

# Systematic review to inform prevention and management of chronic disease for Indigenous Australians: overview and priorities

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In 2008, the Council of Australian Governments (COAG) committed to addressing the health disparity between Aboriginal and Torres Strait Islander peoples (hereafter Indigenous Australians) and non-Indigenous Australians by adopting the *Closing the Gap* policy initiative.<sup>1</sup> Targets were set for a range of health and wellbeing indicators including life expectancy and child mortality.<sup>2</sup> While funding for specific government monitoring of *Closing the Gap* has been withdrawn, there has been some government investment in monitoring and evaluating programs targeting improvements in these indicators. The data show progress in reducing Indigenous child mortality and early improvements in rates of immunisation. However, they show little improvement in achieving equitable health outcomes, and wide disparities remain.<sup>2</sup> For example, the life expectancy gap between Indigenous and non-Indigenous Australians is estimated to be 10.6 years for males and 9.5 years for females.<sup>2</sup> This raises the concern that current *Closing the Gap* initiatives will be insufficient to achieve the equity targets.<sup>3</sup> Chronic diseases underpin about 70% of the Indigenous/non-Indigenous life expectancy gap.<sup>4,5</sup> They share a number of common underlying lifestyle risk factors – notably poor nutrition – and factors such as physical inactivity, alcohol misuse and tobacco smoking, and are influenced by the social determinants of health.<sup>4,5</sup> The main diseases responsible are diabetes, chronic kidney disease, cardiovascular disease and respiratory disease.<sup>4</sup> The risk factors for chronic disease are disproportionately higher among Indigenous Australians,

## Abstract

**Objective:** To describe the main characteristics of systematic reviews addressing questions of chronic disease and related risk factors for Indigenous Australians.

**Methods:** We searched databases for systematic reviews meeting inclusion criteria. Two reviewers assessed quality and extracted characteristics using pre-defined tools.

**Results:** We identified 14 systematic reviews. Seven synthesised evidence about health intervention effectiveness; four addressed chronic disease or risk factor prevalence; and six conducted critical appraisal as per current best practice. Only three reported steps to align the review with standards for ethical research with Indigenous Australians and/or capture Indigenous-specific knowledge. Most called for more high-quality research.

**Conclusion:** Systematic review is an under-utilised method for gathering evidence to inform chronic disease prevention and management for Indigenous Australians. Relevance of future systematic reviews could be improved by: 1) aligning questions with community priorities as well as decision maker needs; 2) involvement of, and leadership by, Indigenous researchers with relevant cultural and contextual knowledge; iii) use of critical appraisal tools that include traditional risk of bias assessment criteria and criteria that reflect Indigenous standards of appropriate research.

**Implications:** Systematic review method guidance, tools and reporting standards are required to ensure alignment with ethical obligations and promote rigor and relevance.

**Key words:** systematic review, Indigenous Australian health, chronic disease

who are more likely to have multiple risk factors with cumulative adverse effects.<sup>2</sup> Providing decision makers working in policy formulation and health services with the best available evidence about opportunities to prevent, and enhance treatment and management of, chronic disease for Indigenous Australians is important to promote health equality. Systematic review is widely recognised by clinicians and government policy decision makers as a key step to guide them towards best practice healthcare.<sup>6</sup> Initially, systematic reviews were limited to synthesis of evidence from randomised controlled

trials (RCTs) addressing questions about health treatment efficacy.<sup>6</sup> However, the methodology has evolved; reviewers now have access to best practice guidance for systematic review of evidence from diverse study designs and even expert opinion, to inform decisions about health treatment and policy.<sup>7-9</sup> The empirical and theoretical literature on knowledge translation in health highlights the importance of reviewers and users – including clinicians, health managers and policy makers – working together to define review objectives and evidence implementation activities to ensure reviews are useful.<sup>10,11</sup>

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The ethical conduct of primary research with Indigenous Australians has received much attention as reflected by various national<sup>12</sup> and local<sup>13,14</sup> guidelines. Practical guides and principle statements<sup>15</sup> have been developed to raise understanding among primary researchers about the ethical obligations that the national and local guidelines/standards impose on them, and to ensure they abide by them.<sup>16</sup> Conversely, there is little literature on how to conduct ethically appropriate rigorous systematic review research, and no guidelines, principles or reporting standards to support best practice systematic review of evidence gathered with Indigenous Australians.

In 2009, the public health group within Cochrane conducted a project<sup>17</sup> that sought to identify gaps in the international evidence relevant to public health decision making to address health inequalities experienced by Indigenous people, and to identify priority areas and topics for future reviews. A number of participating Indigenous researchers and clinicians expressed reservations about the appropriateness and value of conventional systematic reviews of intervention evidence to Indigenous health.<sup>17</sup> One participant expressed the view that improving the quality of Indigenous health intervention research was a greater priority than conducting systematic reviews. Some taskforce members cautioned that prioritising topics for systematic reviews according to criteria such as burden of disease was problematic in that it was too “biomedical” in its approach and would downplay the important role of the social determinants of health in leading to poor health and social outcomes.<sup>17</sup>

Ensuring that systematic review methods for Indigenous health research meet the needs of those that use them, including Indigenous communities themselves, emerged from this project as a key area for future research.<sup>17</sup>

Applying the rigorous processes used to identify and appraise evidence in systematic review, in this overview, we locate and describe the main characteristics of existing, systematic reviews addressing questions about chronic diseases and their risk factors, prevalence and management within the Indigenous Australian population. The intent is to assist in building a program of systematic review research that synthesises evidence the right way and generates valid, relevant findings that help improve chronic disease and other health outcomes for Indigenous Australians.

## Methods

### Inclusion criteria

#### Population

- Indigenous Australians (systematic reviews whose study participants were Indigenous people from Australia, United States, Canada and New Zealand if they reported results separately for Indigenous Australians).

#### Chronic diseases

- Cardiovascular disease (including ischemic heart disease and stroke); chronic kidney (renal) disease; chronic liver disease (including alcoholic liver disease); chronic respiratory disease (including COPD and asthma); type 2 diabetes mellitus; depression; and cancers related to smoking, alcohol and poor nutrition (lung, larynx, oropharynx, bladder, mouth, lip, tongue, nose, nasal, sinus, cervix, ureter, bone marrow, pancreas, stomach, bowel, breast, endometrium, kidney, oesophagus, colon, liver, pharynx).

#### Risk factors

- The main lifestyle risk factors for chronic disease: tobacco smoking, excessive alcohol consumption, physical inactivity and poor diet (nutrition).

#### Systematic review

- Clearly stated review objective(s)/ question(s) addressing prevalence, prevention, treatment and/or management of one or more of the chronic diseases or risk factors considered.
- Clearly defined inclusion criteria.
- Reported search strategy.
- Presentation of synthesised findings for the stated review question(s) including but not limited to narrative and tabular synthesis.

Scoping reviews and systematic reviews of reviews were not considered for inclusion.

### Search and study selection

We searched the following sources for studies published in English between 1990 and 31 December 2013: Cochrane Library (including the Cochrane Database of Systematic Reviews, Database of Abstracts of Reviews of Effects, and Health Technology Assessments); JBI Library of Systematic Reviews and Implementation Reports; Aboriginal and Torres Strait Islander Health Bibliography (Informit); Scopus; Pubmed; CINAHL; and Embase. The start date limitation was applied as initial database searches and discussions with experts established that it is unlikely any systematic reviews in this field would have been published before 1990. Databases were searched separately using specific search strings. Additionally, we used generic

search terms to search Google Scholar, The Lowitja Institute’s website and Indigenous HealthInfoNet to identify relevant grey literature. The searches for each database are available from the authors.

The PubMed search strategy was:

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((australia[mh] OR australia*[tiab] OR .au[ad] OR australia*[ad] OR northern territory[tiab] OR northern territory[ad] OR tasmania[tiab] OR Tasmania*[ad] OR new south wales[tiab] OR new south wales[ad] OR Victoria*[tiab] OR victoria[ad] OR queensland[tiab] OR queensland[ad]) AND (oceanic ancestry group[mh] OR aborigin*[tiab] OR indigenous[tiab] OR health services, indigenous[mh] OR (torres strait*[tiab] AND islander*[tiab]) OR koori[tiab] OR tiwi[tiab]) AND systematic[sb] AND “1990/01/01”[PDat]:“2013/12/31”[PDat]).
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We imported the database search results into Endnote (Thomson Reuters) where duplicate records were removed. Two reviewers (JSG, KC) screened titles and abstracts of records independently to identify studies matching the inclusion criteria. The same reviewers retrieved full text of potentially relevant studies and assessed them against the inclusion criteria. Disagreements were resolved through discussion or by consulting a third reviewer (EA). No statistical test of inter-rater reliability of reviewers was conducted.

### Assessment of methodological quality

In the absence of a tool designed specifically to appraise systematic reviews and other syntheses of research involving Indigenous Australians, we used a modified version of the Joanna Briggs Institute Critical Appraisal Checklist for Systematic Reviews and Research Synthesis.<sup>18</sup> Two reviewers independently assessed each review (JSG, KC). Disagreements were resolved through discussion. Reviews were classified as high (compliance with all 11 quality items in the appraisal tool), good (7–10 items) or moderate (6 or less) quality.

### Data extraction and analysis

Two reviewers (JSG, KC) extracted data using a predefined data extraction tool developed specifically for this review and designed to extract data on key characteristics of systematic reviews. Each reviewer crosschecked data extraction for 20% of the studies (randomly selected) for completeness and accuracy. The data extracted included: 1) objective(s); 2) date limitations of the search; 3) demographic details of population;

4) type of evidence included and synthesis method; 5) main findings for questions addressed; and 6) steps (if any) taken in the systematic review process to capture knowledge that may be unique to Indigenous Australians and/or to ensure alignment with the Indigenous Australian view of ethical research design and conduct.

## Results

### Study selection

We identified a total of 3,568 records from the databases searched (Figure 1). From these, 1,626 duplicates were removed, leaving 1,942 citations for screening of title and abstracts against the eligibility criteria for the review. Initially, we retrieved and selected 38 studies for full text examination. We found an additional two records for full text examination from the search of grey literature sources and one via a peer reviewer of this overview. Of these 41 records, 25 did not meet the eligibility criteria and two could not be retrieved, leaving 14 included systematic reviews. A list of the records excluded at full text examination with reasons (Supplementary File 1) is available with the online version of this article.

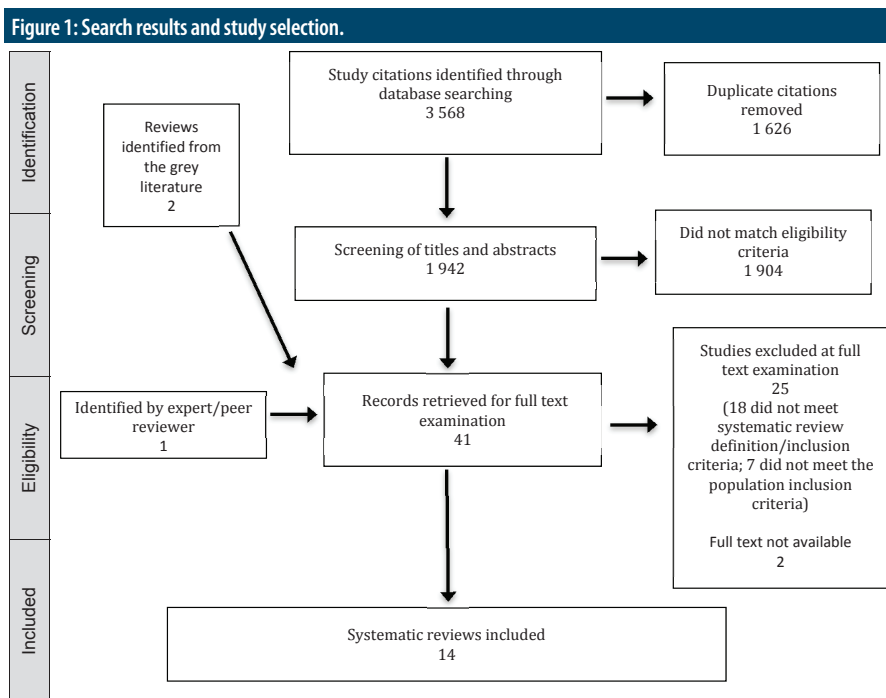
### Methodological quality

All of the included reviews<sup>19-32</sup> met four of the 11 quality criteria in the checklist (1-4 of the criteria in Table 1), as the systematic review inclusion criteria required that they be met. We rated three of the included

reviews as high quality (11/11)<sup>25,26,30</sup> and one as moderate quality<sup>23</sup> (6/11), see Table 1. The majority of the included systematic reviews<sup>19-22,24,27-29,31,32</sup> met eight or nine of the 11 quality items (classified as good quality).

The assessment identified three methodological weaknesses or potential sources of bias in the reviews when considered together. The first was failure to conduct critical appraisal of included studies (5/14)<sup>20,23,24,27,32</sup> or failure to conduct it as per best practice standards (6/14),<sup>19,20,23,24,27,30</sup> which involves two reviewers working

independently, with introduction of a third party in the event of disagreement. The second was narrow coverage of sources in the search, which introduces risk of publication bias. In this regard, 4/14 reviews<sup>21,23,29,31</sup> did not include a search for grey literature or include one or more database(s) specialising in indexing studies conducted with Indigenous Australians. Much of the published evidence regarding Indigenous Australian health – and, in particular, evaluations of interventions – is published as grey literature.<sup>22,33</sup> The third weakness was data extraction by only one



**Table 1: Methodological quality of identified systematic reviews investigating chronic disease and related risk factors for Indigenous Australians.**

Quality Criteria	Dawson 2004 <sup>19</sup>	Power et al 2009 <sup>20</sup>	Chang et al 2011 <sup>21</sup>	Clifford et al 2011 <sup>22</sup>	Minges et al 2011 <sup>23</sup>	Thompson et al 2011 <sup>24</sup>	Carson et al 2012 <sup>25</sup>	Ospina et al 2012 <sup>26</sup>	Porter et al 2012 <sup>27</sup>	Clifford et al 2013 <sup>28</sup>	Gould et al 2013 <sup>29</sup>	Gould et al 2013 <sup>30</sup>	Lee et al 2013 <sup>31</sup>	Rich et al 2013 <sup>32</sup>
1. Clear statement of review objective/question	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
2. Inclusion criteria clearly defined and appropriate	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
3. Reporting of systematic search strategy	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4. Synthesis of studies to answer question using appropriate method	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5. Adequate range of databases searched (min. 2 commercial + 1 grey)	Y	Y	N	Y	N	Y	Y	Y	Y	Y	N	Y	N	Y
6. Critical appraisal reported using identified tool	Y	N	Y	Y	N	N	Y	Y	N	Y	Y	Y	Y	N
7. Critical appraisal by 2 or more reviewers with cross checking	N	N	Y	U	N	N	Y	Y	N	U	Y	Y	Y	N
8. Data extraction by 2 or more reviewers with cross checking	N	N	N	U	N	N	Y	Y	N	U	Y	Y	Y	N
9. Searched at least one database specialising in indexing Indigenous Australians studies	Y	Y	N	Y	N	Y	Y	Y	Y	Y	N	Y	N	Y
10. Policy/practice recommendation supported by data	Y	Y	Y	Y	Y	Y	Y	Y	Y	y	Y	Y	Y	Y
11. Research directives supported by data	Y	Y	Y	Y	Y	Y	Y	Y	Y	y	Y	Y	Y	Y
Overall quality	Good	Good	Good	Good	Moderate	Good	High	High	Good	Good	Good	High	Good	Good

Each item was rated as Y = Yes, N = No or U = Unclear. Unclear was awarded where not enough information was provided.

Table 2a: Characteristics of systematic reviews examining health intervention effectiveness.

Citation	Objective	Search dates	Participants	Type of evidence & synthesis method	Steps to align with Indigenous research ethics and/or capture Indigenous knowledge perspective	Main findings
Power et al (2009) <sup>20</sup>	To determine effective interventions for smoking cessation and identify knowledge gaps	2001-2007	Indigenous Australians	Program evaluations - 9 quantitative - 1 qualitative - 1 mixed method Narrative and tabular synthesis	Two workshops convened with health promotion and Indigenous health experts to assist the reviewers with interpretation of evidence and drawing of conclusions	<ul style="list-style-type: none"> <li>Smoking cessation interventions targeted at individuals such as face-to-face counselling used in conjunction with nicotine replacement therapy (NRT) likely to increase quit rates</li> <li>Cultural acceptance of smoking makes increasing participation and motivating people to quit difficult</li> <li>Need to build primary evidence base on interventions to increase participation and motivation to quit</li> </ul>
Chang et al (2011) <sup>21</sup>	To determine whether involvement of an Indigenous healthcare worker (IHW) in an asthma education program compared to no IHW improves asthma related outcomes	- Jan 2011	Indigenous children from Australia, US Canada and NZ	1 RCT in Australia (113 participants) Narrative and tabular synthesis	None	<ul style="list-style-type: none"> <li>Asthma related outcomes significantly better in the group with IHW involvement (with exception of exacerbation outcome)</li> <li>Evidence suggests IHW involvement improves outcomes but small sample prevents strong conclusion</li> <li>Practice of including IHW in asthma education programs for Indigenous children and adults with asthma is justified, unless data suggest otherwise.</li> <li>Additional high quality primary research required</li> </ul>
Clifford et al 2011 <sup>22</sup>	To (i) critique the methodological and contextual aspects of evaluations of Indigenous-specific Smoking Nutrition and Physical Activity (SNAP) intervention studies; and (ii) examine the effect of these studies on reducing SNAP-related harm in Indigenous Australian communities	1990-August (week 1) 2007	Indigenous Australians	20 intervention studies of 3 were RCTs and 17 used a non-randomised experimental design Narrative and tabular synthesis	Extracted and reported data from included studies on indigenous involvement in intervention development, implementation and evaluation	<ul style="list-style-type: none"> <li>Few evaluation studies of high quality evaluating Indigenous-specific interventions</li> <li>Need for more rigorous evaluations of interventions targeting reductions in SNAP risk factors among Indigenous Australians, and to establish the reliability and validity of measures to quantify their effect</li> </ul>
Carson et al (2012) <sup>25</sup>	To evaluate the effectiveness of smoking cessation interventions and draw inferences for future cessation programmes and research	- 2011	Indigenous people from Australia, US Canada and NZ	4 clinical trials, 1 conducted in Australia (N=111) Tabular and narrative synthesis plus meta-analysis	None	<ul style="list-style-type: none"> <li>Australian trial showed statistically and clinically significant effect in favour of intervention (NRT) for reducing smoking measured by abstinence, however sample size small</li> <li>Modified interventions and more careful outcomes research needed to inform smoking cessation interventions for Indigenous populations</li> </ul>
Clifford et al (2013) <sup>28</sup>	To: (i) identify published evaluations of suicide prevention interventions targeting Indigenous peoples in Australia, Canada, United States and New Zealand; (ii) critique their methodological quality; (iii) describe their main characteristics	1981-2012	Indigenous people from Australia, Canada, US and NZ	9 program evaluations (mixed method) 3 conducted in Australia of which 1 examined community prevention and 2 Gatekeeper training Narrative and tabular synthesis	None	<ul style="list-style-type: none"> <li>Methodological quality of evaluations varied; none high quality</li> <li>The two Australian evaluations examining Gatekeeper training found significant improvements in knowledge and confidence about how to identify individuals at risk; however, non-significant effects post training after 2 years</li> <li>Additional evaluations of preventive interventions targeting reductions in suicide using methodologically rigorous study designs informed by measures that reflect cultural definitions of health and wellbeing from perspective of Indigenous peoples required.</li> <li>Culturally tailored strategies required</li> </ul>
Gould et al (2013) <sup>29</sup>	To summarise the empirical research on culturally targeted anti-tobacco media messages and examine the evidence for the effectiveness of targeted and non-targeted campaigns	Not reported	Indigenous people from Australia, US Canada and NZ	20 mixed method studies, 5 Australian which examined effectiveness of TV/Radio base messages (4) and CD-ROM (1). Narrative and tabular synthesis	None	<ul style="list-style-type: none"> <li>Although Indigenous people had good recall of generic anti-tobacco messages culturally targeted messages preferred</li> <li>Little research comparing effect of culturally targeted versus generic messages with similar message content</li> </ul>
Lee et al (2013) <sup>31</sup>	To examine evaluations of interventions to prevent or treat substance use (including drugs, alcohol, tobacco, cannabis) and understand what works in which contexts	1990-2011	Indigenous Australians (age 8-25)	7 program evaluations (5 qualitative, 2 mixed method) and 1 expert opinion Narrative and tabular synthesis	Assessment of studies included asking whether researchers had: (i) sought permission from communities for the research; (ii) consulted community about study design; (ii) in data gathering included gathering feedback from young people in the community about the acceptability or value of the intervention	<ul style="list-style-type: none"> <li>Limited evidence with major methodological limitations</li> <li>Of the four evaluations that reported reductions in substance abuse, two included recreational or cultural activities and had strong community support; one included supply control combined with employment opportunities</li> <li>The two interventions that only provided education did not show change in substance abuse</li> <li>The limited data support multipronged interventions, designed with community input but more research required</li> </ul>

reviewer (7/14 of the reviews),<sup>19,20,21,23,24,27,32</sup> which is incongruent with best practice.<sup>7,8</sup>

### Characteristics of included studies

Table 2a-c presents the key characteristics of the included systematic reviews. The earliest review relevant to the topic was published in 2004,<sup>19</sup> while just over two-thirds were published in 2012,<sup>25-27</sup> and 2013.<sup>28-32</sup>

Half the reviews<sup>19,20,22-24,30,31</sup> included evidence gathered exclusively with Indigenous Australian participants. Another six<sup>21,25-29</sup> also considered evidence gathered with Indigenous people living in Canada, the US and New Zealand. The remaining review<sup>32</sup> included studies whose participants were Indigenous and non-Indigenous Australians.

Half of the included systematic reviews<sup>20-22,25,28,29,31</sup> synthesised evidence for a question about health intervention effectiveness. Four<sup>23,26,27,32</sup> identified and synthesised evidence for a question of disease or risk factor prevalence; one focusing on asthma,<sup>26</sup> two on diabetes<sup>23,27</sup> and the other on depression.<sup>32</sup> One review had the objective of examining evidence on implementation of a health intervention; more precisely on whether smoking status of Indigenous Health Workers undermines effective delivery of information about the benefits of quitting smoking.<sup>24</sup> Two reviews identified and synthesised various types of evidence to address a broad range of questions about a particular chronic

disease (asthma)<sup>19</sup> or risk factor (smoking).<sup>30</sup> Informing the effectiveness of interventions aimed at smoking cessation has been a focus area of the reviews conducted to date. Just less than half synthesised evidence on the effectiveness of interventions to help Indigenous Australians quit smoking,<sup>20,25,29</sup> the effectiveness of interventions to address smoking plus other risk factors,<sup>22,31</sup> or an issue affecting implementation of interventions<sup>24</sup> designed to help Indigenous Australians quit smoking. The chronic diseases that have received most attention are diabetes<sup>23,27</sup> and asthma.<sup>19,21,26</sup>

Five of the reviews<sup>19,21,25,26,30</sup> searched sources from database inception. In another three,<sup>24,27,29</sup> the date limitations applied in

**Table 2b: Characteristics of systematic reviews examining prevalence and characteristics of chronic diseases.**

Citation	Objective	Search dates	Participants	Type of evidence & synthesis method	Steps to align with Indigenous research ethics and/or capture Indigenous knowledge perspective	Main findings
Minges et al (2011) <sup>23</sup>	To examine the evidence on prevalence of diabetes and impaired glucose tolerance (IGT) and identify patterns, by age, gender, region, ethnicity and remoteness	1997-2010	Indigenous Australians	24 observational analytical studies measuring prevalence of diabetes and/or impaired glucose tolerance (sample size >150) of which 17 conducted in remote, 3 urban, 4 remote and urban areas  Narrative and tabular synthesis	None	<ul style="list-style-type: none"> <li>Diabetes prevalence varies substantially, e.g. 3.5% (young Indigenous women) to 33.1% (Torres Strait Islanders from North Qld)</li> <li>Diabetes prevalence higher among females than men, the Northern Territory's Top End compared to Central Australia and Torres Strait Islanders compared to Aboriginals. Diabetes prevalence higher in older (≥35 years of age) compared to younger groups (≥35 years of age) and remote compared to urban areas</li> <li>Prevalence of IGT ranges from 4.7–21.1% (5 studies)</li> <li>Patterns of IGT prevalence similar to patterns for diabetes</li> <li>Need for further research particularly in the urban areas</li> </ul>
Ospina et al (2012) <sup>26</sup>	To evaluate differences in asthma and chronic obstructive pulmonary disease (COPD) prevalence between adult Indigenous and non-Indigenous populations	- 2011.	Indigenous peoples from Australia, US, Canada & NZ	8 observational analytical studies, 2 Australian of which one included 677 participants (125 Aboriginal) the other 5735 participants (715 Aboriginal)  Narrative and tabular synthesis plus meta-analysis	None	<ul style="list-style-type: none"> <li>Substantial differences in asthma prevalence across Indigenous populations</li> <li>Indigenous Australians reported significantly lower rates of asthma than non-Indigenous Australians (contrary to other populations)</li> <li>Differences across studies in definition and measurement which may explain divergent findings</li> <li>Too little evidence to draw strong conclusions populations</li> <li>Further investigations using similar measures required</li> </ul>
Porter et al (2012) <sup>27</sup>	To determine prevalence of diabetes in pregnancy and its impact on maternal and newborn health outcomes for Indigenous women	Not reported.	Indigenous women from Australia, US, Canada & NZ	7/24 included studies provided results for Indigenous Australians, all retrospective observational analytic studies based on longitudinal data. Years of follow up were 1 (4 studies), 5 (1 study), 8 (1 study) & 12 (1 study)  Narrative and tabular synthesis	None	<ul style="list-style-type: none"> <li>Australian studies suggest (i) prevalence of diabetes in pregnancy varies substantially within Australian Indigenous female population, from 0.4%–12.2%; (ii) prevalence of diabetes in pregnancy higher amongst Indigenous than non-Indigenous women, e.g. rural Victorian study showed prevalence of 10.7% for Aboriginal and 4.5% for non-Aboriginal women</li> </ul>
Rich et al (2013) <sup>32</sup>	To gauge prevalence and correlates of depression among Australian women including for the following sub-groups: different ages; women from Indigenous and culturally and linguistically diverse backgrounds; women living in rural areas	1999 – Jan 2010	Australian women (older than 12 years)	4 studies of which 2 mixed method (1 focus groups and small cross sectional survey; 1 interviews plus longitudinal survey) and 2 quantitative (cross sectional survey based observational analytical studies)  Narrative and tabular synthesis	None	<ul style="list-style-type: none"> <li>Studies indicate Indigenous women experience depression at higher rates than non-Indigenous women</li> <li>Evidence suggests correlates related to depression among Indigenous women include unemployment, smoking or having a partner who smoked cigarettes, physical abuse, low coping skills, anxiety, caring for other people's children and cannabis use. However due to small sizes results not generalizable</li> <li>More research required which must address need for culturally appropriate measures and identification of depression and post-natal depression among Indigenous people whilst displaying a high commitment towards cultural sensitivity</li> </ul>

the literature searches were not reported. The start dates applied in the remaining six reviews were: 1981,<sup>28</sup> 1990,<sup>31</sup> 1997,<sup>23</sup> 1999,<sup>32</sup> and 2001.<sup>20</sup> None of the reviews explained the rationale for the date limitations applied.

There was wide variation in the types of studies considered for inclusion in the identified reviews. For example, in the reviews examining intervention effectiveness, two considered only experimental evidence,<sup>21,26</sup> while four included a broader range of study designs and mixed (quantitative and qualitative) evidence,<sup>20,28,29,31</sup> and one included quantitative evidence from mixed study designs.<sup>22</sup> The majority of the reviews (8/14)<sup>19,20,24,28-32</sup> included mixed (quantitative and qualitative) evidence. Only three reviews<sup>19,24,31</sup> considered expert opinion. Narrative and tabular synthesis of findings dominates the synthesis methods used to date. A total of 11/14 reviews<sup>19-24,27-29,31,32</sup> used narrative and tabular synthesis and two<sup>25,26</sup> used narrative and tabular synthesis plus meta-analysis. One review used a meta-ethnographic synthesis method.<sup>30</sup> The limited use of statistical meta-analysis should not be seen as a weakness, as small samples and

heterogeneity of included studies precluded the conduct of useful meta-analysis in most reviews.

Only three systematic reviews<sup>20,22,31</sup> reported taking steps to align the review process with Indigenous Australian research values or/and capture Indigenous specific knowledge (see Table 2a-c).

## Discussion

We identified 14 systematic reviews examining evidence for one or more question(s) about chronic disease prevalence, risk factors, treatment and management for Indigenous Australians. The small number indicates that systematic review has been under-used to date as a tool for improving Indigenous Australian chronic disease outcomes. Rapid growth in the number of systematic reviews published in recent years is an encouraging trend.

Two considerations were consistent when considering findings of the included systematic reviews. The first was the small number of included studies, many of which

were assessed as moderate to poor quality. This resulted in most reviewers cautioning that poor quality and/or limited evidence prevents drawing strong conclusions and evidence-based recommendations for policy and/or practice. Related to this, most reviewers raised the need for additional high quality research, both intervention and focused on understanding risk factor or disease prevalence. The second observation was that of differences in the results for different population sub-groups (e.g. different age cohorts, females compared to males) and geographical settings (e.g. remote versus urban) of the reviews addressing questions about prevalence of risk factors or diseases.

The small number of systematic reviews synthesising evidence pertinent to intervention effectiveness is of particular concern in light of the need for evidence on what works, what does not and why. We identified additional reviews addressing questions about intervention effectiveness but these were excluded at full text examination for not meeting the minimum method requirements for systematic review. Of the 25 articles reviewed and excluded

**Table 2c: Characteristics of systematic reviews examining intervention implementation or range of questions about chronic disease and related risk factors .**

Citation	Objective	Search dates	Participants	Type of evidence & synthesis method	Steps to align with Indigenous research ethics and/or capture Indigenous knowledge perspective	Main findings
Dawson (2004) <sup>19</sup>	To determine the extent of previous research efforts, current knowledge about prevalence and the nature of asthma in Indigenous Australians and management models tested	- 2003	Indigenous Australians	13 quantitative studies (10 published descriptive studies 3 ABS survey based studies) and various textual opinions including a review, editorials and letters  Narrative and tabular synthesis	None, however authors lamented the absence of a tool for appraising studies conducted in the Aboriginal Medical Service (AMS) setting	<ul style="list-style-type: none"> <li>Wide variation in asthma prevalence population; unclear if real difference or lack of standardisation of measures</li> <li>Mixed findings on hospitalisation and access to services.</li> <li>Only one study of an asthma management strategy; showed good attendance</li> <li>Previous research efforts insufficient, though improvements over past decade and need for additional research, particularly quality studies on effectiveness of asthma management interventions</li> <li>Consultation with Indigenous communities required to determine priorities</li> </ul>
Thompson et al (2011) <sup>24</sup>	To assess whether smoking status of Indigenous health workers (IHW) impedes provision of health information about smoking tobacco to their communities in Australia	Not reported	Indigenous Australians	8 mixed method program evaluations plus 3 textual opinions (1 review, 1 report and 1 opinion paper)  Narrative and tabular synthesis	None	<ul style="list-style-type: none"> <li>Evidence suggests smoking amongst IHW a barrier but poor quality of studies prevents drawing strong conclusions</li> <li>Helping IHWs overcome barriers that undermine their efforts to quit smoking may provide an opportunity to address high rates of smoking in Indigenous communities</li> <li>Further research required</li> </ul>
Gould et al (2013) <sup>30</sup>	To identify key knowledge, attitudes, beliefs and barriers around maternal smoking and cessation and provide recommendations for targeted interventions	- 2011	Indigenous Australians	7 studies with diverse methods included (5 qualitative, 1 small quantitative 1 mixed method)  Meta-ethnography used to synthesize findings	None	<ul style="list-style-type: none"> <li>Evidence suggests social norms and stresses within Aboriginal communities perpetuate tobacco use, as does insufficient knowledge of smoking harms, inadequate saliency of antismoking messages and lack of awareness and use of pharmacotherapy</li> <li>Role of IHWs in supporting smoking cessation challenging and not yet fulfilling its potential</li> <li>Pregnant Indigenous Australian smokers require comprehensive approaches, which consider the environmental context, increase knowledge of smoking harms and cessation methods, and include culturally targeted support</li> <li>Long term, broad strategies should de-normalize smoking in Indigenous Australian communities</li> <li>Further research needed on the causes of resistance to anti-tobacco messages and promote positive attitudes to pharmacotherapy</li> </ul>

at full text, 18 (72%) examined evidence relating to intervention effectiveness (see the supplementary file, available online). This raises the importance of distinguishing the need for more reviews from the need for more high quality reviews.

The definition of systematic review used in this overview was lax rather than strict. It did not require that reviewers conduct and report critical appraisal using a validated tool. International guidance for the conduct of systematic reviews presents critical appraisal as a key step in the review process because it identifies potential sources of bias in the evidence base, and helps reviewers interpret the evidence correctly and draw appropriate recommendations.<sup>6,7</sup> Had completion of critical appraisal and assessment of risk of bias been in the inclusion criteria for this overview, only nine reviews<sup>19,21,22,25,26,28-31</sup> would have been included. Another methodological weakness identified in a portion (30%) of the systematic reviews was failure to include databases using specialist indexing tools designed to capture studies conducted with Indigenous Australians and search for grey literature.

The identified characteristic of widespread inclusion of mixed (quantitative and qualitative) evidence in the identified reviews is positive, as literature on Indigenous research methodology identifies oral evidence and sharing knowledge through story telling/yarning as key to understanding.<sup>34,35</sup> The identified reviews' limited consideration of expert opinion is a weakness, as contextual and cultural knowledge from local Indigenous community representatives/experts is identified by leading Indigenous researchers as key to deriving valid policy/practice recommendations about intervention options to improve Indigenous health outcomes.<sup>17</sup> The scope of health conditions focused on in the set of identified systematic reviews appears narrow and sub-optimal when viewed against the range of chronic diseases affecting Indigenous Australians.

### Methodological priorities

This overview raises three methodological priorities to support ethically appropriate, rigorous and relevant systematic reviews about questions relating to chronic disease and other health issues for Indigenous Australians. The first is raising awareness among reviewers and users of evidence synthesis about the rationale for, and value

of, critical appraisal. This is important because reviews that summarise the evidence without careful and appropriate consideration of the risk of bias in the primary studies using tools relevant to the study design of the evidence they synthesise run the risk of developing conclusions and practice (or policy) recommendations that are not valid. The second methodological priority is the need for reviewers to use comprehensive search strategies that seek grey and commercial literature and cover databases known to be key repositories of studies conducted with Indigenous Australians.

The third methodological priority is the need for research and consultation to develop method guidance, tools (including for critical appraisal) and reporting standards for best practice systematic review of evidence gathered with Indigenous Australians that is informed by ethical standards/guidelines for conducting research with Indigenous Australians<sup>12-16</sup> and Indigenous perspectives on ways of constructing knowledge.<sup>34,35</sup> There are at least five reasons why this is important.

- 1) The national and local guidelines governing research involving Indigenous Australians<sup>12-16</sup> impose an obligation on the research community to consider whether current systematic review guidance and practice is congruent with ethical standards and take steps to adjust it where not.
- 2) Development and use of systematic review method guidance informed by the key principles in the guidelines/standards<sup>12-16</sup> is likely to promote relevance and benefit of systematic reviews for Indigenous Australians. This is because the guidelines<sup>12-16</sup> include the requirements that researchers consult with community representatives prior to conducting research to ensure research questions are informed by the community's identified needs and that Indigenous community representatives and researchers are involved in and benefit from the research.
- 3) The validity of systematic review findings is undermined by failure to adjust systematic review methods to consider and incorporate oral evidence and opinion from Indigenous community representatives/experts (e.g. on cultural and contextual factors), which literature on Indigenous methodology<sup>34,35</sup> and Indigenous researchers<sup>17</sup> have clarified is important.
- 4) Use of critical appraisal tools that do not incorporate criteria informed by Indigenous perspectives on ethically appropriate and rigorous research means that reviews present only a partial understanding

of strengths and limitations of the existing evidence base. 5) Absence of such guidance, tools and reporting standards makes it likely that resources are wasted on reviews that are of limited relevance to and have little benefit for Indigenous Australians.

### Priority questions for systematic reviews – the need for reviewers to engage with users

The small number of systematic reviews identified focused on smoking, asthma and diabetes, suggesting there is still a wide array of questions to synthesise evidence for to inform better chronic disease prevention, treatment and management. Reviewers should be guided by community priorities to decide which review questions should be addressed. Reviewers must also consult with clinicians and other decision makers, including policy makers, working in health services aimed at improving chronic disease outcomes for Indigenous Australians.<sup>10,11</sup> At a practical level, this requires that reviewers view consultation, partnership building and priority setting as part of the review process, and funds need to be invested in this.

### Limitations

One limitation of this overview is that the methodological quality of included reviews was judged using a critical tool designed for studies in any population, not specifically Indigenous Australian populations. A second limitation is the narrow scope of the chronic disease risk factors considered. This is particularly important to highlight in light of the need to synthesise evidence for decision makers on effective measures to address the social determinant of Indigenous Australians poor health outcomes.<sup>17</sup> A third limitation is that we are aware of at least two other soon-to-be-published systematic reviews that would have met all the inclusion criteria, but were not included due to the search date limit (31 December 2013). Including these two reviews would not have altered the profile of the main characteristics of the systematic reviews presented or priorities for the research agenda. A final limitation is that by excluding reviews that did not meet the inclusion criteria, this review excluded a number of additional reviews (see supplementary file) that have addressed questions about chronic disease prevalence, risk factors and management in the Indigenous Australian population.

## Conclusion

There has been considerable investment in research and interventions to improve chronic disease and other health outcomes of Indigenous Australians. They have been among the most researched populations in the world.<sup>17</sup> Despite this, much of the published material is of relatively poor quality and cannot be translated directly into benefits for communities. The majority of Indigenous Australians continue to suffer dismal health outcomes. The research community, including individuals focused on both primary and secondary research involving Indigenous Australians, has an obligation to Indigenous people in Australia to improve the way they do their research.

Over the past decade, a number of guidelines for ethical best practice research with Indigenous Australians have emerged<sup>12-16</sup> and have been used by ethics committees reviewing primary research proposals. This overview raises the importance of not only ethically appropriate primary research but also more rigorous primary research on intervention effectiveness. It identifies development and dissemination of consensus and expert-based method guidance, tools and reporting standards to support ethically appropriate, high-quality and relevant systematic review as a priority. In the absence of such guidance, we offer some suggestions about what is required of systematic reviewers, based on considering ethical guidelines for primary research involving Indigenous Australians<sup>12-16</sup> and Indigenous Australian research expert opinions.<sup>17</sup> We suggest that at a minimum reviewers should: 1) align review objectives/questions with community-identified priorities and decision-making needs of individuals working in health services and/or policy, which may require investing in partnership building and priority setting; 2) include and be guided by Indigenous community representatives in review teams; 3) consider mixed evidence and expert opinion from relevant Indigenous contextual and cultural experts; 4) supplement conventionally used criteria with criteria informed by Indigenous standards for ethically appropriate and rigorous research in critical appraisal; 5) conduct a comprehensive search that is capable of identifying studies published in commercial and grey literature; 6) together with community, plan for and take actions to ensure Indigenous people benefit from reviews, which could include activities to translate the review findings into better health policy and/or practice.

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## Supporting Information

Additional supporting information may be found in the online version of this article:

**Supplementary File 1:** Reviews excluded at full text appraisal with reasons.