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BACKGROUND

•Pedestrian crashes are a major public health concern. In 2009 there were over 4,000 pedestrian deaths and 59,000 pedestrian injuries[1].

•In 2008, NV had the 5th highest pedestrian fatality rate in the nation [2].

•The Las Vegas metropolitan area accounts for 82% of the fatalities[3] and 75% of pedestrian injuries that take place in NV[4].

•Las Vegas is an urban, sprawling, metropolis which increased in population size by 83% between 1990 and 2000[5] and 41.8% from 2000 to 2010[6].

•Pedestrian fatalities have been positively correlated with urban sprawl[7], lack of pedestrian facilities, liquor outlet density, and rapid population growth[8].

•To ensure sustainable communities, pedestrian injury issues in Clark County, NV warrant immediate attention.

OBJECTIVES

In order to understand the social determinants which may impact pedestrian injury rates in an urban, sprawling, western community we conducted an ecologic investigation to compare pedestrian crash rates by social determinants available for census tracts in Clark County, NV.

METHODS

Data Sources: Electronic Uniform Police Traffic Crash Reports, 2004 – 2008, Census 2000 Data

Data elements included: neighborhood demographics, socioeconomic factors, and characteristics of the built environment

Pedestrian crash and fatality rates per 1,000 population were calculated for each census tract and merged by tract onto Census 2000 data. Stepwise multiple linear regressions (MLR) were applied to explore the relationship between each of the predictor variables, and pedestrian crash and fatality rates using SAS 9.3. Prior to MLR, tests for linearity of the criterion variable, normality, and multicolinearity were applied.

View of the sprawling Las Vegas Metro Area

Table 1. Mean Pedestrian Crash Rates by Census Tract

Variable	Mean	SD	Min	Max
Total Crash Rate per 1,000 pop	1.95	2.40	0.13	16.78
Fatal Rate per 1,000 pop	0.39	0.30	0.04	7.31

Table 2. Influence of neighborhood demographics, socioeconomic factors, and built environment characteristics on pedestrian crash rates.

Variable	β	P-value
% households without vehicle	9.18	p<0.001
liquor outlet density	1.85	p<0.001
number transit stops per square meter	0.83	p<0.001
% population walk or take public transit	0.16	p<0.001
population density	- 4.6	p<0.001

RESULTS

2,262 pedestrian crashes in 287 census tracts were identified. Off these, 92.4% were injury crashes, and 4.5% resulted in fatality, 3.1% involved property damage only.

Variables which related to poverty and income, home ownership, education, employment, age, and race were removed from the final model.

The final, selected model for pedestrian crash rate was significant and described 58.2% of the variance in the per capita pedestrian crash rate (r^2=0.582, p<0.001) with VIF all less than two.

The final, selected model for pedestrian fatality rate was significant but described only 8.5% of the variance in the per capita pedestrian fatality rate (r^2=0.085, p<0.001). Given the low amount of variance described by this model it was discarded.

CONCLUSION

The final model suggests that percentage of households without a vehicle, population density, liquor outlets per square meter, the number of transit stops per square meter, and the percent of the population who walk or use public transit in combination were useful in predicting crash rate. Contrary to previous research, population density was a protective factor for pedestrian crashes.

These results underscore the importance of neighborhood determinants in contributing to pedestrian injury. Results should have implications on injury prevention efforts, regional transit planning, and guide public policy. Public health professionals, city planners, and regional transit authorities must collaborate to successfully enhance pedestrian safety.

LIMITATIONS

The assumption that all individuals living in a Census tract have similar characteristics represents an ecological fallacy.

Three Census tracts were removed from the data set which had total pedestrian crashes greater than the tract population. These represent the Las Vegas 'strip', McCarren Airport, and Mt. Charleston, all popular tourist destinations.

Census data (2000) may not reflect current total population, environmental conditions, or population characteristics.

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