

# Smoking cessation and tobacco prevention in Indigenous populations

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## Abstract

This article systematically reviews 91 smoking cessation and tobacco prevention studies tailored for Indigenous populations around the world, with a particular focus on Aboriginal and Torres Strait Islander populations in Australia. We identified several components of effective interventions, including the use of multifaceted programs that simultaneously address the behavioural, psychological and biochemical aspects of addiction, using resources culturally tailored for the needs of individual Indigenous populations. Pharmacotherapy for smoking cessation was effective when combined with culturally tailored behavioural interventions and health professional support, though it is generally underused in clinical practice. From a policy perspective, interventions of greater intensity, with more components, were more likely to be effective than those of lower intensity and shorter duration. For any new policy it is important to consider community capacity building, development of knowledge, and sustainability of the policy beyond guided implementation. Future research should address how the intervention can be supported into standard practice, policy, or translation into the front-line of clinical care. Investigations are also required to determine the efficacy of emerging therapies (such as e-cigarettes and the use of social media to tackle youth smoking), and under-researched interventions that hold promise based on non-Indigenous studies, such as the use of Champix. We conclude that more methodologically rigorous investigations are required to determine components of the less-successful interventions to aid future policy, practice and research initiatives.

Tobacco prevalence among Indigenous populations is substantially higher compared to the corresponding non-Indigenous people across countries. Current estimates of tobacco use include 46–59 percent for First Nation and Canadian Inuits compared to 16 percent for non-Indigenous Canadians (Health Canada 2014; Propel Centre for Population Health Impact 2014), 39 percent in New Zealand Māoris compared to 15 percent (New Zealand Government 2013), 22 percent for American Indian and Alaska Natives compared to 18 percent (Centers for Disease Control and Prevention 2014) and 42 percent for Aboriginal and Torres Strait Islander (TSI) people compared to 16 percent (Australian Bureau of Statistics 2013, 2014b). These values also vary among population sub-groups. For example, in some remote Australian communities the tobacco prevalence estimate is as high as 83 percent (MacLaren et al. 2010). Smoking is also higher among Indigenous Australian pregnant women with up to 65 percent reported to be using tobacco (Carson et al. 2013) and children aged 15–24 years with 39 percent smoking daily (Australian Bureau of Statistics 2011). As a result, a significant disparity in morbidity and premature mortality between these two groups ensues, with Indigenous people bearing the higher burden. This disparity is often referred to as ‘the gap’ (Knibbs and Sly 2014; Russell 2013).

Population-wide interventions targeted at adult smokers (Cahill et al. 2013; Stead and Lancaster 2012) and young people (Brinn et al. 2010; Carson et al. 2011) are known to help smokers quit and prevent the uptake of tobacco use. However, these broad population-level standardised interventions appear to have had little impact on altering the tobacco prevalence *gap* between Indigenous and non-Indigenous. The most recent statistics from the Australian Aboriginal and TSI Health Survey found a decrease in daily smoking rates over the past decade for Aboriginal and TSI Australians, which was comparable to the decrease observed for the non-Indigenous. Results from these surveys, however, show that the gap between daily smoking rates has remained similar, with 27 percentage points in 2011 and 25 percentage points in 2012–13 (Australian Bureau of Statistics 2014a). Moreover, outcomes from some drug prevention programs aimed at youth suggest the possibility that an inappropriate match between program and participant characteristics may actually lead to an increase in the problem behaviour (Dixon et al. 2007). Culturally tailored interventions have shown some success for smoking cessation in adult Indigenous populations (Carson et al. 2012a) and among youth (Carson et al. 2012b), however, these reviews are limited due to a paucity of published data. Considering the ongoing disparities within this high-risk populace and the known benefits a reduction in tobacco prevalence would yield, systematic consolidation of interventions designed specifically for Indigenous people is warranted.

## **Aims and methods**

The aim of this review is to evaluate the current literature for tobacco cessation and prevention interventions for Indigenous populations worldwide. This will allow identification of effective programs that can be translated into policy, in order to guide future cessation and prevention initiatives and research. It will also help to identify ineffective programs so that they can be altered or abandoned.

### *Study search strategy*

We performed a systematic literature search of academic databases, comprising The Cochrane Library, EMBASE, MEDLINE, PsycINFO, and Science Citation Index, on 15 August 2014. We searched for trials of smoking cessation and prevention interventions. The following free text search terms were used to identify records relevant to the topic: (Aborig\*

OR Indigenous\* OR Inuit OR Maori OR Native American OR American Indian OR tribe\* OR tribal) AND (tobacco OR smok\*). No language restrictions were applied.

Online clinical trial registers were also searched for ongoing and recently completed studies: the meta-register of Controlled Clinical Trials ([www.controlled-trials.com/mrct](http://www.controlled-trials.com/mrct)); ISRCTN Register International; Action Medical Research (UK); NIH ClinicalTrials.gov; The Wellcome Trust (UK); UK Trials; and government registries ([www.clinicaltrials.gov](http://www.clinicaltrials.gov)). These sources were searched using the following search strategy (Aborig\* OR Indig\* OR Inuit OR Maori OR Native American OR American Indian OR tribe OR tribal) AND (tobacco OR smok\*).

World Health Organization registries were searched ([www.who.int/trialsearch/](http://www.who.int/trialsearch/)) using the following search strategy: (Indigenous OR Aboriginal OR Torres Strait Islander OR Inuit OR American Indian OR Native American OR Maori OR Tribe OR Tribal) AND (smoking or tobacco).

We conducted an additional search of grey literature that included contact with a tobacco representative from the Cancer Council from each state or territory within Australia to identify government reports meeting the inclusion criteria for this review. Reference lists of included published studies were also searched for identification of relevant studies.

### *Study inclusion criteria*

Randomised controlled trials, controlled clinical trials, pre and post-studies, government reports, and consultation reports were included. Participants were people who are Indigenous to their country, being ‘the experiences shared by a group of people who have inhabited a country for thousands of years, which often contrast with those of other groups of people who reside in the same country for a few hundred years’ (Cunningham and Stanley 2003), and were youth who were yet to become regular smokers or youth and adults who were active smokers participating in a smoking cessation initiative. Trial participants were not required to be selected according to their susceptibility to quitting or suitability for particular interventions. No attempts were made to redefine Indigenous status for the purpose of including a study in this review. When meaningful data were found which referred to an Indigenous subpopulation in a larger study (minimum 20 percent of study population), they was assessed for inclusion in this review.

We included interventions in five categories:

1. Pharmacotherapies: nicotine replacement therapies, bupropion and varenicline tartrate.
2. Cognitive and behavioural therapies: cognitive and behavioural therapy, counselling, support groups, self-help, seminars, and motivational lectures.
3. Alternative therapies: acupuncture, hypnotherapy, and aversion therapy.
4. Public policy: legislative interventions, media campaigns, and community interventions.
5. Combination therapy: a combination of at least two therapies from the above four categories.

### *Analysis methods*

From the title, abstract, or descriptors, two reviewers independently screened the retrieved citations to identify potentially relevant trials (KC and either HJ, MB or KS). All data were independently extracted by two reviewers into standardised data-extraction forms. All studies that did not meet the inclusion criteria for study design, population, or interventions were excluded. All outcome data were analysed using narrative synthesis. Risk of bias for each included study was assessed using the report by Tooth et al. (2005), in addition to standard Cochrane risk of bias grading criteria. We assessed biases using classifications of ‘low risk of bias’ when data for a criterion were reported, ‘high risk of bias’ when data were not reported,

and ‘unclear risk of bias’ when the criteria were not relevant to the study or not reported in the article. Review Manager Version 5.2 software was used to generate the risk of bias graphs.

### **What kind of research is available?**

Four main types of research were available for assessment, including randomised controlled trials, controlled clinical trials, pre-post studies, and government reports. From the pre-specified search strategy a total of 1442 citations were retrieved: 1176 from the academic literature search, 206 from online clinical trial registries and 60 from screening bibliographies, contact with the Cancer Councils of Australia, and author contact. A total of 91 studies met all of the inclusion-exclusion criteria within the review. Twenty-five studies presented completed results for tobacco cessation interventions and nine for tobacco prevention in youth. Four protocols were identified for ongoing tobacco cessation studies, and the remaining 53 studies were government policy and community intervention programs across Australia.

#### *Overall methodological assessment of the included studies*

Methodological rigour among the 91 identified studies was limited due to several flaws in study design. In particular, a lack of randomised and non-randomised controlled study designs reduces the quality of the evidence supplied in pre-post studies and those government reports where intervention data are reported without a comparator population. Difficulties with recruitment were also observed where pre-specified sample sizes were not met and only small numbers of participants were recruited, generating concerns about the generalisability of the recruited sample compared to those who did not want to participate. Substantial attrition in final follow-up samples was also common, which gives rise to questions about the comprehensiveness and generalisability of the follow-up data reported (i.e. differences in the characteristics of those participants who withdrew from the study compared to those who continued through to follow-up). Between-study variability of interventions (by type and duration) and populations (by health and socio-economic demographics, cultural identity and practices and beliefs of the different Indigenous populations), can also impact on the applicability and generalisability of the results.

Moreover, considering that the included studies were conducted between 1987 and 2014, substantial variations will have occurred in practices, environment, population and policy during this time. Outcome measures used to define success also differ between studies in the following ways, all with differing levels of validity:

- the type of outcome used (e.g. continuous smoking abstinence, point prevalence, overall acceptability of the intervention);
- the time of follow-up (e.g. four weeks compared to 12 months);
- the people who collected the outcome data (e.g. Indigenous health workers, research assistants, doctors etc.); and
- how data collection was performed (e.g. face-to-face, self-reported, biological validation of findings, online assessment etc.).

There is also a distinct difference between statistical significance and practical (or clinical) significance. Statistical significance cannot be achieved when there is no comparator group for the cohort receiving the intervention (either via a distinct control population or change from baseline assessments etc.) and is unlikely to be achieved when there is insufficient

power to detect an effect for the intervention (due to the small sample size). For the majority of studies, examining the practical significance of an intervention where authors report a benefit for participants through qualitative assessments (text summaries of ‘good’ or ‘bad’ findings) needs to be taken into account. However, there are also complications when considering information produced from these types of assessments, as there is no way to confirm validity or generalisability of the findings. Authors can also provide an overall comment that is not comprehensive and only reflects one aspect of the study, giving the reader a skewed perception of the intervention’s effectiveness. There is also the potential for selective reporting of results where negative findings are not reported.

We begin by reviewing the major policy developments in Australia, New Zealand, and comparable countries, and the evidence about their respective effectiveness. We then move on to discuss specific themes that arise.

### **Major policy developments among countries**

Nationwide, Australia has implemented many successful tobacco control policies, including tax increases on tobacco products; smoking bans in public places; plain packaging legislation; tougher restrictions on tobacco sales to minors; subsidised nicotine replacement therapy; enhanced regulatory bodies for tobacco content; media campaigns; and many other policies that have shown efficacy in reducing tobacco prevalence on a national level (Australian Government Preventive Health Taskforce 2009).

Although tobacco taxation is believed to be an essential component of these comprehensive tobacco control strategies, there is a lack of evidence about the impact of increasing tobacco cigarette prices on smoking behaviour in heavy/long-term smokers and Aboriginal people (Bader et al. 2011). Evaluations of the impact and perceptions of tax increases in remote Aboriginal Australian communities found wide confidence intervals around the estimated reduction in consumption (2.2% average reduction; 95% *ci* –5 to 10), indicating that the tax increase could have either been associated or *not* associated with a reduction in consumption of tobacco products (Thomas et al. 2013). Although future excise rises are supported, they need to be carefully monitored in the Indigenous context (Thomas et al. 2013). Tax increases on tobacco products are known to be highly effective in reducing smoking among youth, young adults and people of low socio-economic status (Bader et al. 2011).

Since 2008 the Australian Government has funded the ‘Tackling Indigenous Smoking’ measure under the Council of Australian Governments (COAG) National Partnership Agreement on Closing the Gap in Indigenous Health Outcomes (Australian Indigenous Healthinfonet 2012). Under this initiative a regional tobacco coordinator and tobacco action workers are employed and trained in quit smoking measures across all states and territories. This has occurred in conjunction with national media campaign ‘Break the Chain’ (Australian Government 2013), which was found to be a success and resonated well with the target audience. The key messages about ‘Breaking the Chain’ and the harms of tobacco use were reported to have been conveyed and well received, by encouraging Indigenous tobacco users to decrease their smoking while encouraging recent quitters to refrain from re-starting the habit.

In 2014 the Australian government announced funding cuts of \$130 million over five years to the Indigenous Tackling Smoking budget, which is essentially more than a third of the program’s annual funding (Dingle 2014). Indigenous leader Dr Tom Calma, who is the inaugural National Coordinator for the Tackling Indigenous Smoking campaign, has warned that cuts to the program will contribute to the early deaths of Aboriginal smokers (Dingle

2014). Cuts to the Indigenous Tackling Smoking programs are said to occur by not replacing people who are currently employed in various programs once they resign (Speaker Mclucas 2014), leaving questions over the nation's ability to successfully reduce smoking rates within the timeline originally outlined in COAG (Dingle 2014).

The team had to be fully funded, had to be functional, and so the chances of reaching that 2018 target is near impossible now. The logic is that a reduction in information will mean that there will be people who don't receive that information to make an informed choice, and that will contribute to their early demise.

However, substantial amounts of resources and programs have already been developed with community consultation and involvement as part of the COAG funding stream, as reported in Table 2 of this review. Considerable inroads have already occurred for culturally tailored tobacco cessation and prevention programs that have the potential to reduce the tobacco prevalence gap among Indigenous Australian populations. Therefore it is important that the next line of community initiatives and research programs consider the work already undertaken and determine the optimal approach in translating this existing work into the frontline of clinical practice and public policy across Australia. It may also be also pertinent for future programs to consider 'disadvantaged populations' as a whole rather than just focusing on Indigenous people (Gould et al. 2012). This may help to reduce the perception of being specifically targeted with a need for intervention and address a broader 'language of disadvantage' regardless of ethnicity, while also optimising cost effectiveness (Paul et al. 2013).

New Zealand has pioneered many tobacco control measures since the release of their first National Drug Policy, including banning smoking from enclosed workplaces, subsidised nicotine replacement therapy, tax increases on tobacco products, and plain packaging of cigarettes (Trainor and Cancer Control Council of New Zealand 2011). However, there has been some difficulty reported with implementation failures in the use of two New Zealand laws to control the tobacco industry (Thomson and Wilson 2005). Two case studies have identified four occasions over a 14 year period where New Zealand agencies did not enforce consumer protection law, although breaches by the tobacco industry did occur in relation to statements on the relative safety of second-hand smoke. The second case study presents the tobacco industry's failure to provide information on tobacco additives, with the government inadequately enforcing the law and undertaking appropriate political processes for a period of 13 years (Thomson and Wilson 2005). In both instances the financial and opportunity costs of taking legal action, political difficulties, and the fragmented nature of government structures were believed to be responsible for the breaches. In 2011, the New Zealand government publicly adopted the smoke-free 2025 goal, following a landmark Parliamentary enquiry by the Māori Affairs committee. Under this strategy the government has set the long-term goal of reducing smoking prevalence and tobacco availability to minimal levels, essentially resulting in New Zealand becoming a smoke-free nation by 2025 (Ministry of Health 2014). There have also been calls to completely ban cigarettes within 10 years, with one national New Zealand survey between 2007 and 2009 finding that 46 percent of the survey population ( $n = 2,299$ ) supported complete banning, suggesting that most smokers will support stronger government action to control the tobacco industry (Edwards et al. 2013).

In the USA, 2009 legislation providing the United States Food and Drug Administration authority to regulate tobacco products and tobacco advertising has also helped to curtail much of the advertising toward youth (CDC and US Department of Health and Human Services 2012). However, a 2012 report by the Surgeon General has found that for the first time following the Tobacco Masters Settlement Agreement in 1998, the declines observed in youth cigarette smoking have now stalled, and smokeless tobacco use among youth is on the rise. Importantly, the latest research shows that concurrent use of multiple tobacco products is

common among youth, with smokeless tobacco use becoming more popular (CDC and US Department of Health and Human Services 2012). A 2014 report released by the Surgeon General has revealed that the percentage of US middle and high school students that are using electronic cigarettes has more than doubled between 2011 and 2012. Considering the lack of formal regulation and safety concerns around these products, investigations into the use of electronic cigarettes are urgently needed (CDC and US Department of Health and Human Services 2014).

These tobacco prevalence estimates and increase in multiple tobacco product usage are of great concern, particularly considering that none of the five randomised controlled trials evaluating tobacco prevention programs among Indigenous youth in the US showed statistically significant benefits in favour of the intervention at final follow-up, when compared to the control population. Davis et al. (1995) found a statistically significant reduction in smoking in favour of the intervention for boys ( $p = 0.02$ ) and Pueblo students ( $p < 0.01$ ), but not girls or Navajo students.

A number of policy tools have been effectively implemented for tobacco control among Indigenous populations, though these are not mandatory or enforced on a national level. Taxation is currently an underused tool in the US, as access to cheaper cigarettes on Indian reservations is associated with higher tobacco use rates, particularly among youth (Satter et al. 2012). Community control and restrictions of sales do not routinely occur, with active enforcement of tobacco sales-laws and restricting self-service outlets in areas accessible to youth (for example vending machines and counter-top cigarette displays in stores) not standard across Indian reservations. Likewise, smoking bans and restrictions in public places, control of tobacco industry advertising and tobacco education and cessation treatment strategies are not standardised across the US (Satter et al. 2012).

Successes in tobacco control have more than halved smoking prevalence rates since the first Surgeon General's Report released in 1964. Indeed the collective view of smoking has since been transformed from an accepted national pastime to a discouraged threat to individual and public health. The 2009 Family Smoking Prevention and Tobacco Control Act has allowed the government greater authority over tobacco product regulation, and the provision of user fees to be paid by tobacco manufacturers that can support sustained public education media campaigns designed for youth prevention and cessation. Moreover, the 2010 Affordable Care Act has supported initiatives and effective community-based programs and public education campaigns promoting prevention and helping people to quit, as well as expanding access to smoking cessation services with requirements for the majority of insurance companies to cover cessation treatments (CDC and US Department of Health and Human Services 2014).

The Canadian government has implemented several policies in attempts to reduce the tobacco burden, including raising the price of tobacco; complete prohibition on sales of tobacco in certain places; stringent legislation around manufacturing; policies for smoke-free public places and transport; preventing sales to minors; and treatment of people with addictions (Orisatoki 2013). However, some difficulty has been reported in implementing these policy initiatives, with some First Nations feeling that non-Aboriginal governments do not have the right to dictate private behaviours, and therefore ordinary community members are unlikely to accept such regulations (Orisatoki 2013). However, some places within Canada have enforced certain legislation, including Smoke-Free Ontario in 2006, which prohibited smoking in workplaces, enclosed public spaces, and motor vehicles when a minor under the age of 16 is present; banned the public display of tobacco products; and prohibited youth-targeted products such as flavoured cigarillos (Ontario Ministry of Health and Long-Term Care 2011). This action has reportedly greatly reduced tobacco use and lowered health risks to non-smokers in Ontario (Ontario Ministry of Health and Long-Term Care 2011).

## Major policy issues from the evidence base

Looking at the overall evidence base for tobacco cessation, the 25 completed tobacco cessation studies were published between 1997 and 2014, with a total of 9254 participants. Eight were conducted in the American Indian and/or Alaska Native populations, eight in New Zealand Māori peoples, eight in Aboriginal and/or Torres Strait Islander Australians, and one in an Aboriginal Canadian population. Ten were randomised controlled trials, five were controlled clinical trials, and the remaining ten were pre and post-studies. Table 1 provides a summary of the characteristics of each study and results for the 25 completed tobacco cessation trials.

Of the 15 randomised and non-randomised controlled trials only two reported statistically significant reductions in tobacco rates at final follow-up compared to the control population (Holt et al. 2005; Walker et al. 2012). Holt et al. (2005) conducted the only controlled trial that examined the efficacy of the smoking cessation pharmacotherapy bupropion hydrochloride (Zyban). They conclude that an eight week course of bupropion, supplemented with counselling, is an effective smoking cessation treatment in the Māori population. The smoking participants in this study were self-selected highly motivated subjects, limiting the generalisability of the findings to a non-motivated cohort. However, authors highlight that motivated smokers may be the preferable target population for pharmacological interventions. Walker et al. (2012) only included a 25 percent subpopulation of Māori subjects, with results not reported separately for the Māori participants. Thus, the true effect on the Indigenous population in this study evaluating very low nicotine content cigarettes as an adjunct to Quitline counselling is not known. Similar to the successful Holt et al. study, authors of this trial recognise that the study population of Quitline callers were highly motivated and more ready to quit in comparison to the standard population of tobacco users.

Overall, methodological quality was determined to be reasonable for the 25 completed tobacco cessation studies, as per the detailed risk of bias assessment shown in Figure 1. A summary risk of bias assessment presented as a percentage across each bias category is shown in Figure 2.

Quit rates at final follow-up for the remaining ten pre and post-studies ranged from 0 percent (Patten et al. 2010) to 30 percent (Gould et al. 2009). Patten et al. (2010) employed a small sample of 35 subjects, while Gould et al. (2009) used a total sample of only 15 as a pilot to an ongoing trial called 'Give up the smokes'.

The overall mean quit rate at final follow-up for the intervention arm of the 25 tobacco cessation studies was 18.29 percent (excluding the Grigg et al. 2008 and Hearn et al. 2011 studies, which did not report quit rates). Final follow-up ranging from three months to 12 months (average final follow-up occurred at six months). The intervention resulted in reduced levels of smoking at follow-up in 12 of the 15 controlled trials, with the control population producing better smoking abstinence results in three studies (Maddison et al. 2014; Patten et al. 2010; Whittaker et al. 2011). Interestingly, these three studies were all conducted between 2010 and 2014, two of which only included sub-populations of Māori tobacco users in a larger cohort of New Zealand subjects, while the third study included a sample size of only 35 as part of a feasibility study (Patten et al. 2010). Authors of the latter study report that the low enrolment rate reflects that the program was not feasible or acceptable by the study population of Alaska Native pregnant women. Both intervention and control arms of this study included brief face-to-face counselling at the first antenatal visit, with provision of written materials. The intervention group also received four telephone calls, a video highlighting personal stories, and a cessation guide.

### *Australian community intervention programs*

An additional 53 Australian government policy and community intervention programs were identified. Eight focused on youth, of which two looked specifically at tobacco prevention (Kickett 2009; Yarran 2010), with the remaining six examining smoking cessation and prevention among youth (Day 2007; Johnston et al. 2013; Minniecon 2005; Ryan 2010; Shah et al. 2013; Tasmanian Aboriginal Centre Inc. 2012, 2014). A total of 27 studies focused just on adults, and the remaining 18 studies included both adults and youth. Twenty-three studies in total examined both prevention and cessation intervention outcomes, 28 just examined cessation, and as mentioned above, two focused only on tobacco prevention. Five studies were specifically tailored for Indigenous pregnant women (Chamberlain 2008; Murphy 2009; Passey 2009; Passey et al. 2009; Quit SA 2011; Rumbalara Aboriginal Co-Operative 2012). One study, 'Break the Chain', was a nation-wide media campaign targeting recent quitters between 16 and 40 years of age, which commenced in 2011 and is ongoing. Eight studies were conducted in the Northern Territory, five in Queensland, 12 in New South Wales, one in the Australian Capital Territory, three in Victoria, two in Tasmania, nine in South Australia and 11 in Western Australia. Thirty-seven of the 53 projects were reported to be complete, yet only 26 provided published results, with the eleven outstanding studies found to have no published results available despite the reported completion.

Characteristics and findings for these 53 studies are reported in Table 2. In summary, primary intervention components included 35 studies using the media; 33 incorporating some form of counselling; 32 involving health care workers or health services; 16 including pharmacotherapy (all using NRT, and one (Lynch 2005) also using varenicline tartrate and bupropion hydrochloride); 15 including Elder and/or peer role models; 10 using school-based intervention delivery methods; five incorporating government and community policies; while four studies examined only qualitative techniques. Of the 26 completed studies with published results, two showed no evidence of any effect, six examined only qualitative outcome variables, and the remaining 18 provided some descriptions relating to successful intervention delivery mechanisms or overall satisfaction with the intervention from participants. However, only one of these 18 studies provided quantitative data on smoking cessation outcomes (Lynch 2005). Lynch (2005) produced 444 quit attempts by 328 people, 24 percent of which were reported to be ex-smokers for a minimum of six months, with an intervention that incorporated community programs, trained health professional assistance with one-on-one monitoring, provision of pharmacotherapies including NRT, varenicline tartrate and bupropion hydrochloride, and 'healthy start' programs with a maternal infant health focus and school 'keeping well' program, in addition to provision of information at correctional facilities. This was the only Australian government and community study identified that examined a smoking cessation pharmacotherapy other than NRT.

A study by Heydari et al (2014) that reviewed smoking cessation tools in the general population from the years 2000-2012 indicated that NRT, varenicline tartrate, and education training for quit attempts were the most commonly advised cessation aids, while electronic cigarettes and non-nicotine based medicines were the least advised methods (Heydari 2014). The most common forms of NRT used among Aboriginal Australian populations are patches, gum and lozenges, while other smoking cessation pharmacotherapies such as varenicline tartrate and bupropion hydrochloride, though known to be more effective in the general population (Carson et al. 2013), are often underused and under-prescribed in the Indigenous setting.

Four ongoing tobacco cessation studies were identified with protocols published between 2011 and 2014, three being randomised controlled trials and one a pre-post study. The characteristics of the four cessation studies are reported in Table 3.

### *Tobacco cessation studies among pregnant women*

Women who smoke during pregnancy can have complications with premature delivery, and can potentially have babies with complications such as low birth weight, Sudden Infant Death Syndrome (SIDS) and respiratory conditions such as asthma (Li et al. 2013). Furthermore, children born to mothers who smoke during pregnancy have an increased risk of developing Type 2 diabetes and coronary heart disease, and being obese later in life. Although almost all these women know that smoking during pregnancy is not good for their baby, it can be hard to break an addictive lifetime habit, especially if everyone around them continues to smoke (Passey et al. 2013). Among Indigenous pregnant women these concerns are amplified due to the increased prevalence of tobacco use in this population, and the high incidence of negative health outcomes on the mother and baby that already occur due to compounding environmental, social, familial and other factors. Only two of the 25 completed cessation trials were designed for pregnant women (Eades et al. 2012; Patten et al. 2010). Five additional studies were identified among Australian government policy initiatives and community projects, though two of these were ongoing (Passey 2009; Passey et al. 2009; Rumbalara Aboriginal Co-Operative 2012), and the remaining three studies showed some positive effects related to the intervention, though no quantitative smoking abstinence data were provided (Chamberlain 2008; Murphy 2009; Quit SA 2011).

Neither of the two completed cessation trials produced results in favour of the pregnancy tobacco cessation program. Indeed Eades et al. (2012) found no statistically significant difference between intervention smoking rates (11 percent) compared to the control population smoking rates (5 percent) at final follow-up. Patten et al. (2010) had a small sample size ( $n=35$ ) and favoured the control population, with 6 percent of control subjects and 0 percent of intervention subjects reporting abstinence at final follow-up.

Thus, there is a paucity of successful smoking cessation options identified from this review for pregnant women, though the use of counselling and support services are recommended, and reports by some expert committees as per the Australian General Practice smoking cessation guidelines do recommend the use of NRT in certain circumstances (Australian Government Department of Health and Ageing 2004). Long-term abstinence post-partum remains an issue, particularly among Indigenous women, that needs greater attention. Passey et al. (2013) explored the views of Indigenous Australian pregnant women and antenatal care providers, finding that both current smokers and providers thought that the most effective strategy was 'involving family'. Other programs have also found that smoking interventions targeting Indigenous Australians should incorporate family-based components because of the importance and closeness of family ties in Aboriginal populations (Gould et al. 2014; Gould et al. 2013; Johnston and Thomas 2008).

Another strategy that also ranked highly in the Passey et al. (2013) study was the role of 'health professionals'. Many studies have highlighted that advice and support from doctors, nurses and health staff plays a role in aiding and supporting quit attempts. However, speaking to pregnant women about their smoking can sometimes be considered a difficult subject, and one that some health professionals and Aboriginal Health Workers avoid completely. Evaluations indicate that they avoid the topic as they do not want to judge the pregnant woman, fear that they may put extra stress on the woman during pregnancy, and fear that women may not return for follow-up appointments if they have not managed to quit between visits (Passey et al. 2013). However, Passey et al. (2013) found that women believed support from health professionals was likely to be helpful, and was perceived to be effective at aiding quit attempts. A better understanding is needed of the behaviours, attitudes and knowledge of Indigenous pregnant women who are smokers, ex-smokers and non-smokers, as well as those of health professionals who treat these women. Qualitative investigations to date suggest that anti-tobacco messages need to relate to and be tailored to Indigenous women's experiences,

with a focus on quitting processes and support efficacy (including individual, group and family involvement), and should capitalise on the positive changes occurring (Gould et al. 2013; Gould et al. 2012).

### *Evidence base for tobacco prevention in youth*

We identified nine completed studies that evaluate tobacco prevention programs in Indigenous youth, published between 1987 and 2011, with a total of 10,498 subjects. Six were randomised controlled trials – five from the United States of America (USA) and one from Canada – with two controlled clinical trials from New Zealand and one from Australia, and the remaining pre-post study coming from Canada. All nine studies used school forums for message delivery, and three also included wider multi-component community-based initiatives, including mass media campaigns. Follow-up time periods ranged from six months to five years after baseline data collection, with intermediate data collection also occurring in three studies. The characteristics and findings from these studies are summarised in Table 4.

Overall, methodological quality was determined to be reasonable, though a detailed risk of bias assessment for each included and completed tobacco prevention study is available in Figure 3, with a summary as a percentage across each bias category presented in Figure 4.

At final follow-up, five of the controlled studies produced no statistically significant changes between intervention and control groups. One additional study had a sample size too small to allow direct comparison (Mckennitt and Currie 2012), and another was a pre-post study (Baydala et al. 2009), which showed improved post-test responses for the majority of participant questionnaires. For the remaining two studies, one found a benefit for the intervention in two sub-populations, but not for the sample as a whole (Davis et al. 1995) and another study produced results in favour of the control (Glover et al. 2009). For the Davis et al. (1995) trial a statistically significant reduction in smoking in favour of the intervention was observed for boys ( $p = 0.02$ ) and Pueblo students ( $p < 0.01$ ), but not girls or Navajo students. However, for the other Davis trial (Davis and Cunningham-Sabo 1999), a (non-statistically significant) trend was observed in favour of the control, with 38 percent of subjects in the intervention arm reporting tobacco use compared to 25 percent in the control. Intervention subjects were also more likely to report smoking within 24 hours of each test and smoking prior to the post-test for those who had self-reported as non-smokers at baseline. Positive changes in tobacco use were found at post-test ( $p < 0.05$ ; change score of  $-0.15$  for intervention and  $-0.01$  for control) for the Gilchrest et al. (1987) study, however, these were not maintained at six months follow-up (change score of  $-0.11$  for intervention and  $0.07$  for control). Although no statistically significant differences were observed between intervention and control groups at follow-up for the Glover et.al. (2009) study ( $OR$  1.30; 95% *ci* 0.24–7.08), Māori ( $OR$  4.60; 95% *ci* 3.24–6.52) and Pacific Islander ( $OR$  2.75; 95% *ci* 1.92–3.82) students were more likely to initiate smoking by follow-up compared to other ethnicities. In the matched cohort (never-smokers at baseline that completed both pre and post-intervention assessments) a statistically significant difference was observed in favour of the control group, with 21 percent of intervention subjects trying tobacco use compared to 14 percent in the control group ( $p < 0.001$ ), however, these results were not adjusted for baseline differences and need to be interpreted with caution.

Some discussion is warranted highlighting possible explanations for the studies producing outcomes in favour of the control. Tobacco prevention initiatives for youth generally target audiences between the ages of 12 and 18 years, however the age of onset for tobacco use among Indigenous youth is often earlier (Australian Institute of Health and Welfare 2002; First Nations Center 2005). As such, perhaps younger cohorts need to be considered for intervention delivery. Tailoring interventions to the specific population is also important, as findings from some studies have indicated limited generalisability of culturally grounded

drug prevention programs for certain youth ethnic groups, with the possibility that an inappropriate match between the initiative and the participant characteristics may actually lead to an *increase* in the problem behaviour (Dixon et al. 2007). Such characteristics could include age, gender, and lack of consideration around traditional smoking. Likewise the approach of some initiatives could be encouraging young people to smoke through acts of rebellion, especially if community role models, siblings and/or peers continue to smoke as part of the community 'norm' (Scragg and Laugesen 2007). For these reasons, future initiatives need to incorporate secondary outcome measures related to attitudes, perceptions and intentions around the individual's tobacco use, and perceptions around peer or sibling tobacco use.

Evidence from other meta-analyses suggest that underpinning a smoking prevention initiative with an established research theorem that addresses social and cognitive influences of tobacco use may influence the uptake of smoking by youth (Brinn et al. 2010; Carson et al. 2011). A recent Cochrane review assessing interventions for tobacco use prevention for Indigenous youth has presented similar data with inconclusive findings, however due to the strict inclusion criteria for Cochrane meta-analyses, only two of the nine studies we identified for this review were assessed (Carson et al. 2012b). Although this review, like the Cochrane review, highlights the limited evidence to support tailored tobacco prevention initiatives for Indigenous populations, there is encouraging evidence supporting tailored interventions for smoking cessation in Indigenous settings (Carson et al. 2012a; Elton-Marshall et al. 2011). For this reason, well-conducted and culturally tailored tobacco prevention interventions should not be discounted just yet, as a lack of methodological rigour may be partly responsible for our inconclusive findings. Consideration should be given to evaluations within Indigenous populations prior to intervention delivery. These will assist researchers and policy makers alike to identify potential programs and components of programs that are most likely to be effective. They will also allow identification of cultural implications for tobacco use, which need to be incorporated into any initiative (Taulii et al. 2010). No ongoing studies were identified for tobacco prevention for Indigenous youth.

## Discussion

This review of 91 studies has identified culturally tailored Indigenous tobacco cessation and prevention studies from across four countries and thus a diverse range of Indigenous peoples. An intervention that may work well in one country will not always be transferable into another. This is due to differences in the origin of tobacco use within each population, cultural significance surrounding tobacco use, access to products, local policies, traditions, and other factors (Carson et al. 2012a). However, it may still be possible from a policy and practice perspective to extrapolate results from one setting into another, providing they have been appropriately adapted to the target population. Definition of success for the intervention varied substantially between studies. In those where a clear research study design was implemented, such as a randomised controlled trial or a pre-post study, efficacy of the intervention was clearer. However, in studies where no comparator group is reported, sample sizes are not provided, and there is no mention of any clear quantitative or qualitative outcomes related to the cessation or prevention of tobacco, it is difficult to draw any reliable conclusions.

From the available evidence as reported in the tables, we can determine some of the elements from successful interventions that can inform policy and program design. These include:

- multi-faceted interventions that take into account various aspects of tobacco use at once such as biochemical addiction, habit, cultural reasons for smoking and stressors, and psychological reasons for smoking;
- interventions carried out among people who are already highly motivated to quit smoking, such as those with acute illnesses, who have family members with tobacco-related illnesses, or who want to quit for their children;
- use of pharmacotherapy, particularly Champix (varenicline tartrate), Zyban (bupropion hydrochloride), and nicotine patches;
- use of incentives (e.g. Quit and Win competitions);
- programs that train health professionals in smoking cessation and motivational interviewing techniques;
- behavioural support services that take into account cultural practices, traditions and language; and
- interventions involving health professionals in addition to community.

It is more difficult to confidently say that a program is ‘not effective’ and unsuccessful, as opposed to there being ‘no evidence of any effect’. Indeed, in many cases the sample sizes are too small and/or attrition too great to confidently confirm that the results of the study are a true indication of what would happen in the real-world population. Thus, defining aspects of programs that are ineffective is not possible due to the unreliability of the existing sample pool. Other barriers to accurate reporting of results are selective recruitment of participants, lack of methodological rigour in study design, follow-up, outcome measures, method of data collection, duration of the intervention, and who the intervention is delivered by.

Emphasising that some of these studies produced results in favour of the control population is important, and highlights the fact that not every intervention is a good intervention. Consideration needs to be given to attitudes, perceptions and motivations within populations and among individuals who are continuing to smoke or intending to smoke, as in some cases it may be better to not intervene at all than risk a negative community-wide response. In light of this, future studies need to consider not only the number needed to treat, but also the number needed to harm.

## **Emerging issues in tobacco prevention**

### *Electronic cigarettes*

None of the 91 identified studies, completed or ongoing, evaluated interventions using electronic cigarettes (e-cigarettes). E-cigarettes, first introduced in China approximately 10 years ago (Kelly and Asal 2014), are devices that mimic certain components of a real cigarette. They are battery operated and allow users to inhale vapour comprised of substances that include nicotine, propylene glycol, and other flavours (Gallus et al. 2014; Kelly and Asal 2014). They have been marketed as a smoking cessation tool or as an alternative ‘safer’ form of smoking for those who are not able to quit. People and organisations supporting their use say that the device reinforces smoking behaviours, while being a safer alternative to traditional smoking. Many of the chemical products contained within cigarettes, and the by-products that are released from tobacco burning, are the primary factors contributing to respiratory and other health problems. These are not present with e-cigarettes. However, there has been very little research surrounding the use of these devices to facilitate smoking cessation, with some studies reporting that they can cause symptoms such as nausea, headaches, coughing, and throat and lung irritations (Gallus et al. 2014). Neither the World Health Organization nor the Food and Drug Authority have approved the use of e-cigarettes,

and both have warned that they should be approached with caution as there have not been enough clinically based studies analysing the vapour within the device or safety following long-term exposure. The emerging popularity of these devices in mainstream culture, particularly in the USA, makes e-cigarettes a potential smoking cessation tool worthy of further investigation in Indigenous and mainstream settings (Bullen et al. 2010).

### *Training health professionals in smoking cessation and tobacco prevention*

Smokers rarely plan quit attempts (Larabie 2005), though according to the most recent National Aboriginal and TSI Social Survey, nearly two-thirds of current daily smokers had indeed tried to quit or reduce smoking in the 12 months prior to interview, with general health concerns being the primary reason (Australian Bureau of Statistics 2011). Collaborating with health services provides an opportunistic and unique environment in which to deliver smoking cessation programs, as health professionals consult countless people each year and are perceived to be influential sources of information for smoking cessation (Zwar et al. 2009). Reviews and meta-analyses have consistently shown that individual counselling from smoking cessation specialists increase the chances of successful abstinence compared to less intensive support (Carson et al. 2012c; Fiore et al. 2008; Lancaster and Stead 2008). Indeed even training of short duration (a one-off session of 2–3 hours) can have substantial implications for quit attempts among patients of health professionals long-term (Carson et al. 2012c).

However, one Australian study conducted in urban Aboriginal medical services failed due to clinic, patient, Aboriginal health worker and GP factors that interacted with the study design and ultimately resulted in the inability to implement the trial as planned (Sibthorpe et al. 2002). Moreover, many of the healthcare workers and some doctors on the frontline are reporting that they do not believe they have the skills or ability to offer smoking cessation/prevention initiatives to patients. Perhaps more importantly, some admit to the attitude of ‘even if I did, it’s not going to work so why bother’ (Carson et al. 2013b; Carson et al. 2012c). The research base from this review has demonstrated that early collaboration and engagement with Indigenous community members is imperative to successful implementation of initiatives and programs within communities (Carson et al. 2012a; Sibthorpe et al. 2002). Indeed, a review of tobacco use and misuse among Aboriginals in Canada identified that health professionals play a critical role in reducing tobacco use through health intervention programs (Orisatoki 2013). For Aboriginal health professionals in particular, the likelihood of engagement with Aboriginal patients is increased compared to non-Aboriginal health professionals. Moreover, Aboriginal healthcare professionals are often viewed as role models within these communities (Orisatoki 2013). Given this evidence, health professionals should be considered as an opportunistic vehicle to deliver sustainable and culturally-adapted tobacco strategies.

## **Conclusions**

Although we are seeing reductions in smoking rates across Australia (Australian Institute of Health and Welfare 2014) and other countries (Health Canada 2014; New Zealand Government 2013), for many these changes are not coming fast enough. This review of 91 studies found some evidence to support the use of culturally-tailored smoking cessation and tobacco prevention interventions among Indigenous populations. Based on the evidence produced we can confidently say that multi-faceted interventions that take into account various aspects of tobacco use at once such as biochemical addiction, habit, cultural reasons for smoking, and stressors and psychological reasons for smoking, are effective. Another key

characteristic of the successful programs includes recruitment of sample populations that are already highly motivated to quit smoking. Therefore these interventions act more as a support mechanism than a tool to change an individual's attitude from one of pre-contemplation to action. Research and clinical practice evaluations are needed that examine strategies and interventions to aid this transition, so that appropriate community-wide policies and programs can be implemented. We know from epidemiological studies that pharmacotherapy is currently underused in the Indigenous context, despite successful quit attempts observed among studies using smoking cessation medications identified in this review. Use of Champix (varenicline tartrate), Zyban (bupropion hydrochloride), and nicotine patches in particular, have produced statistically and clinically significant benefits in long-term smoking cessation among Indigenous participants. Incentive schemes such as Quit and Win competitions, programs that train health professionals in smoking cessation and motivational interviewing techniques and those including behavioural support services that take into account cultural practices, traditions and language, are also components identified in the successful interventions.

Identifying characteristics of the unsuccessful programs is more difficult, as there is a distinct difference between an intervention not being effective and one which shows no evidence of any effect. Indeed in many cases the sample sizes are too small and/or attrition too great to confidently confirm that an intervention will not work. However, programs that have a longer intervention duration, with greater intervention intensity and more multi-faceted components were more likely to be successful than those of shorter duration and with fewer components (e.g. intervention included medication, culturally-tailored written resources, smoking-bans at community events, counselling with health worker, community-wide program and incentive scheme).

It is also important to note that alongside these studies there are always other tobacco prevention and smoking cessation initiatives that are occurring simultaneously and are not being reported by study authors, which is likely to have an impact on the success of an intervention. As per the discussion above relating to existing major policy developments, some countries will have policies that are enforced throughout the entire nation, whilst other countries do not employ that policy at all, or it is only enforced throughout certain regions. For example, in Australia and New Zealand taxes on cigarette sales are enforced across the entire country, whilst in the USA cigarette taxes are not enforced on Indian reservations. These existing policy differences will have an impact on the generalisability of the findings between countries and even between communities within a country. Another factor to consider is to note when nation-wide policy changes were implemented, and determine whether any occurred during the evaluation of one of the included studies. This is particularly relevant for those studies that do not have a control or comparator group, as any changes observed will relate to all smoking cessation and tobacco prevention initiatives that are occurring at a population level, *as well as* the study intervention level. This compounding of intervention factors means that the true effect of any given intervention program may be overestimated in some cases due to the implementation of plain packaging of cigarettes, increased tax on tobacco, or another policy initiative occurring during the course of the study evaluation period.

Studies that investigate programs tailored for pregnant women are also required. This is a high risk population where interventions are sometimes viewed as being controversial due to the fear of placing extra stress on the pregnant woman. Among Indigenous pregnant women this concern is amplified by the increased prevalence of tobacco use and the high incidence of stress and negative health outcomes already occurring on mothers and babies in this population. However, the benefits of smoking cessation on the health of the mother and baby cannot be overstated. Several studies have examined the role of counselling and group

support in addition to NRT products for cessation, with good short-term results for the duration of the pregnancy. A pragmatic guide for smoking cessation counselling and NRT use specifically among Aboriginal and TSI Australian smokers (Gould et al. 2014) recommended include the use of NRT in pregnancy, which experts believe to be safer than continued smoking. Although an initial quit attempt without pharmacotherapy is suggested, women should be offered an accelerated course of NRT within a few days of continued smoking after the initial quit attempt. This includes oral forms and then the use of patches or combined oral and patch therapy, which should be continued for a minimum of 12 weeks and provided post-partum (Gould et al. 2014). Long-term cessation, however, is not often sustained and further research is required to help new mothers to remain smoke-free. Health professionals, Aboriginal Health Workers, and Aboriginal Education Officers play a significant role in addressing the role of smoking in pregnant Aboriginal women. Adequate and effective training needs to be a priority so that professionals feel that they have the right set of skills and confidence to aid tobacco cessation among this cohort.

Training health professionals who see Indigenous patients in general smoking cessation techniques is one promising area that requires more investigation. The benefit of conducting an investigation in this setting is that implementation of the intervention will simultaneously build community capacity by training health professionals in skills and providing them with knowledge that will be sustainable beyond the life of the project. These are important factors to consider when performing research in the Indigenous context and developing appropriate policy responses.

Future programs need to consider the role of social media in tobacco prevention and cessation interventions, particularly considering that tobacco companies are already using these resources for their own advertising purposes. E-cigarettes are also an area of emerging popularity, despite the lack of evidence about their efficacy. The concern is that young people in particular are being actively marketed to by the tobacco companies who own these products, particularly with the production of flavoured e-cigarettes. The general public perception being encouraged by tobacco companies is that e-cigarettes are the 'safe' alternative to cigarettes, but without methodologically rigorous clinical investigations to support these claims, this cannot be verified and thus cannot be recommended as an effective cessation aid or alternative for smoking cigarettes.

Preventing youth from starting smoking remains the most effective strategy in controlling the tobacco epidemic. Moreover, considering that only one completed study was identified on tobacco prevention in Australia, action is required in this area. Future programs need to consider the appropriateness of these tobacco prevention programs and tailor these to the specific requirements of the population. When designing the intervention, thought needs to be given to exposure and duration of treatment, and training Indigenous project officers wherever possible to enhance the uptake of prevention messages and collect process measures to quantify the degree of implementation.

Until effective evaluation procedures are routinely conducted alongside tobacco cessation and prevention investigations, we cannot identify components of existing interventions most likely to impact on a successful long-term reduction in tobacco prevalence for Indigenous populations. Methodologically rigorous investigations are needed to distinguish components of the less-successful interventions from the successful ones that can be used to aid future policy, practice and research initiatives. Importantly, this review has identified studies producing better results in the control population compared to the intervention group. Future evaluations should consider not only the 'number needed to treat' for a given intervention, but also the 'number needed to harm'.

To battle the tobacco epidemic multi-faceted programs are needed, with consistent messages from all sectors including governments, health institutions, retailers and education

centres, as well as from within individual families and smaller community groups. We do not need to reinvent the wheel; future programs, policies and research should build upon the evidence produced in this review. The next phase of research needs to have a heavy translational focus. All future work in this area needs to address how we can support the intervention into standard practice, policy and/or the front-line of clinical care to maximise benefits to the community. It is possible to reduce and even eliminate the tobacco epidemic by sharing our resources and knowledge between these groups and throughout the global population. In light of recent funding cuts from governments and a lack of reporting on existing heavily resourced interventions, the gap between Indigenous and non-Indigenous health will continue to remain a problem within our society for as long as we allow it to be one.

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**Table 1** Characteristics and results of included tobacco cessation studies

Study reference and design	Sample (n) and age in years	Intervention duration	Intervention description	Findings
<b>Campbell et al. 2014</b> CCT	Aboriginal and TSI Australian ( <i>n</i> =702) 15 and over	2 months	SmokeCheck QLD; Training health professionals; Brief intervention training for two-days based on stages of change model about making every opportunity to help smokers to quit; Training of motivational interviewing techniques for health workers with Indigenous clients and patients; Ongoing post-training support, printed newsletters and other resources; Smoke-free support group, enforcement of tobacco sales legislation; Monitoring of compliance with legislation on tobacco sales; Youth aspect with ‘Smokin’ – no way’ multimedia education program training provided to teachers and resources supplied to schools; Event support program available with organisations able to apply for sponsorship of community events and anti-smoking branded merchandise; ‘Smoke Rings’ support program with five week group support sessions for people trying to quit smoking	<ul style="list-style-type: none"> <li>• No statistically significant difference between intervention and control for daily smoking prevalence</li> <li>• Statistically significant change from baseline observed for daily smoking in the intervention communities at 12 months (43.6%–35.2%; <i>p</i>=0.011; 8.4% quit rate)</li> <li>• Non-significant trend in decline observed for control in daily smoking from baseline to follow-up (44.7%–36.5%; <i>p</i>=0.075; or 8.2% quit rate)</li> <li>• Evaluation of 217 health workers from urban, regional and remote communities producing statistically significant outcomes with increased skills in delivering the intervention, confidence, self-efficacy and role legitimacy</li> </ul>
<b>Glover et al. 2014</b> Pre-post study	Māori New Zealand ( <i>n</i> =148) 18 and over	3 months	WERO study (the Māori word meaning challenge); Quit and win competition competing for NZ\$5000 to charity or community group of winning teams choice; Utilised incentives, competition, social support, behavioural therapy, pharmacological therapy, and interactive iPad application website	<ul style="list-style-type: none"> <li>• Biochemically validated quit rate of 36% at 3 months and 26% at 6 months</li> <li>• Pacific and rural Māori teams had high quit rates of 46% and 44% at 3 months and 36% and 29% at 6 months respectively (point prevalence)</li> </ul>
<b>Maddison et al. 2014</b> RCT	Māori New Zealand ( <i>n</i> =906; 30.9% of subjects were Māori) 18 and over	6 months	Fit2Quit intervention consisting of 10 exercise telephone counselling sessions over six months plus usual care (behavioural counselling and NRT); Control group received usual care alone (behavioural counselling and NRT); Fit2Quit is a comprehensive community based exercise program delivered by Green Prescription services where trained exercise facilitators (patient support persons) contacted participants to offer telephone support	<ul style="list-style-type: none"> <li>• No significant group difference in 7-day point prevalence (23% intervention and 22% control) and continuous abstinence (17% intervention and 18% control) at six months</li> <li>• Probability of smoking significantly higher among Māori participants (<i>p</i>=0.01) in regression model</li> <li>• The more intervention calls successfully delivered the lower the probability of smoking in the intervention group (<i>p</i>=0.01)</li> </ul>

Study reference and design	Sample (n) and age in years	Intervention duration	Intervention description	Findings
<b>Marley et al. 2014</b> RCT	Aboriginal Australia (n=168) 16 and over	12 months	Locally-tailored, intensive, multidimensional smoking cessation program including motivational interviewing techniques, diversions and strategies to deal with smoking related triggers action plans for preventing and dealing with short term relapses, discussion regarding the positives of smoking cessation, referral for and titration of pharmacotherapy, identifications of smoking risk factors, with links to additional non-health support agencies (e.g. public housing, welfare) and monthly peer support groups; Control group received usual care from local primary health service including advice to quit, pharmacotherapy and self-initiated follow-up	<ul style="list-style-type: none"> <li>• Smoking cessation rate for intervention participants:11% (n=6) and 5% for usual care group (n=5) though the difference was not statistically significant</li> <li>• No subjects who had been recently incarcerated, chewed tobacco, or drank alcohol daily quit smoking</li> </ul>
<b>Smith et al. 2014</b> RCT	American Indian and Alaska Native United States of America (n=103) 18 and over	3 months	Culturally tailored smoking cessation treatment for American Indian and Alaska Native smokers; Evidence-based cessation intervention included four counselling sessions and 12 weeks of varenicline tartrate; Intervention tailored to address tobacco related issues specific to Menominee and other American Indian and Alaska Native smokers; Counselling provided by the study coordinator who was an enrolled member of the Menominee tribe and trained as an alcohol and other drug abuse counsellor; Control received standard treatment cessation intervention	<ul style="list-style-type: none"> <li>• No statistically significant group differences in 7-day point prevalence at six months (22.6% intervention and 14% control; intention to treat analysis; responder rate 42%)</li> <li>• Overall 90.2% of subjects reported taking varenicline at one week post-quit, 84% at three weeks post-quit and 32.1% at 12 weeks post-quit</li> </ul>
<b>Cosh, Hawkins, Skaczkowski, Copley, &amp; Bowden 2014</b> Pre post study	Aboriginal and TSI Australians Australia (n=281) 15 and over	3 months	One-on-one telephone counselling support for smokers wanting additional support through the South Australian Quitline telephone smoking cessation service, using a callback service, where counsellors regularly call smokers	<ul style="list-style-type: none"> <li>• Higher proportion of non-Indigenous callers received 3 month quit certificates (14.4%) compared to Indigenous callers (2.5%)</li> <li>• Indigenous callers were also less likely to use cessation medication such varenicline or bupropion (39.5% vs 65.1%) compared to non-Indigenous callers, but were more likely to use NRT patches (9.6% vs 6.9%) and other NRT (4.3% vs 3.7%) respectively</li> </ul>
<b>Eades et al. 2012</b> RCT	Aboriginal and TSI Australians Australia (n=263) 16 and over	9 months (three visits scheduled over this time)	Smoking intervention for pregnant women including general practitioner and other health care worker delivered tailored advice and support to quit smoking during first antenatal visit; Utilised evidence-based communication skills and engagement with woman's partner and other adults in supporting the quit attempts; NRT offered after two failed attempts to quit smoking; Control group received usual care with advice delivered by health professional	<ul style="list-style-type: none"> <li>• At 36 weeks there was no significant difference in smoking rates between intervention group (89%) and usual care group (95%)</li> <li>• Authors report possible contamination of the intervention across groups or the nature of the intervention itself may have contributed to the result</li> </ul>

Study reference and design	Sample (n) and age in years	Intervention duration	Intervention description	Findings
<b>Walker et al. 2012</b> RCT	Māori New Zealand ( <i>n</i> =1410; 25% of subjects were Māori) 18 and over	2 months	Very low nicotine content cigarettes plus usual Quitline care (NRT and behavioural support); Very low nicotine content cigarettes were supplied in a carton of 200 (Quest 3 brand Vector Tobacco Inc.) by a courier at no cost; Participants were instructed to stop smoking their regular cigarettes on a 'quit day' and start smoking the low nicotine cigarettes whenever they had an urge to smoking during the subsequent 6 weeks; Standard Quitline smoking cessation support with vouchers given to purchase subsidised NRT at a pharmacy and telephone support from Quitline advisors over 8 weeks (with 10–15 minute calls) were also included; Control group received usual Quitline care alone	<ul style="list-style-type: none"> <li>• At six months intervention participants were significantly more likely to have quit smoking compared to control subjects with 23% continuously abstinent compared to 15% respectively</li> <li>• Seven day point prevalence estimates at six months were also significant (33% for intervention compared to 28% in usual care)</li> <li>• Results were not reported separately for Māori and Non-Māori subjects</li> </ul>
<b>D'silva, Schillo, Sandman, Leonard, &amp; Boyle 2011</b> Pre post study	American Indian Unites States of America ( <i>n</i> =317) 18 and over	Not specified; 90-day follow-up; 'Exit' of intervention occurred prior to 90-day follow-up	Culturally specific curriculum for tobacco dependence treatment with four 1-hour individual or group sessions of behavioural counselling paired with pharmacotherapy; Sessions were conducted by counsellors who had specialised training in tobacco dependence treatment; NRT and cessation medications were offered to subjects free of charge; Subjects had to enrol in the program and completed a counselling session to receive pharmacotherapy; All clients were offered a \$25 gift card for completing all four sessions	<ul style="list-style-type: none"> <li>• Of subjects who completed 90-day follow-up (47% of <i>n</i>=317 subjects), self-reported abstinence (7-day point prevalence) was reported in 47% of subjects</li> <li>• A missing = smoking analysis (intention to treat analysis) yielded a 21.8% quit rate (7-day point prevalence) at 90 days</li> <li>• Continuing smokers cut their daily smoking by half from 17 to eight cigarettes per day</li> </ul>
<b>Hearn et al. 2011</b> Pre post study with a delayed intervention control (CCT)	Aboriginal Australia ( <i>n</i> =165) Adults	6 months	Culturally specific smoking cessation training program (SmokeCheck) for health professionals working in NSW; Training aimed to increase professional's knowledge, skills and confidence to offer an evidence-based quit smoking brief intervention to Aboriginal clients; Personal smoking behaviour, current practice regarding delivery of smoking cessation brief intervention and availability of resources were also incorporated; History of tobacco use, national and state Indigenous smoking data, social determinants and health effects of smoking and how to advise clients who smoke to quit were all incorporated into the intervention model; Training was provided jointly by an Aboriginal and non-Aboriginal presenter, both with experience in Aboriginal health and education	<ul style="list-style-type: none"> <li>• No changes reported in smoking behaviours or intentions to quit</li> <li>• Control population showed no significant changes however a higher proportion of intervention participants were more confident in talking about the health effects of tobacco use (22% <i>p</i>=0.001), offering quit advice (27% <i>p</i>=0.001), assessing readiness to quit (31% <i>p</i>=0.001) and initiating a conversation about smoking (24% <i>p</i>=0.001)</li> <li>• After training more intervention participants provided advice about NRT (15% <i>p</i>=0.001), environmental tobacco smoke exposure (12% <i>p</i>=0.006) and reducing tobacco use (10% <i>p</i>=0.034)</li> </ul>

Study reference and design	Sample (n) and age in years	Intervention duration	Intervention description	Findings
<b>Whittaker et al. 2011</b> RCT	Māori New Zealand ( <i>n</i> =226; 24% of subjects were Māori) 16 to 25	6 months	Automated package of video and text messages over six months that was tailored to self-selected quit date, role model and timing of messages; Subjects received one message per day for one week prior to quitting, three messages per day for the next four weeks, one message every two weeks following that and one every four days for 20 weeks after that (approx. 6 months after randomisation); Extra messages were available on demand for cravings and to address lapses; Six role models were chosen (three Māori) and subjects were asked to select one person from whom they would receive messages; Control group also set a quit date and received general health video messages sent to their phones every two weeks	<ul style="list-style-type: none"> <li>• Continuous smoking abstinence (intention to treat) at six months was 26.4% in the intervention group and 27.6% for the control</li> <li>• Results were not reported separately for Māori and Non-Māori subjects</li> <li>• Initial target sample of 1300 was unable to be collected (226 recruited)</li> <li>• Biochemical validation of abstinence (NicAlert test-strips) occurred in a subset of subjects with 14 quitters in the intervention group returning the strips (48% of 29 self-reported quitters) with seven confirmed as non-smokers; Fifteen quitters in control group (47% of 32 subjects) returned strip and 11 (31%) were confirmed non-smokers</li> </ul>
<b>Bullen, Howe et al. 2010</b> RCT	Māori New Zealand ( <i>n</i> =1100; 28% of subjects were Māori) 18 and over	10 weeks	Smokers calling the New Zealand Quitline service were provided with 2 weeks of nicotine patches and/or gum prior to target quit date, followed by usual care being 8 weeks of patches and/or gum plus support from Quitline advisors; Control group received usual care being 8 weeks of patches and/or gum plus support from Quitline advisors	<ul style="list-style-type: none"> <li>• Seven day point prevalence of abstinence was reported in 22.7% of intervention subjects and 21% of control subjects at six months follow-up</li> <li>• Results were not reported separately for Māori and Non-Māori subjects</li> </ul>
<b>Makosky Daley et al. 2010</b> Pre post study	American Indian Unites States of America ( <i>n</i> =not reported) Not reported	Not specified	Pilot study of the All Nations Breath of Life smoking cessation program; Four iterations of the program was examined with changes to the intervention made in each; Intervention included weekly in-person group support sessions with individual telephone calls using motivational interviewing, an education curriculum and pharmacotherapy	<ul style="list-style-type: none"> <li>• Preliminary self-reported data revealed quit rates of 65% at program completion and 25% at six months post-baseline</li> <li>• Definition of abstinence and number of participating subjects not reported</li> </ul>
<b>Patten et al. 2010</b> RCT	Alaska Native Unites States of America ( <i>n</i> =35) 18 and over	2 months	Cessation intervention for pregnant Alaska Native women residing in the Yukon-Kuskokwim Delta region of Western Alaska; Intervention included face-to-face counselling at the first visit, four telephone calls, a video highlighting personal stories and a cessation guide; Control group received brief face-to-face counselling at the first visit and written materials	<ul style="list-style-type: none"> <li>• Biochemically confirmed abstinence rates at follow-up were 0% and 6% for the intervention and control groups respectively</li> <li>• Participant rate low with 12% of eligible women enrolled (35/293); Authors suggest that the low enrolment rate reflects that the program was not feasible or acceptable</li> </ul>

Study reference and design	Sample (n) and age in years	Intervention duration	Intervention description	Findings
<b>Boles et al. 2009</b> Pre post study	Alaska Native Unites States of America (n=102; and n=670 non-Alaska native) 18 and over	3 months	Tobacco cessation Quitline service in Alaska providing a 24 hour 7-day a week telephone service staffed by trained nurses; Intervention consisted of tobacco use assessment, treatment planning based on stage of readiness to change, up to eight proactive follow-up counselling calls, a quit kit and free NRT; One Alaska Native nurse was available to speak with Alaska Native callers if requested	<ul style="list-style-type: none"> <li>• Seven day point prevalence of abstinence was 22.2% at three month follow-up, compared to non-Alaska Native participants with a quit rate of 40.7%</li> <li>• 90% of Alaska Native smokers accepted NRT compared to 96% of non-Alaska Native callers</li> </ul>
<b>Gould et al. 2009</b> Pre post study	Aboriginal Australia (n=15) 18 and over	2 months	Pilot study of Give Up the Smokes (GUTS) program including one 3-hour group sessions per week for three weeks presented by a general practitioner and health advisor; Culturally-appropriate intensive cessation program including a range of evidence-based interventions such as motivation to quit, pharmacotherapies, behaviour modification and stress management, Indigenous history of tobacco use, prevalence and health effects of smoking; Two months of NRT was provided	<ul style="list-style-type: none"> <li>• At six month follow-up there was a 30% quit rate (3/10 subjects) compared to a non-Indigenous program (CATS – Chronically Addicted Tobacco Smokers) with a 25% quit rate (19/76 subjects)</li> <li>• Completion rate for the GUTS course was 53% (8/15 subjects)</li> <li>• Definition of abstinence not reported</li> </ul>
<b>Grigg, Waa, &amp; Bradbrook 2008</b> Pre post study	Māori New Zealand (n=655) All ages	12 months	National television campaigns running from August 2001 to September 2002 including 15 television commercials utilising interviews with real Māori smokers and their Whānau (the traditional Māori family unit), talking about quitting smoking and how this has affected them; The end of each add shows the Quitline number with a voiceover giving the call to action “it’s about Whānau, call the Quitline 0800 778 778”	<ul style="list-style-type: none"> <li>• Seventy eight per cent of smokers and 73% of whanau recalled viewing the campaign one year following its launch</li> <li>• Fifty four per cent of smokers stated that the campaign had made them more likely to quit</li> <li>• No quit smoking participant data was reported</li> </ul>
<b>Digiaco, Davidson, Davison, Moore, &amp; Abbott 2007</b> Pre post study	Aboriginal and TSI Australians Australia (n=37) 18 to 70	10 month	High intensity smoking cessation program within a primary care setting for clients and staff of a suburban Aboriginal Medical Service; Weekly cessation counselling sessions occurred with two non-Indigenous health professionals couple with dispensation of free NRT to subjects participating in ongoing counselling sessions; Aboriginal health workers concurrently engaged in culturally appropriate cessation counselling via brief opportunistic interventions	<ul style="list-style-type: none"> <li>• Thirty two of the 37 subjects reported quit attempts during the observation period with three subjects (9%) reported to have quit smoking</li> <li>• Chronic and recurrent life stressors were reported as being the primary barriers to cessation</li> <li>• Definition of abstinence not reported</li> </ul>

Study reference and design	Sample (n) and age in years	Intervention duration	Intervention description	Findings
<b>Hayward, Campbell, &amp; Sutherland-Brown 2007</b> Pre post study	Aboriginal Canada (n=243; and n=2,953 non- Aboriginal) 18 and over	Not specified though randomised to 30-day or 6 month follow- up	Canadian Quitline call service across seven provinces (Newfoundland, and Labrador, Nova Scotia, Prince Edward Island, New Brunswick, Ontario, Manitoba and Saskatchewan) where callers receive basic information and advice, motivational counselling based on scientific protocols and mailed materials; Proactive services are also offered to those callers who are committed to quitting smoking within a given timeframe. Pharmaceutical aids are not provided; This was not a culturally tailored Quitline call service but rather a mainstream program	<ul style="list-style-type: none"> <li>• Six month prolonged abstinence was experienced by 10.7% of Aboriginal callers and 8.8% of non-Aboriginal callers</li> <li>• More Aboriginal males (16.7%) than females (7.2%) achieved long-term abstinence, a discrepancy that was not observed among the non-Indigenous</li> <li>• 30-day point prevalence was achieved by 16.9% of Aboriginal callers and 14.2% of non-Aboriginal callers</li> <li>• 7-day point prevalence was achieved by 18.9% of Aboriginal callers and 16.5% of non-Aboriginal callers</li> </ul>
<b>Bramley et al. 2005</b> RCT	Māori New Zealand (n=355 Māori and i=1350 non- Māori) 16 and over	26 weeks	STOp smoking by Mobile Phone (STOMP); Regular personalised text messages providing smoking cessation advice, support and distraction; Māori specific text messages related to Māori language, support messages (in Māori and English) and information on Māori traditions; After six weeks the number of messages reduced from 5 per day to 3 per day until 26-week follow-up; Text messaging was also free for one month; Control group received no smoking related information but did receive one text message per fortnight reminding them that completed follow-up would be rewarded with a free month of text messaging	<ul style="list-style-type: none"> <li>• Seven day point prevalence at six weeks for Māori participants was 26.1% in the intervention group and 11.2% in the control</li> <li>• No significant difference observed between Māori and non-Māori participants with the latter reporting 28.6% and 13.2% abstinence at six weeks for intervention and control groups respectively</li> <li>• At 26 week follow-up 21.6% of Māori intervention subjects and 18.4% of control subjects reported cessation</li> </ul>
<b>Holt et al. 2005</b> RCT	Māori New Zealand (n=134) 16 to 70	7 weeks	Seven weeks of the cessation medication bupropion (Zyban) using 150mg once daily for three days followed by 150mg twice daily for seven weeks; Control population received an identical placebo for the same duration of time; Both treatment groups also received smoking cessation counselling	<ul style="list-style-type: none"> <li>• Continuous smoking abstinence were statistically significant in favour of the intervention arm at three months (44.3% and 17.4%) and at six months (21.6% and 10.9% for the intervention and control groups respectively)</li> </ul>

Study reference and design	Sample (n) and age in years	Intervention duration	Intervention description	Findings
<b>Horn et al. 2005</b> CCT	American Indian United States of America (n=74) 14 to 19	10 weeks	Pilot study of the American Indian Not On Tobacco (N-O-T) program; Intensity of intervention included 10-hour long sessions occurring weekly; Program addressed topics such as understanding reasons for smoking, preparing to quit, understanding nicotine addiction and withdrawal, accessing and maintain social support, coping with stress and preventing relapses; Delivered in same-sex groups of up to 12 teens and led by a same-sex facilitator; Control group received a brief 15-minute intervention	<ul style="list-style-type: none"> <li>• Intention to treat analysis identified 18% of intervention males compared to 10% of control males quit smoking at three months (24 hour abstinence; not statistically significant)</li> <li>• For compliant subject sample 28.6% of intervention males and 14.3% of control males quit smoking at three months</li> <li>• No females quit smoking during the study</li> </ul>
<b>R. G. Ivers et al. 2003</b> CCT	Aboriginal and TSI Australians Australia (n=111) 18 and over	10 weeks	Forty Indigenous smokers self-selected to receive free nicotine patches and a brief intervention for smoking cessation compared to 71 who chose the brief intervention only; NRT therapy included six weeks of 21mg patches, two weeks of 14mg patches and two weeks of 7mg patches, used 24 hours per day; Each participant received a one week supply of patches with instructions to return to collect more patches from the health centre; The brief intervention included advice on quitting, advice on the health effects of smoking, support in setting a quit date, counselling on cessation, being shown a flip-chart about tobacco and being offered a pamphlet (approximately 5 minutes to administer)	<ul style="list-style-type: none"> <li>• Fifteen per cent of the intervention group and (10% with carbon monoxide validation) and 1% of the control group (carbon monoxide validated) reported that they had quit smoking at six months</li> <li>• Seventy six per cent of the intervention group and 51% of the control group reported reduced tobacco consumption</li> </ul>
<b>Johnson, Lando, Schmid, &amp; Solberg 1997</b> CCT	Native American United States of America (n=601) 18 and over	Not specified	Doctors Helping Smokers (DHS) program across four urban Indian health clinics; A 2-day training session was conducted with medical and laboratory personnel for the intervention, smoking cessation education and recruitment and follow-up procedures; DHS intervention included: screening of patients for smoking status, use of a smoke card as a reminder to providers, clinician message giving, supportive reinforcement by clinic staff and monitoring of quit progress; Control subjects received usual care and smoking cessation materials for distribution; Subjects received a \$25 cash incentive to return to the clinics at one year follow-up	<ul style="list-style-type: none"> <li>• At one year follow-up 7.1% of intervention subjects and 4.9% of control subjects reported abstinence</li> <li>• Of the subjects making at least one visit to the clinics in the 12 month follow-up period 9.4% of intervention subjects and 3.9% of control participants self-reported abstinence</li> <li>• Cotinine validated cessation occurred in 6.7% of intervention and 6.8% of control subjects</li> </ul>

Study reference and design	Sample (n) and age in years	Intervention duration	Intervention description	Findings
<b>Hensel et al. 1995</b> Pre post study	Alaska Native United States of America (n=193) 18 and over	2 months	Tobacco cessation program including behavioural modification classes and NRT (patches); Four group counselling and behavioural modification sessions were conducted over a two week period, followed by seven sessions over a six week period; Content of the group sessions were based on the American Lung Association 'Freedom From Smoking' and American Cancer Society 'Fresh Start' programs; A physician or pharmacist attended the group session and discuss and prescribe NRT	<ul style="list-style-type: none"> <li>• Quit rates at three, six, nine and 12 months respectively were 31%, 30%, 24% and 21%</li> <li>• At three months follow-up 193 subjects (31%) were still enrolled</li> <li>• Twenty-two subjects (12%) did not use any NRT products</li> </ul>

RCT= randomised controlled trial; CCT= controlled clinical trial; NRT = nicotine replacement therapy

**Table 2** Australian government policy initiatives and community projects

<b>Program name</b>	<b>State, year and reference</b>	<b>Funding body</b>	<b>Intervention type, target group and description</b>	<b>Findings</b>
<i>National</i>				
Break the Chain	National 2011-ongoing (Australian Government 2013)	The Australian Government of Health	Media campaign; Targeting recent quitters between 16–40 years of age; The Media campaign was shown across both mainstream and Indigenous TV, radio and print including newspapers and magazines; The campaign supported quit attempts among smokers and promoted strategies to avoid relapse among quitters; It included Elder and peer role-models	<ul style="list-style-type: none"> <li>• The campaign was found to be a success and resonated well with the target audience; The main messages about ‘Breaking the Chain’ and the harms of smoking were conveyed and received well and encouraged Indigenous smokers to decrease their smoking while encouraging recent quitters to not pick up the habit again</li> </ul>
<i>Northern Territory</i>				
Asthma and smoking prevention project	Northern Territory Ongoing (Shah et al. 2013)	Menzies School of Health Research	Multi-component tobacco intervention; Targeting Aboriginal youth; This study uses peer-led education to promote messages to do with smoking and taking action to quit	<ul style="list-style-type: none"> <li>• Ongoing – not yet evaluated</li> </ul>
Enhancement Campaign	Northern Territory and South Australia 2014 (Cancer Council South Australia 2014)	Cancer Council of South Australia	Multi-component Tobacco Intervention; Targeting community; This was an advertisement campaign which featured 60 second commercials which centred around three main themes: footy, men and women; The footy ads focussed on health and sports fitness, the male ads focussed on health and the financial gain and the ads targeted at females focused on health and social/family benefits for offspring and careers; These advertisements were intermingled with feature people calling Quitline and asking for help quitting	<ul style="list-style-type: none"> <li>• The campaign has yet to be evaluated but will be done through the use of a pre-post survey which will measure awareness and use of Quitline services and recall of the campaign</li> </ul>
Healthy Starts (Te Piriphotanga)	Northern Territory 2009–2012 (Ramamoorthi 2009)	Menzies School of Health Research	Multi-component tobacco intervention; Targeting families; Family based programs about ETS smoke were delivered by Aboriginal community workers to see if the number of Indigenous infants (<12 months) coming into hospital with respiratory illness would decrease	<ul style="list-style-type: none"> <li>• A full evaluation is still yet to be released but at last review the program was going well; Recruitment recorded 93 Indigenous participants in Darwin and 228 Māori participants enrolled in New Zealand</li> </ul>

<b>Program name</b>	<b>State, year and reference</b>	<b>Funding body</b>	<b>Intervention type, target group and description</b>	<b>Findings</b>
Monitoring and evaluating Aboriginal tobacco control	Northern Territory 2007–2009 (Thomas 2007)	Collaborative Research Centre for Aboriginal Health and the National Health and Medical Research Council	Community based survey; Targeting community; This was a 2 phase project; Phase 1 consisted of using national surveys, local interview data to understand the reasons as to why Aboriginal people smoke, quit smoking, or never start smoking; Phase 2 consisted of 6 monthly audits of local stores to monitor tobacco sales in the area and to obtain trend data	<ul style="list-style-type: none"> <li>• As of 2008, trend data on tobacco sales has been obtained for 10 communities; The interviews revealed that the biggest factor for this community in influencing their pattern of smoking was family influence as to whether they smoked, continued smoking or never began smoking</li> </ul>
Smoke Check NT	Northern Territory Unclear (Jenkinson 2007)	Department of Health and Families ADSCA	Training health professionals; Targeting health professionals; Free workshops were run to help train Indigenous Health Workers in remote areas in brief intervention approaches; There were 2x1 workshops that were run in Alice Springs and Tennant Creek	<ul style="list-style-type: none"> <li>• The workshops had good feedback from participants and in general the program was well received</li> </ul>
"Starting to Smoke" Experiences of Indigenous Youth	Northern Territory 2011 (V. Johnston et al. 2013)	Lowitja Institute	Interviews; Targeting Indigenous youth; The aim of the project was to explore what factors cause Indigenous youth to begin smoking and to gain an insight into the social and cultural processes that impact on tobacco use among this group; Peer researchers recruited and conducted a series of group and individual interviews to gain knowledge relating to tobacco use trends	<ul style="list-style-type: none"> <li>• Final study group comprised of 46 Indigenous (46% smoking) and 19 non-Indigenous youth (16% smoking); Smoking facilitators included family influences, access to tobacco, role modelling, socialisation, with similar influences reported by non-Indigenous youth</li> <li>• Anti-smoking socialisation in the home was a key determinant of not smoking</li> </ul>
The Tobacco Action Project (TAP)	Northern Territory 1999-2002 (R. Ivers et al. 2005)	Territory Health Services Centre for Aboriginal Health	Multi-component Tobacco Intervention; Targeting community; The study was a multicomponent tobacco intervention that involved six matched and controlled Aboriginal communities in the Northern Territory (NT); The intervention included sports sponsorship, health promotion campaigns, training health professionals in the delivery of smoking cessation advice, school education about tobacco and policy on smoke-free public places; Surveys were also used to measure changes in knowledge about smoking, prevalence of tobacco use and attitudes to smoking and cessation in intervention communities	<ul style="list-style-type: none"> <li>• Tobacco consumption decreased in one of the three intervention communities as compared to its matched control community; The other two communities did not fully implement the intervention; This study suggests that the success of the intervention relies on the community itself as well as the tobacco unit to help support and implement the intervention</li> </ul>

<b>Program name</b>	<b>State, year and reference</b>	<b>Funding body</b>	<b>Intervention type, target group and description</b>	<b>Findings</b>
Top End Tobacco Project	Northern Territory 2007-2012 (Robertson 2007)	National Health and Medical Research Council	Multi-component Tobacco Intervention; Targeting community; Intervention includes: baseline and follow up surveys to measure tobacco use in each community, monitoring tobacco sales in the communities, support for community-developed strategies to reduce and prevent tobacco use, making NRT more readily available, employing local research workers, provision of regular feedback to each community and key stakeholders and support for capacity building of local health workers	<ul style="list-style-type: none"> <li>• The project is still ongoing. However, preliminary data indicates that 77% of the 400 community members interviewed identified themselves as current smokers and that greater than 50% of them are either trying to quit or are thinking about quitting</li> </ul>
<b>Queensland</b>				
Butt Out: NRT trial	Queensland 2007 (Young & Campbell 2007)	James Cook University	Nicotine Replacement Therapy Trial; Targeting community; Patches, gum and counselling were made available to assess the uptake and effectiveness of having free NRT readily available	<ul style="list-style-type: none"> <li>• The study wasn't overly effective. Of the 64 which were recruited, only 26 could be located after 6 months; Of those 9 said that they were smoke free however only 2 of the 9 completed the 10 week NRT</li> </ul>
I-Quitt	Queensland 2009–2012 (Hippi 2009)	Australian Government's Department of Health and Ageing	Multi-component tobacco intervention; Targeting community; The program promotes smoke-free messages throughout the community, and raises community awareness of chronic health conditions caused by smoking and second-hand smoke; The program provides one-on-one support and advice on NRT, provides motivational counselling, educational sessions for youth, focus groups for adults and provides general information about cessation aids; Targeting lactating mothers, parents and carers, school students, sporting participants and supporters and community	<ul style="list-style-type: none"> <li>• Not available – completed</li> </ul>
Murri Places, Smoke-free Spaces	Queensland 2011–ongoing (Institute for Urban Indigenous Health 2011)	Institute for Urban Indigenous Health	Multi-component tobacco intervention; Targeting community; The intervention focuses on making workplaces and medical organisations smoke-free zones; The program involves collaborating with community organizations to create smoke free policies, raise awareness of the smoke free policy, provide smoking cessation and wellness programs available to staff including one-on-one support, quit group and NRT; Smoke-free Murri radio consultations underway	<ul style="list-style-type: none"> <li>• The main finding was that staff and community ownership of smoke-free policies are essential when it comes to determining the success of intervention campaigns</li> </ul>

<b>Program name</b>	<b>State, year and reference</b>	<b>Funding body</b>	<b>Intervention type, target group and description</b>	<b>Findings</b>
Our Space Smoke Free	Queensland 2010–ongoing (Gussy 2010)	Wuchopperen Health Service	Multi-component Tobacco Intervention; Targeting community; Intervention will include media releases, broadcasting on WHS telephone system, website and waiting room displays of the exposure of environmental tobacco smoke (ETS) and dangers of smoking; Handouts, brochures and education sessions through community services and schools on the exposure to ETS and the dangers of smoking. Smoking cessation support and education programs will also be provided	<ul style="list-style-type: none"> <li>• 'Our space smoke free' project plan is in the early stages of implementation</li> </ul>
Smoke Free Life Research Project	Queensland Unclear (Bond 2012)	Australian Institute of Aboriginal and Torres Strait Islander Studies	Interview; Targeting community; During the course of the study, 20 Indigenous ex-smokers were interviewed using a semi-structured interview guide; In particular, the study was interested in finding out what the motivators of smoking change were and the enablers and barriers that were important in their attempts	<ul style="list-style-type: none"> <li>• The study revealed that there was no 'hinge factor' for quitting smoking among those interviewed. Often, the reasons as to why participants gave up smoking were quite complex rather than just realising that it was a toxic and unhealthy habit</li> <li>• Frequently, the reasons as to why they quit smoking were intertwined with life experiences such as experiencing the death of a loved one due to smoking, and came down more to the experiences that they had during their life</li> </ul>
<i>New South Wales</i>				
Aboriginal Tobacco Resistance Tool Kit	New South Wales 2013 (Finlay 2013)	NSW Ministry of Health	Education tool for Health Workers; Targeting health professionals; This was a kit designed to help to Aboriginal health workers with tobacco resistance and control initiatives; Includes NRT management, counselling with smoking cessation referrals, a workplace smoking policy, community policy and social marketing policy	<ul style="list-style-type: none"> <li>• Not available – completed</li> </ul>
'Butt Busters' Program	New South Wales 2005–ongoing (Davison 2005)	Aboriginal Medical Service Western Sydney (AMSWS)	Multi-component tobacco intervention; Targeting community; This program uses Aboriginal Health Workers to work closely with community members using a one-on-one approach to raise awareness and help quit attempts; general counselling, NRT and access to other smoking cessation tools are provided	<ul style="list-style-type: none"> <li>• Evaluation of intervention involving weekly cessation counselling and free NRT between August 2005 and June 2006 found that there was a 9% quit rate at 6 months</li> </ul>

<b>Program name</b>	<b>State, year and reference</b>	<b>Funding body</b>	<b>Intervention type, target group and description</b>	<b>Findings</b>
Clean Air Dreaming	New South Wales 2007–2009 (Sarin, Graham, & Walker 2007)	Commonwealth Department of Health and Ageing under the National Drug Strategy	Multi-component tobacco intervention; Targeting community; This intervention ran a series of school and community education programs and focused on reducing smoking in Aboriginal communities through the use of promotion and prevention campaigns, raising treatment awareness of smoking cessation tools, providing treatment programs, training health professionals to better help with quit attempts and by encouraging communities and organizations to go 'smoke free'	<ul style="list-style-type: none"> <li>• Early evaluations suggest that the program is a successful as mainstream interventions; Evaluations suggest that more community members are at least thinking about quitting then before; The program was expanded to nearing areas due to its success</li> </ul>
Engaging an Aboriginal Elder in Promoting Tobacco Control Messages to the Aboriginal and Torres Strait Islander Community Project	New South Wales 2005 (Minniecon 2005)	NSW Health for World No Tobacco Day	Multi-component tobacco intervention; Targeting population of Aboriginal smokers in Sydney; The intervention encouraged Aboriginal smokers to give up smoking by using culturally suitable health promotion strategies which included the telling of a quit attempt story by a local Elder, radio promotions, promotional postcards with smoking and health information and cessation services were developed and promoted; The Elder was also involved in Koori radio talks about his experience in quitting; Information stalls at the Aboriginal Medical Service, Redfern	<ul style="list-style-type: none"> <li>• Not available – completed</li> </ul>
Give Up The Smokes	New South Wales 2006–ongoing (Gould 2006)	Cancer Institute NSW	Education/training; Targeting health professionals; The program aims to provide intensive support to Aboriginal health workers to better improve their confidence and skills when helping their clients stop smoking; The program aimed to raise awareness within the community about the harms of smoking through the running of workshops	<ul style="list-style-type: none"> <li>• Ongoing – not yet evaluated</li> <li>• Related to (Gould et al. 2009) reported in table 1 above</li> </ul>
Justice Health Quit Smoking Project	New South Wales 2009 (Griffiths 2009)	Justice Health Aboriginal Health Unit	Multi-component tobacco intervention; Targeting prison inmates; Promotions were done through the Chronic Care staff in Prison Health Centres. Patients were provided with NRT and counselling support services to stop smoking	<ul style="list-style-type: none"> <li>• In general the program was well received by the inmates and a large majority of them are in the process of thinking about quitting or have quit</li> </ul>
Keep Koori Kids Smoke Free	New South Wales 2004–2013 (Martinez 2013)	Centre for Population Health and Aboriginal Health Unit	Multi-component tobacco intervention; Targeting community; The intervention includes the use of a smoke free register where those that register are given access to an Aboriginal support officer over the phone, the program also uses social marketing for promotion and also incorporates the training of Aboriginal Health Workers to provide more culturally suitable advice to help clients stop smoking; Run across nine government areas aiming to reduce environmental tobacco smoke exposure	<ul style="list-style-type: none"> <li>• Not available – completed</li> </ul>

<b>Program name</b>	<b>State, year and reference</b>	<b>Funding body</b>	<b>Intervention type, target group and description</b>	<b>Findings</b>
Kick the Habit	New South Wales 2011–ongoing (Aboriginal Health and Medical Research Council of New South Wales 2010)	Aboriginal Health and Medical Research Council and the NSW Ministry of Health	Social Marketing Campaign; Targeting community; The campaign has three target audiences and uses different ways of conveying messages about smoking to elders, parents and kids and youth; The campaign uses films, radio, brochures, posters, stickers and branded clothing and accessories to spread the message about the perils of smoking and what the community can do to get help; Each film stars an age appropriate local community role model who tells their inspiring story of how they gave up smoking	<ul style="list-style-type: none"> <li>• A survey conducted after the completion of the study indicates that participants had a high level of recall about the main messages of the campaign and hence the campaign was thought to be a success</li> </ul>
NSW SmokeCheck Project	New South Wales 2006–2011 (Carroll 2006)	NSW Health and the Cancer Institute NSW	Multi-component tobacco intervention; Targeting community; The intervention had four primary areas of focus; Firstly, it aimed to redesign health care systems/environments to support brief interventions, secondly it aimed to train Aboriginal Health Workers in cessation interventions, thirdly it aimed to increase the number of quit attempts at its own workshops and finally they wanted to focus on smoking cessation programs specifically for Aboriginal women; The intervention included the use of evidence-based cessation counselling, individual support to clients as well as increasing awareness of cessation tools such as NRT	<ul style="list-style-type: none"> <li>• The impact evaluation results showed that improvements were achieved across a number of areas for all workshop participants, in particular there were statistically significant increases in the confidence and in skills and knowledge about NRT and environmental tobacco smoke</li> </ul>
No Smokes North Coast	New South Wales 2010–2012 (Gould 2010)	Mid North Coast Division of General Practice	Multi-component Tobacco Intervention; Targeting community; The program included the training of Aboriginal health workers, the creation of promotional DVDs campaigning to stop smoking, school competitions to involve youth to create anti-smoking messages and art, promotional quit days and raising awareness of smoking cessation tools such as NRT; DVD titled 'Blow away the smokes' created with web-site support; Special guest launch included Tom Calma and Sean Chulburra	<ul style="list-style-type: none"> <li>• The DVD has been successful at educating, informing and inspiring community members to quit smoking</li> </ul>
Smokers Program	New South Wales 2005–ongoing (Lynch 2005)	Office for Aboriginal and Torres Strait Islander Health	Multi-component tobacco intervention; Targeting community; The intervention aims to raise awareness to the community about the detrimental effects of smoking through focus groups and having a trained professional assist the participants one-on-one and monitor them closely; Conducted across seven health services, patients are also given advice on pharmacotherapies (including varenicline and bupropion) and subsidised NRT; Includes Healthy start program with maternal infant health focus and keeping well from school age up; Provision of information sessions at correctional facilities	<ul style="list-style-type: none"> <li>• As of the end of 2009, 444 quit attempts made by 328 people have been recorded. 24% of these people (n=78) are now ex-smokers and have been for a minimum period of at least 6 months</li> </ul>

<b>Program name</b>	<b>State, year and reference</b>	<b>Funding body</b>	<b>Intervention type, target group and description</b>	<b>Findings</b>
Stop smoking in its tracks: understanding smoking by rural Aboriginal Women	New South Wales 2007 (Passey 2009; Passey et al. 2009)	Commonwealth Department of Health and Ageing	Multi-component Tobacco Intervention; Targeting pregnant Aboriginal women; The intervention includes counselling for women, provision of specially designed resources, free NRT for women and their households, rewards for confirmed quitting, household resources, and quitting support groups, with support continuing for 6 months post-partum	<ul style="list-style-type: none"> <li>• Ongoing – not yet evaluated</li> </ul>
<b>Australian Capital Territory (ACT)</b>				
No More Boondah	Australian Capital Territory 2012–2014 (Webb 2012)	Winnunga Nimmityjah Aboriginal Health Service	Multi-component tobacco intervention; Targeting community; The program provides one on one phone support and coaching, and support groups weekly; Social marketing campaigns to spread awareness of the campaign as well as encouraging workplaces to develop a smoke free policy was also part of the intervention; Aims to increase understanding of the effects of environmental tobacco smoke, improve the uptake of prevention programs and utilises other health care workers	<ul style="list-style-type: none"> <li>• It was found that most people in the program did not like setting a quit date as the pressure was too much; It was also found that most people preferred to be assisted with their quit attempts</li> </ul>
<b>Victoria</b>				
Reducing smoking among pregnant aboriginal women in Victoria: a holistic approach	Victoria 2008–2011 (Chamberlain 2008)	Victorian Department of Human Services	Multi-component tobacco intervention; Targeting Aboriginal pregnant women; The intervention included project workers engaging and collaborating closely with health workers and women; Creating supportive environments and providing group support was vital to the success of the intervention as well as providing ongoing training to ultimately reduce smoking prevalence among pregnant Aboriginal women	<ul style="list-style-type: none"> <li>• The results of the study indicate that interventions aimed at pregnant Aboriginal women should incorporate adequate training to Aboriginal Health Workers to build up their confidence and increase their ability to provide effective and suitable clinical-based interventions and community-based tobacco activities; Supportive environments also need to be created in these sorts of interventions so that the women feel safe, secured and not judged; Targeting the whole family is also vital when it comes to the success of the women quitting</li> </ul>

<b>Program name</b>	<b>State, year and reference</b>	<b>Funding body</b>	<b>Intervention type, target group and description</b>	<b>Findings</b>
Rumbalara Quit Program	Victoria Ongoing (Rumbalara Aboriginal Co-Operative 2012)	Healthy for Life Funding	Multi-component Tobacco Intervention; Targeting community; The program provides one-on-one counselling services to members of the community wanting to quit smoking through nurses and other health care workers; As part of the program television commercials were developed as well as short articles published in local newsletters; Small, short programs were also implemented to aid with peoples quit attempts; Supports pregnant women to stop smoking during pregnancy and to reduce exposure to second hand smoke for themselves and their children; Designated smoking areas at health services	• Ongoing – not yet evaluated
Smoking No Good Aye	Victoria 2010–2012 (Ryan 2010)	Australian Government's Indigenous Tobacco Control Initiative	Multi-component Tobacco Intervention; Targeting Indigenous youth; The intervention included the use of media to promote anti-smoking messages through advertisements on TV and radio, posters were also distributed with similar messages; Community workshops were run to provide help to those wanting to quit and mentors were used to inspire youth	• Not available – completed
<b>Tasmania</b>				
Alcohol, tobacco and other drugs program (Tasmanian Aboriginal Centre)	Tasmania Ongoing (Tasmanian Aboriginal Centre Inc 2012, 2014)	Tasmanian Aboriginal Centre	Multi-component tobacco intervention; Targeting community; The alcohol, tobacco and other drugs program runs services which include counselling and preventative tobacco use and smoking cessation programs for young people and the community	• Ongoing – not yet evaluated
Tasmanian Aboriginal Tobacco Control Project	Tasmania 2006–2010 (Boadle 2006)	Office for Aboriginal and Torres Strait Islander Health	Multi-component tobacco intervention; Targeting community and health professionals; The intervention includes the training of health professionals to specifically tailor cessation advice to Aboriginal community members, smoking cessation workshops for community members, promotion and awareness at community events of anti-tobacco messages	• Feedback from the community so far is good on the project; However, areas that have been highlighted as areas that need work include more work on motivational interviewing and information about quitting medications
<b>South Australia</b>				
Ceduna day centre	South Australia Ongoing (Drug and Alcohol Services South Australia 2012, 2014)	Drug and Alcohol Services South Australia	Multi-component tobacco intervention; Targeting community; The centre provides free confidential treatment, counselling and referral services for Aboriginal people concerned about alcohol, tobacco and other drug issues	• Ongoing – not yet evaluated

<b>Program name</b>	<b>State, year and reference</b>	<b>Funding body</b>	<b>Intervention type, target group and description</b>	<b>Findings</b>
Deadly Nunga's Say No to Puiya	South Australia Ongoing (Day 2007)	Muna Paiendi Aboriginal Community Health Service	Multi-component Tobacco Intervention; Targeting community youth between 12–25 years; The intervention will include health promotion campaigns, community surveys, media engagement to promote specific Indigenous events where messages will be relayed, handing out media CDs, smoking cessation and education workshops and NRT	<ul style="list-style-type: none"> <li>• Ongoing – not yet evaluated</li> </ul>
Enhancement Campaign	South Australia and Northern Territory 2014 (Cancer Council South Australia 2014)	Cancer Council of South Australia	Multi-component Tobacco Intervention; Targeting community; This was an advertisement campaign which featured 60 second commercials which centred around three main themes: footy, men and women; The footy ads focussed on health and sports fitness, the male ads focussed on health and the financial gain and the ads targeted at females focused on health and social/family benefits for offspring and careers; These advertisements were intermingled with feature people calling Quitline and asking for help quitting	<ul style="list-style-type: none"> <li>• The campaign has yet to be evaluated but will be done through the use of a pre-post survey which will measure awareness and use of Quitline services and recall of the campaign</li> </ul>
Improving health for Aboriginal people through tobacco related research	South Australia Ongoing (Carson 2012)	The Queen Elizabeth Hospital	Interviews; Targeting two communities being Adelaide and Murray Bridge (urban and inner regional); 10 focus groups with health care workers, ex-smokers, never smokers and current smokers as well as 30 interviews with key community stakeholders, respiratory doctors and other doctors to be performed or until data saturation is reached	<ul style="list-style-type: none"> <li>• Ongoing – not yet evaluated</li> </ul>
Puyu Wiya Smokecheck	South Australia Ongoing (Stewart 2011)	Aboriginal Health Council of SA	Multi-component tobacco intervention; Targeting community; The intervention mainly focuses on providing smoking cessation with quit coaching to members of the community and also raising awareness of quit tools such as NRT	<ul style="list-style-type: none"> <li>• The main finding of the study was that for successful quit attempts, ongoing support is vital to prevent relapses due to stress or because other triggers of smoking</li> </ul>

<b>Program name</b>	<b>State, year and reference</b>	<b>Funding body</b>	<b>Intervention type, target group and description</b>	<b>Findings</b>
Remote Aboriginal Tobacco Project	South Australia 2008–2012 (Gentle 2008)	Country Health SA Hospital Incorporated	Multi-component tobacco intervention; Targeting community; The intervention includes training Aboriginal health professionals in better more suitable intervention methods and promoting smoking cessation messages at community events; Education projects are also run specifically targeting youth and their smoking habits at local schools and youth centres	• Not available – completed
Rewrite your story campaign	South Australia 2013 (Nunkuwarrin Yunti of South Australia Inc 2013)	Cancer Council of South Australia	Multi-component Tobacco Intervention; Targeting community; This was a campaign that embraced the culture of story-telling. It featured 16 local ambassadors re-telling their own inspiring story about giving up smoking and trying to inspire other Aboriginal community members to re-write their own story and give up smoking; Posters, drink coasters and a series of films were created to raise awareness for the campaign	• The campaign was greeted positively by the local aboriginal community; The campaign doesn't preach the 'don't smoke message', but encourages the community to come together, share their stories and support one another to break the smoking cycle
Smoke-free pregnancy project– Aboriginal women and their families	South Australia 2006–2011 (Quit Sa 2011)	Quit SA	Multi-component tobacco intervention; Targeting pregnant women and their families; The program provides counselling services to pregnant women and their families, as well as providing access to NRT and promotional resources from the campaign about quit messages	• The project has raised awareness about why it is the importance to talk not only with the pregnant women but also with their families when it comes to dealing with quitting smoking during pregnancy
Smoking reduction strategy development and intervention among Aboriginal health workers	South Australia 2008–2011 (Daniel 2008)	University of South Australia	Training health professionals; Targeting health professionals; The intervention used focus groups and interviews to obtain information relevant to smoking cessation and interventions; This information is being used to guide and develop culturally suitable interventions for Aboriginal health workers in South Australia in an effort to decrease smoking rates among Aboriginal health workers	• Not available – completed
<b>Western Australia</b>				
Beyond the Big Smoke	Western Australia 2008–2010 (Lewis 2006)	Australian Health Council of Western Australia	Multi-component Tobacco Intervention; Targeting community; The intervention included support groups, advertising of anti-smoking banners as well as anti-smoking campaigns, presentations from tobacco support groups, stories from community members that had given up smoking and community organised competitions	• Not available – completed
Drug and Alcohol Awareness	Western Australia Ongoing (Kickett 2009)	Aboriginal Alcohol and Drug Service	Visual and media; Targeting Indigenous youth; Visuals such as diagrams and pictures were used to raise participants awareness of the effects of tobacco on major organs such as the lungs	• Not available – completed

<b>Program name</b>	<b>State, year and reference</b>	<b>Funding body</b>	<b>Intervention type, target group and description</b>	<b>Findings</b>
Gnumaries Hurt Program	Western Australia 2010–2013 (Dean 2010)	COAG 'Tackling Indigenous Smoking' initiative	Multi-component tobacco intervention; Targeting community; The intervention includes providing access to community workshops that aid with smoking cessation; These workshops are based around Quit program initiatives; Smoke free days as well as school expos are incorporated	<ul style="list-style-type: none"> <li>• Ongoing – not yet evaluated</li> </ul>
Indigenous Women's Project	Western Australia 2009 (Murphy 2009)	Department of Health, Government of Western Australia	Multi-component tobacco intervention; Targeting pregnant women and their families; The program works with pregnant Aboriginal women and their families to encourage them to give up smoking to reduce the chance of their child developing asthma and other tobacco related illnesses; The program also runs workshops to help train health workers that work with these women in smoking cessation techniques	<ul style="list-style-type: none"> <li>• The program was successful at increasing awareness of the dangers of smoking during pregnancy. The project is in the process of trying to get funded again to expand the project to other locations</li> </ul>
Make Smoking History	Western Australia 2000–ongoing (Chapman 2000)	Tobacco Programs, Cancer Council WA	Advertising campaign; Targeting adult smokers; The intervention includes mass media advertising, community support based strategies to target Indigenous community members, the distribution of public education materials and public activities to help promote the quitting campaign	<ul style="list-style-type: none"> <li>• The knowledge gained from the intervention provided information on why certain members of the Aboriginal community smoke or do not smoke and to gain an insight into their attitudes and feelings about smoking; This information is currently being used to make a promotional DVD promoting success stories which will eventually be available nationally</li> </ul>
My Heart My Family Our Culture	Western Australia 2004 (Dimer 2004)	National Heart Foundation WA	Multi-component tobacco intervention; Targeting community; This was a program designed to raise awareness of the risk factors for heart disease within the Indigenous community; It was designed for both consumers and health professionals. Consumers received DVDs, magnets, recipe booklets and risk factor information sheets while health professionals received posters, booklets and flip charts to use as aids and to increase their knowledge	<ul style="list-style-type: none"> <li>• The campaign was thought to be quite successful; There were several attempts at quitting and succeeding throughout the program; The program was well received by the community and health professionals alike</li> </ul>
Prisons Smoking Reduction Plan	Western Australia Ongoing (Read 2012)	Adult Custodial Directorate	Social media; Targeting Aboriginal inmates in Western Australia; CDs and booklets were used to promote quit attempt stories from local entertainers and identities to prisoners; This was designed to be of particular relevance with the non-literate inmates	<ul style="list-style-type: none"> <li>• Ongoing – not yet evaluated</li> </ul>

<b>Program name</b>	<b>State, year and reference</b>	<b>Funding body</b>	<b>Intervention type, target group and description</b>	<b>Findings</b>
Reducing the Risk of SIDS in Aboriginal Communities	Western Australia 2005–ongoing (Ford 2005)	Office of Aboriginal and Torres Strait Islander Health (OATSIH)	Multi-component tobacco intervention; Targeting families and health professionals; Smoking is one of the contributing factors to SIDS; The program is an awareness campaign to highlight to Indigenous members and local professionals the importance of smoking cessation and to encourage community to stop smoking; The program conducts focus groups, community awareness programs and implements training for health workers	<ul style="list-style-type: none"> <li>• The program has highlighted the need for culturally suitable interventions; The program is thought to be successful and has currently engaged over 400 local professionals, 900 community members and over 115 agencies</li> </ul>
Regional Tackling Smoking and Healthy Lifestyle Workforce and Activities	Western Australia 2010 (Coole & Schultz 2010)	Council of Australian Governments (COAG) Closing the Gap Initiative.	Multi-component tobacco intervention; Targeting community; The project builds on the work from the Beyond the Big smoke project; The project uses social marketing campaigns, focuses on training of health professionals and encourages tobacco control policies at work places; The intervention aims to educate community members about healthy lifestyle choices; The program provides members of the community with information about chronic illnesses, encourages regular health checks, provides quit smoking support and promotes anti-smoking messages at community events; Smoke check including consultation with access to NRT and other pharmacotherapy; Included healthy lifestyle education at youth sporting events; Creation of smoke-free areas and events in health organisations; Media releases for newspapers, radio and television	<ul style="list-style-type: none"> <li>• Not available – completed</li> </ul>
Rockingham and Kwinana Tobacco Control Project	Western Australia 2010–2012 (Yarran 2010)	South Metropolitan Public Health University	Multi-component tobacco intervention; Targeting community; This intervention included the use of promotional aids such as pledge cards, posters and smoking fact sheets; Art therapy workshops were also run as well as promotion of the campaign at local events where tobacco control stalls were set up; Movie nights, sporting activities and festivals were also part of the program to specifically target youth; Service providers given prompt cards and fact sheets to aid quit attempts	<ul style="list-style-type: none"> <li>• Ongoing – not yet evaluated</li> </ul>

<b>Program name</b>	<b>State, year and reference</b>	<b>Funding body</b>	<b>Intervention type, target group and description</b>	<b>Findings</b>
The 'Say No to Smokes' Project – Success Stories Campaign (WA)	Western Australia 2002 (Healthway Western Australian State Government 2002)	Healthway (Western Australia State Government)	Promotional media campaign; Targeting population of Aboriginal smokers in Western Australia; This was a campaign designed to encourage more Aboriginal smokers to give up smoking or make more attempts at stopping smoking; The campaign was one that was centred around the sharing of local successful quitting stories that were distributed to the public as a booklet to people considering stopping smoking and also as a CD which was played on local radio, Aboriginal medical services and used in health promotion advertisements	• Not available – completed
Yarning It Up	Western Australia 2013 (M. Davis 2013)	South Metropolitan Public Health Unit	Multi-component tobacco intervention; Targeting community; Numerous interactive information stalls with visual resources, learning groups, workshops delivering smoke free information were incorporated into this intervention; Collaboration with three public health services each containing a health worker	• Ongoing – not yet evaluated

**Table 3** Ongoing tobacco cessation studies identified from published protocols

Study reference and design	Sample (n) and age in years	Intervention duration	Intervention description	Outcome measures or objectives
<b>Pacheco 2014</b> RCT	American Indian and Alaska Native United States of America (n=300) 18 and over	Not reported (follow-up at six months)	Web-based smoking cessation program for Tribal College Students; Intervention includes nicotine gum, patch or Lozenge or bupropion hydrochloride or varenicline tartrate; Other intervention: Honouring the Gift of Heart Health; Other intervention: Internet All National Breath of Life (I-ANBL)	<ul style="list-style-type: none"> <li>• Primary outcome: Smoking cessation at six months</li> <li>• Secondary outcomes: Adherence to program participation, cigarettes smoked and number of quit attempts all measured at six months</li> </ul>
<b>Maddox, Davey, Cochrane, Lovett, &amp; Van Der Sterren 2013</b> Pre and post study	Aboriginal and Torres Strait Islander Australia (n=102) 12 and over	Not specified (follow-up to occur 12 months after first wave of surveys, focus groups and interviews)	Tobacco control programs under the Action Area 1 of the Australian Capital Territory Aboriginal and Torres Strait Islander Tobacco Control Strategy 2010–2014; These programs include smoking cessation groups, youth and community health promotion programs and education campaigns; Data will be collected through surveys, interviews, focus groups and use of existing de-identified health data including the Talking About the Smokes survey data, pharmaceutical benefit scheme data related to smoking and Quitline call data and volume	<ul style="list-style-type: none"> <li>• Objectives to determine if: individual's social networks influence smoking behaviours; is there an association between various social and cultural factors and being a smoker or non-smoker and do tobacco control programs under the Action Area 1 of the Tobacco Control Strategy 2010–2014 impact on tobacco behaviours, attitudes and beliefs in the Indigenous population</li> </ul>
<b>Bonevski et al. 2011</b> RCT	Aboriginal and Torres Strait Islander Australia (n=585) 18 and over	6 weeks (two face-to-face visits each two weeks apart followed by two phone contacts each one week apart)	Smoking cessation for socially disadvantaged populations with a cohort of Aboriginal and Torres Strait Islander Australians; Intensive client centred smoking cessation intervention offered by a caseworker over two face-to-face and two telephone contacts; Intervention uses motivational interviewing to encourage repeated quit attempts, maximise effective quitting strategies and provide support for life 'stressors' contributing to relapse in disadvantaged populations; Incorporates behavioural contracting, provision of pharmacotherapy subsidies, allocation of support person and support pack, referral to specialist quit services as well as centre-run Life Skills courses; Tailoring to disadvantaged groups for level of need, unique circumstances and access; Control group will receive minimal ethical care consisting of on-screen information at completion of survey including advice to quit and the telephone smoking cessation assistance Quitline number	<ul style="list-style-type: none"> <li>• Primary outcome: Client validated self-reported smoking cessation through 24-hour carbon monoxide validated self-report and 7-day point prevalence abstinence at one, six and 12 month follow-up</li> <li>• Secondary outcomes: Six and 12 month continuous abstinence, sociodemographic characteristics, nicotine dependence via the heaviness of smoking index and two-item Fagerström tolerance questionnaire, quit attempts, use of cessation aids, partner smoking behaviour, depression via the two-item patient health questionnaire, financial stress as well as collection of process measures including acceptability of intervention, staff and client intervention checklists and costs relating to intervention delivery and community service sector costs</li> </ul>

Study reference and design	Sample (n) and age in years	Intervention duration	Intervention description	Outcome measures or objectives
<b>Choi et al. 2011</b> RCT	American Indian and Alaska Native United States of America (n=448; 46 groups with 8 smokers per group) 18 and over	6 months (intervention weekly for 12 weeks and one session at six months then data collection again at 12 months)	All Nations Breath of Life smoking cessation intervention including tailoring to the needs of individuals and communities; Includes five primary components of group support sessions, individual telephone counselling using motivational interviewing, a culturally tailored educational curriculum, pharmacotherapy and participant incentives, all of which have been tailored specifically to a heterogeneous group of American Indian and Alaska Native people; Free pharmacotherapy includes varenicline tartrate, bupropion hydrochloride or NRT; Control group will receive the non-tailored current best practice care	<ul style="list-style-type: none"> <li>• Primary outcome: Biochemically verified continuous abstinence at 12 months</li> <li>• Secondary outcomes: number of quit attempts, number of cigarettes smoked, pharmacotherapy utilisation, number of completed group sessions, cost effectiveness of the intervention</li> </ul>

**Table 4** Characteristics and results of included tobacco prevention studies

Study reference and design	Sample (n) and age in years	Intervention duration	Intervention description	Findings
<b>Mckennitt &amp; Currie 2012</b> RCT	Aboriginal (Indian – First Nations; Inuit; Métis) Canada (n=18) Mean 9.3	1 hour	Pilot study of two grade four classrooms with n=11 Aboriginal students in the culturally sensitive smoking prevention program and n=7 in the standard smoking prevention program, each session lasted 60 minutes; Culturally sensitive intervention began with a traditional Aboriginal smudge ceremony that ‘cleaned’ students with tobacco smoke and other ceremonial plants, discussion of differences between commercial and traditional tobacco use, the harmful chemical and consequences of commercial tobacco use and peer pressure refusal strategies; Standard program (control group) included statistics of smoking among youth, peer pressure refusal strategies, emphasis on harmful chemicals in cigarettes and the cosmetic and health changes of smoking	<ul style="list-style-type: none"><li>• A significant reduction in intention to smoke was observed among intervention participants from baseline (mean 5.18 ± 1.40) to follow-up (mean 4.09 ± 1.04; <i>p</i>=0.05); No difference was observed among control participants</li><li>• Small overall sample size precluded direct comparison between intervention and control populations</li><li>• No difference was observed for knowledge about smoking or cultural knowledge</li><li>• At baseline 16.7% of grade four students were experimenting with smoking</li></ul>
<b>Baydala et al. 2009</b> Pre post study	Aboriginal (First Nation; Sioux) Canada (n=15) Grade 3 students	2 months (2-hour modules delivered once per week)	Evidence-based substance abuse prevention program (Life Skills Training (LST) program) tailored to incorporate cultural beliefs, values, language and visual images by the Alexis Nakota Sioux Nation; Adaptations to the program were Aboriginal ways of knowing including ceremonies, prayer, storytelling, circle theories and the recognition of people’s own life stories; Three day workshop prior to intervention delivery included training to inform community members of program content	<ul style="list-style-type: none"><li>• Majority of participant questionnaire responses improved from pre-test to post-test with 55% of children’s scores increasing for overall knowledge, 55% increasing for drug knowledge, 64% for life skills knowledge, 46% for drug attitudes and 73% for life skills summary</li></ul>

Study reference and design	Sample (n) and age in years	Intervention duration	Intervention description	Findings
<b>Glover et al. 2009</b> CCT	Māori New Zealand (n=4508) Range 11–13	9 months	Community level intervention (Keeping Kids Smoke Free) including schools, public and tribal health providers, parents, local businesses, sporting events, parents and other organisations; Key intervention components included promoting smoking cessation to parents and school staff, promoting protective parental behaviour to reduce child uptake of smoking and reducing social supply of tobacco to minors; Detailed intervention components included promoting smoking cessation through quit competitions and teacher weekly support sessions, promote proactive parental behaviours through a DVD 'Our choice, Their future', reduce social supply through visiting retailers and posters, student smoke-free art competition, communication with parents through newsletters and health promotion events in shopping malls; Control group received no intervention	<ul style="list-style-type: none"> <li>• No difference between intervention and control at follow-up (OR 1.30, 95% CI 0.24 to 7.08) as a whole</li> <li>• Māori (OR 4.60, 95% CI 3.24 to 6.52) and Pacific Islander (OR 2.75, 95% CI 1.92 to 3.82) students were more likely to initiate smoking by follow-up compared to other ethnicities; However, these results have not been adjusted by ethnicity and authors report more Indigenous youth were present in the intervention arm with Indigenous youth more likely to take up smoking during the study period</li> </ul>
<b>Dixon et al. 2007</b> RCT	Native American United States of America (n=685) Range 8–10	12 months 10 lessons 2 boosters	Culturally tailored video-enhanced prevention initiative 'Keepin' it R.E.A.L.'; School based program teaching drug resistance skills through: Refuse, Explain, Avoid and Leave (R.E.A.L.); In-class curriculum was supplemented by a media campaign consisting of television, radio and billboard advertisements to reinforce the four strategies of R.E.A.L. with follow-up booster activities at school assemblies, poster projects, murals and essay contests	<ul style="list-style-type: none"> <li>• No significant interaction was observed between treatment and control conditions or American Indian ethnicity compared to the Non-American Indian population or treatment and ethnicity combined</li> </ul>

Study reference and design	Sample (n) and age in years	Intervention duration	Intervention description	Findings
<b>Davis &amp; Cunningham-Sabo 1999</b> RCT	Native American United States of America (n=1589) Range 11–18	7 months 16 lessons	School based curriculum for 'Pathways to Health' developed for South-western American Indian youth integrating activities, storytelling, parent education and school staff training; Developed for and with input from target population primarily around cancer prevention targeting areas of nutrition, tobacco and the skills needed to resist the social influences surrounding children and youth, while encouraging responsibility for one's health; Traditional customs included into the program for example traditional and ceremonial uses of tobacco are distinguished from daily and recreational use of commercial tobacco, a rich heritage of stories, poems, songs and games regarding healthful living is used as a resource; Elders from local communities are included as teachers in the curriculum and instruct the children about traditional Native American culture with importance placed on taking measures to prevent illness and promote healthful lifestyle; Teachers trained during a 2-day session; Delayed intervention control	<ul style="list-style-type: none"> <li>• No statistically significant differences were observed in pre and post-test change categories for fifth or seventh graders self-report of smoking tobacco</li> <li>• Approximately 14% of fifth grade subjects in both intervention and control arms reported smoking at post-test; For seventh grade students 38% of intervention subjects reported tobacco use compared to 25% in the control group at follow-up</li> <li>• Intervention subjects were more likely to have reported smoking within 24 hours of each test and were also more likely to have smoked before the post-test when they had not smoked at baseline, in comparison to controls</li> <li>• Intentions to smoke in the future were also more likely in the intervention subjects (25% at both pre and post-test; 15% changing from 'unsure' to 'yes' at post-test)</li> </ul>
<b>Johnston, Beecham, Dalgleish, Malpraburr, &amp; Gamarania 1997</b> CCT	Aboriginal Australia (n=221) 5 to 17	2 weeks	A 2-week school based educational intervention for primary and high school students with community programs; CD including positive images of non-smokers, stories about peer-group pressure and how to say 'no' to cigarettes, as well as information about the health effects of smoking; Communities visited by well-known sporting personalities who conducted health education and sporting classes; Prizes awarded for best Be Smoke Free Song written by students; Two local rock bands performed a Be Smoke Free concert; Staff at the school and health centre agreed to be smoke free for a fortnight; Classes about the benefits of healthy, smoke-free living were conducted at all levels in the school; Control community received no intervention	<ul style="list-style-type: none"> <li>• Self-reported smoking behaviour and exposure to tobacco smokers in the home remained constant in both groups</li> <li>• A greater proportion of subjects in both the intervention and control communities gave correct answers in the knowledge quiz in the follow-up questionnaire; However authors report that these results may be artefact due to different cohorts of children participating in follow-up data collection</li> </ul>

Study reference and design	Sample (n) and age in years	Intervention duration	Intervention description	Findings
<b>Davis et al. 1995</b> RCT	Native American United States of America ( <i>n</i> =2066) Range 9–13	5 years 2hrs/week 13 weeks/yr	The Southwest Cardiovascular Curriculum project; Multifactorial curriculum focusing on areas of other cardiovascular health programs being: the cardiovascular system, exercise, nutrition, obesity, tobacco use, habit change and social influences. These activities were designed to be culturally appropriate to rural American Indian children in the South-west; American Indian health educators, researchers, teachers and advisers from the community contributed to the design and content of the intervention activities; Focus groups were also employed to determine the educational and cultural appropriateness of the curriculum; Curriculum was taught two hours a week for 13 weeks and was divided into five teaching units: the cardiovascular system, exercise, nutrition, tobacco and social influences.; Delayed intervention control	<ul style="list-style-type: none"> <li>• Among the pre-test non-users, only eight students (<i>n</i>=4 intervention and <i>n</i>=4 control) reported having initiated smoking at post-test</li> <li>• A greater proportion of boys compared to girls had tried smoking (36.5% vs. 26.2%, <i>p</i>&lt;0.001) and a greater proportion of Pueblo students had tried smoking compared with Navajo students (35.2% vs. 26.7%, <i>p</i>&lt;0.001)</li> <li>• A greater proportion of boys in the curriculum group when compared to the control reported smoking less from pre to post-test (41.2% vs. 22%) however this difference was not observed for the girls</li> <li>• Among Pueblo students the proportion reporting smoking less from pre to post-test in the intervention compared to control groups was significantly different (35.9% vs. 18.2%)</li> </ul>

Study reference and design	Sample (n) and age in years	Intervention duration	Intervention description	Findings
<b>Moncher &amp; Schinke 1994</b> RCT	Native American United States of America (n=1396) Mean 11.3	6 months 15 x 50 min lessons + booster	School based curriculum for one intervention arm and School curriculum plus community involvement for other incorporating parents and media; Culturally tailored; Skills-only: Fifteen classroom group interventions and booster sessions six months after initial intervention; Interventions included material on bicultural competence, tobacco use knowledge, cognitive and behavioural techniques for problem solving, communication and resistance and stress and coping; Interactive classroom work was used with participation in rehearsals of techniques to avoid tobacco use; Skills-community: As above plus an annual intervention designed to involve the community including various activities in which students modelled the skills they had learned in classrooms to their parents and other community members; Publications and posters were produced to further educate parents and other community members about the nature and purpose of the intervention; Media was used to enhance participation using traditional Native American legends and puppets to initiate and enhance classroom discussion; Group leaders and group discussions were employed to encourage students to discuss their learning experiences at home and in the community; Control not described – assumed no intervention control	<ul style="list-style-type: none"> <li>• No significant differences in weekly smoking between the intervention and control groups at any follow-up, though all rates more than trebled to 35 to 40% over 3.5 years</li> <li>• Both control conditions and all females reported an increase in daily smoking disproportionate to the rest of the sample at 12 months, however this was not significant</li> <li>• For weekly smoking, the skills-community condition reported the greatest increases; however smoked tobacco use did rise across the entire sample; During the previous month, a slight uptake of smoking was shown across all conditions</li> </ul>
<b>Gilchrist, Schinke, Trimble, &amp; Cvetkovich 1987)</b> RCT	Native American United States of America (n=109) Mean 11.3	10 x 60 min lessons	School based curriculum discussing myths concerning drug use, impact of stereotypes and health education; Culturally tailored with Native American involvement; Intervention included: discussion of myths concerning Indian drug use, impact of stereotypes on behaviour, provision of health education information through games, handouts, films and posters, group discussions and peer guest speakers sharing personal reasons for rejecting drug use, discussions around SODAS problem solving model, opportunities for skills practice, creation of videotape and adult guest speaker invited from tribal alcohol treatment program	<ul style="list-style-type: none"> <li>• Positive changes in tobacco use found at post-test (<math>p &lt; 0.05</math>; change score of <math>-0.15</math> for intervention and <math>-0.01</math> for control) were not maintained at 6 months follow-up (<math>p = \text{NS}</math>, change score of <math>-0.11</math> for intervention and <math>0.07</math> for control)</li> <li>• No intervention effects were observed in subjects' self-identification as tobacco users</li> </ul>

Means  $\pm$  standard deviations are reported in the results unless otherwise stated; OR= odds ratio; 95%CI= 95% confidence interval; RCT= randomised controlled trial; CCT= controlled clinical trial; NRT = nicotine replacement therapy



**Figure 2** Summary risk of bias assessment for each included and completed tobacco cessation study





**Figure 4** Summary risk of bias assessment for each included and completed tobacco prevention study

