past quit attempts did not differ by group; yet, abstinence status at 24-months did. We found dual users were about twice as likely to be tobacco abstinent at follow-up than cigarette only users, and a sizeable proportion of baseline cigarette-only users (23%) reported cigar use at 24-months.

Study limitations included an assessment that listed only one specific cigar brand (i.e., Black & Mild) and lacked detail on cigar characteristics (e.g., size, filter, flavor preference). It is possible that had other cigar brands been listed (e.g., Swisher Sweets, Phillies), rather than having a write-in option, reported use of cigars would have been even higher. Another limitation is that we attempted to exclude those who only smoked cigars at baseline which may have skewed our sample in ways which are not representative of all adolescent cigar users. Lastly, we did not ask a separate question about frequency of cigar use. It is therefore possible that some teens included their cigar use in the reporting of their frequency of cigarette use, especially if they considered

their cigar of choice (i.e., Black & Mild) to be a type of cigarette. Conversely, it is also possible that dual users underreported actual nicotine exposure by not including cigar use in their response to this item. In the current sample, cigarette only users reported greater use per day and had higher levels of cotinine compared with self-reported dual users. Notably, the correlation between reported cigarettes per day and cotinine was  $r=0.48$ , supporting validity of the item.

With the distinction in design between cigars and cigarettes increasingly blurred, assessments of adolescent tobacco use need to adapt. Asking only about cigar use generically will underestimate use among adolescents. Asking about specific brands smoked is likely to result in more accurate surveillance of tobacco exposure and given the group differences observed appears relevant to informing treatment approaches.

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## REFERENCES

1. INTERNAL REVENUE CODE. United States Code, 2010 Edition ed: U.S. Government Printing Office; 2010.
2. CO, JM. 2014; [http://www.johnmiddletonco.com/en/cms/Products/Our\\_Products\\_and\\_Brands/](http://www.johnmiddletonco.com/en/cms/Products/Our_Products_and_Brands/). Accessed 9/22/2014.
3. FAMILY SMOKING PREVENTION AND TOBACCO CONTROL ACT, HR 1256 (2009).
4. SHOP FS. Swisher Sweet Cigars. 2014; <http://www.famous-smoke.com/brand/swisher+sweets+cigars>. Accessed 10/7/2014, 2014.
5. *The Health Consequences of Smoking-50 Years of Progress: A Report of the Surgeon General*. Atlanta (GA) 2014.
6. CENTERS FOR DISEASE CONTROL AND PREVENTION. (2013) Tobacco product use among middle and high school students--United States, 2011 and 2012, *MMWR Morb Mortal Wkly Rep*, 62, 893-7.
7. TERCHEK, J. J., LARKIN, E. M., MALE, M. L. & FRANK, S. H. (2009) Measuring cigar use in adolescents: inclusion of a brand-specific item, *Nicotine Tob Res*, 11, 842-6.
8. NASIM, A., BLANK, M. D., BERRY, B. M. & EISSENBERG, T. (2012) Cigar use misreporting among youth: data from the 2009 Youth Tobacco Survey, Virginia, *Prev Chronic Dis*, 9, E42.
9. PAGE, B. & EVANS, S. (2003) Cigars, Cigarillos, and Youth: Emergent Patterns in Subcultural Complexes, *Journal of Ethnicity in Substance Abuse*, 2, 63-76.
10. YERGER, V., PEARSON, C. & MALONE, R. E. (2001) When is a cigar not a cigar? African American youths' understanding of "cigar" use, *Am J Public Health*, 91, 316-7.
11. BAKER, F., AINSWORTH, S. R., DYE, J. T. et al. (2000) Health risks associated with cigar smoking, *JAMA*, 284, 735-40.
12. RODRIGUEZ, J., JIANG, R., JOHNSON, W. C. et al. (2010) The association of pipe and cigar use with cotinine levels, lung function, and airflow obstruction: a cross-sectional study, *Ann Intern Med*, 152, 201-10.
13. TERCYAK, K. P. & AUDRAIN, J. (2002) Psychosocial correlates of alternate tobacco product use during early adolescence, *Prev Med*, 35, 193-8.
14. FRAZIER, A. L., FISHER, L., CAMARGO, C. A., TOMEO, C. & COLDITZ, G. (2000) Association of adolescent cigar use with other high-risk behaviors, *Pediatrics*, 106, E26.
15. BROOKS, A., GAIER LARKIN, E. M., KISHORE, S. & FRANK, S. (2008) Cigars, cigarettes, and adolescents, *Am J Health Behav*, 32, 640-9.
16. SOLDZ, S., HUYSER, D. J. & DORSEY, E. (2003) Characteristics of users of cigars, bidis, and kreteks and the relationship to cigarette use, *Preventive medicine*, 37, 250-8.
17. RUBINSTEIN, M. L., SHIFFMAN, S., MOSCICKI, A. B. et al. (2013) Nicotine metabolism and addiction among adolescent smokers, *Addiction*, 108, 406-12.
18. DIFRANZA, J. R., SAVAGEAU, J. A., RIGOTTI, N. A. et al. (2002) Development of symptoms of tobacco dependence in youths: 30 month follow up data from the DANDY study, *Tob Control*, 11, 228-35.
19. PROKHOROV, A. V., DE MOOR, C., PALLONEN, U. E. et al. (2000) Validation of the modified Fagerström tolerance questionnaire with salivary cotinine among adolescents, *Addictive Behaviors*, 25, 429-33.

20. JACOB, P., 3RD, YU, L., DUAN, M. et al. (2011) Determination of the nicotine metabolites cotinine and trans-3'-hydroxycotinine in biologic fluids of smokers and non-smokers using liquid chromatography-tandem mass spectrometry: biomarkers for tobacco smoke exposure and for phenotyping cytochrome P450 2A6 activity, *Journal of chromatography. B, Analytical technologies in the biomedical and life sciences*, 879, 267-76.
21. GILPIN, E. A. & PIERCE, J. P. (2003) Concurrent use of tobacco products by California adolescents, *Prev Med*, 36, 575-84.
22. EATON, D. K., KANN, L., KINCHEN, S. et al. (2006) Youth risk behavior surveillance--United States, 2005, *J Sch Health*, 76, 353-72.
23. CENTERS FOR DISEASE CONTROL AND PREVENTION. National Youth Tobacco Survey (NYTS). 2014; [http://www.cdc.gov/tobacco/data\\_statistics/surveys/nyts/](http://www.cdc.gov/tobacco/data_statistics/surveys/nyts/). Accessed 11/10/2014, 2014.
24. DAUPHINEE, A. L., DOXEY, J. R., SCHLEICHER, N. C., FORTMANN, S. P. & HENRIKSEN, L. (2013) Racial differences in cigarette brand recognition and impact on youth smoking, *BMC Public Health*, 13, 170.
25. SCHUSTER, R. M., HERTEL, A. W. & MERMELSTEIN, R. (2013) Cigar, cigarillo, and little cigar use among current cigarette-smoking adolescents, *Nicotine Tob Res*, 15, 925-31.
26. CULLEN, J., MOWERY, P., DELNEVO, C. et al. (2011) Seven-year patterns in US cigar use epidemiology among young adults aged 18-25 years: a focus on race/ethnicity and brand, *Am J Public Health*, 101, 1955-62.
27. COREY, C. G., DUBE, S. R., AMBROSE, B. K. et al. (2014) Cigar smoking among U.S. students: reported use after adding brands to survey items, *Am J Prev Med*, 47, S28-35.
28. HENNINGFIELD, J. E., FANT, R. V., RADZIUS, A. & FROST, S. (1999) Nicotine concentration, smoke pH and whole tobacco aqueous pH of some cigar brands and types popular in the United States, *Nicotine Tob Res*, 1, 163-8.
29. SOLDZ, S., HUYSER, D. J. & DORSEY, E. (2003) The cigar as a drug delivery device: youth use of blunts, *Addiction*, 98, 1379-86.