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Density and Proximity of Tobacco Outlets to Homes and Schools: Relations with Youth Cigarette Smoking

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Abstract

This study investigated the associations of youth cigarette smoking with tobacco outlet densities and proximity of tobacco outlets to youth homes and schools across different buffers in 45 midsized California communities. The sample comprised 832 youth who were surveyed about their smoking behaviors. Inclusion criteria included both home and school addresses within city boundaries. Observations in the 45 cities were conducted to document addresses of tobacco outlets. City- and buffer-level demographics were obtained and negative binomial regression analyses with cluster robust standard errors were conducted. All models were adjusted for youth gender, age, and race. Greater densities of tobacco outlets within both a 0.75-mile and 1-mile buffer of youth homes were associated with higher smoking frequency. Neither tobacco outlet densities around schools nor distance to the nearest tobacco outlet from home or school were associated with youth past-30-day smoking frequency. Lower population density and percent African American in areas around homes, and lower percent unemployed in areas around schools were associated with greater smoking frequency. Results of this study suggest that restricting outlet density within at least 1-mile surrounding residential areas will help to reduce youth smoking.

Keywords

Youth cigarette smoking; Tobacco Outlets; Density; Proximity; Tobacco Control

INTRODUCTION

Controls over the number of tobacco outlets (i.e., outlet density) and its distance from residential areas or schools (i.e., proximity of outlets) represent frequently advocated approaches to reduce youth access to tobacco from commercial sources and exposure to tobacco advertising at the point of sale. Such controls typically include limiting the number

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of tobacco outlets and/or the distance of such outlets from each other, from residential areas and from schools. A small number of studies have examined the associations between tobacco outlet density and/or proximity to youth homes and schools and youth smoking behaviors (Chan & Leatherdale, 2011; Henriksen et al., 2008; Leatherdale & Strath, 2007; McCarthy et al., 2009; Novak, Reardon, Raudenbush, & Buka, 2006; West et al., 2010). More research, however, is needed to guide potential regulations.

We identified few published studies that assessed the relationships of tobacco outlet density and/or proximity to where youth live and their smoking behaviors. A study in Chicago found that youth living in neighborhoods in the top 75th percentile of tobacco outlet density were 13% more likely to have smoked in the past month than youth living in the bottom 25th percentile. No proximity measures included in this study (Novak et al., 2006). Focusing on proximity of tobacco outlets to adolescents' residences, another study found that a short distance from adolescents' homes to the nearest retailer increased use of alcohol and tobacco among Latino adolescents (West et al., 2010). A recent US national study found that, after controlling for various individual risk factors for adolescent smoking, neither outlet density nor proximity to youth residential location were associated with ever smoking or smoking intensity (i.e., a composite measure of past month smoking and "number of cigarettes smoked in your life") (Adachi-Mejia, Carlos, Berke, Tanski, & Sargent, 2012).

A few other investigations have examined these associations, focusing on schools or school neighborhoods. For example, one study found that young smokers at secondary schools in Ontario Canada with a greater number of tobacco outlets nearby were more likely to buy their own cigarettes and less likely to have someone else purchase cigarettes for them (Leatherdale & Strath, 2007). Results of another study in the same locale showed that the number of tobacco retailers within a 1-km radius of youths' schools was associated with greater likelihood of non-smokers being susceptible to future smoking (Chan & Leatherdale, 2011). Two other studies included both density and proximity measures of tobacco outlets surrounding schools. One found that the prevalence of current smoking was higher at schools in neighborhoods with the highest tobacco outlet density (>5 outlets within ½ mile of school) compared to schools in neighborhoods without any tobacco outlets. No association was found with the distance from school to the nearest tobacco outlet (Henriksen et al., 2008). McCarthy et al. found that among high school students, but not middle school students, there was a small but significant relationship between tobacco outlet density within one mile surrounding schools and students' reports of smoking initiation. No associations were found with established smoking, defined as smoking cigarettes at least 1 day in the past 30 days and having ever smoked 100 or more cigarettes (McCarthy et al., 2009).

A few limitations can be noted in this existing research. First, most studies have examined these associations focusing on schools or school neighborhoods. Although most adolescents spend a large portion of their time in or around school, youth homes and neighborhoods are also important environments for substance use (Connell, Gilreath, Aklin, & Brex, 2010; Duncan, Duncan, & Strycker, 2002). Moreover, to the best of our knowledge, none of the existing research has studied tobacco outlet measures in relation to both home and school to determine which matters most or whether they are both important. Finally, only a few studies have included both density and proximity measures to determine whether density or

proximity is more important to regulate, and none has compared measures of outlet density across different geographic units, such as density of tobacco outlets within 0.5-mile, 0.75-mile and 1-mile buffers from youth homes or schools. Such information can help to determine what distance should be considered for an effective regulation.

Regulating tobacco outlet density and proximity from residential areas or schools is still a challenge for tobacco control (Cohen & Anglin, 2009). Previous studies evaluating the associations between changes in alcohol outlet densities or policies that had an impact on alcohol outlet densities (i.e., privatizing alcohol sales, bans on alcohol sales and alcohol licensing policy) and alcohol consumption and related harm suggest the importance of regulating alcohol outlet density to reduce alcohol consumption and related problems (Campbell et al., 2009). This scientific evidence has been made available to guide and support community efforts to regulate alcohol outlet densities. Similar research in the tobacco area is needed to guide potential regulations.

The present study investigates the associations of tobacco outlet density and proximity of tobacco outlets to both youth homes and schools with youth cigarette smoking across different geographic units in 45 midsized California communities. Although the existing research suggests that control over tobacco outlets through policies such as licensing, land use or zoning restrictions may reduce youth smoking, studying the associations of tobacco outlet density and proximity of tobacco outlets to both youth homes and schools with youth cigarette smoking across these different geographic units will help to deepen our understanding of these relationships in order to inform policymakers regarding how best to craft these policies.

METHODS

Study sample and survey methods

This study is based on data from youth who participated in Wave 2 of a longitudinal study in 50 mid-sized California cities. This longitudinal study investigated the effects of existing local tobacco policies and enforcement in 50 California communities on youth cigarette smoking over time (Lipperman-Kreda, Grube, & Friend, 2012b). Wave 2 data concurred with observations conducted in these cities to document addresses of active tobacco outlets. A geographic sampling method was used to select 50 non-contiguous California cities out of an initial sample frame of all 138 California cities with populations between 50,000 and 500,000 (Lipperman-Kreda et al., 2012b). These cities represent 26 counties (out of 58 counties) in the state. For this study we used data from all but the five largest cities (i.e., cities with population more than 200,000) (N=45), as comprehensive lists of all tobacco outlets in the largest cities were not available.

Households for the study were sampled from a purchased list that consisted of households identified as likely to contain respondents in the target age range (i.e., 13-16 years old in Wave 1). Youth were surveyed through a computer-assisted telephone interview (CATI). The interviews were given in either English or Spanish at the respondent's request and lasted approximately 40 minutes. Where more than one eligible adolescent respondent resided in a household, a random selection procedure was used to choose one to be invited to

participate in the survey. Once an adolescent respondent was selected, parental permission was obtained to interview that individual. Interviewers stressed to parents that the interview was confidential and was to be conducted in private. Respondents were informed that the study concerned smoking and drinking behaviors, that it was voluntary, and that they could refuse to participate, refuse to answer specific questions, or decide at any time to end their participation in the study. To reduce opportunities to identify respondents based on census block group location and responses, a spatially masked address for each youth's home was created (Armstrong, Rushton, & Zimmerman, 1999). After spatial masking 89.4% of all respondents were located within their original census block groups and the average distance between the original and masked locations of respondents was 153 meters. This distance is small and unlikely to affect study results. Youth also provided the name of their school and school location was geocoded to the street address, which is usually the street in front of the school office. Institutional review board approval was obtained prior to implementation of the study.

Response rates for list-assisted samples are difficult to calculate because it is impossible to know the number of non-households that were actually eligible (e.g., had youth in the appropriate age group). In this study, of 3,062 sampled households with potential eligible respondents, 1,543 participated in the first telephone interview in 2009 (Wave 1) (estimated response rate 50.4%). Of these participants, 1,312 also completed the second telephone interview (Wave 2) one year later (85% follow-up).

Tobacco outlet data

Since comprehensive address lists of tobacco outlets in California are not readily available, a physical count of all tobacco outlets in the 45 cities was undertaken. Shape files of parcel or zoning areas with recent zoning attributes were obtained from each of the cities. Zoning code definitions were reviewed to indicate which areas could include tobacco retailers. Map books of all retail/commercial areas within the city were made for field study coordinators. Field observations in the 45 cities were then conducted to document the addresses of tobacco outlets.

Measures

Individual-level measures

Smoking behaviors: The dependent measure in all analyses was past-30-day cigarette smoking frequency. Participants were first asked if they ever smoked a whole cigarette in their life. Respondents who had smoked a whole cigarette were then asked about their frequency of cigarette smoking in the past 12 months on a seven-point scale, and those who smoked cigarettes in the past 12 months were asked about their frequency of cigarette smoking in the past 30 days on a seven-point scale ("None" to "All 30 days"). The midpoint of each response category was assigned to represent the number of smoking days: Never (0); 1 or 2 days (1); 3 to 5 days (4); 6 to 9 days (7); 10 to 19 days (14); 20 to 29 days (24); and All 30 days (30). This count variable was used as the outcome measure in all analyses.

Tobacco outlet density and proximity: Tobacco outlet density was captured using measures of the density of tobacco outlets within a 0.75 and 1.00 mile radius of each

participant's home and school. Buffer sizes were created to be large enough to include on average at least one outlet per buffer but small enough to fall mainly within city boundaries. Additional analyses (not shown) using 0.50 mile and 1.50 mile buffers found the buffers to be too small and too large, respectively. As we only had access to tobacco outlet data within city limits, when part of a buffer fell outside city lines (which was the case for over 80% of all buffers), the square mileage of the buffer was adjusted to include only the area within city boundaries. The mean area was 2.58 square miles for home and 2.74 square miles for school 1.00-mile buffers (a buffer contained completely within city boundaries would have an area of 3.14 square miles). The mean area was 1.54 square miles for home and 1.61 square miles for school 0.75-mile buffers (maximum 1.77 square miles).

Tobacco outlet proximity was measured using distance to the closest tobacco outlet from each participant's home and school. These distances were calculated using crow fly distance in miles and, as before, included only tobacco outlets within city boundaries.

Demographics: Students reported their gender, race/ethnicity, and age. Race/ethnicity was treated as a dichotomy (Hispanic or non-Hispanic, white vs. non-white), as the majority of respondents (69.7%) were white. Age was a continuous variable, ranging from 13 to 18 years old in the sample.

Community-level measures

City demographics: Measures of city demographics were obtained from 2010 GeoLytics data (GeoLytics Inc, 2010). City characteristics included population density (1,000 population per square mile), percentage of minors under 18 years old, median family income (per $10,000), percentage African-American, percentage Hispanic, percentage with a college education, and percentage unemployed residents.

1.00- and 0.75-mile buffer demographics: Demographic variables were also created for the 1.00- and 0.75-mile buffer around the participant's homes and schools to more accurately represent the characteristics of those buffer area. These demographic characteristics were the same as those included at the city level. Specifically, using 2010 GeoLytics data at the Census block group level, we determined the proportion of each buffer within specific block groups, and created weighted averages of each characteristic based on the square mileage within the buffer. Only the proportion of each buffer within city limits was included in these calculations.

Data analysis

Inclusion criteria included both home and school addresses within the city boundaries of the 45 California cities. All youth home addresses were geocoded. Of the 1,182 participants who lived in the 45 cities, we were not able to geocode schools of 21 (1.8%). An additional 283 youth attended schools that were located outside of the borders of the 45 cities. Since we had addresses of tobacco outlets only in the 45 cities we also excluded these 283 participants. An additional 7 participants were missing one or more variables, leaving a final sample size of 832. Included and excluded participants were similar in terms of age, percent white and percent male ($p > 0.05$).

To account for the overdispersion of the past-30 day smoking measure, we used negative binomial models for analyses. The Vuong closeness test indicated a standard negative binomial model was a better fit than a zero-inflated negative binomial model. To account for clustering of responses within cities we used cluster robust standard errors within Stata v.11. (StataCorp., 2009). Five primary models were run: Model 1 included 0.75-mile buffers around participants' homes for tobacco outlet density and other neighborhood demographic characteristics (population density, percentage of minors, median family income, percentage African-American, percentage Hispanic, percent college educated, and percentage unemployed). Model 2 included 1.00-mile buffers around participants' homes, Model 3 used 0.75-mile buffers around schools for tobacco outlets and neighborhood demographics, and Model 4 used 1.00-mile buffers around schools. Model 5 included the distance to the nearest tobacco outlet from participants' homes and schools, as well as city-level demographic characteristics. All models were adjusted for individual-level gender, age, and race.

RESULTS

Demographic, cigarette smoking, and tobacco outlet density characteristics of the study sample are presented in Table 1. The majority of study participants were white (69.7%), and 52% were male. Mean age of study participants was 15.69, with a range of 13 to 18 years. The frequency of past-30 day smoking was low (mean, past-30 day smoking=0.67 days (SD 3.86)). The mean density of tobacco outlets within a .75-mile and 1-mile radius of participants' homes were very similar (3.88 per square mile and 4.00 per square mile, respectively). The mean density of tobacco outlets within participants' schools was slightly higher than the rate around homes. The rate was 4.97 per square mile within a .75-mile radius and 4.87 within a 1-mile radius. Distances to the nearest tobacco outlet within city limits from individuals' homes and schools were 0.51 and 0.41 miles, respectively. Table 1 also presents the neighborhood Census-based characteristics for each of the four buffers and at the city level. Results showed that neighborhood characteristics were similar and consistent across the five types of geographic units.

Results of the five negative binomial regression models are presented in Table 2. Being older was consistently associated with greater frequency of past-30 day smoking in all models. Greater density of tobacco outlets within a 1-mile buffer of subjects' homes was significantly associated with greater frequency of smoking, $\beta = .340$, robust $se_b = .082$, $z = 4.13$ in Model 2, as was tobacco outlet density within a 0.75-mile home buffer, $\beta = .293$, robust $se_b = .069$, $z = 4.23$. Neither tobacco outlet densities around individuals' schools nor distance to the nearest tobacco outlet were significantly associated with smoking frequency. Lower population density and percent African American around participants' homes and lower percent unemployed around participants' schools were associated with greater smoking frequency.

DISCUSSION

The present study investigated the associations of youth cigarette smoking with tobacco outlet densities and proximity of tobacco outlets to youth homes and schools in 45 midsized California communities. We also investigated the relations of density of tobacco outlets

within 0.75-mile and 1-mile buffers from youth homes and schools. Results of our study show that greater tobacco outlet density within 0.75-mile and 1-mile buffers from youth homes was associated with greater smoking frequency.

Greater outlet density may be related to youths' smoking through increased access to cigarettes from commercial sources. In particular, the likelihood that young people will be able to locate an outlet that will sell tobacco to them increases as the number outlets in their environment increases. Alternatively, it is possible that competition for tobacco sales is greater when density is higher. Retailers may be less likely to request ID or implement effective policies to curb sales to minors when there are more outlets competing for a market share. Increased competition may also lead to lower prices and thus to increased smoking. In California, price is not regulated nor does the state set minimum prices that can be charged for tobacco products (ChangeLab Solutions, 2012). Although support for an inverse relationship between density and price has been found for alcohol (Treno, et al., 2013), a recent study failed to find such a relationship for tobacco (Lipperman-Kreda, Grube, & Friend, 2012a). Finally, the relationship between outlet density and smoking frequency may simply be due to stores responding to greater demand in certain areas. The cross-sectional design of the current study limits our understanding of these relationships. Future studies should examine the effect of changes in outlet density over time to better understand these relationships.

Tobacco outlet density may also affect youth smoking indirectly because it reflects broader community norms that are supportive of smoking. Using structural equations modeling, our previous studies indicated that youth personal beliefs mediated the relationships between community norms and youth tobacco and alcohol use (Lipperman-Kreda & Grube, 2009; Lipperman-Kreda, Grube, & Paschall, 2010). Additionally, higher density may increase exposure to tobacco advertising or other people who smoke (i.e., role models) at the point of sale. Our results suggest that restricting outlet density within at least 1 mile surrounding residential areas may help reduce youth smoking. Our data limited our ability to examine these associations within a larger area (e.g., a 1.5-mile buffer).

Using a similar approach to study the effects of outlet density and proximity on smoking cessation among adults, a study in the Houston, Texas, metropolitan area found that the density of tobacco outlets around respondents' residences did not predict adult smoking abstinence in any analysis (i.e. 500 meters buffer, 1 kilometer buffer, and 3 kilometer buffer). Residential proximity to tobacco outlets, however, decreased smoking abstinence (Reitzel et al., 2011). In our study, the distance to the nearest tobacco outlet from youth homes or schools was not associated with past month cigarette smoking. These results are different from those reported in a study of Latino adolescents (West et al., 2010). Using a single outcome measure of lifetime use of alcohol and tobacco, a short distance between adolescents' home to the nearest retailer increased use of alcohol and tobacco. Similar to findings of another study (Henriksen et al., 2008), we did not find association with the distance from school to the nearest tobacco outlets.

We found no associations between outlet densities around youth schools and youth smoking. These results are similar to those reported by McCarthy et al (McCarthy et al., 2009) who

found no relation between tobacco outlet density within 1-mile buffers surrounding schools and established smoking among students. By comparison, another study conducted in California found that the prevalence of current smoking was higher at schools in neighborhoods with the highest tobacco outlet density (>5 outlets within ½ mile of school) compared to schools in neighborhoods without any tobacco outlets (Henriksen et al., 2008). Because our sample is not a school-based and we had only very few students per school, we were not able to measure school-level smoking prevalence and its association with outlet density around schools.

Limitations

Results of this study should be considered in light of several limitations. First, we only had access to tobacco outlet data within city boundaries. Although we adjusted our measures of tobacco outlet density when part of a buffer fell outside city lines, it is possible, although unlikely, that tobacco outlet density in areas outside city boundaries were significantly different from those within city boundaries, biasing our density measures. Also, buffer sizes were created to be large enough to include at least one outlet per buffer, on average, but small enough to fall mainly within city boundaries. Given that, we were not able to examine the associations between tobacco outlet density and youth smoking within 0.5-mile and 1.5-mile buffer areas. A larger sample size, for example, would increase the number of youth who live near tobacco outlets within 0.5-mile buffer. Third, the cross-sectional design of the study limited our ability to make directional inferences about relationships between outlet density and youth smoking. For example, the relationship between density and smoking frequency may be due to more stores responding to greater demand rather than causing more smoking. Also, the cross-sectional design did not allow us to explore how changes in outlet density or proximity may affect youth smoking behaviors over time. Fourth, the estimated response rate for this survey was modest (50.4%). However, this response rate is similar to other studies using household telephone surveys (Centers for Disease Control and Prevention, 2008; Frank, Saelense, Powell, & Chapman, 2007). Fifth, we did not measure the mode of transportation youth used to get to and from school. Youth who walk or bike to school may encounter tobacco outlets more than youth who drive or take school bus. Finally, we relied on a simple straight-line method to measure proximity of tobacco outlets to homes and schools. Network distance may provide a better measure of proximity. Yet, a recent study, which compared results of different methods of measuring proximity of tobacco outlets including crow flies, network and driving time demonstrated no differences between methods (Adachi-Mejia et al., 2012). Similarly, we relied on a simple straight-line method to estimate distance from schools and homes to retailers to create buffer areas. These static geographic units may not fully capture youth exposure to tobacco outlets in their daily travel path. Studying youth daily travel path and exposure to tobacco outlets in these spaces may provide more relevant measures of density and proximity.

Conclusions

Results of the current study indicated that greater tobacco outlet density within 0.75-mile and 1-mile buffers from youth homes was related to increased smoking frequency, even after controlling for both youth and neighborhood demographics. These results suggest that restricting outlet density within at least 1-mile buffer surrounding residential areas may help

to reduce youth smoking. Tobacco policymakers may regulate tobacco outlet density through licensing policies and zoning regulations. In general, licensing laws require that businesses obtain a license to operate a certain type of business, whereas zoning regulates how land can be used. Since state pre-emption laws may prevent local governments from regulating tobacco outlet density, elimination of such pre-emption laws in some places may also be necessary. Additionally, more research and technical assistance are needed to inform policy and to guide and support community efforts to regulate tobacco outlet density.

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Table 1

Sample characteristics, Percent or Mean (Standard Deviation) and Range

Variable	% or Mean (SD)	Minimum-Maximum
Individual-level (*N*=832)		
White	69.71%	
Male	52.16%	
Age	15.69 (1.05)	13-18
Number of days smoking, past 30 days	0.65 (3.86)	0-30
Tobacco outlet density near home, 1-mile buffer[a]	4.00 (3.73)	0-29.12
Tobacco outlet density near school, 1-mile buffer[a]	4.87 (3.96)	0-32.54
Tobacco outlet density near home, 0.75-mile buffer[a]	3.88 (5.24)	0-37.20
Tobacco outlet density near school, 0.75-mile buffer[a]	4.97 (5.45)	0-44.62
Distance to nearest tobacco outlet, home	0.51 (0.38)	0.01-2.16
Distance to nearest tobacco outlet, school	0.41 (0.33)	0.03-1.83
0.75-mile buffer, home:		
Population density (1,000 people/square mile)	5.45 (3.55)	0.19-26.66
Percent Hispanic	27.18 (21.14)	4.19-98.17
Percent African American	3.57 (5.08)	0.00-68.98
Percent Unemployed	8.08 (6.81)	0.14-44.64
Percent <18 years	22.66 (3.82)	14.49-33.97
Median HH income (per $10,000)	6.12 (2.09)	2.07-15.52
Percent college graduates	31.89 (16.09)	3.43-74.98
1-mile buffer, home:		
Population density (1,000 people/square mile)	5.33 (3.33)	0.21-25.10
Percent Hispanic	27.95 (20.82)	4.36-97.96
Percent African American	3.67 (5.03)	0.05-61.21
Percent Unemployed	8.37 (6.55)	0.19-45.40
Percent <18 years	22.76 (3.69)	15.21-33.72
Median HH income (per $10,000)	5.98 (1.96)	2.10-13.37
Percent college graduates	31.22 (15.64)	3.33-73.05
0.75-mile buffer, school:		
Population density (1,000 people/square mile)	5.73 (3.48)	0.28-24.45
Percent Hispanic	29.50 (21.03)	5.43-97.84
Percent African American	3.27 (4.16)	0.04-43.94
Percent Unemployed	9.27 (6.76)	0.20-46.40
Percent <18 years	22.95 (3.82)	16.15-33.73
Median HH income (per $10,000)	5.64 (2.12)	2.10-12.27
Percent college graduates	30.36 (15.98)	3.63-68.57
1-mile buffer, school:		
Population density (1,000 people/square mile)	5.64 (3.38)	0.06-25.00
Percent Hispanic	29.51 (20.72)	5.24-97.57

Variable	% or Mean (SD)	Minimum-Maximum
Percent African American	3.30 (4.05)	0.04-40.50
Percent Unemployed	9.29 (6.55)	0.22-48.74
Percent <18 years	22.91 (3.72)	16.11-33.58
Median HH income (per $10,000)	5.62 (2.05)	2.23-12.24
Percent college graduates	30.30 (15.73)	4.23-68.46
City level (*N*=45):		
Population density (1,000 people/square mile)	4.89 (3.51)	1.34-22.33
Percent Hispanic	33.70 (21.16)	8.20-97.43
Percent African American	4.80 (6.29)	0.55-33.52
Percent Unemployed	10.10 (5.09)	2.91-23.46
Percent <18 years	23.39 (3.14)	17.04-30.03
Median HH income (per $10,000)	5.26 (1.50)	2.86-8.36
Percent college graduates	13.25 (6.83)	2.74-35.15

[a] Number of tobacco outlets per square mile

Table 2

Associations (Beta (SE) between past 30-day youth cigarette smoking and density and proximity of tobacco outlets, negative binomial regression with cluster robust standard errors (n=832)

	Model 1	Model 2	Model 3	Model 4	Model 5
Individual-level (*N*=832):					
Tobacco outlet density near home, 0.75-mile buffer	0.293 (0.069)*				
Tobacco outlet density near home, 1-mile buffer		0.340 (0.082)*			
Tobacco outlet density near school, 0.75-mile buffer			0.064 (0.058)		
Tobacco outlet density near school, 1-mile buffer				0.124 (0.073)	
Distance to nearest tobacco outlet, home					−1.025 (0.729)
Distance to nearest tobacco outlet, school					1.281 (1.078)
Male	0.553 (0.378)	0.285 (0.361)	0.123 (0.326)	0.136 (0.342)	0.316 (0.422)
White	−0.723 (0.667)	−1.054 (0.757)	−0.258 (0.525)	−0.510 (0.558)	−0.576 (0.697)
Age	0.630 (0.237)*	0.543 (0.236)*	0.688 (0.181)*	0.665 (0.186)*	0.630 (0.238)*
Area Buffer Characteristics	**0.75-mile buffer, home:**	**1.00-mile buffer, home:**	**0.75-mile buffer, school:**	**1.00-mile buffer, school:**	**City Level**
Population density (1,000 people/square mile)	−0.333 (0.146)*	−0.351 (0.156)*	−0.039 (0.112)	−0.004 (0.006)	−0.000 (0.000)
Percent Hispanic	−0.020 (0.021)	−0.011 (0.022)	0.004 (0.018)	0.018 (0.019)	−0.027 (0.042)
Percent African American	−0.097 (0.040)*	−0.101 (0.043)*	0.007 (0.054)	0.030 (0.060)	−0.151 (0.072)*
Percent Unemployed	−0.062 (0.055)	0.003 (0.067)	−0.135 (0.042)*	−0.126 (0.048)*	−0.056 (0.073)
Percent <18 years	0.051 (0.115)	0.032 (0.113)	−0.147 (0.103)	−0.209 (0.105)	−0.049 (0.153)
Median HH income (per $10,000)	0.114 (0.155)	0.267 (0.176)	−0.041 (0.104)	−0.138 (0.121)	−0.053 (0.031)
Percent college graduates	−0.040 (0.021)	−0.025 (0.020)	−0.024 (0.021)	−0.016 (0.021)	−0.075 (0.078)

*$p \leq 0.05$