Policing Alcohol Impaired Driving

A Rapid Review of the Evaluation Literature: Final Report

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Executive Summary

Background

This report provides a systematic rapid review of the impact evaluation evidence base for policing alcohol impaired driving. This rapid review considers the evaluation evidence for studies that examine the impact of a any police intervention for addressing alcohol impaired driving, with no limit on the outcomes used to evaluate the intervention.

Search Methods

We used a systematic review methodology to identify eligible studies. To be included in the review, each study needed to meet the following criteria:

(1) Include a quantitative impact evaluation of a policing intervention focussed on alcohol impaired driving;
(2) Utilise either a randomised experimental research design, review and/or meta-analytic research design, or a high quality quasi-experimental research design;
(3) Be conducted or published between 2004 and 2018 inclusive; and
(4) Be written in English.

The initial search was conducted within the Global Policing Database and identified 3,079 potentially eligible citations. First stage title and abstract screening resulted in the removal of 1,740 records due to not being about policing alcohol impaired driving. The full-text for the potentially eligible titles and abstracts published between 2004 – 2018 were screened for final eligibility (n = 1,338), which resulted in a loss of 1,201 documents due to no report of an eligible intervention or a quantitative impact evaluation of an eligible intervention. The final corpus of 138 eligible studies (reported in 137 documents) is comprised of 12 randomised controlled trials (RCTs), 9 reviews with or without meta-analyses, and 117 robust quasi-experiments. This level of attrition is common in systematic reviews of evaluation evidence in policing and is reflective of the scarcity of high quality evaluations of criminal justice interventions across the globe. Systematic reviews with or without meta-analyses and RCTs are prioritised in the written syntheses of evidence. This approach ensures that the most recent and robust research is captured in this report. The full corpus of eligible studies is provided at the end of each section.

Results

The 138 eligible studies (reported in 137 documents) were predominantly conducted in the United States, however, a range of developing and developed countries were also represented in the corpus of studies. Almost a quarter of the studies were impact evaluations of tests of technologies for detecting alcohol intoxication in the context of policing. The remaining studies fell into a range of other intervention categories, including:

- Legislative or regulatory changes;
- Partnership policing (e.g., with licenced establishments);
- Sobriety checkpoints and randomised breath test operations;
- Varying the level of police presence or enforcement activities;
- Problem-oriented policing approaches to target policing alcohol impaired driving; and
- Integrating procedurally just communication or interaction style into DUI policing.

This review provides a comprehensive preliminary understanding of the impact of policing interventions to address alcohol impaired driving. It should be noted that this review only provides a narrative synthesis of robust impact evaluations of road policing interventions conducted between 2004 – 2018 that met our inclusion criteria. Caution must be exercised when comparing the results of the single studies because meta-analysis was not used to quantitatively synthesise the outcome data reported in the component studies.

Key Observations

The key observations from our review include:

- Procedural justice elements applied to RBT stops can influence both police and driver perceptions of the efficacy and motives of police activities and the nature of the encounter.
- Regardless of whether or not an individual is arrested, police traffic stops can reduce the likelihood of future alcohol impaired driving behaviours. Increasing police patrols has a generally beneficial impact on traffic fatalities and alcohol-related crashes.
- DUI checkpoints reduce alcohol-involved crashes by a minimum of 17 per cent, and general crashes were reduced by 10-15 per cent.

- Police interventions targeting speeding and driving while impaired found reductions between 20 and 36 percent in accidents resulting in injury. Automated systems such as red light cameras and speed cameras were least effective.
- Road police officers need to have knowledge of toxicology in alcohol absorption in order to optimise their field assessments of intoxication based on behavioural measures.
- Police enacted harm reduction interventions were found to reduce the likelihood of road traffic accidents but this effect is likely to be limited to night time accidents only.
- Passive Alcohol Sensors (PAS) are likely to assist officers to make better decisions about arrests for driving under the influence of alcohol.
- Simplified clinical tests of impairment are efficacious and should be used within 1.5 hours following drug consumption, but not after 7 hours.
- Survey results show that the strongest deterrents to driving under the influence of alcohol were intensified enforcement, severe jail penalties and instant, prolonged license suspension. Fine penalties, delayed punitive responses and legal blood alcohol concentration parameters demonstrated negligible effects.
- Interventions involving harsher penalties were found to reduce general road traffic injuries in all road users and road traffic head injuries in motorcyclists, however stringent speed control legislation with severe penalties for speeding was not found to reduce the likelihood of road traffic accidents.

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1: Review Methodology

1.1 Introduction

The growth of evidence-based policy and practice in criminal justice has led to a growth in experimental research and systematic reviews as a means for identifying best practice. Randomised experiments and systematic reviews are considered the "gold standard" methods in the area of evidence-based policy and practice (Mazerolle & Bennett, 2011). Randomised experiments provide the most robust methods for establishing causality and establishing the impact of an intervention (Blumstein, 2013). Systematic reviews of interventions, which may or may not include a meta-analysis, expand single study evidence by utilising a series of standardised methodological stages to capture and synthesise impact evaluations of interventions (Liberati et al., 2009). Systematic reviews provide concise and comprehensive summaries of high-quality research evidence and are valuable tools for policy-makers and practitioners aiming to identify interventions that are most effective for particular problems and populations (Wilson & Tanner-Smith, 2014).

While systematic reviews are considered the highest quality evidence, they are time and labour-intensive. As a result, scholars have developed alternative review methodologies to allow for expedited syntheses of empirical literature, including reviews of existing systematic reviews, overviews of reviews, scoping reviews, evidence maps, and rapid reviews (Arksey & O'Malley, 2005; Levac, Colquhoun, & O'Brien, 2010; Snilstveit et al., 2016). The review reported here adopts a hybrid approach that draws on a range of review method frameworks. The overall aim is to provide a rapid and broad synthesis of the highest quality available evidence for the effectiveness of road policing for impaired driving.

1.2 Review Methodology

This review adopts a hybrid approach that draws on traditional systematic review methodologies and also alternative review methodologies that permit expedited reviews of evaluation literature (Arksey & O'Malley, 2005; Levac, Colquhoun, & O'Brien, 2010; Snilstveit et al., 2016). The initial stages of the review process utilised a standard systematic review methodology, beginning with a broad systematic search of academic and grey literature (unpublished) sources. All studies identified by the systematic search were then progressed through standardised sequential screening stages to ascertain whether each study met our pre-specified inclusion criteria. At the point of inclusion, studies were categorised to establish the breadth and depth of the evaluation literature. From the point of study

categorisation, this review adopts a narrative synthesis method which summarises the key characteristics of eligible studies across two overarching substantive content areas: (a) tests or technologies for detecting alcohol impaired driving; and (b) other interventions aiming to prevent or control alcohol impaired driving. Specifically, within each of these sections, the evidence is summarised by reporting: (a) the overall number of studies by research design (review, RCT, quasi-experiment); (b) the geographical location of studies; (c) the type of policing approach; and (d) the type of outcome measures used to evaluate the intervention.

1.3 Search Methodology

Search Location: The Global Policing Database

We conducted a systematic search within the Global Policing Database (GPD), housed at the University of the Queensland. The GPD is searchable database designed to capture all published and unpublished experimental and quasi-experimental evaluations of interventions relating to police or policing that have been conducted since 1950. Using innovative systematic review technologies developed at The University of Queensland, the GPD is being compiled by systematically searching, retrieving and screening published and unpublished literature that reports on impact evaluations of interventions relating to police or policing from 1 January 1950. There are no restrictions on the type of policing technique, type of outcome measure or language of the research. A complex search string using a large number of search terms (free-text and controlled vocabulary) and several search fields (e.g., title, abstract, keywords) has been used to search more than 50 databases that collectively cover peer-reviewed and grey literature (see www.gpd.uq.edu.au for a full methodological protocol).

Search Terms

We developed a wide range of search terms to capture relevant literature for both this review and another review requested by the New Zealand Evidence Based Policing Centre on the effectiveness of road policing interventions. Simultaneous processing of the data extracted from the GPD was deemed as more efficient due to the content overlap for the two reviews. To develop the search terms, we drew on existing research and sought input from police practitioners and researchers. Because the GPD systematic search utilised policing terms, the search terms for this review only needed to focus on road policing terminology and highly specific outcomes.

Table 1.1 lists the search terms used for the review, which are used to search the title and abstract fields of eligible studies indexed within in the GPD. A range of search terms were iteratively piloted before reaching this final set of terms in order to ensure that the search terms were not overly

sensitive (capturing a high proportion of irrelevant research) or restrictive (not identifying sufficient relevant research).

Table 1.1 Rapid Review Search Terms[1]

Search Terms Separated by Boolean OR	
accident*	"alcohol limit*"
bike	"alcohol sensor*"
bicycle*	"alcohol screen*"
bus	"alcohol detect*"
buses	"alcohol surveil*"
car	"alcohol test*"
cars	"alcohol interlock*"
collision*	"license suspen*"
crash*	BAC
driv*[2]	BST
fatal*	"blood alcohol"
highway*	breath*[4]
hoon*	"check point*"
infring*	"check-point*"
motor*	checkpoint*
road[3]	DUI
speed*	DWI
traffic	EBA
transit*	RBT*
transport*	sobriety
truck*	"under the influence"
van	"walk the line"
vans	"walk-the-line"
vehic*	

1.4 Criteria for Including Studies in the Review

To be included in this review, each document must have satisfied all inclusion criteria, which are outlined in the subsections below.

Research Timeframe

To provide the most up-to-date synthesis of literature pertaining to road policing interventions for impaired driving, only studies which were published from January 2004 through to December 2018 were progressed through the systematic search and screening process. All eligible studies in this timeframe are captured in the narrative synthesis in Section 2 and 3 of this report.

[1] The following terms were omitted from the search when piloting revealed that they either (a) captured a high proportion of irrelevant research; or (b) were rarely used in the absence of one or more of the other search terms: "minimum drinking age"; ALS; CBT; injur*

[2] Captures the following related terms: "drunk driv*"; "drink driv*"; "driv* drunk"; "driving under"; "driving while"

[3] Captures the following related terms: roadblock*; road-block*; roads

[4] Captures the following related terms: Breathalyser/breathalyzer*; "breath alcohol"; "breath test*" "random breath*"

Population

To provide a comprehensive synthesis of the literature, eligible interventions were included if the participants were:

- Police practitioners or organisations;
- Organisations, businesses, or entities (including employees) working in partnership with police;
- Micro- or macro-places; or
- Citizens.

Types of Interventions

To be eligible for inclusion in the review, each document must have reported on an impact evaluation of a policing intervention aiming to address alcohol impaired driving. Policing interventions could be some kind of a strategy, technique, approach, activity, campaign, training, directive, or funding or organisational change that involves the police in some way (other agencies or organisations can also be involved). Police involvement is broadly defined as:

- Police initiation, development or leadership;
- Police staff or populations are recipients of the intervention or the intervention is related;
- Police practices are the focus or target of an intervention; or
- Police deliver or implement the intervention.

Types of Study Designs

To synthesise the most rigorous research, the review research designs that allow for reliable conclusions about intervention effectiveness. Specifically, systematic reviews and randomised experiments were prioritised for syntheses, as these designs are considered the "gold standard" for ascertaining intervention effectiveness. Eligible comparison conditions/groups include no treatment, placebo, "business-as-usual", waitlist control, or an alternative treatment.

While other research designs are less robust, they are often used due to the difficulties associated with conducting RCTs in criminal justice settings (Weisburd, 2000). In the absence of RCT evidence, "strong" quasi-experiments that attempt to minimise threats to internal validity can be used to provide preliminary causal evidence for the effectiveness of an intervention (see Farrington, 2003; Shadish, Cook, & Campbell, 2002). Threats to internal validity can be reduced through various approaches, including matching the characteristics of the treatment and comparison groups,

controlling assignment of cases to treatment and comparison groups (regression discontinuity), or using difference-in-difference analyses (parallel cohorts with pre-test and post-test measures). Our narrative syntheses prioritises the evidence from systematic reviews and RCTs, yet each section also lists eligible quasi-experiments. However, the full corpus of RCTs and quasi-experimental studies are summarised at the end of each section.

1.5 Screening and Coding Process

All search results were exported from the GPD into *SysReview*, a Microsoft Access database designed for managing systematic reviews (Higginson & Neville, 2013). Prior to screening, all efforts were made to remove ineligible document types (e.g., book reviews) and duplicate records. The subsections below provide a summary of the screening and coding protocol that was followed for the review.

Title and Abstract Screening

To refine the corpus of documents prior to more intensive full-text eligibility screening and coding stages, all records were screened on title and abstract to determine their initial eligibility and relevancy to policing alcohol impaired driving. Trained research staff used a standardised screening companion to screen each record according to whether the record (citation) was (a) unique (i.e., not a duplicate); and (b) focused on road policing or policing alcohol impaired driving. Potentially eligible documents then progressed to the full-text eligibility screening stage.

Full-Text Eligibility Screening

Wherever possible, a full-text electronic version was obtained for all eligible records. Trained research staff screened the full-text of each document in a two-staged screening and categorisation process, using a standardised screening companion according to criteria listed below. If documents were not excluded, they were considered eligible for the review and progressed to categorisation and coding. Upon determining eligibility, documents were categorised into either the current alcohol impaired driving review and/or the corresponding road policing review.

Full-Text Eligibility Exclusion Criteria

- Document is an ineligible document type (e.g., book review);
- Document is not unique (i.e. not a duplicate);
- Document does not report on an eligible intervention; and
- Document does not report on an impact evaluation of the eligible intervention.

Full-Text Categorisation Criteria

- Document reports on an impact evaluation of an intervention relating to technologies for detecting alcohol impaired driving (e.g., screening tests, breathalysers);
- Document reports on an impact evaluation of another type intervention aimed at controlling or preventing alcohol impaired driving (e.g., partnerships with other agencies, legislative changes tied to policing alcohol impaired driving);

Full-Text Coding

A team of trained research staff coded each eligible study using to standardised guidelines to inform the qualitative syntheses within each review theme. Specifically, data were extracted for each study according to the following domains:

- Citation information (type of document, publication date, authors etc.);
- Type of road policing intervention;
- Intervention description (e.g. setting, focus, treatment components, intensity);
- Research design (including comparison condition);
- Geographical location of the intervention; and
- Type of outcome measure(s) used to evaluate the intervention.

2.6 Search and Screening Summary

The results of the eligibility screening and coding phases are presented in the PRISMA flowchart in Figure 2.1 (Moher et al., 2009). The systematic search identified 5,340 records (citations) within the corpus of eligible GPD documents. Of these records, 1,971 were in a language other than English, or were yet to be processed within the GPD due to being unable to source the full-text document through institutional libraries. This left 3,079 available records, of which 1,338 were screened as potentially being about road policing or policing impaired driving, based on their title and abstract. The full-text of these eligible titles and abstracts published between 2010 – 2018 were screened for final eligibility, and 137 documents (representing 138 studies) were deemed to meet full inclusion criteria for the review. These eligible documents were then categorised and coded, with a broad summary provided in Table 2.1.

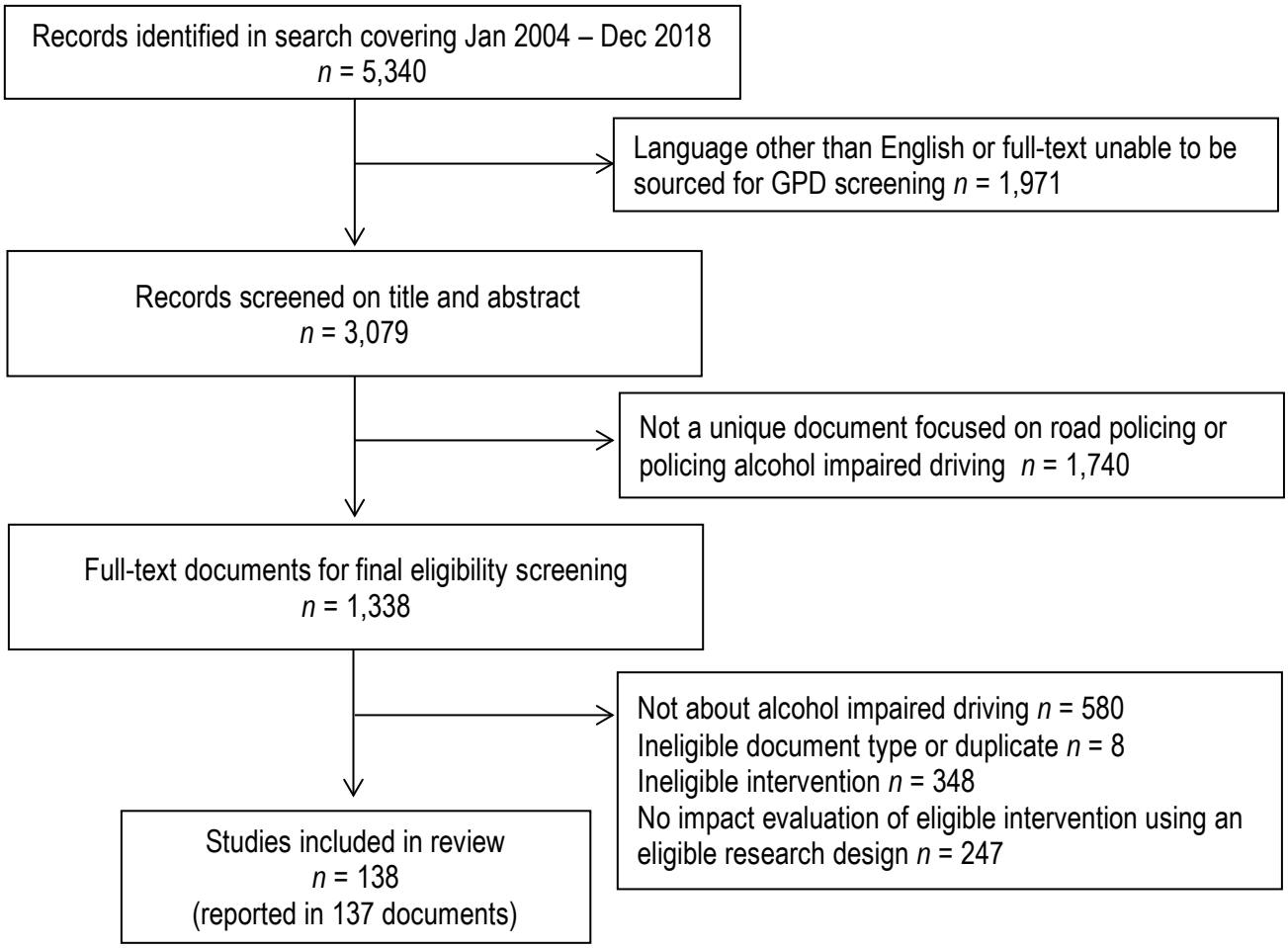

Figure 2.1. PRISMA Flow diagram.

Table 2.1 Summary of *n* = 138 Studies by Intervention Category and Research Design

Intervention Category	Results
Technologies or tests for detecting alcohol impaired driving (*n* = 29)	Systematic reviews and/or meta-analyses: *n* = 1 Randomised controlled trials: *n* = 4 Strong quasi-experiments: *n* = 24
Other interventions for preventing or controlling alcohol impaired driving (*n* = 109, reported in 108 documents)	Systematic reviews and/or meta-analyses: *n* = 8 Randomised controlled trials: *n* = 8 Strong quasi-experiments: *n* = 93

2.7 References

Arksey. H. & O'Malley, L. (2005). Scoping studies: Towards a methodological framework, *International Journal of Social Research Methodology, 8*, 19-32. doi: 10.1080/1364557032000119616

Farrington, D. P. (2003). Methodological quality standards for evaluation research. *The ANNALS of the American Academy of Political and Social Science,* 587, 49–68. doi: 10.1177/0002716202250789

Higginson, A., & Eggins, E. (forthcoming). The Campbell Collaboration. In J.C. Barnes and David R. Forde (Eds.), *Encyclopedia of research methods and statistical techniques in criminology and criminal justice*. Wiley.

Higginson, A., & Neville, R. (2014). *SysReview* [Systematic Review Management Software]. Brisbane, Australia: The University of Queensland.

Levac, D., Colquhoun, H., & O'Brien, K. K. (2010). Scoping studies: Advancing the methodology. *Implementation Science*, *5*, 1-9. doi: 10.1186/1748-5908-5-69

Liberati, A., Altman, D. G., Tetzlaff, J., Mulrow, C., Gøtzsche, P. C., Ioannidis, J. P. A., . . . Moher, D. (2009). The PRISMA Statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: Explanation and elaboration. *Annals of Internal Medicine, 151*(4), W65–W94. doi: 10.7326/0003-4819-151-4-200908180-00136

Moher, D., Liberati, A., Altman, D. G., & The PRISMA Group. (2009). Preferred items for systematic reviews and meta-analysis: The Prisma Statement. *PLoS Med, 6*(7): e1000097. doi:10.1371/journal.pmed1000097

Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Boston, MA: Houghton Mifflin.

Snilstveit, B., Vojtkova, M., Bhavsar, A., Stevenson, J., & Gaarder, M. (2016). Evidence and gap maps: A tool for promoting evidence informed policy and strategic research agendas. *Journal of Clinical Epidemiology*, *79*, 120-129. doi: 10.1016/j.jclinepi.2016.05.015

Wilson, S. J., & Tanner-Smith, E. E. (2014). Meta-analysis in prevention science. In Z. Sloboda & H. Petras (Eds.), *Defining prevention science Defining Prevention Science* (pp. 431–452). New York: Springer.

2: Tests or Technologies for Policing Alcohol Impaired Driving

2.1 Introduction

A total of 29 studies reported on impact evaluations of policing interventions that involved tests or technologies for detecting alcohol impaired driving. One third of the studies were conducted in the United States (n = 9), with the remaining studies being conducted across a range of developed and developing countries. Outcomes used to assess the effectiveness of interventions included biological measures of alcohol intoxication (e.g., blood alcohol concentration (BAC) or level of alcohol on the breath or in oral fluid) and behavioural indicators of intoxication (e.g., gait). The subsection below summarises the randomised controlled trials (RCTs; n = 4) and single systematic review, which are considered the "gold standard" for ascertaining the effectiveness of an intervention. Please see Section 2.3 for a full report of both RCTs and quasi-experimental studies and the full range of outcome measures.

2.2 Tests and Technologies for Blood Alcohol Level and Other Physiological Outcomes

Perry et al. (2017) conducted a systematic review of ethanol forensic toxicology, investigating blood alcohol concentration (BAC) measurement, variables that impact intoxication in relation to BAC, and benchmarks of concentration used to inform legal decisions. In summarising studies from multiple countries, BAC measurement accuracy and variations in perceived intoxication, the authors found that BAC can vary greatly due to a range of individualistic absorption factors. Thus, it was concluded that in law enforcement decisions and assessment a certain level of knowledge of toxicology in alcohol absorption is essential, alongside non-BAC assessment measures such as standardised field assessments of intoxication focused on behavioural measures.

The four RCTs identified examined the effectiveness of different techniques or tests for assessing impaired driving. Fell et al. (2008) conducted a randomised experiment to assess the effectiveness of passive alcohol sensors (PAS) in routine traffic stops on arrests for driving under the influence of alcohol. PAS technology is built into standard police flashlights and enables the detection of a small amount of alcohol on a person's breath, giving police an initial blood alcohol content reading. Officers from the Maryland Police Department (USA) were randomly assigned to Squad A (experimental condition using PAS during all traffic stops) or Squad B (control condition operating traffic stops as usual). After round 1 of the experiment (June 2004 – July 2005), the squads were

swapped for round 2 (October 2005 – February 2006) and Squad B operated under experimental conditions using the PAS while Squad A operated business-as-usual traffic stops. The authors verified the validity of the PAS technology in detecting blood alcohol content at the roadside. While the arrest rate was the same for both the experimental and control conditions, Fell et al. (2008) concluded that the PAS seemed to encourage officers who did not usually make arrests for driving under the influence of alcohol to do so.

Ho et al. (2014) evaluated the effect of different police use of force tactics (conducted electrical weapon exposure, physical fight, dog bite and Oleoresin Capsicum spray to the face) and suspect resistance and escape attempts on sobriety measurement and physiological measures of blood pressure and heart rate. Participants were randomly assigned to one of the experimental conditions and measures of heart rate, blood pressure, blood oxygen saturation and sobriety (Standardised Field Sobriety Test) were taken before and after exposure to the scenario. No significant differences were found on any outcome measure across the two measurement time points, such that suspect resistance and police use of force tactics had no noticeable impact on physiological measures of cardiac activity or field measurements of sobriety. The authors suggest that these findings strengthen the evidential capabilities of Standardised Field Sobriety Test as the results are not seen to deteriorate in forceful or resistance suspect encounters.

Hjelmeland, Gustavsen, Bernard, and Mørland (2015) examined the efficacy of a simplified clinical test of impairment to detect alcohol and hypnotic drug (Zopiclone) related effects on motor control. Sixteen male participants were randomly assigned to one of four conditions: 5 mg of Zopiclone, 10mg of Zopiclone, 50 grams of alcohol, or placebo control condition. Psychometric measures of impairment and motor control function were collected and compared 1.5 and 7 hours following drug administration, along with sample of blood-drug concentration. The clinical measures of impairment included: gait-online test, turn-on-line test, finger-to-finger test, finger-to-nose test, and Romberg's test (standing steadily on one leg for a minimum of 5 seconds while eyes are closed and arms are outstretched). The study found that the simplified clinical tests of impairment were efficacious 1.5 hours following drug consumption, but not after 7 hours. Blood test specificity was high for both substances at both test occasions.

Fiorentino (2018) evaluated the efficacy of standardised field sobriety tests incorporating postural equilibrium assessment at blood alcohol concentration (BAC) levels close to new, lower, imposed

BAC limits (0.05g/dL) for driving in the United States. By comparing postural control between groups with increasing levels of breath alcohol concentration (BrAC), Fiorentino aimed to determine whether postural equilibrium adequately identified individuals at different levels of intoxication. Participants were healthy male and female participants aged 21 to 64, who were moderate to heavy drinkers. They were randomly assigned to one of five BAC groups (0.00, 0.04, 0.06, 0.08, and 0.10 g/210L) and given alcoholic drinks at 10-minute intervals to achieve their specified BAC before postural equilibrium assessment. The author found that the postural equilibrium assessment was only reliably affected by BAC 0.08g/dL and over, meaning that it may be an inadequate test for assessing intoxication below this BAC level.

2.3 Summary of Included Studies

Table 2.1 Studies Evaluating Tests or Technologies for Detecting Alcohol Impaired Driving (*n* = 29)

Author(s)	Document Type	Intervention Location	Research Design	Intervention Type	Outcomes Measured	Reference
Perry et al. (2017)	Peer-reviewed journal article	Multiple	Review	Techniques for detecting intoxication	Multiple	Perry, P. J., Dorougdar, S., & Van Dyke, P. (2017). Ethanol forensic toxicology. *Journal of the American Academy of Psychiatry & The Law, 45*(4), 429-438.
Fell et al. (2008)	Peer-reviewed journal article	United States (Maryland)	RCT	Roadside impairment tests	Alcohol in ambient air, BrAC, DUI arrests	Fell, J. C., Compton, C., & Voas, R. B. (2008). A note on the use of passive alcohol sensors during routine traffic stops. *Traffic Injury Prevention, 9*(6), 534-538. doi: 10.1080/15389580802282566
Ho et al. (2014)	Peer-reviewed journal article	United States (Tempe, Arizona)	RCT	Roadside impairment tests	Field sobriety test results; Toxicology results using oral fluid	Ho, J., Dawes, D., Nystrom, P., Moore, J., Steinberg, L., Tilton, A., & Miner, J. (2014). Effect of simulated resistance, fleeing, and use of force on standardised field sobriety testing. *Medicine, Science and the Law, 55*(3), 208-215. doi: 10.1177/0025802414536152
Hjelmeland et al. (2015)	Peer-reviewed journal article	Norway (Oslo, Austlandet)	RCT	Techniques for detecting intoxication	Behavioural and biological measures of intoxication	Hjelmeland, K., Gustavsen, I., Bernard, J. P., & Mørland, J. (2015). Can a simple clinical test detect impairment of zopiclone and alcohol? A randomized controlled trial. *Forensic Science International, 248*, 129-133. doi: 10.1016/j.forsciint.2014.12.0
Fioerentino (2018)	Peer-reviewed journal article	Not reported	RCT	Roadside impairment tests	BrAC	Fiorentino, D. D. (2018). The effects of breath alcohol concentration on postural control. *Traffic Injury Prevention, 19*(4), 352-357. doi: 10.1080/15389588.2018.1423561
Glinn et al. (2011)	Peer-reviewed journal article	United States (Michigan)	Quasi-experiment	BAC devices	Alcohol in oral fluid	Glinn, M., Adatsi, F., & Curtis, P. (2011). Comparison of the analytical capabilities of the BAC Datamaster and Datamaster DMT forensic breath testing devices. *Journal of Forensic Sciences, 56*(6), 1632-1638. doi: 10.1111/j.1556-4029.2011.01874.x
Philipp et al. (2010)	Peer-reviewed journal article	Germany (NOS)	Quasi-experiment	BAC devices	Range of biological measures of alcohol ingestion	Philipp, R., Hanebeck, O., Hein, S., Bremser, W., Win, T., & Nehls, I. (2010). Ethanol/water solutions as certified reference materials for breath alcohol analyzer calibration. *Accreditation and Quality Assurance, 15*(3), 141-146. doi: 10.1007/s00769-009-0
Peleg et al. (2010)	Other	Not reported	Quasi-experiment	BAC devices	BAC	Peleg, K., Gopher, A., Jaffe, D. H., Siman-Tov, M., & Almog, S. (2010). Comparison of blood alcohol levels with breath alcohol levels measured using the Drager 7110 MKIII breathalyzer. *Injury Prevention, 16*(Suppl. 1), A147-A148. doi: 10.1136/ip.2010.029215.529
Dixon et al. (2009)	Peer-reviewed journal article	United Kingdom (NOS)	Quasi-experiment	Roadside impairment tests	BAC Field sobriety test results	Dixon, P. R., Clark, T., & Tiplady, B. (2009). Evaluation of a roadside impairment test device using alcohol. *Accident Analysis & Prevention, 41*(3), 412-418. doi: 10.1016/j.aap.2009.01.001

Author(s)	Document Type	Intervention Location	Research Design	Intervention Type	Outcomes Measured	Reference
Fessler et al. (2008)	Peer-reviewed journal article	United States (California)	Quasi-experiment	BAC devices	BrAC	Fessler, C. C., Tulleners, F. A., Howitt, D. G., & Richards, J. R. (2008). Determination of mouth alcohol using the Dräger Evidential Portable Alcohol System. *Science & Justice, 48*(1), 16-23. doi: 10.1016/j.scijus.2007.08.004
Fell & Compton (2007)	Conference presentation	United States (Anne Arundel County, Maryland)	Quasi-experiment	Roadside impairment tests	Alcohol in ambient air, BrAC	Fell, J. C., & Compton, C. (2007). Evaluation of the use and benefit of passive alcohol sensors during routine traffic stops. In *Annual Proceedings/Association for the Advancement of Automotive Medicine* (Vol. 51, p. 437). Association for the Advancement of Automotive Medicine.
Lindberg et al. (2007)	Peer-reviewed journal article	Sweden (NOS)	Quasi-experiment	BAC devices	BrAC, ABAC, VBAC	Lindberg, L., Brauer, S., Wollmer, P., Goldberg, L., Jones, A. W., & Olsson, S. G. (2007). Breath alcohol concentration determined with a new analyzer using free exhalation predicts almost precisely the arterial blood alcohol concentration. *Forensic Science International, 168*(2-3), 200-207. doi: 10.1016/j.forsciint.2006.07.018
Gainsford et al. (2006)	Peer-reviewed journal article	New Zealand (NOS)	Quasi-experiment	BAC devices	BrAC, BAC	Gainsford, A. R., Fernando, D. M., Lea, R. A., & Stowell, A. R. (2006). A large-scale study of the relationship between blood and breath alcohol concentrations in New Zealand drinking drivers. *Journal Of Forensic Sciences, 51*(1), 173-178. doi: 10.1111/j.1556-4029.2005.00029.x
Stough et al. (2006)	Government report	Australia (Victoria)	Quasi-experiment	Roadside impairment tests	BAC; Field sobriety test results	Stough, C., Boorman, M., Ogden, E., & Papafotiou, K. (2006). *An evaluation of the standardised field sobriety tests for the detection of impairment associated with cannabis with and without alcohol*. Canberra, Australia: National Drug Law Enforcement Research Fund.
Voas et al. (2006)	Peer-reviewed journal article	United States (Long Beach, California and Fort Lauderdale, Florida)	Quasi-experiment	Roadside impairment tests	BAC, Alcohol in ambient air	Voas, R. B., Romano, E., & Peck, R. (2006). Validity of the passive alcohol sensor for estimating BACs in DWI-enforcement operations. *Journal of Studies On Alcohol, 67*(5), 714-721.
Degia et al., 2005	Peer-reviewed journal article	Not reported	Quasi-experiment	Roadside impairment tests	Behavioural indicators of intoxication (e.g., reaction time)	Degia, A., Meadows, R., Johnsen, S., Hindmarch, I., & Boyle, J. (2005). Development of a portable psychometric testing device for use in the field: an alcohol investigation. *Perceptual And Motor Skills, 101*(2), 383-392.
Razatos et al. (2005)	Peer-reviewed journal article	United States (New Mexico)	Quasi-experiment	BAC devices	BrAC	Razatos, G., Luthi, R., & Kerrigan, S. (2005). Evaluation of a portable evidential breath alcohol analyzer. *Forensic Science International, 153*(1), 17-21. doi: 10.1016/j.forsciint.2005.04.030
Fransson et al. (2005)	Peer-reviewed journal article	Sweden (NOS)	Quasi-experiment	BAC devices	BAC taken at various time points	Fransson, M., Jones, A. W., & Andersson, L. (2005). Laboratory evaluation of a new evidential breath-alcohol analyser designed for mobile testing - the Evidenzer. *Medicine Science and the Law, 45*(1), 61-70. doi: 10.1258/rsmmsl.45.1.61

Author(s)	Document Type	Intervention Location	Research Design	Intervention Type	Outcomes Measured	Reference
Citek et al. (2011)	Peer-reviewed journal article	United States (Forest Grove, Oregon)	Quasi-experiment	Roadside impairment tests	BAC; Field sobriety test results	Citek, K., Elmont, A. D., Jons, C. L., Krezelok, C. J., Neron, J. D., Plummer, T. A., & Tannenbaum, T. (2011). Sleep deprivation does not mimic alcohol intoxication on field sobriety testing. *Journal of Forensic Sciences, 56*(5), 1170-1179.doi: 10.1111/j.1556-4029.2011.01813.x.
Korkosh et al. (2012)	Peer-reviewed journal article	Canada (Winnipeg, Halifax, and Vancouver)	Quasi-experiment	BAC devices	BrAC, BAC	Korkosh, S. L., Hackett, J. A., & Montpetit, J. C. (2012). Blood alcohol and breath alcohol comparisons using the Intox EC/IR II. *Canadian Society of Forensic Science Journal, 45*(4), 195-200. doi: 10.1080/00085030.2012.10757193
Stowell et al. (2008)	Peer-reviewed journal article	New Zealand (NOS)	Quasi-experiment	BAC devices	BrAC, BAC	Stowell, A. R., Gainsford, A. R., & Gullberg, R. G. (2008). New Zealand's breath and blood alcohol testing programs: Further data analysis and forensic implications. *Forensic Science International, 178*(2-3), 83-92. doi: 10.1016/j.forsciint.2008.02.005
Porath-Waller & Beirness (2014)	Peer-reviewed journal article	Canada (whole-of-country)	Quasi-experiment	Roadside impairment tests	Field sobriety test results; Toxicology results using oral fluid	Porath-Waller, A. J., & Beirness, D. J. (2014). An examination of the validity of the standardised field sobriety test in detecting drug impairment using data from the drug evaluation and classification program. *Traffic Injury Prevention, 15*(2), 125-131.
Domingues et al., (2009)	Peer-reviewed journal article	Brazil (Vitoria, Espirito Santo)	Quasi-experiment	Roadside impairment tests; BAC devices	BrAC, Field sobriety test results	Domingues, S. C. A., Mendonça, J. B., Laranjeira, R., & Nakamura-Palacios, E. M. (2009). Drinking and driving: A decrease in executive frontal functions in young drivers with high blood alcohol concentration. *Alcohol, 43*(8), 657-664. doi: b>10.1016/j.alcohol.2009.10.001
Shinar & Schechtman (2005)	Peer-reviewed journal article	United States (Baltimore, Maryland)	Quasi-experiment	Multiple	BrAC, Field sobriety test results	Shinar, D., & Schechtman, E. (2005). Drug identification performance on the basis of observable signs and symptoms. *Accident Analysis And Prevention, 37*(5), 843-851. doi: 10.1016/j.aap.2005.04.002
Ashdown et al. (2014)	Peer-reviewed journal article	United Kingdom (Oxford, Oxfordshire)	Quasi-experiment	BAC devices	BAC	Ashdown, H. F., Fleming, S., Spencer, E. A., Thompson, M. J., & Stevens, R. J. (2014). Diagnostic accuracy study of three alcohol breathalysers marketed for sale to the public. *BMJ Open, 4*(12), e005811. doi: 10.1136/bmjopen-2014-005811
Fierro et al. (2014)	Peer-reviewed journal article	Spain (NOS)	Quasi-experiment	Multiple	Alcohol in oral fluid	Fierro, I., González-Luque, J. C., & Álvarez, F. J. (2014). The relationship between observed signs of impairment and THC concentration in oral fluid. *Drug and Alcohol Dependence, 144*, 231-238. doi: 10.1016/j.drugalcdep.2014.09.770
Domingo-Salvany et al. (2017)	Peer-reviewed journal article	Spain (NOS)	Quasi-experiment	BAC devices		Domingo-Salvany, A,. Herrero, M. J., Fernandez, B., Perez, J., de Real, P., Gonzalez-Luque, J. C., & de la Torre, R.. (2017). Prevalence of psychoactive substances, alcohol and illicit drugs, in Spanish drivers: A roadside study in 2015. *Forensic Science International, 278*, 253-259. doi: 10.1016/j.forsciint.2017.07.005

Author(s)	Document Type	Intervention Location	Research Design	Intervention Type	Outcomes Measured	Reference
Drummond-Lage et al. (2018)	Peer-reviewed journal article	Brazil (Belo Horizonte, Minas Gerais, Brazil)	Quasi-experiment	Techniques for detecting intoxication		Drummond-Lage, A. P., de Freitas, R. G., Cruz, G., Perillo, L., Paiva, M. A., & Wainstein, A. J. A. (2018). Correlation between blood alcohol concentration (BAC), breath alcohol concentration (BrAC) and psychomotor evaluation in a clinical monitored study of alcohol intake in Brazil. *Alcohol, 66*, 15-20. doi: 10.1016/j.alcohol.2017.07.002
Jurič et al. (2018)	Peer-reviewed journal article	Croatia (Zagreb, Croatia Proper)	Quasi-experiment	Techniques for detecting intoxication	BrAC	Jurič, A., Fijačko, A., Bakulić, L., Orešić, T., & Gmajnički, I. (2018). Evaluation of breath alcohol analysers by comparison of breath and blood alcohol concentrations. *Arh Hig Rada Toksikol, 69*(1), 69-76. doi: 10.2478/aiht-2018-69-3064

3: Other Interventions for Preventing or Controlling Alcohol Impaired Driving

3.1 Introduction

A total of 109 studies (reported in 108 documents) examined the impact of policing interventions that aimed to prevent or control alcohol impaired driving. The majority of the studies were conducted in the United States (n = 62, 56.88%), with the remaining studies being conducted across a range of developed and developing countries. We found a wide range of road policing interventions, including:

- Legislative or regulatory changes;
- Partnership policing (e.g., with licenced establishments);
- Sobriety checkpoints and randomised breath test operations;
- Varying the level of police presence or enforcement activities;
- Problem-oriented policing approaches to target policing alcohol impaired driving; and
- Integrating procedurally just communication or interaction style into DUI policing.

The subsections below summarise the randomised controlled trials (RCTs; n = 8) and reviews of eligible interventions (n = 8), which are considered the "gold standard" for ascertaining the effectiveness of an intervention. Please see Section 3.5 for a full report of reviews, RCTs, and quasi-experimental studies and the full range of outcome measures.

3.2 Procedurally Just or Restorative Policing in the Context of Alcohol Impaired Driving

Five documents reported findings from a randomised experiment conducted in Brisbane, Australia that tested procedural justice scripts for police during routine random breath test (RBT) encounters (Bates et al., 2015; Mazerolle, 2011; Mazerolle et al., 2012; Mazerolle et al., 2013; Mazerolle et al., 2015). The Queensland Community Engagement Trial (QCET) randomly assigned 60 roadside RBT operations to either business-as-usual (n = 30), or an experimental condition (n = 30), where police delivered a procedural justice script. This script emphasised the four components of procedural justice: neutrality, citizen participation, respect, and trustworthy motives. Police in the experimental condition also provided drivers with a community information bulletin prepared by the Queensland Police Service. Outcomes included self-reported perceptions of drink driving behaviour, compliance, perceptions of police legitimacy, and satisfaction with police during the encounter. The trial found

significant differences between experimental and control conditions for all measures, suggesting that the procedural justice intervention at RBTs changed perceptions of driving while impaired, and increased satisfaction and compliance with police during the stop.

Further analysis of the trial data by Mazerolle et al. (2015) found a positive relationship between encounter duration and participant's perceptions of police and procedural justice, such that longer procedurally just encounters were associated with more positive perceptions of police and a greater sense of procedural justice. However, an encounter lasting one minute and 50 seconds was found to be the optimal duration for maximising these outcomes, as shorter durations were seen to be too fast to elicit the overt benefits of procedural justice and longer durations may have frustrated motorists. Bates et al.'s (2015) analysis of the trial found that police officers in the procedural justice condition were more likely to believe that RBT encounters are primarily to demonstrate a police presence in the community and prevent crashes due to intoxicated driving through general deterrence, whereas police in the control condition considered RBTs as a method of detaining criminals and reducing crashes through specific deterrence. In addition, the authors found that the experimental manipulation did not influence how drivers perceived the reasoning for the RBT stop as they largely saw the police as having trustworthy motives for initiating the encounter, and few drivers viewed the RBT encounter as purely a method of enhancing police visibility in the community. The authors conclude that procedural justice elements applied to RBT stops can influence both police and driver perceptions of the efficacy and motives of police activities and the nature of the encounter.

Tyler et al. (2007) conducted a randomised experiment evaluating the Australian Reintegrative Shaming Experiments (RISE) in Canberra, Australia. RISE utilises diversionary restorative justice conferences to prevent re-offending of DUI crimes. In this study, the experimental participants were assigned to attend a restorative justice conference, which involved no charges or criminal record as long as drink drivers complied with conference requirements. Conferences aimed to foster feelings of procedural justice (such as participation, trustworthiness, and fairness) and reintegrative shaming (such as reconnecting with others and shame in deviant behaviour). The control group followed traditional prosecution procedures. Results were split into two key outcomes, measured immediately and 2-years post intervention: recidivism and psychological constructs. The authors found no significant reduction in DUI reoffending as a result of the intervention, based on official data and self-reported drinking behaviours. However, two years post treatment, statistically significant results

were found in key psychological constructs for the experimental group, including law legitimacy and problems that re-offending would have on interpersonal relationships.

3.3 Type Police Action or Severity of Sanctions in Alcohol Impaired Driving Contexts

Two RCTs examined the impact of different types of police action or severity of sanctions. Leedy (2007) conducted a randomised vignette study around police stops for alcohol impaired driving. Specifically, students from the University of Oklahoma (USA) who met the criteria for engaging in heavy episodic binge drinking (defined as 5+ drinks in a single occasion in the past month) were randomised to one of three hypothetical scenarios: no police contact, police stop with no arrest, and police stop with arrest for alcohol impaired driving. The author examined the effect of these conditions on a range of outcomes, including peak drinking intentions, typical drinking and frequency of drinking patterns, risky drinking behaviours, and protective drinking behaviours. Results showed that, compared with the no police contact condition, both the arrest and no arrest conditions had a positive and statistically significant effect on all outcome measures. Therefore, the author concluded that regardless of whether an individual is arrested, police traffic stops can reduce the likelihood of future alcohol impaired driving behaviours.

A randomised experiment conducted by Yao, Johnson and Beck (2014) examined how differences in enforcement and punitive legal consequences affected decisions to drive under the influence of alcohol and the perceived risk of being caught by authorities. University students were randomly assigned to one of several combinations of scenarios, which consisted of varying levels of enforcement certainty, penalty fine severity, license suspension severity and swiftness, jail penalty severity, general penalty swiftness and also options for alternative transport such as taxi or shuttle bus. The authors utilised a blocked fractional factorial design to construct a balanced subset of these scenarios as a standard analysis would have yielded a massive amount of possible factorial combinations of variable levels. Following exposure to assigned subsets of conditions, participants were asked to report their self-reported likelihood of driving under the influence of alcohol and perceived likelihood of capture by police for driving under the influence of alcohol. The strongest deterrents to driving under the influence of alcohol were intensified enforcement, severe jail penalties and instant, prolonged license suspension. Alternate methods of transport were also seen to reduce the self-reported likelihood of DUI, whereas fine penalties, delayed punitive responses and legal blood alcohol concentration parameters demonstrated negligible effects.

3.4 Checkpoints and Increased Police Presence

Erke et al. (2009) conducted a meta-analysis of 40 studies examining the impact that driving under the influence (DUI) checkpoints have on traffic accidents (see also Ditsuwan et al., 2015). The studies are predominately focused on Australia, New Zealand, and the United States of America, with select studies from France, the Netherlands, Sweden, and the United Kingdom. The structure and operationalisation of DUI checkpoints vary between regions of implementation, including different intensity of enforcement, method for selecting breath test participants, testing procedures, introduction strategies of, publicity strategies, penalties for DUI, and the legal context. Meta-regression was carried out on seven predictor variables: time period when the program was implemented, country, study design (with or without eligible comparison condition), method of testing of drivers, rates of alcohol involved crashes, accompanying media strategy, and crash severity. The authors found that DUI checkpoints reduce alcohol-involved crashes by a minimum of 17 per cent, and general crashes were reduced by 10-15 per cent. The largest reduction in crashes were observed in the first six months of a program being introduced. Testing all drivers at the checkpoint seems to be more effective. There was no significant relationship between paid media and the efficacy of programs. Finally, the strongest outcomes of DUI checkpoints were found in Australia, which may be related to highly visible and intense nature of testing (through policies such as booze buses). The Australian results are particularly robust as most studies utilised comparison conditions in their evaluations.

Goss et al. (2008) conducted a systematic review of 32 studies examining increased police patrols targeting DUI. To assess efficacy of police patrols, studies were required to analyse number of officers or frequency and duration of police patrols aimed at identifying impaired driving. Campaigns could also include media or public education campaigns, special training or equipment for officers, and sobriety checkpoints in tandem with increased patrols. All studies included were from high-income countries, predominately the United States of America, but also including Australia, New Zealand, and Ireland. The primary outcome of interest is alcohol-related traffic accidents and subsequent injuries and fatalities. Secondary outcomes include the measured BAC of drivers, self-reported impaired driving behaviour, and alcohol test refusal rates. Overall, the authors found that increasing police patrols has a generally beneficial impact on traffic fatalities and alcohol-related crashes, but the results must be interpreted carefully as a result of poor study designs and mixed outcomes. More specifically, results shows some evidence that increasing patrols can reduce traffic fatalities. However, the impact of increasing police patrols on injuries found mixed results,

with no statistically significant reductions across the included studies. Most studies included a media campaign in tandem with increased patrols, making it difficult to separate effects of these intervention components. Nine studies examined impact of increased patrols on alcohol impaired driving. Only four of the studies reported reduction in DUI as a result of patrols and there was no relationship between patrols and reduction of alcohol-related injuries or crashes. However, the authors caution that this may be a result of inadequate study methods rather than the intervention itself.

3.5 Reviews of Multiple Interventions for Alcohol Impaired Driving

Jones et al. (2010) conducted a systematic review of interventions to reduce drinking harm. This review contained 47 eligible studies that were categorised by program type (n = 20 multicomponent community-based studies, n = 12 studies targeting server and/or patron behaviours in licensed alcohol outlets, and n = 15 studies targeting alcohol sales to minors or law enforcement relating to alcohol consumption). One study identified by Jones et al. (2010) met the eligibility criteria for our review (Voas et al., 2002). This evaluation examined a drink driving enforcement program at the US/Mexico border called Operation Safe Crossing, which entailed special patrols, increased foot patrols, and sobriety checkpoints near the San Ysidro border crossing in California. The impact of Operation Safe Crossing on alcohol-related crashes was assessed using a quasi-experimental design comparing US counties that did not receive the intervention. The authors of the systematic review stated that Voas et al. (2002) was of moderate methodological quality and that Operation Safe Crossing was successful in reducing alcohol-related crashes involving 16-20 year old drivers by 45.3%.

Blais and Dupont (2005) conducted a meta-analysis of intensive police interventions on deterring deviant driving behaviours, including six types of programs: random breath tests (RBTs), sobriety checkpoints, automated speed cameras, red-light cameras, random road watch (preventive patrols with random location of police cars), and mixed programs (hybrid of repressive programs and educational approaches). The review included 33 studies, drawn exclusively from industrialised nations, including: the United States of America, Australia, Canada, New Zealand, Netherlands, and Greece. For the meta-analysis, two key outcomes are measured: accidents with injuries and proxy measures of driving while impaired or speeding. Overall, the authors find that all police interventions included in the review lead to a similar reduction in accidents resulting in injury of between 23 and 31 per cent. Programs targeting speeding and driving while impaired found similar results, with reductions between 20 and 36 per cent. Additionally, media campaigns are strongly associated with

successful programmes aimed at deterring DWI, although are not necessarily required. The weakest results were found for automated systems such as red light cameras and speed cameras. Based on these studies, the authors suggest automated systems cannot be randomly placed and factors of implementation must be carefully considered such as visibility, intersection geometry, media, police controls, and yellow light interval.

A systematic review by Staton et al. (2016) evaluated the effectiveness of road traffic injury prevention initiatives in low and middle income countries. The review identified 13 studies evaluating policing interventions including legislation changes (higher financial and demerit point penalties, reduced blood alcohol limits, stringent speed control legislation and enforcement of helmet use, seat belt use and cell phone use) and enforcement (increased police road enforcement, training for use of enforcement technology and setting targets for enforcement practice). Interventions involving harsher penalties were found to reduce general road traffic injuries in all road users and road traffic head injuries in motorcyclists, however stringent speed control legislation with severe penalties for speeding was not found to reduce the likelihood of road traffic accidents. The introduction of a license scoring system and more severe penalties was found to reduce the likelihood of road traffic accidents from 10.5% to 21.3%. Enforcement of helmet, seat belt and cell phone use reduced the length of road traffic accident related hospital stay by 14.7%, and road traffic related emergency room admissions by 17.7% to 33%. Overall, legislation that informed changes in enforcement reduced general road user deaths by 7.2% to 33.2%, and deaths among motorcyclists by 7.1% to 16.4%, however several studies found non-significant reductions for motorcyclists. Increased police enforcement and training in enforcement technology was found to reduce road deaths by 17% in one study, however another found no significant reduction in death or injuries but 58% a reduction in crash frequency. The authors of the review concluded that all of the assessed interventions had a beneficial impact on road safety, and that legislation changes with a focus on enforcement had the strongest and most long lasting effects. However, it was noted that many of the included studies had bias in the form of inappropriate statistical analyses and a lack of methodological detail.

A systematic review by Stockings et al. (2018) evaluating the effectiveness of whole-of-community interventions in reducing population-level alcohol and drug harms identified five studies examining interventions involving police officers. Harm detection and reduction interventions including police presence at parties, enforcement of underage drinking laws and enforcement of alcohol sale to

minors were evaluated in four of the eligible studies, and the remaining study examined a community education program taking place in education settings that utilised law enforcement officers and other community stakeholders as program facilitators. The combination of police enacted harm detection and reduction strategies with varying community programs was found to reduce the likelihood of driving under the influence in one of the eligible studies, whereas another found significantly reduced arrests for DUI in three of the five test communities and no significant effects in other locations. Police enacted harm reduction interventions were found to reduce the likelihood of road traffic accidents in one study, and another evaluation found this effect to be limited to night time accidents only. However, another evaluation found no impact of police harm reduction and detection initiatives on motor vehicle accidents with or without injury. Finally, one evaluation examined the PROSPER (Promoting School-community university Partnerships to Enhance Resilience) program and found it had no impact on drinking after driving.

3.6 Summary of Included Studies

Table 3.1 Studies Evaluating Policing Interventions Aiming to Prevent or Control Alcohol Impaired Driving (*n* = 111)

Author(s)	Document Type	Intervention Location	Research Design	Intervention Type	Outcomes Measured	Reference
Blais & Dupont (2005)	Peer-reviewed journal article	Mixed (USA, Australia, Canada, NZ, Netherlands, Greece)	Review	Range of DUI interventions (e.g., RBTs, sobriety checkpoints)	Multiple	Blais, E., & Dupont, B. (2005). Assessing the capability of intensive police programmes to prevent severe road accidents. *British Journal of Criminology, 45*(6), 914-937. doi: 10.1093/bjc/azi017
Ditsuwan et al. (2015)	Peer-reviewed journal article	Thailand (NOS)	Review	Sobriety checkpoints	Multiple	Ditsuwan, V., Veerman, J. L., Bertram, M., & Vos, T. (2015). Sobriety checkpoints in Thailand: A review of effectiveness and developments over time. *Asia-Pacific Journal of Public Health, 27*(2), 2177-2187. doi: 10.1177/1010539511430851
Erke et al. (2009)	Peer-reviewed journal article	Multiple	Review	DUI checkpoints	Accidents/collisions	Erke, A., Goldenbeld, C., & Vaa, T. (2009). The effects of drink-driving checkpoints on crashes - a meta-analysis. *Accident Analysis & Prevention, 41*(5), 914-923. doi: 10.1016/j.aap.2009.05.005
Goss et al. (2008)	Peer-reviewed journal article	Multiple (USA, Australia, Ireland, and New Zealand)	Review	Level of police presence or enforcement actions	Multiple	Goss, C. W., Van Bramer, L. D., Gliner, J. A., Porter, T. R., Roberts, I. G., & DiGuiseppi, C. (2008). Increased police patrols for preventing alcohol-impaired driving. *The Cochrane Database Of Systematic Reviews, 4*, 1-88. doi: 10.1002/14651858.CD005242.p
Green et al. (2015)	Peer-reviewed journal article	United States, Canada, Sweden	Review	Range of DUI interventions (e.g., legislative and levels of enforcement)	Multiple	Green, R. S., Kureshi, N., & Erdogan, M. (2015). Legal consequences for alcohol-impaired drivers injured in motor vehicle collisions: A systematic review. *Accident Analysis & Prevention, 80*, 106-116. doi: 10.1016/j.aap.2015.04.005
Jones et al. (2010)	Technical report	United States (San Diego county, California)	Review	DUI checkpoints, media and level of police presence or enforcement actions	Accidents/collisions	Jones, L., Atkinson, A., Hughes, K., Whelan, G., & Bellis, M. A. (2010). *Reducing harm in drinking environments: A systematic review of effective approaches.* Liverpool: Liverpool John Moores University.
Staton et al. (2016)	Peer-reviewed journal article	Multiple LMICs	Review	Range of DUI interventions (e.g., legislative and levels of enforcement)	Multiple	Staton, C., Vissoci, J., Gong, E., Toomey, N., Wafula, R., Abdelgadir, J., ... & Hocker, M. (2016). Road traffic injury prevention initiatives: A systematic review and metasummary of effectiveness in low and middle income countries. *PLoS One, 11*(1), e0144971. doi: 10.1371/journal.pone.0144971
Stockings et al. (2018)	Peer-reviewed journal article	Mutliple	Review	Whole-of-community interventions (including police)	Multiple	Stockings, E., Bartlem, K., Hall, A., Hodder, R., Gilligan, C., Wiggers, J., ... & Wolfenden, L. (2018). Whole-of-community interventions to reduce population-level harms arising from

Author(s)	Document Type	Intervention Location	Research Design	Intervention Type	Outcomes Measured	Reference
						alcohol and other drug use: A systematic review and meta-analysis. *Addiction, 113*(11), 1984-2018. doi:10.1111/add.14277
Bates et al. (2015)	Peer-reviewed journal article	Australia (Brisbane, Queensland)	RCT	Procedurally just interaction at RBT operations	Multiple	Bates, L. J., Antrobus, E., Bennett, S., & Martin, P. (2015). Comparing police and public perceptions of a routine traffic encounter. *Police Quarterly, 18*(4), 442-468. doi: 10.1177/1098611115589290
Leedy (2007)	Dissertation	United States (Oklahoma)	RCT	Severity of citations, fines or consequences following violations	Alcohol impaired driving behaviour/attitudes	Leedy, M. J. (2007). *College students' intentions to drink alcohol and engage in incidental alcohol-related legal risk behavior following a hypothetical alcohol-related legal encounter* (Doctoral dissertation). Retrieved from ProQuest Dissertations & Theses Global database. (UMI No. 3291383)
Mazerolle (2011)	Other	Australia (Brisbane, Queensland)	RCT	Procedurally just interaction at RBT operations	Alcohol impaired driving behaviour/attitudes, perceptions of police, willingness to comply with police	Mazerolle, L. (2011). The Queensland Community Engagement Trial. *CEPS Research Quarterly, 1*, 6.
Mazerolle et al. (2013)	Peer-reviewed journal article	Australia (Brisbane, Queensland)	RCT	Procedurally just interaction at RBT operations	Perceptions of police	Mazerolle, L., Antrobus, E., Bennett, S., & Tyler, T. (2013). Shaping citizen perceptions of police legitimacy: A randomized field trial of procedural justice. *Criminology, 51*(1), 33-64. doi: 10.1111/j.1745-9125.2012.00289.x
Mazerolle et al. (2015)	Peer-reviewed journal article	Australia (Brisbane, Queensland)	RCT	Procedurally just interaction at RBT operations	Perceptions of police	Mazerolle, L., Bates, L., Bennett, S., White, G., Ferris, J., & Antrobus, E. (2015). Optimising the length of random breath tests: Results from the Queensland Community Engagement Trial. *Australian & New Zealand Journal of Criminology, 48*(2), 256-276. doi: 10.1177/0004865814532661
Mazerolle et al. 2012	Peer-reviewed journal article	Australia (Oxley, South Brisbane, and Wynnum, Queensland)	RCT	Procedurally just interaction at RBT operations	Perceptions of police	Mazerolle, L., Bennett, S., Antrobus, E., & Eggins, E. (2012). Procedural justice, routine encounters and citizen perceptions of police: main findings from the Queensland Community Engagement Trial (QCET). *Journal of Experimental Criminology, 8*(4), 343-36. doi: 10.1007/s11292-012-9160-1
Tyler et al. (2007)	Peer-reviewed journal article	Australia (Canberra)	RCT	Restorative justice	Alcohol impaired driving behaviour/attitudes, perceptions of police, willingness to comply with law	Tyler, T. R., Sherman, L., Strang, H., Barnes, G. C., & Woods, D. (2007). Reintegrative shaming, procedural justice, and recidivism: The engagement of offenders' psychological mechanisms in the Canberra RISE drinking-and-driving experiment. *Law & Society Review, 41*(3), 553-586. doi: 10.1111/j.1540-5893.2007.00314.x
Yao et al. (2014)	Peer-reviewed journal article	United States (College Park, Maryland)	RCT	Severity of citations, fines or consequences following violations	Alcohol impaired driving behaviour/attitudes	Yao, J., Johnson, M. B., & Beck, K. H. (2014). Predicting DUI decisions in different legal environments: Investigating deterrence

Author(s)	Document Type	Intervention Location	Research Design	Intervention Type	Outcomes Measured	Reference
						with a conjoint experiment. *Traffic Injury Prevention, 15*(3), 213-221. doi: 10.1080/15389588.2013.808338
Abegaz et al. (2014)	Peer-reviewed journal article	Ethiopia (Oromia)	Quasi-experiment	Legislative or regulatory	Accidents/collisions and fatalities	Abegaz, T., Berhane, Y., Worku, A., & Assrat, A. (2014). Effectiveness of an improved road safety policy in Ethiopia: an interrupted time series study. *BMC Public Health, 14*(1), 539-539.
Adams et al. (2015)	Peer-reviewed journal article	United States (whole-of-country)	Quasi-experiment	Legislative or regulatory	Rate of alcohol impaired driving	Adams, S., Cotti, C., & Tefft, N. (2015). Seatbelt use among drunk drivers in different legislative settings. *Economic Inquiry, 53*(1), 758-772. doi: 10.1111/ecin.12155
Andreuccetti et al. (2011)	Peer-reviewed journal article	Brazil (Sao Paulo)	Quasi-experiment	Severity of citations, fines or consequences following violations	Rate of alcohol impaired driving	Andreuccetti, G., Carvalho, H. B., Cherpitel, C. J., Ye, Y., Ponce, J. C., Kahn, T., & Leyton, V. (2011). Reducing the legal blood alcohol concentration limit for driving in developing countries: A time for change? Results and implications derived from a time–series analysis (2001–10) conducted in Brazil. *Addiction, 106*(2), 2124-2131. doi: 10.1111/j.1360-0443.2011.03521.x
Beck & Moser (2004)	Peer-reviewed journal article	United States (Maryland)	Quasi-experiment	Publicised and implemented enhanced monitoring and enforcement	Perceived likelihood of alcohol impaired driving detection	Beck, K. H., & Moser, M. L. (2004). Exposure to the Sobriety "Checkpoint Strikeforce" Campaign in Maryland: Impact on driver perceptions of vulnerability and behavior. *Traffic Injury Prevention, 5*(2), 101-106. doi: 10.1080/15389580490434908
Beck et al. (2018)	Peer-reviewed journal article	United States (whole-of-state, Maryland)	Quasi-experiment	Problem-oriented policing	Accidents/collisions	Beck, K. H., Fell, J. C., & Kerns, T. J. (2018). Evaluation of Maryland's state police impaired driving reduction effort (SPIDRE). *Traffic Injury Prevention, 19*(4), 339-344. doi: 10.1080/15389588.2017.1414948
Beirness & Singhal (2007)	Government report	United States (Saskatchewan)	Quasi-experiment	Short-term licence suspensions by police	DUI recidivism	Beirness, D. J., & Singhal, D. (2007). *Short-term licence suspensions for drinking drivers: An assessment of effectiveness in Saskatchewan*. Ottawa, ON: Traffic Injury Research Foundation.
Beirness & Singhal (2007)	Government report	United States (Saskatchewan and Alberta)	Quasi-experiment	Short-term licence suspensions by police	Accidents/Accidents/collisions and fatalities	Beirness, D. J., & Singhal, D. (2007). *Short-term licence suspensions for drinking drivers: An assessment of effectiveness in Saskatchewan*. Ottawa, ON: Traffic Injury Research Foundation.
Bertelli & Richardson Jr (2008)	Peer-reviewed journal article	United States (whole-of-country)	Quasi-experiment	Range of DUI interventions (e.g., legislative and levels of enforcement)	Alcohol impaired driving behaviour/attitudes	Bertelli, A. M., & Richardson Jr, L. E. (2008). The behavioral impact of drinking and driving laws. *Policy Studies Journal, 36*(4), 545-569. doi: 10.1111/j.1541-0072.2008.00283.x
Bertelli & Richardson Jr. (2007)	Peer-reviewed journal article	United States (whole-of-country)	Quasi-experiment	Legislative or regulatory	Alcohol impaired driving behaviour/attitudes	Bertelli, A. M., & Richardson Jr., L. E. (2007). Measuring the propensity to drink and drive. *Evaluation Review, 31*(3), 311-337. doi: 10.1177/0193841X070310030401

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Bishai et al. (2008)	Peer-reviewed journal article	Uganda (Kampala)	Quasi-experiment	Level of police presence or enforcement actions	Citations, causalities, costs to law enforcement	Bishai, D., Asiimwe, B., Abbas, S., Hyder, A. A., & Bazeyo, W. (2008). Cost-effectiveness of traffic enforcement: case study from Uganda. *Injury Prevention, 14*(4), 223-227. doi: 10.1136/ip.2008.018341
Blais et al. (2015)	Peer-reviewed journal article	Canada (Montréal, Québec)	Quasi-experiment	Legislative or regulatory	Collisions and rate of enforcement	Blais, É., Bellavance, F., Marcil, A., & Carnis, L. (2015). Effects of introducing an administrative .05% blood alcohol concentration limit on law enforcement patterns and alcohol-related collisions in Canada. *Accident Analysis & Prevention, 82*, 101-111.
Briggs (2018)	Peer-reviewed journal article	United States (Minneapolis and St. Paul, Minnesota)	Quasi-experiment	Level of police presence or enforcement actions	Reporting of police actions in media	Briggs, S. J. (2018). The selection of police pursuits of fleeing motorists for coverage in newspapers. *Journal of Crime & Justice, 41*(3), 310-321. doi: 10.1080/0735648X.2017.1373691
Briscoe (2004)	Peer-reviewed journal article	Australia (New South Wales)	Quasi-experiment	Legislative or regulatory	Accidents/collisions	Briscoe, S. (2004). Raising the bar: Can increased statutory penalties deter drink-drivers? *Accident Analysis and Prevention, 36*(5), 919-929. doi: 10.1016/j.aap.2003.10.005
Browning & Thompson (2016)	Peer-reviewed journal article	United States (Fargo, North Dakota)	Quasi-experiment	Sobriety checkpoints	Arrests	Browning, S., & Thompson, K. (2016). Specific deterrence and the infrequent use of sobriety checkpoints. *Security Journal, 29*(3), 340-351. doi: 10.1057/sj.2013.31
Brubacher et al. (2017)	Peer-reviewed journal article	Canada (British Columbia)	Quasi-experiment	Legislative or regulatory	Accidents/collisions	Brubacher, J., Chan, H., Erdelyi, S., Asbridge, M., & Schuurman, N. (2017). Factors predicting local effectiveness of impaired driving laws, British Columbia, Canada. *Journal of Studies on Alcohol and Drugs, 78*(6), 899-909. doi: 10.15288/jsad.2017.78.899
Carpenter (2006)	Peer-reviewed journal article	Canada (Ontario)	Quasi-experiment	Legislative or regulatory	Alcohol impaired driving behaviour/attitudes	Carpenter, C. (2006). Did Ontario's zero tolerance and graduated licensing law reduce youth drunk driving? *Journal of Policy Analysis and Management, 25*(1), 183-196. doi: 10.1002/pam.20161
Carpenter (2007)	Peer-reviewed journal article	United States (NOS)	Quasi-experiment	Range of DUI interventions (e.g., legislative and levels of enforcement)	Arrests	Carpenter, C. (2007). Heavy alcohol use and crime: Evidence from underage drunk-driving laws. *Journal of Law & Economics, 50*(3), 539-557. doi: 10.1086/519809
Carrothers (2016)	Dissertation	United States (79 rural counties, Iowa)	Quasi-experiment	Level of police presence or enforcement actions	Arrests	Carrothers, D. J. (2016). *Immigration and crime in rural America: The case of Iowa* (Unpublished doctoral dissertation). Texas Woman's University, Texas.
Chamlin & Scott (2014)	Peer-reviewed journal article	United States (City of San Marcos, Texas)	Quasi-experiment	Level of police presence or enforcement actions	Calls for service	Chamlin, M. B., & Scott, S. E. (2014). Extending the hours of operation of alcohol serving establishments: An assessment of an innovative strategy to reduce the problems arising from the after-hours consumption of alcohol. *Criminal Justice Policy Review, 25*(4), 432-449. doi: 10.1177/0887403412473474

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Chandran et al. (2014)	Peer-reviewed journal article	Mexico (Guadalajara, Jalisco)	Quasi-experiment	Publicised and implemented enhanced monitoring and enforcement	Accidents/collisions, causalities/fatalities	Chandran, A., Pérez-Núñez, R., Bachani, A. M., Híjar, M., Salinas-Rodríguez, A., & Hyder, A. A. (2014). Early impact of a national multi-faceted road safety intervention program in Mexico: Results of a time-series analysis. *PLoS ONE, 9*(1), e87482. doi: 1
Chen & Jou (2018)	Peer-reviewed journal article	Taiwan (Taipei city, New Taipei City)	Quasi-experiment	Level of police presence or enforcement actions	DUI recidivism	Chen, T.-Y., & Jou, R.-C. (2018). Estimating factors of individual and regional characteristics affecting the drink driving recidivism. *Accident Analysis and Prevention, 119*, 16-22. doi: 10.1016/j.aap.2018.06.011
Clapp et al. (2005)	Peer-reviewed journal article	United States (Southwest, NOS)	Quasi-experiment	Publicised and implemented enhanced monitoring and enforcement	DUI offence, perceived likelihood of detection	Clapp, J. D., Johnson, M., Voas, R. B., Lange, J. E., Shillington, A., & Russell, C. (2005). Reducing DUI among US college students: Results of an environmental prevention trial. *Addiction, 100*(3), 327-334. doi: 10.1111/j.1360-0443.2004.00917.x
Constant et al. (2009)	Peer-reviewed journal article	France	Quasi-experiment	Level of police presence or enforcement actions	Causalities/fatalities	Constant, A., Salmi, L. R., Lafont, S., Chiron, M., & Lagarde, E. (2009). Road casualties and changes in risky driving behavior in France between 2001 and 2004 among participants in the GAZEL Cohort. *American Journal of Public Health, 99*(7), 1247-1253
Corsaro et al. (2012)	Peer-reviewed journal article	United States (Cincinnati, Ohio)	Quasi-experiment	Problem-oriented policing	Accidents/collisions	Corsaro, N., Gerard, D. W., Engel, R. S., & Eck, J. E. (2012). Not by accident: An analytical approach to traffic crash harm reduction. *Journal of Criminal Justice, 40*(6), 502-514. doi: 10.1016/j.jcrimjus.2012.08.003
Dong et al. (2018)	Peer-reviewed journal article	United States (whole-of-country)	Quasi-experiment	Multiple	Accidents/collisions, causalities/fatalities	Dong, C., Xie, K., Zeng, J., & Li, X. (2018). Multivariate dynamic Tobit models with lagged observed dependent variables: An effectiveness analysis of highway safety laws. *Accident Analysis and Prevention, 113*, 292-302. doi: 10.1016/j.aap.2018.01.039
Dula et al. (2007)	Peer-reviewed journal article	United States (All 95 Counties, Tennessee)	Quasi-experiment	Arrests for alcohol impaired driving	Arrests, accidents/collisions	Dula, C. S., Dwyer, W. O., & LeVerne, G. (2007). Policing the drunk driver: Measuring law enforcement involvement in reducing alcohol-impaired driving. *Journal of Safety Research, 38*(3), 267-272. doi: 10.1016/j.jsr.2006.10.007
Eger III (2006)	Peer-reviewed journal article	United States (All 120 Counties, Kentucky)	Quasi-experiment	Level of police presence or enforcement actions	Accidents/collisions	Eger III, R. J. (2006). Policy instruments in injury crashes: Traffic law enforcement and alcohol prohibition. *Transportation research record, 1969*(1), 45-49.
Erickson et al. (2015)	Peer-reviewed journal article	United States (whole-of-country)	Quasi-experiment	Multiple	Perceived presence of police, prevalence of DUI	Erickson, D. J., Farbakhsh, K., Toomey, T. L., Lenk, K. M., Jones-Webb, R., & Nelson, T. F. (2015). Enforcement of alcohol-impaired driving laws in the United States: A national survey of state and local agencies. *Traffic Injury Prevention, 16*(6), 533-539
Erickson et al. (2015)	Peer-reviewed journal article	United States (whole-of-country)	Quasi-experiment	Level of police presence or enforcement actions	Enforcement activities	Erickson, D. J., Rutledge, P. C., Lenk, K. M., Nelson, T. F., Jones-Webb, R., & Toomey, T. L. (2015). Patterns of alcohol policy enforcement activities among local law enforcement agencies: A

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						latent class analysis. *The International Journal of Alcohol and Drug Research, 4*(2), 103-111.
Fell et al. (2005)	Conference presentation	United States (Georgia, Tennessee, Pennsylvania and Louisiana)	Quasi-experiment	Publicised and implemented enhanced monitoring and enforcement	Alcohol impaired driving behaviour/attitudes, causalities/fatalities	Fell, J. C., Langston, E. A., & Tippetts, A. S. (2005). Evaluation of four state impaired driving enforcement demonstration programs: Georgia, Tennessee, Pennsylvania and Louisiana. In *Annual Proceedings/Association for the Advancement of Automotive Medicine* (Vol. 49, p. 311). Association for the Advancement of Automotive Medicine.
Fell et al. (2008)	Government report	United States (Georgia, Louisiana, Pennsylvania, Tennessee, Texas, Indiana, and Michigan)	Quasi-experiment	Publicised and implemented enhanced monitoring and enforcement	Causalities/fatalities, public perceptions	Fell, J. C., Langston,, E. A., Lacey, J. H., & Tippetts, A. S. (2008). *Evaluation of seven publicized enforcement demonstration programs to reduce impaired driving: Georgia, Louisiana, Pennsylvania, Tennessee, Texas, Indiana, and Michigan.* Calverton, MD: Pacific Institute for Research and Evaluation (PIRE).
Fell et al. (2008)	Conference presentation	United States (Georgia, Louisiana, Pennsylvania, Tennessee, Texas, Indiana, and Michigan)	Quasi-experiment	Publicised and implemented enhanced monitoring and enforcement	Causalities/fatalities, public perceptions	Fell, J. C., Tippetts, A. S., & Levy, M. (2008). Evaluation of seven publicized enforcement demonstration programs to reduce impaired driving: Georgia, Louisiana, Pennsylvania, Tennessee, Texas, Indiana, and Michigan. In *Annals of Advances in Automotive Medicine/Annual Scientific Conference* (Vol. 52, p. 23). Association for the Advancement of Automotive Medicine.Automotive Medicine.
Fell et al. (2014)	Peer-reviewed journal article	United States (whole-of-country)	Quasi-experiment	Multiple	Accidents/collisions	Fell, J. C., Waehrer, G., Voas, R. B., Auld-Owens, A., Carr, K., & Pell, K. (2014). Effects of enforcement intensity on alcohol impaired driving crashes. *Accident Analysis & Prevention, 73*, 181-186. doi:10.1016/j.aap.2014.09.002
Fell et al. (2015)	Peer-reviewed journal article	United States (NOS)	Quasi-experiment	Level of police presence or enforcement actions	Alcohol impaired driving behaviour/attitudes	Fell, J. C., Waehrer, G., Voas, R. B., Auld-Owens, A., Carr, K., & Pell, K. (2015). Relationship of impaired-driving enforcement intensity to drinking and driving on the roads. *Alcoholism: Clinical and Experimental Research, 39*(1), 84-92.
Fell et al. (2017)	Peer-reviewed journal article	United States (Monroe County, New York and Cleveland, Ohio)	Quasi-experiment	Problem-oriented policing	Accidents/collisions, other alcohol-related harm	Fell, J. C., Fisher, D. A., Yao, J., & McKnight, A. S. (2017). Evaluation of a responsible beverage service and enforcement program: Effects on bar patron intoxication and potential impaired driving by young adults. *Traffic Injury Prevention, 18*(6), 557-5
Ferris et al. (2013)	Peer-reviewed journal article	Australia (Queensland and Western Australia)	Quasi-experiment	Level of police presence or enforcement actions	Accidents/collisions	Ferris, J., Mazerolle, L., King, M., Bates, L., Bennett, S., & Devaney, M. (2013). Random breath testing in Queensland and Western Australia: Examination of how the random breath testing rate influences alcohol related traffic crash rates. *Accident Analysis & Prevention, 60*, 181-188. doi: 10.1016/j.aap.2013.08.018

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Forsman et al. (2011)	Peer-reviewed journal article	Sweden (NOS)	Quasi-experiment	Partnership policing (with social service agencies)	BAC, cost effectiveness	Forsman, Å., Hrelja, R., Henriksson, P., & Wiklund, M. (2011). Cooperation between police and social treatment services offering treatment to drink and drug drivers - experience in Sweden. *Traffic Injury Prevention, 12*(1), 9-17. 10.1080/15389588.2010.5322
French (2015)	Dissertation	United States (Asheville, North Carolina)	Quasi-experiment	Level of police presence or enforcement actions	Accidents/collisions	French, J. E. (2015). *The relationship between DWI arrests and drug and alcohol related vehicle collisions* (Master's Thesis). Retrieved from ProQuest Dissertation & Theses Global database (UMI no. 1592020)
George et al. (2018)	Peer-reviewed journal article	United States (Lancaster County, South Carolina)	Quasi-experiment	Sobriety checkpoints	Accidents/collisions, Arrests	George, M. D., Holder, H. D., McKenzie, P. N., Mueller, H. R., Herchek, D. C., & Faile, B. S. (2018). Replication of a controlled community prevention trial: Results from a local implementation of science-based intervention to reduce impaired driving. *Journal of Primary Prevention, 39*(1), 47-58. doi: 10.1007/s10935-017-0499-y
Goodfellow et al. (2014)	Peer-reviewed journal article	United States (Lebanon County, Pennsylvania)	Quasi-experiment	Legislative or regulatory	Alcohol impaired driving behaviour/attitudes, public perceptions	Goodfellow, M., & Kilgore, C. (2014). DUI offenders' beliefs about DUI statutes and DUI law enforcement: Implications for deterrence. *Journal of Drug Issues, 44*(3), 269-280. doi: 10.1177/0022042613500052
Gullberg (2005)	Peer-reviewed journal article	United States (Washington State)	Quasi-experiment	Level of police presence or enforcement actions	Breath test refusal	Gullberg, R. G. (2005). Factors associated with breath test refusals in drunken driving arrests. *Science & Justice: Journal Of The Forensic Science Society, 45*(2), 85-92.
Guria et al. (2004)	Peer-reviewed journal article	New Zealand	Quasi-experiment	Publicised and implemented enhanced monitoring and enforcement	Accidents/collisions	Guria, J., & Leung, J. (2004). An evaluation of a supplementary road safety package. *Accident; Analysis & Prevention, 36*(5), 893-904. Doi: 10.1016/j.aap.2003.09.005
Hajjar (2016)	Dissertation	United States (Nationally)	Quasi-experiment	Legislative or regulatory	Multiple	Hajjar, L. M. (2016). Understanding the Employment of Data-Driven Facilitators within Law Enforcement Agencies: Partnerships, Impaired Driving Task Forces and Other Strategies (Doctoral Dissertation). Retrieved from Proquest Digital Disserations. (1001086
Homant et al. (2007)	Peer-reviewed journal article	United States (Wayne County, Michigan)	Quasi-experiment	Problem-oriented policing	Arrests	Homant, R. J., Kennedy, D. B., & Evans, W. C. (2007). Evaluating Last Call: A program directed at outstanding drunk driving warrants. *Police Quarterly, 10*(4), 394-410. doi: 10.1177/1098611107307735
Ivers et al. (2010)	Other	Australia (New South Wales)	Quasi-experiment	Level of police presence or enforcement actions	Accidents/collisions	Ivers, R. Q., Chen, H. Y., Boufous, S., Senserrick, T., Stevenson, M. R., Williamson, A., ... & Norton, R. (2010). Driving offences and risk of subsequent crash in novice drivers: The DRIVE Study.

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						Injury Prevention, 16(Suppl. 1), A67-A67. Doi: 10.1136/ip.2010.029215.243
Jia et al. (2016)	Peer-reviewed journal article	China (Guangzhou)	Quasi-experiment	Legislative or regulatory	Alcohol impaired driving behaviour/attitudes	Jia, K., King, M., Fleiter, J. J., Sheehan, M., Ma, W., Lei, J., & Zhang, J. (2016). Drunk driving offenders' knowledge and behaviour in relation to alcohol-involved driving in Yinchuan and a comparison with Guangzhou, China. *Transportation research part F: Traffic Psychology and Behaviour, 3*8, 182-193. doi: 10.1016/j.trf.2015.12.011
Johnson (2006)	Peer-reviewed journal article	United States (Cincinnati, Ohio)	Quasi-experiment	Number of hours of police training in traffic enforcement	Arrests, citations issues	Johnson, R. R. (2006). Management influences on officer traffic enforcement productivity. *International Journal of Police Science & Management, 8*(3), 205-217. doi: 10.1350/ijps.2006.8.3.205
Jorgensen (2015)	Dissertation	United States (Kansas)	Quasi-experiment	Legislative or regulatory	Accidents/collisions	Jorgensen, A. B. (2015). *Public safety intervention: Analysing the effects of altering traffic safety policies in the states* (Doctoral dissertation, University of Kansas). Retrieved from ProQuest Dissertation and Theses database. (UMI No. 3706840)
Kilmer et al. (2013)	Peer-reviewed journal article	United States (South Dakota)	Quasi-experiment	Severity of citations, fines or consequences following violations	Arrests	Kilmer, B., Nicosia, N., Heaton, P., & Midgette, G. (2013). Efficacy of frequent monitoring with swift, certain, and modest sanctions for violations: Insights from South Dakota's 24/7 Sobriety Project. *American Journal of Public Health, 103*(1), e37-e43. doi: 10.2105/AJPH.2012.300989
Lacey et al. (2006)	Peer-reviewed journal article	United States (Greenbrier, Raleigh, Harrison, and Monongalia Counties, West Virginia)	Quasi-experiment	Sobriety checkpoints	Alcohol impaired driving behaviour/attitudes, public perceptions	Lacey, J. H., Ferguson, S. A., Kelley-Baker, T., & Rider, R. P. (2006). Low-manpower checkpoints: Can they provide effective DUI enforcement in small communities? *Traffic Injury Prevention, 7*(3), 213-218. doi: 10.1080/15389580600696686
Lenk et al. (2016)	Peer-reviewed journal article	United States (48 states, excluding Hawaii and Mississipi)	Quasi-experiment	Sobriety checkpoints	Rate of alcohol impaired driving	Lenk, K. M., Nelson, T. F., Toomey, T. L., Jones-Webb, R., & Erickson, D. J. (2016). Sobriety checkpoint and open container laws in the United States: Associations with reported drinking-driving. *Traffic injury prevention, 17*(8), 782-787. doi: 10.1080/153
Li et al. (2014)	Peer-reviewed journal article	China (Hong Kong)	Quasi-experiment	Range of DUI interventions (e.g., legislative and levels of enforcement)	Public perceptions	Li, Y. C., Sze, N. N., & Wong, S. C. (2014). Effective measures for combating drink-driving offenses: An attitudinal model for Hong Kong. *Transportmetrica A: Transport Science, 10*(8), 722-739. doi: 10.1080/23249935.2013.854425
Macdonald et al. (2013)	Peer-reviewed journal article	Canada (British Columbia)	Quasi-experiment	Range of DUI interventions (e.g., legislative and levels of enforcement)	Accidents/collisions	Macdonald, S., Zhao, J., Martin, G., Brubacher, J., Stockwell, T., Arason, N., ... & Chan, H. (2013). The impact on alcohol-related collisions of the partial decriminalization of impaired driving in British Columbia, Canada. *Accident Analysis & Prevention, 59*, 200-205. doi: 10.1016/j.aap.2013.05.012

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Maistros (2015)	Dissertation	United States (whole-of-country)	Quasi-experiment	Multiple	Accidents/collisions	Maistros, A. (2015). *A multilevel statistical analysis of impaired driving crashes and law enforcement countermeasures* (Doctoral dissertation). Retrieved from ProQuest Dissertation an Theses database. (UMI No.3730112)
Mashhadi et al. (2017)	Peer-reviewed journal article	United States (selected highways, Wyoming)	Quasi-experiment	Level of police presence or enforcement actions	Accidents/collisions	Mashhadi, M. M. R., Saha, P., & Ksaibati, K. (2017). Impact of traffic enforcement on traffic safety. *International Journal of Police Science & Management, 19*(4), 238-246. doi: 10.1177/1461355717730836
McCarthy et al. (2009)	Peer-reviewed journal article	United States (whole-of-country)	Quasi-experiment	Level of police presence or enforcement actions	BAC	McCarthy, M. L., Sheng, P., Baker, S. P., Rebok, G. W., & Li, G. (2009). Validity of police-reported alcohol involvement in fatal motor carrier crashes in the United States between 1982 and 2005. *Journal of Safety Research, 40*(3), 227-232. doi: 10.1016/j.jsr.2009.04.001
McCartt et al. (2007)	Peer-reviewed journal article	United States (Washington State)	Quasi-experiment	Legislative or regulatory	Arrest, recidivism	McCartt, A. T., Blackman, K., & Voas, R. B. (2007). Implementation of Washington State's Zero Tolerance Law: Patterns of arrests, dispositions, and recidivism. *Traffic Injury Prevention, 8*(4), 339-345. doi: 10.1080/15389580701477267
McCartt et al. (2009)	Peer-reviewed journal article	United States (Cabell, Wayne, and Monongalia counties, West Virginia)	Quasi-experiment	Publicised and implemented enhanced monitoring and enforcement	BAC, public awareness	McCartt, A. T., Hellinga, L. A., & Wells, J. K. (2009). Effects of a college community campaign on drinking and driving with a strong enforcement component. *Traffic Injury Prevention, 10*(2), 141-147. doi: 10.1080/15389580802701284
McCowen (2004)	Dissertation	United States (Tennessee)	Quasi-experiment	Problem-oriented policing	Conviction	McCowen, R. G. (2004). *A system for identifying contributions to low conviction rates of alcohol-impaired drivers* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses Global database. (UMI No. 3153945)
Meesmann et al. (2015)	Peer-reviewed journal article	Multiple	Quasi-experiment	Level of police presence or enforcement actions	Rate of alcohol impaired driving	Meesmann, U., Martensen, H., & Dupont, E. (2015). Impact of alcohol checks and social norm on driving under the influence of alcohol (DUI). *Accident Analysis & Prevention, 80*, 251-261. doi: 10.1016/j.aap.2015.04.016
Newstead et al. (2008)	Conference presentation	Australia (Queensland)	Quasi-experiment	Partnership policing (with governmental transport agency)	Accidents/collisions, alcohol-related harm	Newstead, S., Cameron, M., Bobevski, I., & Hosking, S. (2008, November). *Evaluation of the Queensland Road Safety Initiatives Package*. Paper presented at the Australasian Road Safety Research, Policing and Education Conference, Adelaide, South Australia.
Nunn & Newby (2011)	Peer-reviewed journal article	United States (Indianapolis, Indiana)	Quasi-experiment	Problem-oriented policing	Accidents/collisions	Nunn, S., & Newby, W. (2011). The geography of deterrence: exploring the small area effects of sobriety checkpoints on alcohol-impaired collision rates within a city. *Evaluation Review, 35*(4), 354-378. doi: 10.1177/0193841X11405139

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Owens & Boorman (2011)	Government report	Australia (whole-of-country)	Quasi-experiment	Publicised and implemented enhanced monitoring and enforcement	Public perceptions	Owens, P. K., & Boorman, M. (2011). *Evaluating the deterrent effect of random breath testing (RBT) and random drug testing (RDT): The driver's perspective: Research findings* (no. 41). Canberra, Australian Capital Territory: National Drug Law Enforcement Research Fund (NDLERF).
Ramirez et al. (2008)	Government report	United States (Washington)	Quasi-experiment	Partnership policing (with licensed establishments)	Arrests, BAC	Ramirez, R., Nguyen, D., Cannon, C., Carmona, M., & Freisthler, B. (2008). *A campaign to reduce impaired driving through retail-oriented enforcement in Washington State* (No. DOT HS 810 913). Washington, DC: National Highway Traffic Safety Administration.
Sanem et al. (2015)	Peer-reviewed journal article	United States (whole-of-country)	Quasi-experiment	Multiple	Rate of alcohol impaired driving	Sanem, J. R., Erickson, D. J., Rutledge, P. C., Lenk, K. M., Nelson, T. F., Jones-Webb, R., & Toomey, T. L. (2015). Association between alcohol-impaired driving enforcement-related strategies and alcohol-impaired driving. *Accident Analysis & Prevention, 78*, 104-109.
Scagnolari et al. (2015)	Peer-reviewed journal article	Switzerland (Lugano, Ticino)	Quasi-experiment	Level of police presence or enforcement actions	Alcohol impaired driving behaviour/attitudes	Scagnolari, S., Walker, J., & Maggi, R. (2015). Young drivers' night-time mobility preferences and attitude toward alcohol consumption: A Hybrid Choice Model. *Accident Analysis & Prevention, 83*, 74-89.
Schwartz & Davaran (2013)	Peer-reviewed journal article	United States (24 states)	Quasi-experiment	Legislative or regulatory	Arrest, Alcohol impaired driving behaviour/attitudes	Schwartz, J., & Davaran, A. (2013). Enforcement following 0.08% BAC law change: Sex-specific consequences of changing arrest practices?. *Addictive Behaviors, 38*(10), 2506-2512. doi: 10.1016/j.addbeh.2013.04.004
Scott-Parker (2012)	Dissertation	Australia (Brisbane, Queensland)	Quasi-experiment	Legislative or regulatory	Alcohol impaired driving behaviour/attitudes, accidents/collisions	Scott-Parker, B. J. (2012). *A comprehensive investigation of the risky driving behaviour of young novice drivers* (Doctoral dissertation) Queensland University of Technology, Brisbane.
Simandl (2015)	Dissertation	United States (Alabama)	Quasi-experiment	Level of police presence or enforcement actions	Accidents/collisions	Simandl, J. K. (2015). *GIS-based evaluation of the effectiveness of selective law enforcement campaigns in reducing crashes* (Master's thesis). Retrieved from ProQuest Dissertation & Theses Global database. (UMI No. 1600900)
Sloan et al. (2017)	Peer-reviewed journal article	United States (Raleigh and Hickory, North Carolina; Philadelphia and Wilkes-Barre, Pennsylvania; Seattle and Yakima, Washington; and Milwaukee and La Crosse,Wisconsin)	Quasi-experiment	Level of police presence or enforcement actions	Accidents/collisions, perceived likelihood of detection	Sloan, F. A., McCutchan, S. A., & Eldred, L. M. (2017). Alcohol-Impaired Driving and Perceived Risks of Legal Consequences. *Alcoholism: Clinical and Experimental Research, 41*(2), 432-442. doi: 10.1111/acer.13298

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Solmazer et al. (2016)	Peer-reviewed journal article	Multiple	Quasi-experiment	Level of police presence or enforcement actions	Causalities/fatalities	Solmazer, G., Üzümcüoğlu, Y., & Özkan, T. (2016). The role of traffic law enforcements in the relationship between cultural variables and traffic fatality rates across some countries of the world. *Transportation Research Part F: Traffic Psychology and Behaviour, 38*, 137-150. doi: 10.1016/j.trf.2016.01.001
Sousa et al. (2013)	Peer-reviewed journal article	Brazil (Palmas, Tocantins and Teresina, Piauí)	Quasi-experiment	Legislative or regulatory	Alcohol impaired driving behaviour/attitudes, BrAC	Sousa, T., Lunnen, J. C., Gonçalves, V., Schmitz, A., Pasa, G., Bastos, T., ... & Pechansky, F. (2013). Challenges associated with drink driving measurement: combining police and self-reported data to estimate an accurate prevalence in Brazil. *Injury, 44*, S11-16.
Stanojević et al. (2013)	Peer-reviewed journal article	Multiple (Serbia & Northern Kosovo)	Quasi-experiment	Level of police presence or enforcement actions	Alcohol impaired driving behaviour/attitudes	Stanojević, P., Jovanović, D., & Lajunen, T. (2013). Influence of traffic enforcement on the attitudes and behavior of drivers. *Accident Analysis and Prevention, 52*, 29-38. doi: 10.1016/j.aap.2012.12.019
Steuer et al. (2016)	Peer-reviewed journal article	Switzerland (Zurich)	Quasi-experiment	Level or enforcement actions	Rate of alcohol impaired driving	Steuer, A. E., Eisenbeiss, L., & Kraemer, T. (2016). Blood alcohol analysis alone versus comprehensive toxicological analysis–Systematic investigation of missed co-ingested other drugs in suspected alcohol-impaired drivers. *Forensic Science International, 267*, 52-59. doi: 10.1016/j.forsciint.2016.08.009
Stinson et al. (2013)	Peer-reviewed journal article	United States (NOS)	Quasi-experiment	Level of police presence or enforcement actions	Conviction, other alcohol-related harm	Stinson, P. M., Liederbach, J., Brewer, S. L., & Todak, N. E. (2013). Drink, drive, go to jail? A study of police officers arrested for drunk driving. *Journal of Crime and Justice, 37*(3), 356-373. doi: 10.1080/0735648X.2013.805158
Stringer (2018)	Peer-reviewed journal article	United States (49 states, excluding Florida and Illinois)	Quasi-experiment	Level of police presence or enforcement actions	Accidents/collisions, causalities/fatalities	Stringer, R. J. (2018). Policing the drunk driving problem: A longitudinal examination of DUI enforcement and alcohol related crashes in the U.S. (1985–2015). *American Journal of Criminal Justice*. Advance online publication. doi: 10.1007/s12103-018-946
Suo (2015)	Peer-reviewed journal article	China (Chongqing, Southwest China(Administrative district))	Quasi-experiment	Severity of citations, fines or consequences following violations	Alcohol impaired driving behaviour/attitudes, public perceptions	Suo, Q. (2015). Investigation on deterrence effect of legal punishment measures on driving after drinking in Chongqing, China. *Traffic Injury Prevention, 16*(6), 540-544. doi: 10.1080/15389588.2014.1001979
Tay (2005)	Peer-reviewed journal article	Australia (Victoria)	Quasi-experiment	Publicised and implemented enhanced monitoring and enforcement	Accidents/collisions, causalities/fatalities	Tay, R. (2005). The effectiveness of enforcement and publicity campaigns on serious crashes involving young male drivers: Are drink driving and speeding similar? *Accident Analysis and Prevention, 37*(5), 922-929. 10.1016/j.aap.2005.04.010
Trejo (2014)	Peer-reviewed journal article	Mexico (Guadalajara & León metropolitan areas, Jalisco &	Quasi-experiment	Roadblocks	BAC	Trejo, A. C., & Leenen, I. (2014). If you drink, don't drive: Drunk drivers in Guadalajara and León, México. *Gaceta Médica de México, 150*(6), 543-552.

Author(s)	Document Type	Intervention Location	Research Design	Intervention Type	Outcomes Measured	Reference
		Guanajuato respectively)				
Vanlaar (2008)	Peer-reviewed journal article	Canada (Vancouver, Saanich and Abbotsford)	Quasi-experiment	Sobriety checkpoints	Rate of alcohol impaired driving, perceived likelihood of detection	Vanlaar, W. (2008). Less is more: The influence of traffic count on drinking and driving behaviour. *Accident Analysis & Prevention, 40*(3), 1018-1022. doi: 10.1016/j.aap.2007.11.007
Veisten et al. (2013)	Peer-reviewed journal article	Belgium, Finland, and the Netherlands (NOS)	Quasi-experiment	Level of police presence or enforcement actions	Cost-benefit of enforcement	Veisten, K., Houwing, S., Mathijssen, M. P. M., & Akhtar, J. (2013). Is law enforcement of drug-impaired driving cost-efficient? An explorative study of a methodology for cost-benefit analysis. *International Journal of Drug Policy, 24*(2), 122-134. doi: 10.1016/j.drugpo.2012.10.001
Voas (2008)	Peer-reviewed journal article	United States (Charlottesville, Virginia)	Quasi-experiment	Sobriety checkpoints	Multiple	Voas, R. B. (2008). A new look at NHTSA's evaluation of the 1984 Charlottesville Sobriety Checkpoint Program: Implications for current checkpoint issues. *Traffic Injury Prevention, 9*(1), 22-30. doi: 10.1080/15389580701682114
Volpe et al. (2016)	Peer-reviewed journal article	Brazil (Belo Horizonte, Rio de Janeiro, and São Paulo)	Quasi-experiment	Legislative or regulatory	Causalities/fatalities	Volpe, F. M., Ladeira, R. M., & Fantoni, R. (2016). Evaluating the Brazilian zero tolerance drinking and driving law: Time series analyses of traffic-related mortality in three major cities. *Traffic Injury Prevention*. Advance Online Publication. doi:
Welki & Zlatoper (2009)	Peer-reviewed journal article	United States (Ohio)	Quasi-experiment	Arrests for alcohol impaired driving	Causalities/fatalities	Welki, A. M., & Zlatoper, T. J. (2009). How highway safety regulations and enforcement activities affect subcategories of motor vehicle fatalities. *Transportation Research Part E: Logistics and Transportation Review, 45*(6), 1030-1038. doi: 10.1016/j.tre.2009.03.005
West & Naumann (2014)	Peer-reviewed journal article	United States (O'odham Nation, the Ho-Chunk Nation, the White Mountain Apache Tribe, and San Carlos Apache Tribe)	Quasi-experiment	Multiple	Multiple	West, B. A., & Naumann, R. B. (2014). Tribal motor vehicle injury prevention programs for reducing disparities in motor vehicle-related injuries. *MMWR: Surveillance Summaries, 63*(1), 28-33.
Wickens et al. (2018)	Peer-reviewed journal article	Canada (Whole-of-state, Ontario)	Quasi-experiment	Problem-oriented policing	Alcohol impaired driving behaviour/attitudes/attitudes	Wickens, C. M., Flam-Zalcman, R., Stoduto, G., Docherty, C., Thomas, R. K., Watson, T. M., ... & Mann, R. E. (2018). Multiple "Lower BAC" offenders: Characteristics and response to remedial interventions. *Accident Analysis and Prevention, 115*, 110-117.
Wood & Gruenewald (2006)	Peer-reviewed journal article	United States (Alaska Native Villages, Alaska)	Quasi-experiment	Legislative or regulatory	Accidents/collisions, casualties/fatalities	Wood, D. S., & Gruenewald, P. J. (2006). Local alcohol prohibition, police presence and serious injury in isolated Alaska native villages. *Addiction, 101*(3), 393-403. doi: 10.1111/j.1360-0443.2005.01347.x

Author(s)	Document Type	Intervention Location	Research Design	Intervention Type	Outcomes Measured	Reference
Wood et al. (2009)	Peer-reviewed journal article	United States (New England)	Quasi-experiment	Publicised and implemented enhanced monitoring and enforcement	Multiple	Wood, M. D., DeJong, W., Fairlie, A. M., Lawson, D., Lavigne, A. M., & Cohen, F. (2009). Common ground: An investigation of environmental management alcohol prevention initiatives in a college community. *Journal of Studies on Alcohol and Drugs, 16*, 96-105.
Wood et al. (2016)	Peer-reviewed journal article	United States (Colorado)	Quasi-experiment	Severity of citations, fines or consequences following violations	Accidents/collisions, causalities/fatalities	Wood, E., & Salomonsen-Sautel, S. (2016). DUID prevalence in Colorado's DUI citations. *Journal of Safety Research, 57*, 33-38. doi: 10.1016/j.jsr.2016.03.005
Yannis et al. (2007)	Peer-reviewed journal article	Greece (whole-of-country, excluding Athens and Thessaloniki)	Quasi-experiment	Level of police presence or enforcement actions	Accidents/collisions, causalities/fatalities	Yannis, G., Papadimitriou, E., & Antoniou, C. (2007). Multilevel modelling for the regional effect of enforcement on road accidents. *Accident Analysis & Prevention, 39*(4), 818-825. doi: 10.1016/j.aap.2006.12.004
Yannis et al. (2008)	Peer-reviewed journal article	Greece (49 Counties, excluding Athens and Thessaloniki)	Quasi-experiment	Short-term licence suspensions by police	Accidents/collisions, causalities/fatalities	Yannis, G., Papadimitriou, E., & Antoniou, C. (2008). Impact of enforcement on traffic accidents and fatalities: A multivariate multilevel analysis. *Safety Science, 46*(5), 738-750. doi: 10.1016/j.ssci.2007.01.014
Yao et al. (2016)	Peer-reviewed journal article	United States (30 states, NOS)	Quasi-experiment	Level of police presence or enforcement actions	Accidents/collisions, causalities/fatalities	Yao, J., Johnson, M. B., & Tippetts, S. (2016). Enforcement uniquely predicts reductions in alcohol-impaired crash fatalities. *Addiction, 111*(3), 448-453. doi: 10.1111/add.13198 doi: b>10.1111/add.13198
Zwicker et al. (2007)	Government report	United States (Connecticut)	Quasi-experiment	Publicised and implemented enhanced monitoring and enforcement	Multiple	Zwicker, T. J., Chaudhary, N. K., Maloney, S., & Squeglia, R. (2007). *Connecticut's 2003 impaired-driving high-visibility enforcement campaign* (No. DOT HS 810 689). Washington, DC: National Highway Traffic Safety Administration.