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Abstract | The Global Policing Database is used to update a 2007 systematic review of the impact of street-level law enforcement interventions on drug crime and drug-related calls-for-service. A total of 26 studies (reported in 29 documents) were eligible for this updated review. Eighteen of the 26 studies reported sufficient data to calculate effect sizes.

We find that, overall, street-level policing approaches are effective in reducing drug crime, particularly those involving partnerships. We also find that geographically targeted law enforcement interventions are more effective in reducing drug crime than standard, unfocused approaches. Approaches that target larger problem areas for intervention are more effective for reducing drug crime (but not calls-for-service) than approaches that focus on micro problem places.

Street-level drug law enforcement: An updated systematic review

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Australian drug policy costs between A$1.03b and A$1.07b each year (Ritter, McLeod & Shanahan 2013). This estimate includes police services, judicial resources, legal expenses, corrective services, Australian Federal Police, Australian Customs, and Border Force. Nearly two-thirds of drug policy expenditure is spent on state and federal law enforcement activities (Ritter, McLeod & Shanahan 2013). These activities include both proactive street-level drug law enforcement tactics—including third party partnership policing (eg police working with business and other government regulators) as well as problem-oriented policing (Weisburd & Majmundar 2018)—and a range of reactive, 'standard' policing tactics including crackdowns, raids, and buy-busts.

Serious & Organised Crime
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A 2007 Campbell Collaboration systematic review of the effectiveness of street-level drug law enforcement activities (Mazerolle, Soole & Rombouts 2007) found that proactive interventions (such as problem-oriented, partnership and community-wide policing approaches) were more effective at reducing drug-related calls-for-service and drug crime than business-as-usual or 'standard' (usually reactive) law enforcement tactics. Since 2004, when the literature search for the 2007 review was conducted, the landscape around street-level drug law enforcement has changed. Police now face a range of new and emerging drug problems, including synthetic and prescription drugs and new forms of street-level drug distribution, including online markets and postal services for purchasing and distributing illicit substances. In addition, the Global Policing Database demonstrates that high-quality impact evaluations of policing interventions have trebled since 2004 (Mazerolle et al. 2017). Therefore, there is a need to understand whether the findings of the previous review are still applicable, given the shifts in the drug landscape and the increase in evaluations of police practice. This report updates the 2007 review, and provides the most up-to-date and high-quality evidence to inform policy and practice on street-level drug law enforcement.

Method

The updated review uses the Global Policing Database (GPD) to capture evaluations of the impact of street-level law enforcement interventions on drug crime and drug-related calls-for-service. The GPD is an online searchable database designed to capture all published and unpublished experimental and quasi-experimental impact evaluations of policing interventions conducted since 1950. It is compiled by systematically searching, retrieving, and screening published and unpublished literature that reports on impact evaluations of policing interventions. There are no restrictions on the types of policing techniques, outcomes or language. A complex search string was used to search more than 60 academic databases for relevant documents (see Higginson et al. 2015 for full methodological protocol). Table 1 contains the terms used to search the GPD for research published between January 2004 and December 2018. In addition to searching the GPD, we harvested the reference lists of all included studies and of previous reviews related to drug law enforcement. A team of research staff, supervised by Eggins, were trained with standardised materials to screen records retrieved from the search and code eligible studies. The coding of all eligible studies was cross-checked by Eggins and Higginson prior to synthesis.

Table 1: Systematic search terms			
Drug search terms		Highly drug-specific law enforcement or drug market terms	
addict*	mephedrone	bust*	interdict*
acid	methadone	buy	launder*
amphet*	meth	caution*	legali*
bath*	naloxone*	closedown*	market*
benzo*	narco*	"close down*"	network*
cannab*	opiate*	"close-down*"	operation*
cocaine	opioid*	confisc*	precursor*
"date rape"	oxy*	covert	raid*
"date-rape"	overdos*	crack*	rave*
depressant*	pharma*	dark*	referral*
drug*	poly*	deal*	sale*
ecstasy	precurs*	decrim*	saturat*
fentanyl	prescri*	delivery	smuggl*
GBL	pseudo*	deliveries	stop*
GHB	psychoactive	demand*	sting*
hallucino*	Rohypnol	depenali*	substitute*
heroin	speed	disposal*	suppl*
illicit*	spice*	disrupt*	suppress*
impair*	spik*	diver*	sweep*
inject*	steroid*	eradic*	traffick*
intoxica*	stimulant*	expiation	undercover
ketamine	substance*	farm*	
LSD	synthetic*	harm*	
marij*	tranquili*	informant*	
MDMA	weed	informer*	

Note: Terms were combined with Boolean 'OR' to search titles and abstracts of all GPD records

Inclusion criteria

Types of interventions

Consistent with the 2007 review, this update includes any study where the intervention is initiated, managed, and/or implemented by police to reduce or prevent illicit drug use, drug dealing, or associated drug problems at problem places. The updated review includes policing interventions where:

- the intervention targets, at least in part, illicit drugs (eg heroin, cocaine, methamphetamine, cannabis); and
- street-level drug law enforcement is either the only intervention or is one component of a larger intervention.

The review excludes interventions where:

- the intervention targets the illegal use, sale or trafficking of licit substances (eg tobacco, alcohol, solvents) or prescription drugs;
- judicial, correctional and treatment or anti-drug strategies are run exclusively by non-police personnel (eg customs, army);
- police target the wholesale, manufacture or importation of drugs; or
- police interventions are aimed at individuals (eg arrest referral).

Types of participants and settings

This review considers the impact of street-level drug law enforcement interventions on the following population subjects:

- individuals of any age, gender, or ethnicity;
- micro places (eg street corners, buildings, police beats, street segments); and
- macro places (eg neighbourhoods, communities, police districts, cities).

In line with the 2007 review, interventions must be focused on geographic places. No limits are placed on the geographical regions reported in the studies (ie we include high-, low- and middle- income countries in the review).

Types of outcomes

The review includes studies where the reported outcome is drug crime aggregated at the place level. 'Drug crime' is defined as any outcome that falls into one or more of the following categories:

- a drug activity classified as illegal by legislation, including:
  - selling, buying, manufacturing, or possessing drugs or paraphernalia;
  - public nuisance due to illicit drugs (not alcohol); and
  - driving under the influence of drugs (not alcohol).
- variables suggestive of drug crime, including:
  - drug-related arrests;
  - drug-related fines, citations or notices;
  - drug-related calls-for-service;
  - drug-related convictions; and
  - drug-related recidivism.

In line with the 2007 review, this update includes data captured by official sources (eg calls-for-service, arrests, convictions) but excludes outcome data measured via self-report instruments (eg surveys, questionnaires), interviews or observations.

Types of research designs and comparators

The review includes quantitative impact evaluations that use a randomised experimental or quasi-experimental design with a comparison group that does not receive the intervention. It includes studies where the comparison group receives 'business-as-usual' policing, no intervention or an alternative intervention (treatment–treatment designs). The review retains the research design thresholds used in the 2007 review, and only includes quasi-experimental studies where there is a comparison condition (unmatched or matched) and a baseline pre-intervention measure of eligible outcomes. All other weaker research designs are ineligible for this review.

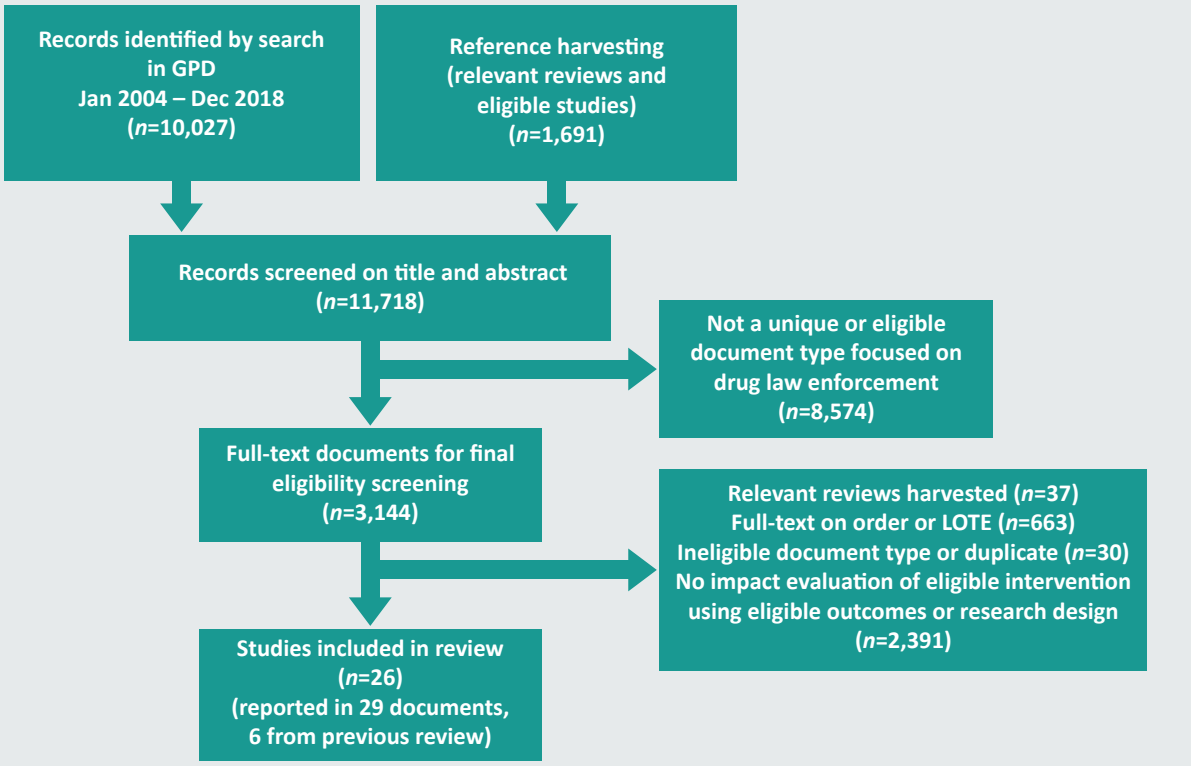
Results

Search and screening

The systematic search within the GPD identified 75,005 records, with citations gathered from over 60 databases and research repositories. Of these, 10,027 had been full-text screened as reporting (or potentially reporting) on a quantitative impact evaluation of an intervention pertaining to police or policing. These records were then processed using SysReview (review management software, Higginson & Neville 2014) to determine their eligibility for the current review. In addition, we harvested and processed potentially eligible studies from the reference lists of 37 reviews relevant to the topic area and all eligible studies. Figure 1 provides a PRISMA flowchart showing the attrition of records through the systematic screening stages.

A total of 26 studies (reported in 29 documents) were eligible for the review, including six studies from the 2007 review. Of these, 18 studies reported sufficient data to calculate effect sizes and are included in the meta-analysis. Only three randomised controlled trials were identified, and all but two studies (one each in the United Kingdom and Canada) were conducted in the United States. All 26 studies are summarised in the appendix in Table A1.

Figure 1: PRISMA flowchart: Systematic screening of GPD records



Meta-analysis and summary of eligible studies

All the studies included in the meta-analysis reported counts or rates of crime, before and after the intervention, in both the intervention area(s) and the comparison area(s). We conducted meta-analysis with the 'metan' function in the statistical software Stata 15, using a random effects model with inverse variance weighting. The relative incidence rate ratio (RIRR) effect size and its corresponding 95 percent confidence intervals (CIs) were calculated for all studies included in the meta-analysis. The RIRR can be interpreted as the relative proportional change in crime in the comparison area after the intervention, compared to the treatment area. The relative proportional change in crime in the treatment area is calculated using 1/RIRR. For ease of interpretation:

- An RIRR that is larger than 1 is evidence that the intervention is effective in reducing crime.
- An RIRR of 1 means there has been no change in crime in the treatment area, relative to the comparison area.
- An RIRR less than 1 means that crime has decreased in the comparison area after the intervention, relative to the treatment area.

For example, an RIRR of 1.25 indicates a 25 percent increase in crime in the comparison area, relative to the treatment area; an RIRR of 0.75 indicates a 25 percent relative decrease in crime in the comparison area.

The eligible studies were categorised to examine whether the impact of the street-level drug law enforcement interventions vary by:

- the size of the problem place targeted by the intervention, categorised as:
  - micro places (eg street corners, buildings, police beats, street segments); and
  - macro places (eg neighbourhoods, communities, police districts); or
- the type of policing approach, as defined in the 2007 review:
  - hotspots policing;
  - problem-oriented policing; and
  - community-wide policing initiatives.

Hotspots policing strategies often consist predominantly of law enforcement tactics; however, the hotspots approach is strategically focused on reducing problems in small places with high concentrations of crime (hotspots).

Problem-oriented policing approaches are defined as involving careful analysis of the underlying criminogenic factors that lead to crime problems and the development and implementation of tailored responses, and then the use of an assessment feedback loop to determine whether or not the interventions reduced the problems. Problem-oriented policing can be geographically focused or it can be focused on problem individuals, and the approach typically involves the forging of partnerships.

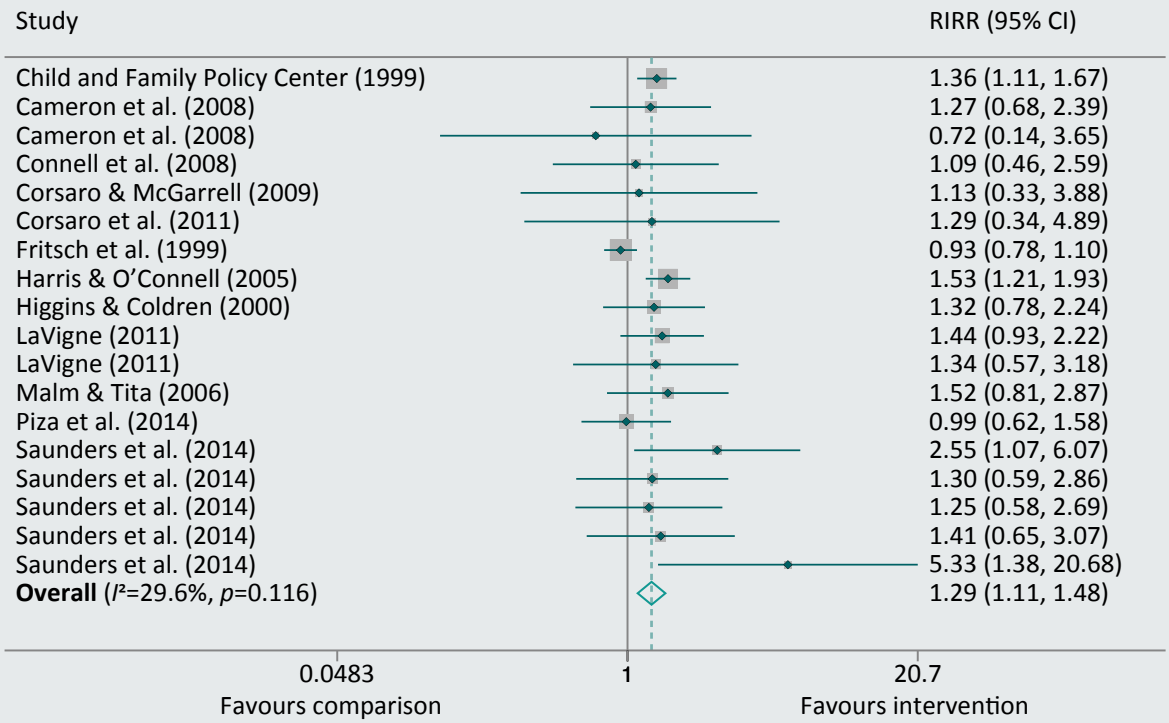
Community-wide policing interventions are defined as adopting a broad multi-agency approach, paying little attention to targeting repeat offenders, repeat victims or geographic concentrations of crime in a given jurisdiction. Initiatives that aim to improve police–citizen relationships in a neighbourhood, like the Weed and Seed program in the United States, are examples of community-wide policing interventions.

Impact of street-level interventions on drug crime

Eighteen studies examined the impact of street-level drug law enforcement on drug crime. The findings of these studies are summarised in Figure 2. Although only four studies show individually statistically significant impacts on drug crime, the overall synthesised effect shows that these place-level policing interventions significantly reduce drug crime in the treatment areas, relative to the comparison areas (RIRR=1.29, 95% CI: 1.11–1.48). The results also indicate that the impact of these place-level policing interventions is relatively stable, as there is no significant variation among the effects of the included studies (I^2=29.6%, p=0.116).

One other eligible study, reported in Adda et al. (2014a, 2014b), examined the impact of cannabis depenalisation on drug crime. As this intervention was anticipated to work in a very different manner from the other policing interventions, this study was synthesised separately. Cannabis depenalisation policing showed no significant impact on drug crime.

Figure 2: Effect of interventions on drug-related crime

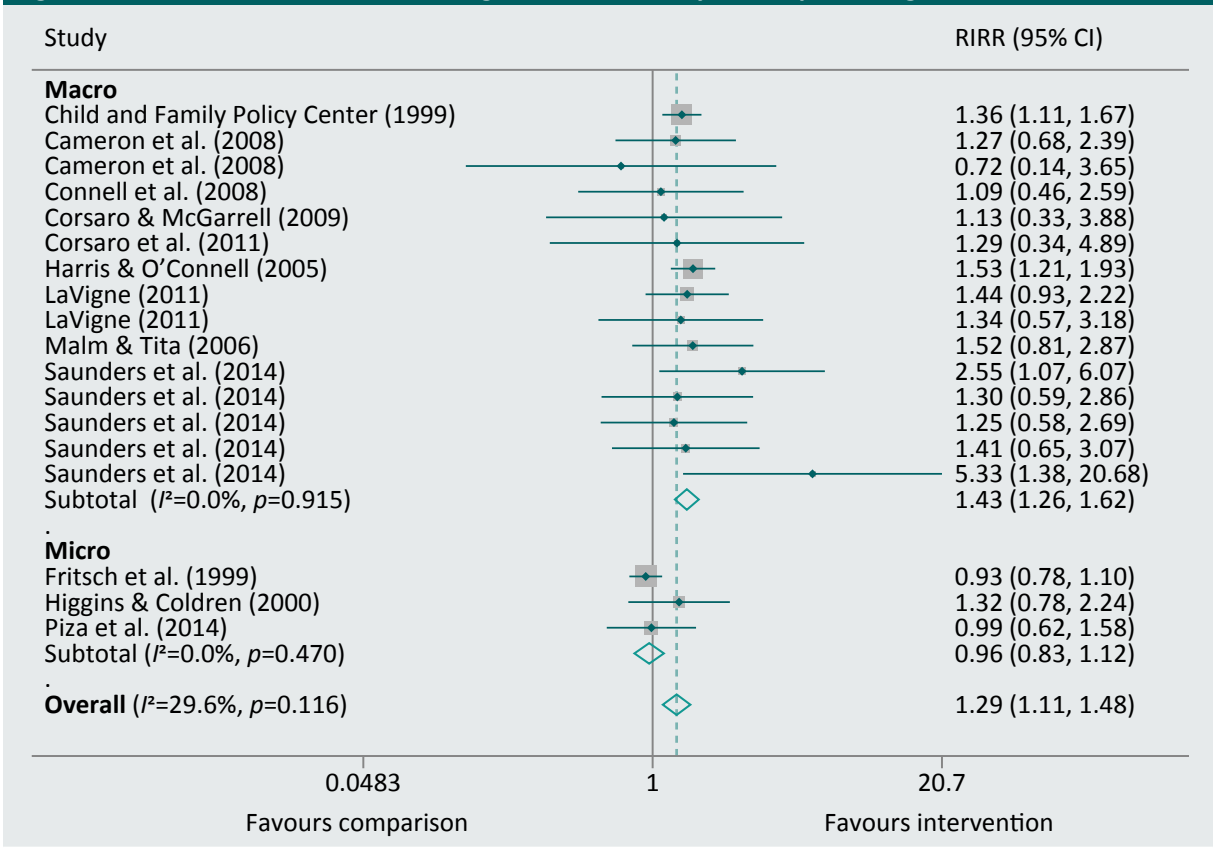


Note: Weights are from random effects analysis. RIRR=relative incidence rate ratio. CI=confidence interval

Moderator analysis: Intervention impact by size of place (drug crime)

Although the results of the overall analysis on drug crime indicated that there was not significant variability among the included studies, we examined whether the impact of the interventions on drug crime varies by the size of the place targeted by the intervention. Figure 3 provides the results of a moderator analysis which demonstrates that interventions targeted at macro levels of place (eg neighbourhoods, communities, police districts, cities) were more effective at reducing drug crime than interventions targeted at micro places (eg street corners, buildings, police beats, street segments). Interventions targeted at macro places significantly reduce drug crime in the treatment areas, relative to the comparison areas (RIRR=1.43, CI: 1.26–1.62), while interventions targeted at micro places show no significant impact on drug crime. The results also indicate that there is no significant variation among the effects of the included studies within each category of geography.

Figure 3: Effect of interventions on drug-related crime, by size of place targeted

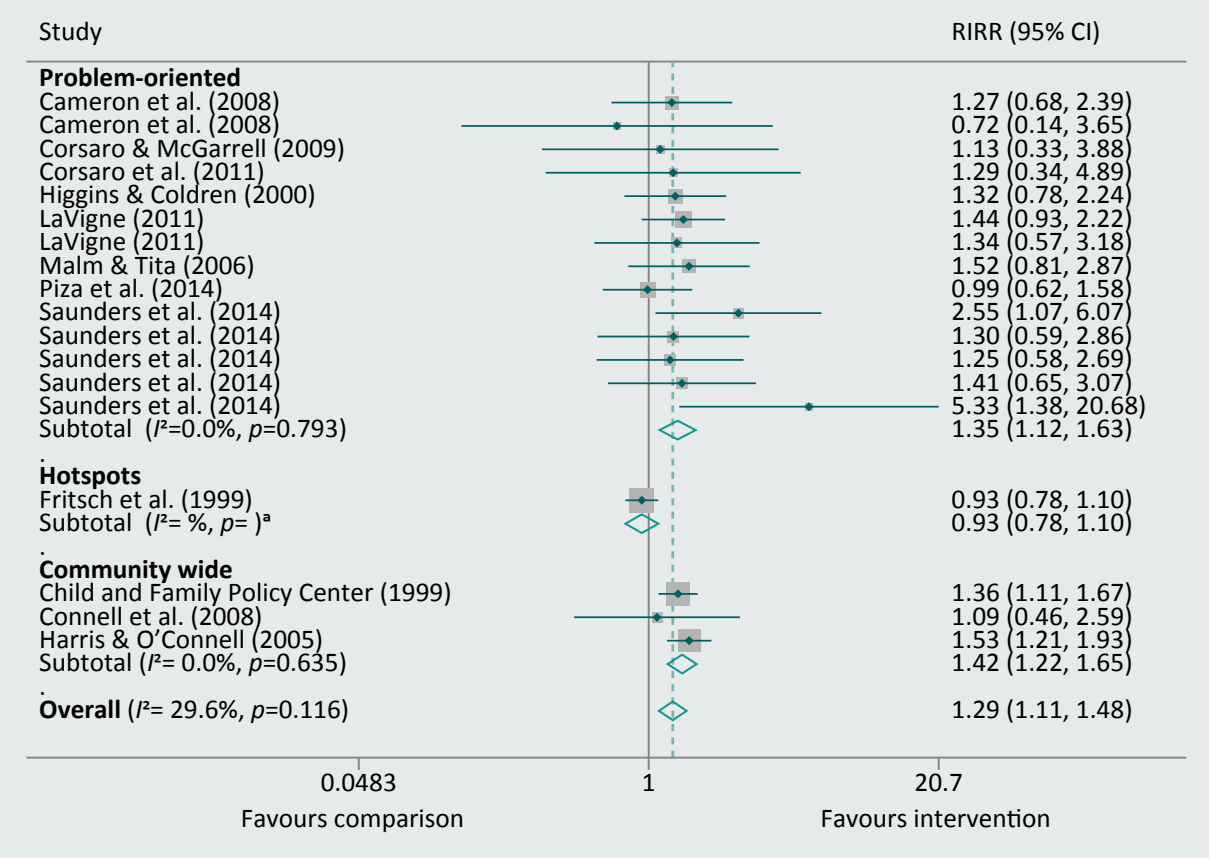


Note: Weights are from random effects analysis. RIRR=relative incidence rate ratio. CI=confidence interval

Moderator analysis: Intervention impact by type of policing approach (drug crime)

Figure 4 provides the results of a moderator analysis which examines whether the impact of the interventions on crime vary by the specific type of policing approach implemented, excluding depenalisation. The results demonstrate the effectiveness of both problem-oriented (RIRR=1.35, CI: 1.12–1.63) and community-wide (RIRR=1.42, CI: 1.22–1.65) policing strategies for reducing drug crime. The one study that evaluated hotspots policing (without problem-oriented strategies) showed no significant effect on drug crime. The results also indicate that there is no significant variation among the effects of the included studies within each category of policing strategy.

Figure 4: Effect of interventions (excluding depenalisation) on drug-related crime, by type of policing approach



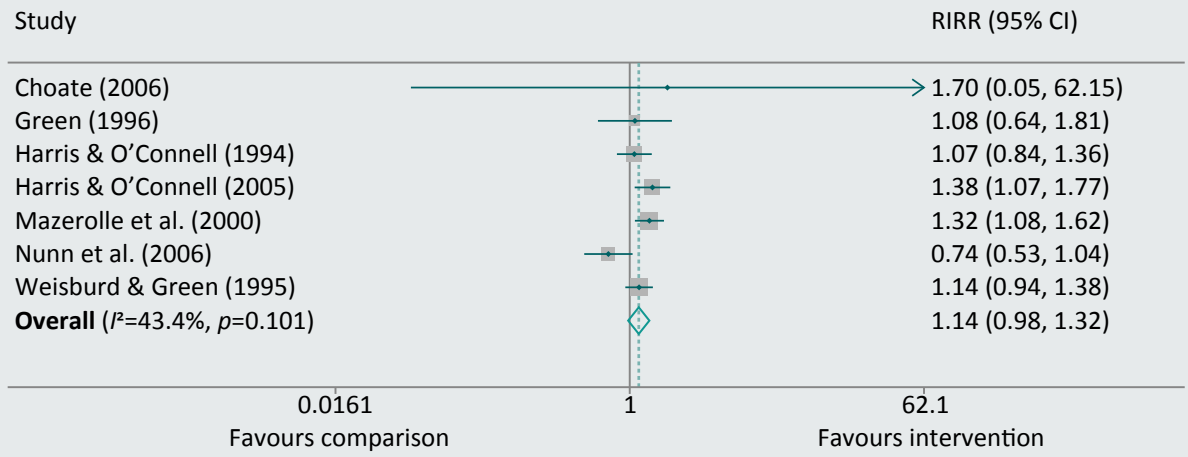
a: A heterogeneity statistic (I^2) and p-value were not produced because there is only one study included in the moderator analyses

Note: Weights are from random effects analysis. RIRR=relative incidence rate ratio. CI=confidence interval

Impact of street-level interventions on drug calls-for-service

Seven studies examined the impact of street-level drug law enforcement on drug-related calls-for-service. These studies are summarised in Figure 5. The overall synthesised effect shows that these place-level policing interventions have no significant effect on drug-related calls-for-service (RIRR=1.14, CI: 0.98–1.32). The results also indicate that there is no significant variation among the effects of the included studies.

Figure 5: Effect of interventions on drug-related calls-for-service



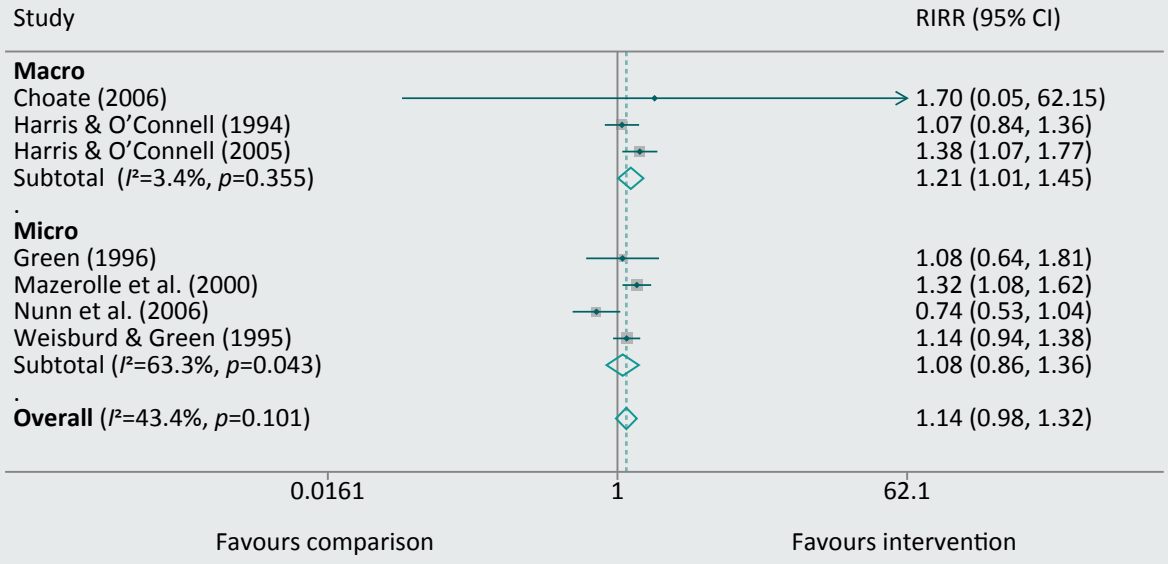
Note: Weights are from random effects analysis. RIRR=relative incidence rate ratio. CI=confidence interval

Moderator analysis: Intervention impact by type of size of place (calls-for-service)

Figure 6 provides the results of a moderator analysis which examines whether the impacts of the interventions on drug-related calls-for-service vary by size of the place targeted. The results demonstrate that interventions targeted at macro places significantly reduce drug-related calls-for-service in the treatment areas, relative to the comparison areas (RIRR=1.21, CI: 1.01–1.45), while interventions targeted at micro places show no significant impact on drug-related calls-for-service (RIRR=1.08, CI: 0.86–1.36). However, the results do not show a significant difference between the impact of interventions targeted at macro levels of place and interventions targeted at micro places.

The results also indicate that, while there is no significant variation among the effects of the interventions targeted at macro places, there is significant variation in effectiveness among the micro-place interventions (I^2=63.3%, p=0.043).

Figure 6: Effect of interventions on drug-related calls-for-service, by size of place targeted



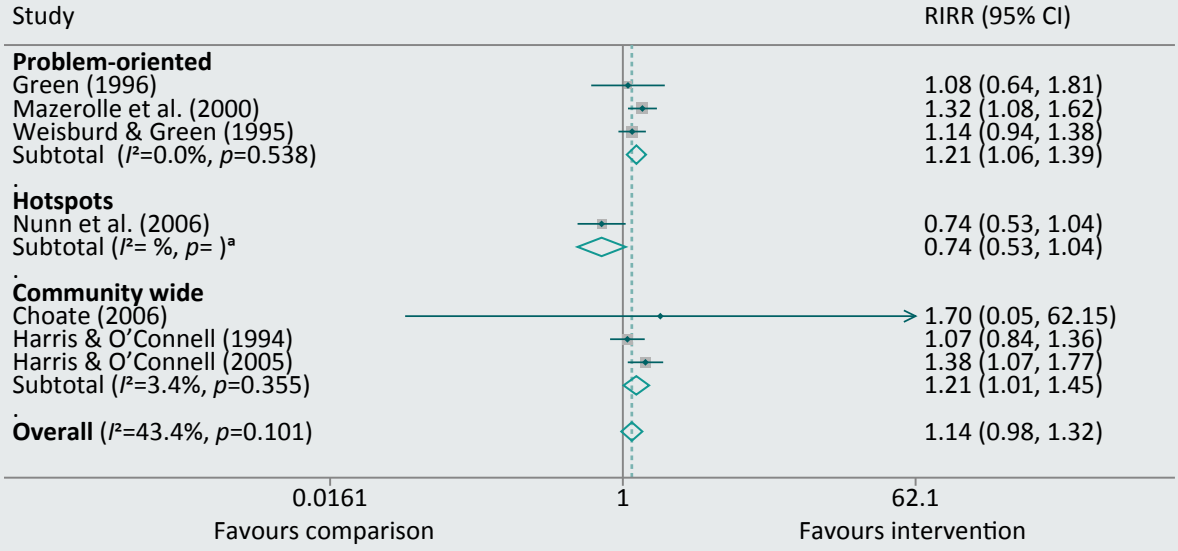
Note: Weights are from random effects analysis. RIRR=relative incidence rate ratio. CI=confidence interval

Moderator analysis: Intervention impact by type of policing approach (calls-for-service)

Figure 7 provides the results of a moderator analysis which examines whether the impact of the interventions on drug-related calls-for-service vary by the specific type of policing approach implemented. The results demonstrate that both problem-oriented policing interventions (RIRR=1.21, CI: 1.06–1.39) and community-wide policing interventions (RIRR=1.21, CI: 1.01–1.41) significantly reduce drug-related calls-for-service in the treatment areas, relative to the comparison areas, while one study that evaluated hotspots policing (without problem-oriented strategies) showed no significant effect on drug-related calls-for-service.

The results also show a significant difference between the impacts of problem-oriented policing and hotspots policing strategies, but no other significant differences among the three groups of strategies. The results also indicate that there is no significant variation among the effects within any of the three groups of strategies.

Figure 7: Effect of interventions on drug-related calls-for-service, by type of policing approach



a: A heterogeneity statistic (I^2) and *p*-value were not produced because there is only one study included in the moderator analyses

Note: Weights are from random effects analysis. RIRR=relative incidence rate ratio. CI=confidence interval

Discussion

This updated review of the impact of street-level drug law enforcement interventions on drug-related crime and calls-for-service highlights four key points. First, we note the substantial increase in the number of high-quality impact evaluations of place-focused drug law enforcement interventions since the original review in 2007. However, even with this increase in high-quality studies, we still observe a general lack of high-quality impact evaluations outside of the United States and a dearth of randomised controlled trials testing the effectiveness of place-focused drug law enforcement interventions in Australia, despite this trial type being the most robust method for determining whether or not an intervention works.

Second, we find that geographically targeted law enforcement interventions, overall, appear more effective for reducing drug crime than standard, unfocused approaches to street-level drug law enforcement. Nonetheless, the evidence around the effectiveness of place-focused drug law enforcement is less compelling when we consider drug-related calls-for-service as the measured outcome. This suggests that citizens may be not be as aware of drug dealing at the micro-place level (or perhaps not as willing to call the police), which is consistent with the findings of the original review.

Third, consistent with the 2007 review, we find that proactive problem-oriented and community-wide interventions, where police services partner with other entities, are more effective in reducing drug-related crime and calls-for-service than reactive hotspots interventions. As with the original review, we suggest that partnership approaches to tackling street-level crime problems are more effective ways for reducing ongoing drug problems than police working alone or in a reactive manner (eg hotspots policing or directed patrols).

Fourth, we find that street-level drug law enforcement approaches that focus on larger problem areas, such as neighbourhoods, suburbs and beats, tend to be more effective than approaches that focus on smaller, more micro problem places. Whether they are part of a community-wide or a problem-focused intervention, partnership approaches are likely easier to forge when they are focused on large geographic areas, like whole neighbourhoods or communities. In Australia, these could be partnerships with local drug treatment centres, city councils, local health and welfare clinics or community organisations (eg Neighbourhood Watch). These types of partners are likely to work across broad geographic areas rather than being narrowly focused on micro places. It may even be that the greater availability of partners at a broader, community-wide level is the reason why street-level drug law enforcement approaches are found to be more effective in larger problem areas than in micro places.

We recognise some limitations of our review. First, this is a partial update of the 2007 Campbell Collaboration review conducted by Mazerolle, Soole and Rombouts. We recognise in particular the changing landscape of street-level illicit drug use, particularly relating to the use of prescription drugs. Nevertheless, we have opted to retain the original eligibility criteria used in the 2007 review and have excluded studies focused on prescription drugs. However, we suggest that a new review that looks broadly at multi-sector responses to illicit prescription-drug use and distribution is needed. These new categories of drug use may or may not respond to street-level drug law enforcement interventions in the same way as is found in this review. Overall, we recommend that practitioners and policymakers focus on community-level, partnership approaches to tackling street-level drug problems in Australia.

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Appendix

Table A1: Summary of eligible studies

Study name	Location	Intervention, participants, research design	Outcome measured
Adda et al. (2014a) Adda et al. (2014b) McConnell (2015)	United Kingdom (Lambeth, London)	Problem-oriented Macro places (boroughs) Quasi-experiment	Drug offences (arrests)
Cameron et al. (2008)	United States (Los Angeles, California)	Hotspots Micro places (housing estates, specific streets) Quasi-experiment	Rates of drug crime
Child and Family Policy Center (1999)	United States (Des Moines, Iowa)	Community-wide Macro places (neighbourhoods) Quasi-experiment	Drug/narcotic violations, total number of offences
Choate (2006)	United States (Tucson, Arizona)	Community-wide Macro places (neighbourhoods) Quasi-experiment	Drug-related calls-for-service
Connell, Miggans & McGloin (2008)	United States (not otherwise specified)	Community-wide Macro places (suburbs) Quasi-experiment	Rates of drug crime
Corsaro (2013)	United States (High Point, North Carolina)	Problem-oriented Macro places (neighbourhoods) Quasi-experiment	Drug offences
Corsaro et al. (2011)	United States (Peoria, Illinois)	Problem-oriented Macro places (police districts) Quasi-experiment	Rates of drug crime
Corsaro et al. (2009)	United States (Nashville, Texas)	Problem-oriented Macro places (neighbourhoods) Quasi-experiment	Rates of drug crime
Fritsch et al. (1999)	United States (Dallas, Texas)	Hotspots Micro places (patrol beats) Quasi-experiment	Drug offences (arrests)
Harris et al. (2005)	United States (West Centre City, Wilmington, Delaware)	Community-wide Macro places (neighbourhoods) Quasi-experiment	Number of drug-related arrests and drug complaints

Table A1: Summary of eligible studies (cont.)			
Study name	**Location**	**Intervention, participants, research design**	**Outcome measured**
Harris & O'Connell (1994)	United States (Wilmington, Delaware)	Community-wide Macro places (neighbourhoods) Quasi-experiment	Drug-related calls-for-service
Higgins & Coldren (2000)	United States (Chicago, Illinois)	Problem-oriented Micro places (police districts in Chicago) Quasi-experiment	Drug-related arrests calls-for-service
La Vigne et al. (2011)	United States (Chicago, Illinois)	Problem-oriented Macro place (census block groups) Quasi-experiment	Rates of drug crime
Lawton et al. (2005)	United States (Philadelphia, Pennsylvania)	Hotspots Micro places (street segments /addresses) Quasi-experiment	Rates of drug crime
Malm (2006); Malm & Tita (2006)	Canada (British Columbia)	Problem-oriented Macro places (areas in British Columbia) Quasi-experiment	Yearly rates of marijuana production
Mazerolle et al. (2000)	United States (Oakland, California)	Problem-oriented Micro places (street blocks) Randomised experiment	Drug-related calls-for-service
McCabe (2009)	United States (Queens County, New York)	Community-wide Macro places (police precincts) Randomised experiment	Arrests for controlled substances
Nunn et al. (2006)	United States (Brightwood, Indianapolis, Indiana)	Hotspots Micro places (streets) Quasi-experiment	Drug-related calls-for-service
O'Connell et al. (2004)	United States (multiple locations)	Community-wide Macro places Quasi-experiment	Rates of drug crime
Piza et al. (2015)	United States (Newark, New Jersey)	Problem-oriented Micro places (CCTV cameras on street segments) Randomised experiment	Number of drug crime incidents

Table A1: Summary of eligible studies (cont.)

Study name	Location	Intervention, participants, research design	Outcome measured
Robinson (2008)	United States (Portland, Oregon)	Problem-oriented Macro places (Portland city) Quasi-experiment	Drug sales arrests
Roman et al. (2005)	United States (Miami, Florida)	Community-wide Macro places (neighbourhoods) Quasi-experiment	Rates of drug crime
Saunders et al. (2015)	United States (High Point, North Carolina)	Problem-oriented Macro places (neighbourhoods) Quasi-experiment	Monthly number of drug crimes and calls-for-service
Shoaf (2005)	United States (Akron, Ohio)	Community-wide Macro places (cities) Quasi-experiment	Rates of drug crime
Telep & Hibdon (2018)	United States (Seattle, Washington)	Hotspots Macro areas (residential areas/blocks) Quasi-experiment	Drug-related calls-for-service
Weisburd & Green (1995)	United States (Jersey City, New Jersey)	Problem-oriented Micro places (street blocks) Randomised experiment	Drug-related calls-for-service

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