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Census-Based Sociodemographic Correlates of Spatially Aggregated Drinking and Driving Arrests in California

BACKGROUND

In 2017, 10,874 people were killed in alcohol-impaired motor vehicle crashes, representing 29% of the total motor vehicle traffic fatalities in the U.S. (National Highway Traffic Safety Administration, 2018). Although DUI incidence and prevalence has been declining over recent decades, numbers of injuries and deaths related to DUI have remained substantial. Data from the National Highway Traffic Safety Administration's national roadside survey indicate that the percentage of weekend nighttime drivers with a blood alcohol content (BAC) of 0.08 g/dL or higher went from 7.5% in 1973 to 1.5% in 2013–2014 (Berning et al., 2015). Trend data from the National Survey on Drug Use and Health from 2002 to 2011 show that self-reported DUI rates among persons 12 years of age or older went from 14.2% in 2002 to 11.1% in 2011 (Substance Abuse and Mental Health Services Administration [SAMHSA], 2012).

OBJECTIVE

The objective of this research is to examine Census-based sociodemographic correlates of DUI arrests in California from 2005 to 2017. The analysis focuses first on trends in DUI arrest rates among Hispanics and Whites. Second, the analysis assesses the extent to which alcohol outlet density, larger Hispanic populations and distance from the California/Mexico border are related to DUI arrests across areas of the state over time.

METHODS

- Arrest data for 2,288,646 DUI felonies and misdemeanors for years 2005 to 2017 come from the Monthly Arrest and Citation Register (MACR) compiled by the California Department of Justice. Arrest data, sociodemographic variables from the Census 2010, and alcohol outlet data provided by the California Department of Alcoholic Beverage Control were aggregated to 503 spatial units consisting of areas covered by law enforcement reporting agencies (LERAs).

- Outlet density was estimated with number of outlets in the area covered by each LERA as the numerator and the LERA square miles as the denominator to generate an aggregate LERA level density measure for each type of outlet (all, bars/pubs, off premise).

- Distance to the California/Mexico border is the linear distance in miles from the centroid of each LERA to the closest border crossing.

- Data analyses were conducted using Bayesian Poisson space–time regression models.
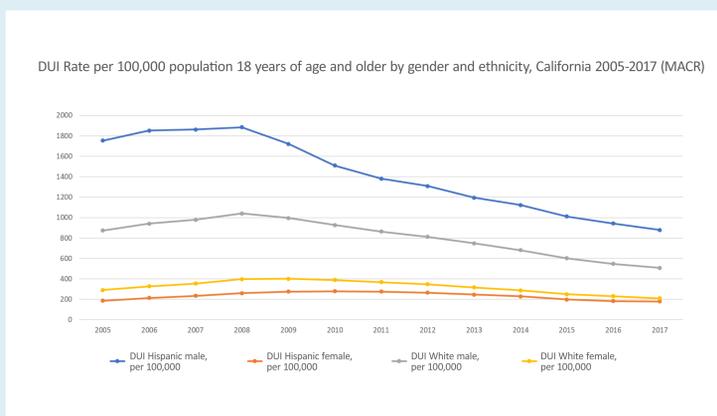
RESULTS

DUI Rate per 100,000 population 18 years of age and older by gender and ethnicity, California 2005-2017 (MACR)

— DUI Hispanic male, per 100,000 — DUI Hispanic female, per 100,000 — DUI White male, per 100,000 — DUI White female, per 100,000

Table 1 — Relative Rates and Credible Intervals for DUI Arrests, by associated LERA characteristics

Fixed effect	Relative rate	95% CI
Study year	0.960*	(0.953, 0.967)
Distance to the border (100's miles)	0.877*	(0.876, 0.879)
Alcohol Outlets (ref: restaurants)		
Total outlet density, per square mile	1.013*	(1.013, 1.013)
Percent bars or pubs (1% change)	1.052*	(1.051, 1.053)
Percent off premise (1% change)	1.000	(1.000, 1.001)
Gender (ref: female)		
Percent male (1% change)	0.961*	(0.959, 0.962)
Race/Ethnicity (ref: White)		
Percent Asian (5% change)	0.988*	(0.986, 0.989)
Percent Black (5% change)	0.923*	(0.921, 0.925)
Percent Hispanic (5% change)	1.023*	(1.022, 1.025)
Age (ref: 50+)		
Percent under 18 (1% change)	0.984*	(0.984, 0.985)
Percent 18-29 (1% change)	1.006*	(1.004, 1.008)
Percent 30-39 (1% change)	1.039*	(1.037, 1.041)
Percent 40-49 (1% change)	1.042*	(1.040, 1.044)
Birthplace (ref: foreign born)		
Percent U.S. born (5% change)	1.032*	(1.030, 1.034)
Income		
Percent below 150% poverty (5% change)	1.039*	(1.037, 1.041)
Median adjusted income, per $10,000	1.099*	(1.097, 1.101)
Education (ref: less than high school)		
Percent high school graduate (5% change)	1.031*	(1.028, 1.034)
Unemployment (ref: employed)		
Percent unemployed (5% change)	0.996*	(0.995, 0.996)
Housing (ref: renter)		
Percent vacant (5% change)	1.020*	(1.019, 1.021)
Percent owner occupied (5% change)	0.945*	(0.944, 0.946)
Population density, 100's per square mile	0.989*	(0.989, 0.989)
Non-DUI arrests per capita	1.127*	(1.124, 1.29)
Residual area	2.892*	(2.836, 2.950)
Distance to the border X Hispanic	1.012*	(1.012, 1.012)
Bars and Pubs X Hispanic	0.998*	(0.998, 0.998)

*Well-supported findings (95% credible interval excludes 1.000)

Among men, DUI arrest rates were significantly higher among Hispanics than Whites for all years (p<.001) (Graph 1). Among women, DUI arrest rates did not significantly differ between Whites and Hispanics. Both among men and women rates showed an upward trend until 2008, decreasing after that year.

Multivariable analysis (Table 1) showed that DUI arrest rates in LERA areas are positively related to proximity to the California/Mexico border, a higher percent of bar/pub outlets, a higher percent of Hispanic population, a higher percent of population 18-29, 30-39, and 40-49 years of age, a higher percent of US-born population, a higher percent of population with annual income of $100,000 or more, a higher percent of population 150% below the federal poverty line, and a higher level of law enforcement activities. The reverse is true of LERA areas with a higher percent of men, a higher percent of population under 18, a higher percent of population Asian or Black, a higher percent unemployed, and a higher percent of owner-occupied housing.

CONCLUSION

Results of this analysis of spatially aggregated and Census-level correlates of DUI arrest rates overlap well with the previous literature on individual level data from survey research on self-reported arrest rates. The indication that arrest rates decrease as distance to the California/Mexico border increases is significant and can be potentially seen as an indicator of the influence of the greater availability of alcohol in the border area on alcohol impaired driving.

REFERENCES

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