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Other tobacco product and electronic cigarette use among homeless cigarette smokers

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Abstract

Objective—We determined the prevalence and correlates of other tobacco product and electronic cigarette (e-cigarette) use in a clinic-based sample of homeless cigarette smokers.

Methods—In April–July 2014, we used time-location sampling to conduct a cross-sectional, in-person survey of 306 currently homeless adult cigarette smokers recruited from 5 clinical sites at Boston Health Care for the Homeless Program. We assessed past-month use of large cigars, little cigars, smokeless tobacco, and e-cigarettes. Among those who had used e-cigarettes, we assessed the reasons for doing so. We used logistic regression analysis to identify the participant characteristics associated with the use of each product.

Results—Eighty-six percent of eligible individuals participated in the survey. In the past month, 37% of respondents used large cigars, 44% used little cigars, 8% used smokeless tobacco, 24% used an e-cigarette, and 68% used any of these products. Reasons for e-cigarette use included curiosity (85%) and to help quit conventional cigarettes (69%). In multivariable regression analyses, homeless smokers with greater subsistence difficulties were more likely to use little cigars ($p=0.01$) and less likely to use e-cigarettes ($p=0.001$). Non-Hispanic black ($p=0.01$),

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Contributors

Dr. Baggett conceived the study, designed the sampling plan, supervised the data collection, analyzed the data, interpreted the findings, and led the writing of the manuscript. Dr. Campbell designed the sampling plan, supervised the data collection, and interpreted the findings. Dr. Chang designed the sampling plan, analyzed the data, and interpreted the findings. Dr. Rigotti conceived the study and interpreted the findings. All authors critically reviewed the manuscript for important intellectual contributions and approved the final version.

Conflict of Interest

Dr. Baggett receives royalties from UpToDate for authorship of a topic review on the health care of homeless persons. Dr. Rigotti receives royalties from UpToDate for authorship of topic reviews on smoking cessation, and has received a smoking cessation medical education grant and travel reimbursement from Pfizer.

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Hispanic ($p < 0.001$), and rough-sleeping ($p = 0.04$) participants were more likely to use large cigars. Readiness to quit was not associated with other tobacco product use but was significantly associated with e-cigarette use to help quit smoking ($p = 0.02$).

Conclusions—Health care providers who serve homeless people should consider routine screening for the use of other tobacco products and e-cigarettes to help guide smoking cessation discussions and tobacco treatment planning.

Keywords

Homeless persons; tobacco use; tobacco products; electronic cigarettes

1. INTRODUCTION

About three-quarters of homeless adults are current cigarette smokers (Baggett & Rigotti, 2010), and this contributes to high rates of smoking-attributable cancer and mortality (Baggett, Chang, Porneala, et al., 2015; Baggett, Chang, Singer, et al., 2015). Relatively little is known about the extent to which homeless cigarette smokers also use other tobacco products and electronic cigarettes (e-cigarettes).

In a 2013 single-shelter convenience sample of 178 homeless cigarette smokers in Dallas, Texas, 51% of respondents reported concurrent use of other tobacco products or e-cigarettes in the past month (Kish, Reitzel, Kendzor, Okamoto, & Businelle, 2014). Among concurrent users, little cigars (50%) and regular cigars (42%) were the most commonly used products, attributed largely to their lower cost. A considerably smaller proportion (12%) reported e-cigarette use, chiefly to cut down or quit cigarettes. Smokeless tobacco use was uncommon. In unadjusted analyses, participants with more homelessness episodes and greater stress were more likely to report use of any of these disparate products, but the correlates of using specific products were not examined. In a 2013 community-based survey of 292 homeless youth cigarette smokers in Los Angeles County, past-month use of little cigars, smokeless tobacco, and e-cigarettes each exceeded the prevalences documented in the Dallas study, with 51% of respondents reporting past-month e-cigarette use and 72% reporting concurrent use of any product (Tucker, Shadel, Golinelli, & Ewing, 2014). In contrast to the Dallas study, e-cigarette use in the youth sample was predominantly for reasons other than quitting smoking. Additionally, the correlates of other product use varied by product type, suggesting that there may be some heterogeneity in which smokers use particular products.

Characterizing the use of other tobacco products and e-cigarettes among homeless smokers could have important implications. Cigar smoking is associated with an increased risk for heart disease, obstructive lung disease, and cancers of the lung and upper aerodigestive tract (Baker, et al., 2000; Iribarren, Tekawa, Sidney, & Friedman, 1999; Lee, Forey, & Coombs, 2012; National Cancer Institute, 1998). Dual users of cigarettes and cigars are more likely to inhale cigar smoke (National Cancer Institute, 1998) and may be especially prone to these risks. Additionally, the lower cost of certain cigar products (Delnevo, 2006; Delnevo & Hrywna, 2007) may reduce the financial pressure for homeless people to quit smoking tobacco.

Although smokeless tobacco may pose fewer health risks than smoked tobacco (Hatsukami, Lemmonds, & Tomar, 2004), it nevertheless increases the risk of cardiovascular disease and certain malignancies (Boffetta, Hecht, Gray, Gupta, & Straif, 2008; Boffetta & Straif, 2009; Piano, et al., 2010; Teo, et al., 2006), and its dual use with cigarettes confers a higher risk for myocardial infarction than smoking alone (Teo, et al., 2006). While evidence from Sweden has suggested a potential role for snus in promoting smoking cessation (Foulds, Ramstrom, Burke, & Fagerstrom, 2003; Furberg, et al., 2005; Gilljam & Galanti, 2003; Rodu, Stegmayr, Nasic, & Asplund, 2002), controlled experimental (Tonnesen, Mikkelsen, & Bremann, 2008) and longitudinal observational (Kasza, et al., 2014; Zhu, et al., 2009) studies in the US have shown no benefit of smokeless tobacco use on long-term smoking cessation outcomes, and dual smokeless tobacco use by homeless youth has been associated with less intention to quit smoking (Tucker, et al., 2014).

The safety profile of e-cigarettes appears considerably more favorable than that of conventional cigarettes (Farsalinos & Polosa, 2014), but their efficacy in promoting smoking reduction or cessation remains uncertain. Nevertheless, e-cigarette use has increased dramatically among smokers nationally (King, Patel, Nguyen, & Dube, 2015). However, the disparate findings of two prior studies examining e-cigarette use among homeless smokers (Kish, et al., 2014; Tucker, et al., 2014) suggest the need for additional investigation to clarify the extent of their adoption in this population.

To address these discrepancies and expand the evidence base on this topic, we assessed the prevalence and correlates of past-month other tobacco product and e-cigarette use in a clinic-based sample of homeless adult cigarette smokers in Boston. Among those who had used e-cigarettes, we assessed the reasons for doing so. To explore the potential harm-reducing role of smokeless tobacco use in this sample, we examined its association with past-month average daily cigarette consumption.

2. METHODS

2.1. Participants and setting

In April to July, 2014, we used time-location sampling (D. MacKellar, Valleroy, Karon, Lemp, & Janssen, 1996; D. A. MacKellar, et al., 2007; Muhib, et al., 2001; Raymond, Ick, Grasso, Vaudrey, & McFarland, 2010) to conduct an in-person survey of 306 homeless adult smokers using Boston Health Care for the Homeless Program (BHCHP) clinical services. BHCHP serves more than 11,000 currently and formerly homeless individuals annually in over 90,000 outpatient medical, oral health, and behavioral health encounters through a network of service sites based in emergency shelters, transitional housing facilities, hospitals, and other social service settings in greater Boston (O'Connell, et al., 2010) (www.bhchp.org). We constrained our sampling frame to 5 clinical sites that account for about 64% of the annual patient care volume at BHCHP. We stratified our sampling from each of these 5 clinical sites in order to recruit participants in proportion to the estimated number of eligible patients seen at each site in the prior year according to administrative and clinical data collected routinely at BHCHP. Within each clinic stratum, we randomly sampled half-day clinic sessions, which comprised the primary sampling units. During a randomly sampled half-day clinic session, interviewers positioned themselves at a

predetermined location within the clinic and consecutively approached patients after their clinic visit to screen them for eligibility.

Eligibility criteria included self-reported proficiency in English, age ≥ 18 years, current cigarette smoking, and current homelessness. We defined current cigarette smoking as having ever smoked ≥ 100 cigarettes and currently smoking some days or every day (Jamal, et al., 2014). Consistent with the U.S. federal definition of homelessness (One hundred eleventh Congress of the United States of America, 2009), we considered individuals to be homeless if they usually slept in an emergency or transitional shelter, a church, an abandoned building, a place of business, a vehicle, anywhere outside, or a hotel or motel in the past 7 days or, if currently staying in an inpatient or residential treatment facility, in the 7 days prior to admission to that facility. In keeping with other surveys of homeless people, we also included individuals who were doubling-up with others in the past 7 days because of not having their own place to live (Grinman, et al., 2010; Hwang, et al., 2008).

After obtaining informed consent, trained interviewers verbally administered the 159-item questionnaire using an electronic tablet. Consistent with other surveys of homeless individuals, participants received \$20 in cash for completing the questionnaire (Kertesz, Hwang, Irwin, Ritchey, & Lagory, 2009; Lebrun-Harris, et al., 2013; Tucker, et al., 2014). The study was approved by the Partners Human Research Committee.

2.2. Measures

2.2.1. Demographic characteristics—We assessed age, gender, and self-reported race and ethnicity, which we categorized as Hispanic, non-Hispanic white, non-Hispanic Black, and non-Hispanic other. We assessed educational history and classified participants according to whether or not they had attained a high school diploma or equivalency.

2.2.2. Homelessness characteristics—We asked participants about the number of times they had been homeless and the duration of their current homeless episode. We used these variables to classify individuals as chronically homeless if they had experienced ≥ 4 episodes of homelessness or if their current episode had lasted ≥ 1 year (Baggett, Lebrun-Harris, & Rigotti, 2013), which is similar to the U.S. federal definition of chronic homelessness (U.S. Department of Housing and Urban Development, 2007). We assessed where participants usually slept at night in the past week, and we grouped responses into the following 3 categories: shelter, rough, or doubled-up. Sleeping rough denotes any arrangement where a person sleeps outside or in a place not intended for human habitation (e.g. car or abandoned building) (U.K. Department for Communities and Local Government, 2010). To gauge participants' material resources, we used a 5-item scale that assesses the frequency (from "never" [0] to "often" [3]) of past-month difficulty finding shelter, food, clothing, a place to wash, and a place to go to the bathroom (Gelberg, Gallagher, Andersen, & Koegel, 1997). These items demonstrated high internal consistency (Cronbach $\alpha=0.80$), so we summed the responses to create a composite score (0-15) of past-month subsistence difficulty.

2.2.3. Behavioral health characteristics—We assessed current drug use, alcohol use, and psychiatric symptoms with the Addiction Severity Index (ASI) – 5th edition (McLellan,

et al., 1992), which has been validated in homeless populations (Argeriou, McCarty, Mulvey, & Daley, 1994; Drake, McHugo, & Biesanz, 1995; Zanis, McLellan, Cnaan, & Randall, 1994). We focused on the ASI items that produce composite scores quantifying the severity of drug and alcohol use and psychiatric symptoms in the past 30 days.

2.2.4. Cigarette smoking characteristics—We assessed nicotine dependence using the Fagerstrom Test of Nicotine Dependence (Fagerstrom, Heatherton, & Kozlowski, 1990; Heatherton, Kozlowski, Frecker, & Fagerstrom, 1991). We estimated past-month average daily cigarette consumption by multiplying the number of past-month smoking days by the number of cigarettes respondents reported consuming on smoking days and dividing by 30. We assessed readiness to quit smoking with the Contemplation Ladder (Biener & Abrams, 1991), an 11-point visual scale (0-10) with 5 verbal anchors. We asked participants whether they had intentionally quit smoking for 24 hours in the past year.

2.2.5. Other tobacco product use—We used items adapted from the Current Population Survey Tobacco Use Supplement to assess other tobacco product use (U.S. Department of Commerce & Census Bureau, 2012). We asked participants about past-month use of regular cigars or cigarillos, both of which are unfiltered, sold singly or in packs of 5 or 8, and classified as “large cigars” by 26 U.S. Code § 5701 (Legacy, 2012; U.S. Department of Commerce & Census Bureau, 2012). We separately asked about past-month use of little filtered cigars, which are similar in size to cigarettes, sold in packs of 20 like cigarettes, and classified as “little cigars” by federal code (Legacy, 2012; U.S. Department of Commerce & Census Bureau, 2012). We also asked about the use of any smokeless tobacco products, including snuff, dip, spit tobacco, chewing tobacco, and snus. We provided product definitions and brand examples if participants expressed uncertainty.

2.2.6. E-cigarette use—We asked participants whether they had used an e-cigarette in the past month. Among those who had, we asked them to endorse any of 8 reasons for using an e-cigarette, the majority of which have been included in other studies of e-cigarette use (Etter & Bullen, 2011; Rutten, et al., 2015; Tucker, et al., 2014): healthier than real cigarettes, cheaper than real cigarettes, to help quit real cigarettes, to smoke inside, to bother other people less, to see if it would produce the same “throat hit” as real cigarettes, to sample flavors, or curiosity.

2.3. Statistical analysis

We summarized categorical variables using frequencies and percentages. We summarized continuous measures using means with standard deviations for normally distributed variables and medians with inter-quartile ranges for non-normally distributed variables. For score-based continuous variables, we presented the proportion of respondents exceeding a threshold score when accepted cut-points were available in order to enhance interpretability, but all inferential analyses used the continuous forms of these variables.

We used univariate logistic regression to determine the unadjusted associations between demographic, homelessness, behavioral health, and cigarette smoking characteristics (independent variables) and the following dichotomous dependent variables: past-month

large cigar use, little cigar use, smokeless tobacco use, and e-cigarette use. Additionally, because of growing debate around the potential role for e-cigarettes as smoking cessation aids (Al-Delaimy, Myers, Leas, Strong, & Hofstetter, 2015; Bullen, et al., 2013; Grana, Popova, & Ling, 2014), we constructed a separate logistic regression model predicting past-month e-cigarette use to help quit smoking, where the reference group consisted of individuals who had not used an e-cigarette or who had used an e-cigarette for any reason but quitting. Independent variables with unadjusted associations significant at $p < 0.05$ were then entered into multivariable logistic regression models. We used this conservative screening p value to help protect against false-positive findings and model overfitting (Cepeda, Boston, Farrar, & Strom, 2003; Peduzzi, Concato, Kemper, Holford, & Feinstein, 1996). To explore the potentially harm-reducing role of smokeless tobacco use, we constructed a linear regression model assessing the association between past-month smokeless tobacco use (independent variable) and past-month average daily cigarette consumption (dependent variable), adjusting for demographic characteristics, homelessness characteristics, behavioral health characteristics, and time to first cigarette. We conducted the data analysis using the survey procedures in SAS version 9.4 (SAS Institute, Cary, NC) to account for the sampling design.

3. RESULTS

3.1. Survey response rate

Interviewers logged 907 approaches over the 3-month study period. Of 876 people who had not already taken the survey, 726 (83%) completed the eligibility screener. Of these, 369 (51%) were ineligible for the following reasons: 15 were not proficient in English, 228 were not current smokers, and 126 were not currently homeless. Of 357 eligible individuals, 306 (86%) consented to participate. Among those who participated, non-response was minimal for the items used in this analysis (median 2%, range 0-6.2%).

3.2. Respondent characteristics

The mean age of respondents was 47.6 years (Table 1). Three-quarters were male. Thirty-six percent were white, 41% were black, and 18% were Hispanic. Eighty-eight percent were chronically homeless, 72% usually slept in a shelter, and 77% reported any past-month subsistence difficulty. Based on ASI cut-points used in the 1996 National Survey of Homeless Assistance Providers and Clients, (Burt, et al., 1999) participants had a high burden of drug use problems (52%), alcohol use problems (43%), and psychiatric problems (73%). Average past-month cigarette consumption was 12 cigarettes per day, and about one-third of respondents were highly nicotine dependent. Forty-six percent were thinking about how to quit smoking, and 63% had intentionally quit for at least 24 hours in the past year. Altogether, 68% of respondents reported past-month use of either other tobacco products or e-cigarettes.

3.3. Other tobacco use

In the past month, 37% of participants had used large cigars, 44% had used little cigars, 8% had used smokeless tobacco, 60% had used any of these products, and 27% had used more

than one of these products. Fifty-six percent had used either large or little cigars in the past month, and 22% reported using both.

Table 2 (part 1) displays the unadjusted and adjusted associations between independent variables and use of other tobacco products. In multivariable analyses, Hispanics ($p < 0.001$), non-Hispanic blacks ($p = 0.01$), and individuals who sleep rough ($p = 0.04$) were more likely to report past-month use of large cigars. Respondents with greater subsistence difficulties ($p = 0.01$) and more psychiatric symptoms ($p = 0.045$) were more likely to report past-month little cigar use. Males ($p = 0.01$) and respondents with greater drug use ($p = 0.001$) were more likely to use smokeless tobacco. Nicotine dependence, readiness to quit, and making a past-year quit attempt were not significantly associated with the use of other tobacco products.

Past-month smokeless tobacco users and non-users did not significantly in their past-month average daily cigarette consumption in unadjusted (13.5 vs. 11.7 cigarettes/day, $p = 0.21$) or adjusted (β 1.8, $p = 0.21$) analyses.

3.4. E-cigarette use

Twenty-four percent of participants reported using an e-cigarette in the past month. Of those who had, curiosity (85%) was the most heavily endorsed reason for doing so, although endorsement of multiple reasons was very common (Figure). Sixty-nine percent reported e-cigarette use to help quit smoking.

Table 2 (part 2) displays the unadjusted and adjusted associations between independent variables and use of e-cigarettes. In multivariable analyses, Non-Hispanic individuals of non-white, non-black racial backgrounds were more likely to use e-cigarettes for any reason ($p = 0.02$), while older respondents ($p = 0.004$) and those with greater subsistence difficulties ($p = 0.001$) were less likely to do so. Hispanic individuals ($p = 0.049$) and respondents with greater readiness to quit ($p = 0.02$) were more likely to use e-cigarettes to help quit smoking.

4. DISCUSSION

This survey assessed the use of multiple tobacco products and e-cigarettes by a clinic-based sample of homeless adult cigarette smokers in Boston, Massachusetts. Little and large cigar use was very common, with over half of participants using a cigar product in the past month. This figure is about 10-fold higher than the prevalence of cigar use among cigarette smokers in the general population (Backinger, et al., 2008; Sung, Wang, Yao, Lightwood, & Max, 2015) and nearly 3-fold higher than the past-month prevalence of cigar use by impoverished, non-homeless male smokers in the U.S. (Vijayaraghavan, Pierce, White, & Messer, 2014). The popularity of little cigar use in this sample, especially among individuals with more frequent subsistence difficulties, may point toward the affordability of these products relative to conventional cigarettes, due in part to historical differences in their regulation and taxation (Delnevo & Hrywna, 2007). Although considerably less prevalent than cigar use, past-month smokeless tobacco use was still about 4 times higher than in cigarette smokers nationally (Backinger, et al., 2008). One-fourth of participants used an e-cigarette in the past month, which is similar to the prevalence in a contemporary national sample of general population smokers (Rutten, et al., 2015). The 68% past-month prevalence of using any of

these products is comparable to that found in a study of homeless youth smokers in Los Angeles (Tucker, et al., 2014) and exceeds that documented in a study of homeless adult smokers in Dallas (Kish, et al., 2014).

Concurrent use of other tobacco products in this sample of homeless cigarette smokers was closely correlated with several markers of increased vulnerability, including rough sleeping (large cigar use), subsistence difficulties (little cigar use), psychiatric symptom severity (little cigar use), and drug use severity (smokeless tobacco use). Given the potential impact of these characteristics on smoking cessation outcomes, tobacco treatment programming for homeless smokers should incorporate an assessment for other tobacco product use, education around the health risks associated with the dual use of these products, and additional support for the unique and complex psychosocial needs of polytobacco users.

There was no association between other tobacco product use and readiness to quit or past-year quit attempts, suggesting that homeless smokers in this sample were not using cigars or smokeless tobacco to cut back or quit conventional cigarettes. Additionally, in contrast to findings documented among dual snus users in Sweden (Gilljam & Galanti, 2003), we found no association between smokeless tobacco use and average daily cigarette consumption, which argues against the notion that participants were using smokeless tobacco as part of a harm-reducing effort to limit their exposure to cigarette smoke.

Quitting conventional cigarettes was a commonly reported reason for e-cigarette use among the 24% of participants who had done so in the past month, echoing prior findings among homeless adult smokers (Kish, et al., 2014) while departing from prior findings among homeless youth smokers (Tucker, et al., 2014). Increasing readiness to quit was significantly associated with e-cigarette use to quit smoking, and a similar trend was evident for the association between past-year quit attempt and e-cigarette use for any reason. Importantly, participants generally endorsed a wide range of reasons for using e-cigarettes, with curiosity being most common. The perception that e-cigarettes are a cheaper alternative to conventional cigarettes was among the least-endorsed reasons for use, and this may explain why smokers with greater subsistence difficulties were less likely to have used an e-cigarette in the past month. Given the commonness of e-cigarette use among homeless smokers, health care providers who work with this population should be prepared to engage in discussions about the use of these devices and the presently uncertain evidence base for their utility in facilitating smoking cessation.

4.1. Limitations

Our focus on a clinical sample of homeless smokers limits the generalizability of our findings but likely approximates what clinicians serving this population may encounter in their practices. Consistent with national surveys (Fryar, et al., 2006; Jamal, et al., 2014; Nguyen, Marshall, Hu, & Neff, 2015), we relied on self-report to determine current smoking status. We did not ask about hookah use or pipe smoking. We also did not assess use of other tobacco products or e-cigarettes among homeless individuals who were not current cigarette smokers. Among participants who had used other tobacco products and e-cigarettes in the past month, we did not assess the frequency of use to identify regular versus non-regular or experimental users. Additionally, we did not ask the reasons for other tobacco product use;

as a result, we were unable to determine whether homeless smokers may view these products as less harmful alternatives to conventional cigarettes or as tools for quitting cigarette smoking. Finally, the small number of individuals who used certain products (e.g. smokeless tobacco) limited our power to detect potentially meaningful correlates of using these products.

4.2. Conclusions

Over two-thirds of homeless adult cigarette smokers in this study reported using other tobacco products or e-cigarettes in the past month. Concurrent use of other tobacco products was closely correlated with several markers of increased vulnerability, suggesting that homeless polytobacco users may require additional cessation support to accommodate their unique and complex psychosocial needs. Given the high prevalence of e-cigarette use in this sample, health care providers serving homeless patients should be prepared to discuss the use of these devices.

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HIGHLIGHTS

- Over half of homeless cigarette smokers also smoke cigars.
- Smokers with greater subsistence difficulties were more likely to use little cigars.
- One-fourth of homeless smokers used an e-cigarette in the past month.
- Participants endorsed several reasons for e-cigarette use; curiosity was most common.

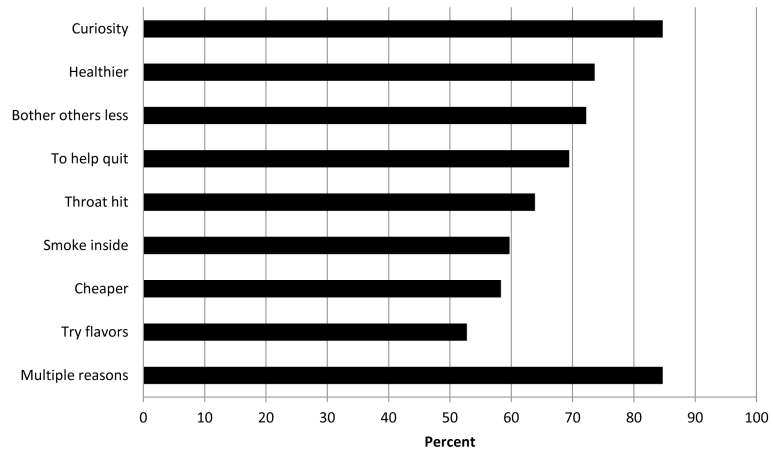


Figure. Reasons for using an e-cigarette among past-month e-cigarette users (N=72).
 Note: Total exceeds 100% because respondents could endorse more than one reason.

Table 1

Characteristics of the study sample (N=306).

Demographic characteristics	
Age, years, mean (SD)	47.6 (10.0)
Gender, N (%)	
Male	228 (74.8)
Female	72 (23.6)
Transgender	5 (1.6)
Race/ethnicity, N (%)	
White non-Hispanic	108 (35.5)
Black non-Hispanic	124 (40.8)
Other non-Hispanic	16 (5.3)
Hispanic	56 (18.4)
High school diploma/equivalency, N (%)	211 (69.2)
Homelessness characteristics	
Chronically homeless, N (%)	264 (88.3)
Usual sleeping arrangement, N (%)	
Shelter	219 (71.6)
Rough	50 (16.3)
Doubled-up	37 (12.1)
Subsistence difficulty (0-15) ^a	
Median score (IQR)	3 (1-7)
Any subsistence difficulty, N (%)	231 (77.0)
Behavioral health characteristics	
Drug use severity (0-1) ^b	
Median score (IQR)	0.11 (0.03-0.19)
Drug use problem, N (%)	152 (51.7)
Alcohol use severity (0-1) ^b	
Median score (IQR)	0.16 (0-0.37)
Alcohol use problem, N (%)	128 (43.1)
Psychiatric severity (0-1) ^c	
Median score (IQR)	0.45 (0.23-0.61)
Psychiatric problem, N (%)	217 (73.1)
Cigarette smoking characteristics	
Past-month average cigarettes per day, mean (SD)	12.0 (8.6)
Nicotine dependence (0-10) ^d	
Mean score (SD)	4.4 (2.3)
High nicotine dependence, N (%)	98 (32.1)
Readiness to quit (0-10) ^e	
Median score (IQR)	5 (5-8)
Thinking about how to quit, N (%)	138 (45.7)

Past-year quit attempt, N (%)	190 (62.9)
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Abbreviations: IQR, inter-quartile range; SD, standard deviation

^aBased on a 5-item scale assessing past-month difficulty finding shelter, food, clothing, a place to wash up, and a place to go to the bathroom. (Gelberg, et al., 1997) Scores ≥ 1 represent difficulty with any of these subsistence needs.

^bBased on the Addiction Severity Index – 5th Edition (ASI-5) drug and alcohol use module.(McLellan, et al., 1992) Cutoff scores for drug use problem (≥ 0.10) and alcohol use problem (≥ 0.17) are from Burt et. al.(Burt, et al., 1999)

^cBased on the ASI-5 psychiatric module.(McLellan, et al., 1992) Cutoff score for psychiatric problem (≥ 0.25) is from Burt et. al.(Burt, et al., 1999)

^dBased on the Fagerstrom Test of Nicotine Dependence.(Heatherton, et al., 1991) High nicotine dependence is defined as a score ≥ 6 .(Fagerstrom, et al., 1990)

^eBased on the Contemplation Ladder.(Biener & Abrams, 1991) A score of 8 corresponds with “I am starting to think about how to quit.”

Table 2

Factors associated with past-month other tobacco product and e-cigarette use.

	Large cigars ^d (N=112)		Little cigars (N=134)		Smokeless tobacco ^b (N=25)		E-cigarette use for any reason (N=72)		E-cigarette use to quit smoking (N=50)	
	OR (95% CI)	AOR (95% CI)	OR (95% CI)	AOR (95% CI)	OR (95% CI)	AOR (95% CI)	OR (95% CI)	AOR (95% CI)	OR (95% CI)	AOR (95% CI)
Age, per 10 years	0.64 (0.50, 0.81)	0.76 (0.57, 1.02)	0.93 (0.71, 1.21)	--	0.64 (0.41, 0.99)	0.68 (0.40, 1.15)	0.66 (0.51, 0.84)	0.65 (0.49, 0.87)	0.70 (0.53, 0.91)	0.79 (0.60, 1.03)
Male	1.49 (0.72, 3.07)	--	1.62 (1.08, 2.43)	1.74 (0.99, 3.05)	4.17 (1.32, 13.2)	4.97 (1.56, 15.8)	1.01 (0.57, 1.78)	--	1.64 (0.67, 4.04)	--
Race/ethnicity										
White non-Hispanic	Ref.	Ref.	Ref.	--	Ref.	--	Ref.	Ref.	Ref.	Ref.
Black non-Hispanic	1.87 (1.07, 3.29)	2.23 (1.21, 4.13)	1.03 (0.64, 1.68)	--	0.46 (0.13, 1.60)	--	1.23 (0.60, 2.53)	1.26 (0.65, 2.45)	1.09 (0.45, 2.64)	1.02 (0.41, 2.52)
Other non-Hispanic	1.08 (0.28, 4.13)	1.19 (0.35, 4.01)	1.25 (0.37, 4.20)	--	1.68 (0.39, 7.26)	--	4.05 (1.23, 13.4)	5.93 (1.36, 25.9)	3.96 (1.11, 14.1)	3.83 (0.91, 16.1)
Hispanic	3.95 (1.87, 8.33)	4.12 (1.91, 8.90)	1.65 (1.00, 2.74)	--	2.09 (0.58, 7.55)	--	2.57 (1.11, 5.94)	2.22 (0.86, 5.69)	3.75 (1.46, 9.63)	2.97 (1.01, 8.79)
High school diploma/equivalency	0.79 (0.45, 1.37)	--	1.30 (0.70, 2.43)	--	0.77 (0.35, 1.70)	--	0.72 (0.48, 1.09)	--	0.61 (0.42, 0.88)	0.71 (0.46, 1.09)
Chronically homeless	1.11 (0.58, 2.13)	--	1.60 (0.59, 4.34)	--	0.38 (0.12, 1.20)	--	0.87 (0.38, 1.98)	--	1.59 (0.53, 4.80)	--
Sleeping arrangement										
Shelter	Ref.	Ref.	Ref.	--	Ref.	--	Ref.	--	Ref.	--
Rough	3.18 (1.54, 6.57)	2.35 (1.05, 5.23)	1.40 (0.72, 2.71)	--	1.34 (0.38, 4.73)	--	1.08 (0.69, 1.71)	--	0.87 (0.44, 1.70)	--
Doubled-up	0.75 (0.37, 1.49)	0.72 (0.37, 1.39)	0.52 (0.23, 1.19)	--	1.04 (0.35, 3.06)	--	1.24 (0.56, 2.76)	--	1.44 (0.54, 3.82)	--
Substance difficulty score, per 1	1.09 (1.03, 1.14)	1.03 (0.96, 1.11)	1.10 (1.04, 1.16)	1.09 (1.02, 1.16)	1.09 (0.98, 1.20)	--	0.92 (0.86, 0.98)	0.88 (0.82, 0.95)	0.94 (0.87, 1.01)	--
Drug severity score, per 0.1	1.09 (0.87, 1.36)	--	1.06 (0.85, 1.31)	--	1.47 (1.19, 1.82)	1.45 (1.16, 1.82)	1.23 (0.99, 1.53)	--	1.11 (0.87, 1.42)	--
Alcohol severity score, per 0.1	1.13 (1.02, 1.25)	1.10 (0.96, 1.27)	1.09 (0.98, 1.20)	--	1.05 (0.89, 1.22)	--	1.01 (0.91, 1.12)	--	1.02 (0.90, 1.15)	--
Psychiatric severity score, per 0.1	1.12 (1.04, 1.21)	1.07 (0.96, 1.18)	1.17 (1.04, 1.31)	1.13 (1.00, 1.28)	1.08 (0.89, 1.30)	--	1.13 (0.98, 1.29)	--	1.15 (0.97, 1.36)	--
Nicotine dependence score, per 1	1.10 (0.98, 1.24)	--	1.04 (0.92, 1.17)	--	1.09 (0.87, 1.37)	--	1.13 (0.98, 1.30)	--	1.09 (0.93, 1.28)	--
Readiness to quit score, per 1	1.07 (0.98, 1.17)	--	1.02 (0.93, 1.12)	--	1.01 (0.90, 1.13)	--	1.04 (0.95, 1.14)	--	1.10 (1.02, 1.18)	1.10 (1.02, 1.18)
Past-year quit attempt	1.10 (0.67, 1.80)	--	1.24 (0.77, 1.99)	--	1.05 (0.44, 2.50)	--	1.59 (1.00, 2.52)	1.45 (0.97, 2.16)	1.84 (1.08, 3.13)	-- ^d

Abbreviations: OR, odds ratio; AOR, adjusted odds ratio

^dIncludes regular cigars and cigarillos.

^bIncludes snuff, dip, spit tobacco, chewing tobacco, and snus.

^aPast-year quit attempt was excluded from the multivariable model for e-cigarette use to quit smoking because of collinearity with readiness to quit.