



The availability of retail tobacco near federally qualified healthcare facilities and addiction treatment centers in New York State

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ABSTRACT

The effectiveness of tobacco control policies that create smoke-free healthcare facilities and encourage the delivery of tobacco dependence treatment may be undermined by the availability of retail tobacco in the surrounding environments. This study examined the availability of retail tobacco in relation to: federally qualified health centers and look-a-like (FQHC/LAL) healthcare facilities ($n = 706$) as well as substance abuse and addiction treatment centers ($n = 953$) across New York State (NYS) in 2018. A statewide tobacco retailer density surface using static-bandwidth kernel density estimation was constructed from geocoded licensed tobacco vendors ($n = 21,314$). For each healthcare facility, tobacco retailer density (retailers per square mile) was extracted from the underlying NYS density surface. Proximity from each healthcare facility to the nearest tobacco vendor was calculated in walkable miles. Across NYS, tobacco retailer density ranged from 0 to 41.02 retailers per square mile. The availability of retailer tobacco near FQHC/LAL healthcare facilities and substance abuse and addiction treatment centers was higher in metropolitan areas than less urban areas as expected. School-based FQHC/LAL healthcare facilities had higher density than all other FQHC/LAL healthcare facilities types (Mean = 20.82 vs. 17.04, $p = 0.0042$), while opioid abuse and addiction treatment centers had on average higher density (Mean = 20.42 vs. 9.81, $p < 0.0001$) and closer proximity to a tobacco vendor (Mean = 0.14 vs. 0.36, $p < 0.0001$) than other substance abuse and addiction treatment centers. State and local tobacco control retailer reduction policies should be considered to reduce the availability of retail tobacco surrounding these facilities.

1. Introduction

In New York State (NYS), there have been significant advances in creating tobacco-free healthcare facilities while increasing nicotine dependence treatment options for medically underserved populations. NYS healthcare facilities are regulated by the Clean Indoor Air Act, which restricts smoking in indoor businesses, including residential healthcare facilities (Clean Indoor Air, 2002). In 2002, the New York City Smoke-Free Air Act broadened this restriction by banning smoking on all healthcare facility grounds (The Smoke Free Air Act, 2002). Substance abuse and addiction treatment centers are also regulated by additional state-wide tobacco policies and in 2008, NYS became the first state to require all licensed substance abuse and addiction treatment facilities to

be entirely tobacco-free and provide treatment for tobacco addiction to patients served (Tobacco-Free Services, 2008).

The density and proximity of tobacco retailers, and subsequent exposures to point-of-sale tobacco marketing, are positively associated with continued smoking in adults, an increased likelihood of relapse in adults attempting cessation, and increased initiation and use in youth (Loomis et al., 2013; Loomis et al., 2012; Paynter and Edwards, 2009; Reitzel et al., 2011). Therefore, availability of retail tobacco near healthcare facilities has the potential to undermine the intended impacts of tobacco control policies. Retail tobacco availability near healthcare facilities is of particular concern as the populations served by these facilities may be particularly vulnerable to the harms of tobacco use, including low-income populations, racial/ethnic minority populations, youth under age 18, and those with mental

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health, and substance abuse/addiction disorders (Centers for Disease Control and Prevention (CDC), 2013, U.S. Department of Health & Human Services (USDHHS), 2014; Lipari and Van Horn, 2017). For example, the prevalence of smoking among patients in substance abuse and addiction treatment therapy ranges between 75% and 90% (Gorelick et al., 1997; Kozlowski et al., 1989; Lai et al., 2000; Patkar et al., 2002; Sees and Westley, 1993; Sullivan and Covey, 2002). Additionally, individuals living with co-occurring mental health and addiction disorders are more likely to be heavy smokers and consume 44% and 46%, respectively, of the cigarettes purchased nationally (Grant et al., 2004; Lasser et al., 2000); and recent research suggests that greater access to retail tobacco may contribute to or exacerbate smoking among individuals with mental health disorders (Young-Wolff et al., 2014). Despite these high levels of prevalence, there remains strong evidence that 44–80% of these patients are interested in quitting tobacco (Clarke et al., 2001; Ellingstad et al., 1999; Irving et al., 1994; Richter et al., 2001; Rohsenow et al., 2003; Zullino et al., 2000).

The extent to which tobacco control policies in healthcare facilities designed to serve vulnerable populations are undermined by the density of and proximity to tobacco retailers is unknown. This cross-sectional, descriptive, study examines the availability of retail tobacco in relation to two types of NYS healthcare facilities that serve vulnerable populations: 1) federally qualified health centers funded through the Health Resources and Services Agency (HRSA) and non-federally funded look-a-like (FQHC/LAL) healthcare facilities; and 2) substance abuse and addiction treatment centers run by the NYS Office of Alcoholism and Substance Abuse Services (OASAS). FQHC/LAL healthcare facilities are outpatient clinics that provide comprehensive health services (i.e., primary care, behavioral health, chronic disease management, preventive care, and other specialty services) in areas where economic, geographic, or cultural barriers limit access to affordable health care services (U.S. Department of Health and Human Services et al., 2018). NYS OASAS substance abuse and addiction treatment centers provide inpatient and outpatient treatment and recovery services for patients with a chemical dependence and/or co-occurring addictions and mental health disorders (New York State, 2019).

This study examined three research questions. First, what is the overall level of retailer density surrounding these healthcare and treatment facilities serving vulnerable populations? Since the number of tobacco retailers and healthcare facilities is correlated to the underlying population size within an area, we also explored how the availability of retail tobacco around these healthcare facilities differs by urban-rural status in answering this research question. Second, are there variations in the availability of retail tobacco between school-based FQHC/LAL healthcare facilities and other FQHC/LAL healthcare facility types? Youth and young adult patients who utilize school-based FQHC/LAL healthcare facilities where there is a higher availability of retail tobacco might be more susceptible to smoking given prior research showing that youth who attend schools in neighborhoods with higher retail tobacco availability are more likely to smoke (Chan and Leatherdale, 2011; Henriksen et al., 2008; Leatherdale and Strath, 2007; Marashi-Pour et al., 2015; McCarthy et al., 2009). Third, we examined the availability of retail tobacco surrounding opioid treatment centers relative to other substance abuse and addiction treatment centers. Rates of relapse among those seeking opioid treatment is between 40% and 60% (National Institute on Drug Abuse (NIDA), 2018), and cigarette smoking increases the likelihood of drug use relapse (NIDA, 2018). Since 85% of patients in opioid addiction treatment smoke (Guydish et al., 2016), understanding the availability of retail tobacco near opioid treatment centers is necessary for improving both smoking and opioid abstinence outcomes.

2. Methods

2.1. Sample

2.1.1. FQHC/LAL healthcare facilities

A dataset of all current NYS FQHC/LAL healthcare facilities (n = 706) in operation as of March 5, 2018 was obtained from HRSA

(U.S. Department of Health and Human Services et al., 2018). FQHC/LAL healthcare facilities were dichotomized by their service delivery setting as either a school-based FQHC/LAL healthcare facility (n = 172) or other FQHC/LAL healthcare facility type (n = 534). School-based FQHC/LAL healthcare facilities were located in public primary, secondary, magnet, and vocational and technical schools. Service delivery settings provided by HRSA for other FQHC/LAL healthcare facilities included: domestic violence centers (n = 2), nursing homes (n = 7), hospitals (n = 6), and “all other clinic types” (n = 519). The location for each FQHC/LAL healthcare facility was derived based on the latitude/longitude coordinates provided in the dataset and visualized in the (ArcGIS desktop, 2017).

2.1.2. Substance abuse and addiction treatment centers

A dataset of all current NYS substance abuse and addiction treatment centers (n = 953) in operation as of February 26, 2018 was downloaded from the NYS OASAS Provider Directory Search website (New York State, 2018). Substance abuse and addiction treatment centers were dummy coded using their provided program type information into either opioid abuse and addiction treatment centers (n = 108) or other substance abuse and addiction treatment centers (n = 845). Other substance and abuse and addiction centers included crisis treatment centers (n = 67), inpatient facilities (n = 58), outpatient facilities (n = 511), and residential facilities (n = 209). The location for each unique treatment center was derived by batch geocoding the treatment program’s address information in ArcGIS (ArcGIS desktop, 2017). To ensure the spatial accuracy of the final geocoded dataset, we manually reviewed each tied and unmatched address (n = 17), as well as any address type other than a rooftop point address or street address (n = 36). The point location for each of these addresses was manually corrected based on a combination of web searches, aerial, and street-view imagery.

2.2. Measures

2.2.1. Rural-Urban Continuum Codes

Each tobacco-free facility was characterized using the 2013 Rural-Urban Continuum Codes (RUCCs) (U.S. Department of Agriculture, 2016). RUCCs are a county-based classification scheme, which unlike the traditional urban vs. rural dichotomy, allow for a more nuanced examination of the potential influence that population density and metropolitan status may have on the availability of retail tobacco relative to these types of healthcare facilities. Urban-rural categories were: Large Metropolitan (i.e., RUCC 1: Counties in metropolitan areas with a population greater than 1 million); Small Metropolitan (i.e., RUCC 2 and 3: Counties in metropolitan areas with a population less than 1 million), Suburban (i.e., RUCCs 4 and 5: Counties with an urban population of greater than 20,000, and which are adjacent/not adjacent to a metropolitan area); or Towns and Rural Areas (i.e., RUCCs 6-9: Counties with an urban population less than 20,000, and which are adjacent/not adjacent to a metropolitan area).

2.2.2. Tobacco retailer density

A list of all active retail tobacco vendors in NYS (n = 21,314) was obtained from the NYS Department of Health (New York State, 2018). Only retailers operating during some or all of the year from April 1, 2016 to March 31, 2017 were included. Retail tobacco vendor addresses were batch geocoded using ArcGIS (ArcGIS Desktop, 2017). We validated the positional accuracy of retail tobacco vendors following the same manual review and correction procedures outlined above for substance use treatment centers. Tied and unmatched addresses (n = 364), as well as any address type other than a rooftop point address or street address (n = 1347) were validated or, if necessary, corrected.

A NYS density surface of active retail tobacco vendors was generated using static bandwidth kernel density estimation (KDE). Static bandwidth KDE is the preferred approach to model the overall

availability of retail tobacco (i.e., density) for each healthcare facility, as it avoids aggregation bias found in neighborhood- or radius-based approaches (Bithell, 1990; Carlos et al., 2010; Guagliardo, 2004). This non-parametric method extrapolates point location data over a study area by calculating the density of the point locations using kernel functions (Carlos et al., 2010). Here, a kernel with a specified bandwidth (i.e., a circle of a given radius centered at the focal location) was moved across NYS, and the density of tobacco retailers within the kernel was computed. At the point where density was being estimated (i.e., focal location), retail tobacco vendors within the kernel were weighted according to their distance from the kernel center. This resulted in a smooth, continuous density surface where every location in NYS had an assigned density value. To account for underlying heterogeneity within the tobacco retail environment across NYS, we chose a fixed bandwidth for each kernel based on national mobility data (i.e., national average shopping trip length by one person in any mode of transportation) (Santos et al., 2009), resulting in a 6.5-mile search radius. Gaussian kernels with a fixed 6.5-mile bandwidth were used to generate the final tobacco retailer density surface across NYS, and density estimates could be extracted with a 250-meter resolution. Density values (retailers per square mile) were extracted from the final density surface in ArcGIS for every FQHC/LAL healthcare facility and substance abuse and addiction treatment center.

2.2.3. Proximity to nearest tobacco retailer

Tobacco retailer proximity was calculated by linking the location of every retail tobacco vendor, FQHC/LAL healthcare facility, and substance abuse and addiction treatment center to a national street network dataset, allowing us to calculate network routes extending from each setting to the nearest retail tobacco vendor. Because network routes were based on the existing street network, they identified the walkable access to the nearest retail tobacco vendor. To properly measure walking distance to each retail tobacco vendor, all street network restrictions were removed (i.e., one-way streets and non-routable roads). For each facility, proximity to the closest retail tobacco vendor was calculated in miles in ArcGIS (ArcGIS Desktop, 2017).

2.3. Statistical analysis

Summary statistics were calculated for each healthcare facility. Independent t-tests assessed the differences in density and proximity between FQHC/LAL healthcare facilities and substance abuse and addiction treatment centers, as well as between the types of each facility. Bonferroni correction was used to adjust for multiple comparisons and significance was assessed at a p-value < 0.01. All analyses were conducted in Stata 15.1 (Stata Statistical Software, 2017).

3. Results

On average, the density of retail tobacco vendors across NYS was 0.20 retailers per square mile and ranged from 0 to 41.02 retailers per square mile (Fig. 1). Across NYS, FQHC/LAL healthcare facilities and substance abuse and addiction treatment centers were located in areas with an average of 17.96 retailers per square mile (SE = 0.58) and 11.01 retailers per square mile (SE = 0.45), respectively. FQHC/LAL healthcare facilities and substance abuse and addiction treatment centers were, on average, within 0.23 walkable miles (SE = 0.02) and 0.34 walkable miles (SE = 0.02) of the nearest tobacco retailer, respectively.

As expected, both retailer density around and proximity around healthcare centers varied by level of urbanicity (Table 1). On average, FQHC/LAL healthcare facilities in large metropolitan had 21.74 retailers per square mile around them and were 0.17 walkable miles from the closest tobacco retailer while FQHC/LAL healthcare centers in towns and rural areas had 0.17 retailers per square mile and were 0.72 walkable miles from the closest tobacco retailer. Similar differences were found for substance abuse and addiction treatment centers.

There was significant variation in tobacco retailer availability between the different types of FQHC/LAL healthcare facilities. The vast majority of school-based FQHC/LAL facilities (97.1%) were located in either large or small metropolitan areas. In large metropolitan areas, these school-based FQHC/LAL healthcare facilities had significantly higher density of tobacco retailers around them (Mean = 26.17 retailers per square mile) than other FQHC/LAL healthcare facilities (Mean = 20.39 retailers per square mile, $p < 0.0001$). Though school-based FQHC/LAL facilities in large metropolitan areas were somewhat closer to the nearest retailer (Mean = 0.13 walkable miles) than other FQHC/LAL healthcare facilities (Mean = 0.18 walkable miles, $p = 0.07$), the difference did not reach statistical significance. In small metropolitan areas there was no difference in tobacco retailer density or proximity between school-based and other FQHC/LAL healthcare facilities.

Different types of substance abuse and addiction treatment centers also varied with respect to tobacco retailer availability. Nearly all opioid abuse and addiction treatment centers (98.1%) were located in either large or small metropolitan areas. In large metropolitan areas, opioid abuse and addiction treatment centers had dramatically higher density of tobacco retailers around them (Mean = 23.65 retailers per square mile) than other substance abuse and addiction treatment centers (Mean = 13.44 retailers per square mile, $p < 0.0001$). Opioid abuse and addiction treatment centers in large metropolitan areas were nearly twice as close to the nearest tobacco retailer (Mean = 0.13 walkable miles) as other substance abuse and addiction treatment centers (Mean = 0.26 walkable miles, $p < 0.0001$). In small metropolitan areas, density of tobacco retailers was not statistically different between opioid abuse and addiction treatment centers (Mean = 2.01 retailers per square mile) and other substance abuse and addiction treatment centers (Mean = 1.69 retailers per square mile, $p = 0.2916$). Despite the similarity in density, opioid abuse and addiction treatment centers in small metropolitan areas were again twice as close to the nearest tobacco retailer (Mean = 0.20 walkable miles) than other substance addiction treatment center (Mean = 0.49 walkable miles, $p = 0.0004$).

4. Discussion

This is the first study to examine variations in the availability of retail tobacco near healthcare facilities and addiction treatment centers serving vulnerable populations. Overall, retail tobacco availability was higher around healthcare facilities in urban areas; however, results showed considerable differences in the availability of retail tobacco between large metropolitan and small metropolitan healthcare facilities. For example, on average, retail tobacco in large metropolitan areas was accessible within a 5-minute walk from a healthcare facility, while in small metropolitan areas it would take twice as long (10-minutes) to walk to the nearest tobacco retailer. Previous studies have shown that the availability of retail tobacco and subsequent exposures to point-of-sale tobacco marketing are positively associated with tobacco use (Loomis et al., 2013; Loomis et al., 2012; Paynter and Edwards, 2009; Reitzel et al., 2011). The high availability of retail tobacco around these healthcare facilities is concerning given the populations they serve are also the most vulnerable to tobacco use, including those with mental health, and substance abuse/addiction disorders, youth under age 18, racial/ethnic minority populations and low-income populations (CDC, 2013; USDHHS, 2014; Lipari and Van Horn, 2017). Therefore, the effectiveness of tobacco-free healthcare environments may be diminished by the ease at which retail tobacco is available in surrounding environments.

This study also found that the availability of retail tobacco near healthcare facilities differed by facility type. School-based FQHC/LAL healthcare facilities had the highest level of tobacco retailer density of any type of healthcare facility examined, while opioid treatment centers were found to have higher levels of retail tobacco availability than

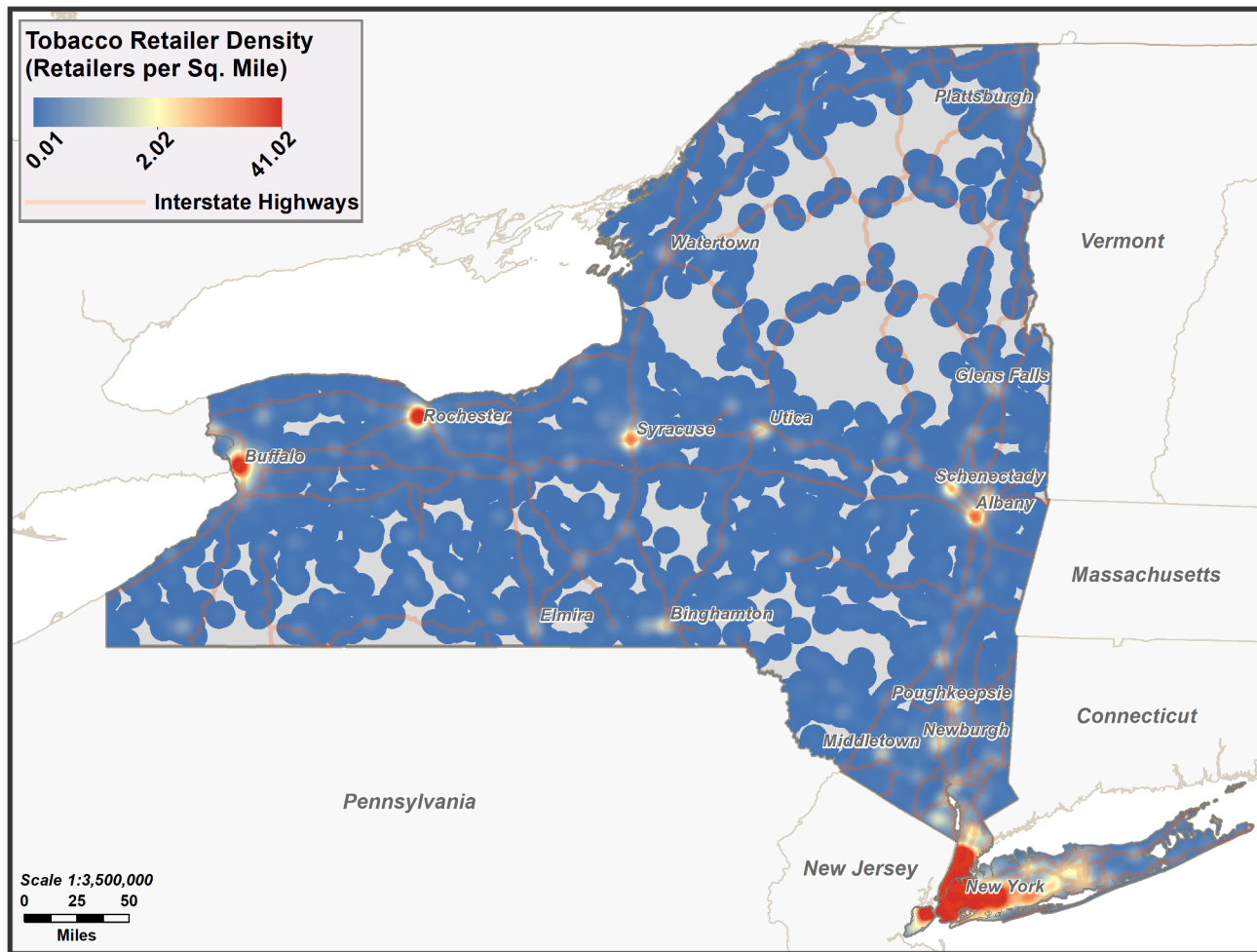


Fig. 1. Density of Retail Tobacco Vendors across New York State in 2016–2017. Note: **Fig. 1** depicts the continuous density surface of retail tobacco vendors (retailers per square mile) across NYS using static bandwidth KDE based on a 6.5-mile search radius and a resolution of 250 m. Areas of the state with higher tobacco retailer density appear in yellow and red. Tobacco retailer density is predominately higher in large and small metropolitan areas of NYS. Increases in tobacco retailer density in more rural areas of upstate NY coincide with populated places along the interstate highways. Grey areas within NYS represent areas where there is no tobacco retailer density (0 retailers per square mile).

other types of substance abuse and addiction treatment centers. Nearly all school-based FQHC/LAL healthcare facilities (97.1%) were located in either large metropolitan or small metropolitan areas, where tobacco retailer density was the highest. While we do not have specific demographic characteristics on the patients who utilize school-based FQHC/LAL healthcare facilities, these findings are noteworthy as research has found the availability of retail tobacco across NYS was higher in neighborhoods with a higher proportion of racial/ethnic minority populations (Loomis et al., 2013). Given that higher retail tobacco availability near schools increases the likelihood of smoking among youth (Chan and Leatherdale, 2011; Henriksen et al., 2008; Leatherdale and Strath, 2007; Marashi-Pour et al., 2015; McCarthy et al., 2009), increased availability of retail tobacco may undermine tobacco-free policies in school-based FQHC/LAL healthcare facilities and could result in increased tobacco initiation and/or sustained use in racial/ethnic minority youth and young adult populations they serve.

Opioid abuse and addiction treatment centers (98.1%) were located in environments with greater access to tobacco retailers than other kinds of substance abuse and addiction treatment centers (88.5%) in large and small metropolitan areas. Higher availability may impact both smoking and opioid use outcomes for those being treated in the centers, given the high rate of smoking among those in treatment for opioid use disorder and the evidence that quitting smoking promotes abstinence from opioids among those in recovery from addiction

(NIDA, 2018; Guydish et al., 2016). Future research should look closely at this vulnerable population to examine the relationship between exposures to retail tobacco and point-of-sale tobacco marketing with both opioid use disorder recovery and smoking cessation.

State and local tobacco control policies can be used to reduce the availability of retail tobacco around healthcare facilities. One policy option to reduce the overall availability of retail tobacco is to ban specific retailers (e.g., pharmacies) from selling tobacco (Center for Public Health Systems Science, 2014). In 2018, New York City implemented such a policy, which banned the sale of cigarettes and other tobacco products in all pharmacies (City of New York, 2017). An evaluation study of this policy found that while the availability of retail tobacco was substantially reduced overall, the impact was not equal across neighborhoods. Neighborhoods with a higher percentage of adults with less than a high school education and a higher proportion of Hispanic residents benefited the least from this policy (Giovenco et al., 2018). Additional policy options could include prohibiting tobacco retailers from operating within a certain distance (e.g., 500 feet) from each other or limiting the overall number of outlets permitted (i.e., cap-and-winnow strategies) within a certain geographic area or relative to population size (Ackerman et al., 2017; Luke et al., 2017; Myers et al., 2015). Policy options best suited to reducing the availability of retail tobacco around healthcare facilities serving vulnerable populations could resemble those that restrict the sale of tobacco around schools

Table 1
Summary Statistics of Healthcare Facilities across NYS by Urban-Rural Status in 2018.

	Large Metropolitan [†]			Small Metropolitan [†]			Suburban [†]			Town/Rural		
	N	Mean [SE]	P-Value*	N	Mean [SE]	P-Value*	N	Mean [SE]	P-Value*	N	Mean [SE]	P-Value*
<i>Density (Retailers per square mile)</i>												
FQHC/LAL Healthcare Facilities	578	21.74 [0.60]		82	1.21 [0.12]		34	0.31 [0.04]		12	0.17 [0.05]	
School-Based FQHC/LAL Healthcare Facilities	135	26.17 [1.04]	< 0.0001	32	1.45 [0.22]	0.1377	5	0.26 [0.12]	0.6767	0	–	–
Other FQHC/LAL Healthcare Facilities	443	20.39 [0.71]		50	1.06 [0.14]		29	0.31 [0.04]		12	0.17 [0.05]	
Substance Abuse and Addiction Treatment Centers	687	14.81 [0.57]		167	1.72 [0.09]		64	0.43 [0.02]		35	0.24 [0.03]	
Opioid Abuse and Addiction Treatment Centers	92	23.65 [1.46]	< 0.0001	14	2.01 [0.29]	0.2916	2	0.68 [0.06]	0.0001	0	–	–
Other Abuse and Addiction Treatment Centers	595	13.44 [0.59]		153	1.69 [0.09]		62	0.42 [0.02]		35	0.24 [0.03]	
<i>Proximity (Walkable miles)</i>												
FQHC/LAL Healthcare Facilities	578	0.17 [0.02]		82	0.52 [0.12]		34	0.31 [0.07]		12	0.72 [0.34]	
School-Based FQHC/LAL Healthcare Facilities	135	0.13 [0.02]	0.0659	32	0.75 [0.25]	0.1671	5	0.51 [0.21]	0.2830	0	–	–
Other FQHC/LAL Healthcare Facilities	443	0.18 [0.02]		50	0.37 [0.11]		29	0.28 [0.07]		12	0.72 [0.34]	
Substance Abuse and Addiction Treatment Centers	687	0.24 [0.02]		167	0.46 [0.07]		64	0.37 [0.05]		35	1.50 [0.37]	
Opioid Abuse and Addiction Treatment Centers	92	0.13 [0.02]	< 0.0001	14	0.20 [0.03]	0.0004	2	0.02 [0.01]	< 0.0001	0	–	–
Other Abuse and Addiction Treatment Centers	595	0.26 [0.02]		153	0.49 [0.08]		62	0.38 [0.05]		35	1.50 [0.37]	

SE, Standard Error; No Data (–).

[†] Significant differences between FQHC/LAL healthcare facilities and substance abuse and addiction treatment centers, p < 0.01.

* Within group differences.

(Ackerman et al., 2017; Luke et al., 2017; Myers et al., 2015). Studies have found that restricting tobacco retailers within a certain distance around schools reduces the overall availability of retail tobacco (Myers et al., 2015), and communities with fewer tobacco retailers near schools have lower rates of youth smoking (Henriksen, 2015; Mistry et al., 2015; Pearson et al., 2015). In NYS, various cities and counties have already implemented variations of this policy (City of Binghamton, 2006; City of Newburgh, 2015; County of Cayuga, 2016; County of Ulster, 2016). Findings from the current study demonstrate the need for implementing equitable density reduction policy options that also include healthcare facilities.

This study has several strengths and limitations. First, the study relied on robustly geocoded facility data. Minor errors in the positional accuracy of the underlying geocoded datasets could have contributed to measurement inconsistencies and biased estimates (Goldberg et al., 2007; Jacquez, 2012), which is particularly problematic in rural settings (Abe and Stinchcomb, 2008; Zandbergen et al., 2012). For example, a study conducted in NYS found that 10% of rural addresses sampled had positional errors of more than 1.5 km, and 5% had positional errors exceeding 2.8 km (Cayo and Talbot, 2003). To ensure the spatial accuracy of each geocoded dataset, we manually reviewed locations within each study dataset to determine whether the underlying positional accuracy for each dataset was adequate for analyses. The current study also evaluated the availability of retail tobacco for each healthcare facility using robust methods to produce reliable density and proximity estimates. This study also examined how the availability of retail tobacco relative to these healthcare facilities differed by urban-rural status, increasing the overall generalizability of the study findings. However, a major limitation of the study is that we cannot draw any specific conclusions regarding how variations in the availability of retail tobacco around healthcare facilities influences tobacco use among the populations seeking services at these locations.

5. Conclusion

The impact of tobacco-free policies and tobacco prevention and cessation efforts of healthcare and addiction treatment facilities in NYS may be weakened if centers are surrounded by retail environments where tobacco products are easily accessible. Vulnerable populations in NYS

also live in neighborhoods with higher levels of retail tobacco availability (Loomis et al., 2013), which is particular concerning, as these populations are more likely to utilize the services provided by these healthcare facilities and are also most likely to use tobacco. In particular, the significantly higher rates of tobacco use among those with either mental health or substance abuse and addiction disorders highlights the need for future studies to examine the influence of retail tobacco on those seeking services at these locations. Tobacco retailer reduction policies, such as zoning, land use laws, and direct regulations by type of facility may provide state and local governments with better approaches to help stem the toll of tobacco-related disease and death. However, as observed in NYC, while a density reduction policy might substantially reduce overall retail tobacco availability, it does not guarantee equitable reduction for all residents. Policies must also work to achieve equitable reach across vulnerable populations most at risk as well.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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