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Transgender Use of Cigarettes, Cigars, and E-Cigarettes in a National Study

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Introduction: Tobacco use among transgender adults continues to be an area of research with few reported findings. The limited literature indicates higher cigarette use among transgender adults, compared with the general population. This national study is the first to report on cigarettes, cigars, and e-cigarettes by examining differences in transgender tobacco use independent of sexual orientation.

Methods: Data were collected in 2013 using a nationally cross-sectional online survey of U.S. adults (cisgender, $n=17,164$; transgender, $n=168$) and analyzed in 2015. Past 30-day tobacco use point estimates and adjusted logistic regression while controlling for false discovery rate were reported for transgender and cisgender respondents.

Results: Transgender adults reported higher past 30-day use of any cigarette/cigar/e-cigarette product (39.7% vs 25.1%) and current use of cigarettes (35.5% vs 20.7%), cigars (26.8% vs 9.3%), and e-cigarettes (21.3% vs 5.0%) compared with cisgender adults (all p -values ≤ 0.003). Transgender respondents had significantly higher odds of past 30-day tobacco product use for any cigarette/cigar/e-cigarette product (OR=1.97, 95% CI=1.25, 3.1), e-cigarettes (OR=5.15, 95% CI=3.36, 7.88), cigars (OR=3.56, 95% CI=2.27, 5.59), and cigarettes (OR=2.10, 95% CI=1.35, 3.28) versus cisgender respondents (all p -values ≤ 0.0035).

Conclusions: Transgender adults are at higher risk for tobacco use than cisgender adults and risk of specific product use varies by gender. This is the first U.S. national study to assess differences in use of various tobacco products using questions that specifically ask for gender identity separately from sexual orientation. This study provides data that can inform targeted interventions to promote transgender health.

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INTRODUCTION

For nearly 20 years, an increasing number of published scientific articles have substantiated higher rates of tobacco use among adult lesbian, gay, bisexual, and transgender (LGBT) individuals, both for smoking and for different types of tobacco use, when compared with heterosexuals.^{1,2} Prior studies have largely limited their analysis to sexual orientation (i.e., lesbian, gay, bisexual, and heterosexual adults); in recent years, studies have begun to disaggregate the LGB group and examine intragroup differences in tobacco use for lesbian, gay, bisexual, or other sexual minority-identified adults.^{1,3-5} However, data reported on tobacco use

among transgender populations remains scant.^{6,7} (Note: *Transgender* is a term for a person whose sense of gender

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does not correspond with their birth sex and *cisgender* is a term used to describe people who are not transgender.)

The 2010 American Lung Association comprehensive report on LGBT and tobacco use acknowledged that there were no published studies on transgender cigarette smoking.⁸ Since 2010, a few have emerged. One study conducted in Missouri, a convenience sample of attendees of four pride festivals throughout the state and an online survey, showed that cigarette smoking rates were nearly twice as high for transgender/genderqueer (43%) than heterosexual individuals (27%).⁹ A community study conducted in San Francisco found that 83% of transgender women respondents indicated that they had smoked a cigarette in the last month, and of these women, 62.3% reported daily smoking.¹⁰ A similar study of transgender adults in Massachusetts found that 43.2% of transgender adults living in an “HIV hot spot” were current smokers compared with 34.3% of transgender adults who did not live in a geographically defined HIV hot spot.¹¹ Data from the largest study, the National Trans Discrimination Survey, which used a nonprobability sample (N=6,400), found that 30% of transgender respondents were smoking daily or occasionally versus 20.6% of the general population.¹² In another analysis of adults from this sample, researchers found that some college educational attainment was protective against cigarette smoking whereas lack of insurance, use of alcohol or drugs, and experience of structural discrimination was associated with higher risk for cigarette smoking.¹³ Furthermore, the Massachusetts Behavioral Risk Factor Social Survey, which used a probability sample, found that 36.2% of transgender compared with 17.3% of cisgender adults were current smokers.¹⁴

There is a dearth of data on transgender tobacco use from nationally representative samples. Two separate papers used data from the 2009–2010 National Adult Tobacco Survey and found that tobacco use among the LGBT aggregate group was higher than non-LGBT adults.^{15,16} Stratified analyses based on sexual orientation and gender identity could not be done because the 2009–2010 National Adult Tobacco Survey only had one question that conflated sexual orientation and gender identity. King et al.¹⁵ acknowledged this to be a limitation as respondents were not given multiple response options to indicate being transgender and their sexual orientation.

Exploring tobacco use among transgender populations is of vital public health importance as initial evidence indicates LGBT populations, and transgender populations in particular, are at disparate risk for using tobacco, and thus may be at disparate risk for a variety of negative health outcomes associated with tobacco. However, without empirical data, it is impossible to determine

the extent of this disparity if it does in fact exist. This study is a step in that direction.

The objective of this study is to use a national sample to examine intragroup differences in tobacco use for transgender adults; this is the first such research. This study used two separate LGBT measures to differentiate gender identity from sexual orientation. This made it possible to examine tobacco use for transgender versus cisgender adults and account for sexual orientation. The results from this paper fill a gap in the literature by providing additional data on cigarettes and cigars, and first-time data on e-cigarettes among transgender adults and identifying the specific risk of use among transgender participants. These data can be used to inform the design of tobacco prevention and cessation interventions that target transgender adults.

METHODS

Study Population

Data for this study were collected as part of an online survey, Tobacco in a Changing Media Environment, developed to assess tobacco use behaviors among adults aged ≥ 18 years and administered by the GfK Group in February and March 2013 (N=17,522). The recruitment design has been reported previously.^{2,17}

The majority of participants (75%) were drawn from GfK's KnowledgePanel® (KP), a probability-based sample of adults recruited using random-digit dialing supplemented by address-based sampling. Of the 34,097 KP members, 61% completed screening for eligibility and 97% of those eligible completed the survey. Tobacco users were oversampled to ensure sufficient sample size for that group. GfK augmented the KP sample by collecting an off-panel convenience sample (25%) and screening people who clicked on online ads for study eligibility. The augmented sample was then calibrated into the probability-based sample on demographic characteristics and tobacco use status. Because there was no sampling frame, response rates for the convenience sample are not available. Respondents who did not (or refused to) report their gender identity were excluded ($n=190$). Of 168 transgender respondents, 74 (44%) were KP members and 94 (56%) were from the off-panel sample. Respondents provided online consent prior to participation.

Weighting adjustments were made to compensate for deviations from equal probability sampling. Post-stratification weights were developed to account for non-response, oversampling of tobacco users, calibration of off-panel respondents, and other sources of non-sampling error.

The resulting sample included 17,332 respondents, of whom 168 were transgender and 17,164 were cisgender. The study received IRB approval from the University of Illinois at Chicago and the University of California, San Diego.

Measures

The measures used in this study included sociodemographic factors, gender identity, and tobacco use behaviors. Sociodemographic variables included self-reported sexual orientation

(lesbian, gay, bisexual, or heterosexual), age, gender, race and ethnicity, household income, and education, which were obtained from participants using standard questions.²

Self-reported gender status was obtained by participants' response of either male or female to the question: *What is your gender?*

Self-reported transgender status was obtained by asking: *Do you consider yourself to be transgender?* Participants responded *yes* or *no*.

Data were collected on cigarette, e-cigarette, and cigar use. Participants were asked about lifetime (ever) use of cigarettes, e-cigarettes (e-cigs), regular cigars, cigarillos, and mini cigars (yes/no). Ever users of cigarettes were asked an open-ended follow-up question: *On how many of the past 30 days did you smoke cigarettes?* Using these two questions, current (past 30-day) cigarette use was dichotomized as not in the past 30 days and in the past 30 days, and never users were included as not being current cigarette users. Ever users of e-cigarettes and cigars were asked a slightly different follow-up questions: *Do you now use [e-cigarettes OR cigars] every day, some days, or not at all?* Responses were dichotomized into current use (*every day and some days*) or no current use (*not at all*). Those who self-reported having never tried the tobacco product or who reported trying but not currently using the tobacco product were categorized as non-current users of the corresponding product. Respondents who reported currently using the tobacco product some days or every day were categorized as current users. Cigar categories (cigars, cigarillos, and mini cigars) were combined into a single cigar use variable. (Note: E-cigarettes are conceptualized as tobacco products as they have recently been deemed as such and are now regulated by the U.S. Food and Drug Administration.)

Statistical Analysis

Prevalence of tobacco product use was estimated for transgender and cisgender participants. Rao-Scott *F*-tests were employed to examine differences in current use of tobacco products (cigarettes, e-cigarettes, cigars) between transgender and cisgender adults. Current use of tobacco products (any use of cigarettes/cigars/e-cigarettes) was modeled using logistic regression, adjusting for age, gender, sexual orientation, race or ethnicity, household income, and educational attainment. All analyses were performed using survey procedures in Stata, version 13 to account for survey designs and weights in 2015. Unweighted frequencies, weighted percentages, and weighted ORs are reported. The four outcomes of current use of tobacco products were analyzed in relation to gender identity and multiple covariates. In each, the point estimates and 95% CIs are reported using the survey logistic procedure and indicate the statistical significance controlling for a false discovery rate at 0.05.^{18,19}

RESULTS

Of all respondents, 0.9% identified themselves as transgender. [Table 1](#) presents sociodemographic characteristics and tobacco use prevalence by transgender and cisgender identity. Transgender respondents, compared with cisgender respondents, were more likely to be aged 45–64 years and non-white. No significant differences

were observed by gender, household income, or educational attainment between transgender and cisgender participants. Most transgender respondents identified as heterosexual and 16.6% identified as LGB. Compared with cisgender adults, transgender respondents reported significantly higher tobacco use across products in the past 30 days, including any use of cigarettes/cigars/e-cigarettes. This disparity was strongest for cigar and e-cigarette use: transgender respondents were > 2.8 times, on average, more likely to report cigar use and 4.3 times more likely to report e-cigarette use compared with cisgender respondents.

[Table 2](#) shows the results of the logistic regression that models tobacco use in association with gender identity (transgender versus cisgender) adjusting for sociodemographic correlates of tobacco use. Transgender respondents had significantly higher odds of current tobacco use across assessed products (e.g., any cigarettes/cigars/e-cigarettes) compared with their cisgender counterparts ([Table 2](#)) in the unadjusted models. Adjusted models showed that transgender adults had higher odds of current use of e-cigarettes (OR=5.31, 95% CI=3.36, 8.43), cigars (OR=3.67, 95% CI=2.23, 6.04), and cigarettes (OR=1.85, 95% CI=1.09, 3.15); of those, the relationships of transgender status with e-cigarettes and cigars were statistically significant controlling for the false discovery rate.

Other factors that were generally significantly associated with higher tobacco use across products were younger age and lower levels of educational attainment ([Table 2](#)).

Prevalence of tobacco product use was estimated among transgender and cisgender by self-reported gender ([Figure 1](#)). Transgender male respondents (white with black stripe bar) reported significantly higher past 30-day use of each of the assessed tobacco products: twice as high cigarette use than cisgender male (simple black bar) or cisgender female (simple gray bar) respondents, five times as high e-cigarette use than cisgender male or cisgender female respondents, and more than two (cisgender male) or six (cisgender female) times as high cigar use. E-cigarette use was three time higher among transgender female (white with black dots bar) adults than cisgender male or female adults. Similarly, transgender female adult cigar use was four times higher than cisgender female cigar use.

Nonsignificant gender differences in past 30-day tobacco use were observed within transgender adults ([Figure 1](#)). Transgender male respondents reported higher prevalence of past 30-day use of each tobacco product, compared with their transgender female counterparts. However, the CIs for transgender male overlapped with those for transgender female, which may be

Table 1. Tobacco in a Changing Media Environment (TCME): Transgender and Cisgender Population Characteristics (N=17,332)

Population characteristics self-reported	Transgender (N=168)		Cisgender (N=17,164)		F test, p-value
	n (%)	CI	n (%)	CI	
Gender					
Male	89 (49.6)	(37.0–62.1)	7,640 (48.0)	(46.8–49.2)	0.81
Female	79 (50.4)	(37.9–63.0)	9,524 (52.0)	(50.8–53.2)	
Sexual identity					
Heterosexual	117 (83.4)	(74.2–92.6)	16,085 (95.2)	(94.7–95.7)	< 0.0001
Gay	8 (3.2)	(0.5–6.0)	325 (2.0)	(1.6–2.3)	
Lesbian	10 (7.9)	(0.0–16.3)	175 (0.8)	(0.6–0.9)	
Bisexual	14 (5.5)	(2.1–8.9)	419 (2.1)	(1.7–2.4)	
Other or missing	19 (10.5)	(2.6–18.4)	160 (1.0)	(0.7–1.2)	
Age					
18–24	16 (6.2)	(2.7–9.7)	1,239 (9.8)	(9.0–10.6)	0.01
25–44	74 (31.2)	(20.0–42.4)	4,830 (34.5)	(33.3–35.6)	
45–64	63 (53.8)	(41.6–66.1)	7,207 (38.2)	(37.1–39.4)	
65+	15 (8.8)	(3.6–14.0)	3,888 (17.5)	(16.7–18.4)	
Race or ethnicity					
White	97 (50.9)	(38.3–63.4)	13,695 (68.4)	(67.3–69.6)	0.02
Black	23 (22.5)	(11.4–33.6)	1,266 (11.3)	(10.4–12.1)	
Hispanic/Latino	38 (19.9)	(10.8–29.0)	1,194 (13.4)	(12.5–14.3)	
Other	10 (6.8)	(0.0–14.2)	1,009 (6.9)	(6.3–7.6)	
Household income					
< \$25,000	48 (28.2)	(16.9–39.6)	3,620 (18.5)	(17.6–19.4)	0.22
\$25,000 to \$49,999	35 (19.8)	(10.0–29.5)	4,659 (23.7)	(22.7–24.7)	
\$50,000 to \$84,999	43 (21.9)	(11.9–31.9)	4,658 (28.3)	(27.3–29.4)	
≥ \$85,000	42 (30.1)	(18.2–42.0)	4,227 (29.4)	(28.4–30.5)	
Education					
< High school graduate	17 (12.2)	(4.7–19.7)	661 (6.6)	(5.9–7.2)	0.28
High school graduate	38 (38.8)	(25.7–51.9)	3,817 (36.1)	(34.9–37.3)	
Some college	60 (28.7)	(18.3–39.2)	6,222 (31.2)	(30.2–32.3)	
Bachelor degree	27 (10.6)	(2.8–18.4)	4,028 (15.9)	(15.1–16.7)	
Any post college	26 (9.7)	(4.8–14.6)	2,436 (10.3)	(9.6–10.9)	
Current (past 30-day) tobacco use					
Any cigarettes/e-cigarettes/cigars	122 (39.7)	(29.5–50.8)	7,289 (25.1)	(24.2–26.0)	0.003
Cigarettes (yes)	113 (35.5)	(26.1–46.1)	6,451 (20.7)	(19.9–21.5)	0.001
Cigars (yes)	79 (26.8)	(19.0–36.4)	2,506 (9.3)	(8.8–9.9)	< 0.0001
E-cigarettes	69 (21.3)	(15.1–29.1)	1,528 (5.0)	(4.6–5.4)	< 0.0001

Note: Boldface indicates statistical significance controlling for false discovery rate at $p < 0.05$ for 10 hypothesis tests.

due to insufficient sample size, although it is possible that there is no difference.

DISCUSSION

This national study fills an important gap in the literature by providing evidence that transgender adults use tobacco at much higher rates than cisgender populations. The evidence is particularly telling when taking into account novel tobacco products such as e-cigarettes. In sum, disaggregate data show the differences in tobacco use among transgender adults, especially for e-cigarettes,

and suggest a need for targeted interventions for transgender groups who may be at higher risk for tobacco-related diseases given their higher tobacco use rates.

Studies using probability-based samples have begun to provide information on higher smoking rates for either the LGB population or the aggregate LGBT population. Recently, additional information has been reported about LGB adult use of other forms of tobacco, such as e-cigarettes.² Until now, no studies have reported on tobacco use from a national sample where transgender data can be disaggregated from sexual orientation. This is the first national sample to disaggregate gender identity

Table 2. Logistic Regression Models Predicting Past 30-day any Cigarettes/E-Cigarettes/Cigars Use, Cigarettes, Cigars, or Electronic Cigarettes Comparing Transgender (N=168) and Cisgender (N=17,164) Tobacco Use (N=17,332)

Current (past 30-day) tobacco use	Model 1: Any cigarettes, cigars, or e-cigarettes		Model 2: Cigarettes		Model 3: Cigars		Model 4: E-cigarettes	
	OR (CI)	p-value	OR (CI)	p-value	OR (CI)	p-value	OR (CI)	p-value
Crude								
Transgender vs. cisgender	1.97 (1.25–3.1)	0.0035	2.10 (1.35–3.28)	0.0010	3.56 (2.27–5.59)	< 0.0001	5.15 (3.36–7.88)	< 0.0001
Adjusted								
Gender identity								
Cisgender	1.00		1.00		1.00		1.00	
Transgender	1.77(1.05–3.01)	0.0333	1.85 (1.09–3.15)	0.0220	3.67 (2.23–6.04)	< 0.0001	5.31 (3.36–8.43)	< 0.0001
Gender								
Male	1.00		1.00		1.00		1.00	
Female	0.66 (0.60–0.73)	< 0.0001	0.90 (0.81–1.00)	0.0415	0.30 (0.26–0.34)	< 0.0001	0.80 (0.68–0.95)	0.0112
Sexual identity								
Heterosexual	1.00		1.00		1.00		1.00	
LGB	1.49 (1.20–1.85)		1.71 (1.38–2.13)		1.39 (1.07–1.79)		1.65 (1.25–2.18)	
Other or missing	0.62 (0.39–0.98)	0.0001	0.71 (0.45–1.14)	< 0.0001	0.54 (0.29–1.00)	0.0047	0.77 (0.39–1.51)	0.0013
Age								
18–24	1.00		1.00		1.00		1.00	
25–44	1.22 (1.00–1.48)		1.41 (1.16–1.71)		0.86 (0.67–1.09)		0.84 (0.64–1.11)	
45–64	1.07 (0.89–1.30)		1.31 (1.08–1.58)		0.47 (0.37–0.60)		0.54 (0.41–0.71)	
65+	0.41 (0.33–0.51)	< 0.0001	0.51 (0.41–0.63)	< 0.0001	0.19 (0.14–0.25)	< 0.0001	0.23 (0.16–0.33)	< 0.0001
Race or ethnicity								
White	1.00		1.00		1.00		1.00	
Black	0.96 (0.81–1.14)		0.88 (0.74–1.06)		1.40 (1.13–1.75)		0.64 (0.47–0.85)	
Hispanic	0.72 (0.60–0.86)		0.67 (0.56–0.81)		0.96 (0.76–1.21)		0.73 (0.55–0.97)	
Other	0.88 (0.72–1.07)	0.0036	0.96 (0.78–1.17)	0.0004	0.78 (0.60–1.02)	0.0025	1.21 (0.90–1.62)	0.0015
Household income								
< \$25,000	1.00		1.00		1.00		1.00	
\$25,000 – \$49,999	0.69 (0.60–0.80)		0.70 (0.61–0.81)		0.75 (0.62–0.92)		0.98 (0.78–1.23)	
\$50,000 – \$84,999	0.61 (0.53–0.71)		0.58 (0.50–0.68)		0.78 (0.63–0.96)		1.11 (0.86–1.42)	
≥ \$85,000	0.47 (0.40–0.56)	< 0.0001	0.38 (0.32–0.45)	< 0.0001	0.71 (0.57–0.90)	0.0124	0.78 (0.59–1.04)	0.0594
Education								
< High school graduate	1.00		1.00		1.00		1.00	
High school graduate	0.83 (0.66–1.04)		0.81 (0.65–1.01)		0.80 (0.57–1.12)		0.57 (0.41–0.81)	
Some college	0.78 (0.62–0.97)		0.74 (0.59–0.92)		0.88 (0.63–1.22)		0.66 (0.47–0.92)	
Bachelor degree	0.43 (0.34–0.55)		0.38 (0.30–0.49)		0.68 (0.47–0.97)		0.34 (0.24–0.50)	
Any post college	0.29 (0.22–0.37)	< 0.0001	0.24 (0.18–0.32)	< 0.0001	0.55 (0.37–0.81)	0.0019	0.24 (0.16–0.37)	< 0.0001

Note: Boldface indicates statistical significance controlling for the false discovery rate at $p < 0.05$ for 32 hypothesis tests. LGB, lesbian, gay, bisexual.

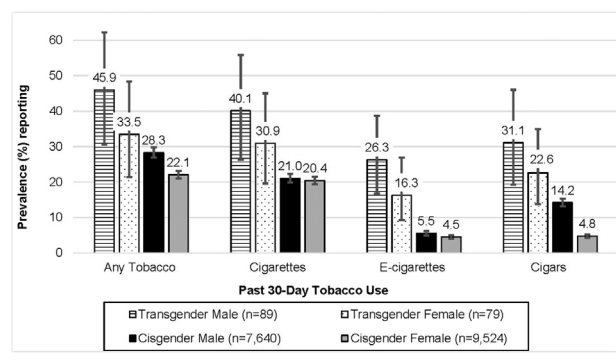


Figure 1. Gender differences in tobacco use among transgender and cisgender adult participants (2013).

from sexual orientation and show that transgender adults use tobacco products at significantly higher rates than cisgender respondents. Additionally, this study shows that transgender participants have a higher risk than cisgender participants to use novel tobacco products such as e-cigarettes. The findings align with other aggregate or state-based research^{14–16} but provide more precise information on the breadth of the tobacco disparity in the transgender population.

The exploratory analyses of tobacco use by gender suggest that there is heterogeneity within the transgender group: Transgender male respondents appear to use tobacco at higher rates when compared with transgender female respondents across all assessed tobacco products, although this difference was not statistically significant. Further research is needed into intragroup differences among the transgender population, especially in view of further analysis from the National Transgender Discrimination Survey that has begun to provide evidence of the link between the effect of structural discrimination experienced by transgender individuals and higher risk for smoking.¹³

In general, there is a dearth of research on the transgender population and tobacco use. Furthermore, national and local surveys may not ask the appropriate questions to increase the understanding of the diversity of tobacco use among different groups. For example, surveys still do not consistently assess gender identity (transgender) separately from sexual orientation; therefore, tobacco use prevalence cannot be reported for the disaggregated groups. Furthermore, disaggregate data are even more scarce because the transgender population is small and often hard to reach. This persistent gap in the scientific literature for transgender communities makes it difficult to justify the need for intervention studies that would help to reduce disease risk among these vulnerable groups. As a result, data from national probability samples are particularly valuable.¹⁸

Limitations

This study has some limitations. Consistent with research on small sample size populations, cell sizes of the transgender sample were small. As a result, subgroup differences beyond gender within transgender population were not analyzed, nor were less commonly used tobacco products such as hookah (for which no past 30-day use information was collected). Increased direct targeting efforts that facilitate a bigger probability-based sample are needed to enhance transgender sample sizes in future studies. Future work with larger populations of transgender participants is needed to expand on these findings that explore subgroup differences between transgender and cisgender populations. Larger sample sizes will provide the opportunity to look at further group differences, especially transgender people of color, sexual orientation, and forms of tobacco use other than cigarettes. Perhaps most important, only a single question explored gender, rather than two separate questions assessing sex assigned at birth and current gender. Future research should additionally capture sex at birth to tease out potential differences across transgender subpopulations (e.g., transition from male to female or female to male). Without that distinction, it is likely that the analysis based on male/female categorization includes some crossover between people assigned male at birth and those assigned female.

CONCLUSIONS

This study used data from a national survey to investigate differences between transgender and cisgender tobacco use. Transgender adults reported more use across tobacco products compared with cisgender adults. Future research that assesses gender identity (transgender) separate from sexual orientation, as in this study, but with an increased sample size, is needed to expand on these findings to allow analysis of subgroup differences within transgender and between transgender and cisgender individuals, including by gender, sexual orientation, and race or ethnicity. Examining the heterogeneity within groups will help develop more-targeted interventions, and also help learn more about gender-specific differences in tobacco use. The findings suggest that additional levels of influence should be explored to help understand why such disparities exist, as social and cultural factors not assessed in this study may influence the type of tobacco male or female transgender people use. The data from this and other studies can be used to inform best and promising practices for tobacco control and prevention for the transgender community in the areas of:

1. increasing monitoring of tobacco use and disparities using a separate question to assess gender identity;
2. evaluating ongoing programs for their effectiveness on transgender tobacco use;
3. crafting comprehensive tobacco control policies and cessation programs to ensure that the transgender population is being protected and appropriately served; and
4. developing targeted health communication campaigns to reduce the use of tobacco products.²⁰

For example, recently, the Food and Drug Administration regulatory activities over tobacco products led to the launch of one health campaign that focuses on transgender individuals, and evaluation of its reach and effectiveness is underway. Other regional- and community-level campaigns may also be needed.

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REFERENCES

1. Lee JGL, Griffin GK, Melvin CL. Tobacco use among sexual minorities in the USA, 1987 to May 2007: a systematic review. *Tob Control*. 2009;18(4):275–282. <http://dx.doi.org/10.1136/tc.2008.028241>.
2. Emory K, Kim Y, Buchting F, et al. Intragroup variance in lesbian, gay, and bisexual tobacco use behaviors: evidence that subgroups matter, notably bisexual women. *Nicotine Tob Res*. 2016;18(6):1494–1501. <http://dx.doi.org/10.1093/ntr/ntv208>.
3. Blossnich JR, Farmer GW, Lee JGL, Silenzio VMB, Bowen DJ. Health inequalities among sexual minority adults: evidence from ten U.S. States, 2010. *Am J Prev Med*. 2014;46(4):337–349. <http://dx.doi.org/10.1016/j.amepre.2013.11.010>.
4. Blossnich J, Lee JGL, Horn K. A systematic review of the aetiology of tobacco disparities for sexual minorities. *Tob Control*. 2013;22(2):66–73. <http://dx.doi.org/10.1136/tobaccocontrol-2011-050181>.
5. Jamal A, Agaku IT, O'Connor E, et al. Current cigarette smoking among adults — United States, 2005–2013. *MMWR Morb Mortal Wkly Rep*. 2014;63(47):1108–1112.
6. Fallin A, Goodin A, Lee YO, Bennett K. Smoking characteristics among lesbian, gay, and bisexual adults. *Prev Med*. 2015;74:123–130. <http://dx.doi.org/10.1016/j.ypmed.2014.11.026>.
7. Rath JM, Villanti AC, Rubenstein RA, Vallone DM. Tobacco use by sexual identity among young adults in the United States. *Nicotine Tob Res*. 2013;15(11):1822–1831. <http://dx.doi.org/10.1093/ntr/ntt062>.
8. American Lung Association. Smoking out a deadly threat: tobacco use in the LGBT community. New York: American Lung Association. www.lung.org/assets/documents/research/lgbt-report.pdf. Published 2010. Accessed June 14, 2016.
9. McElroy J, Everett K, Zaniletti I. An examination of smoking behavior and opinions about smoke-free environments in a large sample of sexual and gender minority community members. *Nicotine Tob Res*. 2011;13(6):440–448. <http://dx.doi.org/10.1093/ntr/ntt021>.
10. Gamarel KE, Mereish EH, Manning D, et al. Minority stress, smoking patterns, and cessation attempts: findings from a community-sample of transgender women in the San Francisco Bay area. *Nicotine Tob Res*. 2016;18(3):306–313. <http://dx.doi.org/10.1093/ntr/ntv066>.
11. Hughto JMW, Reisner SL, Mimiaga MJ. Characteristics of transgender residents of Massachusetts cities with high HIV prevalence. *Am J Public Health*. 2015;105(12):e14–e18. <http://dx.doi.org/10.2105/AJPH.2015.302877>.
12. Grant JM, Mottet LA, Tanis J. *National transgender discrimination survey report on health and health care*. Washington, DC: National Center for Transgender Equality and National Gay and Lesbian Task Force; 2010. www.thetaskforce.org/static_html/downloads/resources_and_tools/ntds_report_on_health.pdf. Accessed June 10, 2016.
13. Shires DA, Jaffee KD. Structural discrimination is associated with smoking status among a national sample of transgender individuals. *Nicotine Tob Res*. 2016;18(6):1502–1508. <http://dx.doi.org/10.1093/ntr/ntv221>.
14. Conron KJ, Scott G, Stowell GS, Landers SJ. Transgender health in Massachusetts: results from a household probability sample of adults. *Am J Public Health*. 2012;102(1):118–122. <http://dx.doi.org/10.2105/AJPH.2011.300315>.
15. King BA, Dube SR, Tynan MA. Current tobacco use among adults in the United States: findings from the National Adult Tobacco Survey. *Am J Public Health*. 2012;102(11):e93–e100. <http://dx.doi.org/10.2105/AJPH.2012.301002>.
16. Fallin A, Goodin AJ, King BA. Menthol cigarette smoking among lesbian, gay, bisexual, and transgender adults. *Am J Prev Med*. 2015;48(1):93–97. <http://dx.doi.org/10.1016/j.amepre.2014.07.044>.
17. Huang J, Kim Y, Vera L, Emery SL. Electronic cigarettes among priority populations: role of smoking cessation and tobacco control policies. *Am J Prev Med*. 2016;50(2):199–209. <http://dx.doi.org/10.1016/j.amepre.2015.06.032>.
18. Benjamini Y, Hochberg Y. Controlling the false discovery rate: a practical and powerful approach to multiple testing. *J R Stat Soc Series B Stat Methodol*. 1995;57(1):289–300.
19. Benjamini Y, Yekutieli D. The control of the false discovery rate in multiple testing under dependency. *Ann Stat*. 2001;29(4):1165–1188.
20. Buchting FO, Furmanski WL, Lee JG, et al. *MPOWERED: best and promising practices for LGBT tobacco prevention and control document*. Ft. Lauderdale, FL: The Network for LGBT Health Equity; 2012. www.lgbthealthlink.org/Assets/U/documents/mpowered.pdf. Accessed September 20, 2016.