

Should anti-tobacco media messages be culturally targeted for Indigenous populations? A systematic review and narrative synthesis

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ABSTRACT

Objective To summarise published empirical research on culturally targeted anti-tobacco media messages for Indigenous or First Nations people and examine the evidence for the effectiveness of targeted and non-targeted campaigns.

Methods Studies were sought describing mass media and new media interventions for tobacco control or smoking cessation in Indigenous or First Nations populations. Studies of any design were included reporting outcomes of media-based interventions including: cognitions, awareness, recall, intention to quit and quit rates. Then, 2 reviewers independently applied inclusion criteria, which were met by 21 (5.8%) of the studies found. One author extracted data with crosschecking by a second. Both independently assessed papers using Scottish Intercollegiate Guidelines Network (SIGN; quantitative studies) and Daly *et al* (qualitative studies).

Results A total of 21 studies were found (4 level 1 randomised controlled trials (RCTs), 11 level 2 studies and 6 qualitative studies) and combined with narrative synthesis. Eight evaluated anti-tobacco TV or radio campaigns; two assessed US websites; three New Zealand studies examined mobile phone interventions; five evaluated print media; three evaluated a CD-ROM, a video and an edutainment intervention.

Conclusions Although Indigenous people had good recall of generic anti-tobacco messages, culturally targeted messages were preferred. New Zealand Maori may be less responsive to holistic targeted campaigns, despite their additional benefits, compared to generic fear campaigns. Culturally targeted internet or mobile phone messages appear to be as effective in American Indians and Maori as generic messages in the general population. There is little research comparing the effect of culturally targeted versus generic messages with similar message content in Indigenous people.

INTRODUCTION

The preamble to the WHO's Framework Convention on Tobacco Control contains statements of deep concern about the high levels of smoking in Indigenous peoples across the globe.¹ Western countries have experienced a decrease in prevalence of smoking in the general population, but little improvement among the Indigenous or First Nations populations embedded within them. In the general Australian population, for example, smoking prevalence dropped from 34% in 1980,² to

16.6% in 2007.³ Data available for Indigenous Australian Aboriginal and Torres Strait Islander populations suggests a small decrease from 53% in 2004,⁴ to 50% nationally in 2008.⁵ Rates were comparable in 2008 for American Indians (49%),⁶ and New Zealand (NZ) Maori (45%),⁷ with levels also remaining static.^{8,9}

Traditional mass media anti-tobacco campaigns communicate through television, radio, newspapers, billboards, posters, leaflets or booklets, with the intention of discouraging uptake, encouraging smokers to quit and maintaining abstinence in non-smokers.¹⁰ More recently, new media have been incorporated into anti-tobacco campaigns and interventions and are the subject of recent research: these include digital formats with interactive technology such as internet, mobile phone, video and CD-ROMs.¹¹ Media campaigns are considered an important component of tobacco control.¹¹ Given the lack of change in smoking prevalence in Indigenous populations in Western nation states, compared with the general population in these countries, it seems that anti-tobacco media messages, as one of several influential drivers of cessation, may not yet be reaching their potential.¹¹ Other important factors influencing Indigenous smoking cessation such as sociocultural factors, consistent implementation of tobacco control policies in Indigenous and remote communities, and access to treatment, while relevant, are beyond the scope of this review.

Targeted marketing is used in the advertising industry including tobacco advertising.¹¹ Targeting is also employed for high-risk population groups with specific health needs or risk factors. The Ottawa charter recommends that health messages should be sensitive and respectful of the cultural needs of diverse populations.¹² There is no agreed definition of cultural targeting. Kreuter and Skinner propose that targeting involves: 'the development of a single intervention approach for a defined population subgroup that takes into account characteristics shared by the subgroup's members'.¹³

Most research on anti-tobacco media interventions has been in general populations of high-income countries.^{14,15} Whether anti-tobacco strategies need to be targeted for minority or disadvantaged subgroups based on divisions such as ethnicity, language or age is debated.¹¹ Bala *et al*, in a Cochrane review of mass media interventions for smoking cessation in adults, found no consistent relationship between campaign effectiveness and ethnicity.¹⁰ Other evidence suggests anti-tobacco messages

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should be culturally relevant, linguistically clear and reinforced by prominent community members.¹⁵

The focus of this review is Indigenous populations of Western nation states, who experience similar disadvantages and high smoking prevalence.¹⁶ Little is known about the optimum delivery of salient anti-tobacco health promotion messages to these Indigenous populations,^{17 18} whether culturally-targeted media messages are needed or, indeed, if tobacco treatment and prevention needs to be targeted at all.¹⁹

This review examines the available literature for evidence about the impact of anti-tobacco messages in Indigenous and First Nations populations in Australia, New Zealand, USA and Canada. This includes Australian Aboriginal and Torres Strait Islanders, Maori from New Zealand, American Indians, Alaska Natives, First Nations and Inuit from Canada. Studies in Pacific Islanders living in the US state of Hawaii are included. The review is deliberately broad to include motivational and interventional anti-tobacco messages delivered through traditional mass media and new media platforms.

Objectives

Our aims were (a) to systematically review and summarise the literature describing attitudes and key responses to culturally targeted anti-tobacco messages and (b) identify any differences in effect according to whether the messages were addressed to the target population or aimed at the general population. The evidence was assessed regarding impacts of media-based interventions in the target populations such as cognitions, awareness, recall, intentions to quit and quit rates.

METHODS

Data sources

The following databases were searched from their earliest date through to October 2011: Medline, CINAHL, Embase, Psych INFO and Australian databases via Informit (see online appendix 1). Searches used truncated keywords and/or subject headings related to (tobacco or nicotine or smoking) combined with (Indigenous populations or Oceanic Ancestry Group or Aborigine or Torres Strait Islander or Maori or Inuit or First Nations or American Indian or Alaska Natives or Pacific Islanders) and further combined with (communication media or mass media or social marketing or advertising or health promotion or health education or internet or mobile phone or arts or arts therapy). Art was included as a search term as it is often used in health promotion for Indigenous populations.^{20 21} Additionally, hand searches of reference lists of included papers and other literature on Indigenous smoking known to authors supplemented the electronic search.

The selection criteria were: full, peer-reviewed papers of original research on media-based anti-tobacco messages using any study design that included Indigenous populations embedded within Australia, New Zealand, USA and Canada, including Australian Aboriginal or Torres Strait Islanders, NZ Maori, American Indians, Alaska Natives, Pacific Islanders, First Nations or Inuit. Papers were not included if no measurement of outcome or impact was reported, such as knowledge, attitudes, beliefs, message recall, intention to quit or smoke, or quit rates.

Two reviewers (GSG and TW) independently applied the criteria then reached consensus. GSG (a medical practitioner) prescreened publications for relevance. Then GSG and TW (a clinical psychologist) independently screened titles, available abstracts and then full papers to determine eligibility. Discrepancies were resolved by consensus. Of the 489 studies found,

after removing 124 duplicates, 21 (5.8%) met the inclusion criteria. (See supplementary figure 1.)

Data extraction

One author (GSG) extracted data, with crosschecking by a second (TW). Information recorded included: aim of the study, geographical region, participant demographics, recruitment methods, methods of data collection and analysis, and summary of results.

Methodological quality for quantitative aspects of studies was assessed for hierarchy of evidence and risk of bias using checklists from Scottish Intercollegiate Guidelines Network (SIGN) 50.²² With no similar guidelines for assessing study quality in qualitative research,²³ we chose an evidence-for-practice theory by Daly *et al*²⁴ to categorise qualitative and mixed studies into: (1) generalisable studies; (2) conceptual studies; (3) descriptive studies and (4) single case studies.

Data synthesis

Data synthesis made use of Popay *et al*'s guidelines for narrative synthesis.²⁵ No statistical meta-analysis was performed due to the diversity of study designs and approaches included in this review. For preliminary synthesis, studies were divided into five groups: television or radio campaigns, print media, internet studies, mobile (cell) phone studies and other media. As study approaches were diverse, these were categorised into four basic approaches depending upon whether the variables tested were generic messages, targeted messages or comparisons of both.

RESULTS

Following Popay *et al*'s guidelines,²⁵ results are organised first to summarise the basic features of the studies. A preliminary synthesis of findings is then presented describing the key findings for each type of media studied: initially, traditional mass media and then new media. Outcome measures, study designs, quality of studies and approaches are then presented. This is followed by a narrative synthesis, which collates information from across the studies. We then examine the responses to culturally targeted anti-tobacco messages for Indigenous smokers and draw comparisons between targeted and generic messages.

In all, 21 papers reporting on 20 studies met the inclusion criteria. Supplementary table 1 contains full details of each study including aim, location, recruitment, participants, methods and analysis, intervention, key findings and relevant comments.

Table 1 summarises the included studies in terms of the type of media used, type of study and the studied population.

The nine quantitative studies were comprised of: four randomised controlled trials (RCTs),^{26–29} a database analysis,³⁰ two post-intervention surveys,^{31 32} and two before and after (BAS) studies.^{33 34} The remaining 12 studies were mixed-methods or qualitative studies,^{35–46} including 4 with a BAS design.^{35–38} No peer-reviewed studies were found describing Canadian First Nations or Inuit. All studies were in community settings covering a range of urban, rural and remote locations. Seven of the studies described the impact of media interventions among youth,^{27 29 32 36 37 41 42} and two addressed women,^{38 39} with one of these aimed at pregnant women.³⁸ Two studies included health staff or health professionals.^{40 43}

Mass media

Television or radio advertisements

Of the 21 papers, 8 evaluated the impact of anti-tobacco television or radio advertisements on attitudes, beliefs, smoking

Table 1 Summary of media type and populations of included studies

Media	Aboriginal and Torres Strait Islander Australians (5 studies)	New Zealand Maori (7 studies)	US Pacific Islander and Native Hawaiians (1 study)	American Indian or Alaska Native (7* studies)
TV and/or radio advertisements	4 TV/Radio studies (1 mixed, 1 mixed BAS, 1 survey, 1 qualitative)	3 TV studies (1 database, 1 BAS, 1 qualitative)		1 TV/Radio study (survey)
Internet				2 internet studies (1 RCT, 1 qualitative)
Mobile phone		3 Mobile phone studies (2 RCT, 1 mixed BAS)		
Print media		1 print media study (BAS)		3 print media studies (4 papers: 1 RCT, 2 qualitative, 1 mixed)*
Other media:	1 CD-ROM intervention (mixed BAS)		1 edutainment study (mixed BAS)	1 Video intervention (mixed BAS)

*Two papers reported the same study.

BAS, before and after study; RCT, randomised controlled trial.

intentions or behaviour. Three New Zealand studies examined the effect of the collaboratively developed, 'it's about whanau' (IAW) television campaign, targeting Maori smokers.^{30 33 39} The first study used a cross-sectional New Zealand-wide survey and Quitline data from two waves: the Quitline monitoring data showed that the proportion of Maori callers to the Quitline increased from 20% to 25% post campaign.³³ The advertisements were rated highly believable (73%) and relevant (67%) and over 50% of Maori survey respondents said the advertisements influenced them to quit. A second study used a focus group of Maori women to elicit their views on a range of smoking cessation initiatives including the IAW campaign, which was seen as portraying enduring values, while fear campaigns by comparison, were considered to have only short-term effects and be culturally inappropriate.³⁹ In contrast, another study reported a greater number of calls by Maori smokers to the Quitline following the screening of an advertising campaign that featured a fear message compared to the screening of the Maori orientated IAW campaign (RR 1.26, 95% CI 1.08 to 1.46). However although the fear message had some Maori specific content, the advertisements had very different objectives, formats and intentions, and therefore the content was not comparable.³⁰

Four papers measured the response of Aboriginal or Torres Strait Islander Australians to television and radio campaigns.^{31 35 40 46} Three studies reported high levels of recall of generic television or radio anti-tobacco advertising,^{31 35 40} two of which further assessed self-reported changes in smoking behaviour.^{31 35} Despite good recall (85%) of the National Tobacco Campaign (NTC), exposure to anti-tobacco interventions (eg, advice, medication and advertisements) did not influence cessation rates among Aboriginal people in three Northern Territory communities ($p=0.42$).³⁵ There was similarly high prompted recall (89.9%) to the 'Bubblewrap' campaign by Aboriginal smokers in Western Australia, with most survey participants reporting positive changes in attitudes such as thinking about cutting down or quitting (81%); however only three participants (1.5%) reported quitting.³¹ Similarly, Indigenous community members and health staff had 'good recall' of TV campaigns when questioned about different tobacco interventions, although health staff believed TV advertisements should be more targeted to Indigenous smokers.⁴⁰ There was a non-significant difference in how Australian Indigenous and non-Indigenous viewers rated TV advertisements featuring strong graphic imagery and personal narratives on a range of outcome measures. These included message acceptance (combined ratings for 'understanding', 'believable' and 'relevant') and personalised effectiveness (combined ratings of 'made me

stop and think', 'concerned about smoking', 'more likely to try to quit' and 'provided good reasons to quit')⁴⁶ Similarly, American Indian students showed no differences compared to students from the general population in how they rated the most popular threat based TV advertisement with 'Artery' rated highest for 'afraid' and 'disgust'.³²

Print media

The print media studies showed varied effects. Improved pack health warnings (PHW) resulted in similar significant increases in recognition of the Quitline number ($p<0.001$), pre/post campaign, for Maori (25.1% increase) and the general New Zealand population (24.1%).³⁴ Two US papers assessed the feasibility of adapting the 'Second Wind' program for pan-tribal populations. Participants representing 17 different tribal groups suggested improving Native design elements, including a Native worldview, oral history, family content and traditional tobacco use.^{44 45} A three-part systematic strategy was used to assess the 'All Nations Breath of Life' educational brochures for scientific accuracy, readability and cultural appropriateness for American Indian and Alaska Native smokers. The authors propose this strategy as a way to enhance the cultural suitability of print materials, prior to conducting a clinical trial.⁴³ Anti-tobacco messages embedded into a mailed-out Native art calendar for American Indians and Alaska Natives did not increase the uptake of smoking cessation advice or nicotine patch prescription (as determined by an audit of the patient's record), compared with a control calendar without messages. No impact on quit rates was observed (6.3% vs 7%, $p=0.33$).²⁸

New media

Internet

Two studies, which included American Indians and Alaska Native participants, reported a positive impact from US internet websites.^{26 41} American Indians formed a small percentage of US participants (2% $n=7$) using a website featuring video clips, in a RCT with a wait-list control.²⁶ On logistical regression there were no significant interactions between ethnicity and condition therefore self-reported quit rates were reported as one group (treatment group 12.3% vs control 5% at 90 days, OR 2.66). In a two-phase action research pilot project American Indian and Alaska Native participants suggested modifications to the generic SmokingZine website to make it more 'Native'.⁴¹ Researchers then compared use of the generic website with the culturally adapted website for American Indian/Alaska Native youth. Usability scores were moderately in favour for the culturally adapted version compared to the non-modified site. Changes in smoking behaviour were not assessed.

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Mobile phone

Three New Zealand studies reported mixed outcomes from mobile phone interventions that used text,²⁷ and video messages.^{29 42} Culturally-adapted text messages were as effective for Maori as generic messages were for non-Maori in the short term, in a four group RCT with controls receiving follow-up reminder texts only. There were no significant differences between Maori and non-Maori in self-reported quit rates (26.1% for Maori in the treatment group vs 11.2% Maori in control group at 6 weeks, RR: 2.34, 95% CI 1.44 to 3.79), and results were similar for non-Maori (RR: 2.16, 95% CI 1.72 to 2.71). This indicates that when Maori are given culturally targeted interventions their quit rates can equal those of the general population.²⁷ A collaboratively developed multimedia mobile phone intervention was successfully piloted producing a 53% self-reported quit rate at a multicultural college, which included Maori.⁴² However when a RCT tested its effectiveness, there was no significant difference in continuous abstinence (intention-to-treat) at 6 months between the smoking cessation video message intervention (26.4%) and a general health video message control (27.6%), ($p=0.8$).²⁹ No data about the ethnic group of the quitters was provided in the latter two studies, even though Maori were a target group.

Other media

Three media studies falling outside the above categories had varying effects: one incorporated a CD-ROM, another used an education-entertainment format and a third used a DVD. An Aboriginal Australian community based program employed a CD-ROM, which was well received and used by participating youth, however there were no changes in self-reported smoking behaviours.³⁷ An education-entertainment multimedia drama performance improved knowledge about addiction ($p=0.021$) and decreased future intentions to smoke ($p=0.041$) in Native Hawaiians and Pacific Islanders in Hawaii, USA.³⁶ In contrast, a study with the intervention group using a culturally-targeted video, counselling and brochures, and the control group receiving brief interventions and brochures only, had poor levels of acceptance and did not change smoking behaviour in pregnant Alaska Native women.³⁸

Outcome measures

Table 2 demonstrates the diversity of outcome measures. A total of 12 studies measured cultural suitability^{38–41 43–45} and/or relevance.^{26 29 31 33 43–46} Only three studies measured believability,^{26 31 46} which is one of the hallmarks of a salient message. Usability was confined mostly to those delivery systems, such as mobile phone and internet, which demanded interactivity on a technical basis.^{26 29 41 42 44 45} Awareness and recall of the messages or campaign was a common feature^{31–36 38 40}; a standard approach is to ask for unprompted then prompted recall,¹¹ however the type of recall in some studies was unspecified.^{35 40} One study had a sophisticated measure of perceived effectiveness and confirmed recall.³² The assessment of smoking attitudes and behaviour varied across the studies and included measuring attitudes to quitting,^{33 46} intentions to quit or smoke,^{26 32 33 36} quit attempts,^{29 31 38} levels of consumption,^{26 42} perceptions about being influenced to quit by the message (including talking to others about quitting),^{31 33 35} calls to a Quitline,^{30 33} receipt of cessation advice,²⁸ and quit rates.^{26 27 29 31 35 38 41 42}

Standardised reporting of smoking abstinence, which is considered best practice, was missing from most of the studies.^{47 48} Only three studies described how they assessed self-reported quit status: consumption over the last 7 days,^{26 29 38} while three

studies biochemically validated abstinence,^{27 29 38} with one using the Russell Standard for continuous abstinence.²⁹

Study designs and quality of evidence

Table 3 summarises the studies and their level of evidence (SIGN and Daly *et al*). Due to the small number of studies in this field, we did not exclude studies on the basis of their quality ranking, but rather gave greater weight to the higher-level studies. Four quantitative studies were rated as level 1+ or 1++ (SIGN),²² which indicates they are higher quality and have a lower risk of bias.^{21–24} One further cohort study was considered 2+, therefore of good quality for its type.⁴⁶ Of the 15 quantitative studies, 10 received a minus score for SIGN ranking, that is the studies were considered to have a high risk of bias.

Nine papers containing qualitative elements were rated using Daly *et al*'s hierarchy of evidence for practice.²⁴ Two mixed-methods studies reported insufficient qualitative details to be assessed. Only two papers were rated as category 2, that is as conceptual,^{38 44} and therefore potentially transferable to other populations,²⁴ while none were ranked in the top category. Seven other papers rated as category 3 were therefore deemed descriptive.^{35 39–43 45}

Study approaches

There was a wide variety of research approaches making comparisons between non-equivalent population groups and interventions difficult. Figure 1 illustrates the study approaches, which can be categorised into four conceptual groups as follows:

1. Effect of generic media on Indigenous people \pm comparison with general population.^{31 32 34 35 40 46}
2. Generic versus targeted for Indigenous people (in this case the interventions had non-equivalent content).³⁰
3. Generic for general population versus targeted for Indigenous population.^{26 27 29 42}
4. Effect of targeted campaigns for Indigenous or measures of cultural suitability.^{28 33 36–39 41 43–45}

Of the 21 papers, 16 had some degree of specificity to the target population or choice of culturally targeted elements. Eight studies described a formative phase in collaboration with the target audiences,^{27–28 33 36–38 41 42} in order to target the intervention.

NARRATIVE SYNTHESIS

Responses to culturally targeted anti-tobacco messages

The qualitative studies revealed a preference for culturally targeted messages. This held true across the populations studied. US participants from pan-tribal Nations recommended that resources should become more inclusive of other Nations' views by: use of appropriately diverse cultural design elements; depicting a broader range of tribal customs; and increasing education about ceremonial tobacco use.^{44 45} American Native youth preferred using a website with a more 'Native' look and advised how to adapt a generic site by incorporating Native design features.⁴¹ In Australia, health and welfare staff, working with Indigenous communities, favoured culturally appropriate messages and suggested that modifications were required for an Indigenous audience.⁴⁰ Stewart *et al* tested one Indigenous targeted TV advertisement that was rated significantly higher, by Indigenous compared to non-Indigenous smokers, for message acceptance and personalised effectiveness.⁴⁶ Indigenous viewers related more to the advertisement and were more likely to discuss it than non-Indigenous viewers. NZ Maori similarly call for more culturally relevant advertisements,³⁹ and point out that mainstream graphic advertisements showing body parts, are inappropriate or tapu.³⁹ The culturally targeted IAW

Table 2 Outcome measures from included studies (lead author, year)

Outcome measures	Wilson, 2010	Wilson, 2005	Grigg, 2008	Ivers, 2005	Boyle, 2010	Fernandez, 2008	Johnston, 2010	Vogeltanz-Holm, 2009				Stewart, 2011	Taualii, 2010	Swartz, 2006	Whittaker, 2008	Whittaker, 2011	Bramley, 2005	Johnston, 1998	Daley, 2006 and Chol, 2009				Doorenbos, 2011	Patten, 2010
																			Daley, 2009	Mitschke, 2010				
Relevance			x		x				x	x	x		x		x		x					x		
Cultural suitability						x				x			x					x						
Identification with message							x			x			x						x					
Emotional response								x		x			x						x					
Usability										x			x					x						
Believability			x							x			x									x		
Perceived effectiveness								x		x														
Awareness			x																					
Knowledge										x							x					x		
Unprompted recall	x				x																			
Prompted recall			x		x																			
Confirmed recall								x																
Recall, unspecified				x			x																	
More likely to quit			x							x														
Influence to quit/cut down			x		x																			
Intention to quit			x										x											
Intention to smoke								x																
Smoking behaviour																								
Talked to others about quitting																								
Cigarette consumption/cutting down			x										x											
Quit attempts					x																			
Self-reported quit rate				x	x								x				x							
Validated quit rate																								
Smoking cessation advice					x																			
Calls to Quitline	x																							
Scientific accuracy																								
Readability score																								
Behavioural observation																								

Table 3 Summary of evidence regarding impact of media-based anti-tobacco messages for Indigenous populations

Reference (lead author, year)	Study and specificity	Population	Type of study	SIGN rankings	Qualitative rankings (Daly <i>et al</i>)	Summary of evidence relevant to review
Wilson, 2005 ³⁰	TV media campaign, Maori specific	New Zealand Maori	Quantitative database	2–	N/A	More calls to Quitline after generic graphic advert compared to holistic Maori advert
Grigg, 2008 ³³	TV media campaign, Maori specific	New Zealand Maori	Quantitative BAS	2–	N/A	Increased recall of adverts and calls by Maori to Quitline
Fernandez, 2006 ³⁹	TV media campaign, Maori specific	New Zealand Maori	Qualitative focus groups	N/A	II	Positive feedback to IAW campaign, compared with generic graphic TV adverts
Ivers, 2005 ³⁵	TV campaign and community interventions, Mostly generic	Aboriginal and/or Torres Strait Islanders	Mixed methods BAS pre/post-intervention surveys	2–	Insufficient information to assess	High recall of adverts. Exposure to any of the various interventions did not influence cessation.
Boyle, 2010 ³¹	TV and radio media campaign, generic	Aboriginal and/or Torres Strait Islanders	Quantitative survey interviews	2–	N/A	High recall of adverts. In all, 25% attempted to quit, 1.5% successful.
Johnston, 2010 ⁴⁰	TV campaign and other interventions, generic	Aboriginal and/or Torres Strait Islanders	Qualitative study semistructured interviews	N/A	III	Best recall of graphic imagery in TV adverts. Health staff believe adverts need to be culturally targeted.
Stewart, 2011 ⁴⁶	TV advertisements, mostly generic	Aboriginal and/or Torres Strait Islanders	Mixed methodology questionnaire and discussion	2+	III	Strong graphic adverts and first person narratives rated highly by Indigenous smokers
Vogeltanz-Holm, 2009 ³²	TV and radio media campaign, generic	American Indian (youth)	Quantitative study structured interviews	2–	N/A	Confirmed recall and perceived effectiveness highest to 'Artery' advert
Daley, 2006 ⁴⁰ and Choi, 2006 ⁴⁴	Program curriculum and printed resources, American Indian specific	American Indian/Alaska Native	Qualitative focus groups	N/A	II Daley, III Choi	Modifications provided for the 'Second Wind' smoking cessation program to improve pan-tribal cultural suitability
Daley, 2009 ⁴³	Health promotional pamphlets, American Indian specific	American Indian/Alaska Native	Mixed methodology: expert opinion, readability scores and focus group	4	III	Scientific and cultural content, and readability scores appropriate: minor changes advocated
Doorenbos, 2011 ²⁸	Native calendar, American Indian/Alaska Native specific	American Indian/Alaska Native	Single-blind randomised controlled trial	1+	N/A	Calendar with health messages did not increase smoking cessation related outcomes compared to calendar without messages
Wilson, 2010 ³⁰	Pack health warnings, generic	New Zealand Maori	Quantitative BAS pre/post telephone surveys	2–	N/A	Significant increase in Quitline number recognition from improved PHWs
Swartz, 2006 ²⁶	Internet website, targeted content	American Indian subset	Non-blinded randomised controlled trial	1+	N/A	No significant difference in cessation rates between ethnic groups
Tualii, 2010 ⁴¹	Internet website, American Indian specific	American Indian/Alaska Native (youth)	Qualitative focus groups	N/A	III	Favourable response to targeted website
Bramley, 2005 ²⁵	Mobile phone text messages, targeted for Maori, generic for others	New Zealand Maori and non-Maori (youth)	Single-blind randomised controlled trial	1++	N/A	No significant difference in response between Maori and non-Maori
Whittaker, 2008 ⁴²	Mobile phone video messages, targeted choice	New Zealand Maori subset (youth)	Mixed methodology questionnaire	2–	III	Favourable attitudes to content. High self-reported quit rate; not stratified to population group
Whittaker, 2011 ²⁹	Mobile phone video messages, targeted choice	New Zealand Maori subset (youth)	Single-blind randomised controlled trial	1+	N/A	No significant difference in cessation rates between intervention and control; results not reported by ethnic group
Johnston, 1998 ³⁷	CD-ROM and other community interventions, Indigenous specific	Aboriginal and/or Torres Strait Islanders (youth)	Mixed methodology BAS questionnaires and informal feedback	2–	Insufficient information to assess	No change in smoking behaviour, increased knowledge, CD favourably viewed

Continued

Table 3 Continued

Reference (lead author, year)	Study and specificity	Population	Type of study	SIGN rankings	Qualitative rankings (Daly <i>et al</i>)	Summary of evidence relevant to review
Mitschke, 2010 ³⁶	Education-entertainment drama, Pacific Islander/Native specific	Pacific Islander and native Hawaiian subset (youth)	Mixed methodology, BAS pre/post-intervention	2 –	III	Evidence of high-level engagement of viewers. Participants' knowledge increased and intentions to smoke decreased.
Patten, 2010 ³⁸	Video and educational materials, Alaska Native specific	Alaska Native pregnant women	Mixed methodology, BAS pre/post-intervention randomised control	2 –	Insufficient information to assess	Intervention deemed not acceptable or feasible as low interest and recruitment. No significant difference between intervention and control groups.

Scottish Intercollegiate Guidelines Network (SIGN) levels of evidence rankings (descriptors taken from SIGN 50)²²: 1 + +, high quality meta-analyses or systematic reviews of RCTs, or RCTs with very low risk of bias; 1 +, well conducted meta-analyses, systematic reviews, or RCTs with a low risk of bias; 1 –, meta-analyses, systematic reviews, or RCTs with a high risk of bias; 2 + +, high quality systematic reviews of case-control/cohort studies or high quality case-control/cohort studies with a high risk of confounding/bias and confounding/bias and a high probability of causal relationship; 2 +, well conducted case-control/cohort studies with low risk of confounding/bias and moderate probability of causal relationship; 2 –, case-control/cohort studies with a high risk of confounding/bias and significant risk relationship is not causal; 3, non-analytic studies, for example case reports, case series; 4, expert opinion.

Daly *et al* rankings for Qualitative Studies²⁴: level I, generalisable studies: high quality, well reported analytical studies based on comprehensive literature review and conceptual framework with diverse sample; level II, conceptual studies: comprehensive study based on conceptual framework, sample may not be diversified but selected on theoretical basis; level III, descriptive studies: atheoretical, no diversification, descriptive only, sample selected to illustrate practical rather than theoretical issues; level IV, single case study: single or small number interviews, may provide rich data or insights.

BAS, before and after study; IAW, 'it's about whanaū' (campaign title); N/A, not applicable; PHW, pack health warnings.

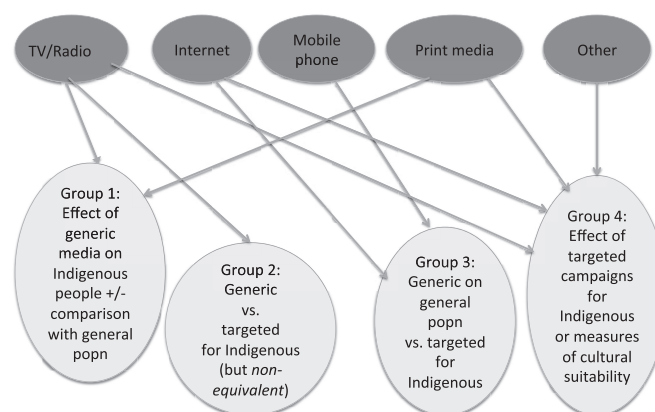


Figure 1 Schema of included studies illustrating conceptual groups 1–4.

campaign increased calls to Quitline and recall of tobacco advertisements in Maori.³³ Although graphic advertisements stimulated more calls by Maori to the NZ Quitline than the IAW campaign,²⁹ less robust qualitative data suggests tacit value in the culturally targeted campaign.³⁹ Emotional engagement and identification is considered a key feature of nicotine dependence,⁴⁹ and also to successful implementation of entertainment-education.⁵⁰ Mitschke *et al*'s study of a culturally targeted tobacco prevention drama for Asian and Pacific Islander and Native youth in Hawaii was the only study in this review that specifically measured the level of emotional engagement with the characters and identification with the messages.³⁶ Analyses demonstrated a significant difference in knowledge after the drama and significant improvements in intention to avoid smoking.

Effects of generic and targeted anti-tobacco messages on Indigenous people

There is weak evidence from five studies that generic messages (devised for the wider population), can be as effective in terms of recall for the Indigenous population as the general population, when tested in Aboriginal or Torres Strait Islanders and NZ Maori.^{31 32 34 35 40} There is evidence against the ability to recall a generic advertisement in the target population translating into increased quit rates as exemplified by Iver *et al*'s study,³⁵ and discussed by Johnston and Thomas,⁴⁰ and Vogeltanz-Holm *et al* in the US.³² Stewart *et al* found that Indigenous and non-Indigenous viewers shown a broad range of advertisements in an experimental study rated those containing strong graphic imagery or personal narratives as effective for a range of measures including being more likely to quit.⁴⁶ Where there was a significant difference, ratings by Indigenous viewers were always higher for graphic and narrative advertisements than those given by the non-Indigenous viewers. A study on new PHW found no significant differences in improved recognition of generic tobacco messages between the New Zealand general population and Maori.³⁴ It can be argued that wholly graphic non-targeted messages such as 'Artery'³² and PHWs²⁹ may be culturally neutral. Indigenous viewers commented that advertisements such as 'Bubblewrap' and 'Alive' targeted everyone as they depicted body parts only.⁴⁶ Conversely the showing of body parts can render messages tapu for Maori.³⁹

Several studies compared culturally targeted content for the Indigenous population with generic (non-targeted) content for the rest of the population. In these cases there is evidence from two level 1 studies using culturally targeted content

demonstrating the approaches were equally effective on quit rates in the short term (6–12 weeks) when comparing responses of the Indigenous samples to the general population samples.^{26 27} The New Zealand text messaging study, which deliberately over-recruited Maori to eliminate health inequality bias (21% Maori participants compared with 14.7% Maori in the New Zealand population), had equivalent Maori to non-Maori self-reported quit rates.²⁷ In contrast, the US study of an automated website with video content had only a small percentage of American Indian participants (2% $n=7$), however it found no significant interactions between ethnicity for any of the ethnic subgroups, including American Indians, and treatment or control condition on logistical regression.²⁶ When a generic threat campaign was measured head-to-head with a targeted holistic Maori campaign, in regard to calls to the Quitline, it appeared the generic threat campaign was more effective.³⁰

DISCUSSION

Should anti-tobacco media messages be culturally targeted for Indigenous people?

Despite qualitative evidence that Indigenous populations prefer culturally targeted messages, there is early evidence of effective recall or recognition of generic messages in the Indigenous cohorts. There is also preliminary evidence that culturally targeted messages can be as effective in Indigenous populations in the short term, as generic (non-targeted) messages are for the general population. Market research supports the view that resources that depict Indigenous faces will be more engaging to an Indigenous audience,¹⁸ except perhaps for youth who relate more to the dominant youth culture.⁵¹ Indigenous people may also be wary of negative stereotyping in the media.⁵² Mounting culturally targeted mass media campaigns for Indigenous smokers, through mass media, may demand a substantial financial investment, for a return that is still as yet uncertain.

This review revealed disparity in the sophistication of media studies in different countries for Indigenous tobacco control. New Zealand has the most comprehensive culturally targeted mass media campaign for its Indigenous people and has trialled mobile phones to deliver anti-tobacco messages to Maori with varying success.^{29 30 33} Although Australia's National Tobacco Campaign included some targeted TV and radio advertisements,⁵¹ Australia has only recently invested in a national culturally targeted mass media campaign.⁵³

Internet-based programs for Indigenous populations and drama appear to be promising interventions, but were only evident in the US. There were several US studies on print media, but no evidence so far that videos for pregnant Alaska Native women, or mailed out print media for American Indians are effective. Notable was a lack of peer-reviewed papers on interventions in Canadian First Nations and Inuit. Those Western countries that have Indigenous citizens can learn from each other's exemplars and trial different targeted approaches to attempt to drive down smoking prevalence.

In light of the importance of transportation and self-referencing for influencing intentions to quit smoking, the case for culturally targeted anti-tobacco media interventions is compelling although methodologically challenging.^{11 54} Effectiveness of interventions is not the sole consideration when implementing interventions in Indigenous populations, particularly in the early, formative stages. Promoting community ownership, self-determination and acceptability are important aims.⁵⁵ Emotional engagement and identification is also plausibly higher if the targeted community has been involved in formative

research, whichever the media used.^{56 57} These elements can be accomplished through community-based participatory research (CBPR),⁵⁸ however higher levels of evidence, afforded by randomised controlled trials, may be unobtainable in community based health promotion programs.⁵⁹

The importance of going beyond tests of cultural appropriateness, acceptability and feasibility to establish effectiveness is illustrated. Some culturally targeted media interventions: the art calendar for American Indians/Alaska Natives,²⁸ the video for pregnant Alaska Native women³⁸ and the New Zealand video mobile phone intervention,²⁹ were no more effective than the control intervention despite being collaboratively developed. The latter two studies were hampered with recruitment issues, with few Indigenous people being ready to quit. The degree to which interventions are culturally sensitive may potentially influence effectiveness. Superficial strategies (such as matching language and themes) may increase receptivity to the message, whereas deeper strategies (targeting sociocultural beliefs influencing health behaviour) convey salience.⁶⁰ An evidence-based method to ensure cultural suitability, readability and accuracy of tobacco control messages is fundamental. The protocol suggested by Daley *et al* could have a worthy application to resource development for print media.⁴³ Researchers in New Zealand are commended for their avoidance of cultural bias by using a boosted sample of Maori participants,^{27 29 33} and conducting and reporting research within a Maori framework.^{27 33 39}

Mass media campaigns can be drivers for prompting quit attempts. While many smokers are able to quit unassisted,⁶¹ the success of individual quit attempts are significantly improved though use of behavioural support and medications.^{62 63} It is documented that mass media campaigns are more effective when supported by comprehensive programs, which may include improved access to treatment.¹¹ Little is yet known about the natural history of quitting for an Indigenous smoker. In the interim, steps need to be taken to ensure that Indigenous populations are not disadvantaged by inequities in access to media broadcasting,⁶⁴ IT technology⁶⁵ and effective treatments, should they wish or need to use them.⁶⁶

This review found an absence of a common taxonomy in Indigenous studies to describe media-based interventions. It also found precise outcome measures are not used routinely, for example for measuring perceived effectiveness, recall and quit rates. This reduces the ability to transfer findings and conduct meta-analyses.

Conclusions

There is a well established evidence base on the effectiveness of anti-tobacco mass media campaigns in the general population.^{10 11 14 67} Yet Indigenous people are one of several disadvantaged groups for whom there is a shortage of robust evidence for either generic or culturally targeted anti-tobacco messages.⁶⁸

Media based research in Indigenous people is diffuse and hindered by a diversity of study approaches and lack of agreed outcome measures. There is limited evidence supporting the need for culturally targeted messages. Preference for culturally targeted messages by Indigenous peoples is acknowledged. Where culturally targeted messages have been trialled campaigns have been shown to be effective in terms of change of knowledge, attitude and behaviour.

Developing messages that are of personal relevance to Indigenous smokers and testing this concept through a well constructed, culturally appropriate campaign, preferably would include longitudinal data to assess whether recall and intentions to quit translate into long-term abstinence. Comparisons

What this paper adds

- ▶ Indigenous populations have a high prevalence of tobacco smoking, which is not decreasing in line with that of the general population.
- ▶ Despite well established evidence for anti-tobacco mass media campaigns for the general population, there is limited evidence for the use of anti-tobacco messages for Indigenous people.
- ▶ This review brings together empirical evidence for culturally targeted and generic anti-tobacco messages for Indigenous populations in North America, New Zealand and Australia.
- ▶ Although Indigenous smokers recall generic anti-tobacco messages, this review also supports the need for culturally targeted messages. Targeted messages for Indigenous smokers are shown here to effectively change knowledge, attitudes and smoking behaviour, and persist as a preferred option.
- ▶ This paper highlights the need for a well constructed trial comparing generic versus targeted messages with similar content for Indigenous smokers.

between targeted and non-targeted campaigns furthermore need to test equivalent genres in order to lay down a proof of principle.

Contributors GSG is lead researcher for this review, conceived the study, designed and conducted the search, reviewed papers for inclusion, assessed study quality, formulated the tables and figures, interpreted data, formed and interpreted the synthesis and wrote the manuscript. AMcE advised on design of review, search strategy, structure of the paper, interpretation of data and critically reviewed all drafts. TW independently reviewed papers for inclusion and quality, crosschecked data tables and critically reviewed drafts. ARC advised on the structure of the paper, interpretation of data, and critically reviewed and edited drafts. RvdZ advised on the concept and design of the review, search strategy, structure of the paper and critically reviewed initial drafts. All authors read and approved the final manuscript.

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APPENDIX 1

Australian specific databases via Informit:

- AMI: Australasian Medical Index
- APAFT: Australian Public Affairs Full Text
- APAIS ATSI: Australian Public Affairs Information Service - Aboriginal and Torres Strait Islander Subset
- APAIS: Australian Public Affairs Information Service
- APAIS-Health: Australian Public Affairs Information Service - Health
- ATSIHealth: Aboriginal and Torres Strait Islander Health Bibliography
- FAMILY-ATSI: Australian Family & Society Abstracts. Aboriginal and Torres Strait Island Subset
- FAMILY: Australian Family and Society Abstracts Database
- Family & Society Plus
- Health & Society Database: H&S
- Indigenous Australia
- Indigenous Studies Bibliography: AIATSIS
- Informit e-Library : Health Collection

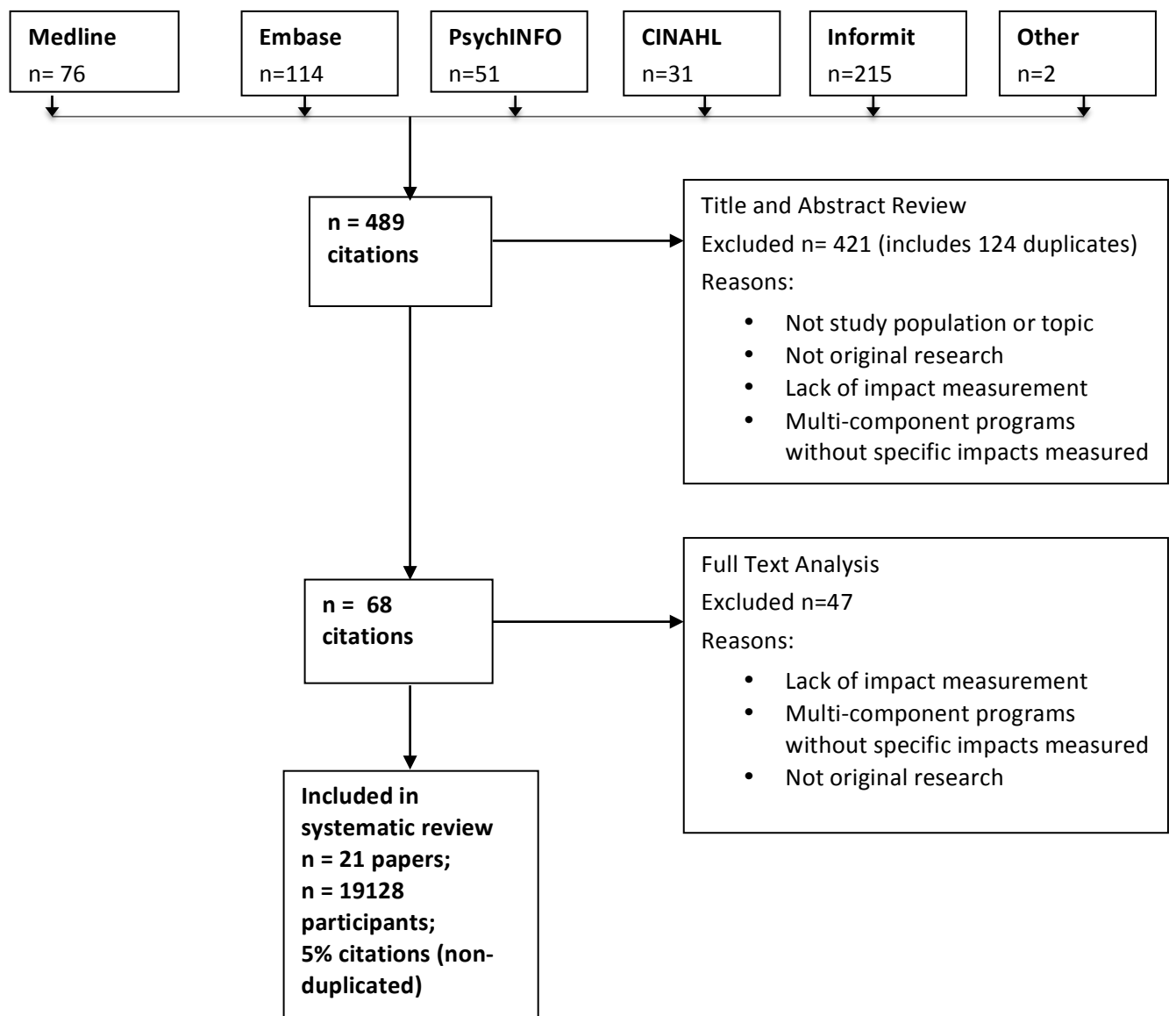


Figure 1: Literature search process

Author Date [Ref]	Aim	Participants location & Recruitment	Participant Numbers and Demographics	Methods and Analysis	Summary of Key Findings relevant to review	Comments
TV and radio ads						
Wilson 2005 [30]	Compares two different ad campaigns ('Every Cigarette is doing you damage' (EC) and 'It's About Whanau' (IAW) in generating Quitline calls by NZ Maori.	NZ-wide: Monthly quit line call data 2002-3.	n=2319 TV placements.	Database analysis. <i>Data Collection</i> Number of calls to NZ Quit line within one hour of 1482 TVCs. <i>Analysis</i> Calls per 100 TARPs calculated.	EC campaign generated 1.3 times number of calls per 100 TARPs compared to IAW campaign (RR 1.26, 95% CI 1.08-1.46). 8.2% of all Maori smokers rang the Quitline over the 2 years.	Ads were different in intent: EC a mostly generic threat appeal, IAW is a culturally targeted holistic /positive benefits appeal.
Grigg 2008 [33]	To assess the effects amongst NZ Maori smokers and <i>whanau</i> (extended family) of 'It's About Whanau' Campaign (IAW) ad campaign.	NZ-wide: Maori current smokers and recent quitters and their <i>whanau</i> .	Pre (n=473) and post (n=655) Weighted to reflect age/sex distribution of Maori smokers from 1996. NZ Census & NZ health survey.	Quantitative. <i>Data Collection</i> Quitline data pre and post launch. Cross-sectional computer aided telephone survey: pre-and post-campaign with Maori interviewers. <i>Analysis</i> SAS Version 13.0 to identify significant changes across survey years.	Campaign increased calls to Quit line following launch. Unprompted recall of smoking related ads increased significantly. Total recall 78% for smokers and 73% <i>whanau</i> . Ads rated highly believable. >50% said ads influenced them to quit.	Description of genesis of IAW campaign included. Source culturally specific.
Fernandez 2008 [39]	To examine Maori women's views on smoking cessation initiatives, including the IAW campaign.	Purposive sampling at a local Maori organization. Maori women, who were abstinent from smoking for six months or more.	n= 5 Maori women aged 28 to 45 yrs.	Qualitative. <i>Data Collection.</i> 2-hr Maori-centred focus groups with discussion, interaction and prompts. Feelings and beliefs about smoking and smoking cessation, including attitudes to culturally specific media campaign. <i>Analysis.</i>	IAW campaign preferred to graphic campaigns. IAW elicited an enthusiastic response to positive role modeling. Graphic anti-smoking ads evoke strong feelings of discomfort: perceived as having only short-term effects and raise cultural concerns re showing of	Positive feedback to IAW campaign compared with generic graphic TV ads.

				Boyatzis thematic analysis of transcribed and coded data.	graphic body parts, believed to be inappropriate or <i>tapu</i> , particularly for the elderly.	
Ivers 2005 [35]	To assess the effect of anti-tobacco TV ads from National Tobacco Campaign (NTC) in comparison to other interventions for Aboriginal people.	Aboriginal people in three remote communities in Northern Territory, Australia: smokers, ex smokers and never-smokers.	n=643 pre-test; n=628 post-test; n=351 both Age 12 yrs. +; 91% Aboriginal; 9% non-aboriginal; 50% male: 15% < 18 years, 46% 18-34 years, 39% > 35 years.	Mixed Methods. <i>Data Collection.</i> Community surveys baseline and 1 year. Outcome measures: recall of TV ads; smoking behaviour and self-reported quit rates. <i>Analysis</i> Chi squared tests of impact of exposure to interventions and changes in smoking behaviour. Logical regression: likelihood of smoking cessation. Thematic analysis qualitative data.	85% recalled ads: smoking status did not influence recall. Self-reported quit rate 4%. Recalling ads had no influence on cessation rate (Fisher's exact test $p=0.42$). Exposure to any of the tobacco interventions (advice, medication, posters, ads, Quit line, education) did not affect likelihood of cessation. Qualitative evidence of ads influencing quitting.	NTC included 2 ads that showed Aboriginal people. Content not described.
Boyle 2010 [31]	To examine responses of Aboriginal and Torres Strait Islander smokers and recent quitters to TV and radio ads from 'Bubblewrap' as part of 'making smoking history' campaign.	Convenience sample 3 sites Perth, Kalgoorlie, and Broome, Western Australia.	n=198 Even age distribution in four groups, 18 to 29 years, 30 to 39 years, 40 to 49 years, and 50 years and over, 55% female, 45% male.	Quantitative. <i>Data Collection.</i> Cross-sectional personal intercept survey. Outcome Measures: recall; changes in smoking in response to ads; information sought after seeing ads; discussions generated by ads; relevance and believability. <i>Analysis</i> Chi squared tests analysed differences between study sites, sex and age groups and advertising mediums.	>83% recalled TV ads. 29.9% recall radio ad, 50% radio recall in non-Metro areas. Ads believable and relevant. 81.1% thought about cutting down/stopping. 59% talked to family about ads. 26.5% sought more information. 25.1% tried to quit in 2 months prior to study. 31.3% tried to cut down. 1.5% had successfully quit (self-reported).	'Bubblewrap' a generic advert. Included an Indigenous targeted radio ad narrated by 'Mary G' Unknown how smokers who stated they 'tried' succeeded in quitting.

Johnston 2010 [40]	To explore perceptions of promote Indigenous community members and health staff regarding acceptability and effectiveness of different tobacco control and health promotion interventions.	Northern Territory, Australia. Purposive and snowball, recruitment, assisted by female elders.	Community members n= 25; Health & welfare staff n= 19 Age range 23-67, 12 male, 13 female: 2 never smoked, 15 current tobacco use, 6 ex-smokers, 2 recent quitters. Of 19 health staff, 5 Aboriginal including 2 AHWs; 14 non-Aboriginal.	Qualitative. <i>Data Collection.</i> Semi structured interviews. Attitudes and beliefs on a range of issues: relevant to this review are community-based interventions and social marketing campaigns. <i>Analysis.</i> Data coded descriptively and thematically analysed with Indigenous research assistants.	Community results: Good recall of TV anti-smoking messages. Best recall for graphic imagery, and graphic messages on tobacco packets. Children used pack warnings as leverage to persuade family to quit. In contrast, health staff thought social marketing campaigns needed to be significantly modified to be acceptable.	Attitudes of health staff may be converse to other evidence. Authors point out recall does not necessarily translate into cessation.
Stewart 2011 [46]	To determine whether mainstream anti-tobacco media advertisements influence Indigenous smokers to quit, and assess the potential effectiveness of different types of messages.	Adelaide and S Australian rural centres. Convenience sample smokers. Recruitment non-indigenous by consumer database and Indigenous by key community contacts.	n=299. 38 groups: 20 groups Indigenous; 18 groups non-Indigenous. n=143 Indigenous; n=156 non-Indigenous. Metropolitan sample: 80 Indigenous; 88 Non-Indigenous. M=145, F= 154. Aged 18-40.	Mixed Methods. <i>Data Collection.</i> Questionnaire post viewing 10 ads (one with Indigenous content). Outcome measures: message acceptance, personalized effectiveness, information, comfort, perceived effect, likely to discuss ad. Discussions recorded and transcribed. <i>Analysis.</i> Multivariate logistical regression analyses for six rating outcomes, Indigenous vs. non-Indigenous, and combined sample. Controlled for ad	'Bronchoscopy' rated highest by >80% Indigenous smokers for 5/6 outcome measures. Significant differences between Indigenous and non-Indigenous ratings: Indigenous rate reflective and positive ads higher. 'Bronchoscopy' and 'Bubblewrap' rated similarly overall: 'Bubblewrap' and 'Alive' ads perceived as neutral regarding gender and ethnicity. Indigenous ad "Billy" made significantly more Indigenous than	Although ads rated similarly on some scales, it is unknown whether motivation translates into behavioural change. How the source of an ad (Indigenous vs. non-Indigenous) rather than type of content/format impacts on response is not elucidated.

				order. Thematic analysis of discussions.	non-Indigenous smokers want to quit ($\chi^2 = 6.10$, $p = 0.014$) but gave mixed qualitative responses.	
Vogeltanz-Holm 2009 [32]	To examine rural youths response to 10 TV and radio tobacco counter marketing ads during a 13-week campaign.	Rural US northern plains state. Random digital phone telephone survey, one-month post-campaign of youth aged 12-17. Over sampling AI.	n=391 including 58 AI. 198 male, 209 female. Equal distribution ages, gender. A higher incidence of ever smoking in AI (39.7%) compared with White (23%).	Quantitative. <i>Data Collection.</i> Telephone survey with structured interview. Outcome measures: recall and confirmed recall; perceived effectiveness and emotional ratings. <i>Analysis.</i> GEE models examine effects of ads, gender, race/ethnicity on respondents confirmed recall (CR) and perceived effectiveness (PE) ratings.	54.7% CR at least 1 out of 5 TV ads; 45.8% CR at least 1 of 5/5 radio ads. Highest CR & PE of <i>Artery</i> ad - no ethnic differences with either; youth with higher intentions to smoke report significantly lower PE ratings. Radio ads more effective for girls.	CR and PE do not necessarily translate into behaviour change; those with increased intentions to smoke find ads less effective.
Print Media						
Daley 2006 [45] & Choi 2006 [44]	Both papers describe the assessment of cultural suitability of the Second Wind smoking cessation curriculum and format for a pan-tribal population.	Kansas USA. Convenience sample Indian health service clients >18yrs interested in quitting, willing to talk with non-Native investigators.	n= 41 in six focus groups 23 different tribal affiliations, similar demographics to IHS clinic.	Qualitative. <i>Data Collection.</i> 90 minute semi-structured focus groups. Attitudes to the curriculum of Second Wind program and ways to modify it. <i>Analysis</i> Transcriptions coded by 3 independent researchers and thematic analysis. Domain analysis addressing semantic relationship of what makes smoking cessation program Native.	Recommendations include: Native design with colour images, oral history and visual understanding; improved family-based content; traditional tobacco use to be included even if not relevant to some tribes; support from Native counsellors preferred with use of talking circles; preserve theme of individual tribes but include Native worldview.	Second Wind program has tokenistic Native images. These can be improved in important aspects to do with family, nature spirituality and respect for Elders. Choi's paper also described how the resources were presented to the focus groups.
Daley 2009	1) To determine if course materials,	Kansas US. Stage 1: Purposive	Stage 1: n=3 experts,	Mixed Methods. <i>Data Collection.</i>	1. Minor modifications re scientific content of	Protocol to ensure suitability on all

[43]	<p>where appropriate for AI/AN population on three domains: scientific accuracy; readability; cultural appropriateness, prior to implementation and further distribution.</p> <p>2) To develop a process to formally test health education materials for other targeted programs.</p>	<p>sample of experts</p> <p>Stage 2: Independent scorers of readability</p> <p>Stage 3: Cultural review panel</p>	<p>Stage 2: n=2 independent scorers,</p> <p>Stage 3: n=13 community members.</p>	<p>Stage 1: Scientific Panel - content analysis. Stage 2: Independent scoring of suitability assessment of materials (SAM), simplified measurement of gobbledygook (SMOG) and Fry readability formula. Stage 3: Focus group discussions on culturally appropriate materials and improvements.</p> <p><i>Analysis.</i></p> <p>Stages 1 & 3: descriptive. Stage 2: Chi square test checked congruence between scorers.</p>	<p>resources</p> <p>2. SAM 80%; Fry averaging reading level 7.1; SMOG readability 8.4</p> <p>3. No culturally insensitive material. Suggestions for improvement: graphics/photos to include more Native nations; add book of traditional tobacco use; additional Native words; video/audio of elders on traditional tobacco significance.</p>	<p>three levels: scientific accuracy; readability levels; cultural appropriateness.</p>
Doorenbos 2011 [28]	<p>Design and implementation of a randomised, controlled calendar mail-out to increase cancer-screening services in an urban population of American Indians and Alaska Natives.</p>	<p>US Pacific Northwest. All patients >18yrs on the database of the Seattle Indian Health Board (SIHB), who accessed treatment over prior 2 yrs.</p>	<p>n= 5605 AI/AN: (n=2805 Native calendar with cancer-screening messages; n=2800 control calendar with no messages). 55/56% Female; 44/45% Male. 29/30% current smokers.</p>	<p>RCT. Intervention: calendar + messages; control: no messages.</p> <p><i>Data Collection.</i></p> <p>Abstract of patient charts for demographic information and pertinent clinical screening procedures. Lung screening outcomes: prescription, advice or referrals for smoking cessation.</p> <p><i>Analysis.</i></p> <p>Chi squared tests evaluated significance in differences in screening outcomes between groups comparing age groups, sex, race (AI/AN vs. other) depending on which</p>	<p>Relevant to this review were lung cancer screening outcomes, based on smoking cessation interventions or advice offered to patients on review of patient charts three months after the calendar was current. There was a non-significant difference for any smoking outcome (prescription, advice, referral) between active and control. (6.3% and 7% patients respectively on intention-to-treat basis. $p=0.33$).</p>	<p>The Native art calendar was collaboratively designed with SIHB staff to include Native artwork and relevant health messages. The results suggested that printed materials with health messages are too weak an intervention to produce desired smoking cessation (and other) health screening outcomes.</p>

calendar received.						
Wilson 2010 [34]	Examination of how recognition of a national landline number changed after new pack health warnings (PHW) introduced in New Zealand.	New Zealand, recruitment via NZ health survey. Respondent ethnicity prioritized.	n= 1376 in first wave, n= 923 in second wave. Maori n=369, PI n=49, European n= 465, Asian n=40.	Quantitative. <i>Data Collection.</i> Prospective cohort design before and after in two waves; computer assisted telephone survey. Recognition Quitline number on PHW on old and new cigarette packs. <i>Analysis.</i> Paired matched odds ratio weighted for boosted sample of three ethnic groups, bivariate analysis socio-economic status.	24.1% absolute increase recognition Quitline number in sample interviewed in wave 1 &2 (OR 3.31, 95%CI = 2.63-4.21. $p < .001$). Reduction in inaccurate interpretations. Absolute increases in recognition similar for Maori as general population (25.1% and 24.1% respectively).	Concurrent TV ads going on before wave 2, similar to some of the PHW's may be a confounding factor.
Internet						
Swartz 2006 [26]	To test efficacy of automatic behavioural intervention to smoking cessation by video-based Internet website and personalised presentations.	Sample of the general US population, including ethnic subgroups. Recruitment of current daily smokers 18+, considering quitting, at worksites via posters and e-mails.	n=351 (171 treatment, 180 control) 52% female, 48% male. 83.5% white, 6.7% African-American, 4.3% Hispanic, 2% Native American Indian, 3.5% other. 7%, 18-25 years; 38% 26-39 years; 48% 40-	RCT with wait-list control. <i>Data Collection.</i> Internet surveys on enrolment, immediately after and 90 days post intervention. Outcome measures: quit rates (7-day point prevalence); patterns of program use. <i>Analysis.</i> Logistic regression of quit status across predictor variables. Differential treatment effects of	Intervention cessation rate treatment group 12.3%, control cessation rate 5% at 90 days ($p=0.015$, OR 2.66, 95% CI 1.18-5.99) intention-to-treat. No sign of interactions between race/ethnicity and other dependent variables, so, chi squared test used.	No significant difference in outcome between different ethnic races, including American Indian. AI represented only a small percentage of total groups. Extensive use of video clips with choice of video role models. 12 different content versions allocated depending

			55 years; 6% >55 years.	predictor variables. Chi squared when predictor variables not significant.		on ethnicity stated.
Taualii 2010 [41]	To collect data on AI/AN ideas about how to use and modify an existing smoking cessation website.	AI/AN urban youth aged 12 to 18, recruited via flyers and powwows. Phase 1, focus groups on current website. Phase 2: usability testing new website.	Phase 1 n=12; phase 2 n=13. Phase 1 equal gender distribution; five, aged 13 -14, two aged 15-16, 5 aged 17-18. Six past smokers. 13 different tribes Phase 2, 13 youth 12-18 yrs.	Qualitative. <i>Data Collection.</i> Phase 1: Focus group review to make current website more culturally appropriate. Phase 2: Usability testing via website: functionality, cultural relevance, content, ease of navigation, and suggestions for improvement. <i>Analysis.</i> Phase 1: Focus groups thematic analysis. Phase 2: Analysis of quality of participants' experience.	Phase 1: look and feel of website needed to be more Native, including Native graphics and music. Phase 2 responses: website <i>cool and creative</i> , seeing decisions visually displayed, having and comparing choices, site would help both smokers and non-smokers, makes you want to quit smoking.	Example of a collaborative action research design for the development of culturally appropriate messages. Illustrated with before and after images of website windows.
Mobile phone						
Bramley 2005 [27]	To determine whether a smoking cessation service using mobile phone text messaging is as effective for Maori as non-Maori.	New Zealand English-speaking youths 16+, current smokers, interested in quitting, able to text on mobile phone. Maori targeted by radio mailing lists, magazine ads, Maori providers and networks.	Maori n=355, non-Maori n=1350 Median age Maori, 25 years active group/24 years control; median age, non-Maori, 22 years active group/21 years control.	Single blind RCT. Intervention: mobile text messages; control: follow-up reminder. <i>Data Collection.</i> Questionnaire by text or call, baseline and follow-up. Self-reported quit rates at 6, 12 and 26 weeks. Random sample verified abstinent by salivary cotinine. <i>Analysis</i> Chi square analysis of	Intervention is as effective for Maori as non-Maori. 26.1% Maori quit in the treatment group versus 11.2% Maori control group at 6 wks (RR: 2.34, 95%CI: 1.44-3.79). No significant difference between RR for Maori and non-Maori (RR: 2.16, 95%CI: 1.72-2.71). Salivary cotinine showed no difference between	Study uses a Kaupapa Maori framework of reporting. Texts were adapted for Maori use with Maori language, Maori health concepts and information on Maori traditions. Discussion points out that this is a good outcome

				percentage quit by treatment group. Comparison of Maori to non-Maori. Analysis of covariance number of cigarettes smoked and Fagerstrom test. Reported intention to quit and last smoking status carried forward.	over-reporting between Maori and non-Maori - 18% congruent with non-smoking. Relative risk not substantially altered in sensitivity analysis for missing data and salivary cotinine.	considering a higher prevalence in Maori youth compared to non-Maori youth.
Whittaker 2008 [42]	To develop a pilot youth-orientated multimedia smoking cessation intervention by mobile phone.	Multicultural College NZ. Phase 1 consultation: random selection 16-18yr smokers + non-smokers; phase 2 development: recruited via website; phase 3 pilot study: recruited via radio.	Phase 1, online survey n=180, focus groups n=27. Phase 2, n=41. Phase 3 n=17. Pilot study: 35% Maori, 24% Pacific Islander 18% European.	Mixed Methods: <i>Data Collection.</i> Phase 1: online survey plus 4 focus groups. Phase 2: online survey. Phase 3: Pilot study telephone survey. Outcomes: attitudes to content and format of website, cigarette consumption and self-reported quit rates at four weeks. <i>Analysis.</i> Descriptive statistics.	Phase 3: Nine out of 17 in the pilot study self-reported quit, 50% of the remainder cut down.	Quit rate was not stratified by ethnicity. Unknown how the self-reported quit status was identified. Extensive use of video clips via mobile phone with suitable and believable role models.
Whittaker 2011 [29]	To assess the effectiveness of an interactive multimedia mobile phone intervention for smoking cessation.	NZ wide: recruitment targeted at 16-25 yrs. particularly young Maori. Age >16yrs. daily smokers with video mobile phone who want to quit.	n= 226 (n=110 treatment; n=116 control). 55% NZ European, 24% Maori, 12% PI, 16% other in intervention group. 47% total female. Mean age 27 (SD 8.7).	Single blind RCT. Intervention: choice of role model videos and text; control: 2-wkly general health video message. <i>Data Collection.</i> 7-day point prevalence at 3 time points; continuous abstinence (Russell Standard) plus salivary cotinine at 6 months plus satisfaction survey.	No significant difference in continuous abstinence (intention-to-treat) at 6 months (between intervention (26.4%) and control (27.6%), ($p=0.8$). Participants in intervention group reported positive attitudes to support and video role models.	Quit rate was not stratified by ethnicity. Attempt was made to validate quitters with salivary cotinine. Difficulties with recruitment so RCT underpowered.

				<i>Analysis.</i> SAS version 9.1.3: Chi squared 2-tail tests of intention to treat quit rates by treatment group.		
Other Media						
Johnston 1998 [37]	To describe current practices, knowledge, attitudes to smoking in school children. To develop educational intervention about tobacco use in school children.	Primary and secondary school children In Northern Territory, Australia: three remote communities.	n= 221, only 38 students completed both pre-and post-surveys and attended the intervention Age range was from less than eight to over 16 yrs.	Mixed methods. <i>Data Collection.</i> Pre-and post-intervention surveys modified from Anti-cancer Council Victoria surveys of secondary school students. Self-reported smoking behaviour pre-and post-intervention, attitudes and behavioural observation to CD-ROM. <i>Analysis.</i> Descriptive statistics.	Increased knowledge post-intervention but no change in smoking behaviour. CD-ROM popular: One community downloaded stories from CD-ROM and turned it into reading book. CD-ROM used as a reward by teachers. Younger children berated older ones & adults about smoking.	Intervention had multi-components. However, outcomes of the CD-ROM were reported. Due to school absences, there were problems following up some children post intervention.
Mitschke 2010 [36]	Describes development and implementation of tobacco prevention edutainment drama, Asian and Pacific Island youth. Evaluating impact of the drama on knowledge, attitudes, intended behaviour and change in future intention to smoke.	Hawaii, US Oahu Island. Fifth to eighth grade audiences at multi-ethnic participating schools.	n=2660 Mean age 12 years: 51.4% male; 48.6% female. 6.9% Pacific Island; 13.8% Native Hawaiian; plus wide variety of other ethnic groups.	Mixed Methods. <i>Data Collection.</i> Pre-and post-surveys. Questionnaire adapted from existing surveys. Attitudes and beliefs assessed according to theory of planned behavior; intention to smoke; relationship to characters and emotions. <i>Analysis.</i> Chi squared tests, pre-test vs. post on knowledge items. Marginal homogeneity test measures pre vs. post	Drama effective in increasing knowledge of tobacco. Significant difference on 3 items: increased understanding of concept and symptoms of addiction, defining second-hand smoke ($\chi^2 = 5.290, p=0.021$). Significant decrease in future intention to smoke. Viewers experience range of emotions indicating engagement (mean 3.39 emotions). 71% relate to non-smoking characters.	The travelling drama was made with input from the students through focus groups. Incorporates multimedia, video, PowerPoint slides, and anti-smoking TV ads.

				intentions to smoke in future.		
Patten 2010 [38]	Assess feasibility and acceptability of a targeted Tobacco Cessation intervention for Alaska Native pregnant women, which included use of a video and educational materials.	Yukon-Kuskokwim Delta W Alaska. Pregnant women >18yrs, <24weeks gestation, tobacco users, want to quit in next 30 days.	Phase 1: n=12 pregnant women in 2 focus groups. n=7 in-depth interviews 5 F + 2M; n= 3 pregnant women pre-test study procedure Phase 2: n=35: 17 pregnant Yupik females intervention; 18 pregnant Yupik females control. Mean age 25. 35/33% smoke, 47/44% use Iqmik; 18/22% chew tobacco.	Randomised 2-group design pilot. Intervention: video, cessation guide & phone counselling; control group: brief intervention & targeted brochures. <i>Data Collection.</i> Pre- and post- interviews, self-reported smoking status and salivary cotinine. Feasibility /acceptability measures: recruitment, compliance and satisfaction. <i>Analysis.</i> Group comparisons: exact test for categorical variables; two-sample rank sum test for continuous variables.	Majority found video and written materials helpful - no significant difference between active and control. Self-reported abstinence rates 6% both groups. Validated abstinence 6% control and 0% for intervention.	Video included stories of local role models to reinforce self-efficacy. Feasibility and acceptability considered poor by authors due inadequate recruitment and interest.

Table 1: Data extracted from included studies

Legend: TV – television; ad/s – advertisements; NZ – New Zealand; TARPS - Target Audience Rating Points; BAS – Before & After Study; IAW – It’s About Whanau; PHW – pack health warnings; N/A – not applicable; AN – Alaska Native; AI – American Indian; PI – Pacific Islander