The Geography of Sobriety Checkpoints and Alcohol-Impaired Driving in Queensland

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Introduction and Aims: Sobriety checkpoints are an effective strategy to reduce alcohol-impaired driving, motor vehicle crashes, injuries, and fatalities. This study aimed to identify the geographic extent over which individual sobriety checkpoints affect alcohol-impaired driving.

Design and Methods: This spatial ecological panel analysis used geographically referenced data for 16,848,089 breath tests conducted by Queensland Police Service between January 2012 and June 2018. These data were aggregated over 338 weeks within 528 Statistical Area level 2 units (n=178,464 SA2-weeks) and 84 Statistical Area level 3 units (n=28,392 SA3-weeks). SA2 units in Queensland contain a mean population of 8,883.5 (SD=5,5018,3) and encompass 468.9 roadway kms (SD=1,490.0); SA3 units contain a mean population of 57,201.6 (SD=29,521.6) and encompass 2,936.0 roadway kms (SD=7,025.0). The independent measures were counts of sobriety checkpoints conducted by Queensland Police Service within local and spatially adjacent space-time units. The dependent measure was a count of breath tests that had Blood Alcohol Concentration (BAC) ≥0.05%. Statistical analyses were conducted using Bayesian intrinsic conditional autoregressive negative binomial models.

Results: An increase of 1 sobriety checkpoint per 1,000 roadway kms was associated with 2.6% fewer breath tests with BAC ≥0.05% within local SA2 units (IRR=0.974; 95%CrI:0.972,0.977), and with 5.6% fewer breath tests with BAC ≥ 0.05% within local SA3 units (IRR=0.944; 95%CrI:0.937,0.953). Associations were attenuated towards null in spatially adjacent units and in temporally lagged units.

Discussions and Conclusions: Sobriety checkpoints reduce alcohol-impaired driving for approximately one week within local areas containing approximately 60,000 residents and 3,000 kms of roadway.

Implications for Practice or Policy: These results will help law enforcement agencies optimally configure sobriety checkpoint programs to maximally reduce alcohol-impaired driving and while minimizing operational costs.

Implications for Translational Research: Based on these results, we are currently piloting an experimental study of optimized sobriety checkpoints in the US.

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