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REVIEW

Strategies to address barriers and improve bowel cancer screening participation in Indigenous populations, particularly in rural and remote communities: A scoping review

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Abstract

Background: Participation in bowel cancer screening programs is low in Indigenous[1] Australian populations, particularly in rural and remote communities. There is growing evidence of strategies to increase screening rates amongst Indigenous Australians, however, there are limited strategies specific to rural and remote communities.

Objective: This review aims to identify strategies that may increase bowel cancer screening rates amongst Indigenous populations, particularly in rural and remote communities.

Methodology: A literature search was undertaken which included peer-reviewed qualitative and quantitative articles of any study design, and grey literature. Evidence from New Zealand, Canada, United Kingdom, and Australia were included, and descriptive numerical and thematic analyses were conducted. The identified strategies were categorised using the National Cancer Policy Board's organisational framework.

Results: Nineteen strategies were identified from 23 included articles. The most frequently used strategies were recommendation from a general practitioner, culturally appropriate education resources, and nonresponder follow up. Four strategies were specific to rural and remote communities including alternative distribution of kits and mobile screening. Thirteen strategies aim to address the Knowledge category of the framework, four address Attitudes, four address Ability, and six address Reinforcement.

So What?: Several strategies are available to increase bowel cancer screening in Indigenous populations, with very few strategies specifically relating to rural and remote communities. Multiple strategies may maximise the likelihood of participation in screening amongst Indigenous Australians. Implementation may require system-level and local-level changes.

KEYWORDS
aboriginal health, bowel cancer, colorectal cancer, early detection, health communication, rural and remote communities, screening

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[1] Throughout this review, the term Indigenous is used to refer to populations who are native to a particular place.

1 | BACKGROUND

Bowel cancer was the third most diagnosed cancer globally in 2018, contributing 10.6% of the total number of new cases behind breast and lung cancers.[1] Indigenous Australians are as likely to be diagnosed with bowel cancer when compared with nonindigenous Australians, however, Indigenous populations have a lower five-year chance of survival on average compared with nonindigenous counterparts, at 58%–67% respectively.[2] Bowel cancer screening programs are an effective tool to detect early-stage cancers which increases the likelihood of effective treatments.[3,4] The Australian National Bowel Cancer Screening Program (NBCSP) provides free immunochemical faecal occult blood testing kits to eligible adults aged 50–74 years.[5] Indigenous Australians have a participation rate of 23.5%, which is significantly lower than the rate of nonindigenous Australians at 40%.[2] Rural and remote communities have an even further limited participation rate, with the Katherine Region in Australia's Northern Territory having the lowest participation rate of 14.1% in 2018–2019, which reduced to 13% in 2019–2020.[6]

Menzies School of Health Research conducted a pilot study to test if screening kits distributed via primary health centres would increase participation rates amongst Indigenous Australians compared with nonindigenous Australians.[7,8] The study demonstrated a significant increase in participation rates amongst Indigenous Australians when using the alternative pathway,[8] however, this study had an under-representation of remote and very-remote regions. Nevertheless, it was able to demonstrate a similar screening pattern for remote areas where the proportion of kits returned through the alternative pathway was higher than the proportion of kits returned through the usual pathway.[8] This pilot study demonstrates one strategy that was effective at not only increasing screening rates of Indigenous Australians, but also increasing screening rates in rural and remote communities.[8] Although the literature examining strategies to increase bowel cancer screening rates amongst Indigenous populations is growing, there are limited strategies specific to rural and remote communities. Therefore, the purpose of this scoping review is to identify the types of strategies that may increase bowel cancer screening rates amongst Indigenous populations, particularly in rural and remote communities. The current scoping review uses an organisational framework by the National Cancer Policy Board[9] to assign strategies to one or more of the four steps required to improve cancer screening practices. This framework categorises the strategies into four areas; knowledge, attitudes, ability, and reinforcement.

2 | METHOD

2.1 | Search strategy

The Joanna Briggs Institute (JBI) Three-step Strategy was used to complete a search of published and grey literature.[10] A search of PubMed and CINAHL was initially conducted using keywords. Of the retrieved articles, additional keywords from the titles and abstracts were identified and included in the search terms. A second search was conducted using all keywords across PubMed, CINAHL, Scopus, ScienceDirect, Web of Science, and Informit, and relevant abstracts were extracted to EndNote. The keywords used are displayed in Table 1. The database searches were limited to articles published in English, from 2006 onwards. The Australian NBCSP was implemented in 2006, which was identified as the starting date for inclusion of literature in the review. A grey literature search was conducted which followed the Canadian Agency for Drugs and Technologies in Health (CADTH) guide of government websites.[11] Other grey literature was identified via search engine (Google) and manually added to EndNote. The final search was conducted of the reference lists of all identified literature to identify any additional articles. All articles were compiled in an EndNote library, and duplicates removed. See Appendix A for a full record of search strategy.

2.2 | Inclusion/exclusion criteria

Titles and abstracts were screened against the inclusion and exclusion criteria (Table 2). Inclusion in the review was based on the 'population-concept-context' framework, as outlined by the guidance for scoping reviews.[10] The population in this review included indigenous populations and/or vulnerable and/or rural/remote populations aged 35–74 years. This is a wider age range than the 50–74 years age group who are eligible for the free bowel cancer screening kit under the NBCSP, and was used to capture younger participants who may be engaging in bowel cancer screening due to family history of disease. The key concept was strategies to increase participation rates in bowel cancer screening programs, specifically addressing unique barriers for Indigenous populations. The context was defined as Commonwealth countries with comparable publicly funded health systems including Australia, United Kingdom, Canada, and New Zealand. Qualitative or quantitative primary research studies of any study design were included.

TABLE 1 Keywords used for search of databases

Population terms	Concept terms	Intervention terms	Context terms
'At-risk population'	'Bowel cancer'	Screen*	Australia
'Vulnerable population'	'Colorectal cancer'	Prevent*	United Kingdom
Indigenous	'Faecal occult blood test*'	Barrier*	UK
Aborigin*	'Faecal occult blood test*'	Challeng*	Canada
First Nation*		Strateg*	New Zealand
		Enabl*	NZ
		Facilitat*	
		Detect*	

*Represents wildcard used for multiple character searching.

TABLE 2 Inclusion and exclusion criteria

Inclusion
Indigenous population and/or vulnerable and/or rural/remote population, aged 35–74 years
Focus on strategies to increase participation rates in bowel cancer screening programs
Following countries: Australia, United Kingdom, Canada, and New Zealand
Peer-reviewed primary research of any study design or grey literature
Published in English language
Exclusion
Focus on facilitators to increase participation rates, not strategies.
Published prior to 2006

2.3 | Study selection

From the potentially eligible short-list, the full text of each article was assessed against the inclusion and exclusion criteria. All articles which met the inclusion criteria were included in the review.

2.4 | Data extraction and quality assessment

The methodological framework proposed by Arksey and O'Malley[12] was followed to ensure accurate data was extracted from the included articles. Descriptive numerical analysis was conducted for the included articles. Qualitative information underwent the Braun and Clarke[13] six-phase thematic analysis to group the types of strategies used. All articles that mentioned a specific strategy were coded and grouped. If an article reported on several different strategies, the article was coded for each strategy. Each included article was critically appraised for quality. The peer-reviewed articles were assessed using the Mixed Methods Appraisal Tool (MMAT).[14] The grey literature articles were assessed using the AACODS (authority, accuracy, coverage, objectivity, date, significance) checklist.[15] An overall percentage score was applied to each article indicating the percent of quality indicators met.

3 | RESULTS

The search strategy identified a total of 322 pieces of literature; 154 articles identified through database searching and 168 articles identified through government websites, internet search engine, and reference lists of all literature. After duplicates were removed, 212 titles and abstracts were screened for eligibility. Eighty-Eight articles were excluded, and the remaining 124 full-text articles were assessed for inclusion. A total of 23 articles were eligible to be included in the review; 61% (n = 14) of articles were peer-reviewed research, and 39% (n = 9) articles were grey literature. The full process for inclusion in the scoping review is graphically represented in Figure 1 using a Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flowchart.[16]

3.1 | Characteristics of included articles

Characteristics of the peer-reviewed articles and the grey literature are presented in Tables 3 and 4, respectively. The majority (n = 22) of included articles and reports were published within the last 10 years. Of the peer-reviewed articles, four were published in Australia, four were published in Canada, four in the United Kingdom, and two in New Zealand. Of the grey literature articles, six were published in Australia, and three were published in New Zealand. Target populations of the included articles were varied, with the majority targeting Indigenous populations: Aboriginal and/or Torres Strait Islanders (n = 7), First Nation/Metis/Hutterite peoples (n = 2), and Maori and/or Pacific Islanders (n = 5).

3.2 | Quality appraisal of included articles

The overall quality of both peer-reviewed and grey literature articles was high. Thirteen out of 14 peer-reviewed articles achieved a quality score of 60% or higher (Table 3). Similarly, 8 out of 9 grey literature articles achieved a quality score of 67% or higher (Table 4). Consistently poor scores were seen amongst the peer-reviewed articles in the category of 'risk of non-response bias' and 'blinded outcome assessors' (Appendix B). Amongst the grey literature, poor scores were consistently seen in the 'significance' category (Appendix C).

3.3 | Strategies to increase screening participation

Nineteen strategies were identified that may increase bowel cancer screening rates amongst Indigenous populations. Four of these strategies were specific to rural and remote communities. Table 5 presents the results sorted by strategy, indicating the number of articles that suggested the strategy, and which category(s) the strategy is targeting. Detailed results of the peer-reviewed articles and grey literature are provided in Appendix D and E, respectively.

The most frequently used strategy was endorsement or recommendation from a patient's general practitioner (GP).[10,17–26] One study found a statistically significant increase in screening uptake when invitation letters included an endorsement banner from the patient's GP practice.[27] This study also noted a 6% increase in the odds of uptake in patients who previously did not participate.[27] Another study found a 1-2-fold increase in likelihood of screening participation if a GP's recommendation is given to the patient.[21] This strategy falls under the Reinforcement category of the National Cancer Policy Board's organisational framework.[9]

The second most common strategy adopted was the development and distribution of culturally appropriate education resources.[18,19,28–33]

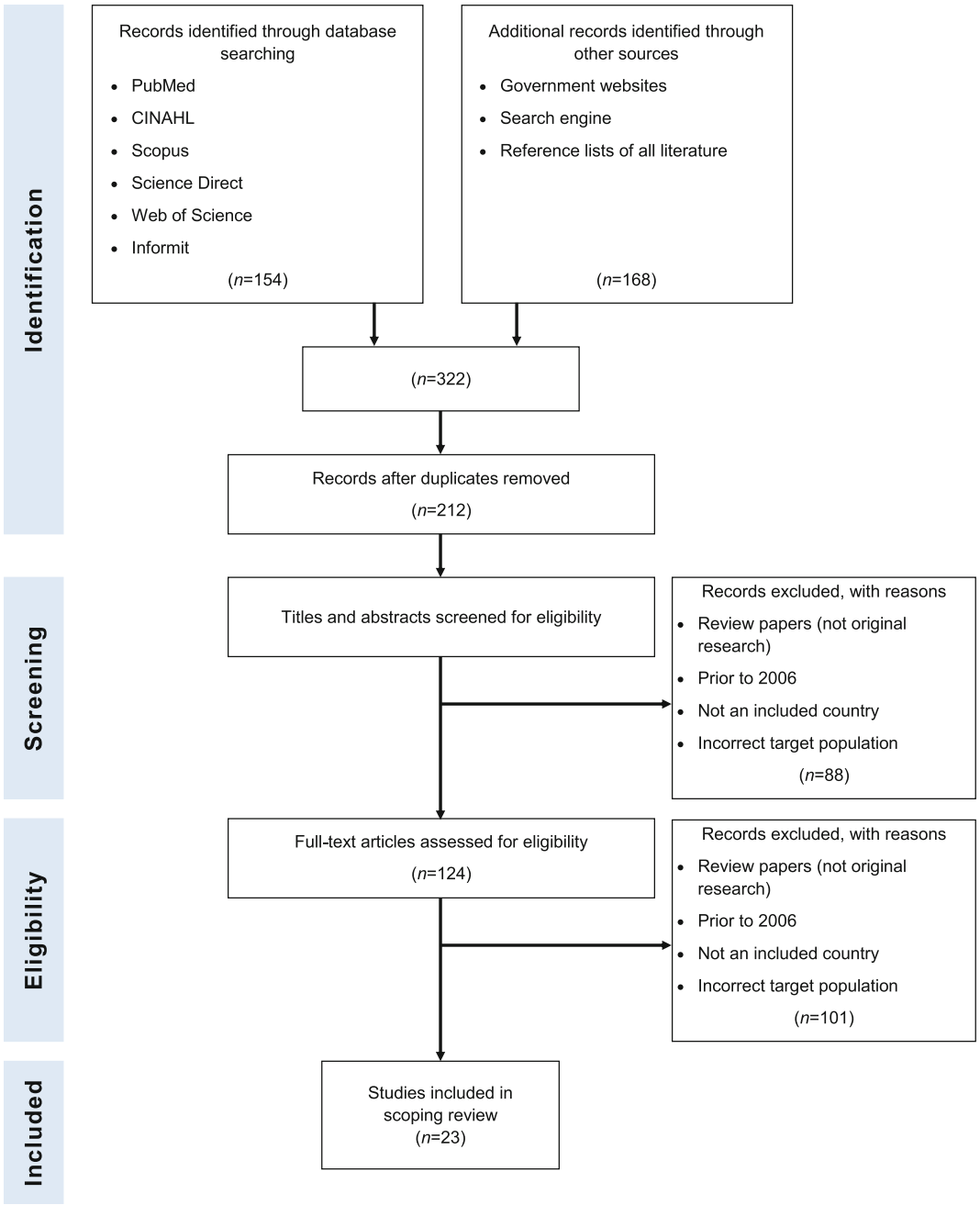

FIGURE 1 Flowchart for selection of included literature

Three articles encouraged the use of resources that were picture-based to associate with storytelling culture, included Indigenous artwork, and were translated into common or native words.[30–32] Christou and Thompson[29] found that 96% of health care worker survey respondents found a culturally appropriate flipbook to be a valuable resource for educating patients, however, this study also found the resource was not widely used in large institutions such as hospitals and was only moderately used in outpatient clinics or Aboriginal health centres. One study developed and distributed a culturally appropriate DVD which could be used by health care workers to assist with educating patients.[34] While this strategy is widely used and accepted in both peer-reviewed and grey literature, two of the included studies concluded that a well-received, culturally appropriate educational resource was not sufficient to increase bowel cancer screening participation.[29,34] This strategy falls under the Knowledge category of the National Cancer Policy Board's organisational framework.[9]

Another commonly used strategy was nonresponder follow up.[20,22–24,28,33] Six articles suggested contacting patients who were overdue for screening, either by phone or a reminder letter, and suggesting a timeframe on when to follow up with their GP. Follow-up was completed at 4 weeks, 2 months, or 6 months after receiving the kit. One study demonstrated that telephone contact was the most effective method.[24]

TABLE 3 Characteristics of included peer-reviewed articles

Study	Location	Aim	Design	Sample (n)	Target population	Quality
Chow et al.,[32]	Canada, Ontario	• To provide cancer screening education and opportunistic cancer screening to residents from rural and remote First Nations communities while accessing health services in the urban centre of Thunder Bay, Ontario, Canada.	Quantitative descriptive.	333	First Nations	80% of quality criteria met
Christou & Thompson,[17]	Australia, Western Australia	• To identify important factors influencing the decision to undertake screening using Faecal Occult Blood Testing (FOBT) amongst Indigenous Australians.	Quantitative descriptive.	93	Indigenous Australians	40% of quality criteria met
Christou & Thompson,[29]	Australia, Western Australia	• To gain feedback on [the flipchart's] design and content as well as its usefulness, relevance and uptake from health providers working with Aboriginal clients.	Quantitative descriptive.	90	Aboriginal health care workers	60% of quality criteria met
Gesink et al.,[21]	Canada, Ontario	• To identify and quantify the barriers and facilitators for breast, cervical and colorectal cancer screening for UNS residing in Ontario, Canada.	Mixed methods.	2,783	Under- and populations	100% of quality criteria met
Haigh et al.,[36]	Australia, Western Australia	• To examine a) the implementation and use of a DVD developed to educate Aboriginal people about bowel cancer and bowel cancer screening; and b) broader aspects of Aboriginal participation in the National Bowel Cancer Screening Program.	Qualitative.	67	Indigenous Australians	60% of quality criteria met
Lotfi-Jam et al.,[18]	Australia, Victoria	• To review known barriers to screening participation and evidence for interventions to increase screening update. • To summarize Cancer Council Victoria's recent programs, evaluation efforts and early results where known. • To provide guidance on future program development, applying the lessons learnt and challenges faced to date.	Quantitative descriptive.	1,700	Under-screened communities including Aboriginal and Torres Strait Islander.	60% of quality criteria met
Mema et al.,[45]	Canada, Alberta	• To explore whether participation in an enhanced-intervention program (Screen Test-EACS) led to increased participation in cervical and colorectal cancer screening compared with usual intervention (Screen Test). • To improve access to screening for First Nations, Metis, and Hutterite women in rural and remote communities.	Quantitative nonrandomised.	958	First Nations, Metis, and Hutterite women	80% of quality criteria met

TABLE 3 (Continued)

Study	Location	Aim	Design	Sample (n)	Target population	Quality
Raine et al.,[27]	United Kingdom, England	• To evaluate the impact of GP practice endorsement on the socioeconomic gradient in CRC screening uptake, and its cost. • To evaluate the impact of GP practice endorsement on CRC screening uptake overall.	Quantitative randomised controlled trial.	265,434	Individuals with low socioeconomic circumstances; individuals from deprived areas.	60% of quality criteria met
Sandiford et al.,[44]	New Zealand, Auckland	• To report the findings of an interrupted time-series evaluation of an intervention to permit bowel screening invitees to drop their test kits off at one of a number of community laboratories.	Quantitative nonrandomised.	29,257	Maori, Pacific, and Asian participants	100% of quality criteria met
Sandiford et al.,[42]	New Zealand, Auckland	• To test whether a telephone follow-up service for Maori, Pacific, and Asian ethnicity individuals increases bowel screening participation in nonresponders to postal invitations.	Quantitative randomised controlled trial.	7,601	Maori, Pacific, and Asian participants	100% of quality criteria met
Shankleman et al.,[24]	United Kingdom, England	• To assess an intervention aimed at increasing awareness and uptake of bowel cancer screening amongst subjects … to assist towards the national screening target.	Quantitative randomised controlled trial.	3,886	Ethnically diverse and relatively deprived population with low awareness and participation.	80% of quality criteria met
Tinmouth et al.,[25]	Canada, Ontario	• To evaluate whether the addition of a FOBT kit to a second mailed invitation compared to a second mailed invitation alone increases CRC screening amongst nonresponders to the first mailed invitation.	Quantitative randomised controlled trial.	3,594	Nonresponders.	80% of quality criteria met
Watson et al.,[35]	United Kingdom, England	• To investigate the impact on the update of FOBT of sending a research questionnaire and related study documents, either with the test kit or separately 2–3 days later.	Quantitative randomised controlled trial.	47,774	People in high deprivation areas.	80% of quality criteria met
Wardle et al.,[26]	United Kingdom, England	• To test four different supplements to the screening information materials aimed at modifying inequality in screening uptake.	Quantitative randomised controlled trial.	745,011	Areas of high deprivation.	80% of quality criteria met

Although this strategy is low-cost, there are potentially logistical barriers with knowing when a patient is overdue, and how long since they have received their kit.[20,22–24,28,33] Monitoring overdue patients would require administrative process and staffing resources which may increase costs. This strategy falls under the Reinforcement category of the National Cancer Policy Board's organisational framework.[9]

Four strategies were suggested specifically to address rural and remote community barriers. Two articles suggested the use of alternative distribution of kits to target an individual's ability to participate in screening.[20,23] The New Zealand Ministry of Health[23] explored the use of community workers to distribute kits to Māori and Pacific people. The Department of Health[20] trialed alternative distribution of kits to Aboriginal and/or Torres Strait Islander communities through local

TABLE 4 Characteristics of included grey literature

Study	Location	Aim	Target population	Quality
Cancer Council Victoria[34]	Australia, Victoria	• To increase bowel cancer screening participation in Aboriginal/Torres Strait Islander populations. • Increase knowledge and understanding of the benefits of bowel cancer screening, and confidence to undertake the test. • Encourage eligible people to undertake the bowel cancer screening test when they are due. • Encourage attendees to speak to their parents/relatives about doing the bowel cancer screening test.	Aboriginal and/or Torres Strait Islander	100% of quality criteria met
Cancer Council Victoria[30]	Australia, Victoria	• To increase knowledge of bowel cancer screening in Victoria's most under-screened communities.	Sri Lankan, Vietnamese, Indian, and Aboriginal communities in South Eastern Melbourne.	34% of quality criteria met
Cancer Council Victoria[31]	Australia, Victoria	• To provide information to health care workers on culturally appropriate communication with Aboriginal and/or Torres Strait Islander people.	Aboriginal and/or Torres Strait Islander	67% of quality criteria met
Cancer Society of New Zealand[19]	New Zealand, Wellington	• To outline the key guidelines and recommendations of bowel cancer screening to the public.	Under-screened population, Maori and Pacific peoples, people living in deprived areas, populations with low health literacy, and people with disability.	100% of quality criteria met
Department of Health[20]	Australia, Australian Capital Territory	• To increase participation in the Program, including improved targeting of invitations, undertaking a national pilot of an alternative pathway for Aboriginal and Torres Strait Islander participants, and improving GP engagement.	Under-screened communities including Aboriginal and Torres Strait Islander.	100% of quality criteria met
Department of Health[28]	Australia, Australian Capital Territory	• To provide information to health workers about the bowel cancer screening program.	Health care workers.	67% of quality criteria met
Department of Health[33]	Australia, Canberra	• To provide information to general practitioners about the bowel cancer screening program.	General Practitioners	67% of quality criteria met
Ministry of Health[22]	New Zealand, Wellington	• To provide the National Screening Unit with strategic advice and recommendations on the appropriateness and feasibility of a population colorectal cancer screening program in New Zealand.	Maori and Pacific people	100% of quality criteria met
Ministry of Health[23]	New Zealand, Wellington	• To determine whether organised bowel screening could be introduced in New Zealand in a way that is effective, safe, and acceptable for participants, equitable and economically efficient.	Maori and Pacific people	100% of quality criteria met

health services rather than direct mail. Two articles suggested the use of mobile bowel screening services to improve uptake in rural and remote communities.[31,35] Mema et al.[35] explored the use of a combined breast, cervical, and colorectal mobile cancer screening program for First Nations, Metis, and Hutterite communities living in rural and remote Alberta. The study found an increase in colorectal cancer screening uptake in this population with an overall higher prevalence of women up to date with colorectal cancer screening post intervention. Cancer Council Victoria[31] suggested offering mobile screening services to Aboriginal and/or Torres Strait Islander communities to improve the opportunity to participate in screening. One study explored the use of appointments offered to guests at a boarding home facility.[32] Chow et al.[32] provided cancer screening to residents from rural and remote First Nations communities in Northwestern Ontario, Canada, who were already staying at a boarding facility in the central hub of Thunder Bar, Ontario, Canada. By integrating cancer screening into already existing health care programs, the study found 32% of all eligible participants were given a screening kit.[32] One article suggested the use of nonpostal return options of completed kits to increase screening participation.[23] The New Zealand Ministry of Health[23] offered Māori and Pacific people the option of dropping off a sample at a local collection centre. All strategies specific to rural and remote communities fall under the Ability category of the National Cancer Policy Board's organisational framework.[9]

TABLE 5 Results sorted by strategy according to the quantity of supportive articles

Evidence-based strategy	Description and rationale	# of articles	Population the strategy has been trialed with	Framework category	Facilitators to implementation	Barriers to implementation
GP recommendation and/or endorsement	• Patient's GP recommends to an individual patient that they should participate in screening • The patient's GP signature on the invitation letter • The patient's GP clinic banner or logo on the invitation letter	11	Indigenous and under-/never-screened communities. Maori and Pacific communities. Low socioeconomic populations. High deprivation populations.	Reinforcement	• Low cost (ie, Can be completed during routine appointments.) • Highly effective at increasing intention to participate • Can be used independently • Minimal effort required from primary care providers (re letters)	• May not be important amongst time-poor GPs managing conflicting priorities.
Development and use of culturally appropriate education resources.	• Simple, easy to read, and pictorial resources are useful for increasing patient understanding. • To include aboriginal artwork • Culturally appropriate resources more likely to resonate with Indigenous patients. • Can use a flipbook, flipchart, or DVD • Resources can be given to patients or can be used by staff to facilitate education. • Resources can be translated to native languages	8	Indigenous and under-screened communities	Knowledge and attitudes	• Nil cost if resources sought from providers (Cancer Council). • Simple and easy to use for any level of health worker • Self-explanatory information (I.e. Typically, does not require explanations from health workers) • Can increase patient self-efficacy of completing the test	• Potential cost associated if resources developed internally • May not be a valued resource amongst staff with competing priorities and time pressures. • More effective in outpatient clinic or Aboriginal health centres. Less effective in hospitals. • Not consistently effective across studies.
Nonresponder follow-up	• Patients who are overdue for screening receive a follow up phone call and/or are sent a letter reminding them to complete the kit. • Follow up can be completed at various intervals (eg, 2 or 6 months after they received the kit) • Patients are given a timeframe on when to follow up with their GP.	6	Indigenous and under-screening communities. Maori and Pacific communities. High deprivation populations.	Reinforcement	• Low cost	• Potentially logistical barriers with knowing when a patient is overdue and how long since they received their kit • Requires administrative resources to monitor and send additional letters. • Requires staffing resources for phone calls
Education for health workers (including GPs)	• Information sheet for health workers and GPs outlining-the importance of	4	Indigenous and under-screening communities	Knowledge and reinforcement	• Low cost • May alleviate health worker fears of offending Indigenous	• May not be seen as important amongst staff with competing

(Continues)

TABLE 5 (Continued)

Evidence-based strategy	Description and rationale	# of articles	Population the strategy has been trialed with	Framework category	Facilitators to implementation	Barriers to implementation
	bowel screening- information about the NBCSP- suggestions on how to encourage their patients to participate- information on cultural concerns. • Encourages health workers to- initiate the conversation- check with patients if they received a kit- check when a patient is due to receive a kit- provide a copy of the 'How to do a bowel screening test' instructions- encourage patients to call the NBCSP Info Line to request a test- order demonstration kits for the clinic- display culturally appropriate posters and brochures				patients by bringing up sensitive topics.	priorities and time pressures.
Media advertising	• Various forms of advertising available:- Online and social media- Television and radio- Newspapers- Posters, billboards, and bus stops • Can be run for a short-term (several forms of advertising at once for an intensive strategy to boost screening) or long-term (spanning out various forms of advertising over a longer period of time).	3	Indigenous and under-screened communities	Knowledge	• Wide-reaching • Accessible for rural and remote communities	• Only effective if used in conjunction with another strategy.
Use of community Indigenous health workers	• Indigenous health workers in the community to encourage participation, and support patients. • May include distribution and collection of kits	2	Maori and Pacific communities. Ethnically diverse populations. Low socioeconomic populations.	Knowledge and reinforcement	• Communication from an Indigenous health worker to an Indigenous patient may be more comfortable for the patient • Frequent exposure to bowel screening education from	• Staffing resources • May require employment of addition Indigenous health workers specifically for this role • Logistical and time intensive

TABLE 5 (Continued)

Evidence-based strategy	Description and rationale	# of articles	Population the strategy has been trialed with	Framework category	Facilitators to implementation	Barriers to implementation
	• Employment of Indigenous staff, particularly females, as doctors, health workers, nurses, administrative, or liaison officers.				trusted sources may assist to normalise the topic.	considerations for kit collection (particularly for rural and remote communities)
Alternative distribution of kits.	• Patients are given a screening kit during an appointment or can pick one up at a clinic. • Assists with making sure the patient actually receives a kit (I.e. Eliminates issues with undeliverable mail) • Opportunity to provide education of screening and instructions on how to complete at the same time.	2	Indigenous and under-screened communities	Knowledge and ability	• Nil reliance on mail • Nil cost associated • Opportunity for face to face education and support • Increased accountability (I.e. The clinic knows that you have been asked to screen and can follow up)	• Requires staffing resources (I.e. Time to provide education on the kit) • Requires patients to be able to travel to a clinic/ health service.
Provision of emotional support and education from health workers.	• Phone or face to face support including building relationships and rapport, and regular communication with patients. • A contact-point for patients who may be struggling with participation for various reasons • Can include dedicated time/ appointments specifically for patient education and how-to instructions for completing the test. • Education should focus on- risks, benefits, limitation, and possible harms of the test- likelihood of false positives and negative results- what happens after a positive test result- reinforcement that the test is noninvasive and painless- kit is	2	Under-/never-screened communities. Maori and Pacific communities	Knowledge and attitudes	• Patient-centred, and compassionate care	• Staffing resource intensive with additional appointments. • May require staff time + to explore and problem solve individual patient issues.

(Continues)

TABLE 5 (Continued)

Evidence-based strategy	Description and rationale	# of articles	Population the strategy has been trialed with	Framework category	Facilitators to implementation	Barriers to implementation
	covered under Medicare with no out-of-pocket expense					
Comedy show	• Comedy show about bowel cancer screening delivered by an Aboriginal comedian, delivered to Indigenous audiences	2	Indigenous	Knowledge and attitudes	• Likely to engage and interest Indigenous people • Education provided by an Indigenous person (not a health worker) may be more comfortable for the patient • Light-hearted nature of the education may assist to normalise the topic. • Highly effective independently	• May be costly to develop and implement • Long lead-in time
Mobile bowel screening service	• Potential to integrate bowel screening into existing mobile screening services (I.e. mobile cervical screening or mammogram clinics). • Mobile service can provide screening collection or provision of kit.	2	Indigenous, Metis, and Hutterite women	Ability	• A one-stop-shop service • Assists to reduce transport barriers for rural and remote communities • Potentially easy implementation if mobile screening services are already established	• Costly and intensive project to establish if mobile screening services do not already exist • Staffing resources • Logistical barriers (I.e. Transportation of health workers to rural/remote communities, transportation of samples).
Community-based group education sessions	• Sessions provided by an Indigenous health worker from the same community to provide information and support in a group-based setting.	2	Maori and Pacific communities. Under-screened communities. Deprived populations. Low health literacy communities.	Knowledge and reinforcement	• Communication from an Indigenous health worker to an Indigenous patient may be more comfortable for the patient • Wider reach of education compared to individual	• Staffing resources • Potential for poor attendance
Information (nonspecific) provided to patients	• Information given to patients that describes the risks and possible harms of screening. Limitations and the likelihood of false results need to be explained. • Explanation that the test is noninvasive and pain-free, to alleviate fears.	1	Maori and Pacific Islander people	Knowledge	• Simple and easy to do • Can be given to patients during regular appointments • Can be provided over the phone, face to face, or in written form.	• May be timely to educate each patient individually • May not be seen as important amongst staff with competing priorities and time pressures.

TABLE 5 (Continued)

Evidence-based strategy	Description and rationale	# of articles	Population the strategy has been trialed with	Framework category	Facilitators to implementation	Barriers to implementation
	• Education provided to clients that the test is covered under Medicare and does not require any payment from the patient.					
Inclusion of additional resources with the NBCSP invitation letter.	• An additional leaflet to explain the outcomes of the screening test. • Simple, easy-to-read document that outlines the potential results and what happens next (I.e., if your test comes back positive, your doctor will refer you for a colonoscopy)	1	High deprivation populations.	Attitudes	• Aims to reduce the fear of the outcome, or fear of diagnosis, by providing education on those outcomes. • Low cost	• May present logistical issues with NBCSP (I.e. Would it be sent out separately to the invitation letter?) • Oversaturation of information / overwhelming amount of written information.
Revision of the standard NBCSP invitation letter.	• Simplified version of the invitation letter, kit instructions, and consent form to be more accessible to a wide range of literacy levels. • A local-specific version can be sent to patients shortly after they receive the standard NBCSP invitation letter	1	Maori and Pacific communities. Ethnically diverse population. Low socioeconomic populations. High deprivation populations.	Knowledge	• Simple and easy to read instructions may improve understanding and self-efficacy of testing • Low cost	• May present logistical issues with NBCSP (I.e. Would a revised letter be *in addition* to the standard letter?) • Oversaturation of information / overwhelming amount of written information.
Advance-notification letters	• A letter sent to the patient 1–2 weeks prior delivery of a screening kit. • Notifies the patient that their screening kit will be arriving soon. • Gives additional exposure to the program and thought-seed planting.	1	Indigenous and under-screening communities	Knowledge and reinforcement	• Low cost • Can act as a reminder or trigger	• Potentially logistical barriers with knowing when a patient is due to receive their kit from NBCSP • Requires administrative resources to monitor and send additional letters.
Cancer screening appointments offered to guests staying at a boarding home facility while accessing other health care services.	• Guests staying at a boarding facility while accessing other health services, are offered screening appointments with a health worker. • Individualised education can be provided to clients	1	Indigenous	Ability	• Low cost • Low staff resources required. • Opportunistic • Patients have already traveled to the facility, so eliminates transportation barriers for rural and remote communities.	• Potentially for patients to decline the service due to demands of other health interventions at the same time.

(Continues)

TABLE 5 (Continued)

Evidence-based strategy	Description and rationale	# of articles	Population the strategy has been trialed with	Framework category	Facilitators to implementation	Barriers to implementation
	regarding necessary screening for their age/sex/medical history.					
Indigenous health worker phone call to offer screening appointment	• Follow up phone call from health worker to never-screened patient. • Phone call to encourage completion of the kit or an appointment at the clinic.	1	Indigenous	Knowledge	• Nil cost associated	• Requires staffing resources
Inclusion of research study participation documents sent with the standard invitation letter and screening kit.	• Documents inviting patients to participate in a research study, are sent alongside the standard invitation letter and screening kit, or 2–3 days later.	1	High deprivation populations.	Knowledge	• Minimal cost associated • Simple to implement	• Poor effectiveness; screening uptake *reduced* in the intervention group.
Option to drop off completed kit at a community laboratory.	• Flyer included in the usual mailed kit offering alternate drop-off option. • Drop off the kit to one of several community laboratories.	1	All eligible individuals for population-based colorectal screening	Ability	• Minimal cost associated • Simple to implement • Offers an alternative if posting a faecal sample is considered culturally inappropriate.	• Travel to a community laboratory may not be feasible for people in rural and remote communities

Several other strategies were identified and are provided in Table 5, including education for health workers including GPs[22,28,30,33] (n = 4), media advertising[17–19] (n = 3), use of community Indigenous health care workers[23,31] (n = 2), provision of emotional support and education from health care workers[18,21] (n = 2), comedy show[33,34] (n = 2), community-based group education sessions[18,19] (n = 2), information (nonspecific) provided to patients[18] (n = 1), inclusion of additional resources with the NBCSP invitation letter[26] (n = 1), revision of the standard NBCSP invitation letter[23] (n = 1), advance-notification letters[20] (n = 1), indigenous health worker phone call to offer screening appointment[32] (n = 1), and inclusion of research study participation documents sent with the standard invitation letter and screening kit[35] (n = 1).

4 | DISCUSSION

Nineteen identified strategies were categorised into one or more of the four steps of the National Cancer Policy Board's organisational framework to improve cancer screening practices. The four identified strategies specific to rural and remote communities could only be categorised into one of the four steps. The four steps of the framework are intended to be linear in nature, however real-life implications may mean patients move between steps along the pathway.

4.1 | Knowledge

Most identified strategies are targeted towards improving patient knowledge, as presented in Figure 2. Research has been targeted towards improving patient knowledge of cancer screening because it is a crucial first step that needs to be addressed before managing other barriers.[9] Eight articles suggested the use of culturally appropriate education resources.[18,19,28–33] Flipbooks, narrative leaflets, flipcharts, and DVDs have been used to easily present information to patients.[18,19,28–33,36] Resources can be sourced from providers such as Cancer Council and Indigenous Bowel Screen at minimal cost.[37,38] The information typically requires minimal training for health professionals to be able to implement the resource with patients.[29] However, there is potentially poor buy-in from health care workers where resources are not seen as valuable. Staff with competing priorities may report time constraints and may prioritise more pressing health

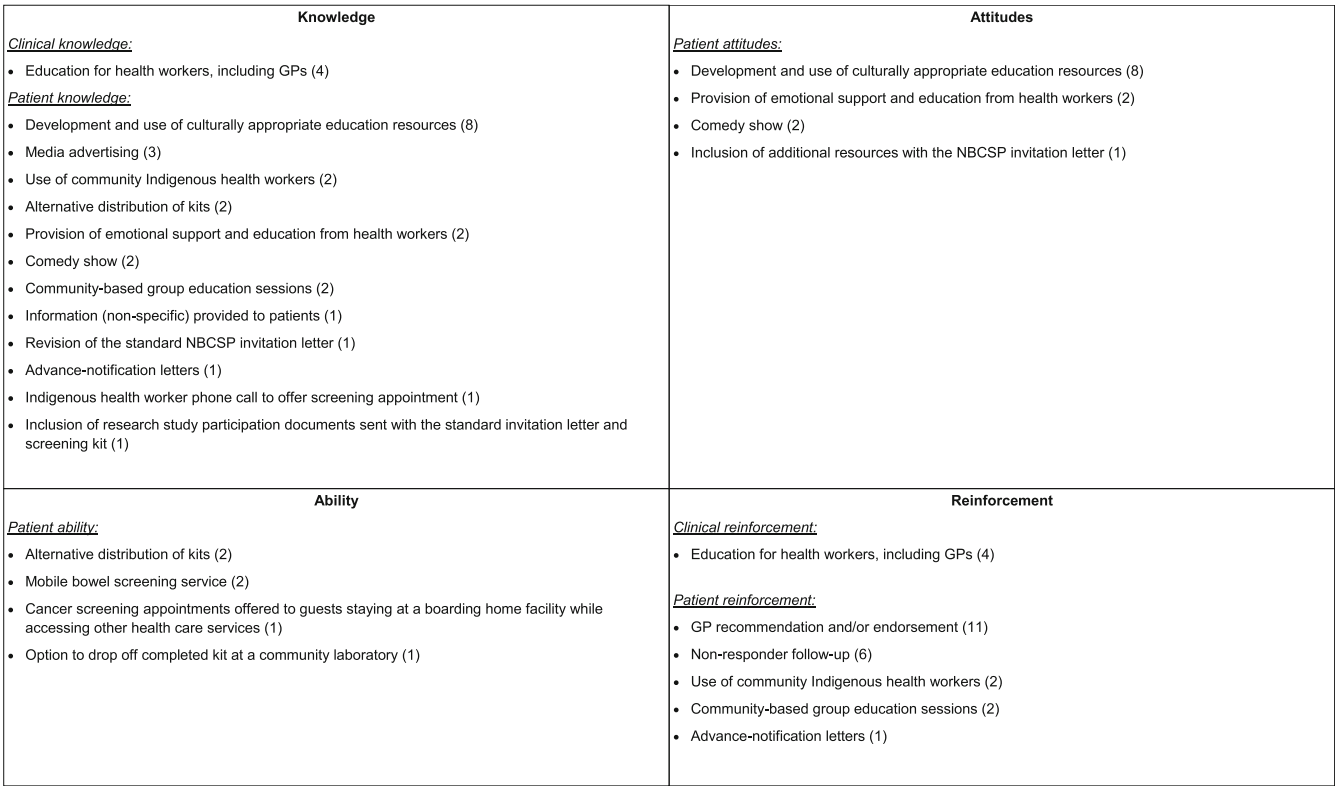

FIGURE 2 Strategies sorted by framework category and the number of articles that support the strategy. Some strategies are presented twice if they fall into two or more categories

education.[29] Another issue is the responsibility amongst health care workers to provide education. Christou and Thompson[29] identified a common theme amongst health care workers that Indigenous health education was not in the scope of their role and should be done by Indigenous health care workers. A similar study by Durey, Thompson, and Wood[39] found that health care workers who hold this view may be engaging in institutional racism and may lack the skills required for delivering culturally appropriate health care. SA Health[40] further promoted this message with the development of its campaign 'Aboriginal Health – Everyone's Business'.

At the provider level, primary care physicians must be familiar with screening requirements, and interpreting and providing results to patients.[9] Four of the grey literature reports suggested educating health care workers as a strategy to increase participation.[22,28,30,33] The Department of Health[28] developed an information fact sheet for GPs specifically for bowel cancer screening amongst Aboriginal and/or Torres Strait Islander people detailing the importance of screening, information about the NBCSP, and suggestions on how to encourage patients to participate. Two grey literature reports suggested that GPs should initiate the conversation with eligible patients, provide education materials, and have demonstration kits available at the practice.[28,33] Providing education to health care workers is a low-cost strategy but may have limited effectiveness where staff have competing priorities and time pressures. Young and Ward[41] identified that seminars by experts in preventative care was the most preferred strategy amongst GPs to disseminate the relevant information regarding cancer screening. Although these strategies may assist with improving knowledge amongst the Indigenous population, they do not specifically address the barriers of rural and remote communities.

4.2 | Attitudes

Individuals with knowledge of bowel cancer screening does not guarantee participation.[9] Personal or cultural beliefs may influence attitudes towards bowel cancer screening which determines participation in screening programs.[9] Attitudes about the importance of screening, the acceptability of the test, and the fear of diagnosis may reduce an individual's intention to participate.[9] One article suggested additional resources be included with the standard NBCSP invitation letter to specifically target changing the attitudes of patients.[26] Wardle et al.[26] reported the use of a 'gist' leaflet or a 'narrative' leaflet to present simplified information for readers with low literacy and/or numeracy, though neither type of leaflet was successful in increasing uptake amongst populations with high deprivation. Although this strategy is very low-cost, it increases the mass of written materials mailed to an individual which may reduce the likelihood of the individual reading it.[26] A more favourable strategy is a joint knowledge-attitude approach; two articles suggested the provision of emotional support and education from health care workers to address patient fears and provide individualised education to patients who express concerns about the screening process.[21,22] This strategy depends on the patient

having a high level of rapport and trust with the health care worker to feel comfortable expressing their fears and may only be suitable at a local level. Another joint knowledge-attitude strategy is the use of a comedy show presented by an Aboriginal comedian delivered to Indigenous audiences.[33,34] This strategy may be difficult to implement given the costly resources required to organise and host several performances. Despite this, the strategy is highly effective at reducing fear around screening, and at increasing participation in Indigenous populations.[33,34] Using a joint knowledge-attitude approach may be favourable compared to single-category interventions.[42]

4.3 | Ability

When knowledge and attitudes are addressed, challenges with the ability to participate still remain.[9] Clinicians who are willing to encourage patients to participate may be unable to offer testing due to operational barriers.[9] At an individual level, patients may not have access to screening tests, particularly in rural and remote communities. D'Onise et al.[43] found that a lack of culturally appropriate health services was a significant barrier to participation. Two articles suggested offering an alternative distribution method of testing kits.[20,23] The Department of Health in Australia[20] suggested offering screening kits available for pick-up at a local health service rather than through mail delivery. Sandiford et al.[44] found a small but significant increase in participation when invited to drop off a completed kit to a community laboratory. This low-cost strategy offered an alternative collection option if posting a faecal sample is considered culturally inappropriate.[44] This is also supported by the Menzies School of Health Research Pilot study who found significant improvements in participation when kits were offered at primary health centres.[7,8] Improvements in participation were seen in remote and very-remote regions, where the proportion of kits returned through this method was higher than the proportion of kits returned via mail.[8] Although, the proportion of remote and very-remote participants in the sample was low.[8] The Ministry of Health in New Zealand[22] also suggested the use of community workers to distribute and collect kits for rural and remote communities, however, this may not be appropriate in rural and remote areas given the extensive distance between communities. Mema et al.[45] suggested the integration of bowel screening services with existing mobile mammography. In this study, women who were already able to access mobile breast screening services also had the option of completing bowel and cervical screening, which was effective in increasing access and participation.[45] However, this strategy is associated with a high resource demand for trained health care workers, and logistical barriers such as transportation. Cancer Council Victoria[30] suggested health clinics offer flexible and out-of-hours appointments, transportation assistance, and group transportation for participation in screening services.

4.4 | Reinforcement

Screening rates may be influenced simply by a failure to remember screening is due or lack of accountability.[9] For health care providers, it can be difficult to keep track of screening status, or remember to reinforce the message to overdue patients. Tracking and reminder systems may be useful to identify the patients who are due or overdue for screening, or when a screening kit has not been returned.[9] It can also be difficult for GPs to meet the guidelines and expectations for every chronic condition or preventative health care strategy, and bowel cancer screening may be a lower priority amongst competing demands. To highlight the importance of bowel cancer screening to GPs, four studies suggested intermittent education for health care workers to reinforce the message.[22,28,30,33]

At the individual level, patients may forget that screening is overdue, or may not feel accountable to complete the screening.[9] The most identified strategy in this study, suggested by 11 articles, was recommendation or endorsement from the patient's GP.[10,17–26] Three articles suggested using the practice's letterhead on the standard invitation letter[24,26,27] and one article suggested a signature on the invitation letter was sufficient.[20] Three articles suggested the use of GP-endorsed reminder letters shortly after the initial invitation letter.[20,24,26] These strategies have proven to be both low cost and highly effective at increasing intention to participate. Nonresponder follow-up was suggested by six articles.[20,22–24,28,33] Nonresponder follow-up involved phone calls from practice staff or reminder letters to patients who are overdue for screening.[20,23,24] Barriers for implementation of this strategy may include having the systems in place to track overdue patients, particularly if the kit was not distributed by the GP practice, and the cost associated with staffing.[24] Three articles also suggested the use of Indigenous health care workers in the community to encourage participation, and to support local patients.[20,23,31] Community-based education sessions delivered by an Indigenous health care worker from the same community may also assist to provide education and support for screening. Two articles suggested this strategy as a means of reaching wider audiences compared to individual education.[19,24] However, hosting community-based education sessions may not be feasible in rural and remote communities.

5 | IMPLICATIONS FOR PRACTICE

Based on the supporting evidence, the main strategies used to increase Indigenous population screening are GP endorsed letters, culturally appropriate education resources, and nonresponder follow-up. To increase Indigenous population screening specifically in rural and remote communities, the main strategies used are alternative distribution of kits and mobile screening services. Multiple strategies used to target the most prevalent barriers within the region offer the most effective results.[9,42]

6 | LIMITATIONS

This study only included countries with similar health care models to Australia, which may have excluded strategies relating to Indigenous

populations adopted in other countries, particularly those targeting rural and remote areas. Some strategies recommended in the grey literature did not provide supporting evidence obtained from robust evaluation. In addition, the organisational framework used to categorise the strategies was published in the United States in 2003 which limits its applicability to the Australian Indigenous setting. The authors felt this framework was still best placed to structure the presentation of findings of the scoping review given its specificity of cancer screening.

7 | CONCLUSION

Strategies that increase bowel cancer screening rates amongst Indigenous populations, particularly in rural and remote communities, may result in earlier detection, may improve treatment options and prognosis, and reduced mortality risk. Several strategies were identified that may increase bowel cancer screening rates Indigenous populations, with very few strategies specific to rural and remote communities. Multiple strategies that reinforce one another may maximise the likelihood of participation in screening. Implementation of strategies may require system-level and local-level changes to address the unique barriers within a region.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

ETHICS STATEMENT

The scoping review is based on the use of publicly available information and does not require ethical approval.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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