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The inequitable distribution of tobacco outlet density: the role of income in two Black Mid-Atlantic geopolitical areas



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ABSTRACT

Objectives: Studies have shown that communities with higher concentrations of low-income racial and ethnic minorities correlate with a greater presence of tobacco outlets. Community-level income has consistently been among the strongest predictors of tobacco outlet density. This study analyzes two Maryland geopolitical areas with similar racial concentrations yet differing income levels in an attempt to disentangle the race–income relationship with tobacco outlet density.

Study design: In this cross-sectional examination of tobacco outlet and census tract-level sociodemographic data, Baltimore City, Maryland, and Prince George's County, Maryland, were geocoded to determine tobacco outlet density.

Methods: Tobacco outlet density was defined as the mean number of tobacco outlets per 1000 persons per census tract. Comparisons of tobacco outlet density and sociodemographic variables were analysed via two-sample t-tests, and the direct effect of sociodemographic variables on tobacco outlet density for each area was analysed via spatial lag regressions.

Results: Prince George's County, the area with the higher income level (\$77,190 vs \$43,571), has a significantly lower tobacco outlet density than Baltimore City ($P < 0.001$). Prince George's County has a 67.5% Black population and an average of 3.94 tobacco outlets per 1000 persons per tract. By contrast, Baltimore City has a 65.3% Black population and an average of 7.95 tobacco outlets per 1000 persons per tract. Spatial lag regression model results indicate an inverse relationship between income and tobacco outlet density in

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Baltimore City and Prince George's County ($\beta = -0.03$, $P < 0.01$ & $\beta = -0.01$, $P = 0.02$, respectively), and a significant interaction term indicating a greater magnitude in the relationship between income and tobacco outlet density in Baltimore City ($\beta = -0.05$, $P < 0.01$).

Conclusion: Results suggest that higher socio-economic status, even in primarily under-represented racial and ethnic geopolitical areas, is linked to lower tobacco outlet density.

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Introduction

The study of the physical availability and concentration of retailers who sell tobacco products in any defined inhabited area, better known as tobacco outlet density, is a relatively new concept in drug epidemiology. Despite the infancy of the concept, many of its methodologies, including geospatial analyses, are well established due to their derivation from several decades of research on alcohol outlet density.^{1,2} However to the contrary, the relationships investigated in this emerging field are under constant change and development. Literature review reveals early studies focused on the association between tobacco outlet density and smoking prevalence, particularly youth smoking.^{3,4} Also among the early studies were investigations of the association between tobacco outlet density and population demographics, specifically underrepresented racial and ethnic groups such as Blacks and Hispanic/Latinos.^{5–7} Despite the early work, relatively few current studies involving tobacco outlet density examine the relationship with population demographics. The prevailing notion resulting from the early tobacco outlet density-demographics studies strongly suggest that inhabited areas with higher concentrations of underrepresented racial and ethnic groups correlate with higher tobacco outlet density, and recent work has expanded this relationship to include underrepresented non-racial groups.^{8–10}

Prior tobacco outlet density studies focused on the role of socio-economic status along with race, concluding that lower income was related with higher density.^{5–8,10} However, it was not until a study by Fakunle and colleagues that socio-economic status and race were controlled in the same analytical model.¹¹ The results of the study, which included multivariable regression analyses of tobacco outlet density by Black population percentage, Hispanic/Latino population percentage, and median household income in two New Jersey counties, showed that median household income had a moderate, negative correlation with tobacco outlet density. Furthermore, it suggested that median household income had the strongest relationship with tobacco outlet density even when controlling for race. The study proposed that the positive association between tobacco outlet density and the concentration of underrepresented racial and ethnic groups may not be as substantial if an area is stratified by median household income. Additionally, tobacco retailers may target areas where there is little-to-no economic power to counter their presence, which typically are also areas highly populated

by underrepresented racial and ethnic groups. The public health implications of tobacco, including the high number of preventable health issues and deaths caused by its use are well known, as well as the exacerbation of negative health outcomes among individuals of lower socio-economic status regardless of race or ethnicity.¹² However, severely lacking are studies that investigate the potential environmental forces that may drive tobacco consumption among lower-income individuals. Further investigation was imperative due to the potential of altering the trajectory for research of tobacco outlet density and population demographics, as well as providing evidence in support of initiating policy aimed at reducing tobacco availability (e.g., restricting tobacco retail licensing, reforming outlet zoning ordinances, etc.) in communities sensitive to price, physical access, and health.

This study continued investigation of the relationship between tobacco outlet density and median household income by analysing two Maryland geopolitical areas: Baltimore City and Prince George's County. Selection of the areas was based on background research of their racial and socio-economic compositions. The result was a natural 'isolation' of race and ethnicity allowing for a focused analysis of tobacco outlet density among two distinct areas with differing median household incomes, but similar racial compositions. The areas had statistically similar racial compositions (comparing Whites versus Blacks), but distinct economic distributions (e.g., high and low median household income). The hypothesis was that the geopolitical area with the relatively higher median household income, holding race constant via the community selection process, would have relatively lower tobacco outlet density.

Methods

Population data for residential census tracts were obtained in 2014 from the 2010 Decennial Census. Demographic data were obtained from the 2007–2011 American Community Survey. Tobacco outlet data from 2013 were obtained from the Maryland Judiciary Business License database. All retailers are required to obtain a permit to sell tobacco and the state maintains that database of licensed retailers. After obtaining, the data were geocoded in 2014 via ArcMap and a spatial join tool was used to determine the number of tobacco outlets per residential census tract. A residential census tract was defined as a tract that was inhabited by at least 600 individuals. One tract was deleted based on this threshold.

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