Effectiveness of Sobriety Checkpoints for Preventing Alcohol-involved Crashes


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Abstract
A systematic review of the effectiveness of sobriety checkpoints in reducing alcohol-involved crashes and associated injuries and fatalities was conducted using the methodology developed for the Guide to Community Preventive Services. Results suggest that both RBT and SBT checkpoints can play an important role in preventing alcohol-related crashes and associated injuries. This paper is based on research previously published in the American Journal of Preventive Medicine (1).

Introduction
Sobriety checkpoints have become a popular tool for enforcing laws against alcohol-impaired driving, and procedures for conducting them vary in different countries. At random breath testing (RBT) checkpoints, which are used in Australia and several European countries, all drivers stopped are given breath tests for blood alcohol levels. Issues regarding the violation of constitutional protections against unreasonable search and seizure prevent the use of RBT checkpoints in the United States (2), where selective breath testing (SBT) checkpoints are used. At SBT checkpoints, police must have reason to suspect the driver has been drinking (i.e., probable cause) before they can demand that a driver take a breath test.

Although sobriety checkpoints remove some drinking drivers from the road, their primary goal is to deter driving after drinking by increasing the perceived risk of arrest. This perceived risk can be influenced by the level of publicity accompanying the enforcement effort, visibility of the checkpoint operations themselves, drivers’ beliefs about their ability to avoid detection, and the objective likelihood of detection (3).

In this review, we estimate the overall effectiveness of sobriety checkpoints. We also examine their long-term effects and the relative effectiveness of RBT and SBT checkpoints.
Methods
This systematic review of studies of sobriety checkpoints was conducted for the Guide to Community Preventive Services (Community Guide). Detailed methods have been described elsewhere (4, 5).

A comprehensive search was conducted for peer-reviewed journal articles, technical reports, and Association for the Advancement of Automobile Medicine proceedings to screen for inclusion in the review. To be included, a study had to: (a) be primary research published in English before June 30, 2000; (b) provide objective data on one or more outcomes related to alcohol-impaired driving (e.g., single-vehicle nighttime crashes); and (c) meet minimum research quality criteria. When multiple papers used similar methods to evaluate a specific intervention, only the paper with the longest post-intervention follow-up time was included in the review.

When available, we selected effect measures that compared alcohol-related crash outcomes to non-alcohol-related outcomes (e.g., comparing single vehicle nighttime crashes to multi-vehicle daytime crashes). These effect measures help control for the long-term downward trend in total crashes and for other factors that influence the total number of crashes, such as safety characteristics of vehicles and highways, weather, economic conditions, and vehicle miles traveled. To further address potential confounding, when possible we also selected effect measures that incorporated a concurrent comparison group such as drivers in communities without checkpoints. For studies incorporating comparison groups, results are reported in the form of the net change, reflecting the difference between the percent change for the intervention group and the comparison group. For studies using interrupted time series or other regression-based designs, results are reported in terms of the percent change estimated from the model. In addition to reporting results from individual studies, we calculated medians and interquartile ranges to summarize outcomes for the three levels of injury severity. We also aggregated results across levels of injury severity to evaluate whether the intervention's effect varied by the type of checkpoint (RBT vs. SBT) or by follow-up time.

Results
The literature search identified 17 studies of the effectiveness of RBT checkpoints that evaluated outcomes of interest. Of these, 12 met the quality criteria for inclusion in this review (three of these studies were reported in one paper) (6 – 15). For RBT checkpoints, median decreases were 22% (interquartile range (IQR): -35%, -14%) for fatal crashes and 16% (IQR: -20%, -11%) for fatal and nonfatal injury crashes. The two RBT checkpoint studies evaluating property damage crashes estimated decreases of 15% and 26%.

A single study assessed the effect of RBT checkpoints on the observed incidence of drinking and driving. This study found that during an RBT checkpoint program, the proportion of drivers with any detectable BAC level decreased 13% and the proportion of drivers who were above the legal limit of 0.08 g/dL decreased 24% from prior levels (13).

Our search identified 15 studies of the effectiveness of SBT checkpoints. Of these, 11 met the quality criteria for inclusion in this review (16 – 26). One of these studies presented data in a form that could not be converted to our summary effect measure (26). SBT checkpoints were
associated with decreases in fatal crashes of 20% and 26% in the two studies reporting this outcome. Median decreases were 20% (IQR: -23%, -9%) for fatal and nonfatal injury crashes and 24% (IQR: -32%, -14%) for property damage crashes.

Outcomes from the studies reviewed are presented in the Figure. Aggregating across all crash types, median decreases were 18% (IQR: -22%, -13%) for RBT checkpoints and 20% (IQR: -27%, -13%) for SBT checkpoints. Length of time from initiation of the checkpoint program to the end of follow-up ranged from 1 to 120 months (median = 14 months; IQR: 10 months, 42 months), and was not related to the extent to which crashes decreased (r = -.14, p = .54).

**Figure:** Percent change in crashes likely to involve alcohol after implementing RBT and SBT checkpoint programs.

**Discussion**
These results provide strong evidence that both RBT and SBT sobriety checkpoints are effective in reducing alcohol-related crashes and associated fatal and nonfatal injuries. The greater sensitivity of RBT checkpoints in detecting drinking drivers might lead one to expect a stronger deterrent effect leading to improved effectiveness in reducing alcohol-related crashes relative to SBT checkpoints (12). The results of this review did not provide evidence of such differential effectiveness. None of the studies reviewed directly compared RBT and SBT checkpoints, however, so these results should be interpreted cautiously.
Despite differences across studies in design, setting, period of observation, and outcome measures evaluated, the results were generally consistent in direction and size. The consistency of the results obtained was further supported by stratified analyses, in which similar beneficial effects were obtained for crashes of varying levels of severity and for both short-term and long-term checkpoint programs.

The results of this review suggest that sobriety checkpoints maintain their effectiveness over time. Some authors have suggested that aggressive enforcement using sobriety checkpoints could eventually result in permanent changes in social norms regarding the acceptability of drinking and driving (3, 27). The degree to which changes in social norms have contributed to the long-term maintenance of the beneficial effects of sobriety checkpoints is unclear.

Several questions remain regarding potential methods for improving the effectiveness and efficiency of sobriety checkpoints. For instance, although passive alcohol sensors have been shown to improve the detection of alcohol-impaired drivers at checkpoints (24, 28), any resulting improvement in the deterrent effects of checkpoints has yet to be evaluated. Further research into the optimal configurations of checkpoints (e.g., number of officers, timing) and the optimal overall level of enforcement and publicity to sustain their deterrent effects is needed.

References


