

# EXHIBIT 1



## Original investigation

# US Adult Cigar Smoking Patterns, Purchasing Behaviors, and Reasons for Use According to Cigar Type: Findings From the Population Assessment of Tobacco and Health (PATH) Study, 2013–2014

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## Abstract

**Introduction:** The US cigar market is diverse, yet until recently most research studies and tobacco surveillance systems have not reported behavioral and related outcomes by cigar type.

**Methods:** The 2013–2014 Population Assessment of Tobacco and Health Study collected data separately for filtered cigars (FCs), cigarillos, and traditional cigars, which were further distinguished as premium or nonpremium. Descriptive statistics for adult established current smokers of each cigar type and cigarettes were calculated for demographic characteristics, tobacco use patterns, purchasing behaviors and reasons for use. Adjusted prevalence ratios (APRs) using a marginal predictions approach with logistic regression assessed correlates of dual cigar and cigarette smoking.

**Results:** Age, sex, race/ethnicity, education level, and poverty status of smokers varied according to cigar type. Daily cigar smoking prevalence and number of cigars smoked per day were higher for FCs (37.3%; median: 1.6 cigars/day, respectively), than all other cigar types (6.7%–25.3%, all  $p < .01$ ; 0.1–0.4 cigars/day, all  $p < .01$ , respectively); daily smoking and cigars per day were similar for nonpremium cigars and cigarillos ( $p = .11$ ;  $p = .33$ , respectively). Cigarette smoking was twice as common among smokers of nonpremium cigars, cigarillos, and FCs (58.0%–66.0%) than among premium cigars (29.9%). Among current cigar smokers, FC smokers (APR = 1.23, 95% confidence interval [CI] = 1.09–1.39), other tobacco product users (APR = 1.27, 95% CI = 1.15–1.41), and those

with a GED/high school diploma or less ( $APR = 1.20$ ,  $95\% \text{ CI} = 1.09\text{--}1.33$ ) were more likely to also smoke cigarettes.

**Conclusion:** User characteristics, cigar smoking patterns, and dual smoking with cigarettes varied by cigar type highlighting the importance of adequately describing the cigar type studied and, where appropriate, differentiating results by cigar type.

**Implications:** Despite the diversity of the cigar market place, historically many research studies and tobacco surveillance systems have treated cigars as a single product type. This study describes similarities and differences in the user characteristics, tobacco use patterns, and purchasing behaviors of premium, nonpremium, cigarillo, and filtered cigar smokers. To enhance tobacco regulatory science, sufficient descriptions of the cigar type(s) studied and, where appropriate, differentiation of the particular cigar type(s) studied should be undertaken to improve the interpretation of study findings, understanding of cigar use patterns and related behaviors and future approaches to reducing cigar-attributable morbidity and mortality.

## Introduction

Annual cigar consumption in the United States doubled from 6.2 billion cigars in 2000 to 12.0 billion cigars in 2016.<sup>1</sup> Cigar smoke contains many of the same toxic and carcinogenic constituents present in cigarette smoke.<sup>2</sup> Regular cigar smoking is estimated to cause approximately 9000 premature deaths annually in the United States primarily from cancers of the lung and upper aerodigestive tract, cardiovascular disease, and chronic obstructive pulmonary disease.<sup>3</sup> Despite the growth in cigar consumption and serious health risks associated with cigar smoking,<sup>2-7</sup> data systems that monitor tobacco use generally provide less detailed information on cigar smoking behaviors and product attributes as a whole and by subtypes compared with data collected for cigarettes.<sup>8-11</sup> Furthermore, data on purchasing behaviors, including where, how, and at what price cigars are bought, as well as beliefs about smoking particular cigar types, have not previously been systematically collected.

Federal regulations define a cigar as “any roll of tobacco wrapped in leaf tobacco or in any substance containing tobacco.”<sup>12</sup> For federal tax purposes, the US Treasury Department differentiates cigars by weight as either small ( $\leq 3$  pounds per 1000 cigars) or large ( $> 3$  pounds per 1000 cigars).<sup>13</sup> Yet, cigars come in a range of shapes and sizes, and vary in their manufacturing processes, packaging sizes, and prices; to date, no federal regulatory definitions further classify cigars to account for the diverse array of products<sup>14</sup> and the myriad of ways they are marketed to the public and referred to by consumers.<sup>15-20</sup> In a previous national telephone-based survey, cigars were distinguished into three types: premium large cigars, cigarillos, and other mass-market (ie, nonpremium) cigars, and filtered cigars (FCs), based on the size/length, components (eg, filters, tips), and cigar brand that was usually smoked.<sup>21</sup> In general, premium cigars, also referred to as “stogies,” consist of more expensive tobacco varieties and components, such as whole tobacco leaf wrapper and binder, and may be assembled by hand. Cigarillos and other larger mass market cigars are generally machine-produced using homogenized tobacco leaf or reconstituted tobacco, and may be sold with plastic or wooden tips. FCs are generally similar to cigarettes in shape, size, and other features and are generally sold in packs or by the carton, like cigarettes.<sup>22-24</sup>

Preference for particular cigar types can vary according to individual user characteristics (eg, sex, age, socioeconomic status), frequency (eg, daily vs. some days) and the extent of co-use with other substances, including cigarettes and marijuana.<sup>9,11,15,21,25,26</sup> Co-use or dual use of cigars and cigarettes has been a focus of recent studies as

cigarette smoking prevalence has declined and the diversity of non-cigarette tobacco products has grown.<sup>9-11,21,27-31</sup> Among the tobacco products that have received particular attention are “little cigars and cigarillos” (or “LCCs”) and their relationship to cigarette smoking. Studies suggest that the relationship between LCCs and cigarette smoking is influenced by factors such as (1) differences in local, state and federal tobacco tax rates, (2) regulations on cigarette flavoring, minimum pack sizes, and advertising restrictions, (3) marketing strategies, including price promotions by tobacco manufacturers, and (4) perceptions among young people about the risks or harms of smoking cigars generally or relative to cigarette smoking.<sup>11,27,28,32-34</sup> Related work has explored how LCC risk perceptions vary according to tobacco flavorings and co-use of other substances.<sup>31,35</sup> However, to date, information specific to each cigar type has been limited, as has data on a full range of tobacco-related behaviors.

The current study describes individual user characteristics, tobacco use patterns, purchasing behaviors, and reasons for use separately for traditional premium and nonpremium cigars, cigarillos, FCs, and cigarettes. This analysis adds to the small body of empirical evidence on the similarities and differences across cigar types and cigarettes. These comprehensive data can provide a better understanding of the cigar marketplace and inform future strategies to reduce the death and disease from cigar smoking.

## Methods

### Sample

The PATH Study is a nationally representative, longitudinal cohort study of 45 971 adults and youth in the United States, aged 12 years and older. The National Institutes of Health, through the National Institute on Drug Abuse, is partnering with the Food and Drug Administration’s Center for Tobacco Products to conduct the PATH Study under a contract with Westat. The PATH Study uses Audio Computer-Assisted Self-Interviews to collect self-report information on tobacco-use patterns and related health behaviors. The PATH Study recruitment employed a stratified address-based, area-probability sampling that oversampled adult tobacco users, adults aged 18–24 years, and African American adults. An in-person screener was used to select youths and adults from households for participation. This analysis draws from the adult interviews ( $n = 32\,320$  participants aged 18 years and older) since adults were asked more detailed tobacco purchasing questions compared with youth. Among households screened for wave 1 (weighted household screener rate = 54.0%), the overall

adult interview weighted response rate was 74.0%. The weighting procedures adjusted for oversampling and nonresponse; combined with the use of a probability sample, the weighted data allow the estimates produced by the PATH Study to be representative of the noninstitutionalized, civilian US population. Further details regarding the PATH Study design, methods, and study instrument (including cigar images) are published elsewhere.<sup>36,37</sup> The PATH Study was approved by the Institutional Review Board at Westat, and the Office of Management and Budget approved the data collection. This analysis relies on data collected from wave 1, fielded from September 2013 to December 2014 and analyzed in 2015–2016.

## Measures

To distinguish cigar types, the PATH Study questionnaire first displays images of traditional cigars with accompanying text describing the physical characteristics and listing examples of popular brands (*“Traditional cigars contain tightly rolled tobacco that is wrapped in a tobacco leaf. Some common brands of cigars include Macanudo, Romeo y Julieta, and Arturo Fuente, but there are many others.”*) Then the questionnaire displays images of cigarillos and FCs with text: *“Cigarillos and filtered cigars are smaller than traditional cigars. They are usually brown. Some are the same size as cigarettes, and some come with tips or filters. Some common brands are Black & Mild, Swisher Sweets, Dutch Masters, Phillies Blunts, Prime Time, and Winchester.”* That is followed by a question about the kind of FCs or cigarillos smoked. Participants who reported smoking cigars *“with a filter (like a cigarette filter)”* were assigned as FC smokers, whereas those reporting having smoked cigars *“with a plastic or wooden tip”* or *“without a tip or filter”* were assigned as cigarillo smokers. Nearly half of all cigarillo smokers (45%) used both tipped and untipped cigarillos. Sensitivity analyses (not shown) indicated that three groups of cigarillo users: dual tipped and untipped, tipped only, and untipped only shared similar use behaviors and profiles, consequently cigarillos were analyzed as a single category.

### Current Established Cigar Smokers

Participants who had ever heard of the cigar type, ever smoked the cigar type *“fairly regularly,”* and now smoked the cigar type every day or some days were defined as current established cigar smokers. Those smoking more than one of the three cigar types (ie, traditional cigar, cigarillo, FC) were administered the cigar module for each cigar type smoked. For this analysis, traditional cigars were further differentiated as premium or nonpremium based on the tobacco blends, components, manufacturing process and other characteristics associated with the usual brand smoked (Supplementary Table A). Relying on usual brand smoked, approximately 10% of traditional cigar smokers could not be assigned a premium status. Among those who were assigned as premium smokers, 90% paid, on average,  $\geq \$2$  per cigar, and a similar percentage assigned as nonpremium smokers paid  $< \$2$  per cigar. Therefore, those with unusable brand information who paid  $\geq \$2$  per cigar were designated as premium cigar smokers, whereas those paying  $< \$2$  were assigned as nonpremium. This analysis comprises four cigar types: traditional premium, traditional nonpremium, cigarillos, and FCs.

### Current Established Cigarette Smokers

Participants who had smoked at least 100 manufactured or roll-your-own cigarettes in their lifetime and now smoked cigarettes every day or some days were defined as current established cigarette smokers.

## Cigar Smoking Patterns

For this analysis, the lifetime number of cigars smoked was categorized as: 10 or fewer cigars, 11–50 cigars, and 51 or more cigars, the upper category intended to be consistent with the lifetime threshold for cigar use applied on national adult tobacco surveys.<sup>38–39</sup> Daily smoking was ascertained from the frequency (ie, every day, some days) the cigar type was smoked. Number of days smoked in the past 30 days was collected continuously for some day smokers; every day smokers were assigned as smoking on all 30 days. Number of cigars smoked per day for each cigar type was calculated for daily and some day smokers; among those who smoked on 0–29 of the past 30 days, this value was calculated as the number of days smoked multiplied by the number of cigars smoked on those days divided by 30 (days). Duration of smoking was calculated by subtracting age at first regular use from current age. Current use of  $\geq 1$  other noncigar, noncigarette product(s) was defined as having ever used at least one of the following tobacco products “fairly regularly” and now using that product every day or some days: e-cigarettes, pipe tobacco, hookah, snus pouches, other smokeless tobacco (ie, loose snus, moist snuff, dip, spit, chewing tobacco), or dissolvable tobacco.

## Cigar Purchasing

Participants reported whether they had a regular brand, the name of the regular brand, and whether the brand was flavored. They also indicated how (in person, from the internet, by telephone or did not buy their own tobacco product) and where (convenience store/gas station, smoke shop/tobacco specialty or outlet store, or somewhere else) they purchased cigars. Participants reported their usual cigar purchase size as single stick or box/pack. Price per cigar was calculated as the usual price the participant reported paying divided by the number of cigars sold in the usual unit purchased. For cigarette smokers, corresponding smoking and purchasing measures were created and reported when applicable.

## Reasons for Cigar Smoking

Participants were asked a total of 12 reasons or beliefs (in a randomized order) why people may smoke cigars and indicated whether each applied to them (“yes”/“no”). Reasons included: *“They are affordable”*; *“I like socializing while smoking them”*; and *“They come in flavors I like.”* The full set is reported in Supplementary Table B. Reasons that included comparisons to cigarettes were stratified according to the participant’s cigarette smoking status.

## Demographic Characteristics

Participants reported the following demographic characteristics: sex (male, female); age in years, categorized as: 18–24, 25–34, 35–54,  $\geq 55$ ; race and ethnicity, categorized as: white non-Hispanic (NH) (“white”), black/African American NH (“black”), other/multi-race NH, Hispanic; education status, categorized as: less than high school diploma, GED, high school diploma, some college/associate’s degree, completed college or more. Based on annual household income and household size, poverty status was assigned following federal guidelines as:  $< 100\%$  federal poverty level (FPL),  $100\text{--}< 200\%$  FPL, and  $\geq 200\%$  FPL.

## Data Analysis

Prevalence estimates for smoking each of the four cigar types and cigarettes were produced in SAS version 9.3 (SAS Institute, Cary, NC) according to demographics, tobacco use patterns, purchasing behaviors, and reasons for use. Tests for differences among smokers of each of the four cigar types or cigarettes were conducted in SAS using

simple linear regression for categorical variables, and were conducted in Stata version 14.2 (StataCorp, College Station, TX) using quantile regression for continuous variables not normally distributed. Adjusted prevalence ratios (APRs) were obtained using a marginal predictions approach with logistic regression<sup>40</sup> in SAS-callable SUDAAN version 11.0.1 (RTI International, RTP, NC) to examine associations between dual cigar and cigarette smoking versus cigar-only smoking according to demographics and cigar use behaviors. All analyses were conducted using replicate weights and balanced repeated replication methods (BRR) to account for the PATH Study's complex survey design.<sup>36–37</sup> For the tests of differences described above, the BRR method implicitly accounts for any correlation between the estimates of groups being compared.<sup>41</sup> Prevalence estimates with a relative standard error of >30% or denominator with <50 observations were suppressed. Variables missing values for >5% of all eligible responses (eg, FPL) were treated as a separate analytic category; otherwise, observations with missing values were dropped from analysis.

## Results

### Demographic Characteristics of Cigar and Cigarette Smokers

The overall prevalence of current established adult tobacco use was 0.7% for premium cigars, 0.8% for nonpremium cigars, 1.7% for

cigarillos, 0.9% for FCs, and 18.1% for cigarettes (Table 1). Males comprised the majority of adult cigar (68.6%–95.8%) and cigarette (55.3%) smokers. Younger adults (aged 18–34 years) accounted for 64.5% of cigarillo smokers and 34.0%–46.8% of smokers of the other products (ie, premium cigars, nonpremium cigars, FCs). Black adults comprised 35.7% of cigarillo and 24.2% of nonpremium cigar smokers and 5.3%–15.7% of smokers of other products. Adults with a GED/high school diploma or less accounted for most smokers of cigarettes (54.8%) and all cigars (54.0%–59.2%) except premium cigars (26.2%). Adults living below the federal poverty level comprised 34.2% of cigarette and 41.2%–47.1% of all cigar smokers, except premium cigars (14.2%).

### Cigar and Cigarette Smoking Patterns

Although most established cigar smokers (62.0%–71.6%) had smoked more than 50 of that cigar type in their lifetime, cigar smoking patterns and tobacco use behaviors varied by cigar type (Table 2). Prevalence of daily smoking was higher for FCs (37.3%), compared with all other cigar types (6.7%–25.3%; all  $p < .01$ ); daily smoking was similar for nonpremium cigars and cigarillos ( $p = 0.11$ ). Cigars smoked per day were greater for FCs (median: 1.6 cigars/day) compared with all other cigar types (0.1–0.4 cigars/day; all  $p < .01$ ); cigars per day were similar for nonpremium cigars and cigarillos ( $p = .33$ ). Age at first regular use was higher for FCs (median:

**Table 1.** Demographic Characteristics of Adult Current Established Traditional Cigar (Premium, Nonpremium), Cigarillo, Filtered Cigar, and Cigarette Smokers, PATH Study Wave 1, 2013–2014

	Premium cigars <sup>a</sup> ( <i>n</i> = 377)	Nonpremium cigars <sup>a</sup> ( <i>n</i> = 489)	Cigarillos ( <i>n</i> = 1186)	Filtered cigars (FCs) ( <i>n</i> = 551)	Cigarettes ( <i>n</i> = 11 402)
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
Overall adult prevalence	0.7 (0.6–0.7)	0.8 (0.7–0.8)	1.7 (1.5–1.8)	0.9 (0.8–1.0)	18.1 (17.6–18.6)
Sex					
Male	95.8 (93.5–98.0)	83.9 (80.2–87.6)	72.7 (70.1–75.4)	68.6 (64.6–72.7)	55.3 (54.2–56.4)
Female	4.2 (2.0–6.5)	16.1 (12.4–19.8)	27.3 (24.6–29.9)	31.4 (27.3–35.4)	44.7 (43.6–45.8)
Age group (years) <sup>b</sup>					
18–24	17.5 (12.3–22.6)	22.1 (18.3–25.9)	35.9 (32.5–39.3)	18.0 (14.2–21.7)	14.1 (13.3–14.8)
25–34	25.5 (20.0–31.0)	24.7 (20.3–29.2)	28.6 (25.2–31.9)	16.0 (12.4–19.6)	24.3 (23.4–25.1)
35–54	34.4 (29.3–39.6)	32.9 (27.7–38.2)	27.1 (23.9–30.2)	39.8 (35.3–44.3)	39.0 (38.0–40.1)
55+	22.6 (17.6–27.6)	20.2 (15.8–24.6)	8.5 (6.6–10.4)	26.3 (22.0–30.5)	22.7 (21.8–23.5)
Race/ethnicity					
White, non-Hispanic	77.2 (71.9–82.4)	58.2 (53.3–63.2)	41.7 (38.3–45.0)	66.2 (61.5–70.9)	69.8 (68.6–71.0)
Black/AA, non-Hispanic	5.3 (2.3–8.3)	24.2 (19.5–28.9)	35.7 (32.1–39.2)	15.7 (11.0–20.4)	12.9 (12.2–13.7)
Other or multi-race, non-Hispanic	6.6 (3.6–9.6)	5.9 (3.5–8.2)	6.6 (5.3–7.9)	6.6 (4.3–8.9)	6.0 (5.5–6.5)
Hispanic	10.9 (7.3–14.6)	11.7 (8.6–14.8)	16.0 (14.0–18.0)	11.5 (8.7–14.3)	11.2 (10.6–11.9)
Education					
Less than high school diploma	5.4 (3.1–7.8)	14.2 (10.7–17.8)	16.0 (13.9–18.1)	17.7 (14.5–21.0)	15.9 (15.2–16.7)
GED	4.6 (2.3–6.8)	12.2 (9.3–15.1)	11.7 (10.0–13.5)	11.7 (8.8–14.6)	10.8 (10.1–11.6)
High school diploma	16.2 (12.0–20.4)	28.4 (24.2–32.5)	26.3 (23.2–29.3)	29.8 (25.3–34.3)	28.1 (26.9–29.4)
Some college/associate degree	34.9 (29.6–40.3)	38.5 (34.0–43.0)	38.2 (35.0–41.4)	33.0 (29.2–36.9)	33.8 (32.7–35.0)
Completed college or more	38.9 (33.2–44.5)	6.7 (4.3–9.2)	7.8 (6.1–9.6)	7.8 (5.1–10.4)	11.2 (10.6–11.9)
Household poverty					
<100% FPL	14.2 (10.7–17.7)	41.2 (36.4–46.0)	47.1 (43.6–50.5)	44.9 (40.1–49.8)	34.2 (32.9–35.4)
100–<200% FPL	15.4 (11.4–19.3)	22.2 (18.6–25.9)	23.6 (20.9–26.3)	27.4 (23.1–31.8)	25.1 (24.2–26.0)
≥200% FPL	62.7 (57.3–68.0)	29.0 (24.3–33.6)	22.6 (19.1–26.0)	18.4 (15.2–21.7)	32.3 (30.9–33.6)
Missing FPL	7.8 (4.7–10.8)	7.6 (5.1–10.1)	6.8 (4.9–8.7)	9.2 (6.2–12.2)	8.5 (7.8–9.2)

CI, Wald confidence interval; AA, African-American; GED, General Education Development certificate; FPL, federal poverty level.

<sup>a</sup>Among traditional established cigar smokers 3% (*n* = 24) could not be assigned as either a premium or nonpremium smoker after assessing responses to usual brand (Supplementary Table A).

<sup>b</sup>When respondent age was missing, imputed values for age were used as described in the PATH Restricted Use File User Guide (United States Department of Health and Human Services, 2017).



**Table 2.** Smoking Patterns Among Adult Current Established Traditional Cigar (Premium, Nonpremium), Cigarillo, Filtered Cigar, and Cigarette Smokers, PATH Study Wave 1, 2013–2014

	Premium cigars	Nonpremium cigars	Cigarillos	Filtered cigars (FCs)	Cigarettes <sup>a</sup>
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
Lifetime cigars smoked					
<1–10 cigars	4.9 (2.8–7.1)	16.8 (13.5–20.1)	7.8 (6.2–9.4)	8.1 (5.3–10.8)	NA
11–50 cigars	23.4 (18.3–28.6)	21.2 (17.4–25.1)	20.9 (18.4–23.4)	21.1 (17.0–25.1)	NA
51 or more cigars	71.6 (66.5–76.8)	62.0 (57.9–66.0)	71.3 (68.6–74.1)	70.9 (67.0–74.8)	NA
Now smoke product every day	6.7 (4.1–9.3)	25.3 (21.3–29.3)	22.0 (19.7–24.2)	37.3 (31.9–42.7)	79.5 (78.5–80.6)
Days smoked in past 30 days <sup>b</sup> (median, IQR)	1.7 (0.0–4.8)	9.2 (1.5–28.5)	7.5 (1.3–29.1)	14.0 (0.8–28.8)	29.4 (29.1–29.7)
Number of cigars or cigarettes/day <sup>c</sup> (median, IQR)	0.1 (0.0–0.2)	0.4 (0.1–2.0)	0.3 (0.1–2.0)	1.6 (0.1–9.5)	10.1 (5.0–19.6)
Age (years) at first regular use <sup>d</sup> (median, IQR)	24.5 (18.8–32.6)	19.5 (16.6–29.6)	18.0 (15.9–23.3)	26.8 (17.8–44.3)	16.6 (14.7–18.7)
Duration (years) since first regular <sup>d</sup> use (median, IQR)	8.7 (3.4–16.8)	10.9 (4.3–18.0)	7.3 (3.3–13.9)	5.4 (1.7–14.4)	21.8 (10.8–35.3)
Currently use ≥1 other cigar type(s) <sup>e,f</sup>	16.8 (12.4–21.3)	64.0 (58.7–69.3)	37.7 (34.1–41.2)	41.6 (36.3–46.8)	9.0 (8.4–9.7)
Currently use ≥1 noncigar, nongarette product(s) <sup>g</sup>	33.7 (29.5–38.0)	31.4 (26.7–36.1)	28.8 (26.0–31.6)	27.1 (23.1–31.1)	15.8 (15.0–16.6)
Cigarette smoking status <sup>h</sup>					
Current established smoker	29.9 (25.5–34.3)	59.5 (54.6–64.4)	58.0 (54.4–61.6)	66.0 (61.3–70.7)	NA
Former established smoker	28.3 (23.0–33.6)	15.6 (11.9–19.3)	10.6 (8.4–12.8)	10.6 (7.5–13.8)	NA
Never smoker	41.8 (36.9–46.7)	24.9 (21.0–28.9)	31.4 (28.2–34.6)	23.4 (18.9–27.8)	NA

CI, Wald confidence interval; IQR, interquartile range (25th and 75th percentiles); NA, not applicable.

<sup>a</sup>When respondent reported smoking both manufactured cigarettes and roll-your-own (RYO) cigarettes ( $n = 554$ ), for certain topics they were asked separate questions about each product. For dual manufactured cigarette and RYO smokers, the responses to manufactured cigarette products are provided; otherwise, responses reflect the single cigarette type the respondent reported smoking.

<sup>b</sup>Number of days using the product in past 30 days was asked of those who now smoke cigars some days; every day smokers assumed to smoke on all 30 days.

<sup>c</sup>Respondents reporting smoking less than one cigar per day on the days smoked were assigned as smoking 0.5 cigars per day.

<sup>d</sup>Those reporting age at first regular use <6 years were assigned a value of 6 years.

<sup>e</sup>For current cigarette smokers, “currently use ≥1 other cigar products” refers to current smoking of one or more cigar products.

<sup>f</sup>If respondent was missing status for one cigar product and did not smoke the other cigar product, then treated as not smoking other cigar types.

<sup>g</sup>Current use of ≥1 noncigar, nongarette product(s) defined as having ever used one or more of the following tobacco products “fairly regularly” and now using that product every or some days: e-cigarettes, pipe tobacco, hookah, smokeless tobacco, snus, or dissolvable tobacco. If respondent reported not using any other tobacco product, or some combination of not using and missing tobacco product use status, then treated as not using any noncigar, nongarette products.

<sup>h</sup>Former established cigarette smokers had to have smoked at least 100 cigarettes in their lifetime and now smoke cigarettes not at all; never cigarette smokers had to smoke less than 100 cigarettes in their lifetime.

26.8 years) and premium cigars (24.5 years) compared with nonpremium cigars, cigarillos and cigarettes (16.6–19.5 years; all  $p < .05$ ). Currently smoking one or more of the other cigar products ranged from 64.0% for nonpremium cigars to 16.8% for premium cigars. Current cigarette smoking was twice as common for those smoking nonpremium cigars, cigarillos, and FCs (58.0%–66.0%) than premium cigars (29.9%), and cigarette smoking status among those smoking FCs differed from that of cigarillos and premium cigars ( $p < .01$ ). The use of noncigar/nongarette tobacco products was lower among those smoking FCs (27.1%) than among those smoking premium cigars (33.7%;  $p = .03$ ), and was similar to those smoking nonpremium cigars (31.4%;  $p = .16$ ) and cigarillos (28.8%;  $p = .46$ ).

### Tobacco Product Characteristics and Purchasing Behaviors

Having a regular tobacco brand was reported by at least three-quarters (77.1%–93.1%) of smokers of nonpremium cigars, cigarillos, FCs, and cigarettes versus half (49.7%) of smokers of premium cigars (Table 3). Swisher Sweets was among the leading brands of nonpremium cigars, cigarillos, and FCs (21.7%–23.6%). Dutch

Masters, Black & Mild, and White Owl brands were together reported by 59.3% of cigarillo and 32.8% of nonpremium cigar smokers, while Cheyenne, Phillies, and Prime Time were together reported by nearly 30% of FC smokers. Reporting use of a flavored usual brand occurred less frequently for premium cigars (11.9%) compared with all other cigar types (53.0%–61.0%, all  $p < .01$ ). Nearly all nonpremium cigars, cigarillos, FCs, and cigarettes were purchased in person (95.5%–97.2%) and most were bought in convenience stores/gas stations (75.4%–86.8%). In contrast, for premium cigars, nearly one-quarter of smokers did not buy in person; smoke shops/specialty stores (46.8%) and cigar bars (29.9%) were the primary purchase locations. The median price paid per stick was lower for FCs (\$0.12) than cigarettes (\$0.27), nonpremium cigars or cigarillos (\$1.00), or premium cigars (\$7.49) (all  $p < .01$ ).

### Factors Associated With Dual Cigar and Cigarette Smoking Versus Cigar-Only Smoking

Among current cigar smokers, those smoking FCs were more likely to be dual cigarette smokers (APR = 1.23, 95% CI = 1.09–1.39), while those smoking premium cigars were less likely to also smoke

**Table 3.** Tobacco Product Characteristics and Purchasing Behaviors Among Adult Current Established Traditional Cigar (Premium, Nonpremium), Cigarillo, Filtered Cigar and Cigarette Smokers, PATH Study Wave 1, 2013–2014

	Premium cigars	Nonpremium cigars	Cigarillos	Filtered cigars (FCs)	Cigarettes <sup>a</sup>
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
Has a regular brand	49.7 (44.4–54.9)	77.1 (73.8–80.5)	83.0 (80.8–85.3)	82.9 (79.4–86.4)	93.1 (92.5–93.6)
Top 5 brands smoked <sup>b</sup>					
Cohiba	16.9 (12.8–20.9)	Swisher Sweets	21.7 (17.0–26.3)	Black & Mild	42.8 (39.4–46.2)
Macanudo	15.2 (11.4–19.0)	Dutch Masters	16.7 (13.0–20.5)	Swisher Sweets	23.6 (20.9–26.3)
Arturo Fuente	13.5 (9.6–17.5)	Backwoods	11.3 (8.1–14.5)	White Owl	10.5 (8.5–12.5)
Acid	6.9 (3.6–10.1)	Black & Mild	9.7 (6.7–12.6)	Dutch Masters	6.0 (4.3–7.6)
Montecristo	6.5 (3.1–9.9)	White Owl	6.4 (4.0–8.8)	Zig Zag	2.2 (1.3–3.1)
Regular brand flavored or mentholated <sup>b,c,d</sup>	11.9 (8.0–15.8)	53.0 (47.7–58.3)	61.0 (57.5–64.5)	60.4 (56.3–64.4)	37.1 (35.8–38.4)
Usually buy in person	77.6 (72.8–82.4)	96.7 (94.8–98.6)	96.7 (95.7–97.8)	95.5 (93.4–97.7)	97.2 (96.9–97.6)
Where buy tobacco product <sup>e</sup>					
Cigar bar	29.9 (24.1–35.6)	*	^	*	NA
Convenience store/gas station	18.2 (13.6–22.8)	78.5 (74.1–83.0)	85.1 (82.5–87.7)	75.4 (70.6–80.2)	86.9 (85.2–88.5)
Smoke shop/tobacco specialty or outlet store	46.8 (40.5–53.2)	18.4 (14.5–22.4)	12.2 (9.8–14.7)	22.0 (17.5–26.5)	10.9 (9.3–12.5)
Somewhere else	5.1 (2.2–8.0)	*	*	*	2.2 (1.5–2.9)
Usual purchase size <sup>f</sup>					
Single	79.1 (73.6–84.6)	44.5 (39.5–49.5)	49.4 (46.1–52.7)	13.8 (10.6–17.0)	1.8 (1.5–2.1)
Box or pack	20.9 (15.4–26.4)	55.5 (50.5–60.5)	50.6 (47.3–53.9)	86.2 (83.0–89.4)	82.0 (80.6–83.3)
Carton	NA	NA	NA	NA	16.2 (14.8–17.6)
Price per stick <sup>g</sup> (median, IQR)	\$7.49 (4.53–9.93)	\$1.00 (0.60–1.40)	\$1.00 (0.60–1.10)	\$0.12 (0.08–0.26)	\$0.27 (0.23–0.32)

CI, Wald confidence interval; IQR, interquartile range (25th and 75th percentiles); NA, not applicable.

<sup>a</sup>When respondent reported smoking both manufactured cigarettes and roll-your-own (RYO) cigarettes ( $n = 554$ ), for certain topics they were asked separate questions about each product. For dual manufactured cigarette and RYO smokers, the responses to manufactured cigarette products are provided; otherwise, responses reflect the single cigarette type the respondent reported smoking.

<sup>b</sup>Among those with a regular brand or if no regular brand, then refers to last brand purchased.

<sup>c</sup>Cigar and RYO smokers were asked whether their regular brand was flavored to taste like menthol, mint, clove, spice, candy, fruit, chocolate, alcohol or other sweets.

<sup>d</sup>Manufactured cigarette and RYO smokers were asked whether their regular brand was mentholated.

<sup>e</sup>Only asked of those who usually buy in person. Where buy tobacco product refers where purchasing most of the time. “Convenience store/gas station” category also includes supermarket, grocery store, warehouse, liquor store; “somewhere else” category also includes duty free shop, military commissary, bar/pub, restaurant, casino, friend, relative, swap meet/flea market, store on an Indian reservation.

<sup>f</sup>For cigar smokers, restricted to usually buy in person; for cigarettes, asked of manufactured cigarette smokers, irrespective of buying in person or not.

<sup>g</sup>Among FC smokers, price per stick is restricted to those who reported purchasing either 20 or 12 count packs (63% of all FC smokers).

\*Estimate has been suppressed because it is statistically unreliable. It is based on a (denominator) sample size of less than 50, or the relative standard error of the estimate (or its complement) is larger than 30 percent.

^The estimate's 95% CI is (0.7–2.3); the estimate is reliable however it is not reported to avoid deducing the value of the suppressed estimate in this column.

cigarettes (APR = 0.52, 95% CI = 0.40–0.67) (Table 4). Cigar smokers who currently used additional tobacco products (eg, e-cigarettes, hookah, smokeless tobacco) were more likely to also smoke cigarettes (APR = 1.27, 95% CI = 1.15–1.41). Compared to whites, black cigar smokers (APR = 0.82, 95% CI = 0.72–0.94) were less likely to also smoke cigarettes. Cigar smokers with a GED/high school diploma or less were more likely (APR = 1.20, 95% CI = 1.09–1.33) than those with at least some college to also smoke cigarettes. Those who reported smoking any cigar type on a daily basis were less likely to smoke cigarettes (APR = 0.88, 95% CI = 0.78–0.99) than those who did not smoke any cigar type on a daily basis.

### Reasons for Using Cigar Products

Socializing when smoking cigars (49.9%–76.6%) and availability of cigars in flavors (48.6%–71.9%) were reasons endorsed by half or more of smokers of all cigar types, while other reasons for use varied by cigar type and cigarette smoking status (Supplementary Table B). Affordability was endorsed by most of those smoking FCs (80.2%), cigarillos (71.7%), and nonpremium cigars (66.4%), but not for those smoking premium cigars (22.7%). More than half of FC smokers overall (52.4%), including 56.2% who also currently smoked cigarettes and 61.0% who formerly smoked cigarettes, indicated FCs were like smoking a regular cigarette, compared with only 6.3%–26.8% of other cigar types.

**Table 4.** Percent of Dual Cigar and Cigarette Smokers Among Adult Current Established Cigar Smokers and Adjusted Prevalence Ratios by Demographic and Cigar Smoking Characteristics, PATH Study Wave 1, 2013–2014

	Prevalence (95% CI)	Adjusted PR <sup>a</sup> (95% CI)
Smoke premium cigars		
Yes	29.9 (25.5–34.3)	0.52 (0.40–0.67)
No	60.3 (57.2–63.4)	Ref
Smoke nonpremium cigars		
Yes	59.5 (54.6–64.4)	0.97 (0.86–1.09)
No	52.1 (49.0–55.2)	Ref
Smoke cigarillos		
Yes	57.9 (54.4–61.5)	1.09 (0.95–1.25)
No	48.7 (44.9–52.6)	Ref
Smoke filtered cigars (FCs)		
Yes	66.0 (61.3–70.7)	1.23 (1.09–1.39)
No	48.7 (45.9–51.4)	Ref
Use other tobacco products <sup>b</sup>		
Yes	62.1 (57.7–66.4)	1.27 (1.15–1.41)
No	50.4 (47.1–53.7)	Ref
Sex		
Male	51.7 (48.7–54.7)	Ref
Female	59.9 (54.7–65.1)	1.01 (0.91–1.13)
Age group (years)		
18–34	55.1 (51.9–58.4)	0.98 (0.89–1.07)
35+	52.1 (47.8–56.3)	Ref
Race/ethnicity		
White, non-Hispanic	55.2 (51.4–59.1)	Ref
Black/AA, non-Hispanic	49.5 (44.5–54.6)	0.82 (0.72–0.94)
Other/multi-race, or Hispanic	53.0 (47.1–58.9)	0.90 (0.80–1.02)
Education		
GED, HS diploma or less	61.7 (58.5–64.9)	1.20 (1.09–1.33)
Some college/associate degree or more	45.9 (42.2–49.6)	Ref
Daily cigar smoking <sup>c</sup>		
Yes	53.8 (48.4–59.2)	0.88 (0.78–0.99)
No	53.5 (50.5–56.6)	Ref

CI, logit-transformed confidence interval; PR, prevalence ratio; AA, African-American; HS, high school; GED, General Education Development certificate.

<sup>a</sup>There were  $n = 2045$  current established cigar smokers with information on current cigarette smoking status. The regression analysis included  $n = 1895$  participants ( $n = 834$  cigar only;  $n = 1061$  dual cigar + cigarette) after observations missing information for  $\geq 1$  covariate were excluded.

<sup>b</sup>Use of other tobacco products defined as having ever used one or more of the following tobacco products “fairly regularly” and now using that product every day or some days: e-cigarettes, pipe tobacco, hookah, smokeless tobacco, snus, or dissolvable tobacco.

<sup>c</sup>Daily cigar refers to smoking at least one cigar type on a daily basis.

## Discussion

While historically many research studies and tobacco surveillance systems have treated cigars as a single product type, the PATH Study fills an important gap by providing detailed information on individual user characteristics, tobacco use patterns, purchasing behaviors, and reasons for use separately for traditional cigars, cigarillos, and FCs. Examination by cigar type revealed similarities and differences in demographic and behavioral outcomes. Compared with smokers of traditional-sized premium cigars, those smoking nonpremium cigars tended to be more like cigarillo smokers in demographics, smoking frequency, brand preferences, and purchasing behaviors (eg, price), suggesting nonpremium cigars and cigarillos may be studied jointly in future work. We also found FCs tended to differ from other cigar types including more frequent daily use, greater numbers of cigars smoked per day and older age at first regular use, which, in conjunction with endorsed reasons for use and other measures, suggests that FCs may be smoked in place of cigarettes. Finally, those smoking premium cigars tended to differ from those smoking nonpremium cigars, cigarillos, and FCs including having users with higher socioeconomic status, lower smoking frequency,

different purchasing behaviors (eg, where and for how much cigars were bought) and reasons for use.

Several recent studies have examined the characteristics, behaviors, and risk perceptions of LCC smokers.<sup>9–11,26–30,35</sup> Tobacco manufacturers and researchers apply the term “little cigar” interchangeably with FCs, making it difficult to distinguish whether LCC smoking includes use of cigarette-like cigars with filters, larger cigarillo-like unfiltered cigars, or both. Our findings that smokers of FCs tended to differ from cigarillo smokers by frequency and number of cigars per day, age at first use, and the likelihood of cigarette smoking, suggests that future studies should clearly describe the cigar types smoked and differentiate the cigar types analyzed. Despite these notable differences, our results align with prior studies that compared smokers of *any* mass-marketed cigar (eg, users of Black and Milds, Swisher Sweets, Phillie Blunts, Captain Black brands) with traditional large cigar smokers.<sup>9,11,42</sup> Specifically, those who reported smoking nonpremium cigars, cigarillos or FCs tended to be younger, non-Hispanic black, have low educational attainment, live below 200% of the federal poverty line, and smoke cigars on a daily basis as compared with those who smoked premium cigars.



This study is among the first to examine correlates of dual cigar and cigarette smoking *among current cigar smokers*. We found that dual users, relative to cigar-only smokers, were more likely to smoke FCs, use other noncigar/noncigarette tobacco products, and have lower educational attainment. One previous study that assessed factors associated with poly-tobacco use (ie, use of cigarettes, chewing tobacco, or snuff) among cigar smokers also found that poly-use was associated with lower levels of education.<sup>43</sup>

Our findings align and advance prior qualitative work that indicated FCs may be marketed to and smoked by consumers as inexpensive substitutes for cigarettes.<sup>22,23</sup> In adjusted analyses accounting for demographic factors and other tobacco use, only those who reported smoking FCs were significantly more likely to report dual use with cigarettes. Most FC smokers who currently or formerly smoked cigarettes agreed that smoking FCs felt like smoking a regular cigarette. Of note, the median age at first regular use of FCs was nearly a decade older than first regular use of cigarettes, indicating that most FC smokers take up FCs in adulthood rather than during adolescence. Those findings, in conjunction with the median price paid per FC being approximately half that of a cigarette, and high endorsement of affordability as a reason for smoking FCs, add further evidence that FCs may be smoked in place of cigarettes.

This analysis differentiated traditional cigar smokers as either premium or nonpremium based on usual brand and price. Since regulatory definitions of premium cigars do not exist, information about the brand's tobacco blends, components (eg, long filler, whole leaf wrapper), and manufacturing process (eg, handmade), obtained through online searches, was used to distinguish premium from nonpremium brands. Where brand information was unavailable, usual price paid per stick of  $\geq \$2$  was applied to identify premium brands, allowing us to classify more smokers than was possible in previous studies.<sup>21</sup> Although the results illustrate clear distinctions between premium and nonpremium smoker characteristics, use patterns and purchasing behaviors, some traditional cigar smokers may have been misclassified using this approach.

Because detailed product use and purchasing questions were asked of those who "ever fairly regularly" smoked cigars, this analysis characterizes a population of more established cigar smokers. The adult prevalence of *experimental* cigar smoking (defined as never fairly regularly smoking cigars and now smoking every or some days) was considerably higher than established cigar smoking. Supplementary Table C provides demographic characteristics of *all* adults now smoking cigars every day or some days, irrespective of ever fairly regularly smoking cigars. This broader definition may be more consistent with the population of current cigar smokers that are captured and reported in national tobacco surveys.<sup>38,39</sup>

This study estimated the median number of cigars smoked per day according to each cigar type. It should be noted that the size (ie, weight) of each cigar type varied, which precluded us from making comparisons that standardized the amount smoked for each cigar type. Our understanding of cigar toxicant exposures in general and whether exposures vary according to cigar type will be enhanced through future analyses of PATH Study biomarkers data. Finally, this study did not assess blunt use, whereby part or all of the cigar tobacco filler is replaced with marijuana before it is smoked. Since blunt use can be common among adolescent and adult cigarillo smokers, and in particular, untipped cigarillos users,<sup>15,25,29,44,45</sup> future analyses of cigar smoking behaviors may explore the influence of blunt use among cigarillo subtypes and assess levels of toxicant exposures among blunt and nonblunt users.

While cigars are a combustible tobacco product and carry many of the same health risks as cigarettes, historically, tobacco control policies focused on cigarettes.<sup>14</sup> Our results may be useful to inform tobacco control efforts related to cigar smoking. Most importantly, our data point to adequately describing the cigar type(s) studied, rather than using non-specific terms like "little cigars" or "LCCs," and to differentiating results by cigar type, where appropriate, to enhance tobacco research and surveillance. Our findings that non-premium cigars, cigarillos, and FCs are more likely to be flavored compared with cigarettes, that FCs had lower median price per stick (\$0.12) compared with cigarettes (\$0.27), and that usual pack size for cigar smokers is more likely to be a "single" stick compared with cigarettes all highlight product features of cigars that tobacco control and regulatory science research could address. In fact, focus is beginning to shift to noncigarette tobacco products, including cigars.<sup>46–50</sup> For example, New York City, Chicago, and Providence, RI have implemented policies restricting the sale of flavored cigars, while Boston has imposed minimum pack sizes for cigars. Additional tobacco control efforts at local, state, and national levels can reduce the morbidity and mortality associated with use of all cigar types.

## Supplementary Material

Supplementary data is available at *Nicotine & Tobacco Research* online.

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## Declaration of Interests

*Authors do not have any competing interest to report. Additionally, authors had full access to all of the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.*

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