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AN ECOLOGICAL ASSESSMENT OF THE POPULATION AND ENVIRONMENTAL CORRELATES OF CHILDHOOD ACCIDENT, ASSAULT AND CHILD ABUSE INJURIES

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Abstract

Introduction—This study examines the relationships of population and environmental characteristics to hospital discharges for childhood accident, assault, and child abuse injuries among youth from 0 to 17 years of age.

Methods—The analysis uses aggregate data on populations and environments in 1646 California zip code areas that were collected for the year 2000. Zero inflated negative binomial models were used to assess ecological relationships between these characteristics and numbers of hospital discharges for childhood injuries from accidents and assaults; negative binomial models were used to assess these relationships for injuries related to child abuse.

Results—A number of different characteristics were related to the different injury outcomes. Childhood accident injuries were related to measures female headed households, adult to child ratio and non-alcohol retail establishments (e.g., numbers of gas stations). Assault injuries were related to measures of poverty and vacant housing. All three outcomes were directly related to percent of female-headed households, percent African American residents, and density of off-premise alcohol outlets.

Conclusion—The results demonstrate that both population and environmental characteristics are significantly correlated with rates of childhood injuries. These results suggest that some environmental characteristics, in particular the presence of many off-premise alcohol outlets in neighborhoods, may reduce the overall level of guardianship of children's activities in zip code areas, resulting in harm to their children.

Childhood injuries are a costly and serious threat to the well-being of children and youth in the United States. In 2001, there were 12,249 deaths among children ages 1–14 (United

States Department of Health and Human Services, 2003). Injuries are the leading cause of death for children in this age group, accounting for 33.2 percent of all deaths among children ages 1 to 4 and 39.4 percent of all deaths among children ages 5 to 14 (United States Department of Health and Human Services, 2003). Moreover, injuries account for approximately 15 percent of medical spending for children and youth ages 1 to 19, making these injuries a costly childhood problem (Miller, Romano, & Spicer, 2000).

These statistics give testimony to the importance of research that explores the causes and consequences of childhood injuries. Consequently, a number of recent studies have focused upon individual- and family-related risk factors related to childhood injury rates (e.g., Brayden et al., 1993; Buck, 1988; Glik et al., 1993; Esbensen et al., 1999). However, it is likely that environmental characteristics also play a critical role in the etiology of childhood injuries. Families in “problem” environments, for example those residing in disordered neighborhoods, may have greater exposures to other risk factors related to injury outcomes due to accidents, assaults, or child abuse among children and youth. For example greater rates of child physical abuse have been observed in impoverished neighborhoods (Coulton et al., 1995; Freisthler, 2004) and those with greater numbers of bars and other on-premise drinking establishments (Freisthler et al., 2004). Should such features of the larger neighborhood environments in which families live increase the risk of injuries due to accidents, assaults, and child abuse to children and youth, then focused environmentally based preventive interventions might provide the impetus for long-term reductions in accidents and injuries to children (Cohen et al., 2003; Damashek and Peterson, 2002). Explanations for the rates of injuries observed in community settings focus usually upon two types of contextual features of these areas: “person” characteristics or those characteristics of populations living in those areas (e.g., poverty, female-headed households) or “place” characteristics or those features of the places or environments in which they live (e.g., alcohol outlets, vacant housing) (Gruenewald et al., 2006). Although the dividing lines between these types of features are somewhat arbitrary, both characteristics are likely to be incorporated in contextual studies of injuries (Gruenewald et al., 2006).

The Larger Social Environment

There is a rich literature in public health, epidemiology, and criminology that suggests certain population (or person) and environmental (or place) characteristics are related to injury outcomes. These include (a) the social capital of neighborhoods (e.g., neighborhood disorganization and impoverishment, Sampson et al., 2002), (b) neighborhood social controls (e.g., rates of vacant housing related to illegal drug sales and use, Green, 1996), and (c) general retail activities that reflect population exposures to problem outcomes (Gruenewald et al., 2006). Limited social capital restricts the ability of neighborhoods to respond to social problems that might endanger children’s health and well being. Reduced levels of social control can encourage risky behaviors to develop and perpetuate unchecked (playing in dangerous streets or vacant housing). Further those areas that have fewer adults available to monitor and supervise children’s activities may further exacerbate problem behaviors. Finally population-level problem outcomes (e.g., assaults, child maltreatment) are positively associated with numbers of off premise alcohol outlets (i.e. places where alcohol is purchased for consumption somewhere else such as a liquor store); however, these studies have generally not controlled for other types of retail activities that may cluster in the same places as these off premise outlets. Thus, the relationship between alcohol outlet density and these outcomes might be spurious and a reflection of overall business pattern locations. In other words these effects might be more accurately accredited to activities that take place around all retail outlets that sell complementary sorts of goods (e.g., soft drinks and cigarettes; Gruenewald and Remer, 2006). As such, the effects related to increases in child maltreatment may not be due to outlet densities, per se, but to the increased traffic due to all

retail establishments that subsequently makes it difficult to identify neighborhood residents from non-residents and develop supportive relationships with neighbors. In other words, as the population of non-residents travel in and out of the neighborhood to shop or dine at restaurants increases the more difficult it becomes for residents of the neighborhood to know who lives in the area and who is just conducting business in the area. This uncertainty impedes the development of long-term relationships with individuals living within those areas (Grannis, 1998).

Parents living in advantaged neighborhoods with higher social capital may have more opportunities to develop social networks and work together to enforce shared norms (Sampson, Morenoff & Earls, 1999). Specifically, neighborhoods with higher levels of concentrated affluence, residential stability and lower population density demonstrate more reports of reciprocated exchange and child-centered social controls (Sampson et al., 1999). Potential social networks are available to residents in socioeconomically advantaged neighborhoods through higher levels of social capital. These social networks provide the opportunity for collective supervision of children, which affords parents increased assistance in monitoring their children (Beyers, Bates, Petit, & Dodge, 2003). Conversely, parents living in neighborhoods with lower social capital bear an increased child care burden, as they need to compensate for the lack of community-level supervision with increased parental monitoring (Beyers et al., 2003; Coulton et al., 1995). Childcare burden refers to the amount of adult supervision, guardianship, and resources available in neighborhoods to care for children (Coulton et al., 1995). Typically child care burden has been measured by the ratio of children to adults, percentage of residents older than 65, and ratio of men to women in an area (Coulton et al., 1995; Korbin et al., 1998). Thus, by increasing understanding of how the neighborhood environment might enhance or diminish guardianship through the presence or absence of available adults to monitor children's behaviors, some childhood injuries might be prevented.

Typically, social disorganization (generally representing a lack of social capital) has been measured by variables or factors indicating impoverishment, residential instability, and child care burden (Coulton et al., 1995; Sampson et al., 1997; Sampson & Groves, 1989). Studies have found that socially disorganized neighborhoods are related to more injuries due to accidents (Haynes et al., 2003), higher rates of child abuse (Coulton et al., 1999; Coulton et al., 1995; Freisthler, 2004) and violent crime, including assaults (Alaniz et al., 1998; Gruenewald et al., 2006; Sampson et al., 1997). Similarly, living in an impoverished neighborhood increases the risk for childhood injuries (Haynes et al., 2003; Reading et al., 1999). The increased risks associated with deprived neighborhoods might be strictly "place" characteristics (e.g., dangerous streets, unprotected industrial sites); they might also reflect an absence of social control that affects socially-determined practices, such as those related to what constitutes appropriate levels of monitoring, autonomy and play activities for children (Haynes et al., 2003; Soori & Bhopal, 2002).

The Alcohol Environment

Alcohol use among adults, many of who are parents, has itself been found to be responsive to the alcohol environment, with greater frequencies of drinking occurring in neighborhoods where there are greater numbers of alcohol outlets (Gruenewald, Johnson and Treno, 2002; Stockwell and Gruenewald, 2004). These greater levels of drinking are, in turn, associated with greater numbers of related alcohol problems such as assaults (Roncek and Maier, 1991; Scribner et al., 1995; Gorman et al., 2001; Lipton and Gruenewald, 2002) and higher rates of child maltreatment (Freisthler, 2004; Freisthler et al., 2007; Freisthler et al., 2004). This is significant as children were at greater risk for injuries at home (1.6 times), in the street (2.4 times) and in recreational areas (3.4 times), in families where the mother was classified as a

problem drinker (i.e., experiences multiple consequences from drinking) (Bijur, Kurzon, Overpeck, & Scheidt, 1992).

Freisthler and colleagues (2004) examined the relationship of alcohol outlet density to child maltreatment through the lens of routine activities theory (Cohen & Felson, 1978). Routine activities theory has primarily been used to describe criminal behavior, not injuries due to accidents. Put simply, routine activities theory states that the convergence of the lack of effective guardianship, along with a suitable target, and motivated offenders result in harm (Cohen & Felson, 1978). These researchers found Census tracts with greater densities of bars had higher rates of substantiated reports of neglect. In these areas, parents may have more opportunities to socialize away from home (regardless of whether or not they are drinking) either leaving their children without a suitable caretaker or providing less supervision of their children's activities. Greater densities of off-premise alcohol outlets (e.g., liquor stores, convenience stores) were related to higher rates of child physical abuse, suggesting that parents with greater access to alcohol in this venue may be drinking at home possibly increasing levels of aggression that result in physical abuse. In terms of accidents, off-premise outlets may increase risky parental drinking at home (i.e. to intoxication) impairing ability to monitor or supervise their children (Freisthler et al., 2004).

The Current Study

As shown above, some environments are more risky than others for children requiring higher levels of guardianship or supervision to prevent harm (Peterson et al., 1993; Cohen et al., 2003). Against the background of these multiple determinants of injuries to children, this study advances the current literature by examining the relationships between alcohol outlets, socially disorganized neighborhoods, and injuries to children 0 to 17 years of age. Although there is no direct measure of parental monitoring or parental alcohol use, this study can provide insights into the ways in which neighborhood environments may be modified to reduce injury risks to children.

METHOD

Data on the outcome variables (hospital discharge data of injuries from accidents, child abuse, and assaults) were obtained by zip codes for the residence of the patient (99% geocoding rate) from California's Office of Statewide Health Planning and Development for the year 2000. These records provide information on all admissions that result in at least one overnight hospital stay, including ICD-9 diagnostic codes related to the hospital stay. Among these codes are "E-codes," event codes that identify the cause of injury. In California, diagnostic coding has a sensitivity and specificity of better than 90% in record check and patient follow-up studies (Meux, et al, 1990) and E-codes are obtained for 100% of all injury admissions to hospitals in the state (Abellera *et al.*, 2005). For this study, we use hospital discharge data for 0 to 17 year olds in 1,646 zip codes in California for accidental injuries (excluding medical misadventure or adverse reactions to medications motor vehicle accidents). These include ICD-9 E-codes for (1) accidental injuries: E800 to E809.9, 826 – 848.9 which refer to other types of transport accidents (e.g., due to watercraft), 850–869.9 (i.e., accidental poisonings), 880–929.9 (i.e., fires, suffocation), and 980–989.9 (i.e. accidents with undetermined cause), (2) child abuse: v612.1 (i.e. child battering, child neglect), E967.0 to E967.9 and E995.5 (i.e. assault by relationship of perpetrator of child abuse), and (3) assault injuries: E960 to E969, excluding E967.0 to E967.9 (i.e., homicide or injury purposely inflicted on another). The difference between an injury due to child abuse versus one due to assault is distinguished by the relationship to the perpetrator. Caretakers who physically abuse (or "assault") a child may have a primary code of child abuse whereas a person of the same age as the injured person or a stranger would have a primary code of

another type of assault. Across the 1,646 zip codes there was an average of 12.62 accidental injuries, 1.05 assault injuries, and .60 child abuse injuries among youth and children 0 to 17 years of age (see Table 1.)

One way to distinguish between the types of independent measures included in ecological studies is to separate effects related to characteristics of populations (“person” characteristics) from features of the places themselves (“place” characteristics). Although some measures are clearly “place”, and others are clearly “person”, some designation decisions are somewhat arbitrary and subject to a different interpretation based on the research perspective. From our perspective person characteristics refer to aggregate descriptions of individuals living within zip code areas. Data on person characteristics were obtained from the 2000 U.S. Census and included measures related to child care burden (ratio of adults to children, ratio of males to females, and percent of female-headed households with children), concentrated disadvantage (percent of high school graduates, percent unemployment, and percent poverty), residential instability (percent of individuals who moved in the past five years), and racial/ethnic composition (percent Hispanic, percent African American, and percent foreign born.) Table 1 provides descriptive statistics for each of the measures.

Data for place characteristics were obtained from three sources (2000 Census, California Alcohol Beverage Control and the U.S. Department of Commerce, Economics and Statistics Administration). Data on the locations of alcohol outlets were obtained from California Alcohol Beverage Control and were categorized as off-premise establishments (i.e. places where alcohol is purchased for consumption somewhere else such as a liquor store), restaurants that serve alcohol, and bars/pubs. Off-premise outlets have license types 20 or 21, and those with license types 41 or 47 were coded as restaurants. Bars/pubs have license types 23, 40, 42, 48, 61 or 75. Only establishments with active licenses at the beginning of January 2000 were used and geocoded to the zipcode level (98% geocoding rate). Density of outlets was calculated in units of number of outlets per roadway miles.

County business pattern data for 1999 were obtained from the U.S. Department of Commerce, Economics and Statistics Administration to measure retail density (99% geocoding rate). Non-alcohol retail establishments were grouped in two categories for this study: gas stations and clothing stores. Density of retail establishments was obtained by dividing the total number of each type of retail establishment by roadway miles for each zip code. Numbers of vacant houses were obtained from the U.S. Census and were divided by roadway miles.

Finally population concentrations were measured using two variables. Child population size was the number of children 0 – 17 years of age living within each zip code area. Population density was measured using the number of children 0 – 17 per roadway mile.

Rao’s likelihood chi-square tests were used to assess the separate contribution of population measures, person characteristics, and place characteristics to the model (G^2 ; Fienberg, 1980). Data were analyzed using zero inflated negative binomial models for injuries from accidents and assaults and negative binomial models for child abuse injuries. Negative binomial models provide a flexible approach to modeling count data that allows for over-dispersion relative to the Poisson distribution. Zero inflated negative binomial models enable direct modeling of count data under circumstances in which an unobserved process produces an excess of zeros relative to a negative binomial distribution (Greene, 2002). Zero inflation may occur for many reasons, including inaccurate case ascertainment or other sources of unobserved incidents of cases. Because areas located next to each other often share similar characteristics (i.e. are correlated), the residuals of these models were assessed

for spatial autocorrelation (Spatial Statistical System, S³, Ponicki and Gruenewald, 2003). Spatial autocorrelation refers to the presence of correlations between spatial units that can bias the statistical tests of the coefficients. Additionally, each unit of analysis (zip code) was weighted by the square root of population size for the age group in that particular area to control for heteroskedasticity found in small area analyses (Greene, 1993). Finally, because these models also included a large number of possibly multicollinear covariates, condition indices for every model were assessed to diagnose the tolerance of model estimates (Greene 1993). The condition index for the final model was 17.13, elevated over usual levels, but not indicative of severe multicollinearity.

Model diagnostics for overdispersion, indicating the need for a negative binomial model versus a Poisson model, zero-inflation vs. non-inflated negative binomial model, and spatial autocorrelation of the residuals for the final models are shown in the final three rows of Table 3. Assessments of overdispersion for all three outcomes and zero-inflation for accidents and assaults were significant. Spatial autocorrelation of the residuals for all three outcomes were not statistically significant.

RESULTS

Table 2 presents the results of Rao's likelihood chi-square tests assessing the fit of each model component to the overall model. This assessment required stepping out specific subcomponents of the analysis model, creating inevitable bias in estimates of the significance of model components, but generally providing an overall idea of the contribution of each block of variables to the analysis (see Fienberg, 1980). The analyses showed that the child population measures (size and density), person characteristics and place characteristics contributed substantially to the models for counts of accidents, assaults, and child abuse.

Detailed results of the zero inflated negative binomial models are shown in Table 3. Local child population sizes were positively related with all three injury types. Child population densities were negatively related to accidents and child abuse injuries, but not related to assault injuries. Children in zip code areas with larger percentages of African American residents and female-headed households with children and more off-premise alcohol outlets per roadway mile had more injuries from accidents, assaults, and child abuse. Lower ratios of males to females were associated with more accidents and assaults. Other person characteristics related to injuries from accidents include percent moved in the past five years (+), percent of high school graduates (+) and adult to child ratio (−). Higher rates of poverty were related to more assault injuries while higher rates of high school graduation were related to increased numbers of injuries from child abuse. In addition to off-premise alcohol outlets, place characteristics with significant findings include densities of gas stations (+) and clothing stores (−) for accident injuries and density of bars (+), clothing stores (−) and vacant housing (+) for assault injuries.

DISCUSSION

This study examined the relationships between population ("person") and environmental ("place") characteristics and injuries from accidents, assaults and child abuses for children and youth aged 0 to 17. The analyses showed that childhood population size and density, and other population and environmental characteristics, contributed substantially to explaining rates of accidents, assaults, and child abuse. The results also indicated that all types of injuries occurred more often in zip code areas with higher percentages of African American residents and female-headed household families with children and with more off-premise alcohol outlets per roadway mile. While this study controlled for density of other

types of retail activity, very few of these variables were related to the three injury outcomes studied here.

The positive relationships observed between all types of injuries and child population size indicates that areas with more children experienced a greater number childhood injuries. In the cases of accident and child abuse injuries, this trivial observation was complemented by an observed negative relationship between the measure of child population density and these injury outcomes. Controlling for child population size, numbers of accident and child abuse injuries were lower in dense urban than rural neighborhoods. It might be suggested on this basis that greater levels of guardianship were more easily maintained in dense urban environments in which more adults are present. Although this interpretation would appear highly speculative, it is supported by two additional observations: Numbers of all injuries were greater in areas with greater numbers of female headed households, lower ratio of males to females (for accident and assault injuries) and those with a lower ratio of adults to children (for accident injuries). These observations collectively suggest that greater number of injury outcomes occurred in zip code areas where relatively fewer adults were available to provide adequate supervision.

Although these suggestions reflect the results of the current ecological study, a detailed empirical assessment of the social mechanisms that relate greater numbers of off-premise alcohol outlets to these three injury outcomes cannot be provided by the present study. It can be logically assumed that the availability of alcohol via off-premise outlets generally promotes drinking in other locations as alcohol cannot be consumed at the establishment where it is purchased. It could be argued that these areas have higher rates of childhood injuries because parental monitoring behaviors are undermined by the use of alcohol as previous research showing that greater densities of alcohol outlets increase frequency of drinking and that young adults in California are more likely to drink at home and at friends' homes (Gruenewald et al., 2002). However, this line of reasoning remains speculative.

The positive relationship of off-premise outlets and child abuse has previously been found for physical abuse but not child neglect. Child maltreatment is often under-identified in hospital settings and may be more likely to be identified if there is a physical injury to a child (Ewigman et al., 1993). Hospital discharge data, however, do not allow us to differentiate between types of child abuse (e.g., physical abuse, neglect). Continued research into these relationships will help further explicate the relationship between alcohol outlet density and child maltreatment.

In general measures related to impoverishment or residential instability were not significantly related to assault and child abuse injuries among children and youth. However, in the case of accidental injuries, measures of neighborhood disadvantage (percent poverty), residential instability (percent moved past five years), and child care burden (adult to child ratio, male to female ratio, percent female-headed households with children) were statistically significant. These findings suggest that parents living in neighborhoods with lower social capital bear an increased child care burden, as they need to compensate for the lack of community-level supervision with increased parental monitoring (Beyers et al., 2003).

Other than off-premise alcohol outlet density, few environmental (or "place") measures were related to injuries due to accidents, assaults, or child abuse. Among the significant findings are a gas stations (+) and clothing stores (−) with accidental injuries and bars (+), vacant housing (+) and clothing stores (−) with assault injuries. Findings related to bars and vacant housing are consistent with previous literature examining assaults among adults (Gorman et al., 2001; Lipton & Gruenewald, 2002; Sampson et al., 1997). The differential

relationship between gas stations and clothing stores with injuries due to accidents is puzzling, but may represent differences in the locations of where these types of retail establishments may be located. For example, gas stations are likely to be located in and around all areas that experience high vehicle traffic while clothing stores are more likely to be distributed solely within other shopping areas. Thus the finding may reflect other aspects of the resident populations in these areas (urban vs. suburban).

Directions for Future Research

The present study is limited in at least two major ways. The data are cross sectional and therefore can only provide correlations between the various measures. Second, the study provides neither a direct nor an indirect measure of parental monitoring. Thus, the linkages between person and place factors, in particular off premise alcohol outlets, and parental monitoring are provided for thoughtful consideration only. The study's authors' suggestion that the density of outlets alters guardianship of children, which in turn affects children's injuries, while intuitively appealing, remains speculative. In order for this explanation to gain credence, studies must measure both patterns of alcohol consumption as well as parental monitoring behavior, how parents and youth spend away from home (e.g., together or apart), at what locations and engaged in what activities. Further research might reveal pathways that explain how alcohol outlets may be related to injuries due to inadequate parental monitoring and the disinhibiting qualities of alcohol, see Pihl et al., 1993, 1997).

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Table 1

Descriptive Statistics for Dependent and Independent Variables across all California Zip Codes (n = 1,646)

	Mean	SD	Minimum	Maximum
Outcomes				
Accidental Injuries	12.62	15.66	0	104.00
Assaults	1.05	2.28	0	24.00
Child Abuse	0.60	1.18	0	11.00
Population Density				
Child population	5595.60	6330.74	0	39733.00
Child population per mile	52.49	66.65	0	722.61
Person Characteristics				
Adult to child ratio	5.90	37.30	0	1139.00
Male to female ratio	1.14	2.19	0	62.87
Percent female-headed household	6.40	5.34	0	100.00
Percent HS graduate	77.71	17.87	0	100.00
Percent poverty	13.92	9.87	0	100.00
Percent moved past 5 years	49.26	13.07	0	100.00
Percent Hispanic	23.82	21.88	0	100.00
Percent African-American	4.60	8.71	0	87.76
Percent foreign born	18.67	14.73	0	78.80
Place Characteristics				
Off Premise outlets	0.19	0.53	0	16.89
Restaurants	0.32	1.90	0	69.47
Bars or Pubs	0.06	0.45	0	16.89
Gas Stations	4.75	6.01	0	81.17
Clothing stores	17.99	114.09	0	3037.26
Vacant Housing	5.41	17.26	0	507.52

Table 2

Tests of Model Fit Comparing Population Density, Person Characteristics, and Place Characteristics to Full Model

Variable Block	Accidents		Assaults		Child Abuse	
	ΔG^2	p	ΔG^2	p	ΔG^2	p
Population Density	1371.10	< .001	462.40	< .001	229.19	< .001
Person Characteristics	195.13	< .001	298.41	< .001	123.52	< .001
Place Characteristics	71.80	< .001	24.93	< .001	128.21	< .001

Table 3

Zero Inflated Negative Binomial Results of Injuries due to Accidents, Assaults, and Child Abuse among Children and Youth Aged 0 to 17 by Zip Code (n = 1,646)

Variable	Accidental Injuries			Assault Injuries			Child Abuse Injuries		
	b	se	p	b	se	p	b	se	p
Constant	0.7893	0.2339	0.001	-0.1178	0.3515		-3.9838	0.7322	<.001
Population									
Child population	0.0001	0.00001	<.001	0.0001	0.00001	<.001	0.0001	0.0000	<.001
Child population per mile	-0.0009	0.0003	0.004	-0.0005	0.0005		-0.0035	0.0008	<.001
Person Characteristics									
Adult to child ratio	-0.0548	0.0122	<.001	0.0018	0.0023		-0.0012	0.0109	
Male to female ratio	-0.2077	0.0173	<.001	-0.2610	0.1091	0.017	-0.0357	0.1340	
Percent female-headed household	0.0411	0.0073	<.001	0.0335	0.0066	<.001	0.1027	0.0203	<.001
Percent HS graduate	0.0107	0.0025	<.001	-0.0035	0.0034		0.0199	0.0073	0.007
Percent poverty	0.0001	0.0030		0.0076	0.0037	0.041	-0.0013	0.0083	
Percent moved past 5 years	0.0041	0.0013	0.002	-0.0011	0.0021		0.0062	0.0043	
Percent Hispanic	0.0023	0.0012		-0.0006	0.0018		0.0058	0.0037	
Percent African-American	0.0035	0.0015	0.021	0.0178	0.0019	<.001	0.0146	0.0037	<.001
Percent foreign born	0.0017	0.0015		0.0008	0.0020		0.0058	0.0042	
Place Characteristics (per mile)									
Off Premise outlets	0.3899	0.1124	0.001	0.3070	0.1453	0.035	0.6706	0.2650	0.011
Restaurants	-0.0035	0.0437		-0.0856	0.0519		0.0454	0.1061	
Bars or Pubs	0.1067	0.1892		0.3887	0.1704	0.023	-0.0795	0.4561	
Gas Stations	0.0119	0.0029	<.001	0.0044	0.0040		0.0099	0.0076	
Clothing stores	-0.0011	0.0003	<.001	-0.0012	0.0006	0.048	-0.0006	0.0009	
Vacant Housing	-0.0042	0.0026		0.0071	0.0019	<.001	0.0041	0.0064	
Overdispersion	.0998	.0069	<.001	.1403	.0347	<.001	.3415	.0467	<.001
Zero Inflation	-1.4213	.0859	<.001	-4.8293	.5150	<.001	NA	NA	NA
Spatial Autocorrelation	.0044		.750	-.0001		.977	-.0009		.984