

## **Improving participation in Cancer Screening Programs:**

### **A review of social cognitive models, factors affecting participation and strategies to improve participation**

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#### **Background**

Screening refers to testing all people in target population groups for signs of a disease. Screening tests aim to find early disease before the presentation of symptoms. Tests are offered to people who may have an increased risk of a particular disease because of their age, gender or other factors. There are three population based cancer screening programs in Victoria – National Bowel Cancer Screening Program, BreastScreen Victoria and National Cervical Screening Program (NCSP). Recruitment for the NCSP is delivered by the PapScreen Victoria program.

The Victorian Cancer Action Plan (2008-2011) identified increasing participation rates in population-based cancer screening programs as a key preventative Priority Area alongside research, treatment and support initiatives. To inform the Victorian Cancer Action Plan (VCAP) activities, the Victorian Department of Health commissioned a review of the relevant literature. The focus of the review was on key areas that inform thinking, knowledge and approaches to engaging individuals, groups and communities to participate in population-based cancer screening programs. Within this broad focus, special attention was paid to the needs of groups that may be under-screened (hard-to-reach groups), innovative approaches to enhancing participation, barriers to participation and the translation of research findings into action. The full review is contained in three stand-alone volumes:

1. *Social Cognition Models: A Review of their Relevance for Understanding Participation in Cancer Screening*
2. *Identifying Hard to Reach Groups: Review of the Factors (Including Barriers) Associated with Cancer Screening*
3. *Knowledge Translation: A Review of Strategies to Increase Participation in Cancer Screening*

The reports are available from <http://vccr.org/stats.html> as a download from the Research and Evaluation Reports section.

#### **Identifying the Literature**

An initial scoping of the literature included a search Medline, ISI Web of Science/ISI Web of Knowledge, CINAHL, SCOPUS and the Cochrane Library of systematic reviews using a combination of the following search terms: breast cancer OR cervical cancer OR colorectal cancer OR bowel cancer OR colon cancer; screen\*; participation OR engagement. Additional articles were located by scrutinising the reference lists of located articles, grey literature databases and the internet. Only items written in English and published mainly (but not exclusively) during the period 1999-2009 were included. The review also utilised literature located in a survey undertaken by the Victorian Cytology Service. The preliminary scoping yielded over 2,000 relevant items and more items were identified as the review progressed. To ensure that the project could be delivered within the available resources and timelines different strategies were adopted for the literature content in each of the volumes. The inclusion criteria for each are described in the following summaries.

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## **Volume 1 Summary**

### **Relevance of Social Cognition Models**

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Social Cognition Models (SCMs) describe key thoughts, perceptions, beliefs that regulate behaviour of an individual. The models have been, and continue to be, applied to the understanding of health behaviour including low compliance rates with cancer screening. The justifications given for using these models are that: (i) thoughts, perceptions and beliefs (i.e. cognitions) are important determinants of behaviour and mediate other factors associated with screening (such as demographic variables and psychological characteristics); and (ii) thoughts and beliefs are more amenable to change than the other factors.

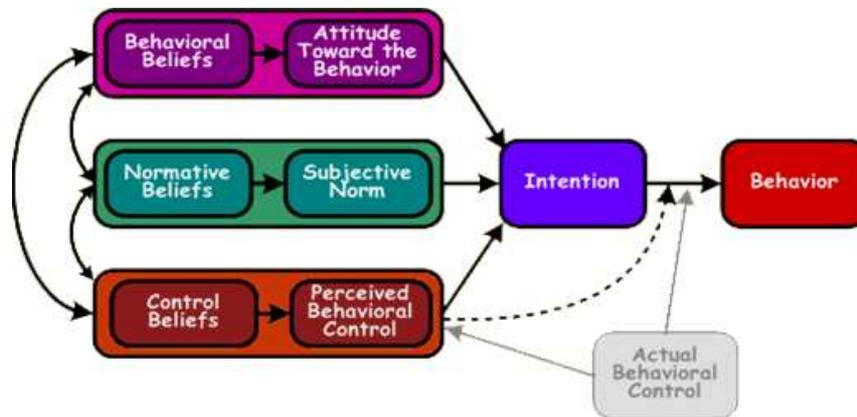
Literature for this review was identified by a 'snowball' method. First, items in the original search were scrutinised to identify those that contained some reference to social cognition models. These items were retrieved and the reference lists examined to identify relevant references – particularly those containing up-to-date descriptions and/or empirical evidence of the models. Finally a search of the internet was undertaken. The review considered the historical and current application of numerous SCMs. However it focused on the Health Belief Model (HBM) and the Theory of Planned Behaviour (TPB) and its forerunner the Theory of

Reasoned Action (TRA). It also included a discussion of the relationship between intention and behaviour which is important in the most recent specification of the TPB model.

The underlying assumptions of the SCMs studied are: (i) that health related behaviour is the result of the outcome of a form of cost-benefit analysis; and (ii) that health decisions are fuelled by motives to protect one's health and to regulate threats associated with health. Although a small amount of literature was examined that refuted these assumptions it was not possible to draw definitive conclusions as to their validity. It was concluded that the relevance of these models for cancer screening resides in their ability to act as frameworks for understanding the many factors associated with cancer screening. These include demographic, cognitive, psychological lifestyle, culture and health system factors. Their major drawback is that the models cannot, of themselves, provide the finer details necessary to inform the design of interventions. This is because there is insufficient detail in the models about: (i) the content of the beliefs and attitudes that are relevant for screening; (ii) which perceptions, beliefs or attitudes to target; (iii) how the beliefs and attitudes should be targeted; and (iv) how different thoughts and beliefs interact to bring about changes in behaviour. These issues, which are fundamental to designing strategies aimed at increasing screening rates, can only be determined empirically.

From a brief review of the empirical evidence relating to the models it appeared that the TPB (Figure 1) was more useful than the HBM for designing interventions.

**Figure 1** Model of the Theory of Planned Behaviour



Source: Downloaded 13/03/2012 from <http://people.umass.edu/aizen/tpb.diag.html> (Copyright © 2006 Icek Ajzen)

The evidence in relation to this model suggested that:

- Activities that succeed in changing intentions will succeed in changing behaviour but the impact on behaviour will be much smaller than the effect on intentions.
- People who are inclined to screen but who do not attend are the major reason why intentions do not align with behaviour.
- Whether the activities should target attitudes, social norms or perceived behavioural control (self-efficacy) depends to some extent on the screening test; and there was nothing to indicate that targeting all three factors will produce a greater effect. There was a very small amount of evidence to indicate that such an approach may be counter-productive.
- Issuing invitations to screen appeared to strengthen the relationship between attitudes and intentions.
- Financial incentives appeared to have the largest impact on intentions; but both financial incentives and social encouragement/pressure/support appeared to have the greatest impact on behaviour.

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## Volume 2 Summary

### A review of the factors associated with cancer screening

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This review was limited to population screening programs for breast cancer (screening mammography), cervical cancer (Pap tests) and colorectal cancer (mainly but not exclusively FOBT). Twenty-six factors were identified and grouped under six headings: demographic, cognitive, psychosocial, health and lifestyle, cultural, and health system. Because there was over 1,500 pertinent primary studies that could have been used to inform the review, the evidence base was limited to monitoring data contained in the non-peer reviewed reports of relevant screening programs and twenty-six literature reviews mostly (but not exclusively) published between 1999 and 2009 inclusive.

Table 1 shows the conclusions reached in relation to each factor. However, before considering these conclusions the following limitations regarding the data need to be considered.

1. Data for the associations between demographic factors and uptake came primarily from the monitoring data of population-based screening programs from various countries, and literature reviews. In many instances there were discrepancies between these two sets of data. This was partly due to the fact that the conclusions in the literature reviews were often based on multivariate analyses that controlled for other variables whereas, the monitoring data analyses did not.
2. Within the literature reviews there were differences of opinion with earlier conclusions being contradicted in more recent reviews. These differences may have come about, in part, to the inclusion of a larger number of studies in the later reviews, differences in review methodologies and differences in the populations included in the reviews.
3. The amount of evidence for each factor contained in the literature reviews and monitoring data (the database) varied. In some instances, there is inadequate evidence on which to base firm conclusions.
4. Much of the evidence related to breast cancer screening. It cannot be assumed that the results for screening mammography will automatically generalise to other cancer screening tests.

**Table1 Assessment of the relationship between the factors and screening uptake**

Factors	Assessment
<b>Demographic</b>	
1. Age	<ul style="list-style-type: none"> <li>• Screening Mammography Participation appeared to be lower in groups at the younger end of the target age for population-based screening programs.</li> <li>• Pap Tests Participation is lower among those at the younger end of the target age for population-based screening programs and there appeared to be a decline as women move towards the upper limits of the target age.</li> <li>• FOBT The available evidence indicated that uptake is likely to increase up to about 70 years of age, after which it will decline.</li> </ul>
2. Gender	<ul style="list-style-type: none"> <li>• FOBT The evidence suggested that uptake will be higher among women than men, although gender differences may be smaller in older age groups.</li> </ul>
3. Ethnicity	<ul style="list-style-type: none"> <li>• Monitoring data indicated lower participation in screening among ethnic and indigenous groups.</li> <li>• The reviews indicated that when the analyses controlled for other factors (e.g. socioeconomic status) ethnicity may not be a significant factor in the uptake of screening.</li> </ul>
4. Socioeconomic Status	<ul style="list-style-type: none"> <li>• Low Income There is some evidence that low income may be associated with lower screening rates however the latest colorectal cancer review indicated that this relationship may not hold among older people (<math>\geq 65</math> years). There is some evidence to suggest that the association of lower screening uptake with low income may not be due to a lack of money but the result of the pressure of everyday life, which work against the uptake of screening.</li> <li>• Employment Status There is no evidence to suggest that employment status has an impact on screening participation.</li> </ul>
5. Education	<ul style="list-style-type: none"> <li>• Screening Mammography, Pap Tests. FOBT The evidence indicated that low levels of education are associated with lower uptake of screening.</li> </ul>

<b>Cognitive</b>	
6. Literacy	<ul style="list-style-type: none"> <li>• Screening Mammography, Pap Tests, FOBT Australian literature suggests that literacy levels are lower among groups for whom English is not their first language. Insufficient evidence is available to draw conclusions about the impact of low literacy levels on uptake.</li> </ul>
7. Health Literacy	<p>Health literacy is related to but not synonymous with literacy. There is some evidence that health literacy is lower among the elderly, ethnic minorities, immigrants, non-active English speakers, those with limited education and low income.</p> <ul style="list-style-type: none"> <li>• Pap Tests There was evidence that lower health literacy is associated with lower uptake when other factors are controlled for in the analysis.</li> <li>• FOBT/Colorectal Cancer Screening There was some evidence that lower health literacy is associated with: (i) lower scores on substitute measures of participation in colorectal cancer screening (knowledge, comprehension, information seeking, and difficulty in understanding information); (ii) negative attitudes towards colorectal cancer screening; (iii) an increased refusal to participate in FOBT; and (iv) a reduced willingness to seek out and engage with health-related information.</li> </ul>
8. Cancer-Related Knowledge	<ul style="list-style-type: none"> <li>• Screening Mammography There was some evidence indicating a poor knowledge of screening, the belief that mammograms are harmful and that mammograms are not needed in the absence of symptoms is associated with lower screening rates.</li> <li>• Pap Tests There is insufficient evidence to draw any conclusions.</li> <li>• Colorectal Cancer Screening There was some evidence that poorer knowledge of colorectal cancer is associated with lower levels of colorectal cancer screening. There was also evidence that colorectal cancer knowledge is lower in some ethnic groups.</li> </ul>

9. Perceived Risk	<ul style="list-style-type: none"> <li>• Screening mammography The evidence indicated that perceiving oneself to be at a heightened risk of breast cancer is associated with an increase in screening uptake, but the effect is small.</li> <li>• Pap Tests and FOBT There was little evidence of an association between perceived risk and the participation.</li> </ul>
10. Perceived Ambiguity	<ul style="list-style-type: none"> <li>• Screening mammography A small amount of evidence suggested that higher levels of perceived ambiguity (in relation to cancer screening guidelines for example) are associated with lower levels of participation.</li> <li>• Pap Tests and FOBT There was no evidence in the reviews or monitoring data.</li> </ul>
<b>Psychosocial Factors</b>	
11. Fear Anxiety Worry	<ul style="list-style-type: none"> <li>• There was relatively strong evidence to suggest that: <ul style="list-style-type: none"> <li>- Fear of the screening process decreases participation;</li> <li>- Cancer worry increases screening; and</li> <li>- Fear of the screening outcome has mixed effects on participation.</li> </ul> </li> </ul>
12. Coping Style	<ul style="list-style-type: none"> <li>• Little research had been conducted into the impact of coping styles on participation in cancer screening programs. However, there was a small amount of evidence indicating that ‘denial’ is associated with increased participation and ‘repression’ with decreased participation.</li> </ul>
13. Social Networks	<ul style="list-style-type: none"> <li>• There was some evidence that family and friends have an influence on the uptake of screening, especially among ethnic groups.</li> <li>• There was evidence to suggest that being single, widowed or divorced may be associated with a decrease in the uptake of mammograms.</li> <li>• There was not enough evidence to draw conclusions about the impact of different types of social support (emotional, tangible, informative) on uptake.</li> </ul>
<b>Health and Lifestyle Factors</b>	
14. Physical and Mental Health	<ul style="list-style-type: none"> <li>• The notion that people living with physical or mental health problems or disabilities would be less likely to participate in screening seems reasonable. However, the evidence for this was not strong. In part this was due to: (i) the issue receiving little attention in the literature reviews; and (ii) the broad range of physical and mental health problems that could be included in this research making it difficult to generalise.</li> </ul>

	<ul style="list-style-type: none"> <li>• FOBT The most compelling (but not strong) evidence indicated that increased uptake is associated with (i) the ability to perform activities of daily living (ADL) and (ii) having a chronic/co-morbid conditions. However, Australian monitoring data indicated increased FOBT uptake by people with severe or profound physical limitations.</li> </ul>
15. Drug and Alcohol Use	<ul style="list-style-type: none"> <li>• Screening Mammography Recent evidence indicated an association between smoking and reduced uptake, and between alcohol consumption and increased uptake.</li> <li>• Pap Tests and FOBT There was no evidence in the reviews or monitoring data.</li> </ul>
16. Prior Screening	<ul style="list-style-type: none"> <li>• There is evidence that people who participate in earlier screening are more likely to respond to future invitations to participate.</li> <li>• There is also evidence that people who participate in one type of screening are more likely to participate in other types of cancer screening.</li> </ul>
<b>Cultural Factors</b>	
17. Acculturation	<p>Acculturation has generally been measured as length of residence in the host country and/or the ability to speak English.</p> <ul style="list-style-type: none"> <li>• Recent Arrival (Length of Residence) There was evidence for an association between recent arrival in a host country and lower uptake of screening mammography and Pap tests.</li> <li>• English Language Skills There was some evidence that lower English language skills are associated with lower uptake.</li> </ul>
18. Fatalism	<p>Fatalism has been defined as either the belief that events are beyond the control of the individual and/or the belief that death is inevitable when cancer is detected.</p> <ul style="list-style-type: none"> <li>• Screening Mammography, FOBT The evidence that was available indicated that higher levels of fatalism are associated with lower uptake.</li> <li>• Pap Tests There was no evidence in the database.</li> </ul>
19. Modesty Embarrassment Shame	<ul style="list-style-type: none"> <li>• Screening Mammography, Pap Tests On balance, the evidence indicated that these factors inhibit screening among ethnic and indigenous groups.</li> </ul>

20. Medical Mistrust	<ul style="list-style-type: none"> <li>• Screening Mammograms One review concluded that medical mistrust had a negative impact on uptake among ethnic and indigenous women.</li> <li>• There was also evidence that medical mistrust or scepticism is not confined to ethnic and indigenous groups but was also associated with a refusal to screen among well-educated Australian Caucasian women.</li> </ul>
21. Collectivism Communalism	<ul style="list-style-type: none"> <li>• There was some indication that collectivism / communalism has a negative impact on screening uptake, but there was little research that examined these factors specifically</li> </ul>
22. Spirituality Religiosity	<ul style="list-style-type: none"> <li>• Screening Mammography The evidence around an association between spirituality/religiosity and uptake of screening mammography is inconclusive.</li> <li>• Pap Tests, FOBT No evidence was identified in the database.</li> </ul>
<b>Health System Factors</b>	
23. Availability	<ul style="list-style-type: none"> <li>• Monitoring data provided clear evidence of geographic differences in screening uptake. The literature provided some hypotheses as to why this may be (eg. lack of services) but the evidence was not definitive.</li> <li>• There was evidence to suggest that people with a usual source of health care are more likely to be screened (especially for breast and colorectal cancer).</li> <li>• There was evidence to suggest that recent visits to a health care provider are associated with higher screening rates. However this association does not appear to hold for visits to an emergency room or admittance to hospital.</li> </ul>
24. Accessibility	<ul style="list-style-type: none"> <li>• Screening Mammography, Colorectal Cancer Screening There was strong evidence of a positive association between recommendation by a doctor and uptake. There was also evidence for this association in Australia where BreastScreen Australia is a self-referral service.</li> <li>• The literature consistently suggested the relevance of accessibility for people from some, but not all ethnic groups.</li> </ul>
25. Affordability	<ul style="list-style-type: none"> <li>• Health Insurance There was strong evidence of a positive association between having insurance and increased uptake of screening in the United States. The issue may be of less relevance in health systems that provide free screening to the target group.</li> </ul>

26. Acceptability	<ul style="list-style-type: none"> <li>• Female Health Care Providers There was some evidence that female health care providers are associated with increased uptake of breast and cervical cancer screening.</li> <li>• Interpreters There was some evidence that, in Australia at least, provision of interpreters may increase the uptake of screening mammography among culturally and linguistically diverse women.</li> </ul>
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The notable implications of the findings from this review for population-based screening programs in Victoria are as follows:

**Targeting:** Where there is reliable demographic data corresponding to monitoring data for population-based screening programs, the data can be used to broadly identify which groups are non-adherent to screening guidelines. This will assist in the targeting of efforts to increase screening participation but it offers little information about the underlying reasons for non-adherence. Groups identified using monitoring data are likely to be heterogeneous, therefore within group differences are likely to affect screening uptake. Such differences need to be considered when designing strategies to improve uptake.

**Engagement:** Concordance between people who have been screened previously and those who will participate in future screening or take part in other screening programs is not definitive. But the implication is that engaging people at the time of the first screen and ensuring they have apposite experience is likely to enhance repeat screening within and across screening programs.

The evidence suggests that recently arrived immigrants are less likely to participate in screening mammography and Pap tests. Screening programs need to consider how to engage this group in culturally appropriate ways. If this could be achieved it may have positive implications for later screening and participation in other screening programs. Engagement of this group will need to address a complex range of issues relating to: health literacy and English language skills; fatalism, modesty, embarrassment and shame; and medical mistrust.

**Information Provision:** A major implication of the evidence is the importance of how information is presented to target populations. There is evidence that literacy is likely to be low among some non-adherent groups. But, because of the specialised nature of health-related information, even those with good literacy skills may have reduced health literacy levels. There is evidence that individuals with reduced health literacy are less likely to seek out and/or engage with health-related literature and information. In such instances, improving cancer-related knowledge about screening cancer and risk as a way of increasing screening participation rates will prove challenging.

**Reducing Anxiety:** Addressing the fear, worry and anxiety issues as a way of reducing people's generalised cancer worries and the fear of the screening process itself would have a positive impact on screening uptake. However, strategies for achieving this will need to understand the psychological and cultural factors that may underpin these feelings.

Evidence of a relationship between coping style and screening uptake was not strong and the implication for population-based screening programs is unclear. Similarly, there is limited evidence in relation to the impact of social networks. If these networks are able to influence the uptake of screening they can presumably do so for better or for worse. It is important that programs provide network members - such as family and friends - with a 'good' experience if they are to exert positive pressure on individuals who are reluctant to participate in screening programs.

**The Health System:** Recommendations from a doctor during visits to their usual source of care, outpatients or primary care doctors has been found to be associated with screening uptake. Also associated with an increase is the provision of female health care providers and the provision of interpreters.

Lacking attention or evidence in the database was the common sense notion that physical and mental health will affect screening uptake. This lack of evidence does not mean that these factors are not important. Screening programs should be cognisant of the difficulties people with physical and mental health issues face when undergoing screening, and make efforts to accommodate them.

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## Volume 3 Summary

### A review of strategies to increase participation in cancer screening

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A total of 154 peer-reviewed primary studies (involving 188 interventions arms or strategies) and 43 literature reviews and meta-analyses formed the basis for the review of strategies to increase uptake of cancer screening. The inclusion criteria were: (i) secondary screening (illness is absent, disease may be present but not obviously so) for breast, cervical and colorectal cancer; (ii) the impact on screening uptake was included in the results; (iii) written in English; and (iv) mainly (but not exclusively in the case of colorectal cancer) published since 1998. Just over two-thirds of the primary studies (68%) related to activities aimed at increasing screening the United States, nine percent related to Australian activities. This literature was supplemented by a small amount of literature related to: (i) to engaging men; and (ii) strategies used to increase uptake in screening for non-cancer related diseases (parallel evidence).

#### Cancer Screening Strategies

Twenty-five cancer screening strategies were identified and assessed as to their effectiveness; twenty-one targeted the screening population; three targeted providers; and one targeted both providers and the screening population. The impact of the strategies on screening uptake was classified as either:

- ‘increased’ - a statistically significant positive increase, indicated by a *p* value of less than 0.05
- ‘none’ - a result that was not statistically significant as indicated by a *p* value of 0.05 or greater
- ‘unclear’ -, meant that: (i) no significance tests were included in the study and there was insufficient data to do post hoc significance testing; (ii) the study did not include a comparison group; or (iii) the results were presented in a way that made it difficult to be sure of the impact on screening rates.

The definition of hard-to-reach groups was based on socio-demographic variables and included ethnic groups, indigenous groups, low income groups and non-urban groups.

## Cancer Screening Strategies Targeting Screening Populations

### 1. Invitations and Reminders

*Description:* Letters with fixed or open appointments, telephone calls, verbal recommendations, prompts and follow-up letters

*Peer-Reviewed Primary Studies (N=32):* Seventeen studies originated in the United States and five were from Australia. Fifteen related to breast cancer only and ten colorectal cancer only. The studies included 36 strategies, and 22 (61%) reported a increase in uptake. Seven of the eight telephone invitations and reminders reported a positive impact (Table 2).

**Table 2** Invitations and reminders primary studies overview

Method	Strategies	Impact on Uptake		
		Increased	Unclear	None
Mail	23	11 ( 48%)	5 ( 22%)	7 ( 30%)
Telephone	8	7 ( 88%)		1 ( 13%)
Face-to-Face	4	3 ( 75%)		1 ( 25%)
Multi-Method	1	1 (100%)		
	36	22 ( 61%)	5 ( 15%)	9 ( 25%)

*Hard-to-Reach Groups:* There was little reporting of the impact of invitations and reminders on specific ethnic groups in the primary studies. Only one study targeted ethnic groups and the strategy did not have a notable impact. Seven studies targeted other hard-to-reach groups – three non-urban and four low-income. Results were mixed: three reported an increase in uptake, three reported no impact; and in one the results were unclear. The only study testing face-to-face invitations and reminders reported an increase in uptake.

*Literature Reviews and Grey Literature:* This literature emphasised that the impact on uptake varies according to the method of administration of the invitation or reminder, the nature of the screening test, and the characteristics of the target group. The overall conclusion was that invitations and reminders did increase uptake, at least among mid- to high- socioeconomic groups. Telephone calls and letters-plus-telephone calls appeared to have a bigger impact than mailed invitations and reminders. The evidence for face-to-face invitations and reminders was less clear.

## 2. Message Framing

*Description:* Messages about screening (either verbal or written) that included: (i) some form of endorsement; (ii) messages tailored to the personal factors of individuals; or (iii) different presentations of risk and loss/benefit.

*Peer Reviewed Primary Studies (N=27):* Twenty studies originated in the United States and two in Australia. Sixteen studies related to breast cancer only, six to colorectal cancer only and three to cervical cancer only. Endorsement by a doctor seemed to have been particularly effective, with six of the seven studies reporting increased uptake. The evidence for the other strategies was mixed (Table 3).

**Table 3 Message framing primary studies: impact on uptake**

Method	Strategies N	Impact on Uptake		
		Increased	Unclear	None
Endorsement				
Doctor	7	6 (86%)		1 ( 14%)
Other	2			2 (100%)
Tailoring	11	6 (55%)	1 ( 9%)	4 ( 36%)
Risk	4	2 (50%)		2 ( 50%)
Loss/Gain	5	1 (20%)		4 ( 80%)
Other	4	1 (25%)	2 (50%)	1 ( 25%)
	33	16 (48%)	3 ( 9%)	14 ( 42%)

*Literature Reviews and Grey Literature:* The conclusions for the reviews were based on a narrower range of interventions and fewer high quality studies. The conclusions were: (i) there was little evidence for the impact of doctor endorsement; (ii) risk framing appeared to increase uptake; but (iii) there was little evidence in of benefit in terms of loss/gain framing.

## 3. Educational Strategies

*Description:* Strategies designed to either increase knowledge of the screening program or the cancer including printed educational materials, audio-visual materials, group and individual teaching and/or home visits; but did not contain a counselling component.

*Peer-reviewed Primary Studies (N=24):* Twenty (83%) of the studies originated in the USA. Eight of the studies related to breast cancer only, ten to colorectal cancer only and three to cervical cancer only. An

increase in uptake was reported for ten strategies, thirteen reported no impact. Studies in which print material was used generally did not report improvements in uptake (Table 4).

**Table 4 Education primary studies: impact on uptake**

Method	Strategies	Impact on Uptake		
		Increased	Unclear	None
Videos	6	3 ( 50%)		3 ( 50%)
Print material	5	1 ( 20%)		4 ( 80%)
Face-to-Face				
One-on-One	2	2 (100%)		
Group	5	1 ( 20%)	2 ( 40%)	2 ( 40%)
Multi-Strategy	7	3 ( 43%)	1 ( 14%)	3 ( 43%)
Other	2		1 ( 50%)	1 ( 50%)
	27	10 ( 37%)	4 ( 15%)	13 ( 48%)

*Hard-to-Reach Groups:* Thirteen strategies targeted hard-to- reach groups. Five (38%) increased uptake in ethnic groups in the USA; in two studies the results were unclear; and in the remaining six (46%) there was no increase uptake.

*Literature Reviews and Grey Literature:* The conclusions reached in the literature reviews were based on a small number of high quality studies and the conclusions are contradictory. The most positive conclusions for the use of printed material included ‘letters’. If these letters were in fact, invitations then this overlaps with the invitations and reminders strategy reported above and may account for the positive conclusion. Overall, the evidence for education appears to be mixed, and no clear trends could be discerned.

#### **4 Counselling**

*Description:* Strategies included face-to-face or via telephone and included a discussion of barriers to screening as well as an educational component.

*Peer-Reviewed Primary Studies (N=17):* The peer-reviewed primary studies were dominated by studies originating in the United States (16) and focused on breast cancer only. Fourteen of the twenty strategies involved telephone counselling and of those fourteen, ten (71%) reported increased uptake. All the six face-to-face counselling strategies reported an increase in uptake (Table 5)

**Table 5 Counselling primary studies: impact on uptake**

	Strategies	Increased uptake	No increase on uptake	Decreased uptake
Telephone	14	10 ( 71%)	3 ( 21%)	1 ( 7%)
Face-to-face	6	6 ( 100%)		
Total	20	16 ( 80%)	3 ( 15%)	1 ( 5%)

*Hard-to-Reach Groups:* Six of the strategies targeted hard to reach groups and five reported increases in uptake.

*Literature Reviews and Grey Literature:* The literature reviews provided limited evidence for the effectiveness of counselling.

## 5. Coaching

*Description:* This included two types of strategies. In the first, lay health workers (often from a particular ethnic group) were trained and educated to provide assistance and support as a means of encouraging screening. In the second a person was trained provide services which helped to guide patients through the healthcare system. The services included education, assistance with scheduling appointments, appointment reminders, transportation, and follow-up after the procedure to determine the need for further action.

*Peer-Reviewed Primary Studies (N=15):* Twelve of the studies originated in the United States. Five studies targeted breast cancer only, six targeted cervical cancer only and one targeted colorectal cancer only. Seven of the strategies (54%) reported an increase in uptake, for three the results were unclear and in three there was no impact. Eleven of the thirteen strategies specifically targeted hard-to-reach groups. Six of the eleven (55%) reported an increase in uptake, for two the impact was unclear and for the other three there was no impact (Table 6).

**Table 6 Coaching primary studies: impact on uptake**

Target Group	Strategies	Impact on Uptake		
		Increased	Unclear	None
Ethnic groups				
Non-urban	3	1 ( 33%)	2 ( 67%)	
Low income	4	1 ( 25%)		3 ( 75%)
Urban	4	4 (100%)		
Gen population	2	1 ( 50%)	1 ( 50%)	
	13	7 ( 54%)	3 ( 23%)	3 ( 23%)

*Literature Reviews and Grey Literature:* The literature reviews concluded that this form of intervention increased the uptake of screening mammography but conclusions were less consistent in relation to Pap tests.

## 6. Mass Media Campaigns

These campaigns were conducted through television, radio, newspapers and other print media.

*Peer-Reviewed Primary Studies (N=4):* Three of the four peer-reviewed primary studies related to campaigns undertaken in Australia and two of the four targeted ethnic groups. The evidence from these studies indicated that media campaigns, by themselves, did not have a positive impact on screening mammography and Pap tests in the general population or targeted ethnic groups.

*Literature Reviews and Grey Literature:* The literature reviews did not offer clear evidence in relation to the impact of media campaigns. The Australian grey literature provided some evidence for a short-term increase in the uptake of Pap tests but provided no evidence in relation to hard-to-reach groups. On balance, it was concluded that media campaigns may have a short-term impact on screening rates but there was insufficient evidence to conclude that one-off media campaigns will, by themselves, increase screening rates in the longer term.

## 7. Community Campaigns

*Description:* Community campaigns generally included: (i) a mass media campaign, educational strategies, and some form of community participation. They ran for more than 12 months; and targeted whole communities (Table 7).

**Table 7 Overview of the impact of community interventions on screening uptake**

	Total	Increased uptake (a)	Impact unclear	No increase
Hard-to-reach	11	7 ( 64%)	2 ( 18%)	2 ( 18%)
General population	2		1 ( 50%)	1 ( 50%)
Total	13	7 ( 54%)	3 ( 23%)	3 (23%)

Notes: (a) Includes two interventions in which the intervention increased the uptake of Pap tests but not mammograms.

*Literature Reviews and Grey Literature:* The only literature review which considered this type of campaign concluded that there was some evidence for their effectiveness but the quality of the evidence was poor.

## **8. Worksite Campaigns**

*Description:* These are generally multi-strategy interventions conducted in the workplace.

*Peer-Reviewed Primary Studies (N=4):* Two studies were from the United State, one from the United Kingdom and one from Taiwan. In two studies there were statistically significant increases in screening and in two the results were unclear. The worksite intervention in Taiwan targeted colorectal cancer screening and had impressive uptake compared to the strategy targeting the uptake of FOBT in the UK. However, given the cultural differences between Taiwanese workplaces and workplaces in non-Asian countries, uptake for workplace interventions in Australia are not likely to be as high as those achieved in the Taiwanese study.

*Literature Reviews and Grey Literature:* The literature reviews offered very little evidence for the effectiveness of worksite interventions. On balance, it was concluded that these interventions are promising but the evidence as to their effectiveness was limited.

## **9. Financial Incentives/Disincentives**

*Description:* These strategies include reduced fee, or free, screening tests, subsidisation of out-of-pocket costs, or the provision of rewards for completions of a screening test.

*Peer Reviewed Studies (N=3):* Two of the studies originated in the United States and all three target breast cancer only. One study found that charging a fee reduced the uptake of screening mammogram. One study of financial incentives for low income women reported a positive impact. Another found that making screening mammogram free had mixed effects among low income ethnic women.

*Literature Reviews and Grey Literature:* The conclusions reached in the literature reviews are mixed. It is unclear whether providing financial incentives or reducing out-of-pocket costs will have a positive impact on uptake of cancer screening.

## **10. Health System Strategies**

*Description:* These strategies aimed to make the screening procedure easier to access or more acceptable. It included offering different screening tests for the same condition, varying the length of time the screening took, opportunistic screening, mobile vans, and periodic health examinations.

*Peer-Reviewed Primary Studies (N=15):* The fifteen peer-reviewed primary studies originated in eleven different countries; six related to cervical cancer only and six to colorectal cancer only. Overall two-thirds of

the strategies reported an increase in uptake and all six interventions relating to FOBT reported an increase in uptake (Table 8).

**Table 8 Procedure change primary studies: impact on uptake**

Method	Strategies	Impact on Uptake		
		Increased	Unclear	None
Pap test (self-sampling)	4	2 ( 50%)	1 ( 25%)	1 ( 25%)
FOBT	6	6 (100%)		
Mobile clinics/ vans	2		1 ( 50%)	1 ( 50%)
Other	3	2 ( 67%)		1 ( 33%)
	15	10 ( 67%)	2 ( 13%)	3 ( 20%)

*Hard-to-Reach Groups:* Four of the strategies targeted hard-to-reach groups. The only study reporting a positive impact involved self-sampling for Pap testing among rural women in India.

*Literature Reviews and Grey Literature:* The literature reviews and grey literature were generally positive about the potential for opportunistic screening, public health examinations, and the use of mobile vans. In this literature, the impact on uptake for changing dietary restrictions and methods of screening for FOBT were generally mixed.

## 11. Multi-component Strategies

*Description:* These strategies combined a variety of methods for increasing uptake; for example, some invitations and reminders plus education. There was no combination of methods that dominated the literature.

*Peer-Reviewed Primary Studies (N=21):* Eighteen studies originated in the United States and one originated in Australia. Eleven studies targeted breast cancer only, two cervical cancer only and four colorectal cancer only. Overall, 11 of the 21 strategies improved uptake. Ten strategies targeted hard-to-reach groups and six of these (60%) reported an increase in uptake. Neither of the two strategies targeted at non-urban groups increased uptake (Table 9).

**Table 9 Multi-component strategy primary studies: impact on uptake**

Method	Strategies	Impact on Uptake		
		Increased	Unclear	None
Non-urban	2			2 (100%)
Low income	3	3 (100%)		
Ethnic groups	5	3 ( 60%)	1 ( 20%)	1 ( 20%)
Gen population	11	5 ( 45%)	2 ( 18%)	4 ( 36%)
	21	11 ( 52%)	3 ( 14%)	7 ( 33%)

*Literature Reviews and Grey Literature:* The literature reviews contained some evidence that some multi-component interventions improved uptake but it was difficult to discern patterns or trends.

### **Cancer Screening Strategies Targeting Providers**

There was scant evidence in the peer-reviewed primary studies for the effectiveness of strategies targeting providers. The literature reviews indicated that prompts may have some effect in terms of increasing uptake for screening mammography and Pap tests however the evidence for the impact of prompts on FOBT was unclear.

### **Parallel evidence from other areas**

The review of the literature relating to parallel evidence was not exhaustive and came mainly from reviews that also included evidence in relation to cancer screening. Reviews to increase screening across a number of areas were dominated by interventions to increase cancer screening and, in particular, the uptake of screening mammograms. The strategies adopted in other areas appeared to be similar to those used to increase participation in cancer screening and the results are similar in terms of the effectiveness. Of particular interest were:

- Coaching: The effectiveness of patient navigation for increasing participation in prostate cancer screening.
- Financial Disincentive: The negative impact of charging a fee on men's participation in health examinations for ischaemic heart disease.
- Procedures: The positive impact of a health prevention nurse in general practice on the recording of (and presumably participation in) screening activities including Pap tests.
- Provider Strategies: The positive impact of organisational change on immunisation.

### **Assessment of the Cancer Screening Strategies**

Table 10 shows an assessment the strategies in terms of targeting the general population, and hard-to-reach groups. The key to the symbols used in the table is as follows.

- ✓ This strategy increased uptake and is worth pursuing
- ✓? This strategy increased uptake and is worth pursuing but there are issues that require clarification
- ? The impact on uptake is inconclusive and needs further study
- X This strategy had no impact on uptake (in the case of the hard to reach groups this was often because of a lack of evidence)

**Table 10 Assessment of the cancer screening strategies targeting the general population**

	Assessment	Issues/Notes
Invitations and Reminders		
Mailed	✓?	The practicality of: <ul style="list-style-type: none"> <li>• The inclusion of an appointment.</li> <li>• Addressing decreasing returns on multiple reminders by using a multi-method strategy such as telephone calls to those who do not respond.</li> </ul>
Telephone	✓	
Face-to-Face	X	
Message Framing		
Tailoring	X	
GP endorsement	✓	
Risk	X	
Loss/Gain	X	
Other framing	X	
Education		
Print material	X	As a stand-alone strategy it was not effective but has been used as part of multi- strategy
Face-to-face	?	
Videos	?	
Multi-strategy	?	Clarification as to which combination of strategies would be most effective.
Counselling		
Telephone	✓	
Face-to-face	✓	
Coaching	?	
Mass Media Campaigns	?	One off campaigns may have a short-term impact, but it is not clear how to sustain the increase in uptake.
Community Campaigns	X	
Worksite Campaigns	?	
Economic Incentives	✓	
Procedures	✓?	The strategies differed by type of cancer and there is a need for more clarity around which strategies will work for which screening test.
Multi-component strategies	?	
Provider Strategies		
Prompts	✓	
Education	X	
Audit and feedback	X	Not as a stand-alone strategy.
Provider +Screening Population	X	

## **Engaging Hard-to-Reach Women in Screening**

- Indigenous groups

Implemented strategies included coaching, community interventions and procedures. All were aimed at Pap tests and/or screening mammograms. The small number of primary studies made it difficult to discern trends in the impact on uptake.

- Ethnic groups

The most effective strategies appeared to be coaching, community interventions, multi-component interventions and counselling. There was less evidence for the effectiveness of education and message framing. A small number of studies indicated that media campaigns, invitations and reminders and procedures did not report positive impacts.

- Low income groups

It was difficult to discern trends because of the low number of studies in each strategy. However, the overall effectiveness (as judged by the number of studies reporting a statistically significant increase in uptake) appeared to be quite low (57%). All the studies of counselling, financial (dis)incentives, procedures and multicomponent interventions reported increased uptake. It was not possible to determine the extent to which this represents publications bias. None of the studies of education reported an increase in uptake.

- Non-urban groups

Once again it was difficult to discern trends in terms of effectiveness because of the small number of studies in each of the strategies, but the proportion of studies reporting positive impacts on screening was less than half (47%). Strategies with studies only reporting increased uptake (i.e. strategies with no studies reporting unclear, or no increase results) included: education and invitations and reminders. The strategies with no studies reporting increased uptake were counselling and multi-component.

## **Engaging Men in Screening**

The evidence for this section of the review came from: (i) a re-analysis of the 39 colorectal cancer primary studies; and (ii) a systematic review of evidence relating to health promoting strategies targeting men.

Twenty-six of the primary studies originated in the United States and six were from Australia. Although there were individual studies that demonstrated the effectiveness of a particular strategy in improving participation rates among men, there was no clear evidence about which was the most effective strategy, especially within the Australian context. It was also pointed out that not all men are the same and may not behave similarly. It is therefore unlikely that all men will be engaged through one particular technique or strategy; as is the case with women.