HEALTH

Methadone clinics don't attract crime, study finds

By BY ANDREA K. WALKER and THE BALTIMORE SUN
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Joel Prell is president of Genesis Treatment Services, a methadone clinic. (Barbara Haddock Taylor, Baltimore Sun)

Methadone clinics are often seen as the bad neighbor nobody wants.

Residents concerned about crime and other quality-of-life issues often protest if they even hear word of a methadone clinic, which treats those addicted to heroin and other opiates, is considering moving into the area.

But drug-addiction specialists who say methadone is one of the most effective ways to treat opiate dependency are hoping a new study led by a University of Maryland School of Medicine assistant professor debunks concerns that the clinics breed crime and drag down neighborhoods.

The study is the first of its kind that takes a geographic look at crime around clinics, according to the National Institute on Drug Abuse. Previous research only has examined the link between crime and methadone users.

"The concern is that methadone treatment facilities are related to a higher crime rate in the area, but there is no evidence that this is what happens," said Antonello Bonci, scientific director of the institute. "We hope this study will alleviate this concern. I hope people will look at this data and realize it is not a problem."

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The research, led by UM's Dr. Susan Boyd and others, found that crime doesn't increase because a methadone clinic opens.

The study used FBI Uniform Crime reports from the Baltimore Police Department to look at crime near 13 methadone clinics for a two-year period beginning in 1999. Researchers compared these reports to crime data for similar areas in Baltimore where there were no methadone clinics.

They also compared crime around methadone clinics to crime near hospitals and convenience stores in the city. Crime was more likely to occur around convenience stores, the researchers found.

"I think there is still a very bad perception of methadone clinics," Boyd said. "There are many more people out there who need treatment, but there are not enough slots and clinics available, and part of it is because of the community stereotypes they have about methadone clinics."

Methadone clinics in the state are tightly regulated by the Department of Health and Mental Hygiene.

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Still, the clinics' locations have caused bitter, and sometimes politically charged battles, some of which have ended up in court. Zoning restrictions keep the clinics out of certain communities. Owners of the clinics said it is sometimes tough to get landlords to lease to them.

In many of these incidents, residents said that they believe crime increases and that methadone users, many of whom must come to the clinic daily, loiter after getting their dose of methadone to control their drug urges.

There also is debate about whether methadone users just trade one addiction for another and that the clinics continue to feed a drug culture. And even though methadone clinics have tight controls for distribution of the drug, there are cases of the drug's abuse and people dying from methadone overdoses.

Most recently, residents in Southwest Baltimore have protested a methadone clinic opened by the University of Maryland Medical Center, which runs that and other treatment services for the Baltimore City Office of Addiction Services. It was among several treatment programs that were relocated.

University officials said there was no connection between the study and its decision to move the Southwest Baltimore clinic.

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The clinic, which serves more than 500 addicts, relocated in January to West Pratt Street after its former building on nearby West Fayette Street was torn down due to its poor condition, said a medical system spokeswoman, Mary Lynn Carver. The new location is accessible to public transportation and close to the university and medical center, she said.

Residents said they were caught by surprise when the clinic opened and said they believe there are too many substance-abuse treatment programs concentrated in their neighborhood. They say they are not against drug treatment.

But crime is a concern. The Southwest Partnership, a coalition of neighborhood groups in the area, posted a picture on its Facebook page of a man sleeping on the street in front of a bus stop. The caption next to the photo: "This should be the poster image for why more rehab services are not needed in the neighborhood."

Also on the page are charts with neighborhood crime data and promises to monitor crime levels because of the clinic.

"It's very frustrating that our community is the headquarters for drug addicts and mental health patients from all over," wrote one resident, Jane Buccheri, in an essay posted on the Facebook page.

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In a phone interview, Buccheri, also a leader of the Southwest Partnership, said residents have no statistics to back up claims the clinic is causing increases crime. But residents know what they see, she said.

"After they have treatment they don't necessarily leave the neighborhood," she said. "It's hard to attract homeowners and quality businesses if there is a lot of loitering.

She added: "It has the potential to attract drug dealers. If you have this many potential clients why would you drive around?"

University of Maryland officials have met with residents to address their concerns, Carver said. She said that there were problems with loitering and security in the area before the clinic opened in January, but that she was not aware of issues because of any of the university's services.

A 73-year-old Baltimore man who uses the UM methadone clinic said that when he started using methadone to beat his heroin addiction he stopped committing crimes. The man, who didn't want to use his name because of the stigma attached to methadone users, said he used to pick pockets and rob people to support his habit.

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Most methadone users are living good lives, he said. People oppose methadone clinics, he said, because of misperceptions.

"People don't know about methadone," he said. "A lot of people aren't aware of the good things that methadone does for patients."

A Pikesville methadone clinic operated by Joel Prell got caught up in a legal battle after Baltimore County Executive Kevin Kamenetz, then a county councilman, passed buffer legislation restricting the location of such clinics.

At the time, Kamenetz said he wasn't opposed to drug treatment programs but thought they should be located "in areas where they don't impact the surrounding areas." Prell's A Helping Hand clinic was located near a residential neighborhood.

The 2002 legislation required that methadone clinics and other state-licensed medical facilities that want to open less than 750 feet from homes in areas zoned for business and office use seek additional approval from the county.

Prell sued to challenge the law and to determine whether he should be forced to move. Residents picketed his house.

Prell eventually closed the facility and relocated to Woodlawn, where he hasn't had any opposition. For another center he runs in Westminster, he got council support before opening. That center is in a business park near an airport, not a residential neighborhood.

"It's fear of the unknown and stereotypes," he said. "What most people don't understand about drug treatment programs is that it works."

Prell said he works to keep order at his clinics, urging people to leave soon after taking the medication. He also said some may perceive patients as loitering when they just stop for a conversation on the way to their cars. But, he noted, not every clinic operates to the same standards as his.

Prell and others said methadone users come from all walks of life, especially as more people are becoming addicted to prescription pain killers after routine surgeries.

Boyd said she hopes her study opens the doors for more clinics to open and addicts treated.

"When they choose to go to treatment it shows they are willing to work to change," Bonci said. "We want to make sure people are not stigmatized because they seek treatment."

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Not in My Back Yard: A Comparative Analysis of Crime Around Publicly Funded Drug Treatment Centers, Liquor Stores, Convenience Stores, and Corner Stores in One Mid-Atlantic City

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Abstract

Objective:

This research examined whether publicly funded drug treatment centers (DTCs) were associated with violent crime in excess of the violence happening around other commercial businesses.

Method:

Violent crime data and locations of community entities were geocoded and mapped. DTCs and other retail outlets were matched based on a Neighborhood Disadvantage score at the census tract level. Street network buffers ranging from 100 to 1,400 feet were placed around each location. Negative binomial regression models were used to estimate the relationship between the count of violent crimes and the distance from each business type.

Results:

Compared with the mean count of violent crime around drug treatment centers, the mean count of violent crime ($M = 2.87$) was significantly higher around liquor stores ($M = 3.98$; t test; $p < .01$) and corner stores ($M = 3.78$; t test; $p < .01$), and there was no statistically significant difference between the count around convenience stores ($M = 2.65$; t test; $p = .32$). In the adjusted negative binomial

regression models, there was a negative and significant relationship between the count of violent crime and the distance from drug treatment centers ($\beta = -.069$, $p < .01$), liquor stores ($\beta = -.081$, $p < .01$), corner stores ($\beta = -.116$, $p < .01$), and convenience stores ($\beta = -.154$, $p < .01$).

Conclusions:

Violent crime associated with drug treatment centers is similar to that associated with liquor stores and is less frequent than that associated with convenience stores and corner stores.

THE PHENOMENON KNOWN AS the "Not in My Back Yard," or NIMBY, syndrome is characterized by neighborhoods' resistance to having technologies, services, commercial outlets, housing developments, group housing programs, or other initiatives in their neighborhood. Although many residents may support these initiatives in theory, they are against having them located in their neighborhood (Davidson & Howe, 2014; Krause et al., 2014; Piat, 2000; Polcin et al., 2012; Takahashi, 1997). Polcin and colleagues (2012) examined community concerns about "sober living houses" (i.e., alcohol- and other drug-free living environments aimed to help residents maintain sobriety) and found that concerns centered on issues such as noise, traffic, violent crime, and unpleasant resident behavior. Other research highlights residents' concerns about property values and quality of life (Piat, 2000).

Takahashi (1997) argues that NIMBY syndrome stems from stigmatization and disdain, particularly for services designed for special populations, such as people with substance use disorders and other mental health problems, people who have been involved in the criminal justice system, and people with insecure housing. NIMBY syndrome has been repeatedly observed in the placement of drug treatment centers (DTCs)—such as methadone clinics—as many believe that people in recovery are objectionable (Boyd et al., 2012; Polcin et al., 2012). Residents are particularly concerned about violence increasing in their neighborhoods subsequent to the establishment of behavioral health or housing initiatives for people with substance use disorders in their neighborhoods (Boyd et al., 2012; Davidson & Howe, 2014; Polcin et al., 2012; Takahashi, 1997).

Empirical data on whether DTCs are associated with increased levels of violence may provide information to (a) help communities make informed, data-driven decisions about whether to support such centers and (b) help advocates mitigate strong opposition with evidence as opposed to moral or rhetorical arguments. We, therefore, sought to empirically test whether publicly funded DTCs are associated with violence in excess of the violence happening around other commercial businesses by matching DTCs with other retail entities by neighborhood disadvantage and comparing the relative rate of crime around DTCs with crime around other business types. Other commercial businesses attract foot and vehicular traffic and have hours of operation inclusive of the standard hours of a DTC.

Method

This was a cross-sectional analysis comparing violent crime around DTCs to violent crime around similar community entities matched by neighborhood disadvantage in Baltimore, MD, in 2011. Similar community entities were selected if they operated in a residential or mixed residential/commercial zone, were open at least 8 hours per day 6 days per week, and were classified as commercial entities. Such locations included liquor stores, major chain convenience stores (e.g., 7-Eleven and Royal Farms), and "mom-and-pop" corner stores.

Violent crimes

Data on violent crimes in 2011 were obtained from the Baltimore City Police Department. These data included the address where the violent crime occurred and a description of the crime. Violent crimes include robbery, aggravated assault, rape, manslaughter, and homicide (Franklin et al., 2010). These are

the Uniform Crime Report violent crime offenses reported to the Baltimore police and do not include arrests or calls for service. There were 9,378 violent crimes in 2011; most were aggravated assaults (53.9%) and robberies (40.9%). Respectively, 2.1% and 3.1% were homicides and sexual assaults. Ninety-nine percent of the violent crimes were geocoded in ArcMap Version 10 (ArcGIS, 2011). The remaining 1% of addresses were not geocoded because of missing addresses or because the addresses were illogical or invalid.

Counts of the number of violent crimes were calculated for each of the community entities in 100-foot buffer increments, from 0 feet to 1,400 feet (i.e., 0–100 feet, 101–200 feet, etc.). Boyd and colleagues (2012) used a similar distance (25 m or 82 feet) but went only as far as 300 m (equivalent to 984 feet or 0.19 miles). The current investigation extended that distance to a full quarter mile, a standard for walking distance in urban centers (Milam et al., 2013; Salbach et al., 2015). In addition, we summed the number of violent crimes for all sites within each category and divided by the number of sites to generate a mean number of violent crimes for DTCs, liquor stores, convenience stores, and corner stores. This allows for comparison of the mean level of violent crime across each of the different sites.

Drug treatment centers (n = 53)

Information on the presence of publicly funded outpatient DTCs was obtained from Baltimore Substance Abuse Systems, Inc. (BSAS), the City of Baltimore's substance use disorder authority (the name has since been changed to "Behavioral Health Systems Baltimore"). Publicly funded DTCs in Baltimore receive funding for uninsured and underinsured clients through federal block grant dollars administered by BSAS. Data included the addresses of all licensed and operating drug treatment facilities in the city of Baltimore in 2011. To be counted as publicly funded DTCs, centers had to be licensed through the Maryland Alcohol and Drug Abuse Administration, receive federal block grant dollars through BSAS, and meet all federal and state regulations for such a facility.

Private DTCs were excluded from these analyses for two reasons. First, most do not receive any treatment block grant dollars (primarily because they take only patients who pay with cash or with private insurance), and they have different reporting requirements, making it more difficult to ascertain data on their locations. Second, they tend to be located in areas outside of Baltimore City and/or in locales that are not comparable to the neighborhoods that are of interest to this investigation. We found only three DTCs in Baltimore City that were excluded from this investigation because they were private.

There were 83 publicly funded DTCs in Baltimore. Five of those were located outside of Baltimore City boundaries and were excluded from these analyses. The remaining 78 DTCs were housed in 53 different locations. Twenty-two centers were co-located in the same building as one or two other DTCs (e.g., a separately run inpatient and outpatient program located in the same building). The unit of analysis for this work is the location of a DTC; therefore, when multiple DTCs were in a single location, we counted that as a single DTC site. Treatment programs included 37% outpatient and intensive outpatient treatment programs (including medication-assisted programs with buprenorphine and methadone); 29% halfway houses; 19% primarily opioid maintenance therapy programs; 9% medium-intensity residential programs; and 6% therapeutic communities, intermediate care facilities, or inpatient detox facilities.

Liquor stores (n = 476)

Data on all alcohol outlets were obtained from the Board of Liquor License Commissioners for Baltimore City. These data included the address and license type for all establishments licensed to sell alcohol in Baltimore City in 2011. There were 1,285 alcohol outlets, and 99% (1,277) of those were geocoded in ArcMap Version 10. Locations without a valid address were not geocoded. We restricted this investigation to the 476 liquor stores that allow sales for both on- and off-premise alcohol

consumption 7 days a week from 6 A.M. to 2 A.M.; these are classified by the Liquor Board as "BD-7" outlets, and we refer to them as *liquor stores* in this article. The following types of alcohol outlets were excluded: restaurants, nonprofit private clubs, arenas, hotels, and package goods stores that sell alcohol exclusively for off-premise consumption. BD-7 outlets are comparable to those with bar/tavern licenses in other states that have the capacity to also sell off-premise consumption package goods (e.g., Pennsylvania or Virginia).

Food stores

The addresses and facility names of all 803 package goods food stores from 2011 were obtained from the Baltimore City Health Department; all sell food intended for off-premise consumption. The food stores were classified into seven categories using the schema developed by The Johns Hopkins Center for a Livable Future (Haering & Franco, 2010). These include supermarkets ($n = 47$), small grocery stores ($n = 19$), corner stores ($n = 308$), convenience stores ($n = 195$), behind-the-glass corner stores ($n = 128$), pharmacy stores ($n = 51$), and discount stores ($n = 55$).

The investigation is restricted to corner stores, behind-the-glass stores, and convenience stores. The former two were combined into a single category because of the considerable overlap in their composition, offerings, and locations. Notably, some liquor stores are also food stores. For these analyses, any stores that sold alcohol and food for off-site consumption were classified as liquor stores to ensure mutual exclusivity across sites.

Corner stores and behind-the-glass stores ($n = 436$). Corner stores are generally independently owned and managed (i.e., they lack national franchise affiliation), have a limited supply network, do not have name recognition outside their neighborhood, and have fewer than five cashiers. Behind-the-glass stores are a subtype of corner stores that are found almost exclusively in Baltimore's low-income African American neighborhoods. Access to goods is limited by Plexiglas serving as a barrier between the customers on one side and the cashiers and merchandise on the other. The barrier is considered a necessary safety measure by many store owners. Many corner stores have been converted to behind-the-glass stores in recent decades. Although some corner stores stock healthy food options, most do not. Typical items include ramen noodles, high-sodium canned goods, snack foods, sodas, and candy. Behind-the-glass stores have the lowest availability of healthy foods in Baltimore, as measured by the Healthy Food Availability Index ratings (Casagrande et al., 2011). After excluding food stores that were also liquor stores, there were 396 corner ($n = 281$) and behind-the-glass stores ($n = 115$). For simplicity, we will refer to these types of food stores as *corner stores* throughout the rest of this article.

Convenience stores ($n = 195$). Convenience stores are franchises of nationally or regionally recognized stores but are much smaller than supermarkets and by definition have fewer than five cash registers. They generally have long hours of operation, well-established distribution systems, and name recognition beyond their immediate area (e.g., 7-Eleven and Royal Farms). Although the stores' different locations are homogeneous in appearance, their offerings may vary greatly based on the socioeconomic and racial composition of the neighborhoods where they are located. Nine convenience stores were excluded because they were also liquor stores.

Matching sites by neighborhood disadvantage

Studies have consistently found an association between neighborhood-level disadvantage and violent crime (Franklin et al., 2010; Ross & Mirowsky, 2001). The presence of corner stores, liquor stores, and convenience stores is also associated with neighborhood-level disadvantage, (e.g., LaVeist & Wallace, 2000; Matheson et al., 2014), making it a potentially important confounding variable. To control for neighborhood disadvantage, we matched DTCs to convenience stores, corner stores, and liquor stores

based on the "Neighborhood Disadvantage" score of the census tract in which they were located. This metric has been used in similar investigations examining relationships between alcohol outlets and violent crime in an urban center (Franklin et al., 2010; Ross & Mirowsky, 2001).

The Neighborhood Disadvantage score is calculated using census-tract level items. We used census data from the 2005–2009 American Community Survey (U.S. Census, 2009). The items used to create the index include the percentages of (a) adults 25 years or older with a college degree, (b) owner-occupied housing, (c) households with incomes below the federal poverty threshold, and (d) female-headed households with children. We used Ross & Mirowsky's (2001) formula to generate the index: $\{[(c / 10 + d / 10) - (a / 10 + b / 10)] / 4\}$ (percentages are entered as whole numbers, not decimals).

Each one-unit increase in the Neighborhood Disadvantage score is equivalent to an increase of 10 percentage points for each component item of the index (Franklin et al., 2010; Jennings et al., 2014; Ross & Mirowsky, 2001). The total score has a possible range from -5 to +5, where -5 is very low/little disadvantage and +5 is very severe disadvantage. We trichotomized the Neighborhood Disadvantage score into low (<0.00), moderate (0.00–1.00), and high (>1.00). The cut points were based on the distribution of the study data across all venues. This trichotomy produced nearly equal tertiles.

A random number generator was used to match each of the DTCs with comparison sites. Matching was conducted within each tier of neighborhood disadvantage (i.e., low, moderate, and high). There were fewer DTCs than liquor stores, corner stores, and convenience stores. We matched just one of each facility with each of the 53 DTCs based on the Neighborhood Disadvantage score.

Spatial analysis

The Network Analyst "create new service area" tool in ArcGIS was used to create network buffers around each site. Network buffers are based on the distance, accounting for navigating street networks. By contrast, a "straight-line" buffer would not account for street networks, highways, or buildings in calculating distance. Straight-line buffers will more often produce overestimates of events within a buffer, as the distance to navigate a street network, to go around a body of water (for example), is greater than an imaginary line that cuts across that body of water with a straight line. The service area tool allows creation of buffers that take these complexities into account. The buffers ranged from 101 to 200 feet around the outlet to 1,301 to 1,400 feet around the outlet, in 100-foot intervals. We did not include the 1- to 100-foot buffers in the regression models (described below) to remove crime occurring at the facility, because in these data, convenience stores, corner stores, and liquor stores had substantially more violent crime (e.g., robberies) occurring onsite compared with DTCs. The *t* test result for each venue compared with DTCs at the 0- to 100-foot buffer revealed a significant difference between the results for DTCs and convenience stores ($p = .013$) but not for corner stores and liquor stores. This most likely reflects the higher likelihood of convenience stores being robbed compared with the other venues.

We extended the buffers to 1,400 feet because a quarter mile (1,320 feet) is generally considered walking distance in urban centers (Milam et al., 2013; Salbach et al., 2015). The buffers were "non-overlapping," meaning that each subsequent buffer excluded the area of the smaller buffer(s) nested inside of it. This also means that the amount of area within each buffer is not equal, because placing a buffer around a buffer creates a larger surface area for the subsequent buffer.

We used a methodology developed by Boyd and colleagues (2012) to determine the levels of violent crime around each site. The count of violent crimes for each buffer was determined using the "Spatial Join" tool, which appends data from two map layers using geographic location. We appended the layer with the location of DTCs, food stores, and liquor stores to the layer with counts of violent crime.

Statistical analysis

The purpose of this investigation was to assess the level of violent crime near DTCs and to compare it with the level of violent crime near liquor stores, corner stores, and convenience stores. As a first step, we calculated the scores on the scale of neighborhood disadvantage and summarized them for each type of facility. Second, we matched DTCs to liquor stores, corner stores, and convenience stores by level of neighborhood disadvantage. The remaining analyses are restricted to the 53 DTCs and the 53 liquor stores, 53 corner stores, and 53 convenience stores that were randomly selected in the matching process.

We calculated the mean level of violent crime overall for each of the four types of facilities at each buffer level. We calculated the mean by summing the counts of violent events and dividing by the number of facilities ($n = 53$ for all four types of facilities). T tests were used to compare the mean count of violent crimes for all buffers around treatment centers to other facilities.

Because the outcome of interest, count of violent crimes, was consistent with a negative binomial distribution, we used negative binomial regression models to estimate the relationship between the count of violent crimes and the distance from each facility. The negative binomial regression model, rather than the Poisson regression model, also accounted for the overdispersion of violent crime (Byers et al., 2003; Long, 1997). The log area of each buffer was used as an offset to adjust for differences in buffer sizes, transforming the count of violent crimes to the density of violent crimes. A statistically significant positive slope (β) would indicate that crime increases as the distance from the facility increases. A variant of the Huber–White sandwich estimator of variance was used to obtain robust standard errors to account for clustering within facility (each facility included 14 buffers in the regression model). A statistically significant negative slope (β) would indicate that crime decreases as the distance from the facility increases (i.e., crime is highest closest to the facility, consistent with the facility being a "magnet for crime"). A slope of zero would indicate that violent crime does not significantly change as the distance from the facility increases, indicating that the facility is independent of the occurrence of crime. Incident rate ratios (IRRs) were used to convey the strength of association, allowing the rate of crime change for each buffer to be expressed as a percentage. Significant findings were reported for α levels below .05, and analyses were stratified by facility. An interaction term between facility and distance was used to determine whether there were statistically significant differences in the slope between facilities. Stata 11.0 (StataCorp LP, College Station, TX) was used for statistical analyses, including negative binomial regression modeling. All geocoding and spatial analyses were conducted using ArcGIS.

Sensitivity analysis

We performed sensitivity analysis to assess the potential impact of biases associated with the joint concerns of spatial autocorrelation and clustering. We checked for and detected spatial autocorrelation among DTCs using one large 1,400- foot buffer around each center (Moran's $I = 0.393$, $p < .001$). Two approaches were tested to address this issue. First, we excluded all venues that had a similar venue in any of the 14 100-foot buffers and reran the regression models. We reran the regression models using only these venues. A second approach that we tested was to include a covariate in the adjusted regression model for the number of similar venues in each of the 14 buffers for each venue type.

Results

Neighborhood disadvantage and matching

Table 1 shows the number of DTCs, liquor stores, corner stores, and convenience stores by level of neighborhood disadvantage for the total sample of facilities. The Neighborhood Disadvantage score for all the facilities ranged from -2.41 to 4.09. DTCs and corner stores had the highest mean disadvantage score; 52.8% of DTCs were in high-disadvantage census tracts. After we matched facilities on

Neighborhood Disadvantage score, the resultant analytic sample had similar mean Neighborhood Disadvantage scores across facilities, minimizing the likelihood of confounding by neighborhood characteristics.

Table 1.

Objective Neighborhood Disadvantage score and total number of retail entities

Variable	Drug treatment centers (n = 53)	Liquor stores (n = 476)	Corner stores (n = 396)	Convenience stores (n = 186)
Scale score, M (SD)	0.90, (1.41)	-0.23, (1.32)	0.62, (1.09)	0.00, (1.10)
Range	-2.78, 3.58	-2.85, 2.93	-2.78, 3.60	-2.41, 4.09
Category,[a] % (n)				
Low (<0.00)	26.4% (14)	51.1% (243)	25.0% (099)	47.3% (88)
Moderate (0.00–1.00)	20.8% (11)	30.0% (143)	36.1% (143)	37.1% (69)
High (>1.00)	52.8% (28)	18.9% (090)	38.9% (154)	15.6% (29)

[a]The total Neighborhood Disadvantage score has a possible range from -5 to +5, where -5 is very low/little disadvantage and +5 is very severe disadvantage.

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Mean level of violent crime

The mean count of violent crimes was calculated for each buffer and facility type (Table 2). Mean counts of violent crime, averaged across all buffers in rank order, were liquor stores (3.98), corner stores (3.78), treatment centers (2.87), and convenience stores, (2.65). The mean count of violent crime was significantly higher around liquor stores (t test; $p < .01$) and corner stores (t test; $p < .01$) compared with DTCs, and there was no statistically significant difference between convenience stores and DTCs ($p = .32$).

Table 2.

Mean number of violent crimes by distance from facility (independent of surface area)

Distance, feet	Drug treatment centers *M* (*SD*)	Liquor stores *M* (*SD*)	Corner stores *M* (*SD*)	Convenience stores *M* (*SD*)
1–100	0.92 (1.72)	1.68 (2.64)	1.57 (1.86)	2.06 (3.09)
101–200	0.87 (1.99)	2.17 (4.36)	0.74 (1.27)	0.66 (1.95)
201–300	1.25 (2.11)	1.79 (3.65)	1.96 (3.25)	1.36 (2.87)
301–400	1.26 (2.41)	1.75 (3.06)	2.53 (3.90)	1.15 (2.72)
401–500	2.28 (3.53)	2.70 (4.32)	2.89 (3.52)	3.08 (5.47)
501–600	1.53 (2.32)	3.55 (3.59)	3.17 (3.73)	2.64 (4.91)
601–700	2.83 (4.27)	3.13 (3.63)	3.09 (3.73)	2.34 (3.33)
701–800	2.94 (4.56)	3.55 (4.10)	3.83 (4.37)	2.30 (3.61)
801–900	4.00 (4.78)	4.70 (5.54)	3.92 (4.21)	3.94 (4.26)
901–1,000	3.66 (5.39)	4.72 (4.71)	4.75 (4.25)	2.94 (5.10)
1,001–1,100	4.06 (4.84)	4.75 (4.76)	4.57 (5.60)	4.13 (4.14)
1,101–1,200	4.79 (5.90)	5.94 (7.19)	6.08 (7.21)	2.98 (4.91)
1,201–1,300	5.25 (5.13)	7.57 (8.94)	5.85 (5.57)	3.94 (4.59)
1,301–1,400	4.51 (5.68)	7.75 (8.89)	7.98 (11.67)	3.53 (4.29)
Grand mean (*SD*)	2.87 (4.38)	3.98 (5.62)	3.78 (5.46)	2.65 (4.17)
t test		-4.26 ($p < .01$)[a]	-3.54 ($p < .01$)[a]	1.00 ($p = .32$)[a]

Notes: $n = 53$ for all types of facilities. [a]*p* value for two-sided *t* test comparing violent crime around facility to treatment centers.

Distance, feet	Drug treatment centers *M* (*SD*)	Liquor stores *M* (SD)	Corner stores *M* (SD)	Convenience stores *M* (*SD*)
1–100	0.92 (1.72)	1.68 (2.64)	1.57 (1.86)	2.06 (3.09)
101–200	0.87 (1.99)	2.17 (4.36)	0.74 (1.27)	0.66 (1.95)
201–300	1.25 (2.11)	1.79 (3.65)	1.96 (3.25)	1.36 (2.87)
301–400	1.26 (2.41)	1.75 (3.06)	2.53 (3.90)	1.15 (2.72)
401–500	2.28 (3.53)	2.70 (4.32)	2.89 (3.52)	3.08 (5.47)
501–600	1.53 (2.32)	3.55 (3.59)	3.17 (3.73)	2.64 (4.91)
601–700	2.83 (4.27)	3.13 (3.63)	3.09 (3.73)	2.34 (3.33)
701–800	2.94 (4.56)	3.55 (4.10)	3.83 (4.37)	2.30 (3.61)
801–900	4.00 (4.78)	4.70 (5.54)	3.92 (4.21)	3.94 (4.26)
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Notes: $n = 53$ for all types of facilities.

[a]p value for two-sided t test comparing violent crime around facility to treatment centers.

Negative binomial regression results

Negative binomial regression models were used to estimate the association between the violent crime count and the distance from each facility (Table 3). There was a negative association with violent crime for each facility: Namely, there was a high likelihood of violence occurring closer to each venue, and violence decreased as you moved away from the venue. This indicates that, in general, crime was happening at a greater rate proximal to each of the venues. This relationship was the strongest for liquor stores and convenience stores. For each 100-foot increase in buffer distance away from liquor stores and convenience stores, there was a 5.6% and 6.6% decrease in crime, respectively (IRR = 0.944, $p < .001$; IRR = 0.934, $p < .001$). The relationship was similar, but smaller, for corner stores. For each 100-foot increase in buffer distance away from corner stores, there was a 3.7% decrease in violent crime (IRR = 0.963, $p = .001$). DTCs had the largest IRR, indicating the slowest drop-off in violent crime as you move away from the venue. There was a 3.2% decrease in the average predicted count of violent crimes for each 100-foot increase in buffer distance away from DTCs (IRR = 0.968, $p = .037$).

Table 3.

Incident rate ratios (IRRs) from negative binomial regression (per 100 feet) for the association between violent crime count and distance from each retail entity

Variables	IRR	[95% CI]	p
Treatment centers	0.968	[0.938, 0.998]	.037
Liquor stores	0.944	[0.917, 0.972]	<.001
Corner stores	0.963	[0.941, 0.985]	.001
Convenience stores	0.934	[0.898, 0.972]	.001

Notes: From negative binomial regression, in 100 feet increments, minus first buffer controlling for surface area. CI = confidence interval.

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All of the facility types were included in the same model to test for interactions between facility type and buffer distance. There were no significant differences in IRR between treatment centers and any venues, indicating that the rate of change in crime as you move away from these venues was not statistically different.

Sensitivity analysis

The resultant sample from our first sensitivity analysis of excluding overlapping outlets included 24 DTCs that had no other DTCs in any of the buffers, 19 convenience stores that had no other convenience stores in any of the buffers, and 16 liquor stores and 17 corner stores that fit similar criteria. We reran the regression models using only these venues. The results were similar in magnitude and direction. For example, the IRR for DTCs in the model with the full sample ($n = 53$) was 0.933 ($p < .01$). In the reduced sample with only DTCs without overlap ($n = 24$), the IRR was 0.924 ($p = .03$). These findings were consistent across all venue types. The second approach, which included a covariate in the adjusted regression model for the number of similar venues in each of the 14 buffers for each venue type, showed that the range of DTCs within each buffer was between 0 and 2, with a mean of 0.136. We reran the regression models adjusting for the count within each buffer. The resulting IRR for DTCs was 0.968 ($p = .036$)—nearly identical to the models without adjustment.

These results were mirrored in the analysis of the other venue types (e.g., adjusted IRR = 0.953, $p < .001$, for corner stores vs. 0.963, $p < .001$, unadjusted) .We opted not to use these estimates as the final reported results even though they were statistically adjusted for the clustering of the same venues. We made this decision for several reasons. First, there are substantially more of the other types of venues than DTCs (Table 1). Second, these adjustments do not take into account the other types of venues that may also be within the buffers that may affect violent crime rates. Most importantly, the goal of the sensitivity analyses was to assess the validity of our results; as the results were very similar, it suggests that our initial approach was valid.

Discussion

NIMBYism poses a significant threat to vital behavioral health services being located in communities. The current investigation sought empirical evidence for whether DTCs were associated with violent crime in excess of the violence occurring around other retail entities located within communities—namely, liquor stores, corner stores, and convenience stores. If DTCs, in fact, do pose a unique threat to communities as magnets for crime, we would have found higher rates of crime closer to the DTCs compared with the other entities. We would also have found statistically significant differences in the rate of change in crime farther from (or closer to) the venue. We empirically tested these relationships and found no statistical evidence that DTCs specifically attract violent crime. The estimated means of violent crime showed a decrease in crime as you move away from each of the venue types, even after the increasing size of the buffer was controlled for.

This implies that all of the venues to some degree are located in sites where violent crime occurs. However, there was significant variation in the magnitude of this effect, with DTCs having the smallest rate of crime proximal to the venue, and corner stores, liquor stores, and convenience stores having an increasingly larger magnetic effect on violent crime. These data suggest that businesses in general tend to attract crime, but this effect is less pronounced for DTCs than for the other locales we studied. Commercial businesses tend to be in areas with greater foot traffic, vehicle traffic, and routine activity, creating both cover for and opportunity for crime.

As an alternative explanation, it is possible that each of these venues has a different spatial function to crime. The area of impact could be greater or smaller, depending on the venue and whether its patrons are mostly residents of the community or come from outside the community. In addition, we found a

larger magnetic effect for non-DTC venues, specifically convenience stores at the 0- to 100-foot buffer range (equivalent to events inside the venue or immediately outside the venue). These findings most likely reflect the higher likelihood of convenience stores being robbed compared with the other venues. Understanding and better clarifying the mechanisms underlying this association is an area for inquiry in future research.

The estimated mean of violent crime was significantly higher for liquor stores and corner stores compared with that for DTCs, but there was no mean difference in the rate of crime change as you moved away from corner stores. Behind-the-glass and corner stores are concentrated in higher disadvantage neighborhoods, and it is possible that they are simply located in communities where crime is endemic and independent of their presence. We matched venues on neighborhood disadvantage to constrain this potential bias, but it is possible that some within-neighborhood variation still remained. In contrast, liquor stores had elevated mean rates of crime compared with all the other venue types, and the rate of decrease in crime as you moved away from liquor stores was significantly faster than it was for corner stores and treatment centers. This supports the notion that liquor stores are magnets for crime and is consistent with the results of other published studies that have found associations between the presence of liquor stores and elevated rates of violent crime proximal to the store (Gruenewald & Remer, 2006; Jennings et al., 2014; LaVeist & Wallace, 2000; Lipton et al., 2013; Scribner et al, 1995).

Before further discussion of these results, a few limitations merit mention. First, there was some evidence of confounding with convenience stores by neighborhood advantage, but we addressed that as best we could with matching. Second, we did not control for other venue types within each of the buffers, such that it was possible, for example, that a DTC had a liquor store in one of its buffers. There was such a large number of venues, however, that we opted to randomly select venues and match them to DTCs based on Neighborhood Disadvantage scores to minimize potential confounding. Random selection was the best approach here to ensure that, if there was some spatial overlap, it would be evenly distributed. To test this hypothesis, we conducted sensitivity analyses—namely, we excluded venues with overlap within any of the buffers and in a separate model adjusted for similar venues within the buffer; the results remained consistent. Last, our study design was focused on contrasting DTCs with other community businesses, but we found interesting results pointing to liquor stores as potential crime attractors. Future investigations will further explore this relationship using the full range of alcohol outlet data, and further research is needed to establish the causal link between liquor stores and crime.

In conclusion, DTCs have an unfairly poor reputation as being magnets for crime and a threat to community safety that is not backed up by empirical evidence. By contrast, other community businesses that have a more pronounced magnetic effect on crime are often solicited by communities to locate within their neighborhoods. Future investigations should include a more comprehensive examination of the synergistic effect of having multiple venue types within a defined geographic area, as well as incorporate a broad range of community perspectives to balance the empirical data with residential experiences.

Footnotes

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