



Contents lists available at ScienceDirect

Preventive Medicine

journal homepage: www.elsevier.com/locate/ypmed

Brief Original Report

Q3 Point-of-sale tobacco marketing in rural and urban Ohio: Could the new
3 landscape of Tobacco products widen inequalities?

Q4 Megan E. Roberts^{a,*}, Micah L. Berman^{a,b}, Michael D. Slater^c, Alice Hinton^a, Amy K. Ferketich^a

^a College of Public Health, The Ohio State University, 1841 Neil Avenue, Columbus, OH 43210, United States

^b Moritz College of Law, Ohio State University, 55 W 12th Ave, Columbus, OH 43210, United States

^c School of Communication, The Ohio State University, 154 North Oval Mall, Columbus, OH 43210, United States

ARTICLE INFO

Available online xxxx

Keywords:

Tobacco
Advertising
Disparities
Policy
Menthol
E-cigarettes
Cigarillos
Smokeless tobacco
Cigars

ABSTRACT

Considerable research has examined how cigarette point-of-sale advertising is closely related to smoking-related disparities across communities. Yet few studies have examined marketing of alternative tobacco products (e.g., e-cigarettes). The goal of the present study was to examine external point-of-sale marketing of various tobacco products and determine its association with community-level demographics (population density, economic-disadvantage, race/ethnicity) in urban and rural regions of Ohio. During the summer of 2014, fieldworkers collected comprehensive tobacco marketing data from 199 stores in Ohio (99 in Appalachia, 100 in Columbus), including information on external features. The address of each store was geocoded to its census tract, providing information about the community in which the store was located. Results indicated that promotions for e-cigarettes and advertising for menthol cigarettes, cigarillos, and cigars were more prevalent in communities with a higher percentage of African Americans. Cigarillos advertising was more likely in high-disadvantage and urban communities. A greater variety of products were also advertised outside retailers in urban, high-disadvantage, African American communities. Findings provide evidence of differential tobacco marketing at the external point-of-sale, which disproportionately targets urban, economically-disadvantaged, and African American communities. There is a need for tobacco control policies that will help improve equity and reduce health disparities.

© 2015 Published by Elsevier Inc.

Introduction

The burden of tobacco unduly affects certain populations, including people living in rural areas, people of low socioeconomic status (SES), and racial/ethnic minorities (Garrett et al., 2013; Wewers et al., 2006). Contributing to these differences, the tobacco industry has for many decades targeted its advertising at vulnerable populations (Yerger et al., 2007). For example, research has found more storefront advertising in low-income communities (Seidenberg et al., 2010), greater point-of-sale marketing for stores closer to, compared to farther from, schools (Pucci et al., 1998) and targeted advertising of menthol cigarettes to African American communities (Moreland-Russell et al., 2013).

With increased restrictions on the channels for advertising cigarettes, the tobacco industry has made advertising at the retail point-of-sale a primary focus (Pollay, 2007). Accordingly, the tobacco industry is directly involved in how its products are marketed at the point-of-sale, incentivizing retailers to post advertising and signage, provide product displays, and give price-related promotions (Lavack and Toth, 2006). Social ecological theory (McLeroy et al., 1988) suggests

these point-of-sale advertisements can have powerful effects on intra-personal and individual behavior. Research on cigarette smoking shows that exposure to point-of-sale tobacco marketing distorts adolescents' perceptions about the availability and popularity of tobacco (Henriksen et al., 2002) and increases their curiosity about its use (Portnoy et al., 2014). Moreover, exposure to point-of-sale tobacco marketing is associated with increasing the likelihood of smoking initiation (Henriksen et al., 2010) and impeding smoking cessation (Cantrell et al., 2015). When retailers use externally-visible advertising, individuals need not even enter the establishment to experience these exposures. Yet external advertising may also be more open to policy-based restrictions. In particular, local laws are typically upheld when they are "content-neutral" (restricting all outside advertising, rather than tobacco advertising alone). Such regulations can restrict the time, place, or manner of advertising—such as by prohibiting advertisements in residential areas, restricting their size, or delineating how far they must be from pedestrian areas.

Now, with the changing landscape of tobacco products, surveillance of the new point-of-sale environment is critical. Although research on point-of-sale marketing for cigarettes has increased, little research has examined alternative products like smokeless tobacco, cigars, cigarillos, or e-cigarettes (Lee et al., 2015). Understanding the current marketing strategies of the tobacco industry will help inform local, state, and FDA

* Corresponding author at: The College of Public Health, The Ohio State University, Columbus, OH 43210, United States. Fax: 614 292 3572.
E-mail address: Roberts.1558@osu.edu (M.E. Roberts).

policy. Given the history of differential marketing of tobacco products to vulnerable populations, it is particularly important for public health research to monitor how advertising varies based on community demographics. Therefore, the purpose of the present study was to examine external point-of-sale marketing of various tobacco products and determine whether this marketing was associated with community-level demographic characteristics (population density, economic disadvantage, race/ethnicity) in urban and rural regions of Ohio.

Methods

Study setting and population

We obtained a list of all tobacco licenses issued within our seven Ohio counties of interest: Franklin County, which comprises the city of Columbus; and Brown, Guernsey, Lawrence, Muskingum, Scioto, and Washington Counties, which comprise areas of rural Appalachian Ohio. Columbus is a diverse city, with a population of approximately 822,000, of whom 59% are non-Hispanic White (U.S. Census Bureau, 2015). In contrast, the Appalachian region of Ohio is primarily rural, non-Hispanic White, and disadvantaged, with lower income, education, and health statuses than the rest of Ohio and the majority of the U.S. (Pollard and Jacobsen, 2014; Wewers et al., 2006)

Proportional sampling was used to select 230 retailers from Columbus and Appalachia. For Columbus, retailers were stratified by location within the city and median income level. For Appalachia, retailers were stratified by county and location within vs. outside a major town. This sampling approach resulted in the number of retailers sampled within each strata being proportional to the total number of retailers.

Of the 230 establishments selected for the point-of-sale audit, 14 could not be observed because they were out of business or not open to the public, 9 could not be located, and 2 did not sell tobacco despite having a license. Data were also not collected at 5 stores that were atypical for tobacco establishments (e.g., a used furniture store), and at one location where the audit was stopped by store staff. After these exclusions, a final sample of 199 retailers (100 in Columbus, 99 in Appalachia) remained for the present analyses.

Fieldworker assessments

During the summer of 2014, fieldworkers collected comprehensive tobacco marketing data from the 199 stores. These point-of-sale audits were conducted by undergraduate fieldworkers during daylight and regular store hours. Fieldworkers were trained extensively to visually inspect each retailer and record their observations on a standard data collection form (see Measures section for more details). The paper-and-pencil data collection form was developed based on work by others (Rose et al., 2013). Information on the store's external features (the focus of the present paper) was collected first; permission from store clerks was then obtained for the audit of the store's internal features (the results of which will be reported in a forthcoming network-analysis paper).

Geocoding

The address of each store was geocoded using ArcGIS software. With the statistical software R, we then used shapefiles provided by TIGER/Line (<https://www.census.gov/geo/maps-data/data/tiger-line.html>) to find the census tracts for each geocoded address. Finally, data from the 2010 U.S. Census were then used to determine tract-level sociodemographic characteristics of the communities in which each retailer was located.

Measures

Audit data

Fieldworkers first recorded the type of store being audited (checklist items included gas stations and convenience stores). In terms of information on the exterior (on windows/doors, building, sidewalk, parking lot, fuel pumps, or elsewhere), they recorded what type of products were advertised outside the store (checklist options included menthol cigarettes and e-cigarettes). These measures were also used to create a continuous scale for the number of different product types sold (possible scale range: 0–6). Fieldworkers also recorded the products that received promotional advertisements (e.g., special prices or coupon rates). We tested interrater reliability for external audits using kappa coefficients several times at the study onset and found moderate to good agreement ($\kappa = .50-.76$).

2010 U.S. Census data

For the census tracts in which audited retailers were located, we obtained information about: the percentage of the population that was African American, the percentage that was aged 21 or older, and various indicators of poverty. We took the average of four primary economic-disadvantage indicators (% population unemployed, % population making < \$10 K, % families below the poverty level, and % all people below the poverty level) to be our aggregate measure of community disadvantage (Cronbach's $\alpha = .92$).

Investigating interactions across multiple community demographics presented difficulties due to multicollinearity and empty cells (e.g., over 90% of all census tracts of interest in Appalachia had populations that were less than 6% African American). Therefore, we created a categorical variable, *Community Type*, and coded all census tracts of interest based on three criteria: (1) a low vs. high percentage of African Americans (<25% or $\geq 25\%$, respectively); (2) low vs. high levels of disadvantage (based on a mean split of the disadvantage variable); and (3) area in Ohio (Columbus vs. Appalachia). There were only 7 retailers located in regions categorized as Low-Disadvantage African American communities; due to the small cell size, these retailers were excluded from analyses looking at differences across Community Type. After these exclusions, our categorization yielded five community types:

Low-Disadvantage/Low-African-American/Columbus communities	165
Low-Disadvantage/Low-African-American/Appalachian communities	166
High-Disadvantage/Low-African-American/Columbus communities	167
High-Disadvantage/Low-African-American/Appalachian communities	168
High-Disadvantage/High-African-American/Columbus communities	169

Analyses

Analyses began with descriptive statistics of the retailers sampled and the products being advertised and promoted outside. We next used chi-square tests to examine how external advertising and promotions varied across community characteristics. Finally, we conducted a one-way analysis of variance (ANOVA) with planned contrasts to determine whether the variety of product types advertised outside was greater in high-disadvantage, African American communities. Due to the large undergraduate population within areas of Columbus, this analysis covaried for age (operationalized as the census' measure of residents over the age of 21).

Results

Of the retailers sampled, 37% were gas station convenience stores and 23% were stand-alone convenience stores; other retailers included mass merchandisers, grocery stores, drug stores, alcohol stores, tobacco shops, and bars/restaurants. The most prevalent external ads were for non-menthol cigarettes (60%), followed by menthol cigarettes (38%), e-cigarettes (35%), cigarillos/little cigars (28%), smokeless tobacco (30%), and cigars (4%). For external promotions (e.g., price reductions), 57% of the retailers had promotions for cigarettes, 15% had promotions for e-cigarettes, and 40% had promotions for other types of tobacco products.

Table 1 shows that tobacco advertisements were generally more prevalent among retailers in Columbus, compared to Appalachia. Consistent with previous point-of-sale research (Cantrell et al., 2013; Henriksen et al., 2012; Yerger et al., 2007). Advertising for menthol cigarettes, cigars, and cigarillos was more likely in communities with a higher percentage of African Americans ($ps < .04$). Higher percentage African American communities were also significantly related to promotions for e-cigarettes ($p = .04$). Advertising for cigarillos was also more likely in high-disadvantage communities ($p = .02$).

When examining the number of different types of products sold, a greater number was advertised by retailers in Columbus' high-disadvantage, African American communities ($M = 2.6$, $SD = 1.5$) and, unexpectedly, in Columbus's low-disadvantage, White communities ($M = 2.3$, $SD = 1.8$). For the ANOVA predicting the number of products advertised, there was a significant main effect for Community Type, $F(4, 181) = 2.67$, $p = .034$ (see Fig. 1). Planned contrasts showed a greater number of products were advertised in Columbus' high-disadvantage, African American communities than in Appalachia's 208

Table 1

Percentage of retailers with outside ads and promotions for various products, across community characteristics (Ohio, 2014). Percentages in bold indicate statistically significant differences between communities.

Type of ad or promotion	Prevalence of African Americans		Community economic disadvantage		Area in Ohio	
	Low (n = 161)	High (n = 38)	High (n = 111)	Low (n = 88)	Columbus (n = 100)	Appalachia (n = 99)
Outside advertisements						
Cigarettes (non-menthol)	57.8	71.1	62.5	58.6	62.0	58.6
Menthol cigarettes	34.2	52.6	40.9	35.1	47.0	28.3
E-cigarettes	33.5	45.9	32.9	38.2	43.3	28.6
Cigarillos	23.9	47.4	36.8	21.8	35.4	21.4
Smokeless tobacco	32.7	18.9	25.6	33.6	29.9	30.3
Cigars	1.9	10.8	4.7	2.7	6.2	1.0
Outside promotions						
Cigarettes	54.7	65.8	59.1	55.0	55.0	58.6
E-cigarettes	12.9	26.3	15.1	15.9	19.6	11.5
Other products	38.5	50.0	42.5	39.2	43.3	38.1

Notes: African American = Non-Hispanic African American. Low vs. high prevalence of African Americans corresponds to census tracts with populations that are <25% or ≥25% African American, respectively. High vs. low levels of community economic disadvantage are based on a mean split of the disadvantage variable.

low- and high-disadvantage White communities and Columbus' high-disadvantage White communities ($ps \leq .023$).

Discussion

This study is among the first to look at point-of-sale marketing of new products such as e-cigarettes. The present results provide evidence of differential tobacco marketing at the external point-of-sale, which disproportionately targets economically disadvantaged, African American communities in Columbus. Results also suggest that compared to rural Appalachia, urban Columbus is experiencing greater point-of-sale marketing for alternative tobacco products—particularly, e-cigarettes and cigarillos. Overall, these findings suggest that the tobacco industry's history of marketing cigarettes to vulnerable populations is repeating with contemporary tobacco point-of-sale advertising. Such results have implications for a new means of perpetuating tobacco-related health disparities.

One unexpected finding was the essentially equal percentages of retailers with external advertisements for smokeless tobacco in Appalachia (29.9%) and Columbus (30.3%)—despite the higher rates of smokeless tobacco use in Appalachia (Wewers et al., 2006). Likewise, although the greater advertising of cigarillos in African American communities corresponds with higher use among African American smokers (CDC, 2012–2013), the greater advertising of e-cigarettes in African

American communities does not (reports indicate lower e-cigarette use among African Americans (Pearson et al., 2012)). This latter finding suggests external point-of-sale advertising is not merely reflecting the use of its clientele, but is part of an effort to increase use among certain populations.

The present study concerns only the external point-of-sale, and thereby underestimates products and marketing inside the stores. Results should also be replicated using smaller geographic units (e.g., census block groups). Although African American communities and urban communities are highly associated in Ohio, research in other areas of the country will better determine the separate and combined effects of these variables on point-of-sale marketing.

At present, many of the products examined are not subject to any regulation by the FDA. However, the Family Smoking Prevention and Tobacco Control Act (FSPTCA) provides potential to change this situation. For example, under the FSPTCA, the FDA may soon issue a deeming rule, which would extend its regulatory authority to all products that meet the statutory definition of a "tobacco product." The FSPTCA also authorizes state and local government to regulate the time, place, and manner (though not the content) of cigarette advertising. Furthermore, state and local governments retain their broader authority to regulate the advertising and promotion of other tobacco products, subject to First Amendment limitations. Although Massachusetts' prohibition on all outdoor point-of-sale advertisements near schools and playgrounds

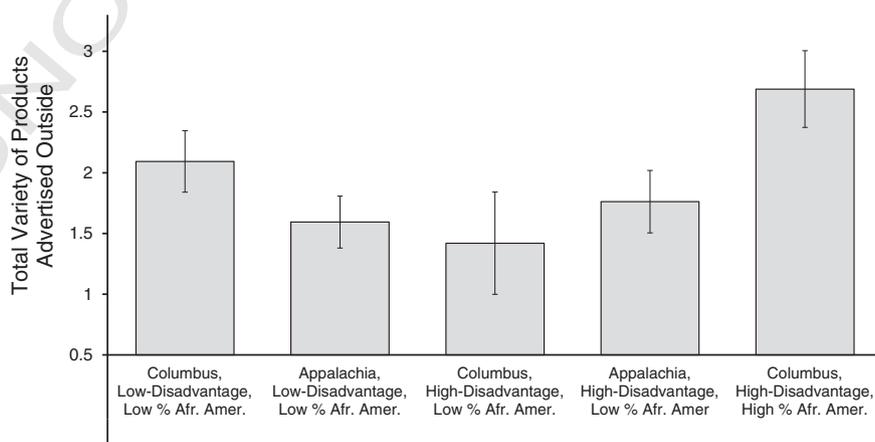


Fig. 1. Estimated marginal means (± 1 S.E.) for the total variety of products advertised outside tobacco retail outlets, across community types (Ohio, 2014). Planned contrasts showed that a greater number of products were advertised in Columbus' high-disadvantage, African American communities than in Appalachia's low- and high-disadvantage White communities and Columbus' high-disadvantage White communities.

was struck down on First Amendment grounds in *Lorillard v. Reilly* (2001), a narrower version of such restrictions might survive First Amendment review (e.g., “content-neutral” regulations of external advertising are more likely to withstand free-speech challenges, particularly if they are enacted for esthetic or public safety reasons). Advances in tobacco-related point-of-sale research since the *Lorillard* decision will also provide state/local governments and the FDA with a stronger empirical basis for restricting certain types of point-of-sale advertising.

264 Conclusions

The present findings suggest the tobacco industry is engaging in differential marketing at the external point-of-sale, which disproportionately targets urban, high-disadvantage, and African American communities. Beyond mentholated cigarettes, this pattern extends to cigarillos, cigars, and e-cigarettes. Ultimately, there is a need for tobacco control policies that will help improve equity and reduce health disparities.

272 Conflict of interest statement

273 The authors declare that there are no conflicts of interest.

274 Funding

275 This work was supported by the National Cancer Institute under
276 grant P50CA180908.

277 References

- 278 Cantrell, J., Kreslake, J.M., Ganz, O., Pearson, J.L., Vallone, D., Anesetti-Rothermel, A., ...
279 Kirchner, T.R., 2013. Marketing little cigars and cigarillos: advertising, price, and asso-
280 ciations with neighborhood demographics. *AJPH* 103 (10), 1902–1909. <http://dx.doi.org/10.2105/AJPH.2013.301362>.
281
282 Cantrell, J., Anesetti-Rothermel, A., Pearson, J.L., Xiao, H., Vallone, D., Kirchner, T.R., 2015.
283 The impact of the tobacco retail outlet environment on adult cessation and differ-
284 ences by neighborhood poverty. *Addiction* 110 (1), 152–161. <http://dx.doi.org/10.1111/add.12718>.
285
286 CDC, 2012–2013. Little filtered cigar, cigarillo, and premium cigar smoking among
287 adults – United States. *MMWR* 63 (30), 650–654.
288
289 Garrett, Bridgette E., et al., 2013. Cigarette Smoking—United States, 2006–2008 and
290 2009–2010. *CDC Health Disparities and Inequalities Report—United States, 2013*.
291 62.3, p. 81.

- Henriksen, L., Flora, J.A., Feighery, E., Fortmann, S.P., 2002. Effects on youth of exposure to
291 retail tobacco advertising. *J. Appl. Psychol.* 32 (9), 1771–1789. <http://dx.doi.org/10.1111/j.1559-1816.2002.tb00258.x>.
292
293
Henriksen, L., Schleicher, N.C., Feighery, E.C., Fortmann, S.P., 2010. A longitudinal study of
294 exposure to retail cigarette advertising and smoking initiation. *Pediatrics* 126 (2),
295 232–238. <http://dx.doi.org/10.1542/peds.2009-3021>.
296
Henriksen, L., Schleicher, N.C., Dauphinee, A.L., Fortmann, S.P., 2012. Targeted advertising,
297 promotion, and price for menthol cigarettes in California high school neighborhoods.
298 *Nicotine Tob. Res.* 14 (1), 116–121. <http://dx.doi.org/10.1093/ntr/ntr122>.
299
Lavack, A.M., Toth, G., 2006. Tobacco point-of-purchase promotion: examining tobacco
300 industry documents. *Tob. Control.* 15 (5), 377–384. <http://dx.doi.org/10.1136/tc.2005.014639>.
301
302
Lee, J.G., Henriksen, L., Rose, S.W., Moreland-Russell, S., Ribisl, K.M., 2015. A systematic
303 review of neighborhood disparities in point-of-sale tobacco marketing. *Am. J. Public*
304 *Health* 105 (9), e8–e18.
305
306
Lorillard v. Reilly, 533 US 525, 564 (2001).
307
McLeroy, K.R., Bibeau, D., Steckler, A., Glanz, K., 1988. An ecological perspective on health
308 promotion programs. *Health Educ. Behav.* 15 (4), 351–377. <http://dx.doi.org/10.1177/109019818801500401>.
309
Moreland-Russell, S., Harris, J., Snider, D., Walsh, H., Cyr, J., Barnoya, J., 2013. Disparities
310 and menthol marketing: additional evidence in support of point of sale policies. *Int.*
311 *J. Environ. Res. Public Health* 10 (10), 4571–4583. <http://dx.doi.org/10.3390/ijerph10104571>.
312
313
Pearson, J.L., Richardson, A., Niaura, R.S., Vallone, D.M., Abrams, D.B., 2012. e-cigarette
314 awareness, use, and harm perceptions in US adults. *Am. J. Public Health* 102 (9),
315 1758–1766. <http://dx.doi.org/10.2105/AJPH.2011.300526>.
316
Pollard, K., Jacobsen, L.A., 2014. The Appalachian Region: A Data Overview from the
317 2008–2012 American Community Survey Chartbook.
318
Pollay, R.W., 2007. More than meets the eye: on the importance of retail cigarette
319 merchandising. *Tob. Control.* 16 (4), 270–274. <http://dx.doi.org/10.1136/tc.2006.018978>.
320
321
Portnoy, D.B., Wu, C.C., Tworek, C., Chen, J., Borek, N., 2014. Youth curiosity about
322 cigarettes, smokeless tobacco, and cigars: prevalence and associations with advertis-
323 ing. *Am. J. Prev. Med.* 47 (2, Suppl. 1), S76–S86. <http://dx.doi.org/10.1016/j.amepre.2014.04.012>.
324
325
Pucci, L.G., Joseph Jr., H.M., Siegel, M., 1998. Outdoor tobacco advertising in six Boston
326 neighborhoods: evaluating youth exposure. *Am. J. Prev. Med.* 15 (2), 155–159.
327 [http://dx.doi.org/10.1016/S0749-3797\(98\)00034-8](http://dx.doi.org/10.1016/S0749-3797(98)00034-8).
328
Rose, S.W., Myers, A.E., D'Angelo, H., Ribisl, K.M., 2013. Retailer adherence to family
329 smoking prevention and tobacco control act, North Carolina, 2011. *Prev. Chronic*
330 *Dis.* 10. <http://dx.doi.org/10.5888/pcd10.120184>.
331
Seidenberg, A.B., Caughey, R.W., Rees, V.W., Connolly, G.N., 2010. Storefront cigarette
332 advertising differs by community demographic profile. *Am. J. Health Promot.* 24
333 (6), e26–e31. <http://dx.doi.org/10.4278/ajhp.090618-QUAN-196>.
334
US. Census Bureau, 2015. State and County QuickFacts. <http://quickfacts.census.gov/qfd/states/39/3918000.html>.
335
336
Wewers, M.E., Katz, M., Paskett, E.D., Fickle, D., 2006. Risky behaviors among Ohio
337 Appalachian adults. *Prev. Chronic Dis.* 3 (4).
338
Yerger, V.B., Przewoznik, J., Malone, R.E., 2007. Racialized geography, corporate activity,
339 and health disparities: tobacco industry targeting of inner cities. *J. Health Care Poor*
340 *Underserved* 18 (6), 10–38. <http://dx.doi.org/10.1353/hpu.2007.0120>.
341