# Effectiveness of 'signs and symptoms' campaigns for lung cancer: a rapid review

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# EXECUTIVE SUMMARY

Lung cancer has the lowest survival rate of all cancers in adults, with only 13% of affected individuals in Australia surviving for five or more years following a diagnosis. It is generally recognised that early diagnosis of lung cancer could be an important factor in improving both the survival rate and patients' quality of life. One way to facilitate the early diagnosis of lung cancer is to improve people's awareness of the signs and symptoms of the disease (e.g. a persistent cough, coughing up blood, fatigue, and weight loss) and encourage them to attend their general practitioner (GP) for investigation of potential symptoms.

The objective of this rapid review was to identify and examine lung cancer 'signs and symptoms' interventions which have been developed in Australia and OECD countries with similar healthcare settings (i.e. New Zealand (NZ), Canada, and the United Kingdom (UK)). This involved assessing the effectiveness of these interventions on influencing knowledge, attitudes, beliefs, and help seeking behaviours (e.g. GP visits) in the general community and at-risk groups (e.g. smokers, individuals from a low socio-economic background, culturally and linguistically diverse (CALD) communities. In addition, the effectiveness of interventions designed to influence the knowledge, attitudes, beliefs, and behaviours of health professionals was also examined.

A review of the academic and grey literature resulted in the identification of eight lung cancer 'signs and symptoms' interventions: 'I'll tackle it soon' (UK), '3 Week Cough' (UK), 'Be Clear on Cancer' (UK), 'Cough, cough, cough' (NZ), 'The Sooner the Better' (NZ), 'The Australian Lung Foundation' (various programs; Australia), 'Find Cancer Early' (Australia), and 'Detect Cancer Early' (UK). The primary aim of all of these interventions was to raise awareness of the signs and symptoms of lung cancer, and increase help seeking behaviour (e.g. seeking help from a GP or other healthcare professional). The interventions typically targeted a single sign and symptom (i.e. a persistent cough lasting for three weeks or more). However, the 'Be Clear on Cancer' intervention publicised additional lung cancer signs and symptoms such as coughing up blood, breathlessness, fatigue, chest/shoulder pain.

The evidence for the effectiveness of these interventions was very limited. For example, only two of the eight interventions had any evaluation data ('I'll tackle it soon', and '3 Week Cough'). These data did indicate that the interventions had positive effects. For example, 'I'll tackle it soon' led to a significant increases in GP visits for lung cancer, along with a 20% increase in chest x-rays and a 27% increase in lung cancer diagnoses. The '3 Week Cough' intervention similarly led to a 23% increase in GP attendances for patients with a cough or other symptoms of lung cancer. Unfortunately, in addition to being limited in quantity, the quality of the evidence was assessed as being low.

There was also no indication of whether these 'signs and symptoms' interventions led to changes in knowledge, attitudes, or beliefs. There were no data examining the effectiveness of these interventions on relevant at-risk populations such as individuals from lower socio-economic groups, indigenous groups, or CALD communities. Furthermore, although some of the interventions indicated that they included a component targeted towards health professionals, there are no published data examining the effects of these health professional components. As a consequence, it is not possible to determine whether lung cancer 'signs and symptoms' interventions are effective in influencing health professionals' knowledge, attitudes, beliefs, and relevant behaviours.

The very limited data for lung cancer 'signs and symptoms' interventions led to an expansion of the review to also encompass 'signs and symptoms' interventions for other relevant cancers such as breast cancer, prostate cancer, and colorectal cancer (a preliminary search was also

conducted for chronic obstructive pulmonary disease interventions, but recent published data were not available). This resulted in the identification of 11 relevant interventions for which evaluation data were available: five of these were for breast cancer, four for colorectal cancer, and two for prostate cancer.

These interventions did focus on increasing awareness of cancer signs and symptoms, but had a range of other goals such as increasing visits to GPs and screening, and increasing detection rates of cancer. The evaluation data were considerably more detailed for these cancers relative to lung cancer. Several of the interventions led to significant improvements in knowledge and awareness of cancer signs and symptoms. For example, the 'Be Clear on Cancer' colorectal cancer campaign led to approximately 50% increase in awareness of symptoms (e.g. 'blood in poo'). The 'Learn, Share and Live' intervention led to an increase in the percentage of women who indicated that they had recently been screened for breast cancer (from 40% to 68%). Furthermore, the 'Screen for Life' intervention was associated with a 19.3% increase in screening rates for colorectal cancer between 2002 and 2008.  There was also evidence of increases in visits to healthcare professionals.  For example, 'Be Clear on Cancer' led to a 48% increase in GP visits for colorectal cancer signs and symptoms.

Unfortunately, the quality of the evaluation data was generally low. Therefore, although these interventions generally had positive effects on the outcome measures these need to be interpreted with caution. In particular, there is a need for more rigorous research designs (e.g. randomised control trials (RCTs), or well-designed observational studies that yield extremely large and consistent estimates of the magnitude of an intervention effect) to better determine the effectiveness of these interventions. Furthermore, as per the lung cancer 'signs and symptoms' interventions, evaluation data did not identify factors that influenced the effectiveness of these interventions, or whether effectiveness varied according to socio-economic or CALD status.

The results of this rapid review indicate that very few 'signs and symptoms' interventions for lung cancer have been developed and trialled in Australia, NZ, the UK and Canada.  Based on the available data it is concluded that:

> Question 1a. 'Signs and symptoms' interventions may be effective influencing knowledge, attitudes, beliefs and help seeking behaviours such as visits to a GP or taking up screening. However the evidence base is limited, especially in relation to lung cancer, with some limited evidence from other cancer interventions suggesting a positive effect.

> Question 1b. There is very limited published evidence of the effectiveness of lung cancer 'signs and symptoms' interventions targeted towards at risk population groups.

> Question 2. There is insufficient evidence to make any conclusions regarding interventions targeted towards health professionals

Based on the available evidence, the following recommendations are made for developing lung cancer 'signs and symptoms' interventions in NSW.

1. Interventions should be based on rigorous formative research with target population groups and stakeholders to generate understanding and useful insights regarding knowledge, attitudes, and behaviours, and explore issues, influences and barriers to increasing awareness and changing behaviour

2. Segmentation of target populations – beyond simple demographic based approaches, but using formative research to identify psychographic audience segments can facilitate targeted and tailored intervention messages

3. Capacity building and training with relevant stakeholders such as healthcare professionals can be helpful to alleviate concerns over resources and build support for intervention aims and objectives

4. Future interventions should use relevant theories to help identify applicable factors influencing behaviour, and to develop behaviour change strategies

5. Evaluation research models which include process, and cost effectiveness, as well as outcome evaluation data, should be built in at the start of future interventions as existing interventions do not report these data

6. A social marketing framework can provide a comprehensive and strategic structure for incorporating the aforementioned recommendations. Social marketing has been shown to be an effective approach for colorectal cancer (Cancer Research UK 2007), and more widely for population health behaviour change interventions (Stead et al. 2007). In addition, utilising an internal social marketing approach – the application of internal marketing for the achievement of social rather than commercial objectives (Smith 2011), to engage relevant stakeholders in the healthcare sector can overcome barriers such as concerns over capacity and support in the system; and issues over procedures and protocols.

# 1 Introduction

Lung cancer is the fourth most commonly diagnosed invasive cancer in Australian adults (excluding basal cell carcinoma and squamous cell carcinoma), accounting for approximately 8% of all cancers (Australian Institute of Health & Welfare (AIHW) 2010. Lung cancer refers to any carcinoma that originates in the lungs (e.g. trachea, bronchi, bronchioles, & alveoli) and can be categorised according to two main types:

1. *Small cell carcinoma.* This is the most aggressive form of lung cancer and spreads very rapidly during the early course of the disease. This means that by the time it is diagnosed, surgery (i.e. removal of the tumour) is often not an effective form of treatment, and the only options are radiotherapy or chemotherapy

2. *Non-small cell carcinoma.* This is a less aggressive form of lung cancer that grows and spreads more slowly. Because the tumour tends to be confined to parts of the lung for a longer period of time, surgery is a more effective treatment option relative to small cell carcinoma.

Lung cancer is a major public health issue as it has a higher mortality rate in both males and females than any other cancer (AIHW 2010). For example, only 13% of diagnosed individuals survive five years after diagnosis, which is considerably lower than the survival rates for breast cancer, prostate cancer, and bowel cancer (AIHW 2010). Lung cancer is more common in males than females; however, the magnitude of this difference has changed considerably over the past 30 years. In 1982, males were 4.7 times more likely to be diagnosed with lung cancer. By 2007, this had fallen to 1.8 times more likely (AIHW 2010). This reflected a 32% decline in the incidence of lung cancer in males between 1982 and 2007, and a concurrent 72% increase in incidence in females during the same period of time (AIHW 2010).

The primary risk factor for lung cancer (particularly small cell carcinoma) is tobacco smoking, which accounts for 90% of all diagnoses in males and 65% of all diagnoses in females (AIHW 2010). However, there are other notable risk factors for lung cancer which include:

1. Second hand cigarette smoke

2. Exposure to carcinogens (e.g. asbestos, diesel exhaust fumes)

3. Radon exposure (naturally occurring radioactive gas released during normal decay of uranium in rocks and soil)

4. Family history of lung cancer

5. A history of lung disease.

The relatively high incidence of lung cancer combined with the low survival rate means there is a need to identify and develop effective strategies to aid prevention. One major strategy has been anti-smoking policies and campaigns, given that smoking is the main risk factor for lung cancer (AIHW 2010; Baldwin & Hubbard 2012). Smoking cessation campaigns have been implemented in many countries, including Australia, and have been shown to be effective in reducing the age-adjusted incidence of lung cancer (Baldwin & Hubbard 2012).

However, a second strategy that requires considerable attention and development involves improving the early diagnosis of lung cancer. It is generally agreed that this could be achieved through a combination of screening interventions and, increasing public and health professional awareness of lung cancer signs and symptoms (AIHW 2010, Hamilton et al. 2005). Unfortunately, screening at a population level may not be an effective or efficient strategy at present given the lack of reliable screening methods (Hamilton et al. 2005). Interventions aimed at increasing

awareness of lung cancer signs and symptoms could be a more effective strategy for improving the survival rate of lung cancer and are the primary focus of this review. The objective of this rapid review is to examine the evidence regarding the effectiveness of these 'signs and symptoms' interventions.

## Lung cancer 'signs and symptoms'

Lung cancer 'signs and symptoms' interventions have the potential to improve the early diagnosis of the disease. This is important because the low survival rate of lung cancer can be partially attributed to most patients being diagnosed at more advanced stages of the disease (AIHW 2010). This is compounded by the low awareness of lung cancer signs and symptoms both in the general community and amongst health professionals (Simon et al. 2012). Strategies for increasing the recognition of signs and symptoms of lung cancer may be effective in improving the survival rate for this disease.

The signs and symptoms of lung cancer vary depending on the stage and type of the disease. However, the most common signs and symptoms are (Hamilton et al. 2005):

1. A persistent cough which has lasted for three or more weeks

2. Haemoptysis - coughing up blood

3. Weight loss

4. Loss of appetite

5. Dyspnoea - subjective reports of breathing difficulties, including breathlessness

6. Fatigue

7. Chest or rib pain

8. Finger clubbing – this refers to a thickening of the skin on the fingertips, leading to an abnormal rounded appearance.

Many of these symptoms (e.g. a persistent cough) are commonly presented by patients visiting a healthcare professional and quite often are indicative of another health condition (Hamilton et al. 2005). However, when there is a co-occurrence of two of more of these symptoms, the likelihood of lung cancer is increased dramatically (Hamilton et al. 2005).

## The present review

A number of lung cancer 'signs and symptoms' interventions have recently been developed and implemented, particularly in the United Kingdom (UK). The purpose of this rapid review is to review available evidence regarding the effectiveness of these interventions. This involves addressing two main questions:

### Question 1

**How effective are community-based 'signs and symptoms' interventions in influencing knowledge, attitudes, beliefs, and help seeking behaviours in:**

a. **The general community?**

b. **Population groups at increased risk of developing lung cancer (e.g. smokers, individuals with low socio-economic status, indigenous communities, rural and remote communities, culturally and linguistically diverse communities)?**

## Question 2

**a. How effective have lung cancer 'signs and symptoms' interventions for health professionals been in influencing knowledge, attitudes, beliefs, and health professional behaviours?**

**b. What are the essential components of lung cancer 'signs and symptoms' interventions for health professionals that have been effective?**

In order to address these questions, we reviewed available academic and grey literature on lung cancer 'signs and symptoms' interventions from Australia and OECD countries with similar healthcare settings, particularly the UK, New Zealand and Canada. This rapid review involves providing:

1. An overview of available interventions and their characteristics

2. A summary of the evidence of the effectiveness of these interventions

3. An assessment of the quality of evidence for these interventions

4. An indication of the factors influencing the success of these interventions (e.g. barriers and enablers)

5. Recommendations that can be used to develop similar interventions in NSW.

The effectiveness of these interventions is assessed in relation to the extent of:

- Improvements in knowledge, attitudes and/or beliefs about lung cancer signs and symptoms. Within this context, knowledge about cancer and its treatment is broadly defined to include knowledge about causes, risk factors, incidence, detection, survival rates, treatment options, and effectiveness of early detection

- Increases in rates of early signs and symptoms recognition

- Increases in rates of contact with healthcare professionals regarding signs and symptoms.

It is noted that although several 'signs and symptoms' interventions have been implemented in these countries, evaluation data are very limited. Therefore, reference is also made to 'signs and symptoms' interventions developed for other cancers such as breast cancer, colorectal cancer, and prostate cancer. Evaluation of these interventions will be useful in informing the recommendations for future lung cancer interventions.

# 2 Methods

## Literature review

In order to address Questions One and Two, we reviewed recent (i.e. 2002–2012) academic literature and grey literature to identify lung cancer 'signs and symptoms' interventions and associated evaluation data. The methodology utilised for the literature search is outlined below.

1. *Academic Literature.* A search of relevant academic literature published between 2002 and 2012 was conducted in the search engines Web of Knowledge (encompasses Web of Science, Medline etc), Cochrane, Scopus, and Psycinfo using the following key words:

   - 'lung cancer'

   - AND

   - aware* OR prevent* OR cough OR breathlessness OR breath*

   - AND

   - campaign* OR program* OR intervention*.

   The reference lists of identified articles were scanned for any additional relevant publications that were not identified through the review.

2. *Grey Literature.* The following websites from Australia, New Zealand, the UK, and Canada were searched for relevant lung cancer 'signs and symptoms' interventions.

   - Australian Department of Health and Ageing

   - Australian state government health departments (e.g. NSW Ministry of Health, VicHealth, SA Health, WA Health, Department of Health of the Northern Territory, Queensland Health

   - Cancer Institute NSW

   - Cancer Council NSW

   - National Health Service (NHS) UK

   - Cancer Research UK

   - Canada Health

   - Canadian Cancer Society

   - NZ Ministry of Health.

A Google search was also conducted using the search terms for the academic literature search in an attempt to identify other lung cancer 'signs and symptoms' interventions, not reported in either body of literature.

Identified interventions were reviewed to derive information on:

- The characteristics of the intervention (e.g. description of the intervention, formative research, target groups, communication strategy, theoretical framework)

- The evidence of the effectiveness of these interventions

- An assessment of the quality of evidence for these interventions

- Factors influencing the success of these interventions (e.g. barriers and enablers).

## *Methods for assessing the quality of evidence*

One of the aims of this rapid review was to assess the quality of evidence regarding the effectiveness of 'signs and symptoms' interventions. In this review, the quality of data used to evaluate these interventions was determined using the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) guidelines (Guyatt et al. 2011). This is a system for rating the quality of evidence for published articles that are included in systematic reviews.

More detail on this rating system is provided in Appendix A. However, in brief, this is a rating system that assesses the quality of evidence from observational studies and RCTs against a number of criteria (e.g. study design, imprecision, bias). Use of this rating system generates a quality of evidence score for a given study ranging from very low quality to very high quality. The four quality levels are described briefly.

- **High quality** – very confident that the estimated effects are close to the true effects
- **Moderate quality** – moderately confident that the estimated effects are close to the true effects
- **Low quality** – there is only limited confidence in the estimated effect
- **Very low quality** – there is very little confidence in the estimated effect.

# 3 Results

## *Overview of lung cancer 'signs and symptoms' interventions*

The review of the academic and grey literature identified eight interventions that made some reference to lung cancer signs and symptoms. One of these interventions was published in the academic literature – 'I'll tackle it soon' (Athey et al. 2011). The remaining seven interventions were identified through grey literature: '3 Week Cough' (UK), 'Be Clear on Cancer', 'Cough, Cough, Cough', 'The Sooner the Better', 'The Australian Lung Foundation' (various programs), 'Find Cancer Early', and 'Detect Cancer Early'.

Furthermore, we identified three interventions that made some reference to lung cancer signs and symptoms: 'Cough On' (Canadian Lung Association), '3 week Cough' (NZ), and the National Tobacco Campaign (Australia). These interventions were not included in the final list given that they did not directly link signs and symptoms with lung cancer and/or did not specifically have a relevant behavioural/attitudinal outcome (e.g. increase visits to a healthcare professional).

Appendix B summarises the eight lung cancer 'signs and symptoms' interventions that were included in this review. The key characteristics of these interventions are described below.

### 1. Goals of the intervention

As shown in Appendix B, the primary goal of all eight interventions was to raise awareness of the signs and symptoms of lung cancer, and increase help seeking behaviour (often measured in terms of the number of visits to the GP or other relevant healthcare professional). All of the interventions targeted a persistent cough, typically lasting for 3 weeks or more. However, other signs and symptoms of lung cancer were not targeted by these interventions. The only exception was 'Be Clear on Cancer' which also aimed to raise awareness of other lung cancer signs and symptoms such as coughing up blood, breathlessness, fatigue, and chest/shoulder pain.

There may be some advantage in targeting only a limited number of lung cancer signs and symptoms. For example, research suggests that communication interventions are more effective when the messages are simple. However, focusing on a single sign and symptom (persistent cough) is a potential limitation of these interventions given that recognition of other symptoms could also be very important. Therefore, future lung cancer 'signs and symptoms' interventions may benefit from focusing on more than one symptom. These could include coughing up blood, breathlessness, fatigue, and chest/shoulder pain, which were also publicised in the 'Be Clear on Cancer' campaign.

### 2. Formative research

Only three of the eight interventions reported that they had conducted any formative research. It is possible that the remaining interventions did conduct formative research but did not report that they had done so. Hence, this review is only able to discuss formative research in relation to the three interventions where this is reported.

The 'I'll tackle it soon' intervention run by the NHS was informed by focus groups with members of the community and consultations with relevant health professionals. The current 'Be Clear on Cancer' intervention also run by the NHS has been based on extensive formative research. This has included focus groups, as well as pilot testing in several smaller communities in the UK to test feasibility. New Zealand's 'The sooner the better' intervention, run in the northern regions of the country, was also informed by extensive formative research. This included focus groups with members of the community and consultations with clinicians and researchers.

The remaining five interventions did not report whether formative research was conducted. This may be a key limitation because formative research is considered important in ensuring that the messages are being tailored appropriately to the target population. For example, it can provide insight into what moves and motivates target populations, and how they might be reached and influenced through awareness raising interventions. Pilot testing of messages and communications with the target population is also useful to test the suitability and effectiveness of intervention materials prior to launch. Therefore, it is recommended that any future intervention is formulated on the basis of extensive formative research and pilot testing.

### 3. Target Groups

The eight interventions differed in regards to the groups that were targeted. One intervention ('Cough, cough, cough') had no clear target group. Five interventions were targeted towards middle aged adults ('3 Week Cough' and 'I'll tackle it soon' were targeted at adults aged 50 years and over, 'Be Clear on Cancer ' targeted at adults aged 55 years and over, 'The sooner the better' Maori and Pacific Islanders aged 45-64 years, and 'Find Cancer Early' targeted adults aged 40 years and over. In addition, the 'Be Clear on Cancer' and 'I'll tackle it soon' interventions were also targeted towards individuals with lower socio-economic status. 'The sooner the better' intervention is the only intervention we identified that is targeted towards a specific ethnic group (Maori and Pacific Islanders). The 'I'll Tackle it Soon' and 'Cough, cough, cough' interventions reported that they also specifically targeted smokers. However, it should be acknowledged that the majority of interventions targeted at risk populations in locations in which smoking prevalence is high. The 'I'll Tackle it Soon' intervention specifically did not mention cancer or make reference to smoking to overcome barriers relating to fatalism about lung cancer and stigma attached to smoking (Athey et al. 2011).

Segmentation and targeting of particular population groups is an important component of effective awareness raising and health behaviour change interventions (Stead et al. 2007). This is because various groups may have different attitudes, beliefs and behaviours, and hence may respond different to messages and cues to action. Therefore, future lung cancer 'signs and symptoms' interventions should include segmentation and targeting of different population groups informed by the insights from formative research with the relevant audience. Importantly, a more sophisticated segmentation approach with consideration for segmenting target groups according to psychographic variables (e.g. attitudes, beliefs) as well as demographic variables (particularly socio-economic status and CALD) should be adopted in lung cancer 'signs and symptoms' interventions. Interestingly, the current review found no direct evidence of psychographic segmentation in the available literature; it is possible that this was examined in some interventions but has not been published.

### 4. Theory

None of the interventions were reported to have been informed by relevant theory. Consistent with the discussion surrounding formative research and psychographic segmentation, it is possible that at least some of the interventions did use theoretical frameworks but did not report this information. This is a common occurrence in many health interventions, whereby relevant theories are used but are not reported in academic or grey literature.

Use of relevant theories such as the Theory of Planned Behaviour and the Health Belief Model is important as it provides a useful framework for understanding health behaviours such as seeking help from a health professional (Glanz et al. 2008). As noted in more detail below, 'signs and symptoms' interventions that have been developed for other cancers have used frameworks such as social cognitive theory (Bandura, 1988) to inform messages and materials. We recommend that future lung cancer 'signs and symptoms' interventions also incorporate relevant behaviour theories.

## 5. Communication Strategy

Most of the interventions delivered messages through a variety of media including:

- Face-to-face events such as road-shows in public venues such as shopping centres featuring media personalities, information and campaign materials (e.g. 'Be Clear on Cancer') linked in with existing events such as fetes, sports activity and open days

- Radio and television advertising

- Posters and Billboards

- Online through campaign and relevant stakeholder's websites, and social media such as e-bulletins, e-newsletters, Twitter feeds, Facebook pages, and articles disseminated on social media sites (e.g. 'Be Clear on Cancer' and '3 Week Cough')

- Leaflets.

The most comprehensive communication strategy has been adopted by the 'Be Clear on Cancer' intervention which, as a national campaign, uses multiple communication channels on a large scale. Other interventions implemented on a smaller scale utilised less expensive media such as newspaper articles, leaflets, and online information. Unfortunately, this level of detailed information is not included in the publications identified in the review. Exploratory research and pre-testing should be able to propose/identify suitable channels of communication with the target audience(s).

## 6. Outcomes

One of the major limitations of the existing literature is that there is a lack of evaluation data examining effectiveness of lung cancer 'signs and symptoms' interventions.  Only two of the lung cancer 'signs and symptoms' interventions have corresponding evaluation data – 'I'll tackle it soon' and '3 Week Cough' – of which only the results of 'I'll tackle it soon', have been published in peer reviewed literature (Athey et al. 2011). Both interventions were linked, as they were administered under the NHS framework, and learning from these interventions was used to develop the national 'Be Clear on Cancer' intervention.

'I'll tackle it soon' was a community based social marketing intervention to raise awareness of lung cancer signs and symptoms, and increase presentations for healthcare (Athey et al. 2011). Social marketing is defined as the "the systematic application of marketing, alongside other concepts and techniques, to achieve specific behavioural goals for a social good" (French and Blair-Stevens 2007). The intervention was conducted among six at-risk communities with high levels of smoking prevalence, and low socio-economic status in Doncaster, England during 2008. The main target group was males aged over 50 who had ever smoked and worked in heavy industry, and their family members. It featured core social marketing intervention criteria including customer orientation and insight generated through formative research, segmentation and targeting, addressing the competition (e.g. barriers to the desired behaviour), and use of the marketing communications mix. Formative research identified a number of issues and barriers to awareness of, and presentation to a health worker in relation to, lung cancer signs and symptoms. These included a lack of clarity and understanding of symptom experience, a lack of knowledge of lung cancer signs and symptoms, and fear including a lack of knowledge of treatments and fatalistic beliefs. Blame and stigma attached to smoking were also powerful influences. Cultural factors such as stoicism, and an unwillingness to complain, waste time or use healthcare resources unnecessarily, were also identified. The formative research also revealed that the role families played could be crucial in overcoming delays in recognising signs and symptoms and presenting for assessment and treatment.

Exploratory research for 'I'll Tackle it Soon' also identified that there were concerns among primary caregivers over becoming overloaded with referrals, the risks associated with x-rays, and

confusion over when to re-refer if an x-ray was normal but symptoms persisted. Furthermore, in the secondary care setting there was concern over capacity in radiology and along the lung cancer pathway (Tod et al. 2008).

The intervention was designed and delivered to account for the insights generated from the formative research. The project aimed to increase the number of symptomatic patients presenting at GP surgeries and to increase x-ray referrals by 20%. Two complementary interventions were developed, with a push-pull approach being utilised. The present element included a public awareness media campaign, media and public relations activities such as face-to-face events and conversations focusing on raising awareness of the importance of seeking help and advice for a cough lasting more than three weeks.

A three week cough was selected as the focus due to evidence suggesting it may be associated with a better prognosis and to ensure simplicity of the message. In addition, focusing on this symptom is useful because if the cough is not a sign of cancer (or another serious disease) then it would normally resolve with antibiotics within three weeks. Intervention messages informed by the formative research did not specifically mention cancer, or smoking, addressing barriers to help seeking behaviour. The pull element of the intervention included brief intervention training to prepare healthcare workers for the intervention and reassure them of capacity in the system. Extensive training was conducted with community pharmacists, GP practices and other healthcare workers involved in the lung cancer pathway.

The evaluation data indicated that 21% of the target population (128/600) recalled the intervention. Compared with a respondent in the control area, a participant in the intervention area was 1.97 times more likely to indicate they would visit their general practitioner and request a chest x-ray for a cough. Primary care chest x-ray referral rates increased by 20% in the targeted practices in the year following the intervention compared with a 2% fall in the control practices; this difference was statistically significant. There was a 27% increase in lung cancer diagnoses in the intervention area compared with a fall in the control area. Evaluation of the intervention did not report data regarding the effectiveness of the intervention on attitudes, beliefs, or knowledge regarding lung cancer signs and symptoms.

The second intervention for which we identified evaluation data was the '3 Week Cough' intervention, which was a five week pilot study to increase awareness of lung cancer signs and symptoms conducted in the Midlands of England in 2011. The intervention was targeted at adults aged 50 years and over. The intervention aimed to increase visits to a GP among the target population when aware of suspected signs and symptoms of lung cancer. Although formative research was not reported in the literature, the intervention was linked to the previous 'I'll tackle it soon' study in Doncaster, and could therefore be assumed to use learning and insights from it. The intervention featured a mass media campaign using television and radio advertising, posters in GP surgeries, and face-to-face events in the community. This involved brief intervention training of health professionals, community pharmacists, community development workers, and cancer information workers; as well as community influencers such as community leaders, community champions and volunteers, who were tasked with having conversations about a 3 week cough with the target audience and advise people how to act.

It was not reported whether the intervention utilised behavioural theory. Evaluation of the intervention found that it was responsible for a 23% increase in GP attendances for patients with a cough or suspected of having lung cancer.

Data identifying factors influencing the effectiveness of these interventions were not reported. Furthermore, it is not clear whether these interventions were more or less effective in CALD communities or among individuals from different socio-economic backgrounds.

## *'Signs and symptoms' interventions – breast, colorectal, and prostate cancer*

Given the lack of evidence regarding lung cancer 'signs and symptoms' interventions and accompanying evaluation data, we supplemented the review by conducting additional literature searches to identify published 'signs and symptoms' interventions for:

- Breast cancer

- Colorectal cancer

- Prostate cancer.

## Search strategy

A search was conducted for relevant academic review articles published between 2002 and 2012 in the search engines Web of Knowledge (encompasses Web of Science, Medline etc), Cochrane, Scopus, and Psycinfo using key words such as:

- 'breast cancer' OR 'bowel cancer' OR 'colorectal cancer' OR 'colon cancer' OR 'prostate cancer'

- AND

- aware* OR prevent* OR signs OR symptoms

- AND

- campaign* OR program* OR intervention*.

From these searches we identified one relevant systematic review of interventions to promote cancer awareness and early presentation (Austoker et al. 2009), which included evaluation of four breast cancer interventions (Rimer et al. 2002; Skinner et al. 2000; Catalano et al. 2003 and Gabram et al. 2008). We also identified one further breast cancer intervention with a signs and symptoms component (Linsell et al. 2009). Therefore, a total of five breast cancer interventions were included in the review.

We identified four colorectal cancer interventions featuring a signs and symptoms component for inclusion in the review: 'Be Clear on Cancer', 'Screen for Life' (Jorgensen et al. 2001), 'West of Scotland Cancer Awareness Project' (WoSCAP) (Eadie and MacAskill 2002, 2008) and a colorectal cancer intervention developed by Broadwater et al. (2004).

In addition, we identified two interventions for prostate cancer which featured a signs and symptoms component: Lyzun and McMullen (2008), and Ilic et al. (2007).

In summary, from these additional searches we identified 11 interventions, five breast cancer, four colorectal cancer, and two prostate cancer interventions containing a signs and symptoms component, the results of which are presented in Appendix C.

Rather than reviewing all of these interventions in detail, we present a rapid review of key features pertaining to breast, colorectal and prostate cancer interventions with a signs and symptoms component for which published evaluation data are available.

### 1. Behaviour change goal

The behaviour change goals varied between the interventions, which is not surprising given that the aims and scope of these interventions were also quite different. Six of the 11 interventions were targeted towards increasing health seeking behaviours. In particular, four interventions

aimed to increase the number of visits to a healthcare professional (e.g. a GP) for symptoms associated with the relevant cancer. Two of the interventions aimed to increase screening behaviours (e.g. mammography). Another common goal of these interventions was to increase awareness of cancer (including signs and symptoms); this was reported in five of the 11 interventions. The other interventions had goals such as increasing the rates of detection (3/11 interventions).

## 2. Formative research

Nine of the 11 interventions indicated that they had performed some formative research; this varied from a simple literature review to in-depth consultations with relevant stakeholders and testing of intervention materials.

Formative research indicated that awareness of cancer signs and symptoms is low, particularly in low socio-economic or CALD communities (e.g. Eadie and MacAskill 2002). Furthermore, concerns about embarrassment, putting unnecessary strain on the healthcare system, and fatalistic beliefs about cancer can act as barriers to action by target populations. Interventions that conducted extensive formative research with the target audience enabled segmentation and targeting strategies to be deployed (e.g. Rimer et al. 2002). This provided tailored print materials and telephone counselling to participants based on data from a baseline telephone interview. Therefore, formative research can often be vital in generating insight on the target audience's knowledge, attitudes and behaviours, identifying barriers to behaviour change, and exploring themes that can inform intervention messages and materials. Interventions that are able to take a more sophisticated segmentation and targeting approach, beyond simple demographic breakdowns and involving psychographic segmentation, have also been shown to be effective (Jones et al 2010).

## 3. Target Groups

The specific groups targeted in these interventions varied quite considerably. This is not surprising given the different target cancers (e.g. prostate versus breast cancer) and the intervention settings. Despite these variations, a key finding is that the majority of these interventions clearly identified a target group. For example, several of the interventions identified groups on the basis of age, particularly middle aged and older adults; socio-economic status, predominantly low socio-economic groups (Mayden Research 2012); ethnicity such as African-American women (Gabram et al. 2008); and/or geography, a specific city or region such as the West of Scotland (Eadie and MacAskill 2002).

## 4. Theory

Five of the 11 'other cancer' interventions identified made use of behavioural theories. The relevant theories are briefly outlined below.

One intervention (Rimer et al. 2002) used the Transtheoretical Model (Prochaska and DiClemente 2005). This model proposes the following five stages of change that need to be negotiated when trying to encourage a new health behaviour:

1. Pre-contemplation: People are not intending to take action for the foreseeable future

2. Contemplation: People are intending to take action in the next six months

3. Preparation: People are intending to take action in the immediate future

4. Action: People have made changes to their lifestyles in the past six months

5. Maintenance: People are trying to prevent relapse to previous behaviour(s).

The theory also proposes a termination stage, whereby a person has fully adopted the new behaviour and will not return to the old behaviour. However, this is a theoretical concept, since very few people will ever reach this stage.

The WoSCAP utilised Social Cognitive Theory (Bandura 1988), to inform their intervention. This model proposes that individuals learn behaviour through their interactions with other people in their social network and by observing other people (e.g. people on television). Observing these 'models' can influence an individual's attitudes regarding a behaviour, which can translate into changes in behaviour. Social Cognitive Theory also incorporates psychological constructs such as self-efficacy and outcome expectancies, which also influence the adoption of behaviours.

Skinner et al. (2000) used a combination of Social Cognitive Theory and the Health Belief Model (see Rosenstock 1966); the latter is a psychological model used to predict health behaviours. The model is based on four constructs of the core beliefs of individuals, based upon their perceptions.

1. Perceived susceptibility (a person's view on their risk of getting the condition)

2. Perceived severity (a person's view of the seriousness of the condition and the consequences)

3. Perceived barriers (a person's view of the factors that facilitate or discourage adopting the promoted behaviour)

4. Perceived benefits (a person's view of the positive consequences of adopting the behaviour).

The Screen for Life intervention used a combination of Social Cognitive Theory and the Theory of Planned Behaviour (Ajzen 1991). The Theory of Planned Behaviour is a widely used theory to understand and predict behaviour across of variety of domains. The model proposes that an individual's behaviour is the result of:

1. The individual's attitude towards the behaviour

2. The individual's perceptions of how other people (e.g. friends, family, work colleagues etc) feel about the behaviour (subjective norms)

3. How confident the individual feels about engaging in the behaviour (perceived behavioural control)

4. Intentions to engage in the behaviour.

One intervention (Linsell et al. 2009) used a theoretical model developed by Bish et al. (2005). This theoretical model aimed to understand some of the factors that influence help seeking behaviours in the context of breast cancer symptoms. The authors developed a model whereby they attempted to explain how attitudes, intentions, and knowledge of symptoms interacted to influence help seeking behaviours.

## 5. Communication strategy

The communication strategies adopted by the interventions also varied considerably depending on the scope of the intervention, the target groups, and the target cancer. For example, the Australian intervention tested by Ilic et al. (2007) involved distributing educational materials to male patients attending a medical centre. In contrast, other interventions such as 'Be Clear on Cancer', the WoSCAP, and 'Screen for Life' utilised a variety of communication channels that aimed to reach a variety of audiences including the target group, friends and family, pharmacies, and a variety of healthcare workers involved in the cancer treatment pathway including GPs, consultants, nurse specialists and radiographers. For example, in support of the 'Be Clear on Cancer' intervention, Bowel Cancer UK and the Royal College of General Practitioners

(RCGP) developed a new bowel cancer resource pack which was sent to GPs across the two regions in which the intervention was piloted.

Communication strategies identified in the interventions identified included:

- Television and radio advertising

- Posters

- Public relations events

- Brochures and fact sheets

- Training of healthcare workers

- Stakeholder engagement

- Peer educators

- Websites

- Physical products – e.g. testing kits.

## 6. Outcomes

In general, most of the interventions had positive outcomes. Several of the interventions led to significant improvements in knowledge and awareness of cancer signs and symptoms. For example, the 'Be Clear on Cancer' intervention which was aimed towards colorectal cancer led to an approximate 50% increase in awareness of symptoms (e.g. 'blood in poo').

Several of the interventions also led to significant increases in cancer screening behaviour. 'Learn, Share and Live' led to an increase in the percentage of women who indicated that they had recently been screened for breast cancer (from 40% to 68%). 'Screen for Life' was associated with a 19.3% increase in screening rates for colorectal cancer between 2002 and 2008; there was also evidence for increases in visits to healthcare professionals. 'Be Clear on Cancer' led to a 48% increase in GP visits for colorectal cancer signs and symptoms.

Unfortunately, the quality of the evaluation data was generally low. Four of the interventions had a high level of quality, whereas six had low quality and one had very low quality. Therefore, although these interventions generally had positive effects on the outcome measures these need to be interpreted with caution.  In particular, there is a need for more rigorous research designs (e.g. RCTs or well-developed observational studies) to better determine the effectiveness of these interventions. Furthermore, as per the lung cancer 'signs and symptoms' interventions, evaluation data did not identify factors that influenced the effectiveness of these interventions, or whether effectiveness varied according to socio-economic or CALD status.

# 4 Discussion

This rapid review was conducted to identify lung cancer 'signs and symptoms' interventions from Australia, New Zealand, Canada, and the UK. There were two main findings from this review. First, there are few very 'signs and symptoms' interventions for lung cancer that have been developed and trialled in these countries. All eight interventions identified were targeted specifically towards members of the general community (Question 1) and only contained components targeted towards health professionals – 'I'll tackle it soon' – (Question 2), which aimed to increase awareness of, and preparedness for, the intervention amongst health professionals. Training also reassured healthcare workers that there was sufficient capacity in the system to deal with increases in presentation and treatment. Second, evaluation data for these interventions are very scarce. For example, of the eight relevant interventions identified, only two had evaluation data. Furthermore, the data were published for only one of these interventions ('It'll go soon') and the quality of the evidence was low.

The lack of data for lung cancer 'signs and symptoms' interventions led to an expansion of the literature search to also include other cancers such as breast, colorectal, bowel, and prostate cancer. Although evaluation data were available for several of these interventions, the evidence base remains limited. Therefore, although this rapid review does attempt to provide recommendations for the development of future lung cancer 'signs and symptoms' interventions within the NSW context, it is emphasised that these are based on very limited data. Therefore, the recommendations and conclusions should be treated with caution, and we would strongly encourage any future interventions to utilise formative research with the target audiences to inform their design and implementation.

We are able to draw the following conclusions based on available data:

## Question 1

**How effective are community-based 'signs and symptoms' interventions in influencing knowledge, attitudes, beliefs, and help seeking behaviours in:**

a. **The general community?**

b. **Population groups at increased risk of developing lung cancer (e.g. individuals with low socio-economic status, indigenous communities, rural and remote communities, CALD)?**

'Signs and symptoms' interventions may be effective influencing knowledge, attitudes, beliefs and help seeking behaviours (e.g. seeking help from a GP, screening behaviours). However the evidence base is limited, especially in relation to lung cancer, with some limited evidence from other cancer interventions suggesting a positive effect. Further published intervention studies are required to build the evidence base in this regard.

There is very limited evidence (whether published in academic journals or reported in grey literature) regarding the effectiveness of lung cancer 'signs and symptoms' interventions targeted towards at risk population groups. There is reasonable evidence to suggest that 'signs and symptoms' interventions for other cancers can increase levels of knowledge, attitudes, beliefs, and help seeking behaviour among low socio-economic groups. There is limited evidence that such interventions can increase levels of health seeking behaviour among CALD communities (e.g. African America women), however there is a paucity of published research. Unfortunately, there are insufficient data to identify factors affecting the effectiveness of interventions targeting rural and remote communities, and the majority of interventions included in the review were in urban or suburban environments.

Further exploratory research is required to investigate knowledge, attitudes, behaviours, and barriers in relation to awareness of lung cancer signs and symptoms and cues to action. Some of these barriers may include: lack of clarity and understanding of symptoms experience, lack of knowledge of lung cancer signs and symptoms, fear including a lack of knowledge of treatments and fatalistic beliefs. Stigma and cultural influences including stoicism, an unwillingness to complain, waste time or use healthcare resources unnecessarily may also be additional barriers.

Families and significant others could also be crucial in overcoming delays in recognising signs and symptoms and presenting for assessment and treatment (Athey et al. 2011).

Several cancer interventions included in the review utilised a social marketing approach to behaviour change including 'I'll tackle it soon', WoSCAP, 'Detect Cancer Early' and 'Prostate Man'. Furthermore, other interventions such as 'Be Clear on Cancer' used social marketing principles such as using formative research to gain insight, and taking a consumer (patient) oriented approach to behaviour change, but were not explicitly described as social marketing. It is likely that 'Be Clear on Cancer' is not overtly described as social marketing due to the change in UK Government in 2010 and the interest in 'Nudge Theory' (or 'Behavioural Economics') which is favoured by the government. This has led to less visible support for social marketing from policy makers.

## Question 2.

a. **How effective have lung cancer 'signs and symptoms' interventions/campaigns for health professionals been in influencing knowledge, attitudes, beliefs, and health professional behaviours?**

b. **What are the essential components of lung cancer 'signs and symptoms' interventions/campaigns for health professionals that have been effective?**

There is insufficient evidence to make any conclusions regarding interventions targeted towards health professionals. Increasing awareness among healthcare workers and addressing concerns over capacity and protocol for x-rays and treatment were components of the 'I'll tackle it soon' intervention. However, outcome evaluation from this intervention did not measure any impact on knowledge, attitudes, beliefs and health professional behaviours.

Interventions for other cancers such as WoSCAP successfully engaged a range of stakeholders in the process of delivering the intervention which appear to contribute to its success. Process evaluation of WoSCAP (Cancer Research UK 2007) outlines how an internal social marketing approach (see Smith and O'Sullivan 2012) was effective at co-opting over 45,000 healthcare workers including clinicians, GPs, pharmacists, NHS management, public health consultants and health promotion staff across the region.

With respect to question 2b, formative research that informed the development of the 'I'll tackle it soon' intervention (see Suckling 2010) identified that there were concerns among healthcare workers on the implications of running a lung cancer signs and symptoms awareness intervention. There were concerns over becoming overloaded with referrals, over the risks associated with x-rays and radiation exposure, and there was confusion over when to re-refer a patient if an x-ray was normal but their symptoms persisted. In addition, there were concerns over capacity in radiology, and more generally along the lung cancer pathway (Tod et al. 2008). The 'I'll tackle it soon' intervention addressed these issues through awareness raising and training with healthcare workers. Therefore, from this limited evidence, it could be suggested that future interventions should investigate whether similar concerns, and ways of addressing them, are present.

# 5 Gaps in the literature

As discussed earlier, further research is required to generate greater understanding and insight on the issues, influences on, and barriers in relation to awareness of lung cancer signs and symptoms and presentation for advice and help. Currently, there is little published formative research with at risk populations regarding lung cancer, and their awareness of signs and symptoms of the disease. Indeed, the entire area of lung cancer 'signs and symptoms' awareness raising interventions is relatively new, with further evidence likely to become available in the coming months and years. Additional studies which conduct exploratory research will contribute considerably to the evidence base.

In addition, there is little in the extant literature regarding the segmentation of target populations according to psychographic variables. Existing interventions do not appear to have made judicious use of behavioural theory to inform development and implementation. Furthermore, there is evidence from other cancer interventions that using theory is useful for informing intervention messages and materials.

The majority of data currently available is from the UK, therefore interventions in other countries would be useful to build the evidence base, and assess the effectiveness of lung cancer 'signs and symptoms' interventions in other domains. There is also little evaluation data currently available in this area, and little to none on process evaluation and cost effectiveness. Therefore, future interventions that include a comprehensive evaluation framework providing data on process, outcomes and cost effectiveness would be helpful.

# 6 Recommendations

The following recommendations are made based on the findings of the review, to inform the development of lung cancer 'signs and symptoms' interventions in NSW.

1. Interventions should be based on rigorous formative research with target population groups and stakeholders to generate understanding and useful insights regarding knowledge, attitudes, and behaviours, and to explore issues, influences and barriers to increasing awareness and changing behaviour

2. Segmentation of target populations – beyond simple demographic based approaches but using formative research to identify psychographic audience segments will enable targeted and tailored intervention messages and communication channels and materials to be used

3. Capacity building and training with relevant stakeholders such as community members and healthcare professionals can be helpful to alleviate concerns over resources and build support for intervention aims and objectives

4. Future interventions would benefit from the use of relevant theories to help identify relevant factors influencing behaviour, and to develop strategies to change behaviours

5. There is a need to develop and test interventions targeting specific at-risk groups

6. Evaluation research models which include process, and cost effectiveness, as well as outcome evaluation data, should be built in at the start of future interventions, as existing interventions do not report these data

7. Social marketing offers a comprehensive and strategic framework for incorporating the aforementioned recommendations, and has been demonstrated to be an effective approach for colorectal cancer (Cancer Research UK 2007), and more widely for population health behaviour change interventions (Stead et al. 2007). In addition, utilising an internal social marketing approach—the application of internal marketing for the achievement of social rather than commercial objectives (Smith 2011), to engage relevant stakeholders in the healthcare sector can overcome barriers such as concerns over capacity and support in the system; and issues over procedures and protocols

8. There is also a need to work with a range of agencies to expand the knowledge base surrounding lung cancer signs and symptoms.

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# Appendix A. Quality grading

The Grading of Recommendations Assessment, Development, and Evaluation (GRADE) guidelines (Guyatt et al. 2011). This is a system for rating the quality of evidence in systematic reviews and takes into account:

1. **Study design** – randomised controlled trials receive a higher initial quality score compared with observational studies

2. **Risk of Bias** – there can be a risk of misleading results if the study design or conduct is flawed (e.g. poorly developed eligibility criteria, failure to control for confounding)

3. **Imprecision** – optimal approach to imprecision is the examination of the 95% confidence interval (CI). CI informs the impact of random error on the evidence quality

4. **Inconsistency** – a body of evidence is not rated up in quality if studies yield consistent results but may be rated down in quality if inconsistent

5. **Indirectness** – evidence can be indirect in 4 ways. Patients may differ from those of interest, tested intervention may differ from intervention of interest, outcomes (or 'surrogate outcomes') differ from those of primary interest and when clinicians must choose between interventions. When there is no head to head comparison of the study, the quality of evidence decreases as the use of indirect comparison is needed. Rating down occurs when there is a large discrepancy between these 4 points of indirectness

6. **Publication bias** – even if individual studies are perfectly designed and executed, synthesis of studies may provide biased estimates. This is partly since there may be a bias in journals publishing negative or no results (eg. overestimating effect size)

7. **Rating up the quality of evidence** – most common reason is evidence of a large effect. Rate up 1 level if study shows at least a 2-fold reduction or increase in risk, and rate up 2 levels for at least a 5-fold reduction or increase in risk. Consider rating up if a systematic review shows evidence of a dose response gradient. Need to consider other criteria for rating down quality of evidence before employing this concept though.

# Appendix B. Lung cancer interventions with a 'signs and symptoms' component

| Campaign | Country and Year | Description of Campaign | Campaign Characteristics | Results |
|---|---|---|---|---|
| *I'll tackle it soon* (NHS)<br><br>Athey et al. 2011.<br><br>Tod et al. 2008. | UK, 2008 | This was a pilot awareness raising campaign implemented in Doncaster (UK) in early 2008. The campaign involved two complementary components. The push element involved a public awareness campaign that focused on raising awareness of the importance of seeking medical advice and requesting a chest x-ray for a cough lasting more than 3 weeks. The pull aspect involved brief interventions to prepare healthcare professionals for the intervention and to assure them that there was sufficient capacity to deal with the increased referrals. | 1. Behaviour Change Goal: increase visits to GP and x-ray referrals<br><br>2. Formative Research: Focus groups, consultations with health professionals<br><br>3. Target Groups: six at risk communities with high smoking rates and low socio-economic status in Doncaster, England. Specifically targeted at men over 50 years who had ever been smokers and worked in heavy industry and their family members<br><br>4. Theory: not reported but did use the five elements model of strategic community engagement: grassroots community work, community infrastructure, professional infrastructure, organisation development, and overview and coordination<br><br>5. Communication Strategy: utilised a range of media such as newspapers, leaflets, radio, and billboards, face-to-face events, and conversations. | 20% increase in chest x-rays.<br><br>Significant increase in GP visits.<br><br>27% increase in lung cancer diagnoses.<br><br>Quality of evidence: Low (controlled trial – no randomisation). |
| *3 Week Cough* (NHS)<br><br>Suckling 2010.<br><br>Elliott & Stacey 2010. | UK, 2011 | Five week pilot campaign trialled in the Midlands (UK) in 2011. The campaign aimed to increase awareness of lung cancer signs and symptoms. | 1. Behaviour Change Goal: increase help seeking behaviour (e.g. increased presentations to a GP)<br><br>2. Formative Research: not reported<br><br>3. Target Groups: Adults aged 50 years and over<br><br>4. Theory: not reported<br><br>5. Communication Strategy: utilised a range of media including television, radio, out of home advertising (e.g. TV screens in GP surgeries) and face-to-face event. | 23% increase in GP attendances for patients with a cough or suspected of having lung cancer.<br><br>Quality of evidence: low. |

| Campaign | Country and Year | Description of Campaign | Campaign Characteristics | Results |
|---|---|---|---|---|
| *Be Clear on Cancer* (NHS) Freud Communications 2012 | UK, 2012 | This two month campaign is part of a larger national cancer awareness campaign, addressing breast, lung, bowel, and prostate cancer. The key messages of the lung cancer campaign focus on the importance of early detection of lung cancer. It also aims to increase awareness of lung cancer signs and symptoms (e.g. coughing up blood, persistent cough, breathlessness, fatigue, chest/shoulder pain). | 1. Behaviour Change Goal: increase visits to GP<br>2. Formative Research: Informed by pilot studies (e.g. 3 week cough)<br>3. Target Groups: Adults aged 55 years and over, with a focus on individuals from lower socio-economic groups<br>4. Theory: not reported<br>5. Communication Strategy: television, radio, print, online, and social media, with face-to-face events, and national and regional PR activity. Material also developed for GPs to prepare them for the increase in referrals and to gain their support in increasing screening for lung cancer. | Not reported. |
| *Cough, cough, cough* (Midland Cancer Network) http://tinyurl.com/8dpupu2 | NZ, 2010 | Awareness raising campaign aimed at improving the early detection of lung cancer in Rotorua, NZ. This was based on a push-pull model. In the push element, the aim was to encourage individuals (especially smokers) with a persistent cough to see their doctor. In the pull element, health care workers were encouraged to promote the early detection of lung cancer and seek help earlier. | 1. Behaviour Change Goal: increase visits to GP and health professionals<br>2. Formative Research: not reported<br>3. Target Groups: Smokers<br>4. Theory: not reported<br>5. Communication Strategy: There is only very limited information regarding the specific communication strategy adopted in this campaign. However, it appears that the campaign was based on posters and brochure material promoting the importance of seeking help from a health professional in response to a persistent cough. | Not reported. |
| *The sooner the better* (Northern Cancer Network) http://tinyurl.com/9nk2qd8 | NZ, 2010 | Campaign aimed at increasing awareness of lung cancer symptoms in Maori and Pacific populations. The campaign involved outlining the main symptoms of lung cancer (e.g. persistent cough, chest pain, persistent chest infection, coughing up blood). Individuals with these symptoms were encouraged to contact their nurse, doctor, local health worker, or the Healthline phone number. GPs and other health care workers were advised of the program. | 1. Behaviour Change Goal: increase visits to nurse, doctor, local health worker, or Healthline phone number<br>2. Formative Research: focus groups with target audience, and consultations with clinicians and researchers<br>3. Target Groups: Adults aged 45–64 years with Maori and Pacific backgrounds.<br>4. Theory: not reported<br>5. Communication Strategy: this campaign included a combination of radio advertisements and newspaper articles disseminated across specific areas of Northern New Zealand. | Not reported. |

| Campaign | Country and year | Description of Campaign | Campaign Characteristics | Results |
|---|---|---|---|---|
| The Australian Lung Foundation (various campaigns)<br><br>http://www.lungfoundation.com.au/shinealightonlungcancer<br><br>http://www.lungfoundation.com.au/showusyourlungs | Australia, 2011 | The Australian Lung Foundation ran a variety of campaigns to raise awareness of lung cancer in 2011; these coincided with Lung Health Awareness month in 2011 and World COPD day.  These campaigns included 'Lung Cancer Doesn't Discriminate', 'Shine a Light On Lung Cancer', and 'Show us your lungs'. | 1. Behaviour Change Goal: increase lung cancer screening (i.e., increase GP visits)<br><br>2. Formative Research: Not reported<br><br>3. Target Groups: No clear target groups, but appeared to be focused on smokers and individuals exposed to asbestos<br><br>4. Theory: not reported<br><br>5.  Communication Strategy: This varied depending on the campaign.  These included face-to-face events, posters, and online information (through the Australian Lung Foundation website). | Not reported. |
| *Find Cancer Early* Cancer Council WA<br><br>http://tinyurl.com/9w669ep | Australia, year not reported | Two-year campaign aimed at increasing awareness of the signs and symptoms of bowel, lung, prostate, and breast cancer in adults aged 40 years and over in regional WA.  The campaign aimed to increase awareness of the main symptoms, and encourage people to visit their doctor. The lung cancer component focused on the following symptoms: a persistent cough, coughing up blood, breathlessness, repeated chest infections. | 1. Behaviour Change Goal: increase visits to GP<br><br>2. Formative Research: not reported<br><br>3. Target Groups: Adults aged 40 years and over, residing in regional WA<br><br>4. Theory: not reported<br><br>5. Communication Strategy: The communication strategy was primarily based on DVD, posters and brochures which were distributed to members of the community in the target group. | Not reported. |
| *Detect Cancer Early* (NHS)<br><br>Scottish Government 2011. | Scotland, lung cancer component planned for 2013 | A social marketing campaign aimed at overcoming the fear associated with cancer and improving awareness levels of cancer signs and symptoms.  The campaign is targeted at breast, lung, and bowel cancer. | 1. Behaviour Change Goal: increase visits to GP<br><br>2. Formative Research: not reported<br><br>3. Target Groups: not reported<br><br>4. Theory: not reported<br><br>5. Communication Strategy: Detect Cancer Early is a large social marketing campaign that includes a lung cancer component which will begin in 2013. Specific details of the lung cancer component are not yet available. | Not reported. |

# Appendix C. Breast, colorectal and prostate cancer interventions with a signs and symptoms component

| Campaign | Setting and year | Description of Campaign | Campaign Characteristics | Results |
|---|---|---|---|---|
| **Breast Cancer** | | | | |
| Catalano et al. 2003. | USA, data collected from Atlanta, Detroit and San Francisco metropolitan areas from 1985–2002 | Evaluation of the impact of the Breast Cancer Awareness Month programme on awareness of breast cancer symptoms, and screening and detection of breast cancer. Breast Cancer Awareness Month is a national mass media campaign focusing on breast cancer awareness and screening, targeting large populations. The campaign has national and local components, and involves a number of partner stakeholders. | 1. Behaviour Change Goal: No reported outcomes measures for awareness of signs and symptoms of breast cancer – only reports rates of detection of breast tumours<br><br>2. Formative Research: Not reported<br><br>3. Target Groups: not reported – targeted at large populations of females<br><br>4. Theory: not reported<br><br>5. Communication Strategy: National and local media campaign involving PR/media relations, print advertising and TV advertising. | No data reported in relation to signs and symptoms of breast cancer.<br><br>Evaluation reported that during Breast Cancer Awareness month quarters of the year from 1985–2002 approximately 790 more tumours than expected were detected.<br><br>Quality of evidence: High. |
| Gabram et al. 2008. | USA , Atlanta Georgia 2001–2004 | A community outreach and internal navigation programme to improve outcomes in relation to breast cancer among African America women. 125 trained community health advocates (CHAs) provided educational programmes to the community to encourage screening, diagnostic procedures (including recognising signs and symptoms) and treatment. | 1. Behaviour Change Goal: No reported outcome measures for awareness of signs and symptoms of breast cancer – only reports rates of detection of breast cancer<br><br>2. Formative Research: Not reported<br><br>3. Target Groups: African America females in Georgia, Atlanta<br><br>4. Theory: not reported<br><br>5. Communication Strategy: CHAs provided educational sessions in the community encouraging screening, increase breast cancer awareness, teach the importance of self examination and encourage participants to see a trained healthcare provider if any symptoms were found. | No data reported in relation to signs and symptoms of breast cancer.<br><br>487 patients were diagnosed and treated for breast cancer 2001–2004. Since 2001, there were 1148 community interventions by CHAs reaching, >10,000 participants. From 2001–2004 the proportion of stage 0 breast cancers increased from 12.4% to 25.8% and there was a decline in stage IV breast cancers from 16.8% to 9.4%.<br><br>Quality of evidence: Low. |

| Campaign | Setting and Year | Description of Campaign | Campaign Characteristics | Results |
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| **Breast Cancer** | | | | |
| *Promoting Early Presentation* (breast cancer)<br><br>Linsell et al. 2009.<br><br>Forbes et al. 2011. | UK, 2007–2008 | This was a RCT conducted to compare the efficacy of two versions of an intervention to promote early diagnosis of breast cancer. The intervention was targeted towards older females who had received free breast cancer screening as part of the NHS Breast Screening Programme. The intervention was delivered during each patient's final mammogram as part of the programme and aimed to increase awareness of breast cancer signs and symptoms, and encourage females to continue screening. Participants were randomised to one of three conditions: (1) usual care (i.e. recommendation from screening unit receptionist to have regular mammograms); (2) the booklet (information on breast cancer signs and symptoms, and importance of regular screening); (3) booklet plus interaction with radiographer—this reinforced messages in the booklet, with instructions on how to check for signs and symptoms of breast cancer. | 1. Behaviour Change Goal: Breast cancer awareness – measured using a validated questionnaire asking about knowledge of breast cancer symptoms, knowledge of risk of breast cancer, and breast checking behaviour<br><br>2. Formative Research: the intervention was developed on the basis of a pilot trial over a 6 month period<br><br>3. Target Groups: females aged 67–70 years, receiving their final mammogram as part of the NHS Breast Screening Programme<br><br>4. Theory: the intervention was based on a theoretical model developed by Bish et al. (2005) which proposed factors influencing help seeking behaviour for breast cancer. This includes factors such as attitudes, intentions, and knowledge of symptoms<br><br>5. Communication Strategy: depending on the condition; the most extensive communication included a face-to-face component with a radiographer and a booklet provided to each participant, which included information of breast cancer signs and symptoms, and recommendations for future breast cancer screening. | At one and 12 month follow up, patients in the interaction plus booklet condition and booklet alone condition were more breast cancer aware. For example, 33% and 13% of patients in the interaction plus booklet and booklet only conditions were breast cancer aware compared to 4% in the control group.<br><br>These effects were sustained at 12 months and 24 months. At 2 years the PEP intervention increased the proportion who were breast cancer aware compared with usual care (21% vs 6% odds ratio 8.1, 95% CI: 2.7–25.0).<br><br>Quality of Evidence Rating: High. |
| Rimer et al. 2002. | USA, North Carolina, 1997–2000 | RCT to assess the effects of a mammography decision making intervention to increase knowledge about breast cancer and mammography, accuracy of breast cancer risk perceptions, and use of mammography, in which women aged 40–44 years and 50–54 years enrolled in Blue Cross Shield health insurance were randomly assigned to one of three groups: usual care (UC) n=378, tailored print (TP) materials n=374), or tailored print materials plus tailored telephone counselling (TC) n=339. | 1. Behaviour Change Goal: Knowledge about breast cancer and mammography, accuracy of breast cancer risk perceptions, use of mammography<br><br>2. Formative Research: Baseline telephone interviews were conducted to inform the tailoring of intervention materials: printed materials and telephone counselling<br><br>3. Target Groups: 1091 women aged 40–44 years and 50–54 years in North Carolina<br><br>4. Theory: Messages and materials were tailored on variables from the Transtheoretical model (TTM)<br><br>5. Communication Strategy: Tailored booklets mailed to participants in year one containing different messages according to responses given in baseline survey interview and according to TTM. Second tailored print intervention mailed following 12 month follow up | At 12 and 24 months, women who received telephone TP & TC had significantly greater knowledge and more accurate breast cancer risk perceptions - 2.3 times more likely to answer correctly than those in UC, and were 40% more likely to have had mammograms. Women in TP group had significant effects for knowledge and accuracy but were less likely to have had a mammogram.<br><br>Quality of Evidence Rating: High. |

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| **Breast Cancer** | | | | |
| | | | interview was a newsletter designed to reinforce and update the booklet. Following both waves of print interventions, trained counsellors called women in the assigned group to discuss questions and concerns regarding breast cancer and mammography. | |
| *Learn, Share and Live*<br>Skinner et al. 2000.<br>Skinner et al. 1998. | USA, St Louis, Missouri, 1995–1996. | A community based breast cancer education programme entitled Learn, Share & Live, targeted at older urban African American women implemented through an urban social service organisation – System to Assure Elderly Services (STAES). | 1. Behaviour Change Goal: Knowledge of breast cancer and mammography, level of mammography screening<br><br>2. Formative Research: Baseline survey conducted with target population and STAES workers to inform intervention protocol.<br><br>3. Target Groups: 323 Older urban African American women, mean age 73.6 years<br><br>4. Theory: Intervention messages were based on the Health Belief Model and Social Cognitive Theory<br><br>5. Communication Strategy: Steering committee of healthcare & community experts informed intervention design. Trained STAES workers delivered educational training in community. Use of peer to peer networking. Programme brochures and posters. | From baseline to year 2 mean knowledge score of breast cancer among participants increased from 3.4 to 4.1. The percentage of women adherent to screening increased from 40% to 68%.<br><br>Quality of Evidence Rating: High (quasi-experimental, group randomised crossover design). |

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| **Colorectal Cancer** | | | | |
| *Be Clear on Cancer* (bowel cancer component)<br><br>Mayden Research 2011. | UK, 2011 | Seven week campaign that aimed to increase the awareness of signs and symptoms of bowel cancer and encourage people to seek help from their GP if they have had symptoms for ≥ 3 weeks. | 1. Behaviour Change Goal: increased GP visits for signs and symptoms of bowel cancer<br><br>2. Formative Research: The intervention was based on a pilot conducted in one cancer network in 2010<br><br>3. Target Groups: Adults aged over 55 years in lower socio-economic groups and key influencers such as family and friends<br><br>4. Theory: not reported<br><br>5. Communication Strategy: the campaign messages, highlighting the symptoms of blood in stool or looser stool for 3 weeks or more, were disseminated through posters and TV, radio, and newspaper coverage, as well as live events. Materials address barriers to presentation such as belief that they might be wasting time or putting a strain on the health system. Screening kits sent out to people aged 60–69 every two years. Messaging also offered advice on lifestyle behaviour to reduce cancer risk. Information sessions and training conducted with GPs and pharmacies. | Evaluation data were available for 74 practices across three cancer networks in the UK: Mount Vernon, Anglia and Avon, Somerset and Wiltshire.<br><br>Statistically significant increases in the public's unprompted awareness of blood in poo (27% to 42%) and looser poo (10% to 23%).<br><br>There were significant increases (48%) in GP attendances for the three symptoms mentioned in the campaign.<br><br>Quality of Evidence Rating: Low. |
| Broadwater et al. 2004. | US, Utah, 2003 | A colon cancer awareness media campaign to increase public awareness about the importance of early detection and prevention of colon cancer aimed at those over 50 years of age.<br><br>The campaign message was that there are no early warning signs of colon cancer, so adults aged 50 or older are encouraged to contact their doctor to find the appropriate colon cancer screening option. | 1. Behaviour Change Goal: Campaign awareness and recall of messages<br><br>2. Formative Research: Market research through telephone interviews to assess public knowledge, attitudes and behaviour regarding colon cancer. Survey was informed by pilot testing in 23 randomly selected Utah residents. Focus group testing of campaign messages was also conducted<br><br>3. Target Groups: Adults aged 50 years or over in Utah<br><br>4. Theory: Not reported<br><br>5. Communication Strategy: TV, radio & print advertising, public relations, celebrity spokespersons, GP public appearances at road show events, TV broadcasting of a colonoscopy, grassroots efforts through stakeholders: parent-teacher associations, business, physicians, health departments. | 409 respondents completed the colon cancer survey. At baseline only 36% of survey respondents had seen or heard advertising about colon cancer. This increased to 79% after the campaign. Of the 79% that had seen or heard an advert, 85% could recall one of the main campaign messages.<br><br>Quality of Evidence Rating: Low. |
| *Screen for Life*<br><br>Jorgenesen et al. 2001. | US, National Campaign, 1999– | Screen for Life is a national multimedia campaign conducted by the Center for Disease Control and Prevention, to raise awareness about colorectal cancer, and encourage men and | 1. Behaviour Change Goal: Raising awareness of the seriousness of colorectal cancer and encouraging people to speak to a physician about getting screened for colorectal cancer | No data on knowledge or attitudes.<br><br>Process evaluation shows that Screen for Life PSAs have generated |

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| **Colorectal Cancer** | | | | |
| CDC, 2012. | ongoing | women aged 50 or older to speak to their GP about being screened. | 2. Formative Research: Extensive review of communication & behavioural science literature. Key informant interviews, and focus groups with target audiences (74 groups in 30 cities) to explore attitudes and behaviours and test message concepts and materials<br><br>3. Target Groups: Men and women aged 50 years or older, with targeted components aimed at African Americans, Hispanics, Alaska Natives and Medicare beneficiaries<br><br>4. Theory: Formative research process, and campaign messages and materials were based on Social Cognitive Theory, and the Theory of Planned Behaviour<br><br>5. Communication Strategy: TV public service announcements (PSAs), posters, brochures, factsheets, radio PSAs, including materials targeted at specific sub populations (e.g. Hispanics – Spanish language materials). Materials include information on signs & symptoms: blood in or on your stool, pain aches or cramps in your stomach that don't go away, losing weight and you don't know why. | more than 10 billion audience impressions (number of times seen or heard by audience members).<br><br>A National Health Survey indicated overall rates of screening for colorectal cancer among respondents aged 50 or over increased from 53.8% to 64.2% between 2002 and 2008.<br><br>Quality of Evidence: Low. |
| West of Scotland Cancer Awareness Project (WoSCAP)<br><br>Eadie and MacAskill 2002.<br><br>Eadie and MacAskill 2008.<br><br>Cancer Research UK 2007. | UK, West of Scotland, 2004–2005 | This was a social marketing campaign aimed to increase awareness of the signs and symptoms of bowel cancer and encourage those with symptoms to present to a GP. | 1. Behaviour Change Goal: To increase awareness of signs and symptoms of bowel cancer, and to increase rates of presentation to a GP<br><br>2. Formative Research: Extensive formative research with the target audience including focus groups and interviews to identify knowledge, attitudes, behaviours and barriers. Extensive consultations with professional stakeholders was also undertaken to identify issues within the healthcare system<br><br>3. Target Groups: Males and females aged 40–70 in lower socio-economic groups<br><br>4. Theory: the campaign was informed by Social Cognitive Theory, which conceptualises human behaviour as being the result on individual factors (e.g. knowledge) and the environment (e.g. social norms, the physical environment)<br><br>5. Communication Strategy: TV and radio advertising, posters and literature (booklets, leaflets), consultation and support of clinicians and nurse specialists, local implementation teams to facilitate smooth running of the intervention. | Prompted awareness of the campaign reached 71%, awareness of coverage of bowel cancer in the media increased from 39% at baseline to 68% at follow up. Awareness of bleeding as a symptom increased from 62% to 71% and awareness of blood in motions almost doubled from 15% to 29%. An approximate 10% increase in referrals from GPs occurred due to the campaign.<br><br>In one participating hospital – Hairmyres – six tumours and 18 polyps were detected and treated through patients presenting directly as a result of the campaign.<br><br>Quality of Evidence Rating: Low. |

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| **Prostate Cancer** | | | | |
| Ilic et al. 2007. | Australia, not specified | This intervention involved providing educational materials via video, internet, and pamphlet about cancer screening (including knowledge of prostate cancer). The aim was to compare the three methods of delivery on knowledge, attitudes, and decision making/screening intentions for prostate cancer. | 1. Behaviour Change Goal: no specific behaviour change goal; the intervention was targeted towards knowledge and awareness<br><br>2. Formative Research: there was no clear evidence for formative research. However, there was some suggestion that the authors did conduct a literature review to develop the three methods of delivery<br><br>3. Target Groups: males aged 45 years and over who had not been tested for prostate cancer<br><br>4. Theory: not reported<br><br>5. Communication Strategy: The educational material was delivered via pamphlet, video, or internet. | The educational materials led to a 27% increase in knowledge about prostate cancer (pre and post comparison).<br><br>The magnitude of this increase was similar between the three methods of delivery.<br><br>Quality of Evidence Rating: Low. |
| *Prostate Man*<br><br>Lyzun et al. 2008. | Canada, 2007 | This is a social marketing campaign aimed at improving awareness of prostate cancer among males in North-western Ontario. This campaign was centred on a fictional comic book character ('Prostate Man'), and was intended to use elements of humour to engage with the target audience and communicate the campaign messages. The campaign evolved over a period of time (2002–2007) and consisted of posters, cartoons, radio and television advertisements to raise awareness of prostate cancer signs and symptoms, as well as the importance of health behaviours such as visiting a health care professional, eating healthily, and engaging in physical activity. | 1. Behaviour Change Goal: this campaign has several behaviour change goals. For example, it aimed to encourage males to visit their healthcare provider regarding prostate health (including cancer). In addition, the campaign promoted other health behaviours associated with diet and physical activity<br><br>2. Formative Research: the campaign was informed by research indicating the importance of role models in relation to health seeking behaviours. The campaign appeared to have been informed by relevant behaviour change principles (although no specific behaviour change model is referred to)<br><br>3. Target Groups: males aged 50 years and over<br><br>4. Theory: although some components of behaviour change models were noted, the campaign did not appear to have been informed by a relevant theory<br><br>5. Communication Strategy: The campaign used a variety of communication channels including posters, cartoons, and advertisements placed on television and radio. | Data have been reported on the number of people who visited the Prostate Man website in 2007; this included the average amount of time that people spend on the website.<br><br>However, there are no formal evaluation data examining the effects of this campaign on awareness of prostate cancer signs and symptoms, or on the behaviour change goals.<br><br>Quality of Evidence: Very low. |