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Cancer screening in Aboriginal communities: A promising practices review

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Executive Summary

Background

In 2010, Aboriginal Health Programs within Alberta Health Services initiated a two year project to bridge the gap between the cancer screening needs of the Aboriginal community and existing health services in Alberta. A systematic review of the literature was conducted by the Applied Research team to identify promising practices within cancer screening, for the purpose of informing future program planning of health services. The search and review of relevant literature was guided by the following research questions: What programs/initiatives have been effective at increasing rates of cancer screening within Aboriginal communities? What is the level of promise of these programs/initiatives?

Methods

The search for peer-reviewed and non-peer-reviewed literature was conducted in 6 academic databases, 29 websites, and through reference lists of included articles. Over 3777 hits, including websites and articles, were reviewed. Twelve studies were included and appraised. Using previously published appraisal tools 4, 6, two reviewers independently reviewed and appraised the included studies for level of scientific rigour, cultural sensitivity and alignment, and level of promise.

Results

Included studies focused on breast and cervical cancer screening. Studies on other types of cancer screening were not excluded, but none fit the inclusion criteria of this review. More than half of the included studies reported research conducted in the United States (U.S.) involving Native American 8- 9, 11-13 and Alaska Native 10, 14 women. Two studies from New Zealand reported on work with Māori women 15-16, while two studies from Australia reported on work with Aboriginal Australian and Torres Strait Islander women 18-17. The sole Canadian study reported on work with Aboriginal women from Manitoba19.

Conclusion

Among the 6 studies that ranked promising or higher, the use of multiple culturally appropriate strategies to increase knowledge and awareness as well as accessibility of screening services was effective at increasing rates of screening. Ways to increase knowledge and awareness include patient navigation 11, home visits by lay health advisors 12, and involving cancer survivors from the community as advocates for screening 16. Ways to overcome the barrier of access included offering on-reserve screening services 8, bringing mobile screening services to Aboriginal communities 19, advanced training for service providers 14, and providing group transportation to fixed sites16.

The 6 studies that ranked less promising or lower included social marketing campaigns 15, organized mammography days 10, and multimedia education 13. The main distinguishing characteristic between the less promising and more promising studies was the level of scientific rigour. Low rigour of the less promising studies made it difficult to determine whether the intervention effect was due to the intervention or flawed study methods. With regard to cultural sensitivity and alignment, all studies scored moderate or higher, a positive indication that researchers are cognizant of the need to work in partnership with Aboriginal communities to develop culturally appropriate and sustainable programs.

Research pertaining to other types of cancer screening beyond breast and cervical cancer was not captured in this review because they did not meet the inclusion criteria. Consequently, research specific to male Aboriginal populations was also not included. Therefore, the applicability of these findings beyond breast and cervical cancer screening among Aboriginal women is unknown. A list of five recommendations was compiled based on the findings of this review.

Recommendations

1. Existing health services should identify the extent to which their current practice is culturally sensitive and aligned with the Aboriginal culture, in supporting the screening needs of Aboriginal communities.

2. The use of Aboriginal lay health advisors or patient navigators, in combination with culturally appropriate teaching materials, should be explored in the context of increasing cancer knowledge and awareness within Aboriginal communities.

3. Ways to increase accessibility of screening services should be explored and implemented in tandem with recommendation #2. There is strong evidence to suggest that multiple culturally appropriate strategies that target knowledge, awareness, and access have promise to increase cancer screening rates among Aboriginal women.

4. Consider the implementation of a pilot study to test the effectiveness of the suggested interventions, within the context of the Aboriginal communities in Alberta. Establish an evaluation plan of the pilot project to capture both process and intervention outcomes.

5. Explore the applicability of these review findings to other types of cancer screening among male Aboriginal populations.

Background

Significant health disparities exist between the First Nations and non-First Nations peoples of Alberta. While some measures of health status, such as life expectancy, among First Nations people have improved significantly in the last few decades, they still remain lower than that of the Canadian population [1]. In 2009, the life expectancy at birth for First Nations people was 69.3 years, compared to 81.5 years for non-First Nations [2]. Specifically within the context of chronic diseases, cancer is the third leading cause of death [2]. Forty-five percent of deaths among First Nations people ages 45 to 64 years were caused by cancer, surpassing injury (9%) and circulatory diseases (23%) as the primary cause of death in that age group[1]. Compared to non-First Nations, First Nations people have a significantly higher age-adjusted cancer-related death rate in the 30-39 year age group [2]. The three leading causes of cancer-related deaths are lung cancer, colon cancer, and breast cancer, accounting for 19.5%, 9.2%, and 8.8% of cancer-related deaths among First Nations people, respectively [2]. Given that two of these three leading causes of cancer-related deaths have established population-based screening programs in Alberta, the uptake of early detection within First Nations communities has great potential in reducing the disparity in cancer-related health outcomes between First Nations and non-First Nations people.

Despite accounting for 45% of the Aboriginal population in Alberta [3], health statistics comparable to that of First Nations people do not exist for the Métis community in Alberta. Data pertaining to the Inuit people are also sparse. Nevertheless, the current evidence still provides ample motivation to improve upon existing cancer-related health services with the hope that it will benefit all three groups of Aboriginal peoples in Alberta.

To this end, Aboriginal Health Programs within Alberta Health Services initiated a two year project to bridge the gap between the health needs of the Aboriginal community and current implementation of cancer screening programs. Specifically, programs that target the Aboriginal community are lacking, and ways to incorporate an Aboriginal focus into existing cancer screening programs have not been explored in depth. The Applied Research team conducted a systematic review of promising practices within cancer screening, for the purpose of informing the program planning of health services that cater to Aboriginal communities.

Methods

The search and review of relevant literature was guided by the following research questions: What programs/initiative have been effective at increasing rates of cancer screening within Aboriginal communities? What is the level of promise of these programs/initiatives?

Search strategy

To identify articles within the peer-reviewed literature, a comprehensive search strategy was developed in consultation with an information scientist. Five academic databases (Medline, PubMed, CINAHL, PsychINFO, and HealthStar) were searched using the following key words: Indian, Native, First Nation, Metis, Inuit, Māori, indigenous, indigent, Aboriginal, Aborigines, cancer screening, mass screening, early detection of cancer, and cancer prevention. A sixth database containing both published and unpublished literature specific to indigenous communities in North America (Native Health Database) was also searched using the same search terms.

A search for relevant grey literature, or articles outside of the peer-reviewed domain, was conducted separately. Again, under the advice of an information scientist, 29 websites were individually searched using the following terms: Indian, native, Aboriginal, First nations, Indigenous, and cancer screening. These include government websites, grey literature repositories, and cancer-specific organizations. If a website-specific search returned more than 100 hits, the first 100 were reviewed. For the Google search, the first 200 hundred hits were reviewed. The decision regarding the number of hits to review was made largely due to decreasing relevance of hits past the first 100 or 200. The list of websites searched is presented in Appendix A.

Finally, a hand search through the reference lists of all included articles was carried out to capture any additional studies.

Selection strategy

Articles were screened first by title, and then abstract by a single reviewer. Articles retained at full-text were divided between two reviewers for assessment of inclusion, based on the pre-established inclusion and exclusion criteria (See Table 1).

Table 1: Inclusion and exclusion criteria for the selection of articles

	Inclusion	Exclusion
Population	- Study participants were from indigenous and Aboriginal communities (Métis, First Nations, and Inuit) - Participants are 18 years of age or older	- Insufficient or no representation from Aboriginal or indigenous communities or no separate assessment of these groups - Participants are under 18 years of age
Intervention	- Cancer screening programs - Programs, practices, or activities that aim to impact screening rates cancer - Is actionable or has potential to be implemented (program, practice, activity, pilot, strategy, tool, intervention)	- Screening programs for diseases other than cancer -Programs, practices, or activities that aim to impact screening of other diseases - Descriptive studies identifying health disparities or risk factors for poor health outcomes (as these are not actionable) - Literature reviews, case reports, position papers, opinion surveys, expert opinions, surveillance or anecdotal evidence
Outcome	- Rates of cancer screening	- All other outcomes (Including knowledge of cancer, interest in screening, etc.)
Other	- Articles in the English language - Articles published from January 1st, 2001 to May 31st, 2011	- Articles in a language other than English - Articles published prior to January 1st, 2001

An electronic database was used to collate information from articles. Information extracted from each study include article citation, sample size, primary content area (any cancer screening), targeted population (Aboriginal, First Nations, Inuit, Métis, American Indian, Native American, Alaskan Native, Eskimo, Torres Strait Islander, Māori, Eskimo), and location of study/program. For included studies, study design, key findings, and appraisal scores were also recorded.

Critical Appraisal

Each included study was critically appraised for scientific rigour as well as cultural sensitivity and alignment. Assessment of scientific rigour was based on an appraisal tool by Flynn et al [4] (see Appendix B). Quantitative studies were critically appraised for selection bias, information bias, and confounding. Although qualitative studies were not excluded purposefully, the quantitative nature of the outcome of interest – rates of cancer screening – excluded the inclusion of any qualitative studies.

Assessment of cultural sensitivity and alignment was done using a tool developed by McNeil et al [6] based on recommendations from the Society of Gynecologists and Obstetricians of Canada [7] and direction from an Aboriginal health advisory committee. In brief, each study was appraised for cultural sensitivity (e.g. recognition of historical trauma, provision of cultural training, supports a holistic perspective of health) and cultural alignment (e.g. social determinants of health considered in service delivery, community members included in service planning and implementation, research aims to build capacity within the community). See Appendix C for the full cultural appraisal tool.

Finally, using a framework developed by McNeil et al [6], the level of promise was determined based on each study's potential for population impact (within which the culture appraisal score was embedded) and certainty of effectiveness (within which the scientific score was embedded). The potential for population impact score included three program characteristics: presence of logic in the program, uptake of the program by participants, and potential reach of the program. In order for a study to rank "high" for potential for population impact, it needed to have met all three of these program characteristics as well as having a mid to high cultural appraisal score. In general, in order for a study to rank "promising" or higher, it needed to score "high" on *either* potential for population impact *or* certainty of effectiveness. See Appendix D for the promising practices appraisal framework.

All included articles were reviewed by a second reviewer blinded to the first reviewer's scores. Both reviewers were graduate level prepared researchers in public health. Of the 12 included studies, the reviewers differed on the promise ranking of four studies – Bethune et al [15], Decker et al [19], Dignan et al [11], and Panaretto et al [17]. The discrepancies were resolved by discussion between the two reviewers.

Results

In total, the search for peer-reviewed and grey literature resulted in more than 300 000 hits. Of the 3777 hits reviewed, 84 articles were retained after the abstract screen. Seventy-two articles were further excluded after full-text review, leaving 12 articles that were included and appraised in this review (Figure 1). Detailed search results are described below.

Peer-reviewed literature search

The search in academic databases produced 2585 hits. Following the removal of duplicates and subsequent title and abstract screens, 64 articles were reviewed at full-text. Fifty-four articles were further excluded after full-text review, yielding 10 articles for inclusion in the review.

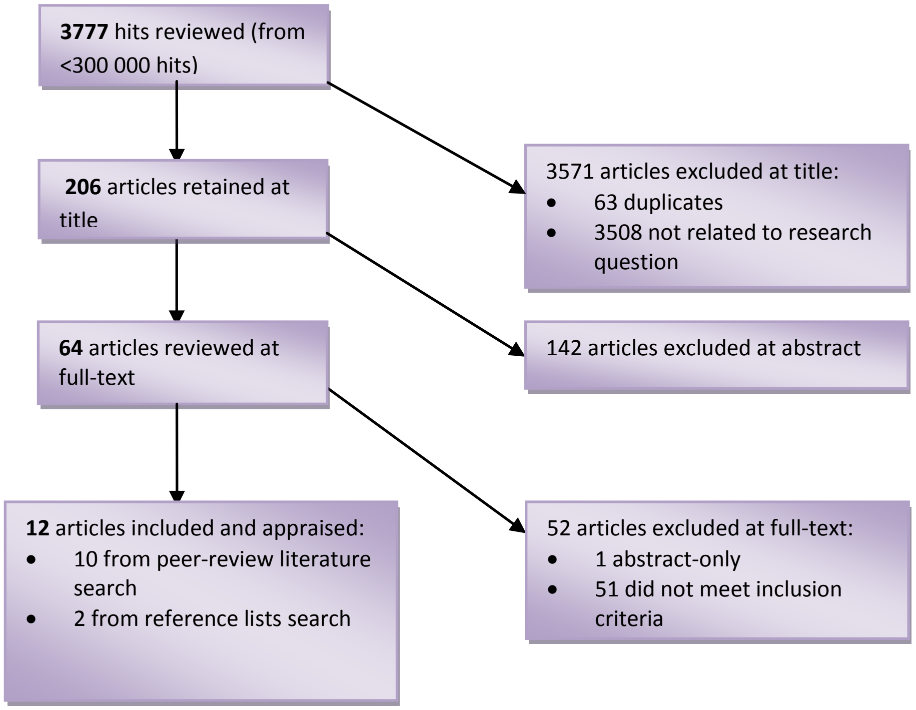
Grey literature search

The search in grey literature databases produced 344 254 hits, of which 1089 were reviewed. Following the removal of duplicates and subsequent title and executive summary screens[a], 17 documents were reviewed at full-text. None of these documents met the inclusion criteria and were excluded from the review.

Reference lists search

The manual search through the reference lists of included articles resulted in 103 potentially relevant articles. Following the removal of duplicates and subsequent title and abstract screens, three were reviewed at full-text. One article was further excluded after full-text review, contributing two articles for inclusion the review.

Figure 1: Flow diagram of article inclusion and exclusion



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[a] The executive summary (if available) was reviewed in the absence of an abstract. If the document had neither an abstract nor an executive summary, it was automatically advanced to the full-text review.

Descriptive characteristics of the included studies, including location of study/program, population(s) of interest, and primary content area are presented here. A summary of all 12 included studies and their appraisal scores is presented in Appendix E. At the request of the project team, a list of barriers to cancer screening identified in the included studies was compiled to provide some context to the promising practices review (See Appendix F).

Study/program location and population(s) of interest

More than half of the included studies reported research conducted in the U.S. (n=7, 58%), involving Native Americans 8-13 and Alaskan Natives 14. The two studies from New Zealand 15-16 both focused on Māori women, while two Australian studies 17-18 reported research with Torres Strait Islanders and Aboriginal Australians. The sole Canadian study 19 was from Manitoba, reporting on a breast cancer screening program in First Nation, Métis, and Inuit communities. None of the studies included for this review focused on Aboriginal men. The applicability of the findings beyond Aboriginal women is, therefore, unknown.

Primary content area

Articles were included if they reported on a program or initiative that impacted screening rates of *any* cancer. However, only initiatives targeting breast and cervical cancer screening were captured in the included studies. Half of the studies pertained to breast cancer screening (n=6, 50%), with three studies on cervical cancer screening. Three studies targeted both breast and cervical cancer screening.

Discussion

Under the promising practices framework 6 (Appendix D), a study can fall into one of the following five levels of promise: most promising, very promising, promising, less promising, and least promising. While no study ranked most promising, one study was ranked very promising. Most of the studies fell within the promising (n=5) and less promising (n=4) categories. Two studies ranked least promising. All 12 studies are discussed below, according to their level of promise.

Very promising study (n=1)

The sole study that ranked very promising was an on-reserve, breast and cervical health program in the United States. Brown et al 8 evaluated the effectiveness of a tribal-run breast and cervical health program targeting Native Americans in Arizona. Although the program targeted both breast and cervical cancer, only breast cancer screening outcomes were reported in this manuscript. The program's effectiveness at increasing rates of cervical cancer screening is, therefore, unknown. The Hopi Women's Health Program (HWHP) provided a range of services, including cancer education and health counseling in English, Hopi, and Tewa; on-site breast and cervical cancer screening service; accompaniment to appointments; and support groups for cancer survivors and their families.

The evaluation compared two cross-sectional surveys, one completed in 2003 and the other in 2006. At the follow-up survey, 95% of women age 40 and over who accessed services from HWHP reported "ever had a mammogram", compared to 78% of all women age 40 and over (significance level not reported). Similarly, 89% of 40+ women who used HWHP reported having a mammogram within the last two years, compared to 69% of all 40+ women (significance level not reported). Compared to the 1993 survey results, the 2006 survey found a 40 percentage point increase in women 40+ who were screened in the last two years (26% in 1993 to 69% in 2006). Age 40+ female users of HWHP services were over 12 times more likely to report a mammogram within the past two years (no significance level reported, data not in table), when compared to all 40+ female residents. Despite having moderate scientific rigour and moderate certainty of effectiveness, this study was deemed to be very promising due to its high potential for population impact. That is, there was a logical program theory, more than 50% of eligible participants agreed to participate, and there was evidence to suggest that HWHP had reached the entire on-reserve community of Hopi women.

Promising studies (n=5)

The 5 promising studies included:

- A population-based breast screening program that employed strategies to involve Aboriginal women in Canada [19]
- A patient navigation intervention to encourage mammography among urban Native American women [11]
- Tailored cervical health education by lay health advisors among Native American women [12]
- A training program targeting nurses who provide breast and cervical screening to Alaskan Native women [14]
- A collaborative effort between a regional screening program and a local health service to increase Māori women's participation in breast cancer screening [16].

One commonality among the interventions described in this section is the use of multiple strategies in overcoming the barriers to screening beyond just increasing knowledge and awareness. Most of these studies addressed the accessibility of screening service either by making mobile service more available or helping secure group transportation. Petersen et al [14] was the sole exception – there was insufficient information in the manuscript to suggest that the nurses were offering mobile screening services in addition to clinic-based screening.

All of the promising studies scored mid or higher on the cultural appraisal. Most of these studies had a moderate certainty of effect and a moderate potential for population impact with the exception of Thomson et al [16]. The five promising studies are described below.

Decker [19] examined whether the Manitoba Breast Screening Program (MBSP) in Canada was meeting the national standard retention rate of 80%. Aboriginal and Asian participants were included in this retrospective analysis of all screening data from 2002 to 2003. MBSP is a population-based provincial breast cancer screening program that provides free mammography to Manitoba women 50-69 years of age. The Program operates out of four fixed sites and two mobile vans. Specific approaches were taken to engage women from Aboriginal communities, such as taking the mobile screening van to areas with high Aboriginal populations. Program staff also communicated with community health representatives in every Aboriginal community at least once every two years to promote the screening program.

In the cohort of participants derived from the MBSP database, 68.5% of return-visit Aboriginal women were re-screened, as compared to 51.8% of first-visit Aboriginal women ($p<0.0001$), an indication that the likely point for Aboriginal women to discontinue screening was after her first screen. Aboriginal women were less likely to be screened compared to non-Aboriginal, non-Asian women (OR 0.44, 95% CI 0.40, 0.49). In the absence of baseline measure of screening rates prior to the implementation of the MBSP (recall the purpose was to evaluate retention, which was the proportion of previously-screened women returning to be rescreened), the determination of a positive intervention effect was based on the logical inference that an introduction of a population-based screening program would increase the rates of screening simply due to the availability of service. In the case of this particular study, participation rate was determined as the percentage of Aboriginal women returning for a re-screen, which was greater than 50% for both first-visit and return-visit Aboriginal participants. With moderate scientific rigour and moderate certainty of effect, this study ranked promising due to its moderate potential for population impact.

Dignan et al [11] tested the effect of a patient navigation intervention called “Native Sisters” among a group of urban Native American women ages 40 and older. Participants were randomized in to one of three groups: 1) telephone support and navigation, 2) face-to-face support and navigation, or 3) usual care. Both of the intervention groups also received an education brochure that was tailored to each woman according to her responses in the baseline survey. In the face-to-face intervention group, there was no significant change in the proportion of women reporting a mammogram from baseline to follow-up (34.4% at baseline, 45.2% at follow-up, p=0.197). In the telephone intervention group, the proportion of women reporting a mammogram increased significantly from 29% at baseline to 41.8% at follow-up (p=0.029). At follow-up, a significantly greater proportion of the navigated women (telephone and face-to-face group combined) reported screening compared to baseline (proportions not reported, p=0.013).

While the telephone intervention appeared to be more effective, it should be noted that there was limited comparability between the three groups at baseline. The telephone group had a greater proportion of women ages 65 and older (53.4% versus 19.5% in the face-to-face group, significance not known). A higher proportion of women in the control group reported a mammogram, compared to the two intervention groups (control: 51.9%, telephone: 29.0%, face-to-face: 34.4%, significance not known). Additionally, the control group was larger than both intervention groups combined, which may have contributed to the reason why the study failed to detect a significant difference between the intervention groups combined and controls at follow-up in the proportion of women reporting a mammogram (p=0.10). It is unclear whether the telephone intervention was actually more effective or if this was an artifact of unsuccessful randomization. Despite these flaws, the positive change in the intervention outcome from baseline to follow-up combined with its moderate potential for population impact placed this study in the promising rank.

Katz et al [12] evaluated the effectiveness of the Robeson County Outreach Screening and Education (ROSE) project – the intervention was a health education program tailored to the needs of each woman. The sample included African American women (32%), Native American women (42%), and Caucasian women (25%) ages 40 and over. The intervention consisted of three home visits by ethnically-matched lay health advisors, follow-up phone calls, and tailored mailings after each visit. The control group received a physician letter and brochure on Papanicolau (Pap) testing. Seven hundred seventy five women were randomized into either the intervention or control group. At follow-up, a significantly higher proportion of women in the intervention group were within risk-appropriate guidelines for Pap testing compared to baseline (66.6% at follow-up versus 51.6% at baseline, p<0.001). The same trend was also true for the control group (63.2% at follow-up versus 52.9% at baseline, p<0.001). Women in both the intervention (OR 1.70, 95% CI 1.13, 2.21) and control group (OR 1.38, 95% CI 1.04, 1.82) had significantly higher odds of obtaining screening at follow-up, compared to baseline There was no significant difference between the odds of obtaining a Pap test between the intervention and control group at follow-up, evident in the inclusion of the odds ratios in the other’s 95% confidence interval. A possible explanation of this may be that the physician letter and brochure on Pap testing (control condition) was, in and of itself, an intervention for this group of women, 60% of whom did not receive a recommendation from their doctors for a Pap test. It is also possible that the sample sizes were too small to detect significant differences between the two groups. Regardless of group assignment, 62.9% of the entire cohort of Native American women were within risk-appropriate guidelines for Pap testing, compared to 50.6% at baseline (p<0.001). This was a moderately rigorous study with a positive impact on the rates of cervical cancer screening among Native American women. In terms of potential for population impact, it lacked reach as the total number of Native American women was 328 and there was no indication as to whether this encompassed an entire community. As such, this study ranked promising.

Petersen et al [14] tested the effectiveness of a training program on rates of breast and cervical cancer screening among Alaskan Native women. The Native Women Enjoying the Benefits (WEB) program is a training program for nurses employed by Indian Health Services and tribal clinics. The 40-hour training program prepares nurses in five broad areas: 1) breast and cervical cancer screening and education techniques, 2) development and use of a tracking/reminder system, 3) screening promotion and community education, 4) cultural and gender sensitivity, and 5) quality improvement skills to maintain a “well woman clinic.”

This study differed from the others included in this review in that the intervention targeted providers of screening rather than recipients of care and the measure of outcome was not directly from participants, but from the providers’ assessment of changes in screening behaviour.

At the follow-up survey, the 60 nurses who took part in the training were asked to rate nine assertions about screening behavior using a Likert scale, where 1 was strongly disagree and 5 was strongly agree. The nurses agreed that, since Native WEB training, the number of women seeking clinical breast exams and mammogram have increased (median Likert scale score = 4.5), the number of women seeking cervical exam have increased (median Likert scale score = 4.5), more women are adherent to breast cancer screening guidelines (median Likert scale score = 4.29), and more women are adherent to cervical guidelines (median Liker scale score = 4.56). Information bias from self-report may have potentially exaggerated the intervention effect. In other words, having undergone WEB training, the nurses may have reported higher rates of cancer screening among the clients that they see, making the intervention appear to be more effective than it actually was. A moderate certainty of effect with a moderate potential for population impact made this study a promising practice.

Thomson et al [16] conducted an evaluation of whether a new partnership between the regional cancer screening program in New Zealand (BreastScreen Midland Service) and a local health service provider (the Te Whanau a Apanui Community Health Services, TWAACH) had an impact on Māori women’s participation in breast cancer screening. Project activities were broadly categorized into two groups: 1) increasing local involvement (promotion of breast cancer screening, identifying eligible women, improving registration/appointment process), and 2) reducing barriers to participation (cancer survivors from the community as advocates for breast cancer screening, providing transportation support, mobile screening services, giving participants a small gift after screening). The project activities began sometime after the 2003 biennial screening and before the 2005 biennial screening. Outcome measure was the repeated cross-sectional data on mammography participation rates before, during, and after the implementation of project activities. In 2003, less than 45% of women eligible for mammography were screened, compared to 97.9% in 2005 and 97.6% in 2007. Clearly, the proportion of eligible women obtaining a mammogram increased substantively in the years following the implementation of the program, although it is not clear if this is wholly attributable to the project due to the cross-sectional nature of the data. Without temporal sequence, it is difficult to say whether the increase in screening participation resulted from the program or from other factors.

Although this study scored low on certainty of effectiveness due to a less rigorous study design, it ranked promising because of its high potential for population impact. It was successful in reaching the entire community of Māori women living in the community of Te Whanau a Apanui.

Less promising studies (n=4)

The four less promising studies included a social marketing campaign to increase cervical cancer screening among Māori women [15], a culturally appropriate navigation intervention to increase mammography rescreening among Native American women [9], mammography screening days for Native American women [10], and culturally appropriate interactive education for Native Americans [13].

The studies described here differ from that of the promising studies in that there was more variability in the range of interventions. Notably, two interventions that only targeted knowledge and awareness are captured here, whereas there was no promising intervention that solely targeted knowledge and awareness. While all these studies scored mid or higher in terms of cultural sensitivity and alignment, the major difference was in the scientific appraisal scores. The less promising studies all scored low on certainty of effect and moderate on potential for population impact. The four less promising studies are described below.

Bethune et al [15] evaluated the effectiveness of a social marketing campaign to increase Māori women's participation in the National Cervical Screening Program in New Zealand. The main objective was to address the inequalities in coverage between Māori and Pacific women[b] , and the rest of the eligible population. The social marketing intervention included television advertisements, radio and outdoor advertising. Posters and brochures created specifically for Māori and Pacific women were widely distributed in target areas. The National Cervical Screening Program also supported extended hours of its screening centers and offered free mobile phone access to its information line, all in an effort to increase its accessibility by Māori and Pacific women. Outcome data was through three cross-sectional surveys. Screening coverage of Māori women increased from roughly 47% in August 2007 (before launch of the marketing campaign) to a little over 53% in August of 2008 (significance level not report). Similar trends were observed for Pacific women as well as other ethnic groups. Despite its moderate potential for population impact, this study ranked less promising because of a low quality study design which resulted in a low certainty of effectiveness score.

Burhansstipanov et al [9] tested the effectiveness of a culturally appropriate navigation intervention among Native Americans, Latina Americans, and low-income Caucasian women. Navigators used a set of tailored education materials in education session, either face-to-face or via telephone (at the discretion of the participant), and provided one-on-one assistance to schedule a mammogram. Participants were recruited from the navigators' own social networks.

Of the 113 women who received the intervention, 62 (55%) had a re-screening mammogram ($p<0.0001$). There was significant association between receiving the intervention and reporting a re-screening mammogram for all ethnic groups ($p<0.05$). Of the women who did not receive a mammogram recommendation from their physicians, those who received the intervention still obtained a mammogram (data not shown, significant level not reported), leading the authors to suggest that the intervention may help with mammography adherence in the absences of provider recommendation. These findings should be interpreted with caution as there were some flaws in the study design that preclude accurate ascertainment of the outcome. First, this was a single-group, pre-/post-test design, and sampling was not random. In the absence of a comparable control group, it is not known whether there were other factors that contributed to the increased rescreening beyond the intervention itself. Second, the intervention aimed to increase rescreening among previously screened women, and not the uptake of screening among never-screened women. Therefore, the applicability of this intervention to reach Native American women who have never had a screening mammography is unknown. With a low certainty of effectiveness and moderate potential for population impact, this study ranked less promising.

English et al [10] developed Ramah Navajo Mammography Days for Native Americans living in New Mexico using a community based participatory research approach. The manuscript was largely a description of the planning process of the Mammography Days, guided by community capacity building principles. As such, there was very limited quantitative information to evaluate the effectiveness of the Mammography Days, such as baseline and follow-up rates of mammography.

Three Mammography Days were held over the course of five months. Each Mammography Day was the product of a range of interventions, including community outreach, culturally and linguistically appropriate cancer education, group transportation, priority appointment scheduling, and socially supportive environment for participants. The recruitment of participants was through community health representatives from the Ramah Navajo communities. In total, 39 women ages 50 to 86 obtained a mammogram as a result of the three Mammography Days. Denominator information on how many women attended was not available. On the assumption that all the women attending Mammography Days received a mammogram, uptake was 100%.

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[b] Pacific peoples are a diverse population made up of cultures from many different Pacific islands. The 7 largest pacific ethnic groups in New Zealand are Samoan, Cook Islands Māori, Tongan, Niuean, Fijian, Tokelauan, and Tuvaluan (Ministry of Women's Affairs, 2011; http://www.mwa.govt.nz/women-in-nz/pacificwomen)

Needless to say, this study scored high on cultural sensitivity and alignment, but with a low certainty of effect and moderate potential for population impact, it ranked as less promising.

Von Friederichs-Fitzwater et al [13] evaluated the effectiveness of the Mother's Wisdom Breast Health Program, which was an education intervention delivered through an interactive Digital Versatile Disc (DVD) to Native American participants. The DVD contained several short video segments on nutrition, exercise, breast structure and function, breast self-exam, mammography screening, and breast cancer myths. Native American breast cancer survivors narrated the stories and shared their own testimonials with cancer. The development of the DVD was guided by key informant interviews and focus groups with Native American women.

At baseline, 9% of the participants stated they intended to get a mammogram in one to two years, as compared to 74% after viewing the DVD ($p<0.0001$). At one year follow-up, of the 118 women who stated they intended to get a mammogram, 95% actually obtained one (significance level not reported). Within this cohort of Native American women, there was a significant association between intent to obtain a mammogram and actually obtaining one ($p<0.001$). Interestingly, of the women who did *not* intend to get a mammogram after viewing the DVD, 80% did. Despite these positive changes in outcome, the single-group, pre-/post-test design with no information on potential confounders caused this study to score low on certainty of outcome. A participation rate of less than 50% also decreased its potential for population impact score. This study ranked less promising as a result of the above factors.

Least promising practices (n=2)

The two least promising studies included a multi-strategy, multi-site project to increase breast and cervical cancer screening among Aboriginal Australian and Torres Strait Islander women [18] and a well woman program that aimed to improve the sexual health of Aboriginal Australian and Torres Strait Islander women [17]. Both of these studies had limited information on the methods of the study, which negatively impacted its scientific rigour score. The use of aggregate, cross-sectional data for outcome ascertainment also hampered the ability to be certain of the intervention effect. In terms of the cultural appraisal, they were both moderately culturally sensitive and aligned. Their low certainty of effect combined with the low potential for population impact made them least promising. Both of these studies are described below.

Carey et al [18] evaluated a multi-site, 15 month project by the Royal Australian College of General Practitioners to increase rates of breast and cervical cancer screening among Aboriginal Australians and Torres Strait Islanders. The project had three overall objectives: 1) to identify barriers to early detection and management of breast and cervical cancer, 2) to identify strategies to overcome these barriers, and 3) to implement these strategies at the local level. The project was implemented in three sites: Mackay, Coonamble, and Adelaide. Only the evaluations of MacKay and Coonamble are included in this review, as the evaluation of project activities at Adelaide did not measure rates of screening as an outcome.

Strategies implemented at each local site depended on the needs of the community. At Point MacKay, strategies were implemented at the beginning of 2002 and included increasing access to a female practitioner, employing an indigenous health worker as a liaison between services providers and the Aboriginal community, and continuing culturally sensitive professional education for general practitioners. At Coonamble, project activities also began at the beginning of 2002, and included the development of a new well women clinic, hiring of an Aboriginal community liaison worker, and implementing a media campaign to promote breast and cervical cancer screening.

At MacKay, 92 women underwent breast cancer screening in the first 11 months of 2001, compared to 114 for the same period in 2002. At Coonamble, one woman underwent cervical cancer screening in 2000, compared to 12 women in 2001, and 32 women in 2002. Recall project activities at both sites began in 2002. This evaluation report scored low on scientific rigour mostly due to the data sources for outcome ascertainment. Both baseline and follow-up screening rates were derived from cross-sectional surveillance data. It was difficult to determine the sample size of each site. Therefore, the potential for population impact score was also impacted in the absence of data to substantiate reach and uptake. Taken together, this study ranked least promising.

Panaretto et al [17] implemented the "Well Women's Program" with the primary objective of determining the prevalence of sexually transmitted infections (STIs) among a group of Aboriginal Australian and Torres Strait Islander women. The secondary objective of the project was to increase Pap testing. Project activities were mostly health promotion in nature, such as placement of posters and leaflets in clinic settings and broadcasting health segments on the local indigenous radio station. A female Aboriginal Health Worker was hired as coordinator of this project. The project was implemented from March 2002 to January 2004.

Pap testing participation rates were derived from clinical data from the Townsville Aboriginal and Torres Strait Islander Health Service. In 2001, 20.9% of eligible women obtained a Pap test, compared to 28.6% in 2002-2003, and 35.6% in 2004. There was a significant increase in Pap testing from baseline to follow-up (20.9% versus 35.6%, $p<0.001$). Similarly, the data source for outcome ascertainment limited this study to a low score on the scientific appraisal. It is unclear whether those who obtained screening were in fact those who were exposed to the program. A low certainty of effect score combined with limited potential for population impact contributed to a least promising rank for this study.

Limitations

The review was guided by a specific research question that focused on rates of cancer screening as the outcome of interest. As is the case with many behavioral interventions, the time from intervention to behavioral change is usually longer than that of the follow-up period in most studies. Therefore, this review may have excluded studies that tested potentially promising interventions but only measured changes in process indicators of the outcome (e.g. knowledge, attitude, intent to screen).

The exclusion of articles was done by a single reviewer, with only included articles reviewed by a second reviewer. There may have been relevant articles that were excluded as a result of the single reviewer exclusion process.

Conclusion

From a review of 12 studies that met the inclusion criteria of this review, the evidence suggests that ways to increase Aboriginal communities' participation in cancer screening programs are continually explored and refined to achieve success. Within the premise of this review, all of this evidence was generated from research conducted with female Aboriginal populations, specifically within breast and cervical cancer screening. Over half of the studies were from U.S.-based research with Native Americans and Alaskan Natives, with some contribution from New Zealand-based research with Māori women, and Australian-based research with Aboriginal Australian and Torres Strait Islander women. There was only one Canada-based study with Aboriginal women.

All of the studies ranked mid or higher in terms of cultural sensitivity and alignment, an optimistic finding that suggests researchers are becoming increasingly aware of the need to work in partnership with the community to develop programs that honour traditions of the Aboriginal culture.

Among the 6 studies that ranked promising or higher, one common theme was the use of multiple culturally appropriate strategies to increase knowledge and awareness as well as increasing the accessibility of screening services. Ways to overcome the barrier of access included offering on-reserve screening services, bringing mobile screening services to Aboriginal communities, and providing group transportation to fixed sites.

Among the 6 studies that ranked less promising or lower, there was more variability in the strategies employed to increase cancer screening rates. These included social marketing campaigns and multimedia education where increasing knowledge and awareness was the main objective, without strategies to increase accessibility of screening services. Generally, the main distinguishing characteristic between these studies and the more promising studies was the level of scientific rigour. The use of aggregate, cross-sectional data for outcome ascertainment was problematic and little or no information on study methods also contributed to a lower scientific score.

Research pertaining to other types of screening beyond breast and cervical cancer is lacking, as well as research involving Aboriginal men. Therefore, the applicability of these review findings beyond Aboriginal women within the realms of breast and cervical cancer screening is unknown. Ways to increase Aboriginal men's participation in cancer screening is an area that requires further research.

A list of 5 recommendations was compiled based on the findings of this review.

Recommendations

1. Existing health services should ensure current practice is culturally sensitive and aligned with the Aboriginal culture in supporting the screening needs of Aboriginal communities

2. The use of Aboriginal lay health advisors or patient navigators, in combination with culturally appropriate teaching materials, should be explored in the context of increasing cancer knowledge and awareness within Aboriginal communities

3. Ways to increase accessibility of screening services should be explored and implemented in tandem with recommendation #2. There is strong evidence to suggest that multiple culturally appropriate strategies that target knowledge, awareness, and access have promise to increase cancer screening rates among Aboriginal women

4. Consider the implementation of a pilot study to test the effectiveness of the suggested interventions, within the context of the Aboriginal communities in Alberta. Establish an evaluation plan of the pilot project to capture both process and intervention outcomes

5. Explore the applicability of these review findings to other types of cancer screening and among male Aboriginal populations

Appendix A: Grey literature search sources and results

Web Source	Internet Address	# of hits
Google	http://www.google.ca	32700[*]
Google – **Māori** specific	http://www.google.ca	306000[ψ]
Best Practices Portal	http://cbpp-pcpe.phac-aspc.gc.ca/	0
Public Health Agency of Canada	http://www.phac-aspc.gc.ca/index-eng.php	0
National Institutes of Health	http://www.nih.gov/	13
Australian Department of Health and Aged Care	http://www.health.gov.au/	0
New Zealand Ministry of Health	http://www.moh.govt.nz/moh.nsf	856[ψ]
First Nations Inuit Health	http://www.hc-sc.gc.ca/fniah-spnia/index-eng.php	3976[ψ]
Australian Indigenous Health InfoNet	http://www.healthinfonet.ecu.edu.au/	1
Māori Health	http://www.Māorihealth.govt.nz/moh.nsf/indexma/home	46
Canadian Partnership Against Cancer	http://www.partnershipagainstcancer.ca/	0
The Cochrane Library	http://www.thecochranelibrary.com/view/0/index.html	1
Gov Info: Government on the Web	http://toby.library.ubc.ca/govinfo/govinfo.cfm	57
National Cancer Institute	http://www.cancer.gov/cancertopics/screening	1
World Health Organization	http://www.who.int/en/	44
ProQuest – These and Dissertations	http://proquest.umi.com.ezproxy.lib.ucalgary.ca/pqdweb?RQT=302&COPT=REJTPTNiMGYmSU5UPTAmVkVSPTI=&clientId=12303&cfc=1	11
OpenDoar	http://www.opendoar.org/	101[ψ]
First Nations Periodcal Index	http://www.lights.ca/sifc/INTRO.HTM	0
Cancerlit	http://cancer.gov/cancertopics/cancerlibrary/cancerliterature	1
Health Sciences Online	http://hso.info/hso/cgi-bin/query-meta?v%3aframe=form&frontpage=1&v%3aproject=HSO&	16
Indian Health Service	http://www.ihs.gov/index.cfm	23
Australian Institute of Aboriginal and Torres Strait Islander Studies	http://www.aiatsis.gov.au/	4
The Lowitja Institute: Australia`s National Institute for Aboriginal and Torres Strait Islander Health Research	http://www.lowitja.org.au/	0
American Indian Health	http://americanindianhealth.nlm.nih.gov/	35
National Aboriginal Health Organization (Canada)	http://www.naho.ca/	1
Aboriginal Canada Portal	http://www.aboriginalcanada.gc.ca/acp/site.nsf/eng/index.html	0
Outreach Connections: Native Health Information	http://native.outreachconnect.info/wiki/index.php?title=Main_Page	2
Native American Cancer Research	http://www.natamcancer.org/index.htm	9
National Collaborating Centre for Aboriginal Health	http://www.nccah-ccnsa.ca/en/	182[ψ]
Centre for Indigenous Peoples' Nutrition and Environment	http://www.mcgill.ca/cine/	2
National Screening Unit (New Zealand)	http://www.nsu.govt.nz/index.aspx	172[ψ]

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[*] The first 200 hits were reviewed for relevance

[ψ] The first 100 hits were reviewed for relevance

Appendix B: Scientific rigour appraisal tool

Selection Bias (8 points)

- Sample was population based
- Eligibility Criteria were specified
- Random Selection
- Dropout rates/reasons reported
- Reasons for loss same in each group
- Subjects were randomly allocated
- Follow up > 80%
- Intent to treat if RCT

Information Bias (7 points)

- All groups assessed in the same manner
- Blinding for outcome/exposure measurement
- Blinding for caregivers
- Blinding for participants/subjects
- Concealed allocation for RCT
- Baseline assessments valid/reliable
- Outcome assessments valid/reliable

Confounding (3 points)

- Differences in prognostic factors described
- Groups comparable on prognostic factors
- Confounding factors taken into consideration during analysis

Ranking –

0-6 points = low rigour
7-11 points = moderate rigour
12-18 = high rigour

Appendix C: Appraisal for Cultural Sensitivity & Alignment

Cultural Sensitivity: 9 factors

- The program provides training or education about Aboriginals to the staff
- The manuscript recognizes the impact of colonization in the introduction or discussion
- The introduction or discussion mentions or suggests recognition of the government obligations to Aboriginal peoples in Canada
- The practice/service considers both medical/health and other determinants of health
- The practice/service aims to improve health or well-being outcomes as a primary or secondary outcome
- The manuscript does not make assumptions about the population, services, or need that reflects an attitude of stereotyping
- The manuscript differentiates between sub-populations of Aboriginal individuals *or* identifies a specific sub-population of interest
- Demographic data relevant to the program was collected and used to interpret the data and results
- Education resources or workshops are available to the program implementers through the program

Cultural Alignment

Service Delivery: 6 factors

- The service/practice makes an effort to address socio-demographic contributors to health (e.g. poverty, housing, mental health, education, etc.) *or* these factors are discussed, indicating awareness
- The service/practice is located in proximity to Aboriginal individuals *or* if it is located further away from Aboriginal individuals, there is a built-in strategy to provide cultural support
- The service/practice is available in at least one native language *or* cultural interpreters *or* language interpreters are available
- The manuscript identifies that informed consent was obtained *or* states that ethical approval was obtained (ethical approval would require informed consent)
- Roles are identified for the participants/target individual's family *or* community
- Traditional medicine is included in the service/practice

Capacity Building: 7 factors

- The program is community-based in that it is administered by the community
- The program is community-based in that it was developed or implemented at the request of the community
- The research was community-based in that it was conducted in the community
- The research was community-based in that it was developed or implemented at the request of the community
- Aboriginal individuals *or* the community are involved in a leadership *or* advisory capacity (e.g. design, development, implementation, evaluation)
- Service options are available to Aboriginal individuals to select from
- The manuscript identified a gap in service in collaboration with Aboriginals or Aboriginal communities

Ranking –

0-7 factors met = low cultural sensitivity and alignment
8-14 factors met = moderate cultural sensitivity and alignment
15-22 factors met= high cultural sensitivity and alignment

Appendix D: Promising Practices Framework

Certainty of effectiveness

		Study Outcomes			
		Negative	Neutral	Positive	Unknown
Scientific Rigour Rank	High	Low	Mid	High	Mid
	Mid	Low	Low	Mid	Low
	Low	Low	Low	Low	Low

Potential for Population Impact

		Number of Program Characteristics$^{\Omega}$			
		0/3	1/3	2/3	3/3
Cultural appraisal Rank	High	Low	Mid	Mid	High
	Mid	Low	Low	Mid	High
	Low	Low	Low	Low	Mid

$^{\Omega}$Program Characteristics:

1) Logic: Is the program/intervention logical?
2) Reach: Does the program/intervention reach ≥ 500 Aboriginal participants *or* the entire community in the case that the community is less than 500?
3) Uptake: Did 50% or more eligible participants agree to participate in the program?

Promising Practice Ranking

		Potential for Population Impact		
		Low	Moderate	High
Certainty of Effectiveness	High	Promising	*Very* Promising	*Most* Promising
	Mid	*Less* Promising	Promising	*Very* Promising
	Low	*Least* Promising	*Less* Promising	Promising

Appendix E: Summary table of included studies (n=12)

Citation	Topic Area	Population(s) of interest	Program Description	Key Findings	Overall comments	Scientific Rigour	Program outcomes	Certainty of Effectiveness	Cultural appraisal	Program characteristics	Potential for population impact	Level of promise	Number of groups; n at analysis
thune et al. (2009) New Zealand	Cervical cancer screening	Māori women	Social marketing intervention developed with the objective of addressing the inequalities in screening coverage between Māori and Pacific women, and the rest of the eligible population. The intervention consisted of a communication campaign with television advertisements, radio, and outdoor advertising. Specific versions of posters and brochures were created for the Māori and Pacific women. The National Cervical Screening Program was also re-designed to be more accessible to the priority group (extended hours, free mobile phone access)	Of the primary target audience of Māori and Pacific women between the ages of 30-50 years of age, an increase of 6.8% and 12.7%, respectively, was reported in screening at 12 months follow-up. There was also a positive impact of other women (not the immediate target audience) who showed an increase in screening rates of 2.7%. Confidence intervals or odds ratios were not reported. No significance testing done	The process of designing the intervention was lengthy (2+ yrs) and detail oriented. This allowed the project team to develop in-depth insights into the key issues and barriers for the priority audiences. Also, it gave the team the opportunity to fully understand the issues, motivations, barriers, and current perceptions of Māori and Pacific women	low	positive	low	mid	2/3 (no uptake)	mid	less promising	3 groups: 3 cross-sectional surveys; n=928
Brown et al. (2011) USA	Breast cancer and cervical cancer screening	Native American women (Hopi)	Hopi Women's Health Program (HWHP) is a tribal-run, breast and cervical cancer screening program funded by the CDC. HWHP provides education on breast and cervical health and various types of counseling in English and in Hopi and Tewa (Native American languages); on-site breast and cervical cancer screening service; patient advocacy; and support groups for cancer survivors and their families. While the program targeted both breast and cervical cancer, only breast cancer screening outcomes were reported.	78% of all age 40+ women reported “ever had a mammogram”, compared to 95% in 40+ women who used HWHP. 69% of all 40+ women reported mammogram within the last 2 years, compared to 89% in 40+ women who used HWHP. Compared to the 1993 survey, the 2006 results found a 40 percentage point increase (from 26% in 1993 to 69% in 2006) in women 40+ who were screened in the last 2 years. Also increases in proportion of women who think mammogram can detect cancer (from 59% in 1993 to 88% in 2006). Women aged 40+ who reported ever having used the services of the HWHP were over 12 times more likely to report a mammogram within the past 2 years (no significance level reported, data not in table)	It is unclear whether the objective of this evaluation was to detect changes in breast cancer screening practice among all women 40+, or women 40+ who accessed the HWHP. Small sample size in the latter group, so none of the adjusted ORs were significant, whereas they were for the all women 40+ group. The HWHP likely had greater reach beyond women who had direct contact (HWHP was based in the tribal area) due to dissemination of information within social networks, given the confines of a small tribal community.	mid	positive	mid	mid	3/3	high	very promising	1 group - no control. N=249

Burhansstipanov et al. (2010) USA	Breast cancer screening	Native American women	Targeted medically underserved population. A culturally appropriate navigation intervention used with native Americans, Latina, low-income Caucasians. Navigators also used a set of education materials to carry out face-to-face or telephone education session, with one-on-one assistance to schedule a mammogram. Participants were recruited by navigators from their own networks. Navigators were trained on a variety of topics, including risk factors to breast cancer, patient support care, computer skills. Refreshers were conducted every 6 months, again, on a variety of topics: adult education process, community resources for patients, hormone replacement therapy. Cancer education materials were also used, including personalized breast screening brochures, shower card, pocket calendar, breast models, and bead necklace depicting tumor size	Of the 113 women who received the intervention, 62 (55%) had a re-screening mammogram ($p<0.0001$). There was a significant association found between having received the intervention and reporting a re-screening mammogram for all racial/ethnicity groups ($p<0.05$. Data not shown, stated in text). Also looked at provider recommendation on mammograms. Of the women who did not receive a mammogram recommendation from their physicians, those who received the intervention obtained a mammogram, indicating that the intervention may help with mammography adherence in the absence of provider recommendation (data not shown, stated in text. significance level not shown)	Around 35% of sample were Native Americans, did not find statistically significant differences between ethnic groups in terms of outcome measure. The intervention was used for groups that have been screened at least once, one point in time. Therefore, its applicability to those who have never been screened is unknown.	low	positive	low	mid	2/3 (no reach)	mid	less promising	1 group - no control; n=106
Carey et al. (2003) Australia	Breast and cervical cancer screening	Aboriginal women, Torres Strait Islander women	A large 15 month project initiated by the Royal Australian College of GP's (RACGP), with the overall objectives to 1) identify barriers to early detection and management of breast and cervical cancer, 2) identify strategies to overcome these barriers, and 3) implement these strategies at the local level. Implemented at 3 sites, only Mackay and Coonamble included (Adelaide did not measure rates of screening as outcome). Strategies at Mackay: increase access to female practitioner, indigenous health workers as liaison between service providers and indigenous community, continuing professional education for GPs. Strategies at Coonamble new well women clinic, Aboriginal community liaison worker, and media campaign to promote screening	MacKay: 92 women underwent breast cancer screening during the first 11 months in 2001, compared to 114 for the same period in 2002 (project activities started at beginning of 2002). Coonamble: 1 woman underwent cervical cancer screening 2000, 12 in 2001, and 32 in 2002 (project activities started beginning of 2002).	Low scientific rigour due to data source, baseline and outcome data using cross-sectional surveillance data. Could have potential to be promising if sample sizes were bigger (did not have reach or uptake), thus scored low on promise. Because of data source for outcome ascertainment, it was difficult to decide what the sample sizes were.	low	positive	low	mid	1/3 (no reach, no uptake)	low	least promising	MacKay: 2 groups (2 cross-sectional counts). N=206 (total # of women screened, before and after). Coonamble: 2 groups (2 cross-sectional counts). N=45 (total # of women screened, before and after)
Decker (2008) Canada	Breast cancer screening	Aboriginal (First Nations, Métis, and Inuit)	The Manitoba Breast Screening Program (MBSP) is a population-based provincial breast cancer screening program that provides bilateral mammogram to Manitoba women 50-69 years of age and includes4 fixed sites and 2 mobile vans. Measures were taken to provide access for Aboriginal women by taking the mobile screening van to areas with high Aboriginal populations. MBSP staff also communicated with community health representatives in every Aboriginal community at least once every 2 years to promote the screening program. This manuscript was mainly intended to evaluate whether the MBSP was meeting the national standard retention rate of 80%.	In the cohort of participants derived from the MBSP database from 2002-2003, 4.9% were Aboriginal women (1.8% were first visits, 2.7% were return visits). Aboriginal women were less likely to be screened compared to other non-Aboriginal, non-Asian women (OR 0.44, $p<0.0001$). 68.5% of return-visit Aboriginal women were re-screened, as compared to 51.8% of first-visit Aboriginal women, a statistically significant difference of 16.7% ($p<0.0001$), and indication that the likely point for Aboriginal women to discontinue screening is after her first screen.	Manuscript erroneously classified Aboriginal, Inuit, or Métis people under the umbrella term of "First Nations." All findings here are reported using the correct term of Aboriginal. In the absence of baseline date (e.g., before MBSP), we classified the intervention outcomes as positive because the introduction of a screening program would, logically, increase rates of cancer screening, compared to before.	mid	positive	mid	mid	2/3 (no uptake)	mid	promising	1 group; n=2144

Dignan et al. (2005) USA	Breast cancer screening	Native American women	Study focused on urban Native Americans. Intervention was delivered by trained Native Sisters. Tested 3 interventions: 1) telephone support/navigation, 2) face-to-face support/navigation, and 3) control. Both intervention groups also used an education brochure that was tailored to each woman according to her responses at baseline survey.	Outcome was self-reported screening mammography in the past 12 months. Face-to-face group increased from 34.4% at baseline to 45.2% at follow-up. Telephone group increased by 29% at baseline to 41.8% at follow-up (p=0.029). Controls decreased from 51.9% to 50% at follow-up. Significantly greater proportion of the navigated group (telephone and face-to-face-to-face combined) obtained screening at follow-up, when compared to baseline (Pre vs. post, p=0.013).No significant difference in screening rates between navigated and non-navigated groups at post-test (p=0.10).	Participants were non-adherent (never screened and not up to date) to mammography guidelines identified from the Colorado Mammogram Program database, randomized into 1 of 3 groups. No baseline comparability between the 3 groups - higher baseline screening in comparison group, telephone group had higher proportion of older women.	mid	positive	mid	mid	2/3 (no uptake)	mid	promising	3 groups: 2 intervention groups; n=157
English et al. (2008) USA	Breast cancer screening	Native American women (Navajo)	Ramah Navajo Mammography Days, which integrated community outreach, culturally and linguistically appropriate cancer health education, group transportation, priority appointment scheduling, and socially supportive environment for mammography day participants.	Manuscript was largely descriptive, of how the intervention came to be. Limited information on rates of screening. In brief, 39 women received a mammogram as a result of the Mammography Days (3 in total, over a 5 month period). No denominator information on how many attended was provided. On the assumption that all women attending Mammography Days received a mammogram, uptake was considered to be 100%	Key objectives of project were to establish a community coalition; conduct focus groups to ascertain individual, community, and system-level factors affecting community breast cancer early detection; design the intervention to target the indentified leverage points; implement and evaluate the pilot. The Mammography Days were the results of these activities. Recruitment of women to participate was through community health representatives. Likely sustainable and has potential to be more promising, but based on the information of this manuscript, it scored lower on the promise framework. An evaluation of this pilot with more quantitative information would have strengthened its ranking.	low	positive	low	high	2/3 (no reach)	mid	less promising	1 group (no control); n=39
Katz et al. (2007) USA	Cervical cancer screening	Native American women	Robeson County Outreach Screening and Education (ROSE) project - the intervention was an individualized health education program that was tailored to the needs of each woman. The intervention consisted of three home visits by ethnically-matched lay health advisors; follow-up phone calls; and tailored mailings after each visit. Control group received a physician letter and brochure on Pap tests.	Women in both the intervention (1.70, CI 1.13-2.21) and control (1.38, CI 1.04-1.82) groups had significantly higher odds of obtaining screening, at follow-up compared to baseline. Similarly, significantly higher proportion of women in either group were within risk-appropriate guidelines for Pap testing at follow-up, compared to baseline (Int. 66.6% vs. 51.6%, p<0.001; cont. 63.2% vs. 52.9%, p<0.001). No significant difference between control and intervention, evident in the inclusion of the ORs in the other's 95% confidence interval). As an entire cohort (regardless of group assignment), 62.9% of Native Americans were within risk-appropriate guidelines for Pap testing versus 50.6% at baseline (p<0.001)	Native Americans were 42% of study sample. No significant difference between the 3 ethnic groups in terms of outcome. The likely explanation of the lack of difference between groups is due to the control intervention: a letter by physician, suggesting that MD recommendation and education materials may also be effective. ? and small sample size	mid	positive	mid	mid	2/3 (no reach)	mid	promising	2 groups; n=328
Panaretto et al. (2006) Australia	Cervical cancer screening	Aboriginal women, Torres Strait Islander women	"Well women's program" involved community-based health promotion activities like placement of posters and leaflets in clinic settings, placing health segments on the local Indigenous radio station. A female Aboriginal Health Worker was the coordinator of this project. Primary goal was to determine the prevalence of STI, with the secondary goal of increasing Pap testing. Project period was Mar. 2002 to Jan. 2004.	Pap testing participation rates based on clinical data from health center (Townsville Aboriginal and Torres Strait Islander Health Service): 2001=20.9%, 2002-03=28.6%, 2004=35.6%. Significant increase in Pap testing from baseline to follow-up (20.9% vs. 35.6%, p<0.001).	Participants consenting to study were automatically screened with a Pap test right after baseline survey (recall primary objective was to determine prevalence of STIs). 57.6% were Aboriginal and 15.7% were Torres Strait Islanders. Pap testing rates were derived from cross-sectional data from clinic records. Limited information on methods in manuscript. Could have the potential to be more promising if methods were more clear.	low	unknown	low	mid	1/3 (no reach, no uptake)	low	least promising	3 groups (cross-sectional data collected at 3 separate points, denominator info unknown); n=189 (number of women screened in

													project)
Petersen et al. (2002) USA	Breast and cervical cancer screening	Alaskan Native women (nurses who work this community)	Native WEB (Women Enjoying the Benefits) was a training program for nurses employed by the Indian Health Services, tribal clinics, and clinics serving underserved populations. The 40-hr training program prepared nurses in 5 broad areas: 1) breast and cervical cancer screening skills and BSE education techniques; 2) development and use of tracking and reminder system, 3) screening promotion and community education, 4) cultural and gender sensitivity, 5) quality improvement skills to maintain a "well woman clinic."	Since Native WEB training, the # of women perceived by nurses to be seeking CBE and mammogram increased (4.5, where 1 was strongly disagree and 5 was strongly agree), the # of women seeking cervical exam increased (4.5), more women are adherent to breast cancer screening guidelines (4.29), and more women are adherent to cervical guidelines (4.56). In summary, when asked if number of women seeking CBE, Pap test, for mammography have increased since the Native WEB training, the average response was 4.11 to 4.59.	Outcome measure (rates of screening) was not direct measuring of screening rates, but nurses' survey response on changes in screening behavior (nurse as proxy).	mid	positive	mid	mid	2/3 (no reach)	mid	promising	1 group; n=60 nurses
Thomson et al. (2009) New Zealand	Breast cancer screening	Māori women	Intervention can be broadly categorized into two groups: 1) increased local involvement (promotion of breast cancer screening, identification of eligible women, improved registration/appointment process) and 2) reducing barriers to participation (cancer survivors from the community as advocates for breast cancer screening, the Service provided transportation support, mobile screening service, Service workers had tea with participants during appointment, women were given small gift after screening)	Mammography screening rates - 2003: <45% of eligible women (50-64 yrs) screened, 2005: 97.9% of those eligible screened; 2007: 97.6% of those eligible screened (program activities were implemented after the biennial screening in 2003).	Project was the result of a partnership between breast cancer screening program (regional/provincial) and local health service (The Te Whanau a Apanui Community Health Services, TWAACH, "The Service"). Project activities began sometime after the 2003 biennial screening and before the collection of 2005 data. Low rigour, but culturally appropriate and high potential for population impact.	low	positive	low	high	3/3	high	promising	3 groups (cross-sectional data collected at 3 separate points); n=333
von Friederichs-Fitzwater et al. (2010) USA	Breast cancer screening	Native American women	Mother's Wisdom Breast Health Program - delivered via multimedia, interactive DVD. DVD contained several short video segments on nutrition, exercise, breast structure and function, breast self-exam, mammography screening, breast cancer myths, and stories shared by Native American and Alaskan Native breast cancer survivors.	At baseline, 9% of the participants stated they intended to get a mammogram in 1-2 years, as compared to 74% after viewing DVD (p<0.0001). At 1 year follow-up, of the 118 women who stated they intended to get a mammogram, 95% actually obtained a mammogram. Significant association between stating that they intended to get a mammogram and actually getting one (p<0.001). Of those women who did not intend to get a mammogram following viewing the DVD, 80% did obtain one within the year following the intervention. Significant changes in breast health knowledge from pre-test to post-test.	The DVD was developed with findings from focus groups and interviews with Native American women.	low	positive	low	high	1/3 (no reach, no uptake)	mid	less promising	1 group; n=161

Appendix F: A brief summary of barriers to cancer screening unique to Aboriginal communities

At the request of the project team, a list of barriers to cancer screening unique to Aboriginal populations was compiled to provide some contextual information to the promising practices review. It should be noted that the barriers information was taken from studies identified in this review, and are therefore, mostly limited to U.S.-based research on breast and cervical cancer screening with Native Americans and Alaskan Natives.

Barriers to screening can be broadly categorized into structural barriers (e.g. facility, funding), socioeconomic barriers (e.g. literacy, education), and intrapersonal barriers (e.g. beliefs, awareness).

Structural barriers

Structural barriers are factors inherent in the health care system that prevent Aboriginal peoples from participating in screening, such as shortages of gender appropriate Aboriginal service providers 9, insufficient attention to patient education 11, lack of culturally appropriate materials 14, and misperceptions of cancer risk by service providers 20. There is some research evidence to suggest insufficient state-funded health care for off-reserve Native Americans Indians also plays a part in low screening rates 14. Perhaps the most obvious structural barrier is the physical isolation of Aboriginal communities from health services 21, with accessible health services mostly oriented to acute care instead of preventative care. There is also a lack of primary care providers in the communities, with high staff turnover 22. As a result, most seek primary care through emergency room services.

Unreliable mail delivery system also undercut the ability of population-based screening programs from reaching on-reserve Aboriginal populations with screening invitation and reminder letters 16. Peterson et al 14 pointed out that the lack of clinic-patient communication as a major factor that prevents Native American from seeking screening or re-screening.

Socioeconomic barriers

Socioeconomic barriers to screening include poverty, low literacy, distance from screening services, lack of transportation, and social isolation [14]. Language was a particularly potent deterrent among older Native American and Alaskan Natives – their inability to speak English was compounded by the scarcity of translators. In addition, Petersen et al [14] also found that there may be no adequate translations for the word “cancer.” Kaur [20] notes that one native language uses the same term for “cancer” as it uses for leprosy and tuberculosis. A recent document by Cancer Care Ontario noted comprehension challenges related to literacy and technical cancer terminology as two barriers experienced by First Nations, Métis, and Inuit communities [22].

In discussing how a mobile breast cancer screening service can be amended to better meet the needs of Māori, Thomson et al [16] found that individual appointments, as opposed to appointments made for a group of women, decreased uptake of the mobile service.

Intrapersonal barriers

Personal beliefs about cancer screening specific to the Aboriginal culture are yet another set of obstacles to overcome. Petersen et al [14] found that some Native American tribes believe that a person stays in harmony by thinking good thoughts and not consciously inviting any taboos. In other words, to engage in cancer screening or even to think about it may be to invite cancer and the spirit of cancer upon oneself [14]. The lack of awareness about cancer risks as well as the benefits of early detection is not a new barrier to the uptake of screening. In addition to this, Thomson et al [16] asserts that the lack of awareness of how to access screening service compounds this barrier. This is echoed by a recent report by Cancer Care Ontario [22]: lack of awareness of screening programs or how to access them and viewing screening as a treatment and not early detection are major barriers to cancer screening among First Nations, Métis, and Inuit communities in Canada.

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