ID#07963

CAPITOL

NEIGHBORHOODS, INC.
MADISON, WISCONSIN

December 4, 2007

Members of City of Madison Common Council
City Clerk's Office
210 MLKJ Blvd., Room 103
Madison, Wisconsin

Subject: Field Pass

Dear Common Council Members:

CNI's Alcohol Issues Committee has strong concerns about granting a license to the Field Pass at 777 University Avenue. We recommend opposing this license.

1. One concern is that the establishment will be located in a multi-use building that will house large numbers of college students, including many who will be underage. In view of the continuing concerns about risky and heavy drinking in Dane county, especially by young people – legal-aged and underage – we believe it would be poor policy to locate an alcohol retail outlet in the same building where many students will be living.

2. Another concern is the sheer size of the facility and its location. The site falls within the recently revised established area of restricted alcohol density. According to Google Maps, the following establishments are located within 0.1 mile of the proposed Field Pass: Brothers, Church Key, City Bar, Johnny O's, Kollege Klub, Madison Avenue, Red Shed, and Wando's. The following establishments are located within 0.2 miles: Badgerland, Blue Velvet, Lava Lounge, Nitty Gritty, and The Pub. Some of these establishments have been the scene of frequent disturbances and other crimes, including violent crimes. Prior research in many cities has demonstrated that a high density of alcohol retail outlets is associated with high rates of crime, including violent crime. Madison Police statistics demonstrate that there is already a high rate of violent and other crime in an area of high density near campus, and the proposed site would fall within this area. Bringing up to 550-800 additional drinkers into this area of high density would make this an area of extremely high density and inevitably bring more problems to the neighborhood.

3. A related concern is the safety of up to 550-800 drinkers who would leave the Field Pass at bar time. The applicant has a reasonable security plan for within the facility. The quality of the establishment does not diminish the issues related to alcohol outlet density. How will intoxicated patrons be kept safe when they empty out of the Field Pass on to University Avenue at bar time? Will the sidewalks accommodate such a large crowd? Will the crowd spill into University Avenue, creating a significant traffic hazard and high risk for intoxicated pedestrians? Will the criminal element that has been attracted to nearby bars prey on the intoxicated patrons of the Field Pass? Does the Madison Police have the staff to handle the issues that will inevitably arise,

when it is already stretched very thin? Our multi million dollar downtown commercial district is already disfigured with vomit, urine, garbage and graffiti, by people who choose to use drink alcohol to the point of disrespect to other people property public and private.

4. Another concern is that the establishment is seeking licensure as a restaurant. Whether an establishment is a bar or restaurant is to be determined by three factors: (A) the amount of capital, labor, time, attention, and floor space devoted to each business activity; (B) the sources of net income and gross income; and (C) the name appearance, and advertising of the establishment, the hours of operation, the frequency, duration, timing and magnitude of entertainment, staff scheduling, and the use of security staff. While the applicant foresees that the majority of income will be generated from food, we have seen many such predictions not hold true for other establishments in the past. While there is a large area set aside for tables, we have seen other so-called restaurants move tables out of large areas at night, essentially creating a bar.

Several aspects of the business plan suggest that the establishment will function largely as a bar:

- The establishment will stay open until 2:30am. Bona fide restaurants do not stay open until 2:30am.
- The Dane County Tavern League representative stated at the ALRC meeting "this will be a primarily alcohol driven business and nobody makes money on late night food in downtown Madison."
- The establishment will have a "sports bar theme." Restaurants usually have a theme that revolves around food, not drinking.
- While the plans to have a fairly large security staff demonstrate the applicant's sense of responsibility, such plans also demonstrate that the establishment plans to operate as a bar. Bona fide restaurants do not need a security staff.

Given the potentially large impact that 550-800 additional drinkers could have on the neighborhood, our substantial concerns about crime and safety, and the lack of time we had to engage in further discussion with the applicants, we request that this application be denied. We believe that there are too many unresolved issues to grant licensure at this time, especially as a restaurant, but as any alcohol outlet in this particular location. As the Common council's primary responsibility is to guard the health and safety of the citizens of Madison, we hope the Common Council will agree.

Sincerely,

Jamie McCarville, Chair
Alcohol Issues Committee

Public Convenience or Necessity:
The Power of Local Municipailities to Control Alcohol Outlet Density

East County Community Change Project • June 2004

In a region experiencing rapid growth, such as the eastern area of San Diego County, communities are at risk of becoming oversaturated with bars, liquor stores and other locations where alcohol can be purchased.

If controls are not imposed, such conditions can threaten public health and safety and reduce the quality of life in surrounding neighborhoods. This issue briefing details the problems associated with high alcohol-outlet density and the power of local municipalities to mitigate them by adopting stronger prevention policies

The effects of outlet density on a community

Until recently alcohol-related problems were viewed as the result of individual behavior. However, about 15 years ago researchers began to look at these problems from a new perspective, taking into account the context in which they occur. There is now a large and growing body of evidence showing that the negative consequences of alcohol use are strongly influenced by environmental factors. Foremost among these factors is alcohol-outlet density.

Many studies establish direct correlations between high alcohol availability and increases in drunken driving, sexual assault, crime and violence, underage drinking, health problems and economic decline. Moreover, the relationship between these problems and outlet density is statistically significant, regardless of socioeconomic and other demographic factors. (See enclosed Research Summary.)

For these reasons, the California Department of Alcoholic Beverage Control (ABC) has established guidelines for the acceptable level of alcohol outlet density in a given census tract. If the number of alcohol retailers exceeds the number recommended, that census tract is considered to be oversaturated (detailed information is available on the ABC Web site: www.abc.ca.gov)

Using Public Convenience or Necessity (PCN) as a tool to control oversaturation

In 1994, the California State Legislature adopted the Caldera bill, which authorizes local municipalities to control the number of bars and retail outlets in their communities. These rules apply to ABC license requests in areas that are already oversaturated and/or areas that have high crime rates. Under the statute, high crime is defined as an area that exceeds the city's average crime rate by 20 percent

"If the local authority denies a PCN waiver, then state law requires the ABC to honor that decision and deny the alcohol license application."

Under such conditions, ABC must deny the license application unless there is a finding of need, termed

"Public Convenience or Necessity" (PCN) in the statute Depending on the type of business requesting a license, the finding of "Public Convenience or Necessity," is determined either at the state or local level.

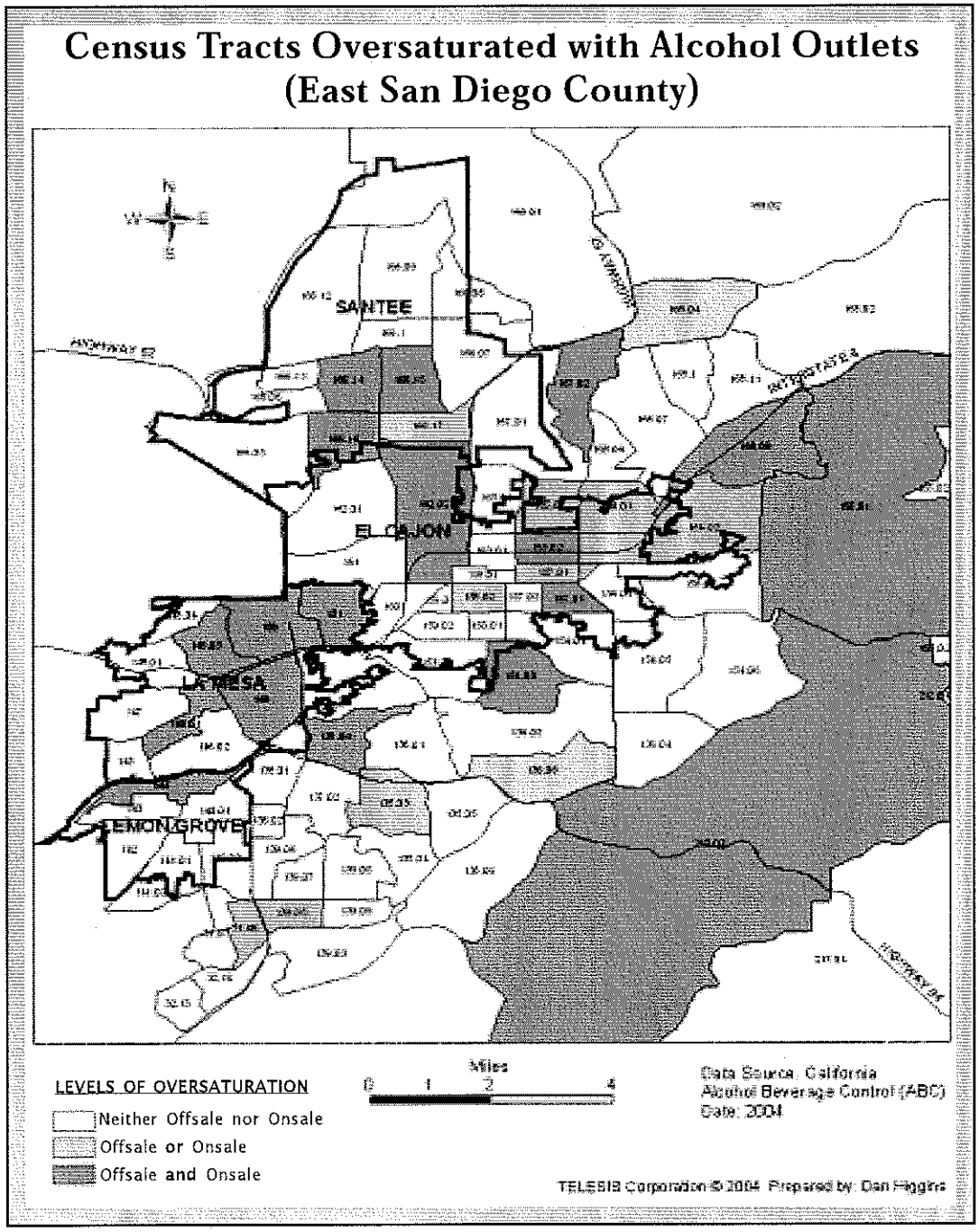
The State Department of Alcohol Beverage Control has sole authority over restaurants, hotels, motels and other lodging establishments, but local governments have discretionary power over bars and liquor stores. If, in these cases, the local authority does not find a need, state law requires the ABC to honor that decision and deny the license application.

The Burden of Proof

Despite the authority of local municipalities to control outlet density, many of the census tracts in San Diego County, including the East Region, have reached or surpassed saturation levels (see map below)

Part of the reason may be that local governments are seeking to support small business and they are unaware of the problems that inevitably come with high outlet density. As such, governing authorities may lean toward approval of new applications unless it can be demonstrated that the license in question will result in escalated crime or some other negative consequence to the surrounding area.

But this is a flawed standard that is contrary to the intent of state law. When dealing with high-crime and oversaturated areas, local residents and health advocates should not be required to establish the potential for harm. *Instead, the burden of proof should be on the applicant, to show that there is a need for another alcohol outlet or, at a minimum, the outlet will be of benefit to the community*



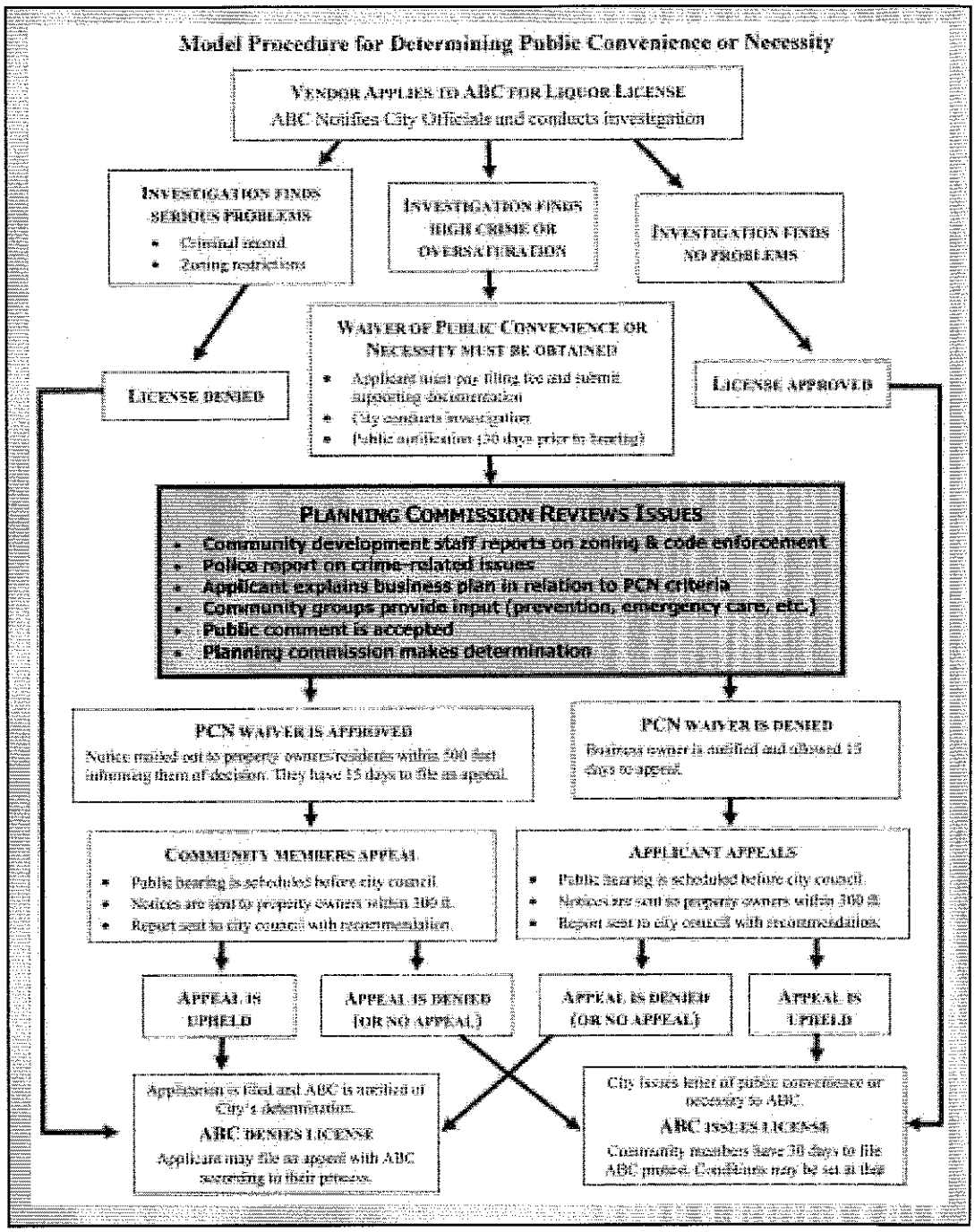
The Need for Public Involvement

In some cities, PCN-related decisions are made by an administrator such as the city manager or planning director. However, such a procedure does not

allow for any community input on the issue A preferable approach would be to hold a public hearing, so the effect on local neighborhoods could be assessed

An ideal process would solicit input from a variety of stakeholders In addition to local law enforcement and planning department staff, community members, health and emergency care providers, and representatives from other community agencies would be asked to participate

Because these decisions are related to land use, a local planning board or commission is often a good venue for this kind of hearing Under such a system, the board would have the power to make a final decision, but if it were contested, it could still be appealed to the city council for a final resolution (See model procedure at right)



Establishing PCN Criteria: How and Where to Draw the Line

State law does not mandate a set of criteria to be used to establish PCN Instead, that decision is left up to the local elected officials, so they can take into account characteristics unique to their respective communities To aid them in making this decision, prevention experts have developed two sets of criteria

The first set is "Mandatory" criteria; conditions under which an application automatically will be denied The second set is "Discretionary" criteria; conditions that may disqualify an application based on a risk-and-benefit assessment It should be noted these two are not meant to be mutually exclusive To the contrary, using a combination of both is recommended, as that would afford the highest level of protection (See next page, taken from: *Public Convenience or Necessity: A Guide for Local Government*, produced by the EMT Group and funded by the California Department of Alcohol and Drug Programs)

Mandatory Criteria

The following factors are examples of those that might be used as the basis to reject a PCN waiver in an area of undue concentration or high crime:

- Targeted law enforcement areas, i e. regions already drawing excessive amounts of law enforcement resources
- Elevated rates of alcohol-related crime (i e., disturbing the peace, public intoxication, prostitution, vandalism, graffiti, etc.)
- Long-term levels of undue concentration (20 percent higher than the state average)
- Proximity to sensitive land uses (i e , schools, churches, residences, parks, areas designated for economic development)

Discretionary Criteria

Under this model, the decision-making body conducts a risk and benefit analysis, with the benefits being considered first. Here the applicant and/or those supporting the application have an opportunity to present the merits of the proposed outlet and explain what value it will bring to the community. If no tangible benefits can be demonstrated, no waiver would be granted. If there are discernable benefits, then the risks are examined.

Benefit Analysis

- Net employment gain, especially of local residents
- Various business taxes
- Unique business addition
- Upgrading an area and its usage
- Positive cultural or entertainment value
- Long-term economic development goals

Risk Analysis

- Law enforcement calls for service (20 percent higher than the average)
- Ratio of all police calls to alcohol-related calls
- Level of law enforcement capacity
- Health indicators, alcoholism rates, homelessness
- Percentage of youth in the immediate vicinity
- Alternative business uses available
- Duplication of existing services
- Business operations (i e , percentage of alcohol vs. other items sold, late-night sales, underage staff, sale of inexpensive or fortified wines, etc)

Since the density of alcohol outlets in a given community can have a significant impact on public health and safety, local governments should have policies and procedures in place to prevent oversaturation Establishing a strong set of PCN criteria and applying them to new applications as part of the planning process is a fair and reasonable way to meet this goal

"The burden of proof should be on the applicant to show that having a new alcohol outlet will be of benefit to the community."

This issue briefing was produced by the Institute for Public Strategies, a nonprofit organization advancing public health through changes in policy and community norms For more information, call (619) 296-3311, e-mail info@publicstrategies.org or visit www.publicstrategies org

Funded by County of San Diego Health and Human Services Agency Alcohol and Drug Services

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RESEARCH SUMMARY | Institute for Public Strategies

Evaluating the Impact of Outlet Density on Crime

While much of the crime data police collect may not appear to be related to alcohol consumption, much less the density of alcohol outlets, the research tells a different story. As demonstrated in the studies below, crimes such as domestic violence, assault, burglary, grand theft and others are linked to the availability of alcohol in a community. It would therefore be a mistake to minimize the relevance of such data when making decisions about whether to permit additional alcohol outlets in a neighborhood.

Violence and Crime

The relationship between alcohol outlet density and violent crime has been well documented. Communities with 100 or more alcohol outlets and a population of 50,000 or more can expect an annual increase of 2.5 violent crimes each year for every alcohol outlet added in the area.[i] Criminologists studying the distribution of violent crimes have found on-site alcohol outlets such as bars and restaurants were among the "hottest" of the "hot spots" for such incidents.[ii] In one large U.S. city, researchers found city blocks with bars had higher rates of assaults, robberies and rapes than other blocks, even after the analysis accounted for the effects of unemployment and poverty.[iii]

Researchers also found these so-called "wetter" neighborhoods have higher levels of public drunkenness and disturbing the peace violations[i] along with calls for police services.[iv] Further support for the causal relationship comes from research showing violence and other problems decrease when alcohol availability goes down.[v vi vii viii]

Increased homicide rates also are prevalent in regions with high densities of off-site alcohol outlets such as liquor stores.[vi ix] One study of urban neighborhoods in New Orleans found a 10 percent higher outlet density was associated with a 2.4 percent higher homicide rate. According to the researcher, this was true even after considering other factors such as the percentage of unemployed, black, young male residents and the number of households headed by unmarried people.[ix]

Domestic Violence and Sexual Assault

New findings suggest domestic violence and sexual assault in a neighborhood may rise as the number of liquor licenses in the area increases. Even after accounting for socioeconomic factors that could influence domestic violence, a study in Maryland showed that a doubling of the density of liquor stores was associated with a nine percent increase in the rate of reported domestic violence. While alcohol is certainly not the only factor in domestic violence and sexual assault, researchers concluded that reducing the incidence of domestic violence in certain areas may be as simple as spreading out the stores that are allowed to sell alcohol.[x]

Several studies of college students also found a correlation between alcohol use and sexual assault. Specifically, the studies showed an increased likelihood of victimization among drinking and intoxicated women.[xi] In a study of 52 women bar drinkers, 85 percent of the women reported some form of nonsexual physical aggression. Thirty-three percent reported an attempted or completed rape occurred after drinking in a bar.[xii] The risk of nonsexual victimization was not greater for women who went to bars frequently, but the risk of sexual victimization increased.

Alcohol-related collisions

The most frequently reported consequences of high outlet density are alcohol-related collisions. According to a study of 72 cities in California, for every one percent increase in outlet density there was a .54 percent increase in alcohol-related crashes. Thus, if a city of 50,000 had 100 alcohol outlets, the residents would experience an additional 2.7 crashes for each new bar or liquor store.[i] Some studies indicate the rate of crashes can be reduced by responsible beverage service training programs, but the level of risk still is high when outlet density exceeds the acceptable levels of saturation.[xiii]

This is of special concern in cities such as El Cajon and La Mesa, the two most populous cities in the East County region, where there is high outlet density and most of the alcohol outlets are located along major roads and highways. The presence of so many bars and restaurants, closely packed together near major intersections, tends to increase the chances of alcohol-related traffic crashes. According to data from the California Office of Traffic Safety (OTS), many of these incidents take place at night, as bars are closing and highways become crowded with patrons who have been drinking.[xiv] This is confirmed by the Place of Last Drink survey data, which indicates about half of drunken drivers in San Diego County are coming from bars and restaurants.[xv]

Underage Drinking

A study of three cities in Northern California showed communities with high outlet density have significantly higher levels of underage drinking as well as gang-related behavior, drug sales and sexual promiscuity among youth. According to the authors, if alcohol outlets define the physical and social environment for youth, then they are more likely to engage in such activities.

A strong correlation was established between the age of a young person's first drink and a variety of personal and social problems. These include getting involved in fights, suffering personal injury, unprotected sexual activity and drinking problems later in life.[xvi] [xvii] It can be especially problematic when young people grow up in an environment with alcohol advertisements on every street corner.

Economic Decline

According to city planning departments, the most common complaints regarding alcohol outlets are related to noise, traffic or loitering. These problems may seem minor, but over time they change the character of a neighborhood. As a result, those who regularly visit may change their routines and even those living nearby may start to avoid the area.[xviii]

This phenomenon is consistent with research showing over-concentration of alcohol outlets often is part of a neighborhood's broad economic and social disintegration. *When an area becomes oversaturated with bars and liquor stores, it looses its economic base as well as its diversity and becomes less attractive to residents and potential retail customers.*[xix] Accordingly, a proliferation of alcohol outlets can be considered a symptom of economic decline and a factor that worsens such decline.

Conclusion

In light of this research, appeals by community organizations and residents to limit and/or decrease the number of alcohol outlets in their neighborhoods should not be construed as anti-business. To the contrary, crime and over concentration are barriers to attracting new businesses and commercial enterprises that can promote economic revitalization and development. Any new license applications in oversaturated areas should be considered with caution.[vii] [xx]

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xii. Parks, K., & Miller, B.A. (1997). Bar victimization of women. Psychology of Women Quarterly, 21(4), 509-525.

xiii. Holder, H.D., & Wagenaar, A.C. (1994). Mandated server training and reduced alcohol-involvement traffic crashes: A time series analysis of the Oregon experience. Accident Analysis and Prevention, (26)1, 89-97.

xiv. Data for California cities are available on the Office of Traffic Safety website: http://www.ots.ca.gov/cgi-bin/rankings.pl

xv. Place of Last Drink data is available on the East County Community Change Project website: http://www.publicstrategies.org/east/index.htm

xvi. Grant, B.F., and Dawson, D.A. (1997). Age of onset of alcohol use and its association with DSM-IV alcohol abuse and dependence: Results from the National Longitudinal Alcohol Epidemiologic survey. Journal of Substance Abuse, 9, 103-110.

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Effects of Alcohol Outlet Density on Economic Development

East County Community Change Project • February, 2003

Research shows that a high concentration of alcohol outlets in a location can hamper economic development. While such businesses may be heavily patronized, they add little intrinsic value to the community as a whole, and they make the area less attractive to other types of retail business.

In order to ensure the future economic growth of the small business communities of the East County region, as well as preserve the quality of life in the region, limits should be placed on the density of retail alcohol outlets. This requires a collaborative effort among retail business operators, property owners, local residents, community service agencies and local governments.

ECONOMIC DECLINE

The over-concentration of alcohol outlets is often part of a neighborhood's broad economic and social disintegration. An outlet-heavy area's economic base loses its diversity and becomes less attractive to both residents and potential retail customers. The proliferation of alcohol outlets is thus both a symptom of economic decline and a factor that worsens the decline [1]

NEGATIVE NEIGHBORHOOD CLIMATE

High bar density changes the character and environment of the neighborhood and the routine activities of those living or visiting that block. Complaints about alcohol outlets that are most often reported to city planners have to do with noise, traffic or loitering [2] [3]

VIOLENCE AND CRIME

"Wetter" neighborhoods have higher levels of accidents and violence.[4] This includes higher crime rates for murder, rape, assault, robbery, burglary, grand theft and auto theft [5] A study done in 1995 in Los Angeles showed that each additional alcohol outlet was associated with 3 4 additional assaults per year. Adding one bar to a block would result in 3 38 additional crimes committed on that block in a year [3]

AUTO CRASHES

According to a study done in Los Angeles, there is a greater number of alcohol-related injury crashes in cities with higher outlet densities A 1% increase in outlet density means a 54% increase in alcohol-related crashes Thus a city of 50,000 residents with 100 alcohol outlets would experience an additional 2 7 crashes for each new outlet opened [6]

This fact sheet was produced by the Institute for Public Strategies, a nonprofit organization advancing public health through changes in policy and community norms. For more information, call (619) 660-6233, email info@publicstrategies org or visit www publicstrategies.org.

[1] Maxwell, A & Immergluck, D. "Liquorlining: liquor store concentration and community development in lower-income Cook County (IL) neighborhoods" Chicago IL: Woodstock Institute 1997.

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[3] Runcek, D. & Maier, P. "Bars, blocks and crimes revisited: linking the theory of routine activities to the empiricism of 'hot spots'" *Criminology* (29) 4: 725-753 1991

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Changes in Outlet Densities Affect Violence Rates

Paul J Gruenewald and Lillian Remer

Background: Previous assessments of empirical relationships between alcohol outlets and rates of interpersonal violence have been conducted using cross-sectional spatial data, data collected across small geographic units such as Census Tracts and zip codes These assessments demonstrate that the availability of alcohol, measured by the number and types of alcohol outlets, is related to violence These analyses have examined many potential confounds of the outlets–violence connection (i e , population and place characteristics) and statistically corrected for biases that arise in analyses of spatial data The current study contributes the first observation of longitudinal relationships between alcohol outlets and violence

Method: The study examined longitudinal data from 581 consistently defined zip code areas represented in the California Index Locations Database, a geographic information system that coordinates population and ecological data with spatial attributes for areas across the state Six years of data were collected on features of local populations (e.g , household size) and places (e g , retail markets) thought to be related to 1 measure of violence (i e., hospital discharges related to violent assaults) Assault rates were related to changes in population and place characteristics using random effects models with controls for spatial autocorrelation ($n \times t$ = 3,486 observations). Changes in population and place characteristics of bordering (spatial lagged) areas were also considered

Results: Lower median household income and greater percentages of minorities (African American, Hispanic, and Asian) were related to increased rates of violence Ten percent increases in numbers of off-premise outlets and bars were related to 1 67 and 2 06% increases in violence rates across local and lagged spatial areas Every 6 outlets accounted for 1 additional violent assault that resulted in at least 1 overnight stay at hospital These effects increased with larger male populations, doubling with every 3% increase in percent males

Conclusion: Assault rates were most strongly related to median household incomes and minority populations within zip code areas Controlling for changes in assault rates related to these measures, greater numbers of licensed alcohol retail establishments, especially bars and off-premise outlets, were related to rates of assault. Failures to regulate the growth in numbers of bars will increase rates of violence, especially in urban areas.

Key Words: Alcohol Outlets, Assaults, Violence Panel Model, Population Ecology

PUBLISHED EMPIRICAL OBSERVATIONS of direct relationships between alcohol outlets and measures of interpersonal violence now number in the dozens Greater numbers of off-premise outlets and bars or taverns, but not restaurants, are directly correlated with greater rates of violence measured through calls to police, arrests by police, and the appearance of severe assaults in hospital emergency rooms (reviewed in Stockwell and Gruenewald, 2004). These studies have examined ecological data from Census Tracts, zip code areas, and cities to assess these relationships and, given the spatial nature of these geographic data, adopted statistical procedures appropriate to correct for a number of biases that arise in assessments of these relationships (e g., spatial autocorrelation; Lipton and Gruenewald, 2002) Spatial analyses have also afforded researchers the opportunity to assess the scope of outlet–violence effects. The spatial interrelationships of data from geographic units, for example adjacent Census Tract areas, contribute to the prediction of violence rates Characteristics of populations in nearby areas are related to violence, such as the wealth or poverty of populations in adjacent neighborhoods, so-called spatial lag effects (Gorman et al., 2001). These studies have revealed that the effects of outlets on violence appear to be "local"; restricted to the unit of analysis and unrelated to violence elsewhere Population characteristics, conversely, appear to act more globally, with population movements appearing to support the diffusion of violence across community areas.

Over the past 15 years, considerable effort has gone into developing the theoretical foundations for explaining outlet–violence relationships. Most recently, this work has resulted in integrated ecological models at the population level, models of population–environment interactions that

From the Prevention Research Center, Berkeley, California

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support violence. In outline, these theoretical models suggest that (a) violence will most likely occur among populations that are socially disorganized and economically distressed, (b) violent acts will occur most often in places that encourage social contact among at-risk populations and in which there is an absence of guardianship by enforcement agents, and (c) spatial interactions between these 2 facets of the etiology of violence among human populations will focus and accelerate violent outcomes (spatial interaction effects that form "hot spots" for violence). These theoretical foundations draw upon a long history of research into the characteristics of populations most prone to violence (e.g., social disorganization theory; Sampson et al., 1997; Shaw and McKay, 1947), the human activities that support violence (e.g., routine activity theory; Felson, 1987; Felson et al., 1997), and the spatial ecologies of crime and violence (e.g., crime potential theory; Brantingham and Brantingham, 1993, 1999). Applied in the context of suitably rich cross-sectional data on population characteristics and crime environments, the predictions of these theoretical models have been borne out in some detail (Gruenewald et al., 2006). In this context, alcohol outlets serve as locations where at-risk populations may interact while consuming an intoxicating, and for aggression a potentially disinhibiting, substance (Giancola et al., 2003). Indeed, studies of the microenvironments of off-premise establishments (Alaniz et al., 1998) and bars (Haines and Graham, 2004) suggest that this social process is active much of the time.

Limitations of Population Models

Two great motivating concerns have guided most empirical work over the past 2 decades: first, alcohol outlets might serve as markers for other population or environmental features of places that are related to violence. These particularly include specific population characteristics related to greater levels of violence (e.g., poverty; Gorman et al., 2001) and place characteristics that are related to lower levels of police enforcement and surveillance (e.g., vacant housing and other retail activities; Gruenewald et al., 2006). Second, alcohol outlets are part of the continuous spatial fabric of communities and, as such, standard statistical analyses of data from populations and places where outlets are located require the application of spatial models that correct for the variety of biases that arise from failures of spatial independence (Griffith, 1988; Gruenewald et al., 1996). These 2 general concerns have been well addressed in the literature and, although observed too often in the breach, comprehensive spatial analyses of outlet–violence relationships are becoming the norm rather than the exception.

This groundwork having been laid, current ecological studies are now addressing the 2 remaining limitations of previous work: the absence of identified temporal associations between outlets and violence, and inadequate theoretical formulations of the social processes that support violence in those community settings that include alcohol outlets. The first issue is an analytic one: the identification and assessment of statistical associations over time. The second issue is a conceptual one: the identification of the specific mechanisms by which the addition of an outlet to a community area may lead to increased violence rates. The current study addresses the first limitation. The empirical implication of cross-sectional analyses of the outlet–violence relationship is that changes in numbers of outlets should be related to changes in violence rates over time. The policy implication is that regulating numbers or densities of outlets will lead, of necessity, to reductions in violence. To justify policies intended to regulate numbers and densities of outlets, a much stronger case must be made that the simple addition, or subtraction, of outlets will lead to increases and decreases in violence in different community settings.

The goals of the current study are (1) to provide a first observation of the relationships between alcohol outlets and violence over time and (2) to establish whether these longitudinal effects are context specific; that is, whether the addition or subtraction of an outlet from different places with different populations will have different effects. The suggestion of the cross-sectional work by Gruenewald et al. (2006) is that the addition of alcohol outlets in places with large at-risk populations will accelerate violence rates, providing opportunities for violence that release potentials for violence. These potentials are greatest in disorganized, impoverished neighborhoods, with great income inequality, and low socioeconomic status.

METHODS

This study adopts a purely population-based ecological approach to the examination of rates of violence across community areas. Aggregate archival data on population and place characteristics were collected for 581 index zip codes over 6 years within the state of California. This large number of observations was subjected to a statistical analysis that enabled the examination of temporal effects relating changes in numbers of alcohol outlets to changes in violence rates. Data sources included all hospital discharges identified as related to an assault event that resulted in at least 1 overnight stay, the primary outcome measure used in the study.

Geographic Basis

The geographic basis for the study was regions defined using electronic maps of the state of California obtained from Claritas (Ithaca, NY) and Environmental Systems Research Institute Inc. (ESRI, 2001, 2002) of Redlands, CA. These maps were developed by GDT (Geographic Data Technology, Lebanon, NH) by geocoding U.S. postal route zip code information and estimating unspecified areas based on topology. The resulting electronic zip code base maps have 100% coverage of the state, but include synthetic zip codes for extremely low population density areas such as national forests and state parks, and include some zip codes such as post offices and government buildings with negligible geographic area. Considering only zip codes with some geographic extent, 1,646 zip codes from the year

2000 served as the source of 581 "stable" zip codes for the current study. "Stable" areas were defined as those zip codes that maintained a consistent area definition over the 6 years of the study (adjudicated by reference to Census 2000 block internal points). These areas, by definition, were consistent over time, thus obviating the severe interpretive problems that arise in analyzing data from continuously modifiable area units (Openshaw, 1984). The use of stable geographic areas lends other benefits to the current project: the infilling and loss of alcohol and other retail establishments in these areas could be simply represented by outlet counts, distributed within consistently defined areas over time. These data are contained in the California Index Locations Database, a geographic information system that compiles population and individual-level data into data frames suitable for spatial analysis.

Hospital Discharge Data

Hospital discharge data were obtained from the California Office of Statewide Health Planning and Development and were geocoded to the residential zip code of the injured party. These records provide information on all admissions that result in at least 1 overnight hospital stay, including ICD-9 diagnostic codes. Among other information recorded on admission records are "E-codes," event codes that identify the cause of injury. E-coded "assaults" identify injuries resulting from interpersonal violence (E960–E969). In California, with the exception of medical misadventures, E-codes are obtained from 99% of all injury admissions to hospitals in the state that result in at least 1 overnight stay (Abellera, et al., 2005). In California, E-coded injury records have a sensitivity and specificity of better than 90% in record check and patient follow-up studies (Abellera, et al., 2005; Meux, 1993; Meux et al., 1990). The data used in the current study were filtered for patients age 15 and older to eliminate child abuse and cases where alcohol use was improbable. Hospital discharge assault events are more serious than most police incident reports because they exclude altercations with minimal or no physical injury. Thus, only those events that result in injuries that require at least an overnight hospitalization for treatment are included. Discounting persons below age 15, homeless persons, out-of-state residents, and the very few patients without zip code information, and converting postal box zip codes to the zip code in which the post office was located, geocoding to electronic base maps exceeded 99%.

Alcohol Outlets

Data on the locations of alcohol outlets were obtained from California Alcohol Beverage Control. Outlet locations were geocoded to zip code based upon street address of the establishment. Numbers of active alcohol outlets by zip code were tabulated for off-premise establishments, restaurants, and bars plus pubs. Geocoding rates exceeded 99%, a rate comparable with those obtained in previous investigations (Gruenewald, et al., 2006) and by previous investigators using other data at this level of geographic resolution (Alaniz, et al., 1998; Gorman et al., 2001).

Retail Data

County business pattern data are collected annually by the U.S. Department of Commerce and published electronically as Zip Code Business Patterns by the U.S. Census Bureau. The data include counts of retail establishments within zip codes by type (NAICS, North American Industry Classification System codes), although counts may be low because the census is voluntary for small businesses that do not have any paid employees. Numbers of nonalcohol retail establishments were tabulated for 4 categories: accommodations (NAICS 721, e.g., hotels and motels), gas stations (NAICS 447, as an index of traffic density), clothing (NAICS 448), and other nonalcohol retailers (NAICS 451, 452, and 453, e.g., sporting goods, hobbies, books, music, general merchandise, and miscellaneous retail stores). Converting nonspatial zip codes (PO boxes and single-building zip codes) to the surrounding zip code, geocoding rates exceeded 99%. Although these data are maintained by the Census with zip code identifiers, there was a small loss of some retail outlet location information because of Internal Revenue Service reporting restrictions.

Demographic Data

Variables that characterized population living in zip code areas were obtained from *Sourcebook America* (CACI Marketing Systems, 1996, 1997, 1998, 1999, and ESRI-BIS, 2001, 2002) annual estimates. At the zip code level, these estimates are available for a limited number of measures that represent changes in core population characteristics previously identified to be associated with violence rates: population size (×1,000), percent population age 15 and older, average household size, median age, percent male population, median household income (×1,000, not adjusted for inflation), percent African American population, percent Hispanic population, and percent Asian population.

Statistical Analyses

The dependent measure for these analyses was the natural logarithm of numbers of assaults per 1,000 population. Population characteristics were identified by population size and the census demographics noted above. Place characteristics were identified by number of nonalcohol retail establishments and alcohol outlets per zip code. All independent measures (population and place) were obtained for each of the 581 zip codes over the 6 years of study and for every zip code adjacent to each zip code. The latter measures were averaged across adjacent areas of each zip code and included in analysis models as measures of spatial lag effects, the effects of physically external (i.e., geographically adjacent) population, and place characteristics on local rates of outcomes in each zip code. Thus, 4 different effects of local and lagged population and place characteristics were considered in the analysis, population and place characteristics measured within "local" zip code areas and measured in geographically adjacent "lagged" areas.

The easiest way to conceive the analyses of these data is to view each zip code as an independent time series with local and lagged population and place characteristics used to predict rates of assault measured using hospital discharge data. The 581 zip code areas constitute 581 replicates of this short time series, providing the statistical power necessary to assess change over time. The primary concern to be addressed when statistically analyzing panel data of this sort is whether cross-sectional differences between units, so-called unit effects, may bias coefficient estimates of longitudinal relationships. This concern can be allayed either by random sampling observations from the universe of observable units, impossible in the current case, or through statistical assessments of bias between different model specifications. The latter step is achieved through a statistical comparison of observed effects between a known asymptotically consistent model [i.e., a least squares dummy variable (LSDV) regression model] and a model treating unit effects as random (i.e., as if randomly drawn from the population of units). If a Hausman test comparing these models is not significant, then results from the more efficient random effects, REM, model can be accepted (Greene, 1993). In the current case, the results of this test indicated that model coefficients from the REM were consistent, asymptotically unbiased, relative to LSDV estimates (Hausman test $\chi^2 = 0.21$, $df = 35$, $p = \text{NS}$). Additional statistical controls were introduced in all models representing time trends (5 *df*) and controlling for heteroskedasticity between units due to population size (using

appropriate population weights in the REM specification, Greene, 1993)

Another statistical problem that can arise in analyses of data from geographic areas is a loss of unit independence because of spatial autocorrelation, the tendency of data from nearby spatial units to be correlated one with the other. Spatial autocorrelation can lead to substantial biases in statistical tests and must be controlled using one of several techniques when observed (Waller and Gotway, 2004). In the current case, spatial autocorrelated error among residuals from the REM model was found to be positive and significant (Moran coefficient = 0.419, $z = 28.418$, $p < 0.001$), indicating some risk for Type I errors in this uncorrected model. Unbiased estimates of effects were subsequently obtained through application of an REM that incorporated a statistical control for spatial autocorrelated error (Ponicki and Gruenewald, 2005). This spatial random effects model also incorporated explicit controls for groupwise heteroskedasticity related to population size. The results of both the original REM and the spatial REM are reported here.

RESULTS

The goals of the current study were (1) to provide a first observation of the relationships between changes in numbers and types of alcohol outlets and violence over time and (2) to establish whether these longitudinal effects were context specific. To answer the first question, it was necessary to establish that there was sufficient variation in measures between units, and over time, to provide efficient estimates of outlet effects. As shown in Table 1, this was certainly the case. Numbers of assaults per year varied substantially across units with an average rate of 16.4 and a range from 0 to 342. Importantly, the percent change in numbers of assaults within units over the 6 years of the study averaged −4.6%, with some 30% of the units exhibiting levels of change in excess of 82.2%. Similar levels of variation were to be seen in the exogenous measures. The average population comprised 23,344 persons, ranging from 17 to 73,670 persons, with 30% of the units exhibiting more than 9.4% population growth (or decline) over the 6 years of the study. The average number of off-premise establishments was 24.7, ranging from 0 to 135 outlets, with 30% of the units exhibiting more than 24.6% growth (or decline) over time. The average number of bars was 6.2, ranging from 0 to 61, with 30% of the units exhibiting more than 42% growth (or decline) over time.

The REM analyses of data from the 581 zip code areas included the core measures of population size and time ("Base Variables"), demographic measures, nonalcohol retail establishments, and alcohol establishments. The impacts of demographic and retail establishment measures from spatial lagged areas were also assessed. As shown in Table 2, estimates of the contributions of each block of variables to the fit of the model demonstrated that all were significant (F-tests of equality constraints). Overall, the spatial lagged effects were also significant, showing that the changing characteristics of nearby places significantly affected violence rates over time.

Effects related to the individual measures in the study are presented in Table 3. Each group of effects is distinguished by whether the assessment involved local or lagged measures of the specific model components (base variables, demographics, and retail effects). Coefficient estimates, t-values, and 2-tailed tests of significance are provided for each measure. The last column presents elasticities relating 10% changes in independent measures to percent changes in the measure of assault rates for significant effects. Arc elasticities provide a method by which the relative sizes of effects can be compared across heterogeneous independent measures.

As shown in this table, rates of assaults per population decreased as a function of population size. Within these fixed geographic units, greater population densities were related to lower rates of assault per person, a density dependence that appears only when other exogenous variables are included in the model. Among the demographic measures, assault rates were greater among populations with larger percentages of males and African Americans, and lower median income. Among the nonalcohol retail measures, places with greater numbers of miscellaneous

Table 1. Descriptive Statistics and Percent Change in Measures Over Time

Variable group	Variable name	Mean	Standard deviation	Minimum	Maximum	Percent[a] change
Endogenous measure	Assaults	16.38	23.32	0	342	−4.623 (82.247)
Population	Population (×1,000)	23.34	15.19	0	73	0.339 (9.413)
Demographics	Household size	2.79	0.53	1	4	−1.690 (2.521)
	Percentage male	50.09	2.70	4	80	0.200 (3.145)
	Median household income (×1.000)	41.28	15.14	11	124	31.785 (17.989)
	Median age	34.71	5.58	21	68	3.024 (5.431)
	Percent African-American	6.83	12.45	0	86	−3.894 (31.828)
	Percent Hispanic	27.17	20.90	1	98	16.291 (18.157)
	Percent Asian	10.31	10.75	0	61	5.157 (25.360)
Retail markets	Accommodations	4.94	6.98	0	87	25.485 (188.640)
	Gas stations	7.47	5.74	0	31	23.578 (70.011)
	Clothing stores	13.85	20.71	0	148	22.166 (89.503)
	Miscellaneous retail	22.181	22.53	0	165	−4.520 (148.574)
Alcohol outlets	Off-premise	24.69	18.13	0	135	−0.431 (24.584)
	Restaurants	27.15	25.85	0	195	5.273 (54.086)
	Bars	6.17	6.289	0	61	−3.981 (42.061)

[a]Average percent change within zip codes from 1995 to 2000 (standard deviation in parentheses)

Table 2. Significance Tests for Components of the Random Effects Regression Model

Spatial relationship	Component	ΔF^a	*df*	*p*
Local effects	Base variables	3 03	6	0 014
	Demographics	52.89	7	<0.001
	Nonalcohol retail	7.13	4	<0.001
	Alcohol outlets	15.29	3	<0.001
Lagged effects	Demographics	11.51	8	<0.001
	Nonalcohol retail	2.99	4	0.030
	Alcohol outlets	5.62	3	0.001
Total lagged effects	—	7.51	15	<0 001

[a] *F*-tests calculated with denominator degrees of freedom equal to 3,450

retail establishments were related to greater rates of assault Among the alcohol retail measures, places with more off-premise establishments and more bars exhibited greater rates of assaults; places with more restaurants exhibited lower rates of assault.

Effects related to spatially lagged demographic measures were significant and reflected characteristics of populations in surrounding areas that increased risks for assaults; greater household sizes related to lower rates of assault and greater percent population Asians related to greater rates of assault. Among nonalcohol retail establishments, greater numbers of gas stations were related to greater rates of assault. Among alcohol retail establishments, greater numbers of bars were related to greater rates of assault.

As residuals from the REM exhibited significant spatial autocorrelation, a spatial REM was used to assess statistical relationships between the independent variables and violence rates that included an explicit correction for spatial autocorrelation. For this purpose, spatial relationships among units were represented by a binary connection matrix indicating units that shared common boundaries. The results of this analysis are shown in Table 4. As shown at the bottom of the table, spatial autocorrelation was substantive and significant in this analysis. However, although the details of the results of this analysis are somewhat different from those in Table 3, effects related to local and lagged outlet densities were significant and robust using this alternative specification. Local densities of bars and off-premise outlets remained positively related to assaults; densities of restaurants remained negatively related to assaults. Again, lagged bar densities were particularly important to assault rates. The remaining dif-

Table 3. Effects Estimates and Elasticities for the Random Effects Regression Model

Spatial relationship	Model component	Variable	*b*	*t*	p^a	Elasticity[b] (%)
Local effects	Base variables	Population age 15+(×1,000)	−15 426	−4.761	<0.001	−3.24
		Time 1	−43 976	−1.537		
		2	80 038	2 208	0.027	
		3	24 700	0.661		
		4	−26 337	−0.676		
		5	−47 400	1.122		
	Demographics	Household size	105 501	1.248		
		% Male	15 614	2.156	0 031	7 05
		Median income (×1,000)	−20 470	−9.067	<0 001	−7 64
		Median age	1 936	0.314		
		% African American	23 438	6.705	<0 001	1 44
		% Hispanic	3 398	1.388		
		% Asian	−3.059	−0 748		
	Nonalcohol retail	Accommodations	−1.311	−0 345		
		Gas stations	0.282	0 059		
		Clothing	−0.506	−0 033		
		Miscellaneous	3.096	2 059	0 040	0 62
	Alcohol outlets	Off-Premise	12 435	4 137	<0 001	2 76
		Restaurants	−4 188	−2 184	0 029	−1.03
		Bars	11.839	1 966	0 049	0 66
Lagged effects	Demographics	Population age 15+(×1,000)	0 065	0 315		
		Household size	−161.876	−2 174	0.030	−4 06
		% Male	−0 001	−0.035		
		Median age	−0 008	−1.897		
		Median income	0 001	0.107		
		% African American	0 004	1.557		
		% Hispanic	0.002	1.777		
		% Asian	0 005	2 514	0 012	1.17
	Nonalcohol retail	Accommodations	0.569	0 116		
		Gas stations	26 964	2 739	0 006	1.63
		Clothing	−1.792	−0 540		
		Miscellaneous	4.687	1 640		
	Alcohol outlets	Off-premise	−2 400	−0 427		
		Restaurants	−3 981	−1 103		
		Bars	25.432	2 160	0 031	1 23

[a] Two-tailed tests. Nonsignificant effects have no entry.
[b] Arc elasticity centered at grand mean, relative to a 10% change in exogenous measures Elasticities not reported for time dummies.

Table 4. Effects Estimates and Elasticities for the Spatial Random Effects Regression Model

Spatial relationship	Model component	Variable	*b*	*t*	*p*[a]	Elasticity[b] (%)
Local effects		Population age 15+(×1,000)	−6.649	−3.504	<0.001	−1.40
		Time 1	−47.278	−1.708		
		2	30.383	0.853		
		3	−36.540	−1.014		
		4	−78.794	−2.106	−0.035	
		5	−21.829	−0.555		
	Demographics	Household size	48.477	0.726		
		% Male	8.597	1.052		
		Median income (×1,000)	−21.854	−11.206	<0.001	−8.15
		Median age	−0.774	−0.123		
		% African American	31.180	13.558	<0.001	1.91
		% Hispanic	15.114	7.698	<0.001	0.93
		% Asian	8.090	3.158	0.002	0.50
	Nonalcohol retail	Accommodations	1.277	0.506		
		Gas stations	7.154	2.236	0.025	0.73
		Clothing	0.073	0.077		
		Miscellaneous	1.677	1.514		
	Alcohol outlets	Off-premise	7.529	4.211	<0.001	1.67
		Restaurants	−3.016	−2.578	0.010	−0.74
		Bars	11.408	3.267	0.001	0.64
Lagged effects	Demographics	Population age 15+(×1.000)	22.393	1.430		
		Household size	−132.510	−2.103	0.035	3.32
		% Male	0.133	0.523		
		Median age	−0.462	−1.536		
		Median income	−3.641	−0.058		
		% African American	−0.065	−0.596		
		% Hispanic	−0.189	−2.448	0.014	1.11
		% Asian	−0.068	−0.542		
	Nonalcohol retail	Accommodations	−7.949	−1.335		
		Gas stations	11.945	1.514		
		Clothing	−2.073	−0.912		
		Miscellaneous	2.406	1.009		
	Alcohol Outlets	Off-premise	−3.842	−0.954		
		Restaurants	−2.790	−1.057		
		Bars	29.360	3.627	<0.001	1.42
Spatial	Autocorrelation	ρ_s	0.112	5.927	<0.001	

[a]Two-tailed tests. Nonsignificant effects have no entry.
[b]Arc elasticity centered at grand mean, relative to a 10% change in exogenous measures. Elasticities not reported for time dummies or spatial autocorrelation.

ferences were effects found to be significant in the original model but no longer significant in the spatial REM (i.e., effects related to percent males in the population and miscellaneous retail stores, and percent Asian and gas stations in lagged areas) or effects newly observed to be significant in the spatial REM (i.e., effects related to percent Hispanics and Asians in local populations).

One additional concern in these analyses was that the great differences in sizes of zip code units, or lengths of roadway systems, served as a source of bias in estimates of assault rates (Openshaw, 1984). When included as covariates in the previous analysis, neither of these independent measures were significantly related to assaults ($b = -0.266$, $t = -1.370$, and $b = -0.187$, $t = -0.372$, respectively).

The last column of Tables 3 and 4 presents a general means by which the relative sizes of effects between independent measures may be compared. Using the estimates provided by the spatial random effects model (Table 4), the most "effective" means of reducing violence, by this criterion, was attributable to increases in median household income. A 10% increase in median household income was related to a −8.15% decrease in rates of hospital discharges related to violence. This reaffirms the relevance of impoverishment to greater rates of violence in community areas. Elasticities related to percent minority populations reaffirm the impact of minority status upon rates of violence, with elasticities of 1.91, 0.93, and 0.50% related to 10% greater populations of African Americans, Hispanics, and Asians, respectively. Compared with these effects, changes in numbers of alcohol outlets contributed a proportionately smaller share to rates of violence. A 10% increase in local numbers of off-premise outlets was related to a 1.67% increase in violence. A 10% increase in numbers of bars was related to a .64% increase in violence. Across local and lagged areas, a 10% increase in numbers of bars was related to a 2.06% increase in violence.

Contribution of Bars

These results indicate that the contribution of a single bar in any 1 zip code area to the rate of violent assaults that result in hospital discharges is relatively small. Based upon the analyses presented in Table 4, the addition of 1

bar to the average zip code area in the current study would produce about 0.17 hospitalized assaults per year or 1 assault for every 6 bars. It is important to note, however, that zip code areas with very large numbers of bars or pubs (up to 61 in the current study) and very dense populations (up to 73,000 persons age 15 and older) can expect to have far greater numbers of assaults related to bars, a figure ranging up to 76 per year based on current analyses. Thus, it would appear that numbers of bars or pubs within zip code areas provide a small but pervasive upward pressure upon rates of assault that particularly affects violence in urban areas. With this observation in mind, it makes sense to consider the impacts that equally pervasive controls could have upon violence related to bars.

An evaluation of the contribution of bar densities to violence rates based upon the model presented in Table 4 is presented in Table 5. The first column of this table indexes the range of changes in the number of bars observed across zip codes over the 6 years of the study (± 6 outlets). The second column provides an estimate of the percent change in rates of assault in local areas. The third indicates the "savings" from the change in numbers of outlets. "Savings" are defined by estimated reductions in numbers of assaults per year across the 581 places examined in this study. Columns 4 and 5 repeat this information, but now include reductions and increases in both local and lagged areas.

Demographic Context

To assess whether locating bars in different population contexts differentially affected violence rates, local bar count-by-population characteristic interactions were added to the model presented in Table 4. For this purpose, all local demographic measures were considered (household size, percent male, median income, median age, percent African American, percent Hispanic, and percent Asian). In the context of this new set of variables, only the interaction of bars with percent males was significant ($b = 3.929$, $t = 4.144$, $p < 0.001$). However, this effect was quite substantive. Each percent increase in the size of the male population was related to a 34% increase in the size of the bar coefficient. With changes in the percent male population varying by as much as 3% or more over the years of the current study, this suggests that some places could see a doubling of rates of assault related to alcohol outlets.

Table 5. Estimated Impacts of Increasing or Reducing Numbers of Bars Across Zip Code Areas

Average change in numbers of bars per zip code	Percent change in rates of assault (local only)	Savings[a]	Percent change in rates of assault (local and adjacent)	Savings
−6	−6.56	604	−18.30	1742
−4	−4.23	403	−12.20	1161
−2	−2.12	201	−6.10	581
−1	−1.06	101	−3.05	290
0	0.00	0	0.00	0
+1	1.06	−101	3.05	−290
+2	2.12	−201	6.10	−581
+4	4.23	−403	12.20	−1161
+6	6.56	−604	18.30	−1742

[a]Expected number of assaults reduced per year (across 581 units with a total population of 13,562,864 persons 15 years of age or older with a total of 9,517 expected assaults per year)

DISCUSSION

The results of this study demonstrated that changes in outlet counts over time were directly related to changes in violence rates across 581 index locations, stable zip codes that exhibited growth and decline in population and place characteristics over time. As expected from prior theoretical and empirical work, local and lagged population characteristics were related to local rates of violence. The most salient of these characteristics were median household income and percent African American populations. Elasticities related to median household income (7.64 and 8.15% in the REM and spatial REM analyses) suggest the strength and importance of impoverishment as a potential cause of greater levels of violence. Clearly, risks for violence were greater in areas with growing poor minority populations. However, in support of established cross-sectional findings, bar and off-premise outlet densities were also related to violence.

Elasticities related to changes in outlet densities were much smaller than those observed for changes in median household income and generally reflect effect sizes expected from previous cross-sectional research (i.e., a 2% increase in assaults related to a 10% increase in outlets). These numbers do not reflect, however, the generally pervasive effects that outlets may have on violence across communities in the state. The results of the current analyses suggest that 1 assault will result from every 6 bars in the average zip code area. Considering that there were some 3,500 bars or pubs in the 581 zip code areas studied here, and these too would produce assaults at this rate, violence related to bars may be considerable (about 600 admissions to hospital for assault injuries per year). As shown in Table 5, although these effects are relatively small, their regulatory potential for reducing violence may nevertheless be substantial. States can, and do, regulate numbers of outlets through which alcohol may be sold. As Table 5 shows, failures to regulate numbers of bars can place continuous upward pressure upon violence rates. Regulation of alcohol outlets can constrain these rates.

In addition to these observations, the current longitudinal panel analyses indicate that violence rates may also be affected by other place characteristics including densities of other retail outlets (e.g., miscellaneous retail stores or gas stations) and lagged densities of bars and off-premise establishments. The effects related to other retail establishments would appear to have no other theoretical interpretation than that these places are markers for areas

in communities with substantial human activities. The effects related to alcohol outlets continue to support the view that some sort of spatial interactions between populations and places with more alcohol outlets are associated with rates of violence. The results of the current analyses also suggest that numbers and densities of bars in nearby areas may also affect local rates of violence. This is contrary to the theoretical position that the effects of greater or lesser numbers of outlets are to increase and decrease rates of violence on a purely local scale (Gorman et al., 2001). Rather, the current longitudinal data suggest that such effects are more global in nature, reflecting either social-normative effects or human activities that bridge larger spatial scales.

As noted in the introduction, and confirmed by the current work, the observation that numbers of bars, in particular, are related to rates of violence over time emphasizes a direct relationship between bars and violence that appears very robust. The current study contributes to this literature by demonstrating that these effects can be observed over time, are independent of concurrent changes in other population and place characteristics, and are independent of effects related to other alcohol outlets (off-premise establishments and restaurants). This latter observation is particularly important as off-premise outlets, often observed to be directly related to violence rates, may be so related because of a variety of reasons that are unrelated to the use of alcohol. Within urban areas, off-premise outlets are often sites for other social exchanges that entail greater levels of violence (e.g., prostitution, illegal drug sales, Alaniz et al., 1998). Without a correspondingly adequate model of illegal drug sales and distribution and their impacts on violence across community areas, interpretation of specific effects related to off-premise outlets remains a concern. In the current study, the multiple contexts in which bar densities continue to affect violence rates suggest that these effects go beyond those observed for off-premise establishments.

Implications of Demographic Context

As noted in the introduction, one of the essential hypotheses regarding the mechanisms by which greater numbers of bars may affect rates of violence is that these places serve as attractors to individuals more likely to commit violent acts (e.g., young males) and provide them with an intoxicating substance that may enhance likelihoods for aggression. This being the case, one would expect that the addition of outlets in areas with larger at-risk populations would be much more problematic than the addition of outlets to places with larger low-risk populations. As shown in these analyses, this appeared to be the case only for percent males in the local population. Greater concentrations of alcohol outlets in places with larger proportions of males placed unique upward pressure on violence rates. As estimated here, a 3% increase in the percent males in any population will double the rate of assaults related to bars. Thus, rates of assault related to bars in areas of the state where the proportion of males in the population are quite large (up to 80% in the current study) could be very substantial, increasing rates by up to 1 order of magnitude.

Limitations

Despite the statistical benefits conferred by the use of these longitudinal data, a number of problems arise in the interpretation of these results that are not resolved in this study. Of first concern is the short length of the time series of observations measured for each geographic unit. Although panel data and spatial analysis models attempt to overcome some of the limitations of short time series by the replication of these series across units, they can do so without bias only to the extent that the observed units are random samples from larger populations or differences between units are unrelated to modeled effects. The diagnostic tests presented here give some assurance that unit effects have not biased the outcomes observed, but the only guarantee of the consistency of these estimators is to be provided through the collection of further longitudinal data.

A second concern is the interpretation of demographic effects related to populations living in lagged spatial areas, outside of the local areas under study. The analyses indicate that both lagged household size and lagged percent Hispanic population were inversely related to local rates of assault. This could be interpreted as reflecting the activities of populations living in lagged areas as affecting contacts and interactions with populations in local areas. This being the case, however, it is difficult to explain why these effects are either not significant within, rather than between, localities (i.e., household size) or are related to violence but with different signs (i.e., percent Hispanic). As for many other ecological processes, interpretation of these effects is contingent upon well-developed theoretical models of the population processes involved, reflected in suitable mathematical representations of these effects, and captured by adequate well-conditioned statistical analyses of these types of panel data. Although there is little reason to believe that the observed lag effects are statistically in error (multicollinearity of these effects, independent of cross-sectional differences between units, was moderate with a condition index of 26.3; Greene, 1993), the mapping between theoretical assertions regarding population processes and reduced form equations is not complete. Techniques for suitably representing and modeling these spatial lag effects require further development.

Related to the problem of determining the meaning of effects related to local and spatially lagged measures of demographic effects is the determination of the meaning of effects related to alcohol outlets across local and lagged areas. Here it is at least logically possible that lagged measures of numbers of outlets improve model fit

by providing better measurement (multiple measures of change) rather than indexing direct impacts of changes in alcohol outlets in adjacent regions on rates of violence in local areas over time. This argument presumes that there is substantial measurement error in the estimation of numbers of alcohol outlets across areas. Given the quality of archival data related to locations and numbers of alcohol outlets (with low rates of classification error between active and nonactive outlets and high geocoding hit rates) and the substantial range over which numbers of outlets vary between places and over time (Table 1), measurement error in both local and lagged areas would appear generally quite low.

In this context, it is also reasonable to consider an alternative causal path by which changes in numbers of alcohol outlets may be related to local rates of violence over time: reversing the causal scheme, perhaps places with higher levels of violence are also places with greater social disorganization and more rapid turnover in alcohol outlets? Sampson et al. (1997) suggest that homicide rates have temporally lagged effects on residential instability, greater homicide rates leading to subsequent changes in housing turnover some years later. For alcohol outlets, this requires the somewhat heroic assumption that annual variations in violence rates will effect changes in outlet turnover within each year, a process that would appear much slower than the obverse (i.e., outlets affecting violence). Complete exploration of these relationships will require the development of separate equation models for the growth and development of alcohol outlets across community areas independent of the growth of violence rates.

A final concern with the results of the current analyses is their limited generalizability to all areas throughout the state of California. As shown in Table 1, the demographic range of the populations observed in the current study reflects the broad diversity found across all populations in California. The units themselves, however, are far from a random sample from the state and the analysis method, random effects models, does not imply or require such generalizability to provide unbiased statistical estimates of longitudinal effects for the units observed (a benefit of the procedure). It is feasible to apply poststratification adjustments to data from the current sample of places to approximate more closely results for the population of the state. However, the results of such an analysis would be artificial in the extreme; the units selected are geographically stable and reflect local characteristics of relatively stable populations and places, making generalization to places that exhibit rapid population growth (and, hence, redefinition of zip code areas) difficult. The solution to this problem requires further development of the California Index Locations Database to incorporate information about places that do and do not change area definitions over time. The current analysis, however, did include a large variety of statistical controls for variations in population and place characteristics known, or believed, to be related to alcohol use and violence rates. These include measures of median population age (likely to be low in areas with substantial college age populations), gender composition (likely to be skewed toward males in areas near military bases), and tourism (likely to be high in places with larger numbers of retail accomodations, Table 1). These controls enabled the best assessment to date of the independent effects of changes in outlet densities on one measure of violence over time.

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