

TOBACCO SALES IN COMMUNITY PHARMACIES: REMOTE DECISIONS AND DEMOGRAPHIC TARGETS

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This study applied multilevel modeling procedures with data from 678 community pharmacies and 382 residential census tracts in a Midwestern U.S. state to determine if two sets of variables: retail type (e.g., remotely owned, independently owned) and population demographics of the tracts in which outlets were located were associated with retail tobacco availability in community pharmacies. Data were derived from three archival sources: listings of all retailers in Iowa who obtained tobacco licenses in year 2003; all pharmacies registered with the Iowa Board of Pharmacy in 2003; and year 2000 census data. Refuting previous research, multilevel logistic regression results of this study demonstrate that population demographics, as well as retail type, significantly predict whether a community pharmacy sold tobacco. Pharmacies selling tobacco were more likely to be remotely owned outlets and located in areas with higher percentages of African American residents and higher median income. Implications for

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JOURNAL OF COMMUNITY PSYCHOLOGY, Vol. 38, No. 1, 39–48 (2010)

Published online in Wiley InterScience (www.interscience.wiley.com).

© 2009 Wiley Periodicals, Inc. DOI: 10.1002/jcop.20350

environmentally focused prevention interventions are discussed.

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INTRODUCTION

Although the use of tobacco products is associated with 438,000 deaths per year in the United States and \$167 billion in annual health-related costs and loss of labor productivity, many healthcare institutions benefit economically from the sale of tobacco products (American Cancer Society, 2007; Centers for Disease Control and Prevention [CDC], 2005). Pharmacies are an integral part of the American health care system as they fill prescriptions and act as a conduit for health communication. However, the important role pharmacists play in promoting healthy behaviors among patients is compromised when a contradictory message is provided by selling tobacco products.

When polled, most pharmacists are against the sale of tobacco in their pharmacy (Hudmon, Fenlon, Corelli, Prokhorov, & Schroder, 2005; Kotecki, Elanjan, Torabi, & Clark, 1998). Many pharmacists, however, may have little recourse in exercising these wishes as pharmacies are increasingly owned by corporations (Department of Health and Human Services, 2000; Miller, 2004). To reconcile the competing messages of health promotion and tobacco sales, pharmacists would have to persuade their employers to remove tobacco products from their shelves.

Statistics compiled by the CDC (2007) indicate the following about the use of tobacco products in the United States: 20.8% of all adults smoke cigarettes (45.3 million people); smoking is more common among men (23.9%) than women (18.0%); prevalence of smoking is highest among American Indians (32.4%) and African Americans (23.0%) compared to other ethnic groups; smoking estimates are highest for those adults with a general equivalency diploma (GED; 46.0%) or without a high school diploma (35.4%); smoking is more common among adults who live below the poverty level (30.6%) than those living above the poverty level (20.4%). This analysis focuses on Iowa where the prevalence of current adult smokers aged 18–35 years is 28.4% (CDC, 2006).

After the tobacco industry agreed to end broadcast advertising of their products in 1971, they have increasingly relied on point of sale marketing and greater product availability to encourage the use of tobacco (Lavack & Toth, 2006; Laws, Whitman, Bowser, & Krech, 2002). This approach has been seen as disproportionately targeting communities with higher numbers of ethnic and racial minority groups (Laws et al., 2002; Moore, Williams, & Qualls, 1996). The result of this marketing strategy has been a greater concentration of retail tobacco outlets in specific geographic areas. Several studies have investigated this link between an area's demographic constitution and the presence of tobacco retail outlets. Findings have generally supported the assertion that both tobacco retailing and advertising is disproportionately concentrated in areas with specific economic and demographic profiles.

Hyland et al. (2003) gathered data on licensed tobacco outlets in Erie County, New York, and compared their location to census tract data on race and income. Findings revealed tobacco outlets had a higher density in areas with lower median incomes and greater numbers of African Americans (Hyland et al., 2003). Schneider, Reid, Peterson, and Hughey (2005) extended this work by including income, percentage of African Americans, and percentage of Latinos in their analysis of tobacco outlet

density at the census tract level in Polk County, Iowa, and found the tracts with the lowest median income had more than twice the number of tobacco outlets per 10 kilometer of roadway than the highest median income areas. Also, areas with the highest proportions of African Americans and Latinos had much higher tobacco outlet density as compared to tracts with lower proportions of African Americans and Latinos (Schneider et al., 2005). Another analysis by Reid, Peterson, Lowe, and Highey (2005) tested the moderation effect of race between tobacco outlet density and smoking prevalence at the county level for Iowa. The findings showed that the relationship between tobacco outlet density and smoking prevalence was significantly impacted by a county's proportion of African American residents (Reid et al., 2005). An extension of this study found similar results about the relationship between an area's racial profile, tobacco outlet density, and smoking prevalence, but in contrast to other studies, Peterson, Lowe, and Reid (2005) found areas in Iowa with higher median incomes actually had higher tobacco outlet density. A possible explanation for this finding was that Iowa is a state with relatively low income inequality (Peterson et al., 2005).

Only one previous study directly tested the relationship between tobacco sales in pharmacies by retail type and population demographics. Hickey, Farris, Peterson, and Aquilino (2006) used data from the Iowa Pharmacy Association to identify all pharmacies in Iowa and whether or not they sold tobacco products and analyzed the relationship between the location of the pharmacies, population demographics, and type of pharmacy (mass merchandiser, grocery, and chain). Findings indicated that remotely owned pharmacies, particularly those in grocery stores and mass merchandisers, were more likely to sell tobacco products, and that the presence of tobacco products in a pharmacy was related only to retail type and not an area's population demographics (Hickey et al., 2006). This result differs from previous research that had established a clear link between race, ethnicity, income, and tobacco outlet density.

This study extends the work on tobacco outlet density (e.g., Hyland et al., 2003; Laws et al., 2002; Peterson et al., 2005; Reid et al., 2005; Schneider et al., 2005) by concentrating on community pharmacies that retail tobacco products, and extends the Hickey et al. (2006) study using hierarchical linear modeling (HLM) to more accurately assess the relationship between pharmacy tobacco outlets, population demographics, and type of retail outlet. This study differs from the Hickey et al. (2006) study in two critical ways. First, we use the Census tract level of analysis instead of county. Previous outlet density studies have shown smaller units of analysis (i.e., Census tracts) are more appropriate than larger units (i.e., Counties; Gorman, Speer, Gruenwald, & Labouvie, 2001; Scribner, Cohen, Kaplan, & Allen, 1999; Speer, Gorman, Labouvie, & Ontkush, 1998). In addition, this study applies HLM to capture a more accurate picture of the dynamics between pharmacy sale of tobacco and population demographics, whereas the Hickey et al. (2006) study failed to utilize multilevel modeling procedures to analyze these effects. In contrast to the earlier study, we expect to find population demographics (percentage of African American and median income) to play an important role in predicting whether or not a pharmacy sells tobacco products. Studies that clarify the linkages between population demographics, pharmacy characteristics, and tobacco sales can have crucial implications for future interventions. Community-based initiatives that attempt to build healthy environments often target sociopolitical, economic, or physical environmental conditions that can promote or constrain lifestyle choices (Galambos, 2003; Pentz,

2000; Snell-Johns, Imm, Wandersman, & Claypoole, 2003). One way for researchers to assist these initiatives is to identify environmental factors that can be targeted for change, providing communities with ammunition to use to influence policy change. This study was needed to determine whether retail type and population demographics were associated with tobacco sales in community pharmacies.

METHOD

Three different datasets were utilized in this study. The first dataset contained all of the retailers in Iowa who had obtained tobacco licenses in 2003. The retailers were organized by the type of retail store, e.g., grocery store, gas station, or pharmacy. The dataset also contained the addresses with zip codes and county of location. The second dataset was from the Iowa Pharmacy Association. It contained a list of all pharmacies that were registered with the Iowa Board of Pharmacy in 2003. It also contained pharmacy addresses with zip codes and the type of pharmacy it was, e.g., chain, franchise, independent, or hospital. Among chain pharmacies, we also designated whether pharmacies were grocery, mass merchandise, or pharmacy chain. All hospital pharmacies ($n = 148$) were excluded from the analysis, as we are not concentrating on institutional pharmacies. The dataset ultimately used for analysis was created by adding tobacco license status and compliance status to the dataset containing all Iowa community pharmacies. Addresses of 678 community pharmacies were geocoded using the 2000 TIGER/line street data for Iowa (Environmental Systems Research Institute, 2004). Third, data regarding demographics, including race, ethnicity and income, were obtained using 2000 Census data for the tract in which the pharmacy was located.

For purposes of this study, if the retail outlet such as grocery or mass merchandiser had a pharmacy located in it and also sold tobacco, then the pharmacy was defined as selling tobacco. We anticipated chain pharmacies to be more likely than independent or franchise pharmacies to sell tobacco. Tract-level demographic variables included median household income, percentage of African Americans, and percentage of Latinos. Ethnicity variables included in the Hickey et al. (2006) study were excluded here (Pacific Islander, Native American, Asian) due to their low numbers in Iowa, creating an overwhelming number of census tracts with a value of zero. Pharmacy characteristics included pharmacy type, which was included in the model as three dummy variables designating chain, mass merchandise, and grocery compared to independently owned. All pharmacy types were mutually exclusive. No franchise pharmacies sold tobacco; therefore, they were excluded from the HLM analysis.

RESULTS

The relationship between pharmacy type, an area's population demographics, and a pharmacy's decision to sell tobacco products was analyzed using HLM. Hierarchical linear modeling minimizes the risk of both type I and type II errors by accounting for nonindependence of nested data (pharmacies within census tracts; Bliese & Hanges, 2004). This type of analysis allows the authors to differentiate between pharmacies in similar geographic areas (Raudenbush & Bryk, 2002). Of the 678 pharmacies included

Table 1. Multilevel Logistic Regression Predicting Pharmacy Sale of Tobacco in 2003 With Retail Type and Demographics at the Census Tract Level of Analysis 1

<i>Variables</i>	<i>Increase</i>	<i>Odds Ratio</i>	<i>Standard Error</i>	<i>95% CI</i>	<i>p</i>
Pharmacy Level Characteristics/Retail Type (<i>n</i> = 678)					
Chain (vs. independent)	1	34.13	10.35	(18.84, 61.82)	<.001
Mass Merchandise (vs. independent)	1	40.89	14.34	(20.56, 81.32)	<.001
Grocery (vs. independent)	1	476.23	314.44	(130.55, 1737.18)	<.001
Census Tract Level Characteristics (<i>n</i> = 382)					
Percent African American	10%	1.34	.35	(.79, 2.24)	<.05
Percent Hispanic	10%	1.85	.57	(1.02, 3.38)	.27
Median Household Income	\$10,000	1.21	.11	(1.01, 1.44)	<.05

Note. Franchise (apothecary) pharmacies were excluded because none sold tobacco products.

in the analysis, 331 were independently owned (48.8%) and 347 were remotely owned (51.2%). Of those pharmacies, 166 (24.5%) were chain stores, 96 (14.2%) mass merchandise stores, and 85(12.5%) grocery stores.

The multilevel logistic regression model predicting whether or not a specific pharmacy sold tobacco products is shown in Table 1. If a pharmacy type was chain, mass merchandise, or grocery, then they were much more likely than a locally owned and operated pharmacy to sell tobacco products. Thus, pharmacy type was a significant predictor of whether or not tobacco products were stocked on their shelves. Specifically, in our model chain pharmacies (OR = 34.13; 95% CI = 18.84–61.82), mass merchandise pharmacies (OR = 40.89; 95% CI = 20.56–81.32), and grocery store pharmacies (OR = 476.23; 95% CI = 130.55–1737.18) were all more likely to sell tobacco products than locally owned and operated pharmacies.

Population demographics at the census tract level were significant predictors of whether or not a pharmacy sold tobacco products in our model. Proportion of African American residents and median income in a census tract were predictive of a pharmacy selling tobacco products. Pharmacies were more likely to sell tobacco products in census tracts with higher percentages of African American residents and in census tracts with higher median incomes. Specifically, for every 10% increase in the number of African American residents in a Census tract, pharmacies were 1.34 times (95% CI = 1.02–3.38) more likely to sell tobacco products and for every \$10,000 additional income, pharmacies were 1.21 times (95% CI = 1.01–1.44) more likely to sell tobacco products.

DISCUSSION

Our results indicate that the decision to sell tobacco in a pharmacy is predicted by the type of pharmacy and the population demographics of the area where the pharmacy is located. This finding concerning the significance of demographic predictors is in contrast to that of Hickey et al. (2006), who concluded that population demographics were not predictors of whether a pharmacy sold tobacco products. Our results do reinforce the Hickey et al. (2006) findings that a pharmacy's retail type is highly predictive of the decision to sell tobacco products; however, our results showed a

stronger effect for grocery store pharmacies. The Hickey et al. (2006) study is the only point of comparison for the very large odds ratios obtained for retail type, and when the standard error is taken into account, the findings are similar. However, additional research that addresses the influence of retail type in the decision to sell tobacco products in pharmacies is needed to place the strong results found here within a national context. In contrast to previous studies on tobacco outlet density work completed in Iowa and New York, which found that areas with lower median incomes tended to have higher densities of tobacco selling retail outlets (Hyland et al., 2003; Schneider et al., 2005), the results of our present study showed that areas with higher median income were more likely to have pharmacies that sold tobacco. Our findings are more consistent with Peterson et al.'s (2005) study, which showed that both tobacco outlet density and smoking prevalence were greater in areas with higher percentages of African American residents and higher median income. It is important to note, however, that these studies (Hyland et al., 2003; Peterson et al., 2005; Schneider et al., 2005) focused on demographic predictors among all tobacco outlets rather than community pharmacies and the organizational and demographic predictors of their decision to sell tobacco.

A pharmacy's decision to sell tobacco products seems to be driven by its ownership as independent, owner-operated pharmacies were much less likely to sell them than large chain outlets, mass merchandisers, and grocery stores where decision making is remotely held. Independent pharmacies are more likely than their chain pharmacy counterparts to be owned by pharmacists, who may be more concerned with the reputation damage done by carrying and implicitly promoting tobacco products. The fact that these independent pharmacies decided against the sale of tobacco reflects pharmacists' role as public health advocates concerned for the wellbeing of their consumers. On the other hand, chain pharmacies are less likely to attend to the mixed message sent by selling tobacco products in a health care setting and more to customer demand and fulfilling a range of needs in their stores. Large, remotely held decision making is unlikely to be swayed by the wishes of the pharmacists working in retail chains. As such, land-use policy change can be a solution to limiting the sale of tobacco in pharmacies.

The propensity of tobacco-selling pharmacies to be located in areas with higher proportions of African American residents reflects the long-standing pattern of the targeted marketing of tobacco products to minority groups in the United States (Laws et al., 2002; Moore et al., 1996). To counter the tobacco industry's practice of making their products more visible and available in these areas, the application of environmentally focused prevention initiatives is advanced here. Findings from the National Health Interview Survey indicate Hispanics and African Americans were more likely than Caucasian smokers to respond to an increase in the cost of tobacco by reducing or quitting smoking (Farrelly & Bray, 1998). The findings suggest the application of land-use policies be explored to limit availability of tobacco products, especially in community pharmacies where messages about public health and tobacco use collide. This idea has taken hold in San Francisco where the sale of tobacco products in its community pharmacies was recently banned and in New York State where a similar bill is being considered (Egelko, 2008; Scott, 2009). The suggestion to restrict the sale of tobacco in community pharmacies complements and adds to those of Ashe, Jernigan, Kline, and Galaz (2003) who advocated land use policy to restrict tobacco outlets in areas near child-centered activity, limit the total number of tobacco outlets in a community, and limit tobacco outlet proximity to one another. Adding the

restriction of the sale of tobacco products in public health arenas will strengthen strategies used to improve the health of American communities.

The strategy to reduce tobacco outlet density through land-use policy is especially important in light of the findings here showing a pharmacy was much more likely to carry tobacco products based on their retail type. This suggests that pharmacists lack control over decisions impacting the health of their communities when they are owned by large corporate entities and when pharmacists lack significant ownership. Pharmacists then become locked in a situation where consumers are presented with lethal products in an environment of public health without recourse to right the discrepancy.

Additionally, the lack of decision-making power corresponded in our study with the targeting African American communities, which add to the social disparities already seen in tobacco availability and smoking prevalence (Chuang, Cubbin, Ahn, & Winkleby, 2005; Sorenson, Barbeau, Hunt, & Emmons, 2004). Tobacco outlet-siting strategies that focus and, in fact, inundate particular communities with lethal products serve to restrict their ability to make healthy choices. The role of the community psychologist may be to focus on the ecological, mediating factors contributing to detrimental health outcomes for a targeted population group, here the high density of tobacco-retailing pharmacies in African American communities (Jason, Engstrom, Pokorny, Tegart, & Curie, 2000; Lichtenstein, Nettekoven, & Ockene, 1991). Problems that are in part influenced on a community level require a response with a community focus, advanced here through environmentally focused prevention efforts and community coalition building (Jason, 2006; Wandersman & Florin, 2003). Restricting the sale of tobacco products in pharmacies coincides with prevention initiatives that aim to reduce outlet density as well as initiatives that target individuals (Chilenski, Greenberg, & Feinberg, in press; Fagan, Van Horn, Hawkins, & Arthur, 2007). Making tobacco products less available generally increases the travel distance between consumer and product, which, in turn, increases the cost of the product both in absolute and relative terms (actual cost and time spent). Tobacco use has been shown to be sensitive to cost, with consumption decreasing as cost increases (Chaloupka & Pacula, 1999; Chaloupka & Warner, 2000). Environmentally based prevention initiatives could focus on reducing the density of tobacco outlets in a community.

The extent to which community psychologists can tap into community capacity and frame the tobacco control issue within the larger issue of community wellbeing may predict success for these initiatives (Merzel, Moon-Howard, Dickerson, Ramjohn, & VanDevanter, 2008). Utilizing a community organizing strategy, the data presented here can be used to cut an issue as it pertains to the message sent by our health care institutions, especially when that message is diluted by competing interests of health communication and tobacco sales. Not only can the health of a community be improved, but citizen involvement in urban planning may empower communities to make meaningful change. Following Hughey, Culley, Peterson, Poston, and Haddock (2004), who developed a tool to be used by communities in making zoning and regulatory action recommendations, and Snell-Johns et al. (2003), who elucidated the strength of community coalitions to impact policy change in this arena, communities can be activated to participate in a strategy for community change. These initiatives would have to balance the desire to increase the health of a community with concerns about reducing individual rights. The results from our study show that access to tobacco is predicated upon an area's population demographics and strategies to reduce this differential should be considered.

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