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The differential impact of state tobacco control policies on cessation treatment utilization across established tobacco disparities groups

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ABSTRACT

Tobacco control policies are effective in promoting quit attempts and increase the likelihood that smokers use evidence-based cessation treatments (e.g., nicotine replacement therapies (NRT), non-NRT medications, behavioral treatment, and/or quitlines). However, what is less clear is how these policies might differentially impact different groups of smokers, perhaps in some cases even widening disparities in the use of evidence-based tobacco dependence treatments. This paper examined how different state-level tobacco control policies impact the use of evidence-based cessation treatments by race/ethnicity, gender, socio-economic status (SES), age, and smoking history. Participants included 9110 adult smokers reporting a past-year quit attempt within the 2010–2011 Tobacco Use Supplement to the Current Population Survey. Lasso regression modeling was used to identify a subset of interactions between tobacco policies and individual smoker characteristics that predicted use of evidence-based cessation treatment. Significant interactions were fitted via participant-weighted generalized linear models to determine effect sizes and relations to each cessation treatment outcome. Results highlighted that various state level tobacco control policies differentially impacted the reported use of both prescription and non-prescription stop smoking medications by race/ethnicity, age, and SES. The relationship between state level tobacco control policies and the use of behavioral treatments and quitlines did not differ by smoker characteristics. In sum, tobacco control policies differentially impact the use of FDA approved stop smoking medications across different race/ethnicity, age, and SES groups. Understanding such effects can help to target interventions to ensure equal access to evidence-based tobacco dependence treatments.

1. Introduction

More than half of all smokers in the United States make an attempt to quit smoking annually, but 94% of them fail, typically within the first week (Centers for Disease Control and Prevention, 2011a). Utilization of evidence-based tobacco dependence treatment such as nicotine replacement therapy (NRT), non-NRT medications (e.g., varenicline, bupropion), behavioral treatment, and/or quitlines significantly improves a smoker's likelihood of cessation success (Fiore et al., 2008). Yet, the majority of smokers attempting to quit do so unaided (Cokkinides et al., 2005; Fix et al., 2011). Despite widespread and rapidly increasing availability of evidence-based cessation treatments, rates of treatment utilization have remained relatively stagnant over the past 15 years. For example, use of cessation treatment increased from 22% in 2000 to only 31% in 2015 (Cokkinides et al., 2005; Fix et al., 2011; Fiore et al., 1990; Babb et al., 2017). Thus, there is clear need to promote use of evidence-based cessation treatment at the population level.

Policy-based tobacco control is arguably the most effective means through which to promote population-level smoking cessation and perhaps, by extension, use of evidence-based cessation treatment (Farrelly et al., 2011; Holford et al., 2014; Levy et al., 2004). Over the last 50 years, tobacco control policies have contributed to a 55% decrease in smoking prevalence and the prevention of 2 million smoking-attributable deaths (Levy et al., 2016). Examples of tobacco control policies enacted at the state level include: tobacco excise taxation, tobacco control appropriations, comprehensive smoke-free laws (i.e., smoking bans in workplaces, restaurants, bars), provision of free cessation medications by quitlines, and state Medicaid coverage of cessation treatment. A number of studies demonstrate that these state-level tobacco control policies promote smoking cessation by promoting quit attempts and making it easier for smokers to access evidence-based tobacco dependence treatments (Bush et al., 2009; Sheffer et al., 2010;

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Morley and Pratte, 2013; Land et al., 2010). Moreover, a recent study from our group examined the main effects of a host of state tobacco control policies (e.g., tobacco excise taxation, tobacco control appropriations, state Medicaid coverage of treatment, provision of free cessation medications by state quitlines) on smoking cessation treatment utilization (Dahne et al., 2017). Results indicated that total state and federal tobacco control appropriations were the most robust predictor of cessation treatment utilization and predicted NRT, quitline, and behavioral treatment use. Additionally, state Medicaid coverage of non-NRT medications and tobacco excise taxation significantly predicted NRT use while Medicaid coverage of behavioral treatment and tobacco excise taxation significantly predicted non-NRT medication use (Dahne et al., 2017). What is less clear is how different state-level tobacco policies promote uptake of evidence-based cessation treatment across different subgroups of smokers.

This question of *for whom* state-level tobacco policies exert their impact is paramount as tobacco use is increasingly concentrated among marginalized populations who often have limited access to evidence-based tobacco dependence treatments (Jamal et al., 2016; Goodwin et al., 2017). Further, numerous studies have documented disparities in rates of smoking cessation by race/ethnicity (Trinidad et al., 2011; Haiman et al., 2006), gender (Piper et al., 2010; Smith et al., 2016), socio-economic status (SES) (Reid et al., 2010; Barbeau et al., 2004), smoking history (Hymowitz et al., 1997), and age (Steinberg et al., 2006), which in turn correspond to higher rates of tobacco-related illness (Moolchan et al., 2007). These lower levels of quitting smoking are likely, at least in part, due to disparities in the use of evidence-based tobacco dependence treatments (Fu et al., 2005; Smith et al., 2015; Hiscock et al., 2012).

To date, few studies have examined the impact of tobacco control policies on the use of evidence-based tobacco dependence treatments and how such policies might differentially impact subgroups of smokers. Herein, we present analysis of a large, nationally representative dataset of smokers, in which we examine how exposure to different state-level tobacco control policies relates to the use of evidence-based cessation treatments across racial/ethnic, gender, SES, smoking history, and age subgroups.

2. Method

2.1. The Tobacco Use Supplement to the Current Population Survey (TUS-CPS)

The Tobacco Use Supplement to the Current Population Survey (TUS-CPS) (United States Department of Commerce Census Bureau, 2015) is the largest national survey that queries on individual methods of quitting. Data for the present study were utilized from the 2010–2011 TUS-CPS. The CPS uses a multi-stage probability sample based on the results of the decennial census procedure to interview a nationally representative sample of households of non-institutionalized civilian U.S. population aged 15 and older, with coverage in all 50 states and the District of Columbia. The TUS is a periodic survey attached to the CPS every four years which includes data from U.S. households regarding smoking, use of tobacco products, and tobacco-related norms, attitudes, and policies. For 2010–2011, TUS questions were added to the CPS surveys in May 2010, August 2010, and January 2011. Nonresponse rates for self-respondents for the TUS were 37.7% in May 2010, 38.4% in August 2010, and 40.2% in January 2011. The TUS-CPS was more recently completed in 2014–2015, but that wave did not assess individual methods of quitting and thus was not utilized. Additional details regarding methodology employed by the TUS-CPS can be found by visiting the TUS-CPS website (http://appliedresearch.cancer.gov/tus-cps/).

Table 1
Demographics.

	Unweighted	Weighted
n	9110	8,672,380
Age (*M*(*SD*))	43.3(14.6)	42.5(0.2)
Female (%)	52.4%	50.4%
Race/ethnicity (%)		
Non-Hispanic White	77.1%	73.9%
Non-Hispanic non-White	16.3%	17.8%
Hispanic	6.6%	8.3%
Income (%)		
< $20k	28.7%	29.0%
$20k–$35k	23.1%	23.6%
$35k– < $60k	23.9%	23.1%
≥$60k	24.3%	24.3%
Marital status (% married)	41.4%	41.1%
Education (%)		
Below high school diploma/GED	14.7%	15.6%
High school diploma or GED	39.1%	38.4%
Some college or associate's degree	34.1%	34.0%
Four year college degree or more	12.1%	12.0%
Smoking status (%)		
Everyday	79.8%	79.9%
Some days	20.2%	20.1%
Average cigarettes smoked per day (*M*(*SD*))	10.8(9.0)	10.7(0.1)

Note: All participants were recruited as part of the 2010–2011 Tobacco Use Supplement to the Current Population Survey.

2.2. Participants

Participants in the present study were smokers from the 2010–2011 TUS-CPS dataset who made a quit attempt in the last year lasting at least 24 h. Use of each cessation method was asked of daily and some-days smokers (the latter defined as smoking on 12 or more days out of the last 30 days) who made a > 24 h quit attempt in the last year.

Within the 2010–2011 TUS-CPS, there were 171,365 self-respondents, of whom 27,611 were current daily/some-days smokers. Of this group, 9232 (33.4%) reported a past-year quit attempt. An additional 122 were excluded from subsequent analyses due to missing data, resulting in a final sample of 9110 (see Table 1 for demographics). A non-response adjustment weight, derived and provided by CPS, was used for all analyses.

2.3. Smoker characteristics

The TUS-CPS collected demographic data on all participants, which were then utilized in the present study as individual-level moderators, reflecting established tobacco-related disparities. Demographic variables were selected that have previously been associated with smoking cessation. Specifically, we examined: race/ethnicity (coded as non-Hispanic White, non-Hispanic non-White, Hispanic), gender, and age. In order to reduce the total number of individual-level predictors, we created a composite heaviness of smoking variable from cigarettes per day and smoking status (daily, some-days) and an SES composite variable from income, education, and employment. These composite variables were created using principal components analysis in which the first principal component (PC) was retained. For heaviness of smoking, with only two input variables (cigarettes per day and smoking status), each was given equal weight. The first PC accounted for 75% of the variance. Current some-days smokers' heaviness of smoking scores were lower than those of daily smokers, and were ordered within smoking status by reported cigarettes per day (ranges: − 2.44, − 0.68 and − 0.59, 2.85, respectively). The SES composite variable was defined as the first PC from a PC analysis which included income, education, and employment. The first PC explained 51% of the variance of the SES variables, with each having approximately equal weight in the generation of the composite score. The remaining 49% of the variance for the SES indicators was spread approximately evenly across the other