Effectiveness of violence and injury observatories in reducing violence in an adult population: rationale and protocol for a systematic review

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Effectiveness of violence and injury observatories in reducing violence in an adult population: rationale and protocol for a systematic review

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Keywords: Violence and injury observatory, injury surveillance system, epidemiologic surveillance, violence prevention

Word Count: 2164
ABSTRACT

Introduction: The violence and injury observatories developed in Colombia and found throughout the Americas and Western Europe aim to maximize inter-institutional cooperation, information-sharing, analysis and security policy development initiatives to enhance governance. The purpose of the violence and injury observatories is directed toward preventing crime and violence at the local and regional level. Despite the proliferation of various observatory models, over 100 worldwide, there is little published research to demonstrate their effect on decreasing levels of violence and crime. We therefore propose to conduct a systematic review and meta-analysis in order to investigate the effectiveness of observatories in reducing violence in an adult population.

Methods and analysis: A number of databases will be searched, supplemented by same keyword searches in grey literature. Search terms will include studies published from 1 January 1990 through 30 October 2014. Study quality will be assessed using a validated quality assessment tool. Two researchers will independently assess articles for study eligibility to reduce bias, minimize errors, and enhance the reliability of findings. Disagreements will be resolved by consensus amongst three authors. This review protocol has been published in the PROSPERO International Prospective Register of systematic reviews, registration number 2014:CRD42014009818.

Dissemination: There is a paucity of evidence for the effectiveness of violence and injury observatories and their influence on violence in an adult population. We plan to
address this gap in knowledge by way of a systematic review and meta-analysis outlined in this abstract. We anticipate that the results could be used by researchers and policymakers to help inform them of the efficacy of violence and injury observatories and their broader role in contributing to violence prevention.

**Trial registration number:** PROSPERO registration number

2014:CRD42014009818

(http://www.crd.york.ac.uk/prospero/register_new_review.asp?RecordID=9818&UserID=6974).

**Strengths and limitations of study**

- To our knowledge, this is the first systematic review protocol that will attempt to assess the impact of violence and injury observatories in contributing to violence prevention among an adult population
- This study will inform research practice and future studies on the effectiveness of observatories
- Inferences regarding outcomes cannot be drawn from the present protocol, but will be reported following the systematic review and meta-analysis described herein
Introduction

Violence is now recognised officially as a global health issue, with the World Health Organisation (WHO) reporting that 1.6 million people die annually from violence [1]. South Africa’s injury burden is very high, particularly for homicide, which is seven times the global average [2]. The 2010 Global burden of disease study, which bases its estimates on vital registration, found interpersonal violence to be the third leading cause of premature death in South Africa accounting for approximately 4.4% of all Years of life lost (YLL) [3]. Mortuary data record significantly more homicides and thus the contribution of interpersonal violence to the disease burden is likely to be considerably higher [4].

The public health approach to injury prevention includes 3 elements, namely risk assessment, interventions development and programme evaluation [5]. A key component of the public health approach is a surveillance system capable of providing essential information for the assessment phase in order to develop appropriate interventions and programme evaluation methods [6, 7]. Injury surveillance is widely recognized as a critical prerequisite for effective injury prevention [10]. Injury surveillance utilises a variety of data sources, from mortality and hospital discharge data to emergency department registry data, surveys and police, fire or ambulance records [6].

Ongoing surveillance can monitor the incidence of injury, identify risk factors and contribute to the planning and evaluation of injury prevention programs [9, 10]. This can be illustrated by studies across several injury surveillance systems in different countries which have highlighted their system’s ability to identify contextual risk
factors and the larger contribution to injury prevention programs[9-14]. Substantial success in a notable reduction in a number of violence outcomes have been reported in observational studies and trend analyses from centres developed in Colombia and throughout South America[15-16]. Directed towards preventing crime and violence at the local and regional level, these violence and injury observatories aim to maximise inter-institutional cooperation, information-sharing, analysis and security policy development initiatives to enhance governance[17].

The terms injury surveillance system and injury observatories are sometimes used interchangeably in the literature. We will use the term “observatory” as it is specific to a surveillance system that collects data from multiple sources, e.g. crime, clinical and forensic data, whereas injury surveillance systems almost exclusively focus on the use of injury data alone.

Despite the proliferation of various observatory models worldwide ranging from the surveillance of school violence and child abuse to violence against women and transport crime, there is little published research on the effectiveness of observatories in producing or stimulating the production of demonstrable social change and decreased levels of violence and crime[15]. We therefore propose to conduct a systematic review and meta-analysis in order to investigate the effect of observatories in reducing violence in an adult population.
Methods

This review protocol has been published in the PROSPERO International Prospective Register of systematic reviews (http://www.crd.york.ac.uk/PROSPERO), registration number 2014: CRD42014009818.

Criteria for considering studies for this review

Type of studies
We will include Randomised-Controlled Trials (RCTs), Non-Randomised controlled trials, quasi-experimental designs, prospective and retrospective cohort studies and controlled before after series. In the absence of these, cross sectional studies will be included. Studies performed in general or specific populations and in hospitals or clinics will be included. Additionally, studies performed in any country and published in any language will be included.

Types of participants
Participants for this study will include adults >= 18 years of age who are located within the catchment area of the observatory.

Types of interventions
We will include Observatories/Injury surveillance system interventions that address violence prevention and whether these reduce violence in adult populations. All surveillance systems that focus specifically on the collection of violence and injury data will be included in this review.
Types of outcome measures

For purposes of the systematic review, violence will be defined as the intentional threat or use of physical force against oneself, another person or a group or community that results in injury, death, psychological harm, maldevelopment or deprivation[18]. The outcome measures will be based upon the Organisation of American States (OAS) regional system of standardized indicators in peaceful coexistence and citizen security[19], as they represent the largest member organisation of crime and violence observatories worldwide, and will include measures obtained by administrative record or surveys.

Primary outcomes

Primary outcomes will include murder/homicide, suicide, transit death, unintentional injury death, sexual violence and intra family/family/domestic violence[19].

Secondary outcomes

Secondary outcomes will include aggravated assault, crime victimisation and the perception of insecurity, fear or risk[19].

Search methods for identification of studies

The searching of databases and grey literature will be performed by AJ with the help of the University of Cape Town librarian, to identify all relevant studies available by 30 October 2014, regardless of language or publication status. Peer-reviewed journal articles and grey literature (unpublished, internal or non-reviewed papers and reports) will also be searched.
Database

We will search the following electronic databases: Pubmed, Sociological abstracts and International bibliography of the social sciences (IBSS) and Education sources information centre (ERIC) via Proquest, PsycINFO and Cumulative index to nursing and allied health literature (CINAHL) and Humanities International via Ebscohost, SCOPUS, Cochrane Collaboration, Campbell Collaboration, Social Care Online, National Criminal Justice Reference Service, Web of Knowledge and Regional databases of the WHO. Furthermore the following websites will be searched for relevant literature: websites of WHO Violence Prevention Alliance (http://www.who.int/violenceprevention/en/), Blueprints for Violence Prevention (http://www.colorado.edu/cspv/blueprints), the Community Guide (http://www.thecommunityguide.org/violence/index.html), Centers for Disease Control and Prevention (http://www.cdc.gov/ViolencePrevention/index.html), The World Bank (http://www.worldbank.org), the Juarez violence and injury observatory (http://observatoriodejuarez.org/dnn/ENGLISH.aspx) and the Medical Research Council (MRC) burden of disease research unit (http://www.mrc.ac.za/bod/bod.htm).

In addition, the following conference proceedings will be searched for relevant abstracts: International Conference on Crime Observatories, United Nations Congress on Crime Prevention and Criminal Justice, Global Violence Reduction conference, Annual meeting of Violence Prevention Alliance and the International society for violence and injury prevention international conference. We will use both text words and medical subject headings (MeSH) terms. The terms will be used in varying combinations. The specific database will determine the literature search strategy employed as shown in table 1. Reviewers will also search reference lists of relevant studies identified.
Table 1. PubMed search strategy, modified as needed for use in other databases

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MeSH, medical subject heading

Data collection and analysis

The Cochrane Handbook of Systematic Reviews for Interventions[20] will serve as the reference for methods employed in this study.

Selection of studies for inclusion

Review authors will use a screening guide developed by AJ to ensure that inclusion criteria are consistently applied. Two review authors (AJ and DB), working independently, will screen the titles and abstracts of all studies identified through the
literature searches for eligibility. Full texts of potentially eligible studies will be obtained by AJ. The two authors (AJ and DB) will independently assess the full text of each article for eligibility, and compare their results. Reviewer agreement will be reported by a kappa statistic. Discrepancies will be resolved through discussion and consensus, consulting a third author (MEE) to resolve any persistent disagreements. Reviewers will document the reasons for all studies excluded from the systematic review.

**Assessment of risk of bias in included studies**

Two reviewers will both assess all included studies using the effective public health policy (EPHPP) questionnaire, which is a quantitative study assessment tool to identify methodological issues[21]. The criteria used to assess the risk of bias in RCTs will be random sequence generation; allocation concealment; blinding of participants, study personnel; blinding of outcome assessors; incomplete outcome data; selective outcome reporting; other sources of bias and overall risk of bias, in accordance with the methods used by the Cochrane Collaboration and the EPHPP tool[20-21]. The criteria used for risk of bias assessment for non-randomised studies will include selection bias (dealing with confounding, adjustment and comparability of groups); performance bias (in terms of the fidelity of the interventions); detection bias (regarding unbiased and correct assessment of outcomes, including blinding of assessors); attrition bias (with regard to completeness of sample, follow-up and data); and reporting bias (with regard to publication biases and selective reporting of results)[20]. Studies will be scored as having low, high or unclear risk of bias. Any disagreements between the two authors in the assessment of risk of bias will be resolved in discussion and consensus and the consultation of a third author when necessary.
**Data extraction and management**

Two authors will independently extract descriptive and outcome data for each included article using a standardised data collection form, resolving any discrepancies by discussion and consensus; failing which, a third author (MEE) will arbitrate. The final data will be entered into the Cochrane Collaboration Review Manager V.5.1 statistical software ([http://ims.cochrane.org/RevMan](http://ims.cochrane.org/RevMan)) by AJ whilst DB will crosscheck the data entered to ensure that there are no data entry errors. References will be managed using Refworks Version 2.0 [22].

**Data synthesis including assessment of heterogeneity**

Data analysis will be managed using the Cochrane Collaboration Review Manager V.5.1 statistical software ([http://ims.cochrane.org/RevMan](http://ims.cochrane.org/RevMan)) with the outcomes of interest being either dichotomous or continuous. Risk ratios and their respective 95% CI and p values will be calculated for dichotomous outcomes, and mean differences and standard deviations will be calculated for continuous outcomes. Standardised mean differences (SMD) will be calculated where outcomes are measured using different scales[23]. Heterogeneity will be assessed by examining types of participants, interventions and outcomes in each study with the intention to pool data and estimate effect sizes using a fixed-effects model only from studies in which outcomes are judged to be homogenous. Alternately the random-effects model will be employed. Statistical heterogeneity in each meta-analysis will be assessed using the χ² test and quantified using the I² statistic[24]. The findings will be discussed as a narrative summary if the heterogeneity remains significant. Included studies will be summarised in tables to highlight the main existing evidence.
Sub group analyses

Sub group analyses will be performed by intervention subtypes: high income versus low income areas and high concentration of violence areas versus low concentration of violence areas. Analysis will be further stratified by study design (randomised controlled separate from nonrandomised studies) and intervention type (surveillance system collecting violence and injury data only versus system that collects violence and injury data as well as crime data). We will also conduct a sub-group comparison of self-reported violence outcome behaviours versus verified criminal records as well as according to age categories and country setting.

Assessment of quality of evidence

We will use the grading of recommendations assessment, development and evaluation (GRADE) approach[25] to assess the quality of evidence for the effectiveness of the observatory intervention. The GRADE approach assesses the quality of the body of evidence as high, moderate, low or very low. Evidence is considered of high quality if ‘further research is very unlikely to change our confidence in the estimate of effect’; and moderate quality if ‘further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate’[25]. Low quality evidence implies that ‘further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate’, and very low quality that ‘we have very little confidence in the effect estimate’[25].
**Sensitivity analyses**

Multiple sensitivity analyses will be conducted. We will first determine whether the study design (RCT vs nonrandomised study) could influence the results of the meta-analysis. Second, the model of the statistical method (random-effects vs fixed-effects model) will be evaluated to determine if this could change the results. We will determine the impact of excluding studies with a high risk bias on the results, with emphasis on allocation concealment, blinded outcome assessment and losses to follow-up (with a cut-off of 25% loss to follow-up). Further sensitivity analyses will be considered if necessary.

**Reporting of this review**

This reviews findings will be reported in several ways. PRISMA flow diagrams will be used to summarise the study selection process[26]. The κ statistic [27] will be used to assess agreements between the full-text screening, data extraction and risk of bias assessment by the two authors (AJ and DB). Where necessary, we will adapt the reporting to ensure that all items relevant to this review are included.

**Ethics and dissemination**

Ethics is not required for this study as it utilises public health data. The findings of this study will be widely disseminated through peer-reviewed publications, conference presentations and submitted to relevant authorities in national departments of health. Updates of the review will be completed to inform and guide violence preventative measures.
Implications

The findings of this systematic review will have implications for the management of violence in our context. Inequality and homicide rates in the Western Cape were greater than the national average for both males and females in 2000[2]. The highest rates of homicide in Cape Town, the province’s largest city and home to almost two thirds of the provincial population, were recorded in the relatively impoverished sub-districts of Nyanga (132 per 100,000 population) and Khayelitsha (120 per 100,000 population)[2]. Whilst the criminal justice system remains the primary tool for addressing violence in South Africa, evidence based interventions for prevention are becoming increasingly influential with public health assuming a more central role in policy making.
Acknowledgements

The authors would like to acknowledge the critical input and support of the Evidence-Based Medicine Research Support Unit, Faculty of Health Sciences, University of Cape Town.

Contributionship statement

Ardil Jabar, MBChB, EMDM, MPH and Dylan Barth, BTech, MPH are PhD students. Mark Engel, MPH, PhD and Richard Matzopoulos, MPhil, PhD are senior researchers.

AJ conceived of the review. AJ and DB wrote the first draft and all authors edited the subsequent versions of the draft. AJ and DB developed the protocol, will conduct the searches and extract the data. MEE and RM will oversee the final analysis of the data. All authors have reviewed and accepted the final version of the protocol and given their permission for publication.

Competing interests

The authors declare that they have no competing interests.

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References


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Keywords: Violence and injury observatory, injury surveillance system, epidemiologic surveillance, violence prevention

Word Count: 3058
ABSTRACT

Introduction: The violence and injury observatories developed in Colombia and found throughout the Americas and Western Europe aim to maximize inter-institutional cooperation, information-sharing, analysis and security policy development initiatives to enhance governance. The purpose of the violence and injury observatories is directed toward preventing crime and violence at the local and regional level. To date there has been no systematic review of the literature to present a succinct review of the evidence. We, therefore, sought to summarise the evidence from existing studies on the contribution of violence and injury observatories towards violence prevention.

Methods and analysis: A number of databases will be searched, supplemented by same keyword searches in grey literature. Search terms will include studies published from 1 January 1990 through 30 October 2014. Study quality will be assessed using a validated quality assessment tool. Two researchers will independently assess articles for study eligibility to reduce bias, minimize errors, and enhance the reliability of findings. Disagreements will be resolved by consensus amongst three authors. This review protocol has been published in the PROSPERO International Prospective Register of systematic reviews, registration number 2014:CRD42014009818.

Dissemination: There is a paucity of evidence for the effectiveness of violence and injury observatories and their influence on violence in an adult population. We plan to address this gap in knowledge by way of a systematic review and meta-analysis.
outlined in this abstract. We anticipate that the results could be used by researchers and policymakers to help inform them of the efficacy of violence and injury observatories and their broader role in contributing to violence prevention.

**Trial registration number:** PROSPERO registration number

2014:CRD42014009818

(http://www.crd.york.ac.uk/prospero/register_new_review.asp?RecordID=9818&UserID=6974).

**Strengths and limitations of study**

- To our knowledge, this is the first systematic review protocol that will attempt to assess the impact of violence and injury observatories in contributing to violence prevention among an adult population
- This study will inform research practice and future studies on the effectiveness of observatories
- Inferences regarding outcomes cannot be drawn from the present protocol, but will be reported following the systematic review and meta-analysis described herein
- Causality cannot be inferred from this review and only an association can be inferred
Introduction

Violence is now recognised officially as a global health issue, with the World Health Organisation (WHO) reporting that 1.6 million people die annually from violence [1]. South Africa’s injury burden is very high, particularly for homicide, which is seven times the global average[2]. The 2010 Global burden of disease study, which bases its estimates on vital registration, found interpersonal violence to be the third leading cause of premature death in South Africa accounting for approximately 4.4 % of all Years of life lost (YLL)[3]. Mortuary data record significantly more homicides and thus the contribution of interpersonal violence to the disease burden is likely to be considerably higher[4].

The public health approach to injury prevention includes 3 elements, namely risk assessment, interventions development and programme evaluation[5]. Essential to facilitating this approach, is a surveillance system capable of providing essential information for the assessment phase in order to develop appropriate interventions and programme evaluation methods [6, 7].

Ongoing surveillance can monitor the incidence of injury, identify risk factors and contribute to the planning and evaluation of injury prevention programs [8, 9]. Injury surveillance is widely recognized as a critical prerequisite for effective injury prevention [10]. Injury surveillance utilises a variety of data sources, from mortality and hospital discharge data to emergency department registry data, surveys and police, fire or ambulance records[6].
Several studies in different countries have highlighted injury surveillance systems’ ability to identify contextual risk factors and, the larger contribution to injury prevention programs [9-14]. Furthermore, substantial success in notable reductions in a number of violence outcomes have been reported in observational studies and shown in trend analyses from centres in Colombia and throughout South America [15-16]. Directed towards preventing crime and violence at the local and regional level, these violence and injury observatories aim to maximise inter-institutional cooperation, information-sharing, analysis and security policy development initiatives to enhance governance[7].

An observatory is primarily a tool to help in decision making based on the principle that a better knowledge of situations affecting security will make it possible to ensure more targeted and thus more effective interventions. Although a diagnostic tool measuring the degree of violence in a defined region, over time an observatory also makes it possible to monitor and evaluate the impact of measures adopted.

To date there has been no systematic review of the literature to present a succinct review of the evidence. We, therefore, sought to summarise the evidence from existing studies on the contribution of violence and injury observatories towards violence prevention.
Methods

This review protocol has been published in the PROSPERO International Prospective Register of systematic reviews (http://www.crd.york.ac.uk/PROSPERO), registration number 2014: CRD42014009818.

Criteria for considering studies for this review

Type of studies

We will include Randomised-Controlled Trials (RCTs), Non-Randomised controlled trials, quasi-experimental designs, prospective and retrospective cohort studies and controlled before after series. In the absence of these, cross sectional studies will be included. Studies performed in general or specific populations and in hospitals or clinics will be included. Additionally, studies performed in any country and published in any language will be included.

Types of participants

Participants for this study will include adults >= 18 years of age who are located within the catchment area of the observatory.

Types of interventions/Exposures

For purposes of the systematic review, we will use the term “observatory” to denote a surveillance system that collects data from multiple sources, e.g. crime, clinical and forensic data, whereas injury surveillance systems almost exclusively focus on the use of injury data alone. We will include Observatories/Injury surveillance systems that address violence prevention and whether these reduce violence in adult populations. All
surveillance systems that focus specifically on the collection of violence and injury data will be included in this review.

**Types of outcome measures**

Violence will be defined as the intentional threat or use of physical force against oneself, another person or a group or community that results in injury, death, psychological harm, maldevelopment or deprivation [17]. The outcome measures will be based upon the Organisation of American States (OAS) regional system of standardized indicators in peaceful coexistence and citizen security[8], as they represent the largest member organisation of crime and violence observatories worldwide, and will include measures obtained by administrative record or surveys.

**Primary outcomes**

Primary outcomes will include murder/homicide, suicide, transit death, unintentional injury death, sexual violence and intra family/family/domestic violence[8].

**Secondary outcomes**

Secondary outcomes will include aggravated assault, crime victimisation and the perception of insecurity, fear or risk[8].

**Search methods for identification of studies**

The searching of databases and grey literature will be performed by AJ with the help of the University of Cape Town librarian, to identify all relevant studies available by 30 October 2014, regardless of language or publication status. Peer-reviewed journal
articles and grey literature (unpublished, internal or non-reviewed papers and reports) will also be searched.

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We will search the following electronic databases: Pubmed, Sociological abstracts and International bibliography of the social sciences (IBSS) and Education sources information centre (ERIC) via Proquest, PsycINFO and Cumulative index to nursing and allied health literature (CINAHL) and Humanities International via Ebscohost, SCOPUS, Cochrane Collaboration, Campbell Collaboration, Social Care Online, National Criminal Justice Reference Service, Web of Knowledge and Regional databases of the WHO. Furthermore the following websites will be searched for relevant literature: websites of WHO Violence Prevention Alliance [http://www.who.int/violenceprevention/en/], Blueprints for Violence Prevention [http://www.colorado.edu/cspv/blueprints], the Community Guide [http://www.thecommunityguide.org/violence/index.html], Centers for Disease Control and Prevention [http://www.cdc.gov/ViolencePrevention/index.html], The World Bank [http://www.worldbank.org], the Juarez violence and injury observatory [http://observatoriodejuarez.org/dnn/ENGLISH.aspx] and the Medical Research Council (MRC) burden of disease research unit [http://www.mrc.ac.za/bod/bod.htm].

In addition, the following conference proceedings will be searched for relevant abstracts: International Conference on Crime Observatories, United Nations Congress on Crime Prevention and Criminal Justice, Global Violence Reduction conference, Annual meeting of Violence Prevention Alliance and the International society for violence and injury prevention international conference. We will use both text words and medical subject headings (MeSH) terms. The terms will be used in varying combinations. The specific database will determine the literature search strategy.
employed as shown in table 1. Reviewers will also search reference lists of relevant studies identified.

| Table 1. PubMed search strategy, modified as needed for use in other databases |
|---|---|
| Search | PubMed |
| #1 (violence and injury observator*) OR (injury surveillance system) OR (crime observer*) |
| #2 ("domestic abuse*" OR "physical abuse*" OR "partner abuse*" OR violent OR violence OR assault OR homicide OR gang OR gangs OR gang violence OR bully OR aggression OR aggressive OR robbery OR assault OR GBH OR contact crime OR interpersonal violence OR murder OR homicide OR aggravated assault OR robbery OR suicide OR transit death OR non intentional death OR kidnappings OR theft OR robberies OR rape OR sexual crimes OR assault OR physical violence OR aggression OR sexual violence OR violent crime OR violent crime conviction) |
| #3 (prevention OR preventing OR prevent OR reduction OR reduce OR decrease OR decreased OR decreasing OR decline OR declining OR control OR controlling OR impact OR effect OR effects OR affect OR affecting OR affects OR change OR changing OR changes OR intervene OR intervention) |
| #4 adult |
| #5 #1 AND #2 |
| #6 #3 AND #4 |

MeSH, medical subject heading

Data collection and analysis

The Cochrane Handbook of Systematic Reviews for Interventions[9] will serve as the reference for methods employed in this study.
Selection of studies for inclusion

Review authors will use a screening guide developed by AJ to ensure that inclusion criteria are consistently applied. Two review authors (AJ and DB), working independently, will screen the titles and abstracts of all studies identified through the literature searches for eligibility. Full texts of potentially eligible studies will be obtained by AJ. The two authors (AJ and DB) will independently assess the full text of each article for eligibility, and compare their results. Reviewer agreement will be reported by a kappa statistic. Discrepancies will be resolved through discussion and consensus, consulting a third author (MEE) to resolve any persistent disagreements. Reviewers will document the reasons for all studies excluded from the systematic review.

Assessment of risk of bias in included studies

Two reviewers will both assess all included studies using the effective public health policy (EPHPP) questionnaire, which is a quantitative study assessment tool to identify methodological issues[10]. The criteria used to assess the risk of bias in RCTs will be random sequence generation; allocation concealment; blinding of participants, study personnel; blinding of outcome assessors; incomplete outcome data; selective outcome reporting; other sources of bias and overall risk of bias, in accordance with the methods used by the Cochrane Collaboration and the EPHPP tool[9]. The criteria used for risk of bias assessment for non-randomised studies will include selection bias (dealing with confounding, adjustment and comparability of groups); performance bias (in terms of the fidelity of the interventions); detection bias (regarding unbiased and correct assessment of outcomes, including blinding of assessors); attrition bias (with regard to completeness of sample, follow-up and data); and reporting bias (with regard to
publication biases and selective reporting of results)[9]. Studies will be scored as having low, high or unclear risk of bias. Any disagreements between the two authors in the assessment of risk of bias will be resolved in discussion and consensus and the consultation of a third author when necessary.

**Data extraction and management**

Two authors will independently extract descriptive and outcome data for each included article using a standardised data collection form, resolving any discrepancies by discussion and consensus; failing which, a third author (MEE) will arbitrate. The final data will be entered into the Cochrane Collaboration Review Manager V.5.1 statistical software (http://ims.cochrane.org/RevMan) by AJ whilst DB will crosscheck the data entered to ensure that there are no data entry errors. References will be managed using Refworks Version 2.0 [11].

**Data synthesis including assessment of heterogeneity**

Data analysis will be managed using the Cochrane Collaboration Review Manager V.5.1 statistical software (http://ims.cochrane.org/RevMan) with the outcomes of interest being either dichotomous or continuous. Risk ratios and their respective 95% CI and p values will be calculated for dichotomous outcomes, and mean differences and standard deviations will be calculated for continuous outcomes. Standardised mean differences (SMD) will be calculated where outcomes are measured using different scales[12]. Heterogeneity will be assessed by examining types of participants, interventions and outcomes in each study with the intention to pool data and estimate effect sizes using a fixed-effects model only from studies in which outcomes are judged to be homogenous. Alternately the random-effects model will be employed. Statistical heterogeneity in each meta-analysis will be assessed using the $\chi^2$ test and quantified using the I² statistic[13].
The findings will be discussed as a narrative summary if the heterogeneity remains significant. Included studies will be summarised in tables to highlight the main existing evidence.

**Sub group analyses**

Sub group analyses will be performed by intervention subtypes: high income versus low income areas and high concentration of violence areas versus low concentration of violence areas. Analysis will be further stratified by study design (randomised controlled separate from nonrandomised studies) and intervention type (surveillance system collecting violence and injury data only versus system that collects violence and injury data as well as crime data). We will also conduct a sub-group comparison of self-reported violence outcome behaviours versus verified criminal records as well as according to age categories and country setting.

**Assessment of quality of evidence**

We will use the grading of recommendations assessment, development and evaluation (GRADE) approach to assess the quality of evidence for the contribution of the observatory towards violence prevention[14]. The GRADE approach specifies four levels of quality ranging from high to very low, with the highest quality rating denoting a confidence that the true effect lies close to the estimate of the effect. Quality will be rated according to an a priori identification of potential participant-centered outcomes, including benefits and harms [15].

Two authors will independently assign the grade scores and compare results as per the process for the recording of previous aspects of the study. Discrepancies will be resolved by consensus discussion between the two primary reviewers (AJ and DB), with arbitration by a third reviewer (MEE) as necessary.”
Sensitivity analyses

Multiple sensitivity analyses will be conducted. We will first determine whether the study design (RCT vs nonrandomised study) could influence the results of the meta-analysis. Second, the model of the statistical method (random-effects vs fixed-effects model) will be evaluated to determine if this could change the results. We will determine the impact of excluding studies with a high risk bias on the results, with emphasis on allocation concealment, blinded outcome assessment and losses to follow-up (with a cut-off of 25% loss to follow-up). Further sensitivity analyses will be considered if necessary.

Reporting of this review

This reviews findings will be reported in several ways. PRISMA flow diagrams will be used to summarise the study selection process[15]. The κ statistic [16] will be used to assess agreements between the full-text screening, data extraction and risk of bias assessment by the two authors (AJ and DB). Where necessary, we will adapt the reporting to ensure that all items relevant to this review are included.

Ethics and dissemination

Ethics is not required for this study as it utilises public health data. The findings of this study will be widely disseminated through peer-reviewed publications, conference presentations and submitted to relevant authorities in national departments of health. Updates of the review will be completed to inform and guide violence preventative measures.
Implications

Whilst the criminal justice system remains the primary tool for addressing violence in South Africa, evidence-based interventions for prevention are increasingly employed, with public health assuming a more central role in policy making[18]. The findings of this systematic review may provide evidence for the introduction of injury surveillance systems for the management of violence in our context. While we acknowledge that causality cannot necessarily be inferred from conducting a systematic review, we can however, quantify a level of effect of an association between the introduction of an observatory and a subsequent decrease in levels of violence. Furthermore policy implications regarding the results of the review may be that there is a greater acceptance by stakeholders in the safety cluster that security policies must be based on reliable, objective information. Finally, the implications for future research may be to understand how observatories influence social change.

Acknowledgements

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Contributionship statement

Ardil Jabar, MBChB, EMDM, MPH and Dylan Barth, BTech, MPH are PhD students. Mark Engel, MPH, PhD and Richard Matzopoulos, MPhil, PhD are senior researchers.

AJ conceived of the review. AJ and DB wrote the first draft and all authors edited the subsequent versions of the draft. AJ and DB developed the protocol, will conduct the searches and extract the data. MEE and RM will oversee the final analysis of the data. All
authors have reviewed and accepted the final version of the protocol and given their permission for publication.

Competing interests

The authors declare that they have no competing interests.

Funding

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References


### Prima P checklist 2015

**ADMINISTRATIVE INFORMATION**

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<td><strong>Identification</strong></td>
<td>1a</td>
<td>Identify the report as a protocol of a systematic review</td>
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<td><strong>Update</strong></td>
<td>1b</td>
<td>If the protocol is for an update of a previous systematic review, identify as such</td>
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<td>If registered, provide the name of the registry (e.g., PROSPERO) and registration number</td>
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<td><strong>Contact</strong></td>
<td>3a</td>
<td>Provide name, institutional affiliation, and e-mail address of all protocol authors; provide physical mailing address of corresponding author</td>
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<tr>
<td><strong>Contributions</strong></td>
<td>3b</td>
<td>Describe contributions of protocol authors and identify the guarantor of the review</td>
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<td><strong>Amendments</strong></td>
<td>4</td>
<td>If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments</td>
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**INTRODUCTION**

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### Study records

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<tr>
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<th>Describe the mechanism(s) that will be used to manage records and data throughout the review</th>
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<tr>
<td>Data collection process</td>
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<td>Describe planned method of extracting data from reports (e.g., piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators</td>
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<tr>
<td>Data items</td>
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<td>List and define all variables for which data will be sought (e.g., PICO items, funding sources), any pre-planned data assumptions and simplifications</td>
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<td>Outcomes and prioritization</td>
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<td>List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale</td>
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<td>Risk of bias in individual studies</td>
<td>14</td>
<td>Describe anticipated methods for assessing risk of bias of individual studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis</td>
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### Data

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<tr>
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<td>If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data, and methods of combining data from studies, including any planned exploration of consistency (e.g., I², Kendall’s tau)</td>
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<td>15d</td>
<td>If quantitative synthesis is not appropriate, describe the type of summary planned</td>
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<td>Describe how the strength of the body of evidence will be assessed (e.g., GRADE)</td>
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