



Short communication: Racial/ethnic disparities in cigar and cigarette exclusive, dual, and polyuse among adults

Jana L. Hirschtick^{a,*}, Richa Mukerjee^a, Ritesh Mistry^b, Delvon Mattingly^a, Nancy L. Fleischer^a

^a Department of Epidemiology, University of Michigan School of Public Health, 1415 Washington Heights, Ann Arbor, MI, USA

^b Department of Health Behavior and Health Education, University of Michigan School of Public Health, 1415 Washington Heights, Ann Arbor, MI, USA

ARTICLE INFO

Keywords:

Polytobacco
Cigarillos
Filtered cigars
Racial/ethnic disparities

ABSTRACT

Background: Despite documented racial/ethnic differences in cigar use, disparities in the context of dual and polyuse with cigarettes are unclear.

Methods: Using the Population Assessment of Tobacco and Health Study (2016–18), we examined prevalence and intensity of use patterns among adults (18+) who were Non-Hispanic (NH) Black, NH White, Hispanic, or another race/ethnicity: exclusive cigarillo, filtered cigar, traditional cigar, or cigarette use; dual use of each cigar product with cigarettes; dual or polyuse of cigars without cigarettes; and cigar and cigarette polyuse. We used multinomial logistic regression to compare odds of each pattern of use to non-use of cigars or cigarettes and quantile regression to assess differences in median products used per day.

Results: In our sample ($n = 33,424$), NH Black adults were more likely to exclusively smoke cigarillos (1.8%), cigarillos and cigarettes (1.6%), and multiple cigar products with or without cigarettes than other racial/ethnic groups. In adjusted models, NH Black compared to NH White adults had higher odds of exclusive cigarillo use (aOR 5.24, 95% CI 3.74–7.34), exclusive filtered cigar use (aOR 2.40, 95% CI 1.33–4.35), cigarillo and cigarette dual use (aOR 2.19, 95% CI 1.60–3.00), and dual/polyuse of cigar products (aOR 2.03, 95% CI 1.22–3.38) compared to non-current use. However, NH White adults tended to smoke the most cigarettes and filtered cigars per day.

Conclusions: While the prevalence of cigar use was generally highest among NH Black adults, intensity of use was often highest among NH White users. These patterns may further explain racial/ethnic disparities in tobacco-related health outcomes.

1. Introduction

Tobacco products fall on a risk continuum, with combustible products posing a greater health risk than non-combustible products (Zeller & Hatsukami, 2009). Cigarettes are viewed as the most dangerous, in part because of their frequency and intensity of use (Corey et al., 2018; National Cancer Institute, 1998). However, cigars can deliver more nicotine than cigarettes and have been linked to poor health outcomes like chronic obstructive pulmonary disease and cancer-related mortality (Chang, Corey, Rostron, & Apelberg, 2015; National Cancer Institute, 1998; Rodriguez et al., 2010).

Many existing surveillance studies collect data for cigars as a group, making it impossible to differentiate cigars that contain varying amounts of tobacco and are consumed differently. Traditional cigars may contain as much tobacco as an entire pack of cigarettes (≥ 14 g)

(Centers for Disease Control and Prevention, 2020) and are often smoked over a period of at least one hour (National Cancer Institute, 1998). Cigarillos typically contain about three grams of tobacco, while little cigars are similar in size to cigarettes and often contain a filter (Centers for Disease Control and Prevention, 2020).

Although cigars contain at least as much tobacco and similar toxicants as cigarettes, they are less heavily regulated. The Food and Drug Administration (FDA) updated the Family Smoking Prevention and Tobacco Control Act to include cigars in 2016 but only recently announced it will ban flavored cigars (Food and Drug Administration, 2021). Additionally, cigarettes can only be sold in packs of 20 or more, while cigars can be sold in smaller packs or singly at the point-of-sale, providing a lower-cost and readily-available alternative to cigarettes (Delnevo, Hrywna, Giovenco, Miller Lo, & O'Connor, 2017).

There are also notable differences in cigar use by race/ethnicity,

* Corresponding author.

E-mail address: janahirs@umich.edu (J.L. Hirschtick).

<https://doi.org/10.1016/j.abrep.2022.100412>

Received 15 November 2021; Received in revised form 24 January 2022; Accepted 29 January 2022

Available online 2 February 2022

2352-8532/© 2022 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

which may explain some tobacco-related health disparities. Black adults have higher tobacco-related cancer incidence and mortality rates than other racial/ethnic groups (Henley et al., 2016), despite smoking fewer cigarettes per day than White adults (Haiman et al., 2006; Holford, Levy, & Meza, 2016). Conversely, Black adults have a higher prevalence of cigarillo use than Hispanic or White adults (Kasza et al., 2017), and Black and Hispanic young adults smoke cigars more frequently than White young adults (Cullen et al., 2011).

While cigarette consumption decreased by 39% from 2000 to 2015, cigar consumption increased by 85% (Wang, Kenemer, Tynan, Singh, & King, 2016). Furthermore, concurrent use of cigars and cigarettes represents over 20% of dual (two products) or polytobacco use (three or more products) (Kasza et al., 2017). Adults who use both products may smoke as many or more cigarettes per day on the days they smoke than exclusive cigarette users (Cohn, Cobb, Niaura, & Richardson, 2015; Richardson, Xiao, & Vallone, 2012). However, studies on population-level patterns of cigar and cigarette use are limited (Cohn et al., 2015; Lee, Hebert, Nonnemaker, & Kim, 2014; Messer et al., 2015; Richardson et al., 2012; Sterling, Fryer, Pagano, & Fagan, 2016). We are not aware of any studies examining intensity of cigar or cigarette exclusive or dual/polyuse overall or by race/ethnicity, which may help identify drivers of existing tobacco-related health disparities. Therefore, our objective was to identify racial/ethnic disparities in the prevalence and intensity of use for distinct types of cigars and cigarettes via secondary analysis using the Population Assessment of Tobacco and Health (PATH) Study. We hypothesized that Black adults would have a higher prevalence and intensity of cigar use than White adults. Although not examined here, hypothesized Black-White differences in cigar use could help explain persistent disparities in cancer incidence and mortality between Black and White adults that have not been explained by cigarette use patterns to date.

2. Methods

2.1. Sample

We used publicly available data from Wave 4 (December 2016 – January 2018) of PATH, a longitudinal study of the civilian, non-institutionalized US population aged 12 and older (Hyland et al., 2017). We restricted our analysis to adults aged 18 and older ($n = 33,644$). Wave 4 contains a replenishment sample to provide representative prevalence estimates of the US population. We used PATH imputed variables to account for missingness when possible and excluded respondents who were missing information on cigar/cigarette patterns of use or covariates from the analysis ($n = 220$).

2.2. Measures

PATH collects information on cigarillos, filtered cigars, and traditional cigars. We defined current cigar use as every day or some day use among respondents reporting they ever smoked the cigar product fairly regularly, excluding individuals who used cigars exclusively to smoke marijuana ($n = 2,488$). For cigarettes, we defined current use as every day or some day use among respondents who had smoked at least 100 cigarettes in their lifetime. We quantified intensity of use as the average number of cigars or cigarettes used per day in the past 30 days, setting improbable responses to missing ($n = 9$).

2.3. Analysis

We produced weighted prevalence estimates of nine patterns of cigarillo, filtered cigar, traditional cigar, and cigarette use by race/ethnicity: exclusive product use (four categories), cigar and cigarette dual use (three categories), dual/polyuse of cigars without cigarettes (one category), and polyuse of cigarettes with at least two cigar products (one category). Multinomial regression estimated the odds of each

pattern of use vs. non-current use of cigars or cigarettes by race/ethnicity (Hispanic, Non-Hispanic (NH) White, NH Black, another racial/ethnic group), adjusting for age group (18–24, 25–34, 35–54, 55+), sex (female, male), educational attainment (less than high school degree, high school degree/GED, some college, college degree or more), and annual household income ($\leq \$25,000$, \$25,000–\$49,999, \$50,000 or more, unknown). For each pattern, we estimated median and interquartile range (IQR) values of relevant products used per day using weighted conditional quantile regression to assess racial/ethnic differences.

All analyses accounted for the complex survey design using Stata 15 (StataCorp, 2017), including Balanced Repeated Replication with replicate weights and Fay's adjustment set to 0.3 (Judkins, 1990) for variance estimation, apart from the quantile regression in which we were only able to apply the survey weight. Our study was deemed not regulated as human subjects research by the University of Michigan Institutional Review Board.

3. Results

The majority of the analytic sample ($n = 33,424$) was aged 35 and older (69.7%), female (51.9%), and had an annual household income of \$50,000 or more (43.7%; Table S1). NH Black (17.5%) and NH White (17.4%) adults were more likely to exclusively smoke cigarettes than adults who were Hispanic (13.0%) or another race/ethnicity (11.5%). NH Black adults were also more likely to exclusively smoke cigarillos (1.8%), cigarillos and cigarettes (1.6%), at least two cigar products without cigarettes (0.4%), and cigarettes with at least two cigar products (0.7%) than other racial/ethnic groups.

Table 1 presents adjusted models for the odds of each pattern of cigar and/or cigarette use relative to non-current use of cigars and cigarettes by race/ethnicity. Compared to NH White adults, adults who were Hispanic (aOR 0.36, 95% CI 0.32–0.40), NH Black (aOR 0.69, 95% CI 0.62–0.76), or another race/ethnicity (aOR 0.61, 95% CI 0.52–0.71) had reduced odds of exclusive cigarette use. Adults who were Hispanic, NH Black, or another race/ethnicity also generally had reduced odds of exclusive traditional cigar use, traditional cigar and cigarette dual use, and filtered cigar and cigarette dual use than NH White respondents, although not all point estimates were statistically significant.

Conversely, NH Black adults had over five times higher odds of exclusive cigarillo use (aOR 5.24, 95% CI 3.74–7.34) and over twice the odds of exclusive filtered cigar use (aOR 2.40, 95% CI 1.33–4.35) than NH White adults. NH Black adults also had twice the odds of cigarillo and cigarette dual use (aOR 2.19, 95% CI 1.60–3.00) and cigar-only dual/polyuse (aOR 2.03, 95% CI 1.22–3.38) than NH White adults. Adults who were Hispanic or another race/ethnicity generally had lower odds of cigarillo and cigarette dual use and cigar-only dual/polyuse than NH White adults.

For intensity of use, NH White adults smoked the most cigarettes per day across nearly all user groups (Fig. 1). Among adults who exclusively smoked cigarettes, the median cigarettes per day was higher for NH White adults (12.0, IQR 6.0–20.0; referent) than adults who were Hispanic (5.0, IQR 1.0–10.0; $p < 0.001$), NH Black (8.0, IQR 3.0–14.0; $p < 0.001$), or another race/ethnicity (10.0, IQR 3.3–15.0; $p = 0.005$). Among cigar and cigarette polyusers, NH White adults also had a higher median cigarettes per day value (20.0, IQR 5.0–20.0; referent) than Hispanic (4.0, 2.0–10.0; $p < 0.001$) and NH Black adults (10.0, 3.0–20.0; $p < 0.001$). Hispanic adults had the highest median cigarettes per day among respondents who smoked both filtered cigars and cigarettes (20.0, IQR 5.0–20.0; referent), followed by adults who were NH White (15.0, IQR 5.0–20.0; $p = 0.344$), NH Black (7.0, IQR 2.5–10.0; $p = 0.013$), or another race/ethnicity (0.7, 0.0–10.0; $p = 0.001$). Notably, in every racial/ethnic group, the highest cigarettes per day value was among cigar and cigarette dual or polyusers.

The median cigars per day tended to be much lower than cigarettes per day, apart from filtered cigar use among particular user groups.

Table 1

Multinomial logistic regression examining patterns of cigar and cigarette exclusive, dual, and polyuse versus non-use of cigars or cigarettes (n = 33,424), Population Assessment of Tobacco and Health Study Wave 4 (2016–2018).

	Hispanic (n = 6,613)				NH Black (n = 5,105)				Another race/ethnicity (n = 2,661)			
	aOR	95 % CI		p value	aOR	95 % CI		p value	aOR	95 % CI		p value
		LB	UP			LB	UP			LB	UP	
Exclusive cigarette use (n = 8,915)	0.36	0.32	0.40	0.000	0.69	0.62	0.76	0.000	0.61	0.52	0.71	0.000
Exclusive cigarillo use (n = 302)	0.62	0.40	0.98	0.042	5.24	3.74	7.34	0.000	0.84	0.46	1.52	0.560
Exclusive filtered cigar use (n = 89)	1.00	0.46	2.17	0.997	2.40	1.33	4.35	0.004	1.45	0.52	4.06	0.474
Exclusive traditional cigar use (n = 292)	0.63	0.38	1.05	0.075	0.80	0.50	1.29	0.363	0.36	0.17	0.78	0.010
Cigarillo + cigarette dual use (n = 383)	0.40	0.27	0.58	0.000	2.19	1.60	3.00	0.000	0.64	0.41	0.98	0.041
Filtered cigar + cigarette dual use (n = 188)	0.30	0.17	0.54	0.000	0.59	0.38	0.92	0.019	0.34	0.15	0.76	0.008
Traditional cigar + cigarette dual use (n = 103)	0.22	0.10	0.49	0.000	0.30	0.13	0.67	0.003	0.57	0.26	1.23	0.153
Cigar dual/polyuse (no cigarettes) (n = 111)	0.71	0.37	1.38	0.313	2.03	1.22	3.38	0.006	0.23	0.09	0.62	0.003
Cigar and cigarette polyuse (n = 200)	0.46	0.27	0.78	0.004	1.51	0.97	2.35	0.066	0.60	0.33	1.10	0.098

NH = non-Hispanic; aOR = adjusted odds ratio.

Racial/ethnic referent category = NH White (n = 19,045).

Adjusted for age group, sex, education, and annual household income.

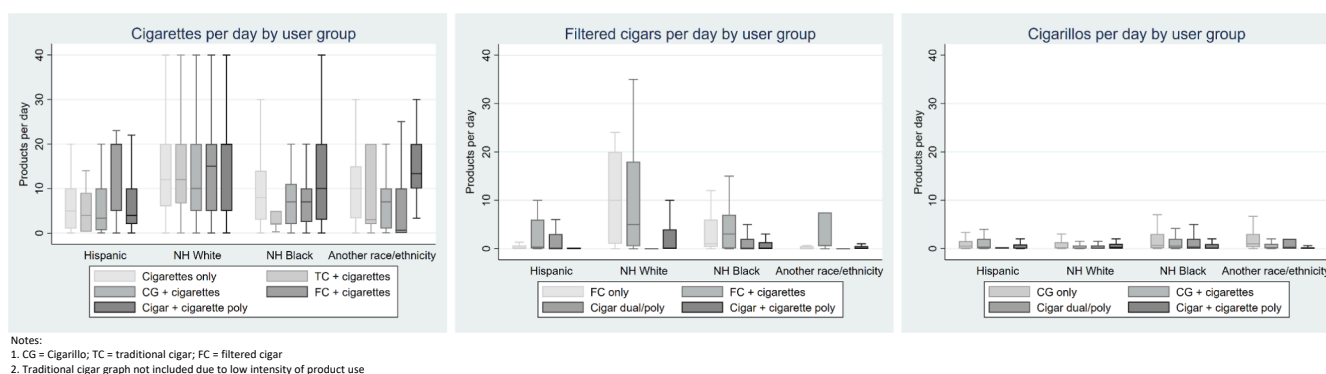


Fig. 1. Box and whisker plots of cigarettes and cigars used per day.

Among adults who exclusively smoked filtered cigars, NH White adults had a higher median filtered cigars per day value (10.0, IQR 1.0–20.0; referent) than NH Black (1.0, IQR 0.3–6.0; $p = 0.016$) and Hispanic adults (0.0, IQR 0.0–0.7; $p = 0.004$).

4. Discussion

Our study provides estimates of cigar and cigarette prevalence and intensity of use for adult exclusive, dual, and polyusers by race/ethnicity. In adjusted models, NH Black adults had higher odds of cigarillo or filtered cigar exclusive use, cigarette and cigarillo dual use, and cigar-only dual/polyuse than NH White adults. Conversely, adults who were NH Black, Hispanic, or another race/ethnicity had lower odds of exclusive cigarette use and filtered cigar and cigarette dual use than NH White adults. NH White adults also tended to smoke more cigarettes and filtered cigars per day than adults who were NH Black, Hispanic, or another race/ethnicity. Overall, cigarette use intensity was much higher than cigar use intensity, with the highest cigarettes per day value among cigar and cigarette dual or polyusers for every racial/ethnic group.

Our finding that NH Black adults had a higher prevalence of cigarillo and filtered cigar use than other racial/ethnic groups is consistent with prior studies (Chen-Sankey et al., 2021; Phan, McNeel, & Choi, 2021) and of great concern for health disparities, as Black adults have the highest rates of tobacco-related cancer incidence and mortality (Henley et al., 2016). Non-premium cigars, offered at a lower price point than cigarettes (Delnevo et al., 2017), are heavily marketed in Black communities (Cantrell et al., 2013). In a recent study, Black cigar users reported both affordability and marketing appeal as reasons for use (Dunn, Johnson, Sterling, & Cohn, 2021). Additionally, compared to NH White adults, NH Black adults had a greater prevalence of several types of cigar

and/or cigarette dual or polyuse. Individuals who smoke both cigars and cigarettes may inhale cigars more deeply, increasing the risk of tobacco-related disease (National Cancer Institute, 1998). Future studies should focus on cigar use, particularly dual and polyuse with cigarettes, to better understand racial/ethnic disparities in tobacco-related health outcomes.

In total, our results were not entirely consistent with our hypothesis that NH Black adults would have a higher prevalence and intensity of cigar use than NH White adults. While we did find that NH Black adults had the highest prevalence of many types of cigar use, differences in intensity of product use by race/ethnicity were somewhat puzzling. NH White adults generally had the highest intensity of use, including cigarette intensity across nearly all use patterns with cigarettes. These findings are consistent with the existing paradox that despite the greater risk of tobacco-related disease in the Black community, Black adults have a lower intensity of cigarette use than White adults (Holford et al., 2016). Similar to at least one prior study (Chen-Sankey et al., 2021), NH White adults also had a higher intensity of filtered cigar use than other racial/ethnic groups. Among NH White adults, filtered cigars had the highest intensity of use of all cigar products, suggesting they are consumed similarly to cigarettes (Corey et al., 2018; Delnevo et al., 2017) and should be examined separately from cigarillos and traditional cigars. Given the higher prevalence but lower intensity of use among NH Black cigar smokers, future studies should assess potential racial/ethnic differences in historical cigar use, such as age at initiation and cumulative exposure, as well as magnitude of current exposure in addition to intensity, such as inhalation, to potentially explain existing racial/ethnic disparities in tobacco-related cancer incidence and mortality.

This study has several limitations. Due to small cell sizes, we could not break down the other racial/ethnic group further, stratify results by

sex, or distinguish premium from non-premium traditional cigars. However, we provide many details about cigar use by race/ethnicity not typically available in other studies, including results by cigar type, dual and polyuse with cigarettes, and intensity of use.

The prevalence of cigar use among NH Black adults and the frequency of filtered cigar use among NH White adults suggest that cigars should be regularly examined in addition to cigarettes to document racial/ethnic disparities in tobacco use and related health outcomes. Additionally, future studies are needed to understand the inconsistency between intensity of combustible product use and risk of tobacco-related disease for Black and White adults in particular. Lastly, to address racial/ethnic disparities and the rising prevalence of cigar use at the population level, we urgently need regulations to reduce targeted marketing in Black communities, increase the price point of cigars, either individually or by requiring minimum pack sizes, and restrict flavoring, so they do not continue to serve as a lower-cost alternative to cigarettes.

Funding

This work was supported by the National Cancer Institute of the National Institutes of Health [grant number U54-CA229974]. The opinions expressed in this article are the authors' own and do not reflect the views of the National Institutes of Health, the Department of Health and Human Services, or the United States government.

CRedit authorship contribution statement

Jana L. Hirschtick: Conceptualization, Methodology, Formal analysis, Data curation, Writing – original draft. **Richa Mukerjee:** Data curation, Writing – review & editing, Visualization. **Ritesh Mistry:** Writing – review & editing. **Delvon Mattingly:** Writing – review & editing. **Nancy L. Fleischer:** Conceptualization, Methodology, Resources, Writing – review & editing, Supervision, Project administration, Funding acquisition.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

None.

Appendix A. Supplementary material

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.abrep.2022.100412>.

References

- Cantrell, J., Kreslake, J. M., Ganz, O., Pearson, J. L., Vallone, D., Anesetti-Rothermel, A., ... Kirchner, T. R. (2013). Marketing little cigars and cigarillos: Advertising, price, and associations with neighborhood demographics. *American Journal of Public Health, 103*(10), 1902–1909. <https://doi.org/10.2105/ajph.2013.301362>
- Centers for Disease Control and Prevention. (2020). Smoking & Tobacco Use: Cigars. Retrieved from https://www.cdc.gov/tobacco/data_statistics/fact_sheets/tobacco_industry/cigars/.
- Chang, C. M., Corey, C. G., Rostron, B. L., & Apelberg, B. J. (2015). Systematic review of cigar smoking and all cause and smoking related mortality. *BMC Public Health, 15*, 390. <https://doi.org/10.1186/s12889-015-1617-5>
- Chen-Sankey, J. C., Mead-Morse, E. L., Le, D., Rose, S. W., Quisenberry, A. J., Delnevo, C. D., & Choi, K. (2021). Cigar-smoking patterns by race/ethnicity and cigar type: a nationally representative survey among U.S. adults. *American Journal of Preventive Medicine, 60*(1), 87–94. <https://doi.org/10.1016/j.amepre.2020.07.005>
- Cohn, A., Cobb, C. O., Niaura, R. S., & Richardson, A. (2015). The other combustible products: prevalence and correlates of little cigar/cigarillo use among cigarette smokers. *Nicotine & Tobacco Research, 17*(12), 1473–1481. <https://doi.org/10.1093/ntr/ntv022>
- Corey, C. G., Holder-Hayes, E., Nguyen, A. B., Delnevo, C. D., Rostron, B. L., Bansal-Travers, M., ... Borek, N. (2018). 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. *Nicotine & Tobacco Research, 20*(12), 1457–1466. <https://doi.org/10.1093/ntr/ntx209>
- Cullen, J., Mowery, P., Delnevo, C., Allen, J. A., Sokol, N., Byron, M. J., & Thornton-Bullock, A. (2011). Seven-year patterns in US cigar use epidemiology among young adults aged 18–25 years: A focus on race/ethnicity and brand. *American Journal of Public Health, 101*(10), 1955–1962. <https://doi.org/10.2105/ajph.2011.300209>
- Delnevo, C. D., Hrywna, M., Giovenco, D. P., Miller Lo, E. J., & O'Connor, R. J. (2017). Close, but no cigar: Certain cigars are pseudo-cigarettes designed to evade regulation. *Tob Control, 26*(3), 349–354. <https://doi.org/10.1136/tobaccocontrol-2016-052935>
- Dunn, D. S., Johnson, A. L., Sterling, K. L., & Cohn, A. M. (2021). Differences in reasons for little cigar/cigarillo use across white and black/African American young adult users. *Addictive Behaviors, 118*, Article 106884. <https://doi.org/10.1016/j.addbeh.2021.106884>
- Food and Drug Administration. (2021). FDA commits to evidence-based actions aimed at saving lives and preventing future generations of smokers [Press release]. Retrieved from <https://www.fda.gov/news-events/press-announcements/fda-commits-evidence-based-actions-aimed-saving-lives-and-preventing-future-generations-smokers>.
- Haiman, C. A., Stram, D. O., Wilkens, L. R., Pike, M. C., Kolonel, L. N., Henderson, B. E., & Le Marchand, L. (2006). Ethnic and racial differences in the smoking-related risk of lung cancer. *New England Journal of Medicine, 354*(4), 333–342. <https://doi.org/10.1056/NEJMoa033250>
- Henley, S. J., Thomas, C. C., Sharapova, S. R., Momin, B., Massetti, G. M., Winn, D. M., ... Richardson, L. C. (2016). Vital Signs: Disparities in Tobacco-Related Cancer Incidence and Mortality - United States, 2004–2013. *MMWR. Morbidity and Mortality Weekly Report, 65*(44), 1212–1218. <https://doi.org/10.15585/mmwr.mm6544a3>
- Holford, T. R., Levy, D. T., & Meza, R. (2016). Comparison of smoking history patterns among African American and white cohorts in the United States born 1890 to 1990. *Nicotine & Tobacco Research, 18* Suppl 1 (Suppl 1), S16–S29. <https://doi.org/10.1093/ntr/ntv274>
- Hyland, A., Ambrose, B. K., Conway, K. P., Borek, N., Lambert, E., Carusi, C., ... Compton, W. M. (2017). Design and methods of the Population Assessment of Tobacco and Health (PATH) Study. *Tob Control, 26*(4), 371–378. <https://doi.org/10.1136/tobaccocontrol-2016-052934>
- Judkins, D. (1990). Fay's method for variance estimation. *Journal of Official Statistics, 6*, 223–239.
- Kasza, K. A., Ambrose, B. K., Conway, K. P., Borek, N., Taylor, K., Goniewicz, M. L., ... Hyland, A. J. (2017). Tobacco-Product Use by Adults and Youths in the United States in 2013 and 2014. *New England Journal of Medicine, 376*(4), 342–353. <https://doi.org/10.1056/NEJMsa1607538>
- Lee, Y. O., Hebert, C. J., Nonnemaker, J. M., & Kim, A. E. (2014). Multiple tobacco product use among adults in the United States: Cigarettes, cigars, electronic cigarettes, hookah, smokeless tobacco, and snus. *Preventive Medicine, 62*, 14–19. <https://doi.org/10.1016/j.ypmed.2014.01.014>
- Messer, K., White, M. M., Strong, D. R., Wang, B., Shi, Y., Conway, K. P., & Pierce, J. P. (2015). Trends in use of little cigars or cigarillos and cigarettes among U.S. smokers, 2002–2011. *Nicotine Tob Res, 17*(5), 515–523. doi:10.1093/ntr/ntu179.
- National Cancer Institute. (1998). *Smoking and Tobacco Control Monograph 9: Cigars: Health Effects and Trends*. Bethesda, MD.
- Phan, L., McNeel, T. S., & Choi, K. (2021). Prevalence of current large cigar versus little cigar/cigarillo smoking among U.S. adults, 2018–2019. *Prev Med Rep, 24*, 101534. doi:<https://doi.org/10.1016/j.pmedr.2021.101534>
- Richardson, A., Xiao, H., & Vallone, D. M. (2012). Primary and dual users of cigars and cigarettes: Profiles, tobacco use patterns and relevance to policy. *Nicotine & Tobacco Research, 14*(8), 927–932. <https://doi.org/10.1093/ntr/ntx306>
- Rodriguez, J., Jiang, R., Johnson, W. C., MacKenzie, B. A., Smith, L. J., & Barr, R. G. (2010). The association of pipe and cigar use with cotinine levels, lung function, and airflow obstruction: A cross-sectional study. *Annals of Internal Medicine, 152*(4), 201–210. <https://doi.org/10.7326/0003-4819-152-4-201002160-00004>
- StataCorp. (2017). *Stata Statistical Software: Release 15*. College Station, TX: StataCorp LLC.
- Sterling, K. L., Fryer, C. S., Pagano, I., & Fagan, P. (2016). Little cigars and cigarillos use among young adult cigarette smokers in the United States: Understanding risk of concomitant use subtypes. *Nicotine & Tobacco Research, 18*(12), 2234–2242. <https://doi.org/10.1093/ntr/ntw170>
- 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>
- Zeller, M., & Hatsukami, D. (2009). The strategic dialogue on tobacco harm reduction: A vision and blueprint for action in the US. *Tob Control, 18*(4), 324–332. <https://doi.org/10.1136/tc.2008.027318>