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## Prevalence of use and perceptions of risk of novel and other alternative tobacco products among sexual minority adults: Results from an online national survey, 2014–2015

Pratibha Nayak<sup>a,\*</sup>, Laura F. Salazar<sup>a,b</sup>, Krishna K. Kota<sup>a,b</sup>, Terry F. Pechacek<sup>a,c</sup>

<sup>a</sup> Georgia State University's Tobacco Center of Regulatory Science, Atlanta, GA 30308, USA

<sup>b</sup> Georgia State University, School of Public Health, Department of Health Promotion and Behavior, USA

<sup>c</sup> Division of Health Management & Policy, Georgia State University, Atlanta, GA 30303, USA

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### ABSTRACT

Sexual minority (lesbian, gay, and bisexual [LGB]) populations experience disparities in cigarette use, but sparse evidence exists about novel and other alternative tobacco product use. In this study, we compared rates of novel and other alternative tobacco product use, risk perceptions, and worldview between LGB and heterosexual (HET) adults. An online survey administered in 2014–2015, using a weighted probability sample of 11,525 U.S. adults, assessed awareness of tobacco products; ever and current use of e-cigarettes, cigars, little cigars and cigarillos, and hookahs; perceptions of e-cigarettes; and worldview (individualism vs. communitarianism). Bivariate and adjusted multivariable analyses were performed to determine differences between LGB and HET groups. In the adjusted analyses, LGB adults were 1.5 times more likely to have ever used e-cigarettes (95% CI 1.2–1.9) and 1.9 times more likely to have ever used hookahs (95% CI 1.5–2.4) as compared to HET adults. A lower percentage of LGB adults, as compared to HET adults (16.7% vs. 19.2%), believed that exposure to vapors from e-cigarettes was “harmful” and reported that they “did not know” of any harm (35.1% vs. 39.8%). LGB were 20% less likely than were HET adults to endorse an individualistic worldview. These results suggest that a disparity exists, whereby LGB adults are more likely to have used e-cigarettes and hookahs. In addition, although vapor from e-cigarettes contains nicotine and other chemicals, LGB adults are less likely to perceive exposure to secondhand vapor as harmful. Tailored awareness campaigns and interventions are needed to convey the risks and curb use of these products.

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### 1. Introduction

Among adults in the United States, the rates of tobacco smoking declined from 20.9% in 2005 to 15.3% in 2015, and the proportion of daily smokers decreased from 16.9% in 2005 to 13.7% in 2013 (Jamal et al., 2014; U.S. Department of Health and Human Services et al., 2016). However, cigarette smoking has remained high among certain groups, such as sexual minorities (i.e., lesbian, gay, and bisexual [LGB] individuals), for whom rates are consistently higher in comparison to those of heterosexual (HET) individuals (Jamal et al., 2014). Indeed, a systematic review of 42 studies conducted between 1987 and 2007 reported strong associations between LGB status and smoking, with odds ratios (ORs)

between 1.5 and 2.5 (Lee et al., 2009). Thus, it has been well documented that sexual minority populations experience significant disparities related to tobacco use (Balsam et al., 2012; Bennett et al., 2015; Fallin et al., 2015a; Fallin et al., 2015b; King et al., 2012; Lee et al., 2009; Rath et al., 2013). One potential mechanism that explains this disparity is that LGB individuals experience stigma and harassment, discrimination, rejection from family, and even emotional and physical violence (Balsam et al., 2012; Gruskin et al., 2007). As a result, LGB individuals experience more stress, depression, and low self-esteem than do their HET counterparts, making them more vulnerable to use substances such as tobacco.

In response to declining cigarette sales, tobacco companies have shifted their focus from combustible tobacco products to novel tobacco products, including e-cigarettes and, to some degree, alternative tobacco products (e.g., cigars, cigarillos/little cigars, hookahs). Coupled with pervasive marketing strategies (Duke et al., 2014; Kim et al., 2014; Kornfield et al., 2015; Shang and Chaloupka, 2017), this shift to novel tobacco products has resulted in an increase in e-cigarette awareness, ever use, and current use among U.S. youth and adults (Agaku et al.,

*Abbreviations:* AOR, adjusted odds ratio; CI, confidence interval; ENDS, electronic nicotine delivery systems; HET, heterosexual; LCCs, little cigars, cigarillos, and filtered cigars; LGB, lesbian, gay, bisexual individuals; OR, odds ratio.

\* Corresponding author at: Tobacco Center of Regulatory Science, School of Public Health, Georgia State University, Urban Life Building, Atlanta, GA 30303, USA.

E-mail addresses: [pnayak@gsu.edu](mailto:pnayak@gsu.edu) (P. Nayak), [lsalazar1@gsu.edu](mailto:lsalazar1@gsu.edu) (L.F. Salazar), [kkota1@gsu.edu](mailto:kkota1@gsu.edu) (K.K. Kota), [tpechacek@gsu.edu](mailto:tpechacek@gsu.edu) (T.F. Pechacek).

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2014; Huang et al., 2015; King et al., 2015; Regan et al., 2013). Several studies have estimated the prevalence of the use of e-cigarettes and other alternative products among LGB individuals to determine whether there are patterns. The results suggest a disparity in the rates of use; however, with a few exceptions (Cabrera-Nguyen et al., 2016; Emory et al., 2016; Huang et al., 2015), the studies were either conducted with small sample sizes (Tami-Maury et al., 2015) or restricted to one city or state (Gruskin et al., 2007; Jordan et al., 2014). In addition, most studies did not examine the underlying factors that contribute to the higher rates of novel and other alternative tobacco product use, especially for e-cigarettes.

Perceived risk may be a significant underlying factor, as research has shown that risk perceptions influence many types of health behavior, such as sexual behavior, bike helmet use, diet, and exercise (Slovic, 2000). Risk perceptions significantly influence decision making such that individuals who perceive little to no risk for certain behaviors are more likely to engage in those behaviors compared to individuals who perceive the behavior to have a high risk (Slovic, 2000; Slovic, 2010). Risk perceptions for cigarette smoking are particularly important in the initiation of smoking, as the beginning smoker perceives very little risk from smoking (Davis et al., 2008; Weinstein et al., 2005). Perceptions of risk are influenced by factors such as marketing and promotion. Manipulative advertisements often associate cigarette smoking with happiness, fun, and stress relief (U.S. Department of Health and Human Services, 1994) and do not convey risks; thus, perceptions of risk may be minimal. In addition to stigma and discrimination, LGB populations are also exposed to targeted marketing practices of the tobacco industry through direct advertising in LGB publications, outreach efforts, and event sponsorships (Hine et al., 1997).

Risk perceptions, according to the cultural theory of risk, also may be influenced by a person's worldview (Douglas and Wildavsky, 1983; Kahan et al., 2009; Palmer, 1996). The premise of this theory is that individuals form beliefs about societal dangers that mirror and support their idealized form of how society should be organized (Douglas, 2007; Oltedal et al., 2004). In other words, people are “the active organizers of their own perceptions” (p. 43) (Wildavsky and Dake, 1990), choosing what to fear, such as the use of tobacco products.

Cultural cognition, a concept related to cultural theory, is a heuristic approach that can be used to measure an individual's cultural worldviews (Kahan, 2012) and has been conceptualized as two intersecting categories called “grid-group.” *Grid* refers to the degree of social stratification within society and ranges from egalitarianism (low grid) to endorsing of a hierarchy (high grid), whereas *group* refers to the degree to which there is group control of individual behavior and ranges from complete independence (low group) to dependence among individuals (high group) (Hirsch and Baxter, 2011). Low group or individualism values commerce, industry, and limited government involvement, whereas high group or communitarianism holds a moral suspicion of commerce and industry and values government regulation. Using this perspective, worldviews have been researched in terms of many different types of risky situations or dangers and have been linked to risk perceptions of financial investments and health activities (Palmer, 1996), technology and the environment, war, the economy (Wildavsky and Dake, 1990), and pesticide policies (Hirsch and Baxter, 2011). Nevertheless, it is not well documented whether LGB individuals differ significantly from HET individuals on their worldviews. It stands to reason that they may differ given their diverse cultural and life experiences and that these differences may affect their risk perceptions; thus, they should be explored.

Another related issue is the promotion of e-cigarettes as an effective harm-reduction tool for smoking cessation (Drummond and Upson, 2014; Loughead, 2015; Martinez-Sanchez et al., 2015). Although many strongly believe that e-cigarettes are less risky than combustible cigarettes, the FDA and many leading public health organizations have reported concerns about the safety of e-cigarettes, the potential for increased nicotine addiction, and how these products are marketed to the public (Drummond and Upson, 2014; Knorst et al., 2014; Loughead,

2015). E-cigarettes may be harmful, particularly to youth, if they increase the likelihood that nonsmokers or former smokers will start using combustible tobacco products or if they discourage smokers from quitting. The American Association for Cancer Research and the American Society of Clinical Oncology published policy statements on electronic nicotine delivery systems (ENDS), stating that they “recognize the potential ENDS have to alter patterns of tobacco use and affect the health of the public; however, definitive data are lacking” (p. 952) (Brandon et al., 2015). Until there is more definitive evidence of the safety of e-cigarettes, there is a need for research to address the role of risk perception in e-cigarette use and whether these products promote smoking cessation or perpetuate nicotine addiction through experimentation, initiation, or the use of combustible cigarettes plus novel and other alternative tobacco products (dual use or poly use). Because LGB populations experience disparities in smoking rates, and some evidence suggests disparity in the rates of e-cigarette use as well, more research is needed to examine the risk perceptions in regard to e-cigarettes (e.g., “effects on health,” “useful for cessation”) and the potential factors specific to LGB individuals that may contribute to their use. Our study addresses these concerns by utilizing a nationally representative sample of LGB adults and by generating new knowledge to help inform tobacco prevention and control efforts. The objectives of this study are to document the prevalence and frequency of novel and other alternative tobacco product use in a sample of self-identified sexual minority adults (gay, lesbian, or bisexual) and to examine differences between HET and LGB adults in novel and other alternative tobacco product use, related health risk perceptions, and worldviews. We also examined their use of regular tobacco cigarettes and their intentions to quit, as both may be predictive of novel and other alternative tobacco product use.

## 2. Methods

This study used combined data from the 2014 and 2015 Tobacco Products and Risk Perceptions Surveys conducted by the Georgia State University Tobacco Center of Regulatory Science. This annual survey draws a probability sample of U.S. adults from KnowledgePanel, which is weighted to be representative of non-institutionalized U.S. adults. Participation rates for each year were 74% and 75%, respectively. A combined sample of 11,768 adults was obtained from the two years (5717 in 2014 and 6051 in 2015). Demographic and geographic distributions from the most recent Current Population Surveys were employed as benchmarks for adjustment and included age, gender, education, annual household income, race/ethnicity, census regions, and metropolitan area. The analytical sample for the present study was restricted to respondents who reported their sexual orientation, yielding a final study sample of 11,525. This study was approved by Georgia State University's Institutional Review Board.

### 2.1. Measures

#### 2.1.1. Sexual identity

Respondent were asked, “Do you consider yourself to be...?” and responses were categorized as heterosexual or straight, and non-heterosexual (“lesbian,” “gay,” “bisexual,” and “other”).

#### 2.1.2. Primary outcomes

**2.1.2.1. Awareness, ever use, and current use of novel and other alternative tobacco products.** The survey assessed awareness, ever use, and current use of the following four novel and other alternative tobacco products: (1) electronic vapor products, including e-cigarettes, e-cigars, e-hookahs, e-pipes, vape pens, hookah pens, or personal vaporizers/mods; (2) traditional cigars or large (premium) cigars; (3) little cigars, cigarillos, and filtered cigars (LCCs); and (4) hookahs, also referred to as water pipes or narghile pipes that are often used to smoke tobacco.

For each novel and other alternative tobacco product, *awareness* was assessed, using the response to the question, “Which of the following

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