Exploring the Ecological Association Between Crime and Medical Marijuana Dispensaries

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ABSTRACT. Objective: Routine activities theory purports that crime occurs in places with a suitable target, motivated offender, and lack of guardianship. Medical marijuana dispensaries may be places that satisfy these conditions, but this has not yet been studied. The current study examined whether the density of medical marijuana dispensaries is associated with crime. **Method:** An ecological, cross-sectional design was used to explore the spatial relationship between density of medical marijuana dispensaries and two types of crime rates (violent crime and property crime) in 95 census tracts in Sacramento, CA, during 2009. Spatial error regression methods were used to determine associations between crime rates and density of medical marijuana dispensaries, controlling for neighborhood characteristics associated with routine activities. **Results:** Violent and property crime rates were positively associated with percentage of commercially zoned areas, percentage of one-person households, and unemployment rate. Higher violent crime rates were associated with concentrated disadvantage. Property crime rates were positively associated with the percentage of population 15–24 years of age. Density of medical marijuana dispensaries was not associated with violent or property crime rates. **Conclusions:** Consistent with previous work, variables measuring routine activities at the ecological level were related to crime. There were no observed cross-sectional associations between the density of medical marijuana dispensaries and either violent or property crime rates in this study. These results suggest that the density of medical marijuana dispensaries may not be associated with crime rates or that other factors, such as measures dispensaries take to reduce crime (i.e., doormen, video cameras), may increase guardianship such that it deters possible motivated offenders. (*J. Stud. Alcohol Drugs, 73,* 523–530, 2012)

WITHIN THE PAST 15 YEARS, a new type of drug outlet has developed in the United States that combines place-based distribution with an illicit substance—medical marijuana dispensaries. At present, 17 states and the District of Columbia have passed legislation legitimizing the use of medical marijuana and its distribution (National Organization for the Reform of Marijuana Laws, 2012). Thus, marijuana distribution in the United States is for the purpose of medical use and only recognized by state-level policies.

Internationally, similar place-based dispensaries have been present since the late 1970s as "coffee houses" or "hash clubs." They are perceived to be a breeding ground for criminal networks, attracting individuals prone to crime and increasing potential for crime around these locations (Asmussen, 2007, 2008; Ministry of Health, Welfare, and Sport, 1995; Møller, 2008). In the United States, the increase in medical marijuana outlets (often referred to as dispensaries or collectives) during the mid to late 2000s has created perceptions that dispensaries support conditions that encourage crime in and around their locations (California Police Chief's Association, 2009). Although the concerns of place-based related crime are consistent across geographic contexts, little is known empirically about medical marijuana dispensaries (Penick, 2006; Reiman, 2007). In fact, only one study has assessed the ecological effects of dispensaries: Jacobson et al. (2011) observed that crime was higher around medical marijuana dispensaries 10 days after their mandated closures compared with 10 days before the closure. Although contrary to previously discussed perceptions, the results cannot be fully evaluated because this technical report was withdrawn after the authors determined that a systematic review of the study's methodology and conclusions was required.

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Routine activity theory of crime

Routine activity theory provides a framework to understand how the presence of medical marijuana dispensaries may contribute to criminal activity. According to this theory, crime occurs when three necessary conditions are met: (a) the presence of a motivated offender; (b) a suitable target defined by its value, visibility, access, and/or likelihood of low resistance to crime; and (c) the absence of guardians against crime, such as place managers (i.e., owners and the agents they hire to monitor and regulate behaviors), inadequate security, and/or low levels of informal social control in the surrounding environment (Clarke and Felson, 1993; Cohen and Felson, 1979; Eck and Weisburd, 1995).

Neighborhood demographic and structural characteristics are not constant over space and thus create opportunities where these three conditions may converge in a geographic area that increase the potential for victimization and encourage crime (Brantingham and Brantingham, 1993; Clarke and Felson, 1993). First, demographic neighborhood characteristics capture the concentration of motivated offenders and potential targets. Various studies have observed that the concentration of potential offenders in neighborhood areas, measured by neighborhood economic deprivation (e.g., concentrated poverty and unemployment rate), is positively associated with neighborhood crime rates (Andresen, 2006; Miethe and McDowall, 1993). The concentration of populations identified as suitable targets has also been observed to be associated with neighborhood crime rates. Neighborhood areas with high concentrations of young males (ages 15–24 years) residing in single-adult households and/or disrupted family (or single-parent) households are likely targets because of the increased likelihood that these neighborhoods are composed of populations who socialize outside of the home and have an increased amount of goods per household (Cohen and Felson, 1979; Sampson and Wooldredge, 1987).

Guardianship of a place or geographic area is related to the presence of individuals or systems that can monitor and regulate behavior to protect against crime, such as place managers, formal authorities (e.g., security guards or police), and/or informal social control provided by individuals within the surrounding environment (e.g., friends or neighbors) (Clarke and Felson, 1993; Cohen and Felson, 1979). Thus, demographic factors can indicate potential guardianship of an area based on informal monitoring and the presence of individuals who may deter crime. For example, a higher percentage of vacant housing units can increase the absence of guardians, such as neighbors and place managers, and thus increase the potential for crime both in and around these vacant locations (Roncek and Maier, 1991; Spelman, 1993). Conversely, high population density may increase the presence of guardians in an area, resulting in the often observed negative association between population density and crime (Andresen, 2006). This additional monitoring of individuals is likely to offset crime expected from the concentration of potential targets and goods within a given amount of space (Cohen et al., 1980).

In addition, structural neighborhood features can contribute to both violent and property crime. Commercially zoned areas are associated with a higher level of street activity and cash flow. These conditions tend to attract crime and/or create opportunities where the three conditions of crime accidentally converge. As a result, there is typically a positive relationship between percentage of a neighborhood area identified as commercially zoned and crime outcomes (Brantingham and Brantingham, 1993; Cohen and Felson, 1979; Sampson and Wooldredge, 1987). Roadway features, such as the presence of highway ramps, may also encourage crime in the general area by easing a potential offender's ability for a quick getaway. Neighborhood areas with highway ramps, then, may be viewed as more suitable for crime through increased access (Felson, 1987). Therefore, those neighborhoods composed of demographic and structural factors associated with crime may create conditions in which both the physical location of a business and the surrounding areas are at risk for higher crime incidents (Brantingham and Brantingham, 1993).

Routine activities approach to medical marijuana dispensaries

Previous work has established the spatial relationships between crime locations and place (Eck and Weisburd, 1995; Greenbaum and Tita, 2004; Gruenewald et al., 2004; Roncek et al., 1991). Places such as medical marijuana dispensaries provide an opportunity where the conditions for crime outlined by routine activities theory can also converge. However, there have been no peer-reviewed studies that explore whether medical marijuana dispensaries are related to crime.

Applying routine activity theory to medical marijuana dispensaries suggests that dispensaries may uniquely contribute to crime even when other contextual factors associated with crime have been controlled. They have on-site stock and sales of marijuana and are a predominantly cash-based business (California Police Chief's Association, 2009). The centralized location of the goods—marijuana and cash—within the dispensaries makes the location a suitable target for a potential offender who might be motivated to seek out ways to obtain the desirable goods, particularly where security appears to be absent.

Based on the conditions described above, dispensaries can be at risk for property crimes, such as burglary. Employees of the dispensaries can be at risk for violent crimes, such as robbery or assault, because they are gatekeepers to both the marijuana products and the cash at the site. Estimates from the western United States and other countries show that users of medical cannabis are primarily male (i.e., two thirds to three fourths of all users) and White, with a wide range of ages (i.e., late teen years to old age; median age between 30 and 50) (Aggarwal et al., 2009; O'Connell and Bou-Matar, 2007; Ogborne and Smart, 2000; Penick, 2006; Reiman, 2007; Ware et al., 2005). The typical clientele for dispensaries (i.e., older White men) are not associated with being at risk for perpetrating crime (Cottle et al., 2001; Hirschi and Gottfredson, 1983). However, they are at risk for being targets of violent crimes, such as robbery, because they are likely carrying cash on entry and some physical amount of marijuana product on exit. In addition, medical marijuana dispensaries have a diverse clientele, with some who are older, frail, and/or diagnosed with chronic, debilitating conditions (O'Connell and Bou-Matar, 2007; Reiman, 2007; Swift et al., 2005; Ware et al., 2003). These more vulnerable

clients may appear to be easier targets for a motivated offender and are at higher risk for victimization (Cohen and Felson, 1979).

Study aims

To date, only preliminary quantitative evidence exists for the relationship between these medical marijuana dispensaries and crime. Thus, the current study investigated the relationship of crime rates in Sacramento, CA, during 2009 to medical marijuana dispensaries to better understand their ecological impact. We hypothesized that medical marijuana dispensaries would be associated with higher crime rates, controlling for other aggregate neighborhood measures of routine activities known to contribute to crime.

Method

Study design

This study used an ecological, cross-sectional design to explore the spatial relationship between the density of medical marijuana dispensaries and crime rates in the City of Sacramento. California recognized distribution of marijuana through collectives in 2004; however, Sacramento did not implement local regulatory policies until 2010. Thus, data are from 2009, a period that represents the longest time for growth before regulations of medical marijuana dispensaries in Sacramento. The sample for the study included all census tracts with centroids within Sacramento City boundaries (N = 95). All data were aggregated to 2000 U.S. Census tract boundaries. Census tracts approximate neighborhood areas with regard to size and composition: (a) average population is 4,000 residents, (b) boundaries align with visible features of the environment, and (c) homogeneous with respect to population characteristics and/or living conditions (U.S. Census Bureau, Geography Division, 2008).

Measures

The dependent variables in the study were violent crime and property crime as measured by police crime incident data obtained from the Sacramento Police Department. Crime incidents were available by crime code and location of incident. Data were recoded into violent crime and property crime categories and geocoded to greater than 99%. Violent crimes were recoded based on the Uniform Crime Reporting definitions, which included homicide, sexual assault, robbery, and aggravated assault. Sexual assaults were excluded from the analysis because address information is confidential to protect the victim; those crimes were not able to be geocoded. Property crimes also were recoded based on the Uniform Crime Reporting definitions, which included burglary, larceny-theft, motor vehicle theft, and arson. For each type of crime category, the number of crime incidents in a census tract was divided by the total population of the tract and multiplied by 1,000 to create the associated crime rate variable. Table 1 provides descriptive statistics for crime rates per census tract. Because of the right-skewed distributions of the dependent variables, violent crime rate and property crime rate were transformed by a natural log. Table 2 provides zero-order correlations between the natural log of each type of crime rate and each continuous independent variable.

Table 1. Descriptive statistics for dependent and independent variables across census tracts in Sacramento, CA (N = 95)

Variable	*M*	*SD*
Crime rates		
Violent crime rate per 1,000 population	12.72	22.46
Property crime rate per 1,000 population	67.03	107.98
MMD density		
MMDs per 10 roadway miles	0.41	0.90
Routine activity theory controls		
Total population, in 1,000s	5.07	2.67
% Vacant housing units	6.14	3.97
Population density, in 1,000s	7.07	3.66
Male-to-female ratio	0.99	0.23
% of population 15–24 years old	13.60	4.41
% One-person household	33.49	17.47
% Disrupted family household	11.94	6.06
Unemployment rate	14.84	13.45
Index of concentration at the extremes	-0.25	0.23
% Commercial zoning	12.16	13.71

Note: MMD = medical marijuana dispensary.

The locations of medical marijuana dispensaries were determined by comparing multiple sources: (a) Sacramento City's listing associated with Ordinance No. 2009-033, *An Ordinance Establishing a Moratorium;* (b) news publications; (c) discussion boards on the Internet; (d) trade publications; and (e) survey of dispensary owners/managers. Locations were verified by having at least three sources document that a dispensary was operating on or by June 16, 2009, which provided a midpoint estimate for locations opened during the year. All outlets were geocoded based on point location to 100%. A total of 40 medical marijuana dispensaries were located within 28 of the 95 census tracts (29.5%) in Sacramento. The density of medical marijuana dispensaries was measured by the number of dispensaries per roadway mile in a census tract; this measure was scaled to density per 10 roadway miles. The aggregation to census tracts provided the best variability of density for the smallest areal unit that approximates a neighborhood area. The number of dispensaries ranged from 0 to 3 outlets per tract with density per tract ranging from 0 to 4.95 dispensaries per 10 roadway miles. Figure 1 shows the location of medical marijuana dispensaries mapped onto an unweighted gradient of violent crime rates and property crime rates per 1,000 population by census tract. Those areas with the highest rate of violent or property crime are not necessarily the areas with the greatest population.

TABLE 2. Zero-order correlation coefficients of independent variables with violent crime rate and property crime rate ($N = 95$)

Variable	Violent crime rate (LN)	Property crime rate (LN)
MMD per 10 RWM	.421***	.423***
1,000 population/square mile	-.208*	-.414***
% Vacant housing units	.509***	.425***
Male-to-female ratio (LN)	.523***	.470***
% Population 15–24 years old	-.207*	-.590***
% One-person household	.462***	.656***
% Disrupted family household	.440***	.137
Unemployment rate (LN)	.528***	.161
Index of concentration at the extremes	-.675***	-.367***
% Commercially zoned	.609***	.735***

Notes: LN = natural log; MMD = medical marijuana dispensary; RWM = roadway mile.
*$p < .05$; ***$p < .001$.

To control for neighborhood population and place characteristics that routine activity theory would suggest contribute to observed crime rates, several control variables were created and included in the model. The following variables were selected to control for neighborhood contextual factors commonly associated with aggregate patterns of crime: population density (1,000 population per square mile), male-to-female ratio, percentage of population ages 15–24 years, percentage of one-person households, percentage of disrupted family (or single-parent) households, unemployment rate, and percentage of housing units that were vacant. Data for the measures were from the 2009 estimates of population and housing characteristics obtained from GeoLytics Inc. (2009). Geocoding rates for these census measures are, by definition, 100%. Table 1 provides a summary of descriptive statistics for all control variables. Male-to-female ratio and unemployment rate were transformed using the natural log to address right-skewed distributions.

In addition, neighborhood disadvantage was measured by the index of concentration at the extremes representing concentrated poverty (-1.0) to concentrated affluence (1.0) on a continuous scale. The variable was constructed by subtracting the number of poor households from the number of affluent households and dividing the result by the total number of households (Massey, 2001). Poor households were determined by using 2008 poverty guidelines. Any household composed of two or more individuals and with a combined income less than $26,400 (all dollar values are in

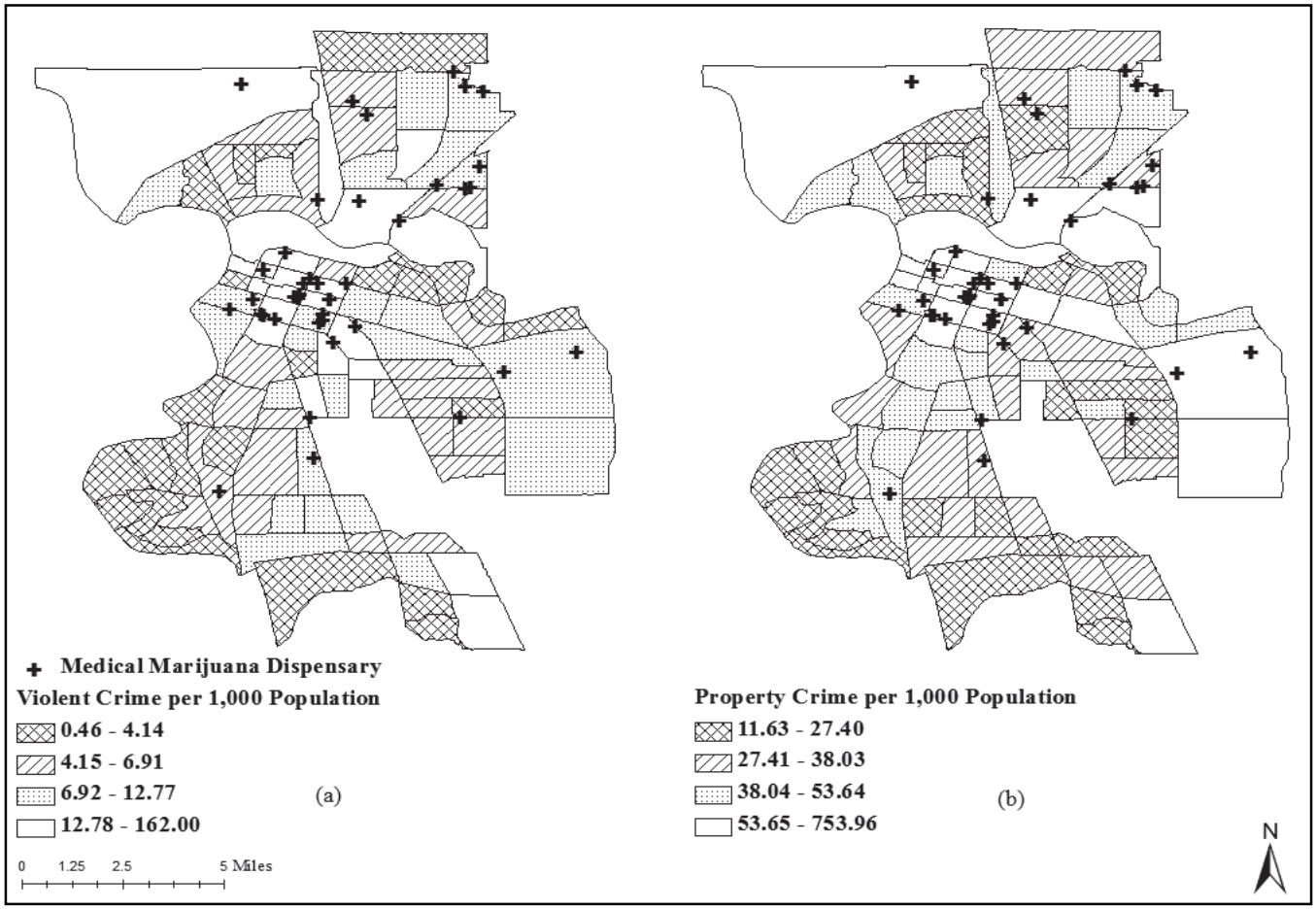

FIGURE 1. Medical marijuana dispensary locations and neighborhood crime rates per 1,000 population ($N = 95$): (a) violent crime rate by census tract, (b) property crime rate by census tract

U.S. dollars) were considered to be below the 200% poverty level. As a result, all households with an income of less than $25,000 were included in the poor household count. Affluent households were determined by any income that was more than two standard deviations above median income, resulting in all households with an income of $100,000 or more being included in the affluent household count.

A categorical variable for the presence of highway on-ramps was created as a proxy measure for physical characteristics that allowed for quick and easy entry and exit into a census tract. We used a categorical measure because of the limited variability in the number of highway ramps per census tract (i.e., 56 of the 95 census tracts had no highway exits; less than 5 census tracts had more than one highway exit). All roadway segments with the Census Feature Class Code (CFCC) A63 (i.e. access ramp) were selected and then aggregated to the census tract; the variable was coded 0 for no highway ramp present and 1 for highway ramp present. ESRI 2008 Streets for United States and Canada (based on 2003 Tele Atlas Dynamap Transportation Version 5.2 product) was used to identify highway ramps (ESRI, 2008). The geocoding rate for highway ramps was 100%; however, the street file is based on 2003 streets and does not account for development in the 5 years between 2004 and 2009.

Finally, all areas defined as commercial zoning for the City of Sacramento (i.e., C1 = limited commercial; C2 = general commercial; C3 = central business district; SC = shopping center; HC = highway commercial; C4 = heavy commercial; ORMU = office/residential mixed use; EC = employment center; OB = office zone) were selected and were parsed into polygons that aligned with census tract boundaries so square mile area could be calculated. The percentage of commercially zoned area was calculated by dividing the aggregate square mile area of commercial zoning by the total square mile area of the census tract and then multiplying by 100. The shapefile for commercially zoned areas from 2010 was obtained from Sacramento County and the City of Sacramento, Geographic Information Systems Division. Geocoding rates for commercially zoned areas were 100% for areas within Sacramento City boundaries.

Statistical analyses

This study used geospatial methods, which have become standard practice for studying ecological relationships between place and crime (Gruenewald et al., 2006). Area units (e.g., census tracts) located next to each other often share similar characteristics that may bias results because they are highly correlated, a phenomenon called *spatial autocorrelation* (Cliff and Ord, 1973). Spatial techniques address this bias by accounting for the spatial autocorrelation. To test if spatial autocorrelation was an issue for these data, the Univariate Moran's *I,* which is a global measure of spatial autocorrelation, was calculated for the dependent variables (Bailey and Gatrell, 1995). Moran's *I* was statistically significant for violent crime rate ($I = 0.3257$, $p < .05$) and property crime rate ($I = 0.4625$, $p < .05$).

Spatial regression models were used to address spatial autocorrelation observed for the dependent variables. This study used a Rook's connection matrix to identify adjacencies between census tracts using an $n \times n$ (in this case 95×95) matrix, where census tracts that shared a boundary were given a 1 and those that did not, a 0 (Bailey and Gatrell, 1995). One challenge to using this approach with smaller geographic areas, such as census tracts, is that the model assumes all areas have the same population. This assumption results in census tracts with small populations and with large populations being weighted equally. To address this, all variables were weighted by the square root of the census tract population to address issues of heteroscedasticity, providing more weight to census tracts with higher population (Greene, 1993). In addition, the condition index was used to test for collinearity in the geographically weighted regressions; any value above 30 indicates problematic collinearity issues within the model (Belsley, 1991; Wheeler, 2007). The condition index for the final models was 21.2 (Table 3), which is not indicative of severe multicollinearity. The fit of the model was examined using the likelihood ratio test, which compared the log-likelihood from the full model (i.e., medical marijuana dispensary density variable plus routine activity variables) with that of the restricted model (i.e., medical marijuana dispensary density variable) to determine if the contribution of routine activity variables improved the overall fit of the model (Greene, 1993).

Results

Table 3 shows the results of the spatial error regression models for violent and property crime rates with the associated condition index, pseudo-R^2, and model-fit statistics. Model I for violent crime rates indicated that medical marijuana dispensaries per 10 roadway miles were not significantly related to violent crime rates. When routine activity theory control variables were added in Model II, the density of medical marijuana dispensaries remained not significantly related to violent crime rates. Model II showed that violent crime rates had a significant positive association with percentage of one-person households, unemployment rate, and percentage of commercial zoning when controlling for other variables. As expected, lower population density was associated with higher levels of violent crime. In addition, lower levels of index of concentration at the extremes (or higher levels of concentrated disadvantage) were significantly associated with higher violent crime rates.

For property crime rates, Model I indicated that medical marijuana dispensaries per 10 roadway miles were not

TABLE 3. Spatial error regression of MMD density on the log of violent crime rate and log of property crime rate by census tract ($N = 95$)

	Violent crime rate (LN)				Property crime rate (LN)			
	Model I MMD density		Model II +RAT controls		Model I MMD density		Model II +RAT controls	
Variable	*b*	*SE*	*b*	*SE*	*b*	*SE*	*b*	*SE*
Constant	1.752***	0.167	-0.068	0.259	3.575***	0.144	0.798***	0.198
MMD density								
MMD per 10 RWM	0.214	0.138	0.006	0.093	0.107	0.140	0.002	0.069
RAT controls								
1,000 population/square mile			-0.033*	0.016			-0.019	0.012
% Vacant housing units			0.019	0.021			-0.013	0.016
Male-to-female ratio (LN)			-0.973	0.684			-0.787	0.506
% Population 15–24 years old			0.023	0.018			0.107***	0.013
% One-person household			0.018**	0.006			0.034***	0.005
% Disrupted family household			0.003	0.009			-0.012	0.007
Unemployment rate (LN)			0.291**	0.105			0.211**	0.081
Index of concentration at the extremes			-1.241*	0.537			0.421	0.406
Highway ramp present			-0.098	0.123			0.123	0.092
% Commercially zoned			0.018*	0.007			0.027***	0.006
Spatial autocorrelation								
Λ	0.508***	0.108	0.077	0.145	0.392**	0.121	-0.128	0.151
Model-fit statistics								
Condition index	1.6092		21.2062		1.6092		21.2062	
Pseudo-R^2	.2462		.6944		.1374		.8083	
Log-likelihood	-112.9175		-66.8066		-116.1663		-43.0518	
D (Δ*df, p*)			92.22 (10,<.001)				146.23 (10,<.001)	

Notes: MDD = medical marijuana dispensary; LN = natural log; RAT = routine activity theory; RWM = roadway mile.
*$p < .05$; **$p < .01$; ***$p < .001$.

significantly related to property crime rates. In Model II, the density of medical marijuana dispensaries remained not statistically significant when routine activity control variables were added to the model. Model II showed a significant positive association with percentage of population ages 15–24 years, percentage of one-person households, unemployment rate, and percentage of commercial zoning when controlling for other variables.

Discussion

In sum, the statistically significant variables for the violent crime rate and property crime rate models were consistent with aggregate neighborhood measures reported within the routine activity theory literature (Andresen, 2006; Cohen and Felson, 1979; Sampson and Wooldredge, 1987). Percentage of a census tract that was commercially zoned, percentage of housing units in a census tract that were one-person households, and unemployment rate were positively related to violent and property crime rates. However, no cross-sectional associations were observed between the density of medical marijuana dispensaries and violent or property crime rates, controlling for ecological variables traditionally associated with routine activity theory.

These findings suggest two possible conclusions. First, the density of medical marijuana dispensaries may not be associated with neighborhood-level crime rates. For example, dispensaries may be associated with crime but no more than any other facility in a commercially zoned area with conditions that facilitate crime. Alternatively, the relationship between density of medical marijuana dispensaries and crime rates is likely more complex than measured here. The study did not measure on-site security or guardianship at the dispensaries. If medical marijuana dispensaries have strong guardianship, such as security and monitoring systems, routine activity theory would suggest that the three necessary conditions for crime are not met. Place-specific guardianship would decrease the accessibility and increase the risk of being caught, decreasing the suitability of a target.

The findings are based on an ecological, cross-sectional study. As a result, no conclusions can be made about causation. First, the study cannot demonstrate whether increasing density of medical marijuana dispensaries is associated with an increase in crime rates over time and space. At an aggregate level, dispensaries in Sacramento are not associated with crime cross-sectionally; however, the introduction of these dispensaries in these areas may have served to increase crime rates from the prior year. This hypothesis can only be tested by examining the changes in medical marijuana dispensary locations and crime rates over time. Second, the ecological design does not allow individual-level variation to be factored into the models, specifically owners' selection of the location of a dispensary. Future studies should address the issue of endogeneity by obtaining information from dispensary owners on their decision-making

processes associated with medical marijuana dispensary locations.

The small sample size of 95 census tracts may have limited the power of the final model. Limited power may have contributed to why variables theorized to affect crime (e.g., percentage of vacant housing, percentage of population ages 15–24 for violent crime rates) were not significant. However, the power was sufficient to establish whether the density of medical marijuana dispensaries would be associated with crime in the univariate models (i.e., Model I).

Other unmeasured ecological factors may also be influencing results. Because of sample size limitations, the current study omitted the locations of illicit drug market activity (Eck, 1995; Gorman et al., 2005; Weisburd and Mazerolle, 2000) and alcohol outlets (Gruenewald et al., 2006; Scribner et al., 1999), both of which are associated with higher crime rates. In addition, dispensaries may be located in areas that reflect the demographics of their clientele (i.e., older White men). The routine activity literature indicates that areas with these local neighborhood characteristics are not likely to have high crime rates (Cohen and Felson, 1979). Exploration of ecological factors associated with location of dispensaries is essential to better understand the role of neighborhood context related to these findings.

The focus on one mid-sized city in California limits the context to which these findings can be generalized. Future studies need to expand spatial methods of this type to other regions of California, other U.S. states, and international regions where marijuana place-based distribution occurs. In addition, the sample size did not allow for the inclusions of variables, such as interaction of place and population characteristics (e.g., Medical Marijuana Dispensary Density × Commercial Zoning) or spatial lags. Finally, measures of premise-based features and operation procedures may provide a better indication of guardianship and employee vulnerabilities that may be associated with findings.

These findings run contrary to public perceptions (California Police Chief's Association, 2009). The cross-sectional results suggest that dispensaries are not associated with crime rates; however, current media and policy efforts have focused their attention on the place-based regulation of these dispensaries to protect the public against crime (California Police Chief's Association, 2009; City of Los Angeles, 2010; Lopez, 2010). Based on the limited evidence presented by this study, it is unclear if place-based policies will be effective. Future studies should address previously described limitations, such as longitudinal studies, to assess the influence of medical marijuana dispensaries on existing crime rates, to gain a better of understanding of the relationship between medical marijuana dispensaries and crime. In addition, future studies should explore specific elements that make dispensaries vulnerable or resistant to crime to better guide future policies.

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