Suicide prevention interventions targeting Indigenous peoples in Australia, New Zealand, the United States and Canada: a rapid review

A Clifford
CM Doran
K Tsey

An Evidence Check review brokered by the Sax Institute for the NSW Ministry of Health

June 2012
This rapid review was brokered by the Sax Institute for the NSW Ministry of Health.

This report was prepared by:

Anton Clifford¹, Christopher M Doran² and Komla Tsey³
1 School of Population Health, University of Queensland, Brisbane, Australia
2 Hunter Medical Research Institute, Newcastle, Australia
3 James Cook University and Cairns Institute, Australia

June, 2012.

© Sax Institute, 2012.

This work is copyright. No part may be reproduced by any process except in accordance with the provisions of the Copyright Act 1968.

Enquiries regarding this report may be directed to:
Knowledge Exchange Program
Sax Institute
Level 2, 10 Quay Street Haymarket NSW 2000
PO Box K617 Haymarket NSW 1240 Australia
T: +61 2 95145950
F: +61 2 95145951
Email: knowledge.exchange@saxinstitute.org.au

Suggested Citation:

Disclaimer:
This Evidence Check review was produced using the Evidence Check methodology in response to specific questions from the commissioning agency. It is not necessarily a comprehensive review of all literature relating to the topic area. It was current at the time of production (but not necessarily at the time of publication). It is reproduced for general information and third parties rely upon it at their own risk.
## Contents

**Figures and tables** .................................................................................................................. 5  
**1 EXECUTIVE SUMMARY** ............................................................................................... 6  
  1.1 Scope of review ............................................................................................................... 6  
  1.2 Methods ......................................................................................................................... 6  
  1.3 Key results ...................................................................................................................... 6  
  1.4 Key findings .................................................................................................................... 7  
  1.5 Implications ..................................................................................................................... 7  
  1.6 Key recommendations .................................................................................................... 8  
**2 Introduction** .................................................................................................................... 9  
**3 Methods** ........................................................................................................................ 11  
  3.1 Search strategy ............................................................................................................... 11  
  3.2 Classification of studies ................................................................................................. 12  
  3.3 Search of the self harm literature for intervention studies ............................................. 13  
  3.4 Data extraction from intervention studies ...................................................................... 13  
  3.5 Methodological critique of intervention studies ............................................................ 13  
  3.6 Data extraction from abstracts of descriptive studies .................................................... 13  
**4 Results** ............................................................................................................................ 14  
  4.1 Indigenous population and sample ................................................................................. 17  
  4.2 Intervention strategies .................................................................................................... 17  
  4.3 Data collection methods and outcomes ........................................................................ 18  
  4.4 Methodological adequacy .............................................................................................. 19  
  4.5 Methodological adequacy .............................................................................................. 21  
  4.6 Effectiveness of interventions ....................................................................................... 21  
  4.7 Likely causes of suicide articulated in the descriptive literature ................................... 21  
**5 Discussion** ....................................................................................................................... 22  
  5.1 Methodological adequacy of intervention evaluations .................................................. 22  
  5.2 Strengths and limitations of intervention evaluations ................................................... 22  
  5.3 Potential limitations of the review ................................................................................ 23  
**6 Key findings, implications and key recommendations** ..................................................... 24  
  6.1 Key findings ................................................................................................................... 24  
  6.2 Implications .................................................................................................................... 24  
  6.3 Key recommendations .................................................................................................... 25  
**7 Conclusions** .................................................................................................................... 26  
**8 References** ....................................................................................................................... 27  
**7 Glossary** ........................................................................................................................... 31
Figures and tables

Figure 1: Flowchart of search strategy 10
Table 1: Characteristics of evaluations of suicide prevention interventions 14,15
Table 2: Methodological adequacy of evaluations of suicide prevention interventions 19
1 EXECUTIVE SUMMARY

1.1 Scope of review

This report presents the results of a systematic search of the peer reviewed and grey literature, aimed at identifying studies that describe or evaluate suicide prevention interventions, including early intervention, prevention and postvention strategies, targeting Indigenous peoples in Australia, New Zealand (NZ), Canada or the United States (US), for the period 1981 to 2012 (May) (inclusive). It critiques the methodology of evaluations of suicide prevention interventions and describes their key characteristics. The likely causes of suicide among Aboriginal and Torres Strait Islander Australians most commonly articulated in the descriptive literature are also identified. The implications of overall findings for suicide prevention programs and policies targeting Aboriginal communities in NSW are discussed.

1.2 Methods

A qualified librarian systematically searched 17 electronic databases and 13 websites for scientific and grey literature publications relating to suicide among Indigenous peoples of Australia, NZ, Canada or the US, identifying 945 publications. Examination of the abstracts of these 945 publications identified 38 intervention studies. Of these 38 intervention studies, 29 (76%) described a suicide prevention intervention program or policy and 9 (24%) evaluated a suicide prevention intervention program of policy.

1.3 Key results

The nine studies evaluating a suicide prevention intervention targeted Indigenous peoples in the United States (n=5 studies), Australia (n=3 studies), and Canada (n=1 study). No intervention evaluation targeted Indigenous peoples in NZ. The main intervention strategies evaluated by studies included community prevention (n=4 studies), gatekeeper training (n=3 studies) and education (n=2 studies).

Community prevention interventions targeted specific Indigenous groups and communities at high risk of suicide. Two of the four community prevention interventions employed multiple strategies to reduce risk factors of suicide and/or suicidal behaviours among Indigenous young people. Broadly, these included educational programs, social and cultural activities, and mental health service delivery. One community prevention intervention employing multiple strategies reported reductions in rates of suicidal behaviours. Two community prevention interventions each employed one main strategy: one an empowerment program and the other, community level alcohol restrictions. Alcohol restrictions reduced suicide rates, with less restrictive measures more effective at reducing suicide rates than more restrictive measures.

Gatekeeper training involves teaching specific groups of people in the community how to identify and support individuals at high risk of suicide. The three studies evaluating Gatekeeper training reported post-training increases in participants’ knowledge of suicidal risk behaviours, and confidence and/or willingness to assist individuals at risk of suicide. One study measuring the long term effects of gatekeeper training found improvements in knowledge and confidence were diminished at two years follow-up. No study evaluating gatekeeper training measured changes in suicide or suicidal behaviour.
For education interventions, one was integrated into the school curriculum and delivered to Indigenous teenagers at school, while the other was delivered via multi-media technology to Indigenous peoples across varying age groups and from different social backgrounds. The school-based intervention achieved significant reductions in psychological risk factors of suicide among Indigenous teenagers receiving the intervention versus those that did not. The multi-media education intervention resulted in modest improvements in participants’ knowledge of suicide risk factors. Again, neither education evaluation measured changes in suicide or suicidal behaviour.

1.4 Key findings

In summary, there are four key findings of this review. Firstly, there is a lack of evidence from published studies on the most effective intervention strategies for preventing suicide in Indigenous populations, but community prevention programs currently have the most evidence for reducing actual rates of suicide or suicide behaviours among Indigenous populations (two out of four community prevention evaluations showed a significant effect). Secondly, tailoring suicide prevention intervention strategies, in collaboration with targeted Indigenous communities, to address the needs and preferences of high risk Indigenous groups (e.g. young people) is likely to be crucial for optimising acceptability and feasibility of program delivery. Thirdly, the most common risk-factors for suicide reported in data-based, analytical descriptive studies specific to Aboriginal and Torres Strait Islander populations were mental illness, alcohol abuse and a prior history of self-harm. Other risk factors for suicide in the Aboriginal and Torres Strait Islander population reported in non data-based descriptive studies included low levels of access to mental health services, low levels of help seeking behaviours, imprisonment, social powerlessness and high levels of exposure to trauma and violence. Fourthly, evidence from systematic reviews (see Appendix 1) of community suicide prevention programs show that multi-faceted approaches combining one or more individual strategies, tailored to specific communities, and targeting common risk factors for suicide (mental health disorders, alcohol abuse and a prior history of self-harm), offer considerable promise for reducing rates of suicide and suicidal behaviour. Promising individual strategies that can be combined into a coherent community prevention program, as opposed to being independently implemented, include:

- Training general practitioners (GPs) to recognise and treat suicidal behaviour
- Improving access to timely and appropriate mental health care for at-risk individuals (e.g. those with a history of self-harm) and groups (e.g. young people)
- Teaching specific groups of people in the community how to identify individuals at high risk of suicide and refer them for treatment (gatekeeper training)
- Cognitive behavioural approaches to assist individuals displaying suicidal behaviours (e.g. feelings of hopelessness and depression), and/or engaging in high risk behaviours for suicide (e.g. alcohol abuse), to make changes in their lives to reduce their risk of suicide
- Restricting access to means of suicide among high-risk groups and individuals.

1.5 Implications

There is currently insufficient evidence from published evaluations of suicide prevention interventions targeting Indigenous peoples to confidently allow prescriptive determination of suicide prevention, early intervention and postvention policies or programs for Aboriginal people in NSW. This has two major implications. Firstly, an evidence-informed policy would take into account the main findings from this systematic review of the literature. Specifically, policies and
programs are most likely to be effective if they comprise multiple components, (e.g. GP and gatekeeper training, cognitive behavioural therapy and greater restrictions on access to potential means of suicide), especially evidence-based components targeting mental health disorders, alcohol abuse and a prior history of self-harm, and are tailored to specific communities (as opposed to being generic for all communities). The methodologically strongest study in this review effectively tailored alcohol restrictions to reduce suicide in Indigenous communities, demonstrating this process is possible. Second, there is an urgent need to evaluate policies or programs, especially in terms of their costs given there have been no economic evaluations. Such evaluations can be designed with researchers with relevant skills and need not be expensive if they occur simultaneously with the development and implementation of a policy or program. The Centre for Aboriginal Health at the NSW Ministry of Health is pioneering this combined implementation and evaluation approach to improve cultural competence in hospitals in NSW and to improve chronic care services delivered in Aboriginal Community Controlled Health Services.

1.6 Key recommendations

Based on the findings of this systematic review of the current evidence base, it is recommended that:

A. Suicide prevention, early intervention and postvention policies or programs for Aboriginal people in NSW reflect the need to develop and implement multiple strategies coordinated across, and tailored to, defined communities. At a minimum, a list of best-evidence strategies could be provided from which Aboriginal communities can choose those that are most feasible to implement in their community, depending on their own specific needs and circumstance

B. Given the current lack of evidence, NSW Health extends its pioneering approach of facilitating partnerships between communities/clinicians and researchers with skills and expertise in evaluation design to Aboriginal suicide prevention, early intervention and postvention programs. At least one evaluation could be designed and implemented to measure the impact and economic costs of a best-evidence community program, the results of which would improve the effectiveness of future policies and programs for reducing rates of Aboriginal suicide.
2 Introduction

Indigenous peoples of Australia, NZ, Canada and the US have rates of suicide that are two to three times higher than in their country’s general population.\textsuperscript{1–5} Suicide was the sixth leading cause of death among Aboriginal and Torres Strait Islander Australians in 2010, accounting for 4\% of all deaths.\textsuperscript{1} This compares with 1.6\% of all deaths attributable to suicide in the general Australian population.\textsuperscript{1} The actual rates of suicide among Aboriginal and Torres Strait Islander Australians are most likely higher, with evidence of underreporting of Indigenous suicides due to factors such as misclassification of Indigenous status on death certificates and differences between jurisdictions in procedures for reporting deaths, and the limitations of legal criteria for determining the cause of death.\textsuperscript{2}

The overall rates of suicide among Canadian First Nations people are at least two times that of Canada’s general population\textsuperscript{3}. In the US the rate of suicide among the American Indian population is approximately 1.5 times that of the general US population.\textsuperscript{4} In NZ, Maori and non-Maori suicide rates were similar to 1987, after which a significant increase in the Maori suicide rate was reported, particularly for young males.\textsuperscript{5,6}

Epidemiological data show variations in rates and patterns of suicide deaths across Indigenous communities.\textsuperscript{7} For example, suicide clusters – a series of suicides approximated in time and geographical place, and etiologically linked\textsuperscript{8} – have been reported in remote Aboriginal communities in Australia\textsuperscript{9,10} and on American Indian reservations.\textsuperscript{11} Suicide rates in Indigenous populations are also disproportionately higher among younger, relative to older, people\textsuperscript{7}, and among non-Indigenous people of the same age.\textsuperscript{9} For instance, in Australia, almost half of the health gap between Aboriginal and non-Aboriginal Australians due to injury is attributable to suicide in young Aboriginal males\textsuperscript{12}, and in NZ, suicide rates in Māori youth are more than double that of non-Māori youth.\textsuperscript{4}

In addition to being younger, the main risk factors for suicide are mental health disorders, stressful life events and substance abuse.\textsuperscript{13,14} All these risk factors occur at disproportionately higher rates in Indigenous populations, placing them at significantly higher risk of suicide than the general population.\textsuperscript{15,16} For instance, Indigenous peoples are more likely than the general population to use alcohol and other drugs at levels that increase their risk of mental health disorders\textsuperscript{1,6}, and their higher levels of social disadvantage increases their exposure to stressful life events, such as unemployment, homelessness, incarceration and family problems\textsuperscript{13} that, in turn, have been shown to increase risk of suicide.\textsuperscript{14} Indigenous peoples of Australia, NZ, Canada and the US are also at an increased risk of suicidal behaviour due to factors embedded in their historical experiences, including loss of land and culture, trans-generational trauma and grief, racism and social exclusion.\textsuperscript{17–22} Indigenous peoples’ continued exposure to multiple risk factors for suicide underscores their urgent need for suicide prevention interventions.

There is evidence from systematic reviews for the effectiveness of different suicide prevention interventions\textsuperscript{13,23,24} This evidence, however, largely derives from evaluations of suicide prevention interventions targeting the general population. Although there are published reviews of suicide interventions specifically targeting Indigenous populations\textsuperscript{25–28}, a systematic review of published evaluations of suicide prevention interventions targeting Indigenous populations is timely for at least two reasons. Firstly, with the exception of one review on approaches for reducing suicide among Indigenous youth\textsuperscript{28}, there have been no published evaluations of systematic reviews of suicide prevention interventions targeting the Indigenous peoples of Australia, NZ, Canada or the US. Outcomes of suicide prevention interventions targeting an Indigenous population in one of these countries may be applicable to Indigenous populations in the other countries, in so far as they have similar risk factors, such as historical experiences, levels
of socioeconomic disadvantage and burden of ill health and disease.\textsuperscript{15,16} Secondly, existing systematic reviews of suicide prevention interventions targeting Indigenous populations focus on describing the interventions, rather than examining the methodological quality of their evaluation designs.\textsuperscript{25–27} Therefore, this systematic review aims to: firstly, identify evaluations of suicide prevention interventions targeting Indigenous peoples in Australia, NZ, Canada and the US published in the scientific and grey literature; secondly, critique their methodological quality using a standardised assessment tool and describe their key characteristics; thirdly, identify the causes of suicide among Aboriginal and Torres Strait Islander Australians most frequently articulated in published descriptive studies and discussion papers; and finally, discuss the overall implications of findings for preventing suicide among Aboriginal communities in NSW, Australia.
3 Methods

3.1 Search strategy

Figure 1 summaries the databases searched, the search terms used, the exclusion criteria, and classification of included studies.

Figure 1. Flowchart of search strategy

**SEARCH 1**

**Databases searched:**
Project Cork; NDARC Library catalogue; DRUG; Indigenous Australia; Indigenous Studies Bibliography: AIATSIS; ATSIHealth; APAIS-ATSI; FAMILY-ATSI; Campbell Library; Cochrane Library; PsycINFO; PsycEXTRA; Medline; Embase; CINAHL; Global Health.

Separate searches for each database using database specific subject headings and keywords:

**Search strategy:** suicid* + (Indigenous OR Aborigin* OR Torres Strait Islander* OR Native American* OR Inuit* OR Maori) + (prevention OR intervention OR program* OR policies OR postvention)

**Years searched:** 1981–current

**Search 1 = 1221 publications (after electronic removal of duplicates)**

**SEARCH 2**

**Websites searched:**

**Australia:** Indigenous HealthInfoNet; Closing the gap clearinghouse; Life is for Everyone; Australian Institute for Suicide Research and Prevention, Griffith University; Centre for Suicide Prevention Studies, University of Queensland

**Canada:** The National Collaborating Centre for Aboriginal Health; National Aboriginal Health Organization

**NZ:** Maori Health

**US:** American Indian and Alaska Native Suicide Prevention Website; American Indian Health; Arctic Health; One Sky Center; Turtle Island Native Network

**Search strategy:** Keywords and/or the appropriate topic headings in each website: Suicid* OR Aborigin* OR Indigenous OR Native OR Inuit OR Maori

**Search 2 = 118 publications (after removal of duplicates)**

**Searches 1 and 2 = 1339 publications (journal articles, reports, book chapters and books)**

**EXCLUDED**

Published pre 1981=1
Duplicates=2
Animal study=4
Non-Indigenous related=107
Non-suicide-related=114
Non article, report, book chapter=166

**Manual search of 1339 citations/abstracts**

**945 articles categorised by type of publication**

- **Intervention n=38**
  - Descriptions of interventions n=29
  - Evaluations of interventions n=9

- **Non-intervention n=907**

- **Published 2001–2012 n=413**
  - Descriptive studies with Aboriginal Australians, 2001–2012 n=183
Consistent with methods detailed in the Cochrane Collaboration Handbook on Systematic Reviews of Health Promotion and Public Health Interventions\(^{29}\), and with previous systematic reviews\(^{30-31}\), the search strategy comprised three steps.

First, consultation with a qualified librarian identified 17 relevant electronic databases to search: Project Cork; NDARC Library catalogue; DRUG; Indigenous Australia; Indigenous Studies Bibliography; AIATSIS; ATSHealth; APAIS-ATSI; FAMILY-ATSI; Campbell Library; Cochrane Library; PsycINFO; PsycEXTRA; Medline; Embase; CINAHL; Global Health. The terms suicid* and Aborigin* OR Indigenous OR Torres Strait Islander* OR Native American* OR Inuit OR Maori were searched using keywords and MESH terms in each database. The combined searches of the 17 databases (excluding duplicates) identified 1221 references that were imported into Endnote.

Second, to maximise search coverage of the grey literature, 13 websites and clearinghouses related to Indigenous peoples of Australia, NZ, Canada and/or the US were also searched (See Figure 1, Search 2). 118 studies not identified in the electronic database search were identified.

Third, reference lists of four reviews of suicide prevention interventions targeting Indigenous peoples of Australia, United States, Canada and/or NZ\(^{25-28}\), identified by the electronic database search, were hand-searched for relevant studies not yet identified. No additional studies were identified.

In total, 1339 references were identified for classification.

### 3.2 Classification of studies

The titles and abstracts of the 1339 identified references were classified in a three-step process.

**Step 1: Identification of studies for exclusion.**

Papers were excluded if they: (a) were duplicates (n=2); (b) did not focus on suicide, or if the outcomes or predictor variables did not include or specifically relate to suicide (n=114); (c) did not focus on Indigenous people in Australia, NZ, US or Canada (n=107); (d) were not journal articles, reports or book chapters (n=166); (e) were an animal study (n=4); and (f) were published pre-1981 (n=1). Step 1 excluded 394 papers, leaving 945 references.

**Step 2: Classification of studies.**

The abstracts of remaining studies (n=945) were examined to identify studies that were: (i) Intervention evaluations, defined as those that evaluated a suicide prevention, early interventions or postvention program or policy (n=9); (ii) Intervention descriptions, defined as those that described the development, implementation and/or components of a suicide prevention, early interventions or postvention program or policy, but did not undertake an evaluation (n=29); (iii) Reviews, defined as literature reviews of suicide prevention interventions, (n=4); and Other, defined as studies that were not intervention-related or reviews (n=904). Ten percent (n=95) of studies were re-classified by an individual blinded to the results of the initial classification, to cross-check classifications performed by the first author (AC). Agreement was 83 per cent. The articles excluded in Step 1 were not cross-checked because they were not relevant to the review.

Step 2 identified 9 intervention evaluations\(^{32-41}\) (See Appendix 2), 29 intervention descriptions\(^{42-65}\) (See Appendix 3) and 4 literature reviews\(^{25-28}\) (See Appendix 1).

**Step 3: Identification of causes of suicide relating to Aboriginal and Torres Strait Islander peoples.**

Abstracts of studies classified as ‘other’ were manually searched to identify those relating to Indigenous Australians. Given the large number of studies (n=907), only the abstracts of studies published in the previous 10 years (2001–2012) were searched (n=413). 183 studies relating to
Methods

Indigenous Australians were identified. The abstracts of these 183 studies were further examined to identify causes of suicide among Indigenous Australians most commonly articulated in the descriptive-based literature.

3.3 Search of the self harm literature for intervention studies

Given the small number of evaluations of suicide prevention interventions identified \( n=9 \), the initial search of the electronic database (Page 11) was replicated replacing the term ‘suicid*’ with ‘self harm’ in an effort to identify additional intervention evaluations. This search identified 282 additional publications. A manual search of the abstracts of these publications did not identify any additional intervention evaluations.

3.4 Data extraction from intervention studies

Criteria for data extraction from studies were adapted from the Cochrane Collaboration Handbook for Systematic Reviews of Health Promotion and Public Health Interventions. The criteria, shown in Table 1, relate to the intervention/s, the sample (including eligibility, size, age range and percent male), the outcomes measured, effects and the cost calculations performed.

3.5 Methodological critique of intervention studies

Methodological quality was assessed using the Dictionary for the Effective Public Health Practice Project Quality Assessment Tool for Quantitative Studies. Sections A to F (A. selection bias; B. allocation bias; C. confounders; D. blinding; E. data collection methods; and F. withdrawal and drop-outs) were coded weak, moderate or strong, consistent with the component rating scale of the Dictionary. Descriptive information was recorded, in line with the Dictionary recommendations.

3.6 Data extraction from abstracts of descriptive studies

The causes of Indigenous suicide reported in the abstracts of descriptive studies published between 2001 and 2012, and relating to Aboriginal and Torres Strait Islander Australians, were identified and grouped into broad themes.
4 Results

Table 1 summarises the characteristics of intervention evaluations.
<table>
<thead>
<tr>
<th>1st Author Year</th>
<th>Publication type</th>
<th>Country, location</th>
<th>Main intervention type</th>
<th>Intervention component/s (number of sessions)</th>
<th>Target age, sample (n)</th>
<th>Design</th>
<th>Data collection methods</th>
<th>Outcomes</th>
<th>Effects</th>
<th>Follow-up</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>LaFromboise 1995</td>
<td>Journal article</td>
<td>US, rural New Mexico</td>
<td>Education</td>
<td>Culturally tailored school-based life skills curriculum, including manual and teacher training. (3 sessions/week x 30 weeks)</td>
<td>Native Americans 14–19 yrs (n=128); mean age=15.9 yrs; 39% male</td>
<td>Controlled pre–post study, (2 control groups)</td>
<td>- Self-report survey - Observational methods</td>
<td>Suicide vulnerability: hopelessness, depression, self-efficacy</td>
<td>Intervention v control: less hopelessness (P&lt;0.05); less suicidal (P&lt;0.07); not less depressed</td>
<td>8 months</td>
<td>NR</td>
</tr>
<tr>
<td>Berman 1999</td>
<td>Journal article</td>
<td>US, rural Alaska</td>
<td>Community prevention</td>
<td>Alcohol restrictions</td>
<td>Experimental: 29,000 Control: 21,000</td>
<td>Interrupted time series with control group</td>
<td>Alaska Bureau of Vital Statistics</td>
<td>Death rates: Accidents, suicides, homicides</td>
<td>Significant reductions (P&lt;0.05) in homicide for high-level restrictions, and in suicide for low-level restrictions 0.21 reduction in injury deaths overall</td>
<td>1–13 yrs</td>
<td>NR</td>
</tr>
<tr>
<td>Tsey 2000</td>
<td>Journal article</td>
<td>Australia, remote Qld</td>
<td>Community prevention</td>
<td>Four-stage empowerment program (1 x 4-hr session per week for 10 weeks per each stage)</td>
<td>Aboriginal community members (n=31); age range 20s–50s; median age=early 40s; 10% male</td>
<td>Pre–post, no control</td>
<td>- Self-report survey - Participant observation - Narrative interviews</td>
<td>Changes in individual and community levels of empowerment</td>
<td>NR</td>
<td>10, 20, 30, and 40 weeks</td>
<td></td>
</tr>
<tr>
<td>May 2005</td>
<td>Journal article</td>
<td>US, rural New Mexico</td>
<td>Community prevention</td>
<td>- Train youth as natural helpers - Drug and suicide education - Family outreach post-suicide - Suicide-risk screening - Community cultural events - Reorientation of mental health services</td>
<td>Native Americans 10–19 yrs; and 20–24 yrs 5 yrs into project (n=approx 800)</td>
<td>Interrupted time series, no control</td>
<td>Self-report by health professionals and police and medical records</td>
<td>Suicide attempts, gestures and completions</td>
<td>Significant reductions (P&lt;0.05) in rates of suicidal gestures and attempts. No change in suicidal completions</td>
<td>13 yrs</td>
<td>NR</td>
</tr>
<tr>
<td>Deane 2005</td>
<td>Journal article</td>
<td>Australia, regional NSW</td>
<td>Gatekeeper training</td>
<td>Suicide awareness and skills gatekeeper training (8 x 1-day workshops)</td>
<td>48 Aboriginal Australian community members, 19–55 yrs; mean age=36 yrs; 9% male</td>
<td>Pre–post, no control</td>
<td>- Self-report survey - Interviews</td>
<td>Knowledge and intentions to help suicidal individual and refer to mental health service</td>
<td>- Significant increases pre–post training in knowledge, intentions, confidence - Non-significant changes post training to 2 years’ follow-up</td>
<td>2 yrs</td>
<td>NR</td>
</tr>
<tr>
<td>1st Author</td>
<td>Publication type</td>
<td>Country, location</td>
<td>Main intervention type</td>
<td>Intervention component/s (number of sessions)</td>
<td>Target age, sample (n)</td>
<td>Design</td>
<td>Data collection methods</td>
<td>Outcomes</td>
<td>Effects</td>
<td>Follow-up</td>
<td>Cost</td>
</tr>
<tr>
<td>------------</td>
<td>------------------</td>
<td>-------------------</td>
<td>------------------------</td>
<td>----------------------------------------------</td>
<td>-----------------------</td>
<td>--------</td>
<td>------------------------</td>
<td>----------</td>
<td>---------</td>
<td>-----------</td>
<td>------</td>
</tr>
<tr>
<td>Haggarty</td>
<td>Journal article</td>
<td>Canada, rural</td>
<td>Education</td>
<td>Multi-media education (1 x 30-minute session)</td>
<td>Healthcare providers, teachers, students and elders (24)</td>
<td>Pre–post, no control</td>
<td>Self-report survey</td>
<td>Knowledge</td>
<td>Significant increases in knowledge</td>
<td>NR</td>
<td>NR</td>
</tr>
<tr>
<td>Westerman</td>
<td>Grey report</td>
<td>Australia, rural and remote WA</td>
<td>Gatekeeper training</td>
<td>Training and information workshops</td>
<td>Aboriginal youth 15–25 yrs and community members (769)</td>
<td>Pre–post, no control</td>
<td>Self-report survey</td>
<td>Knowledge, confidence, intentions</td>
<td>Medium to large improvements in knowledge and confidence</td>
<td>NR</td>
<td>NR</td>
</tr>
<tr>
<td>Muelenkamp</td>
<td>Journal article</td>
<td>US, Native American</td>
<td>Gatekeeper training</td>
<td>Gatekeeper training, education workshops, social activities, individual counselling and education seminars, student support team, social networking, spiritual ceremonies</td>
<td>Native American college students (n=90)</td>
<td>Pre–post, no control</td>
<td>Self-report survey</td>
<td>Knowledge, attitudes and skills after gatekeeper training and workshops</td>
<td>Significant improvements in problem solving ability, and marginal improvements in communication skills and knowledge</td>
<td>NR</td>
<td>NR</td>
</tr>
<tr>
<td>Allen</td>
<td>Journal article</td>
<td>US, remote Alaska</td>
<td>Community prevention</td>
<td>Community module: 26 prevention activities (7 targeting community) in 32 sessions. Additional activities: increased alcohol control, suicide crisis response team and prayer walks (32 sessions over 12 months)</td>
<td>Alaskan Indigenous youth 12–17 yrs (n=61) mean age=14 yrs; 30% male. Adults of youth?(n=47); mean age=46 yrs; 42% male Community informants (n=5)</td>
<td>Pre–post, no control</td>
<td>Self-report survey</td>
<td>Increase in community readiness and number of protective behaviours in youth and adults</td>
<td>NR</td>
<td>NR</td>
<td></td>
</tr>
</tbody>
</table>

Note. NR=Not reported. Yrs=Years.
4.1 Indigenous population and sample

Five intervention evaluations targeted Native Americans35,37,42; three targeted Aboriginal Australians33,34,36,41 and one First Nation Canadians (Inuit).32 No interventions targeted the Maori of NZ. The sample population reported by studies included both Indigenous young people and general community members36,38; young people only35,37,39; defined adult sub-populations within communities33,41; and whole communities.40 Six studies reported age of participants, as ranging in age from 10 to 55 years.33,36–39,41 Four studies reported the percentage of male participants: 9%;33 10%;41 36%;39 and 30% (youth) and 42% (adults).38

4.2 Intervention strategies

The main intervention strategies employed by the nine intervention studies included: community prevention37,38,40,41;gatekeeper training33–34; and education programs.32,39

Community prevention

Four intervention studies employed community prevention strategies targeting Indigenous groups and communities at high risk of suicide.37,38,40,41 Two studies evaluated one main strategy; one evaluated alcohol restrictions in multiple Native Alaskan communities40, and the other an empowerment program in an Aboriginal community in Australia.41 The former study was a natural experiment of the impact of Alaska’s local law option, which allows community control over the local supply of alcohol, on rates of suicide among Native Alaskans. The effects of different levels of community-initiated alcohol control on rates of suicide were examined40, with less restrictive measures more effective at reducing suicide rates than more restrictive measures. The latter study implemented an Aboriginal-specific family and wellbeing program in response to high rates of youth suicide in a remote Aboriginal community in Australia.41 The program comprised four distinct stages designed to build empowerment in targeted individuals and the broader community. Individual level changes in personal and psychological empowerment as expressed through participants’ narratives were reported.41

The other two community prevention studies employed multiple strategies to reduce risk factors of suicide and/or suicidal behaviours among Indigenous young people.37,38 One community prevention program, the ‘Adolescent Suicide Prevention Project’, was initiated by the Indian Health Service (IHS – Federal Health Program for American Indians and Native Alaskans) in response to high rates of suicides among Native American young people living in a defined rural location.37 The intervention strategies of the Project were selected following extensive community consultations with Indigenous community elders, youth, parents and individuals and groups working with young people. A key finding of community consultations was that community members’ perceptions and experiences of suicide were that it had underlying causes of alcohol abuse, violence, childhood abuse and trauma, and unemployment. The Project, therefore, included multiple intervention strategies integrated within a public health framework, including: training youth as natural helpers; drug and suicide education; family outreach post-suicide; suicide-risk screening; community social and cultural events; and the reorientation and expansion of mental health service delivery.37 The Project achieved reductions in rates of suicidal risk behaviours. The other community prevention program employing multiple strategies, the Elluam Tungiun prevention program, was developed by local community members and researchers in response to the findings of community-based suicide research undertaken with young people in the community.38 Strategies designed to develop protective behaviours and resilience were integrated into a cultural framework and delivered to youth and the broader community with the aim of preventing suicide and alcohol abuse among youth. Additional strategies implemented by the community included increased control over the sale of alcohol and regular meetings of a suicide response team.38
Gatekeeper training

Gatekeeper training involves teaching specific groups of people in the community how to identify and support individuals at high risk of suicide. Three studies evaluated the effectiveness of gatekeeper training, all of which reported that gatekeeper training programs were developed in consultation with targeted groups and communities. Two studies evaluated the effectiveness of gatekeeper training only, and one evaluated gatekeeper training complemented with additional strategies, including individual counselling, education and support, and group-based social and cultural activities. Two gatekeeper training interventions appeared to be delivered in a defined number of sessions over a short time period, while one was delivered in three stages over 18 months ‘to enable participants and their communities to develop their knowledge and skills over time’. Overall, gatekeeper training interventions resulted in significant short-term increases in participants’ knowledge and confidence in how to identify individuals at risk of suicide, and their intention to help those at risk of suicide.

Education

Two studies employed an education intervention: one to reduce suicidal behaviours and the other to improve knowledge of suicide. The education intervention targeting reductions in suicidal behaviours integrated culturally tailored life skills training (e.g. communication and problem-solving) into the high school curriculum for delivery to Native American teenagers. The program was delivered three times a week for 30 weeks. There were significant reductions in psychological risk factors for suicide among Native American teenagers receiving the intervention versus those that did not.

The education intervention targeting improvements in knowledge of suicide was delivered as a one-off 30-minute intervention to interested community members via interactive self-learning multi-media technology. Modest improvements in participants’ knowledge of suicide risk factors were reported.

Education and training were prominent intervention strategies, with seven of the nine intervention studies (three gatekeeper training, two education and two community prevention interventions) using these approaches. Six of these studies reported developing a new education resource; or adapting an existing education resource package for delivery. Two also reported training intervention deliverers. Three reported the number of intervention sessions delivered over a time period: 8 weeks; 40 weeks; and 90 weeks respectively. The main components of multi-component community prevention interventions were education workshops, social and cultural activities and/or mental health service delivery.

4.3 Data collection methods and outcomes

Seven studies used self-report measures only; three used self-complete surveys only; two used self-complete surveys and interviews; one self-complete survey and observation; and one self-complete surveys, interviews, and observation. Two studies used routinely collected data, one of which complemented this with self-report interviews. Only two studies measured suicide-specific outcomes, including suicide attempts, gestures and completions. Four studies measured changes in knowledge, confidence and/or intentions to identify and assist individuals at risk of suicide. One study measured psychological risk factors for suicide, including depression, vulnerability and feelings of hopelessness. One study reported targeting the whole community but only measured individual level outcomes, while another reported positive changes among intervention participants but did not indicate measures used.
4.4 Methodological adequacy

Table 2 summarises the methodological adequacy of the nine studies.
<table>
<thead>
<tr>
<th>1st Author</th>
<th>Selection bias (A)</th>
<th>Allocation bias (B)</th>
<th>Con-founders (C)</th>
<th>Blinding (D)</th>
<th>Data collection methods (E)</th>
<th>Withdrawal &amp; dropouts (F)</th>
<th>Analysis (G)</th>
<th>Intervention integrity (H)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LaFromboise 1995</td>
<td>Weak</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Citation for formula used in the analysis</td>
<td>No consent rate reported, 76% follow-up rate</td>
</tr>
<tr>
<td>Berman 1999</td>
<td>Strong</td>
<td>Strong</td>
<td>Strong</td>
<td>N/A</td>
<td>Strong</td>
<td>N/A</td>
<td>Citations to justify analysis but no citations for analysis method</td>
<td>Communities level of exposure to alcohol control reported and considered in analysis</td>
</tr>
<tr>
<td>Tsey 2000</td>
<td>Weak</td>
<td>Weak</td>
<td>Weak</td>
<td>N/A</td>
<td>Weak</td>
<td>Moderate</td>
<td>Citation to justify theory but not analysis</td>
<td>Consents rate reported and follow-rate only partially reported</td>
</tr>
<tr>
<td>May 2005</td>
<td>Moderate</td>
<td>Weak</td>
<td>Weak</td>
<td>N/A</td>
<td>Strong</td>
<td>N/A</td>
<td>No citation for formula used in the analysis</td>
<td>Number and type of prevention activities recorded but reported elsewhere</td>
</tr>
<tr>
<td>Deane 2006</td>
<td>Moderate</td>
<td>Weak</td>
<td>Weak</td>
<td>N/A</td>
<td>Moderate</td>
<td>Strong</td>
<td>Citations to justify analysis but no citations for analysis method</td>
<td>93% consent rate and 91% and 100% follow-up reported</td>
</tr>
<tr>
<td>Haggarty 2000</td>
<td>Weak</td>
<td>Weak</td>
<td>Weak</td>
<td>N/A</td>
<td>Weak</td>
<td>Moderate</td>
<td>No citation for analysis method</td>
<td></td>
</tr>
<tr>
<td>Westerman 2007</td>
<td>Weak</td>
<td>Weak</td>
<td>Weak</td>
<td>N/A</td>
<td>Moderate</td>
<td>Moderate</td>
<td>No description of analysis or citation</td>
<td>Consent rate not reported and 77% follow-up</td>
</tr>
<tr>
<td>Muelenkamp 2009</td>
<td>Weak</td>
<td>Weak</td>
<td>Weak</td>
<td>N/A</td>
<td>Moderate</td>
<td>Weak</td>
<td>No citation for analysis method</td>
<td>No consent rate reported and follow-rate difficult to determine</td>
</tr>
<tr>
<td>Allen 2009</td>
<td>Moderate</td>
<td>Weak</td>
<td>Strong</td>
<td>N/A</td>
<td>Moderate</td>
<td>Strong</td>
<td>Citation for formula used in the analysis</td>
<td>Intervention toolkit for tailoring to local needs</td>
</tr>
</tbody>
</table>

4.5 Methodological adequacy

Seven studies used a pre-post study design\textsuperscript{32,33,35–36,38,39,41}; six did not employ a control group\textsuperscript{32,33,35–36,38,41}, making it difficult to attribute outcomes reported to the intervention. Two studies employed a time series design, one with\textsuperscript{40} and the other without a control group.\textsuperscript{37} No study employed randomisation, increasing the risk of selection bias. Seven of the nine studies reported using previously tested measures and provided a citation to justify its selection\textsuperscript{33–39,40}, but no study reported the validity and reliability of measures used. Of the six studies in which it was appropriate to report consent rates, four did not\textsuperscript{35,36,39,41} and two reported consent rates of 93\%\textsuperscript{33} and 61\%\textsuperscript{38} respectively. Follow-up rates were fully reported by two of the six relevant studies and ranged from 76 per cent\textsuperscript{39} to 100 per cent.\textsuperscript{38}

Six studies reported tailoring the intervention prior to its implementation to improve its acceptability to Indigenous peoples. Methods of tailoring included Indigenous community input and/or feedback\textsuperscript{33–39,41}, piloting intervention materials\textsuperscript{36,38,39}, integration of Indigenous culture into intervention content\textsuperscript{33,36,38,39,41} and researching suicide in the target population.\textsuperscript{36} The intervention study evaluating the impact of alcohol restrictions on suicide reported that the restrictions were community initiated.\textsuperscript{40}

Methods to optimise consistency in intervention delivery were described in four studies and included training intervention deliverers\textsuperscript{39}, intervention manuals or packages\textsuperscript{33,36,38,39,41} and/or self-report or observation.\textsuperscript{39,41} One intervention was developed by an Indigenous-specific psychological service\textsuperscript{36} and another by survivors of the stolen generation in Australia.\textsuperscript{41}

Seven studies recorded participant attendance at intervention activities to measure their level of exposure to the intervention\textsuperscript{32,36–39,41}, one of which also reviewed participant’s clinical records.\textsuperscript{37} The study evaluating the impact of alcohol restrictions measured the level of, and period of exposure to, restrictions in each intervention community.\textsuperscript{40}

4.6 Effectiveness of interventions

Due to the methodological deficiencies of included studies, and the variability in outcomes reported, effect sizes could not be combined in a meta-analysis and summarised for comparison.

4.7 Likely causes of suicide articulated in the descriptive literature

Examination of the abstracts of descriptive studies targeting Aboriginal and Torres Strait Islander Australians and published from 2001–2012, identified several commonly reported risk factors for suicide. The common risk-factors for suicide reported in the abstracts of data based, analytical descriptive studies (e.g. epidemiological studies) specific to Aboriginal and Torres Strait Islander populations were mental illness, alcohol abuse and a prior history of self-harm. Other risk factors for suicide in the Aboriginal and Torres Strait Islander population reported in the abstracts of non-data-based studies (e.g. discussion and commentary) included low levels of access to mental health services, low levels of help seeking behaviours, imprisonment, social powerlessness and high levels of exposure to trauma and violence.
5 Discussion

This systematic review of published evaluations of suicide prevention interventions targeting Indigenous peoples of Australia, Canada, the US and NZ identified four community prevention interventions, three gatekeeper training interventions and two education interventions. Community prevention interventions typically employed multiple strategies and two of the three gatekeeper training interventions complemented training with additional strategies. Interventions primarily targeted suicide in Indigenous young people and were developed and/or tailored in collaboration with Indigenous community members to optimise acceptability and feasibility of their delivery.

5.1 Methodological adequacy of intervention evaluations

The methodological adequacy of included intervention studies varied considerably and none had consistently strong methodology across the majority of criteria. Weak ratings were commonly recorded for selection bias, allocation bias and confounding. Data collection methods were generally moderate to strong, with five studies using measures with some published evidence of their reliability and/or validity. The reporting of consent and dropout rates varied, with only three of five studies reporting the former and two of five the latter. Statistical analysis used was rarely supported by a citation of source. Interventions were tailored to optimise their acceptability, manuals developed to standardise their delivery and five studies made efforts to measure participants’ levels of intervention exposure. Overall, interventions targeting whole communities were generally consistently methodologically stronger than those targeting individuals.

5.2 Strengths and limitations of intervention evaluations

Five of the nine intervention evaluations were conducted in the US, three in Australia, one in Canada and none in NZ. Although outcomes of suicide prevention interventions targeting an Indigenous population in one of these countries can provide valuable evidence and lessons applicable to Indigenous populations in the other countries, as has been previously suggested, between country differences in Indigenous peoples’ rates and patterns of suicide, population distribution, and systems of healthcare warrant that more rigorous evaluations of suicide prevention interventions targeting Indigenous populations other than in the US are required.

Six of the nine interventions were implemented to address suicide in Indigenous young people. This finding is encouraging as it indicates that suicide-related interventions implemented in Indigenous communities are targeting high-risk groups. Less encouraging was the finding that only one intervention study targeting Indigenous young people measured the impact of an intervention on suicide-specific outcomes (i.e. suicide gestures, attempts and suicide). While the remaining five studies reported reductions in feelings of hopelessness and depression and improvements in problem-solving and coping with stress among Indigenous young people, the impact of these changes on suicidal behaviour was not evaluated.

Intervention strategies were generally evidence-based, although the number and combination of intervention strategies employed were less than optimal. For example, three interventions...
employed gatekeeper training\textsuperscript{33,35,36}, but only one of these targeted healthcare professionals and employed additional strategies.\textsuperscript{35} A systematic review of gatekeeper training found it is more likely to be effective for preventing suicide and suicidal behaviour when implemented as a component of a multi-faceted intervention and delivered by healthcare professionals.\textsuperscript{24} Two studies employed school-based strategies aimed at Indigenous young people.\textsuperscript{35,39} Although school-based programs offer great potential to reach large numbers of young people\textsuperscript{30} and have been shown to increase knowledge and improve attitudes to mental illness, there is no evidence they reduce suicidal behaviour in the absence of other strategies.\textsuperscript{13} Additionally, it is highly questionable whether or not school-based programs are likely to reach Indigenous young people most at risk of suicide, given evidence that high-risk young people typically attend school irregularly or not at all.\textsuperscript{9,28}

No study considered costs. Economic analysis of the cost-effectiveness of suicide prevention interventions is important for costing and valuing reductions in suicide, as well as providing a benchmark to evaluate potential savings associated with individuals and communities.\textsuperscript{66} Although the economic costs of suicide in Indigenous populations has not been measured, the profound negative impact of suicide on the social and emotional wellbeing and psychological functioning of affected Indigenous individuals, families and communities\textsuperscript{5,7,14} strongly suggests they are likely to be high and accumulate over a lifetime.

### 5.3 Potential limitations of the review

Although a rigorous and thorough search strategy was used, there is a possibility that the review did not locate all relevant studies. Relevant intervention evaluations may have been misclassified, however, a high level of agreement between blinded coders suggests not. Additionally, a separate database search, replacing the key word ‘suicide\textsuperscript{*}’ with ‘self harm’ did not yield any additional studies relevant to the review. Finally, since evaluations with statistically significant findings are more likely to be published, it is possible that the published evaluations reviewed over-estimate the true intervention effectiveness.\textsuperscript{67}
6 Key findings, implications and key recommendations

6.1 Key findings

In summary, there are four key findings of this review. Firstly, there is a lack of evidence from published studies on the most effective intervention strategies for preventing suicide in Indigenous populations, but community prevention programs currently have the most evidence for reducing actual rates of suicide or suicide behaviours among Indigenous populations (two out of four community prevention evaluations showed a significant effect). Secondly, tailoring suicide prevention intervention strategies, in collaboration with targeted Indigenous communities, to address the needs and preferences of high-risk Indigenous groups (e.g. young people) is likely to be crucial for optimising acceptability and feasibility of program delivery. Thirdly, the most common risk factors for suicide reported in the epidemiological studies specific to Aboriginal and Torres Strait Islander populations were mental illness, alcohol abuse and a prior history of self-harm. Other risk factors for suicide in the Aboriginal and Torres Strait Islander population reported in the abstracts of non-epidemiological-based studies included low levels of access to mental health services, low levels of help-seeking behaviours, imprisonment, social powerlessness and high levels of exposure to trauma and violence. Fourthly, evidence from reviews (see Appendix 1 and references 13, 23 and 24) of community suicide prevention programs show that multifaceted approaches combining one or more individual strategies, tailored to specific communities, and targeting common risk factors for suicide (mental health disorders, alcohol abuse and a prior history of self-harm), offer considerable promise for reducing rates of suicide and suicidal behaviour. Promising individual strategies that can be combined into a coherent community prevention program, as opposed to being independently implemented, include:

- Training general practitioners (GPs) to recognise and treat suicidal behaviour
- Improving access to timely and appropriate mental health care for at-risk individuals (e.g. those with a history of self-harm) and groups (e.g. young people)
- Teaching specific groups of people in the community how to identify individuals at high risk of suicide and refer them for treatment (gatekeeper training)
- Cognitive behavioural approaches to assist individuals displaying suicidal behaviours (e.g. feelings of hopelessness and depression), and/or engaging in high-risk behaviours for suicide (e.g. alcohol abuse), to make changes in their lives to reduce their risk of suicide
- Restricting access to means of suicide among high-risk groups and individuals.

6.2 Implications

There is currently insufficient evidence from published evaluations of suicide prevention interventions targeting Indigenous peoples to confidently allow prescriptive determination of suicide prevention, early intervention and postvention policies or programs for Aboriginal people in NSW. This has two major implications. Firstly, an evidence-informed policy would take into account the main findings from this systematic review of the literature. Specifically, policies and programs are most likely to be effective if they comprise multiple components (e.g. GP and gatekeeper training, cognitive behavioural therapy and greater restrictions on access to potential means of suicide), especially evidence-based components targeting mental health disorders, alcohol abuse and a prior history of self-harm, and are tailored to specific communities.
Key findings, implications and key recommendations

(as opposed to being generic for all communities). The methodologically strongest study in this review effectively tailored alcohol restrictions to reduce suicide in Indigenous communities, demonstrating this process is possible. Second, there is an urgent need to evaluate policies or programs, especially in terms of their costs given there have been no economic evaluations. Such evaluations can be designed with researchers with relevant skills and need not be expensive if they occur simultaneously with the development and implementation of a policy or program. The Centre for Aboriginal Health at the NSW Ministry of Health is pioneering this combined implementation and evaluation approach to improve cultural competence in hospitals in NSW and to improve chronic care services delivered in Aboriginal Community Controlled Health Services.

6.3 Key recommendations

Based on the findings of this systematic review of the current evidence base, it is recommended that:

A. Suicide prevention, early intervention and postvention policies or programs for Aboriginal people in NSW reflect the need to develop and implement multiple strategies coordinated across, and tailored to, defined communities. At a minimum, a list of best-evidence strategies could be provided from which Aboriginal communities can choose those that are most feasible to implement in their community, depending on their own specific needs and circumstances.

B. Given the current lack of evidence, NSW Health extends its pioneering approach of facilitating partnerships between communities/clinicians and researchers with skills and expertise in evaluation design to Aboriginal suicide prevention, early intervention and postvention programs. At least one evaluation could be designed and implemented to measure the impact and economic costs of a best-evidence community program, the results of which would improve the effectiveness of future policies and programs for reducing rates of Aboriginal suicide.
7 Conclusions

The urgent need to reduce the disproportionately high rates of suicide in Indigenous peoples of Australia, NZ, Canada and the US has been widely acknowledged. In order for this to occur, an increase in the number of evaluations of preventive interventions targeting reductions in Indigenous suicide using methodologically rigorous study designs across geographically and culturally diverse Indigenous population groups is required. While evaluations of suicide prevention interventions in discrete Indigenous communities using non-experimental designs may be easier and cheaper to implement, they are unlikely to provide strong evidence applicable to other Indigenous populations. Without this evidence there is a greater likelihood that ineffective interventions will be implemented to prevent suicide in Indigenous peoples of Australia, NZ, Canada and the US, reducing the likelihood of achieving reductions in rates of suicide in these populations. There is an opportunity in NSW to work with real world, complex intervention research specialists to design, and simultaneously implement and evaluate, suicide prevention, early intervention and postvention suicide policies or programs which would both improve outcomes for Aboriginal Australians and significantly strengthen the currently weak evidence base, identifying cost-effective strategies for other Indigenous communities in Australia and internationally to replicate.
References


References


47. EchoHawk M. Suicide prevention efforts in one area of Indian Health Service, USA. Arch Suicide Res 2006;10(2):169–176.


## Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Allocation bias</strong></td>
<td>Differences in the process of allocating participants to the intervention or control group</td>
</tr>
<tr>
<td><strong>Attrition</strong></td>
<td>Loss of participants during the course of a study</td>
</tr>
<tr>
<td><strong>Attrition bias</strong></td>
<td>Withdrawals or exclusions of people entered into a study</td>
</tr>
<tr>
<td><strong>Bias</strong></td>
<td>A systematic error or deviation in results or inferences from the truth</td>
</tr>
<tr>
<td><strong>Blinding</strong></td>
<td>The process of preventing those involved in a controlled trial from knowing individual participants’ group allocation</td>
</tr>
<tr>
<td><strong>Causal effect</strong></td>
<td>The association between two characteristics that is demonstrated when a change in one characteristic causes a change in another</td>
</tr>
<tr>
<td><strong>CDSR</strong></td>
<td>Cochrane Database of Systematic Reviews — a database in The Cochrane Library that combines Cochrane Reviews and Protocols for Cochrane Reviews</td>
</tr>
<tr>
<td><strong>Contamination</strong></td>
<td>Unintentional exposure of an intervention being evaluated to people in the control group, and/or failure to expose people in the intervention group to an intervention</td>
</tr>
<tr>
<td><strong>Context</strong></td>
<td>The conditions and circumstances under which an intervention was provided</td>
</tr>
<tr>
<td><strong>Confounder</strong></td>
<td>A factor that is associated with both an intervention and the outcome of interest. Randomisation is used to minimise confounding variables between experimental and control groups. Confounding is a major issue in non-randomised studies</td>
</tr>
<tr>
<td><strong>Consent rate</strong></td>
<td>The number of study participants divided by the number of potential study participants</td>
</tr>
<tr>
<td><strong>Controlled pre–post-study</strong></td>
<td>A non-randomised study design where a control group of similar characteristics as the intervention group is identified. Data are collected before and after the intervention in both the control and intervention groups</td>
</tr>
<tr>
<td><strong>Control group [In a controlled trial]</strong></td>
<td>The group that acts as a comparison for an alternative group receiving an intervention (i.e. experimental group)</td>
</tr>
<tr>
<td><strong>Cost-effectiveness</strong></td>
<td>An economic analysis that measures effects in terms of costs for some additional health gain (e.g. cost per each suicide prevented)</td>
</tr>
<tr>
<td><strong>Critical appraisal</strong></td>
<td>The process of assessing and interpreting evidence by systematically considering its validity, results and relevance</td>
</tr>
<tr>
<td><strong>Descriptive study</strong></td>
<td>A study that describes characteristics of a sample of individuals. Unlike an experimental study, the investigators do not actively intervene to test a hypothesis, but merely describe the health status or characteristics of a sample from a defined population</td>
</tr>
<tr>
<td><strong>Dropouts</strong></td>
<td>Participants lost during the course of a study</td>
</tr>
<tr>
<td><strong>Economic analysis</strong></td>
<td>Analyses of the relationship between costs and outcomes of alternative healthcare interventions</td>
</tr>
<tr>
<td><strong>Effects</strong></td>
<td>Changes resulting from an intervention</td>
</tr>
<tr>
<td><strong>Effectiveness</strong></td>
<td>The degree to which an intervention works as intended under normal conditions</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Efficacy</td>
<td>The degree to which an intervention produces a beneficial result under ideal conditions</td>
</tr>
<tr>
<td>Embase</td>
<td>Excerpta Medica database — a major European database of medical and health research</td>
</tr>
<tr>
<td>Epidemiology</td>
<td>The study of the health of populations and communities as opposed to specific individuals</td>
</tr>
<tr>
<td>Follow-up</td>
<td>The observation over a period of time of study/trial participants to measure outcomes under investigation</td>
</tr>
<tr>
<td>Grey literature</td>
<td>Research reports that are not published in peer-reviewed journals. For example, government and community reports</td>
</tr>
<tr>
<td>Intention to treat analysis</td>
<td>Participants are included in the group to which they were allocated for analysis, regardless of whether or not they received (or completed) the intervention given to that group</td>
</tr>
<tr>
<td>Inter-rater reliability</td>
<td>The level of agreement between independent raters under identical conditions</td>
</tr>
<tr>
<td>Interrupted time series</td>
<td>A study design that collects data at multiple time points before and after an intervention (interruption)</td>
</tr>
<tr>
<td>Intervention</td>
<td>The process of intervening on people, groups, entities or objects in an experimental study</td>
</tr>
<tr>
<td>Intervention exposure</td>
<td>The frequency and type of participant contact with an intervention and its components</td>
</tr>
<tr>
<td>Intervention group</td>
<td>A group of participants in a study receiving an intervention</td>
</tr>
<tr>
<td>Intervention integrity</td>
<td>The extent to which an intervention was implemented and delivered in the manner it was intended to be</td>
</tr>
<tr>
<td>Key words</td>
<td>A string of words attached to an article that are used to index or code the article in a database</td>
</tr>
<tr>
<td>MEDLINE</td>
<td>An electronic database produced by the United States National Library of Medicine that indexes millions of articles in selected journals</td>
</tr>
<tr>
<td>MeSH headings</td>
<td>Medical Subject Headings—terms used by the United States National Library of Medicine to index articles in Index Medicus and MEDLINE</td>
</tr>
<tr>
<td>Meta-analysis</td>
<td>The use of statistical techniques in a systematic review to synthesise the results of included studies</td>
</tr>
<tr>
<td>Methodological quality</td>
<td>The quality of a study design and rigour of its implementation</td>
</tr>
<tr>
<td>Outcome measure</td>
<td>A variable used to assess the effectiveness of an intervention (see also primary outcome, secondary outcome)</td>
</tr>
<tr>
<td>Peer review</td>
<td>A refereeing process for assessing the quality of reports of research and selecting research reports for publication</td>
</tr>
<tr>
<td>Pre–post-study</td>
<td>A non-randomised study design with no control group. Data are collected before and after only in a group receiving an intervention</td>
</tr>
<tr>
<td>Primary outcome</td>
<td>The outcome considered to be most important</td>
</tr>
<tr>
<td>Publication bias</td>
<td>Publication of only a subset of all relevant studies. For example, studies in which an intervention is not found to be effective are sometimes not published</td>
</tr>
<tr>
<td>Random allocation</td>
<td>A method that uses chance to assign participants to comparison groups in a trial</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Randomisation</td>
<td>The process of randomly allocating participants into one of the groups in a controlled trial</td>
</tr>
<tr>
<td>Randomised controlled trial (RCT)</td>
<td>An experiment in which two or more interventions, possibly including a control intervention or no intervention, are compared by being randomly allocated to participants</td>
</tr>
<tr>
<td>Reliability</td>
<td>The degree to which results obtained by a measurement procedure can be replicated</td>
</tr>
<tr>
<td>Search strategy</td>
<td>The methods used to identify publications within the scope of a systematic review</td>
</tr>
<tr>
<td>Secondary outcome</td>
<td>An outcome deemed less important than primary outcomes that is used to evaluate the effects of an intervention</td>
</tr>
<tr>
<td>Selection bias</td>
<td>Systematic differences in the characteristics of participants who are selected for study and those who are not</td>
</tr>
<tr>
<td>Self-report</td>
<td>A type of questionnaire, survey, or interview in which respondents select a response or provide an answer without researcher interference</td>
</tr>
<tr>
<td>Statistically significant</td>
<td>A result that is unlikely to have happened by chance</td>
</tr>
<tr>
<td>Study design</td>
<td>The procedure under which a study is carried out</td>
</tr>
<tr>
<td>Systematic review</td>
<td>A review of published studies that uses systematic and explicit methods to identify, select, and critically appraise relevant studies, and to collect and analyse data from studies to answer a question/s</td>
</tr>
<tr>
<td>Treatment</td>
<td>Intervening with individuals to enhance their health and wellbeing</td>
</tr>
<tr>
<td>Withdrawal</td>
<td>Participants who drop out of a study</td>
</tr>
</tbody>
</table>