Centre for Allied Health Evidence

Rapid Review of the Literature

Mass media interventions

Extended Review Report

Prepared for:

Health Development Unit
Public Health Branch
Department of Health
Melbourne
Victoria 3000

August 2009

Prepared by:

The Rapid Review Team
Centre for Allied Health Evidence
University of South Australia
Adelaide
SA 5000

University of South Australia | CAHE Centre for Allied Health Evidence

RESEARCH CENTRE RESPONSIBLE FOR THE PROJECT

Centre for Allied Health Evidence
School of Health Sciences
City East Campus
University of South Australia
Adelaide
South Australia 5000
Website: www.unisa.edu.au/cahe

Centre Director
Professor Karen Grimmer-Somers
Phone: (08) 8302 2769
Fax: (08) 8302 2766
Email: karen.grimmer-somers@unisa.edu.au

Project officers
Dr. Saravana Kumar and Ms. Lucylynn Lizarando
Phone: (08) 8302 2085
Fax: (08) 8302 2766
Email: saravana.kumar@unisa.edu.au

Review team
Ms. Anthea Worley
Ms. Zuzana Machotka

Project administered by
Ms. Madeleine Mallee
Business Services Officer
Business Development Unit
Division of Health Sciences
University of South Australia
Phone: (08) 8302 2121
Fax: (08) 8302 1472
Email: madeleine.mallee@unisa.edu.au

Citation details:
The Centre for Allied Health Evidence (2009) Effectiveness of mass media interventions: A Rapid Review. A technical report prepared for Department of Health, Victoria.

Table of contents

Executive Summary ... 4
Background ... 10
Conceptual framework ... 11
Purpose of the review ... 11
Review questions ... 12
PECOT ... 12
Key words ... 12
Databases ... 13
Literature retrieval ... 13
Evidence integration ... 14
Critical appraisal ... 14
Data extraction ... 14
Data synthesis and production of rapid review ... 14
Communications ... 14
Literature interrogation ... 14
Answers to review questions ... 15
Key findings ... 16
Disadvantaged population ... 18
Tier one category of publications ... 18
Tobacco use ... 18
Physical activity ... 22
Combined reviews (tobacco, healthy eating and physical activity) ... 23
Tier two category of publications ... 24
Cost-effectiveness of interventions ... 24
Socially disadvantaged populations ... 28
Theoretical framework ... 30
Media products ... 32
NHMRC Body of Evidence Matrix ... 32
Core learnings ... 33
Literature gaps ... 38
Limitations of this rapid review ... 38
References ... 39

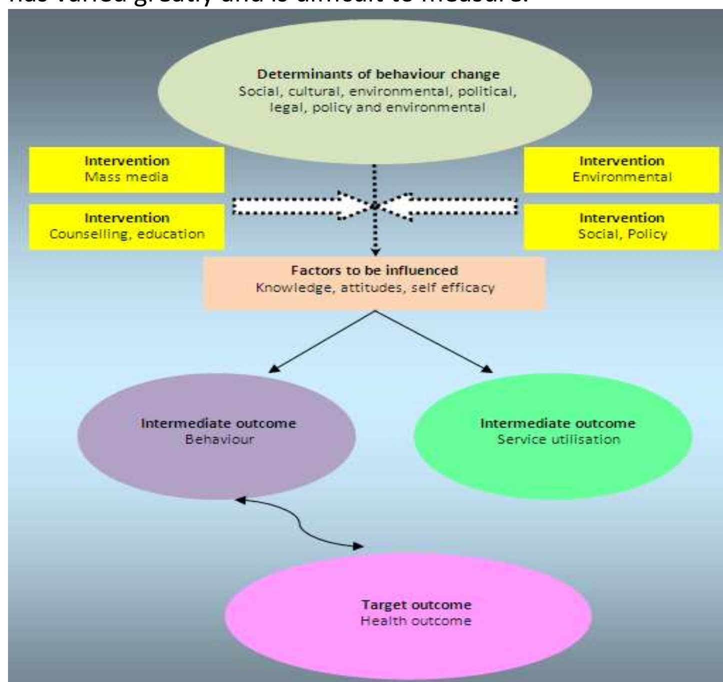
List of appendices

Appendix 1 Flowchart of review selection process ... 42
Appendix 2 CAHE approach to literature inclusion in Rapid Reviews ... 43
Appendix 3 Critical appraisal (reviews) ... 44
Appendix 4 Critical appraisal (cost-effectiveness) ... 47
Appendix 5 Data extraction ... 78
Appendix 6 NHMRC evidence grading table ... 65

List of figures and tables

Figure 1 Diagrammatic overview of how mass media may influence a range of health behaviours ... 11
Figure 2 Theoretical frameworks ... 31
Figure 3 Media products ... 32
Table 1 Tier-one publications ... 16
Table 2 Tier-two publications ... 17
Table 3 Overview of commonly used theories of behaviour change ... 30

Executive Summary

Statement of review questions	1. What is the evidence of effectiveness for mass media campaigns in reducing risk factors for unhealthy eating, physical inactivity and tobacco? a. Key issues that need to be considered include critical success factors, impact on health inequalities/social gradient and accompanying strategies needed to maximise effectiveness. 2. What is the evidence of effectiveness for mass media campaigns targeted at disadvantaged populations? a. Key issues that need to be considered include critical success factors and key features of successful interventions, accompanying strategies needed to maximise effectiveness, and level of investment.
Mass media and behaviour change (Conceptual framework adapted from Bertrand et al 2006)	When compared to international standards, Australia could be considered to be a healthy country. However, this claim is likely to be threatened in the near future. There is considerable evidence which indicates that Australia faces an increasing economic and social burden because of chronic diseases and their associated risk factors. Recognising such needs, the National Preventative Health Taskforce was established with its primary focus on prevention of obesity, tobacco use and harmful consumption of alcohol (National Preventative Health Taskforce 2008). The use of mass media campaigns as an integral tool to promote healthy behaviours and discourage unhealthy behaviours for a range of public health issues (healthy eating, being active, stopping smoking, practicing safer sex, responsible alcohol consumption, just to name a few) has been extensively reported. While considerable time, resources and finances are contributed towards mass media interventions, the effectiveness of mass media has varied greatly and is difficult to measure. 
Purpose of the	The aim of this rapid review was to provide a brief synthesis and judgement of

review	available research evidence related to the effectiveness of mass media interventions for healthy eating, increasing physical activity and reducing smoking. It also focused on the influence of social gradient on health outcomes, such as the socioeconomically disadvantaged. This review also focused on component techniques of interventions, theoretical basis underpinning interventions, critical success factors and what, if any, strategies are required to maximise effectiveness. The evidence base was limited to "best available evidence", as is the nature of any rapid review and hence the research evidence was drawn primarily from existing systematic reviews, meta-analyses and economic evaluations.
Methodology	A systematic, step-by-step approach, underpinned by best practice in reviewing the literature, was utilised as part of the methodology of this rapid review.
Literature interrogation	Interrogation of the literature identified 12 reviews within *"tier one"* and 8 reviews within *"tier two"*. ***Tier one*** – Systematic reviews whose primary focus was mass media interventions for healthy eating, increasing physical activity and reducing smoking. ***Tier two*** – Systematic reviews whose primary focus was generic and wide ranging, where mass media was one component among a "package of care" of interventions (e.g. social marketing approach) for healthy eating, increasing physical activity and reducing smoking.
Answers to review questions	There is now consistent evidence which indicates that mass media can be an effective tool for addressing a range of health behaviours. For mass media strategies to be effective, they must be combined with other interventions and utilise multiple media. These supporting inventions should address social, environmental, policy and cultural factors. Much of this evidence is derived from the body of evidence focused on smoking, with emerging evidence for healthy eating and physical activity. There is, however, little clarity in the literature regarding what exactly works for whom when it comes to health behaviour-change interventions. As mass media is often used as one of many tools, it is unclear of the singular influencing role of mass media in achieving health behaviour change. Due to the nature of this intervention, the influence of secular trends too cannot be controlled. There is also a paucity of evidence regarding the effectiveness of mass media interventions for disadvantaged populations. Similar gaps in literature exist for cost effectiveness data for general and disadvantaged populations. Evidence that was identified from the literature was limited to socioeconomic status, which is merely one index of disadvantage. Overall, the strength of the evidence supporting mass media interventions was good.

The literature also highlights a range of **critical success factors**, which could be considered as part of mass media interventions. These critical success factors were extracted, in a narrative form, from the retrieved literature. The following list of factors was identified from a range of reviews as being consistently critical in ensuring the success of mass media interventions. In the section below, each critical success factor is presented along with a *Recommended Implementation Plan (RIP)*.

Critical success factor one: Use of theory

The use of theory to inform and underpin mass media campaign, while supported by a growing body of evidence, continues to be overlooked (Noar et al 2007, Randolph and Viswanath 2004, Sowden 2009). Use of behaviour-change theory in mass media campaigns can influence target audiences' behaviour by influencing the determinants leading to that behaviour.

Recommended Implementation Plan

- Any mass media campaign should be underpinned by a sound theoretical framework and a careful understanding of determinants of behaviours targeted in the mass media campaign.
- Consider a range of theories of behaviour change when developing appropriate message strategies and when considering the right media products to place these messages. Currently, there is no "one size fits all" approach and the evidence supports of use of many theories to inform the development and implementation of mass media campaigns.
- Theory-based mass media campaigns should also extend into ongoing and regular evaluation in order to ensure appropriate outcomes are attained.

Critical success factor two: Community involvement

Any population-based campaign should be underpinned by community involvement, engagement and partnership with key stakeholders (Marshall et al 2004, Milat et al 2005, Quigley et al 2007, Niederdeppe et al 2008, Wakefield et al 2003). This overarching success factor builds on, and complements, the previous critical success factors.

Recommended Implementation Plan

- The community must be involved in the development, implementation and evaluation of mass media campaigns.
- Mass media campaigns and programs can be informed by communities' knowledge of "what works" in their communities.
- Active involvement of communities may be in the form of developing social approval for health-enhancing behaviours, promoting access (such as leisure activities) and developing and maintaining networks.

Critical success factor three: Targeted and tailored

There is a growing body of evidence (Friend and Levy 2002, Marshall et al 2004, Milat et al 2005, Noar et al 2007) which recommends mass media interventions should be targeted and tailored to suit the requirements of those whose

behaviour it aims to influence. There is good evidence which indicates that targeted and tailored programs are more successful than those without clarity over targeting, which are hence considered to be generic.

Recommended Implementation Plan

- Identify key groups of people whose behaviour mass media campaign aims to influence. Once this is defined, the content and products of communication could be defined.
- With specific population groups, such as culturally and linguistically diverse groups, mass media campaigns should be tailored in culturally appropriate ways. Similarly, for low-income groups targeted, small sets of interventions may be more effective than a generic approach.

Critical success factor four: Consider all influencing factors

There is consistent evidence (Niederdeppe et al 2008, Michie et al 2009, Quigley et al 2007, Randolph and Viswanath 2004, Sowden 2009) from the literature which recommends the need to understand and consider all factors that will, or are likely to, influence the target group. There are examples from the literature where failure to address these factors has been a barrier to effective mass media campaigns.

Recommended Implementation Plan

- Undertake formative research to understand target audience perspectives on media use preferences and health-related behaviour. This will ensure the target audience is particularly exposed to, and motivated by, the mass media campaign.
- As part of influencing factors, it is important to consider the literacy needs, language preferences and other cultural values of the target audiences.
- Consideration of these issues is particularly relevant in socially disadvantaged population groups

Critical success factor five: Appropriate and supportive environment

There is good evidence (Randolph and Viswanath 2004, Sowden 2009) from the literature which recommends the need to create an appropriate and supportive environment for the target audience to be exposed to, and to make, the recommended change.

Recommended Implementation Plan

- Ensure processes are in place to identify, and target, barriers (social, environmental, policy) that prevent the target audience from making the recommended change.
- This may include the social and environmental context in which the proposed behaviour change is expected to occur. Structural (physical environment) and process (access to services) changes may need to be considered.

- An appropriate information environment[1] and maximising the exposure of campaign messages to the target audience are vitally important. Media campaigns can achieve this via paid or donated media time or space. This could be complemented with other media products and media mix such as pamphlets and other promotional materials.

Critical success factor six: Comprehensive and integrated strategy

There is consistent evidence from the literature (Marshall et al 2004, Milat et al 2005, Niederdeppe et al 2008, Noar et al 2007, Sowden 2009) which recommends mass media interventions should be supported by multiple interventions and a range of products. An integrated strategy which utilises a range of creative and concomitant interventions should be considered.

Recommended Implementation Plan

- Mass media campaigns should be complemented by other programs such as community mobilisations, social support, counselling, policy changes and access, just to name a few.
- Other elements (such as new and improved structures and processes) should be part of any mass media strategy in order to assist people to take the action stated by the mass media messages (such as healthy food available in canteen, availability of quit counsellors).
- This may also include opportunities via legislation and regulation to make mass media campaign effects strong and sustainable.

Critical success factor seven: Assessment and analysis

The need for rigorous assessment and ongoing analysis of any mass media campaigns, as part of process analysis and exploring opportunities for change, has been identified in the literature (Michie et al 2009, Quigley et al 2007, Randolph and Viswanath 2004). While it is important to identify any expected behaviour change, other process markers of success (or lack thereof) of campaigns, such as exposure, are equally important to capture. Inadequate analysis during the developmental and implementation stages of a mass media campaign can be a significant barrier to success.

Recommended Implementation Plan

- Assess campaign objectives and set out key indicators (process and outcomes) of success.
- Ensure there is clear justification (based on evidence) for any mass media campaign (design, development and implementation).
- Clearly set out which process and outcomes will be measured and how they will be captured.
- Ensure provisions for ongoing and regular evaluations are considered and lessons from these processes "fed back" into the campaign.
- The evaluation may focus on effectiveness (including cost-effectiveness), equity, safety, acceptability and feasibility of the mass media campaign. Many of these elements also form the core elements of health care

[1] The aggregate of individuals, organisations, or systems that collect, process and disseminate information.

quality.

Literature gaps

This rapid review identified key gaps in the literature which require further reflection. They are:

- When unpacking the "black box" of mass media interventions, it is still unclear which strategies work best for which groups. It is imperative that future research investigates which interventions are appropriate to which groups of populations to achieve optimal outcomes. As part of quality health care, of which primary prevention is an integral component, the right intervention, at the right time, for the right population group, for the right outcome is an important consideration.
- There is a scarcity of data on the cost-effectiveness of mass media interventions for general populations and special-interest groups such as socioeconomically disadvantaged populations.
- While there is abundant information on various media products used as part of mass media campaigns, literature is scant on the content used in these products.
- Emergence of new technology brings new challenges. The introduction of user-control technology such as TiVo (where you can fast forward through advertisements), the internet (social networking sites) and mobile phones (an all-in-one entertainment centre) challenge the traditional understanding of "mass media" and its use as an intervention medium. Future research should investigate the influence of these new technologies as facilitators, or barriers, for health behaviour interventions.

Introduction

Background

When compared to international standards, Australia could be considered to be a healthy country. However, this claim is likely to be threatened in the near future. There is considerable evidence which indicates that Australia faces an increasing economic and social burden because of chronic diseases and their associated risk factors (Gross et al 2003). Gross and colleagues (2003) highlight that twelve chronic diseases account for an estimated 42% of total disability-adjusted life years (DALYs) lost in Australia in 1996 and all such diseases accounted for 80% of DALYs lost. To address these staggering statistics, they state "*we now need larger injections of political will. The early prevention and better coordinated management of chronic conditions will require changes in the methods of financing and paying for healthcare, inspired and supported by strong leadership from our politicians*" (pg 234 Gross et al 2003).

Recognising such needs, the National Preventative Health Taskforce was established with its primary focus on prevention of obesity, tobacco use and harmful consumption of alcohol (National Preventative Health Taskforce 2008). The focus on obesity, tobacco use and harmful consumption of alcohol has been necessitated due to the fact that these in combination with physical inactivity, poor diet, high blood pressure and high blood cholesterol contribute to approximately 32% of Australia's illness (National Preventative Health Taskforce 2008). It has been estimated that addressing these risk factors may increase the healthy life span of many people by five years (WHO 2008). However, achieving this is no easy feat and there are no quick short-term solutions. As this will require a community-wide approach, it is imperative that any prevention initiatives reach the whole community, are based on effective public education and have the cooperation of mass media (National Preventative Health Taskforce 2008).

The use of mass media campaigns as an integral tool to promote healthy behaviours and discourage unhealthy behaviours for a range of public health issues (healthy eating, being active, stopping smoking, practicing safer sex, responsible alcohol consumption, just to name a few) has been extensively reported (Randolph and Viswanath 2004). While considerable time, resources and finances are contributed towards mass media interventions, the effectiveness of mass media has varied greatly and is difficult to measure (Randolph and Viswanath 2004). There are several reasons for difficulties in accurately determining the effectiveness of mass media interventions. Firstly, behaviour change is influenced by a range of factors including social, cultural, political, legal and economic factors. These factors may act as enablers or barriers in different contexts. Within this context, mass media interventions are expected to influence a range of psychological factors such as knowledge, attitude and self-efficacy (Bertrand et al 2006). Secondly, mass media interventions, which aim to target a range of factors, are commonly provided as bundled interventions delivered at numerous settings (e.g. home, school, workplace) through numerous delivery modes (e.g. print, telephone, websites) (Norman 2008). Therefore it becomes difficult to accurately determine the key component, or "active ingredients" as termed by Norman (2008), of the bundled interventions that actually resulted in behaviour change. What this means, however, is key stakeholders (such as clinicians,

funders and policy makers) are often left wondering what actually works in health behaviour change interventions.

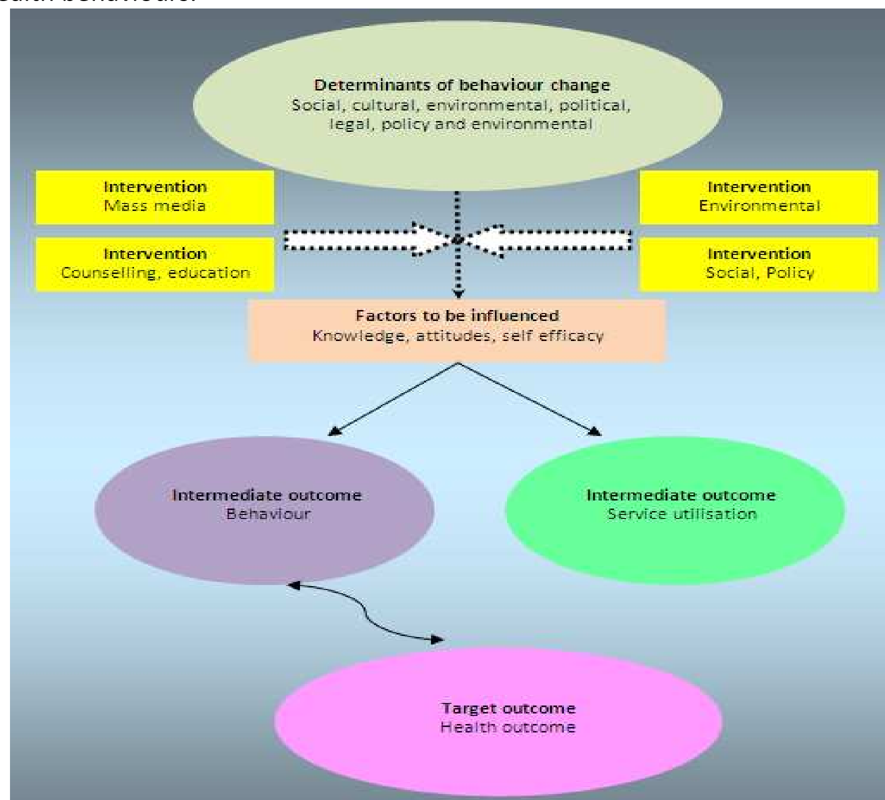
Michie and colleagues (2009) also highlight the importance of health behaviour change interventions drawing on theories of behaviour and behaviour change in their development. Common theories of health behaviour include the health belief model, social cognitive theory, the transtheoretical model and the theory of reasoned action/integrated model of behaviour change (Randolph and Viswanath 2004). Michie et al (2009) highlight three key reasons for this:

- Health behaviour change interventions are more likely to be successful if they target causal determinants of behaviour and behaviour change
- Theory-based interventions facilitate an understanding of why some interventions work while others don't. This will facilitate future, better development of interventions for targeted populations, and
- Theory can only be advanced if interventions and evaluations are linked.

However, several authors acknowledge that in many studies the theoretical models and process and outcomes of change are rarely linked (Michie et al 2009; Randolph and Viswanath 2004).

Conceptual framework (adapted from Bertrand et al 2006)

Figure 1 provides a diagrammatic overview of how mass media may influence a range of health behaviours.



Purpose of the review

The aim of this rapid review was to provide a brief synthesis and judgement of available research evidence related to the effectiveness of mass media interventions for healthy eating, increasing physical activity and reducing smoking. It also focused

on the influence of social gradient on health outcomes, such as the socioeconomically disadvantaged. This review also focused on component techniques of interventions, theoretical basis underpinning interventions, critical success factors and what, if any, strategies are required to maximise effectiveness. The evidence base was limited to "best available evidence", as is the nature of any rapid review and hence the research evidence was drawn primarily from existing systematic reviews, meta-analyses and economic evaluations.

Review questions

3. What is the evidence of effectiveness for mass media campaigns in reducing risk factors for unhealthy eating, physical inactivity and tobacco?
    a. Key issues that need to be considered include critical success factors, impact on health inequalities/social gradient and accompanying strategies needed to maximise effectiveness.

4. What is the evidence of effectiveness for mass media campaigns targeted at disadvantaged populations?
    a. Key issues that need to be considered include critical success factors and key features of successful interventions, accompanying strategies needed to maximise effectiveness, and level of investment.

Methodology

A systematic, step-by-step approach, underpinned by best practice in reviewing the literature, was utilised as part of the methodology of this rapid review.

PECOT

Participants	*All, healthy populations; focus also on disadvantaged populations (e.g. race, socioeconomic status, minority groups etc)*
Exposure	*Mass media as the primary component of social marketing; for the purpose of this review mass media will include diverse media outlets (such as television, radio, newspapers, billboards, posters, leaflets, booklets, internet) and include paid advertising, donated media time, direct marketing etc.*
Comparator	*Usual practice / no intervention*
Outcomes	*A range of outcomes will be considered but will not be limited to:* • *Healthy eating (changes to consumption of fruit and vegetables, energy-dense foods & drinks, water)* • *Physical activity (changes in physical activity, changes in sedentary behaviour)* • *Tobacco (changes in smoking, avoidance of smoking, quit rates)* • *Social gradient (such as socioeconomic status)*
Time	*Short and long term*

Search strategy

In agreement with stakeholders from the Department of Health, Victoria, specific criteria for inclusion in this review were considered using the PECOT framework. Only English articles published in the past ten years were included in order to capture the most recent scientific evidence on mass media campaigns.

Key words

A combination of search terms (Keywords 1, 2 and 3) were used to identify, and

retrieve, peer-reviewed articles from databases highlighted below. Additional key words synonymous to the initial search terms and MESH headings were also used to expand the search, as appropriate. These key words were derived from existing systematic reviews on this topic and the searches for databases have been modelled based on published search strategies embedded in identified systematic reviews.

Keyword 1	*Keyword 2*	*Keyword 3*
mass media media campaign social marketing advertisement	television or TV radio newspapers billboards posters leaflets booklets internet	healthy eating or fruit* or vegetable* or nutriti* or diet* physical activity or obes* or sedentary or sport* smoking or tobacco or cigarette or smoking cessation or smoking addiction or quitting

Note * represents optional conclusion of these words

Databases

- Academic search premiere
- Biomed Central Gateway
- CINAHL database
- Cochrane Library
- Current contents connect
- CSA Illumina
- DARE
- EMBASE
- ERIC
- Meditext
- MEDLINE
- PsychInfo
- PsychArticles
- Psychology a SAGE full-text collection
- PubMed
- Science Direct
- Scopus
- Web of knowledge/science
- TRIP Database/ DARE
- HighWire Press
- Google

Literature retrieval

A staged approach to interrogating the literature was undertaken, whereby we examined the best available research evidence (systematic reviews/meta-analyses) as they are the most comprehensive source of evidence. In the absence of such best available research evidence, searches for primary research evidence to fulfil such evidence gaps were undertaken. For example, when a systematic review or meta-analysis relevant to the PECOT had been identified and published recently, no further searches for primary research studies were undertaken. However, in the absence of high-level, high-quality evidence, the best available evidence was sourced to identify and report the research evidence base underpinning the PECOT (such as randomised controlled trials).

The titles and abstracts identified from the above search strategy were assessed for eligibility by the CAHE researchers and stakeholders from the Department of Health, Victoria. In order to avoid duplication and "double counting" umbrella reviews (a review of reviews) were excluded. However, these umbrella reviews were utilised to identify other relevant articles by pearling their reference lists. Full-text copies of eligible articles were retrieved for full examination. Appendix 1 provides a

	diagrammatic overview (consort diagram) of the literature retrieval process.
Evidence integration	A conceptual framework of integrating evidence from different sources was disseminated for comment. This *"evidence pyramid"* was operationalised when integrating different bodies of evidence. The evidence pyramid is included in Appendix 2.
Critical appraisal	Once relevant research publication(s) were identified, two CAHE reviewers independently evaluated the methodological quality of the article using the Critical Appraisal Skills Program (CASP) tools. Differences in opinion were resolved by discussion. Copies of the critical appraisal tools are included in Appendix 3 and 4.
Data extraction	Data was extracted from the identified publications using data extraction tools which were specifically developed for this review. Copies of the data extraction tools and results are included in Appendix 5.
Data synthesis and production of rapid review	Findings from the included publications and their methodological quality (based on critical appraisal scores) were synthesised in a narrative summary. The strength of the body of evidence was determined based on the Australian National Health and Medical Research Council (NHMRC) Evidence Grading Matrix. A copy of the NHMRC Evidence Grading Matrix is included in Appendix 6.
Communications	Ongoing discussions were held with stakeholders from the Department of Health, Victoria, to ensure the rapid review, at every crucial stage was informed by all the stakeholders' perspectives. Additionally, this process also ensured external monitoring of the rapid review processes.
Literature interrogation	Interrogation of the literature revealed large numbers of publications focusing on the role of mass media individually, as well as being one of the many tools utilised as part of an extensive social marketing approach. Many of the social marketing reviews identified during interrogation of the literature utilised Andreasen's six benchmark criteria to define social marketing (behaviour change, consumer research, segmentation and targeting, marketing mix, exchange and competition) (Gordon et al 2006). However, as this rapid review was primarily focused on the role of mass media as the primary intervention, the focus of the search was on reviews which investigated the effectiveness of mass media interventions. In instances where mass media interventions were reported as one of many interventions, as was the case for many social marketing reviews, these reviews were included but only data specifically focusing on mass media was extracted. Therefore, for the purpose of this review, a two-tiered system of systematic reviews was developed. ***Tier one*** – Systematic reviews whose primary focus was mass media interventions for healthy eating, increasing physical activity and reducing smoking. ***Tier two*** – Systematic reviews whose primary focus was generic and wide ranging, where mass media was one component among a "package of care" of interventions (e.g. social marketing approach) for healthy eating, increasing physical activity and reducing smoking.

Interrogation of the literature identified 12 reviews within "tier one" and 8 reviews within "tier two".

The reviews originated from diverse locations reporting on mass media interventions from a number of countries. Most of these were from Western countries, possibly due to the large focus on chronic diseases and the wide spread use of mass media. While these findings may have some relevance to the Australian context, generalisability to the local context should be undertaken with caution.

Answers to review questions

There is now consistent evidence which indicates that mass media can be an effective tool for addressing a range of health behaviours. For mass media strategies to be effective, they must be combined with other interventions and utilise multiple media. These supporting inventions should address social, environmental, policy and cultural factors. Much of this evidence is derived from the body of evidence focused on smoking, with emerging evidence for healthy eating and physical activity.

There is, however, little clarity in the literature regarding what exactly works for whom when it comes to health behaviour change interventions. As mass media is often used as one of many tools, it is unclear of the singular influencing role of mass media in achieving health behaviour change. Due to the nature of this intervention, the influence of secular trends too cannot be controlled. There is also a paucity of evidence regarding the effectiveness of mass media interventions for disadvantaged populations. Similar gaps in literature exist for cost-effectiveness data for general and disadvantaged populations. Evidence that was identified from the literature was limited to socioeconomic status, which is merely one index of disadvantage.

There are, however, consistent messages from the literature on critical success factors for successful mass media campaigns. These are:

- Creating an appropriate information-rich and supportive environment for the target audience to be exposed adequately;
- Consideration of all factors (social, cultural, environmental, policy) that will, or are likely to, influence the target audience;
- Use of a comprehensive strategy underpinned by multiple interventions and mass media products;
- Interventions which are targeted and tailored to key stakeholder groups. This is especially important in socially disadvantaged groups. For example, mass media which targets culturally and linguistically diverse groups need to consider using ethnic media channels;
- Use of theories to understand drivers of health behaviour and the development of theory-based campaigns. The use of a range of theories to underpin mass media campaigns has been widely recommended;
- Campaigns should be well coordinated, sustainable and regularly evaluated in order to ensure they are flexible to changing and emerging needs. For example the introduction of user-control technology and social networking sites means traditional mass media campaigns need to be adaptive in their approaches;
- Any population-based campaign should be underpinned by community

involvement, engagement and partnership with key stakeholder groups.

Overall, the strength of the evidence supporting mass media interventions was good.

Key findings

This rapid review focused on the effectiveness of mass media for a range of health behaviours. It is well recognised that for behaviour change to occur, a range of factors need to be taken into account and appropriately addressed. These may include social, cultural, political, legal, policy and economical factors. These factors may influence different media including personal, social, community and organisational. Using mass media to influence behaviour change may be undertaken by two approaches (Randolph and Viswanath 2004).

The first approach is to increase the amount of available information on the topic of interest. The second approach is to redefine or reframe the issue as a public health problem to make it more salient, attract the attention of the target population and also suggest a solution to resolve the problem. The body of literature identified for this rapid review utilised a similar framework to that proposed by Randolph and Viswanath (2004). Most systematic reviews included in tier one focussed on addressing behaviour change targeted to specific health behaviour (e.g. smoking, healthy eating and physical activity). Systematic reviews included in tier two had a broader focus and included a large number of interventions, which either targeted a specific health behaviour or a range of health behaviours.

The table below matches tier-one reviews with health behaviours of interest. Randolph and Viswanath's (2004) review has been included in tier one although it is not a true systematic review. However, in this review of the literature, the authors highlight key lessons learnt from public health mass media campaigns (an intervention of interest for this rapid review) and have included examples of case studies on smoking, screening and healthy eating. Their results will inform the findings of this rapid review. Therefore Randolph and Viswanath's (2004) review has been included in this cohort of publications, albeit highlighted in a different colour to ensure distinction.

Table 1 Tier-one publications

Evidence source	Smoking	Healthy eating	Physical activity
Bala et al (2003)			
Farrelly et al (2003)			
Finlay and Faulkner (2005)			
Friend and Levy (2002)			
Marshall et al (2004)			
Milat et al			

(2005)			
Niederdeppe et al (2008)			
Noar et al (2007)			
Randolph and Viswanath (2004)			
Silver (2001)			
Sowden (2009)			
Wakefield et al (2003)			

The table below matches tier-two reviews with health behaviours of interest. The Cobiac and Barendgret (2009) paper has been included in this cohort of publications although it is a cost-effectiveness study as it reports on a range of interventions to improve physical activity. Mass media is merely one of the many interventions compared. Therefore, to highlight this distinction, a different colour is used to demonstrate this.

Table 2 Tier-two publications

Evidence source	Smoking	Health eating	Physical activity
Cobiac and Barendgret (2009)			
Gordon et al (2006) (NSMC R1)			
Kahn et al (2002)			
McDermott et al (2006) (NSMC-R2)			
Michie et al (2009)			
Stead et al (2006) (NSMC – R3)			
Thornley et al (2007)			
Wellings et al			

(2006)			

Disadvantaged population

Two systematic reviews (Michie et al 2009; Niederdeppe et al 2008) exclusively focused on the impact of social gradient and its relationship to health-related behaviour change outcomes for smoking, physical activity and healthy eating. Niederdeppe et al (2008) investigated the role of media campaigns to promote smoking cessation among socioeconomically disadvantaged populations and Michie et al (2009) investigated the effectiveness of a range of interventions targeting low-income groups to reduce smoking, increase physical activity and/or healthy eating. As the disadvantaged (low-income) population has a unique set of drivers and barriers to changing health behaviour, in comparison to the general population, results from these two systematic reviews will be discussed separately.

Tier one category of publications

Tobacco use

Within the tier-one category, nine reviews pertinent to tobacco use were identified. Not surprisingly, smoking-related reviews were abundant and were the largest group of publications included in this rapid review. Bala et al (2008) was a Cochrane systematic review which investigated effectiveness of mass media interventions in reducing smoking in adults. A range of intermediate and health outcomes were captured and change in smoking behaviour was the primary outcome of interest. The findings from this review indicated that mass media may play a key role in achieving smoking behaviour change in adults. There was evidence of decreased smoking prevalence, decreased tobacco consumption and increased quit rates.

However, the evidence underpinning this review (Bala et al 2008) was derived from studies of variable methodological quality and scale. This review was explicitly designed to identify and assess the specific contribution of mass media in changing smoking behaviour, however in the included literature mass media campaigns were rarely the only component of a community-based smoking cessation intervention. The implication of this is that it was almost impossible to differentiate the contribution of specific elements to the overall impact of a tobacco-control initiative. Similar difficulties also arose when determining the impact of duration and intensity of a campaign on its effectiveness. No consistent relationship was observed between campaign effectiveness and age, education, ethnicity and gender. There were no identifiable critical success factors and barriers to success.

Farrelly et al (2003) undertook a systematic review of the literature on counter-marketing efforts targeted at youth smoking. Counter-marketing efforts aimed at youth traditionally contain three elements. They are:

- Combat positive images of smoking in cigarette advertising
- Expose industry manipulation
- Development of an anti-smoking “brand”

After reviewing a number of programs, the authors conclude that mass media prevention campaigns are effective and go on to suggest that they may be more effective when complemented with school- or community-based programs. However, the authors also acknowledge that no message pattern can guarantee consistent

success. They highlight that program success may be largely dependent on other variables such as level of exposure, degree of focus on a target audience, and the presence of complementary school and/or community programs. There is also only limited evidence that counter marketing is a cost-effective strategy in isolation and there continues to be a gap in informing best practice in designing successful campaigns. Additional evidence gaps include effects of message theme, emotional content and stylistic features. With the emergence of new technology (e.g. TiVo), new barriers to mass media campaigns arise.

Friend and Levy (2002) undertook a review of the literature which focused on reductions in smoking prevalence and cigarette consumption associated with state and local mass media campaigns. While the target of the campaigns was the general population, the results also provide an insight into state- and community-level youth-oriented programs. As part of the review, state-level and community-level campaigns targeting the general population from California, Massachusetts, Michigan and Oregon were reported. Youth-directed state-level and community-level campaigns included Arizona and Florida. The findings from this review indicated that well-funded and well-implemented mass media campaigns targeted at the general population and implemented at the state level, in association with a comprehensive tobacco-control program, were associated with reduced smoking rates. However, youth-oriented campaigns provided mixed results especially when the programs were smaller and implemented at the community level. On the integral question of the role of the ad’s content (that is the message or the theme portrayed) the evidence was unclear. The authors also highlight that other variables (such as demographic characteristics of the target population, support of tobacco-control activities) may influence the impact of different types of messages. The importance of co-interventions or existing interventions (such as clear indoor air laws) as part of mass media campaigns was also recognised by the authors.

Milat et al (2005) undertook a review of the literature to investigate effectiveness of mass media strategies, as part of the social marketing framework, for a range of health behaviours across Australia targeted at culturally and linguistically diverse (CLD) groups. This review identified eight studies which reported on a range of health behaviours including smoking, cervical screening, injury prevention (smoke detectors), drink driving, immunisation and illicit drugs. When focusing on smoking specifically, the process indicators include level of recall and the outcome investigated included smoking prevalence, daily consumption of cigarettes and knowledge and attitudes of the target audience. When unpacking the interventions, mass media included ethnic radio and press advertisements, print resources, advertisement in video releases and use of community television. The use of mass media was complemented by other strategies including distribution of quit manuals through community networks, publicity strategy and community action. These programs targeted Chinese, Vietnamese, Greek and Arabic speakers in Australian states. The findings of this review indicate that due to the paucity of methodologically rigorous evaluation studies on the CLD groups, clear conclusions in relation to the characteristics of effective CLD population health social marketing campaigns in Australia, including mass media strategies, cannot be drawn. Methodological issues included lack of adequate pre-post data and evaluations reporting only on process measures with no

information on outcomes. However the findings did indicate that CLD communities do access campaign related information from both mainstream and ethnic media channels. Vietnamese respondents are more likely to access campaign messages through ethnic radio and Chinese respondents through ethnic press. With regards to achieving health behaviour change, while there is tentative evidence, overall evidence is generally weak.

Silver (2001) carried out a systematic review on the effectiveness of media-based, anti-tobacco campaigns as a community health intervention, targeted at teenagers. This review identified three primary research studies. The first study used mass media interventions in the form of television, billboard and radio advertising. The second study evaluated the development and effectiveness of printed advertising material targeted at children (7 to 11 years). The third study examined the effects of a school-based versus a school-based combined with a mass media interventional approach for adolescent girls in the prevention and reduction of smoking. Outcomes of these studies included reported smoking incidence, smoking frequency and the uptake of mass media messages. Major findings from these three studies include significant reductions in smoking incidence after television advertising but not radio or billboard; by the age of 13 both smokers and non-smokers had made long-term smoking decisions and therefore anti-tobacco messages were no longer seen to be effective; a print advertising campaign needed to use target-specific, age-appropriate language to relay media messages to children; a school-based intervention program in conjunction with mass media is more effective than a school-based intervention alone in lowering weekly smoking rates in adolescent girls; teenage smokers did not have a concrete negative internal image of the negative health effects associated with smoking but the non-smokers did after mass media message intervention. Only one study had follow-up data with approximately half of the participants lost at four years post-intervention. Therefore the effects of these interventions can only be considered in the short term. In addition this review found that conducting prior research into the type of advertisements that children and teenagers find appealing can be beneficial. This is demonstrated with two effective studies utilising a two phase approach by gathering information from surveys and focus groups prior to development of mass media intervention. Specific details of mass media components cannot be determined from the studies identified in this review. Overall this review concludes that the results reveal that state wide, state-funded, mass media anti-tobacco campaigns are effective as additions to community efforts to decrease the use of tobacco use in teenagers. However this systematic review does have several methodological limitations with a small number of studies identified, no study quality assessment, limited database searching (3 databases) and no statistical analysis data presented. Therefore the results of this study should be considered with caution.

Sowden (2009) undertook a Cochrane systematic review on the effectiveness of mass media campaigns in preventing the uptake of smoking in young people (under the age of 25). Included studies demonstrated a primary focus on preventing the uptake of smoking in young people; however campaigns that were combined with school-based programs were also included. Primary measures sought included subjective self-reported measures, such as self-reported usage and attitudes towards smoking, and objective measures such as saliva thiocyanate levels and alveolar carbon dioxide

levels. All studies evaluated self-reported smoking behaviour and two out of the six studies found an overall effectiveness in the reported reduction of smoking uptake in young people. Of the two effective intervention studies one used mass media alone and the second used both mass media and a school-based intervention, thereby making direct comparisons difficult. Similar components found between the two effective studies included a solid theoretical basis, and formative research undertaken in designing and developing campaign messages. Broadcasting of these messages was of a reasonable intensity over an extensive period of time, over three and four years respectively. No adverse reactions were seen in any of the studies.

The methodology and theories on which the campaigns were based differed greatly between studies. Three of the six studies focused solely on mass media intervention and three utilised a combination of mass media and a school-based intervention. The intensity, duration and follow-up periods of media campaigns varied significantly between the studies and therefore direct comparisons or recommendations could not be made. Overall the findings from this review indicate that mass media may be effective in preventing the uptake of smoking in young people but the overall evidence base is negligible.

A systematic review by Wakefield and colleagues (2003) aimed to review government-funded anti-smoking campaigns, ecologic studies of population impact on anti-smoking advertising, and qualitative studies that examine the effects of anti-smoking advertising on teenagers. Multiple outcomes were considered that related to smoking behaviour and knowledge retention from mass media intervention. Results from this review found that anti-smoking mass media approaches can be effective in terms of smoking up take, attitudes towards smoking and knowledge of associated health risks in early adolescents. Mass media seemed to be more effective for early female adolescents compared with their male counterparts, in achieving positive outcomes. It is unclear whether this is due to developmental differences, is a reflection of smoking experience, or a combination of the two. Social group interactions through family and peers as well as cultural context were found to have positive effects in reinforcing anti-smoking campaigns. School-based interventions combined with multimedia were more effective than school-based interventions alone in terms of knowledge uptake and initiation of smoking rates but no difference was found in reducing smoking rates.

Limitations to this review (Wakefield et al 2003) include a limited database search (2 databases), no quality appraisal, no statistical data presented and it is unclear as to how many studies were retrieved from the search. As multiple outcomes and study designs were incorporated, direct comparisons between studies and hence recommendations were limited. The findings from this review demonstrate that the effects of anti-smoking advertising on youth smoking can be enhanced by the use of other tobacco-control strategies. Multi-faceted mass media interventions, such as those incorporating school-based programs, can be more effective for increasing knowledge uptake, and decreasing smoking initiation. Campaigns targeting an early adolescent population can have a more positive effect than those targeting late adolescent populations. In addition more positive effects can be found in campaigns that arouse an emotional response from the target audience.

Physical activity

Finlay and Faulkner (2005) conducted a systematic review to analyse, from a media studies perspective, mass media interventions to promote physical activity. Studies that evaluated message recall, behaviour and knowledge change were considered. A large variety of mass media interventions were found and often a multi-faceted approach was used to promote the media message. This review identified 17 studies which reported the use of public education, social learning or social marketing frameworks either separately or in conjunction with each other. Positive changes were found in message recall in eight studies. Of the six studies that evaluated behavioural outcomes, five had significant positive effects by increasing physical activity and one study found no effect. Overall eight studies supported the use of mass media interventions in influencing short-term physical activity recall (message recall) and to a lesser extent associated changes in physical activity knowledge. Although the studies provided extensive details on media interventions used, minimal to no information was supplied in relation to the contents of these interventions; therefore comparing interventions on content basis was not undertaken. The findings of this review reveal current studies that assess the effects of mass media intervention and physical activity fail to give adequate descriptive detail on the mass media intervention. Therefore the authors conclude that understanding the success behind media campaigns, the recall of media messages or associated behaviour change can only truly be understood through the application of a more sophisticated form of media analysis within the literature.

A systematic review conducted by Marshall et al (2004) evaluated the effectiveness of mass media, print, telephone and web-delivered interventions to promote physical activity. Fifty-eight studies were identified in this review of varying study designs. Outcome measures frequently involved surveys taken before and after intervention and were related to behaviour change or media message recall. Identified literature related chiefly to television as a mass media intervention with few studies related to print, telephone or internet interventions. Results of this review were categorised into mass media approaches, print, telephone and internet-delivered approaches. Durations typically were found to be between six and eight weeks and could be repeated over a period.

Mass media results indicate that there is consistent evidence for recall of campaign slogans and message content and limited impact on behaviour change for physical activity promotion. Campaigns that were more comprehensive in terms of supplementing campaigns with other strategies, such as community events and printed material, reported greater behavioural changes than those that did not. In addition this review found sustained and concentrated campaigns could yield better results in terms of behavioural change than short-term campaigns. Mass media campaigns which focus on regional areas and incorporate coordinated, collaborative and sustained efforts to be established can be more effective than state-wide campaigns.

Six studies evaluated printed material. Results indicate that state-targeted and personality-specific print materials can produce significant behavioural changes in motivated volunteer samples. In addition the results from this review suggest that personalised or targeted print approaches seem to be more effective than non-

personalised ones to increase physical activity.

Three studies utilised telephone-delivered interventions. Mixed results were found. One study found that additional telephone contact in conjunction with printed material did not enhance the effect of increasing physical activity. Two studies employed the use of automated telephone counselling to promote physical activity. One study found it to be effective in the short-term but long-term usage diminished significantly after participants voiced a preference for human contact. The second study did provide support for it as a physical activity promotional intervention.

Three studies utilised internet-delivered interventions. Mixed results were found and thought to be associated with poor participant engagement and retention found with this type of intervention.

Limitations with the Marshall et al (2004) review include limited database searching (2 databases), no quality assessment and limited information presented from all identified studies. In addition, this review captured a broad range of study designs and interventions with multiple outcome measures, making direct comparisons between studies and recommendations difficult.

Overall this review found that mass media is less effective when used in isolation. When mass media is used in combinations of two or more media this may bring about more effective results.

Combined reviews (tobacco, healthy eating and physical activity)

Within the tier-one publications, the interrogation of the literature also revealed a meta-analysis, undertaken using a systematic approach, on the effectiveness of tailored print interventions for a range of health behaviours. Noar et al (2007) undertook a meta-analytic review of the literature with the primary focus on effects of tailored print health behaviour change interventions. For the purpose of this research, studies had to include at least one print-only tailored intervention condition and they had to measure health behaviours as key outcomes. This review identified 57 studies which met the inclusion criteria and were part of the meta-analysis. The review identified a range of health issues which were targeted using tailoring including smoking cessation, diet, mammographic screening, exercise, vaccination/immunisation, pap test and a plethora of other preventative, screening and vaccination initiatives. The key finding from this meta-analysis (reported here using effect sizes) was that tailored print interventions have been shown to be effective in cessation of smoking ($r = .086$), adoption of healthy diet ($r = .084$) and adoption of exercise ($r = .028$). In addition to these findings this review also reported on critical success factors of tailored print interventions. According to the authors, the strongest print-tailored health behaviour change interventions to date:

1. Intervened on preventative or screening behaviour (as compared to vaccination or immunisation)
2. Generated pamphlets, newsletters or magazines (as compared to letters, manuals and booklets)
3. Utilised more than one intervention contact (as compared to one point of contact)

4. Had shorter periods between intervention and follow-up
5. Recruited participants from households rather than clinics or health centres; this may be due to recruitment strategies where people with a range of socioeconomic status (SES) were included (as would be case in households) rather than targeted SES groups (as would be case in clinics or health care centres).
6. Were tailored on 4-5 theoretical concepts or more, as well as behaviours and demographics
7. Used a behavioural theory that includes concepts such as attitudes, self-efficacy, stage of change, process of change and also social influences (such as social support). These might include social cognitive theory, theory of planned behaviour, transtheoretical model, the integrated model and the attitude-social influence-efficacy model.

Similarly, in a review of the literature, Randolph and Viswanath (2004) investigated a range of issues focused on mass media interventions in achieving health behaviour change. While this review is not a systematic one and also does not focus on individual health behaviour, instead drawing its lessons from a number of public health mass media campaigns, the findings highlight key factors for success and failure of campaigns. Among the range of public mass media campaigns included in this review, campaigns targeted at smoking, physical activity and healthy eating were also captured. Evidence presented indicates that mass media campaigns were effective, to some extent, in addressing these issues. Based on critical reflection on a range of campaigns, the authors offer some key lessons for effective mass media interventions. These are:

1. Successful manipulation of the information environment by campaign sponsors to ensure sufficient exposure of the audience to the campaign's messages and themes (influencing the information environment and maximising exposure).
2. Using social marketing tools to create the appropriate messages for distribution and, where possible, message theory and tailoring (creative marketing messages).
3. Creating concomitant structural conditions such as a supportive environment/opportunity structure that allows the target audience to make the recommended change (supportive environment).
4. Developing campaigns with a careful understanding of the determinants of health behaviour that could potentially lead to desired health outcomes (theory-based campaigns).
5. Process analysis and especially assessing exposure to campaign messages could serve as useful intermediate markers both in making midcourse correction and in explaining final campaign outcomes (process analysis and exposure assessment).

Tier two category of publications

Within tier two, several publications were identified as being relevant sources of evidence and therefore informed the findings of this rapid review. Many of these publications did not exclusively focus on one health behaviour, rather a range of health behaviours including screening and prevention.

Cost-effectiveness of interventions

A cost-effectiveness analysis of interventions to promote *physical activity* was undertaken by Cobiac et al (2009). Physical activity and transport intervention literature was reviewed to identify effective interventions suitable for implementation

in Australia. From the review process, six intervention programs were identified and these included GP prescription, GP referral to an exercise physiologist, mass media campaigns, the TravelSmart program[2], pedometers and the internet. The cost of implementing such interventions was derived from an Australian sector perspective and included costs for both government and patients. The health outcomes of each intervention, on the other hand, were evaluated in terms of disability-adjusted life years (DALYs), which were calculated to determine changes in mortality and morbidity for five physical activity-related diseases, i.e. ischemic heart disease, ischemic stroke, type II diabetes, breast and colon cancer. The number of DALYs averted range from 740 for internet-based intervention to 23,000 for a mass media campaign. Intervention costs also varied from AUS$13 million for the mass media campaign to AUS$410 million for the TravelSmart individualised marketing program. After analysis, two interventions were identified to be most effective and cost-effective – the mass media campaign and the pedometer program. Both interventions showed 100% probability of being cost-saving. An economic analysis was also performed for all six interventions combined in a package and this led to a substantial improvement in population health at under AUS$50,000 per DALY. There were, however, limitations to this study which must be considered. For some interventions, single studies were used for the cost-effectiveness analysis which could limit generalisability of results. Shorter duration studies have been included in the analysis and the level of evidence underpinning the measures of intervention effect was relatively weak. Nonetheless, findings have shown that interventions aimed at increasing physical activity participation are highly recommended in Australia.

The interrogation of the literature revealed a series of systematic reviews published by Ross Gordon, Laura McDermott, Martine Stead and Kathryn Angus from the Institute of Social Marketing, United Kingdom. These reviews were conducted as part of the plan by National Social Marketing Strategy (NSMS) to produce a marketing strategy for health improvement in England (Gordon et al 2006). Three separate reviews were undertaken to examine the effectiveness of social marketing on improving diet (McDermott et al 2006), increasing exercise (Gordon et al 2006), and tackling substance abuse (including tobacco) (Stead et al 2006). For the purpose of these reviews, social marketing was defined using Andreasen's six essential benchmarks of a "genuine" social marketing intervention. In the systematic review focusing on improving diet, McDermott et al (2006) identified only projects which include a media campaign as part of a range of other strategies for reducing cardiovascular disease rates in a high-risk population. The findings from this study indicated that dietary changes attributed to the program were associated with major reductions in the population's cholesterol and blood pressure levels. However, McDermott and colleagues were unable to "unpack" the multi-component interventions to identify which factors actually influence key outcomes, including secular trends.

In the systematic review focusing on increasing exercise, Gordon et al (2006) identified one intervention which primarily used mass media (the VERB project). This

[2] An active transport program targets households with tailored information (e.g., maps of local walking paths, bus timetables) and merchandise (e.g., water bottles, key rings) as an incentive and/or reward for reducing use of cars for transport.

project targeted school children (aged 9-13) and the intervention included activities delivered through other channels in addition to the media element such as educational materials and community events. The intervention targeted levels of physical activity with knowledge outcomes. There was a positive effect on physical activity levels of children who were aware of and took part in the interventions. There was also a positive effect on knowledge outcomes.

In the systematic review focusing on tackling substance abuse, Stead et al (2006) identified four interventions which were primarily mass media based. All four interventions included activities delivered through other channels in addition to the media element (e.g. telephone helpline, support in the community). Most of the mass media and other smoking cessation programs measured smoking prevalence, number of cessation attempts and continuous quitting period. This review identified that mass media interventions (smoking prevention programming and school curriculum) had a positive effect on significantly lowering weekly smoking and smokeless tobacco use at one-year follow-up. The review also identified that mass media-based programs had a significant impact by lowering smoking prevalence (when combined with a community program) and both increasing the likelihood of being a quitter and lowering the odds of being a smoker. However, Stead and colleagues (2006) also identified that a mass media-based program designed to improve the general health of Hispanic Americans on the Texas-Mexican Border had a positive impact on smoking quit rates in one community but not in the other. Stead and colleagues (2006) also concede that in large-scale multi-component and community interventions and mass media programs, it is impossible to control fully for other factors, nor “unpack” successful attributes, which might influence outcomes.

A review of various national campaigns was analysed by Wellings and colleagues (2006). It is important to note that this was not a true review of literature findings; rather the sources of data were campaign materials, evaluation materials, relevant documents and even interviews with key informants. Therefore this body of evidence is fundamentally different to the other publications included within this cohort. Two smoking-related campaigns and one healthy eating campaign were reviewed as part of this initiative. The two smoking campaigns (“Testimonials” and “Give up before you clog up”) seemed to produce mixed results for a range of reasons. The “Testimonial” campaign was successful in increasing awareness, quit attempts and reducing the number of cigarettes smoked. However, there was debate whether this translated into behaviour change. The “Give up before you clog up” campaign was also partially successful with high levels of awareness and spontaneous recall being achieved. However other key objectives of the program were not adequately met (delivering new news and engendering a “Pavlovian response”). The “Five a day” campaign was not an advertising-led campaign. Most of its resources were committed to the school fruit and vegetable scheme. There was no paid-for advertising. Yet, despite this, this campaign, albeit slowly, seems to have achieved high profile across the United Kingdom.

A systematic review was undertaken by Kahn et al (2002) to determine the effectiveness of different approaches to increasing physical activity: informational, behavioural and social, and environmental and policy approaches. Findings from the

review (Kahn et al 2002) have shown effectiveness of two informational interventions (point-of-decision prompts to encourage stair use and community-wide campaigns), three behavioural and social interventions (school-based physical education, social support in community settings, and individually adapted health behaviour change) and one environmental and policy intervention (creation of or enhanced access to places for physical activity combined with informational outreach activities). From these interventions, the community-wide campaigns have incorporated mass media as a component of the whole program. The campaign messages reported in the literature were directed to large audiences through diverse media, including television, radio, newspaper, direct mailings, billboards, and advertisements in transit outlets and trailers in movie theatres. These mass media activities have included some combination of social support, such as self-help groups; risk factor screening, counselling, and education about physical activity in a variety of settings, including worksites, schools, and community events; and environmental or policy interventions such as the creation of walking trails.

There was strong evidence to demonstrate that community-wide campaigns were effective in increasing levels of physical activity as measured by the number of people engaging in physical activity, energy expended and other measures of physical activity. It was, however, impossible to determine the relative contributions of each component. Community-wide campaigns have also been thought to produce other benefits that can improve overall health and build social capital in communities. A greater sense of cohesion and collective self-efficacy may develop from communities working together. Social networks may also be developed or strengthened to achieve intervention goals, and community members may become involved in local government and civic organisations, which could also increase social capital. Proposed barriers to implementation of these interventions are mostly related to the availability of resources. Community-wide campaigns require planning and coordination, well-trained staff and adequate resources to carry out the campaign. Therefore, insufficient resources and a lack of well-trained staff may affect how these interventions are implemented. Findings from studies which examined the use of mass media alone were also reported. There was insufficient evidence found to evaluate the effectiveness of mass media campaigns, when used alone, to increase physical activity.

Quigley et al (2007) examined the evidence for social marketing interventions in encouraging healthy nutrition practices and environment. Five specific areas were covered: high intake of energy-dense, micro-nutrient-poor food; high intake of sugar-sweetened soft drinks and fruit juices; high level of television viewing; home environments that support healthy food choices for children; and school environments that support healthy food choices for children. The main outcomes of interest were nutrition practices and environments that contribute to the environment of healthy weights and prevention of obesity. Findings have shown strong evidence for the effectiveness of social marketing on school environments and moderate evidence for reduced consumption of energy-dense, micro-nutrient-poor foods. Due to the small number of studies, limited evidence was found for impact on consumption of sugar-sweetened beverages, and television viewing. There was also weak evidence for the impact of social marketing on home environments. Relatively

stronger evidence was demonstrated for interventions targeted to low-income populations in home and school environments. This review identified important factors for effective social marketing practices and these include:

- simple messages tailored to a target group, culturally appropriate and acceptable to a wide range of stakeholders and service providers;
- use of a comprehensive approach with multiple intervention strategies and communication channels;
- development of strong partnerships between government, industry, non-government organisations and communities;
- a national approach that is coordinated with, and supports, local programs;
- interventions that are of sustained duration;
- culturally specific and tailored interventions set within a population approach that includes community control, community participation and leadership;
- monitoring and evaluation of social marketing programs to inform and modify programs over time;
- a focus on foods rather than nutrients;
- a focus on environmental barriers (e.g. legislative, pricing, and policy changes) coupled with efforts to change behaviours.

Key barriers to social marketing were also described. The role of the environment was emphasised as crucial and therefore restricting marketing of unhealthy foods is required. Financial incentives for schools to offer unhealthy foods, and incentives to be part of sponsorship and fundraising schemes involving energy-dense food were also described as barriers. Other findings such as those from studies which did not meet all the criteria for social marketing interventions but have given important messages were also reported. Single-approach interventions, like the mass media-only approach or promotion-only interventions, where messages were clear and simple to carry out, were found effective. Mass media-only intervention was particularly effective in influencing the type of milk purchased. A limitation of this review was the inclusion of published evidence only which could mean that some data (e.g. grey and unpublished literature) which may have been informative to this review has not been included.

Socially disadvantaged populations

This review identified two systematic reviews (Niederdeppe et al 2008; Michie et al 2009) which targeted socially disadvantaged groups due to consistent evidence that people from these backgrounds are less successful in achieving behaviour change such as smoking cessation. Both systematic reviews focused on low-income populations, which is merely one index of disadvantage.

Niederdeppe and colleagues (2008) undertook a systematic review of the literature which investigated effectiveness of mass media campaigns which promote smoking cessation among socioeconomically disadvantaged populations. This review included 29 studies from USA, Canada, Australia and Western European nations. The review captured a range of process and outcome measures. Process measures included message recall and message exposure and outcome measures included quit rates, smoking prevalence and relapse rates. This comprehensive review identified three key findings. First, there is considerable evidence that media campaigns to promote smoking cessation at the overall population level are often less effective, at times

equally effective, and rarely more effective among low-SES populations relative to high-SES populations. Many of these campaigns may in fact have the unintended effect of increasing or maintaining existing disparities in smoking rates and mortality burden of tobacco by SES. Secondly it is likely that disparities in the effectiveness of media campaigns may occur at any of the following three stages: differences in meaningful exposure, differences in motivational response or differences in opportunity to sustain cessation in the long term. Third, media campaigns appear to be most effective among low-SES smokers when they are implemented alongside larger tobacco-control programs that include community mobilisation, free nicotine-replacement therapy, telephone counselling, social support or policy changes to change the social and structural context of cigarette use. While recognising some key gaps in literature, the authors provide five best practices for media campaigns among disadvantaged populations:

(1) The simple promotion of self-help materials or a “quit to win” contest, in isolation, should not be undertaken. These efforts tend not to benefit low-SES populations;
(2) Media campaigns should strive to ensure as much exposure as possible, including paid media campaigns, earned media coverage[3], donated media time, and direct marketing;
(3) Media campaigns should be combined, whenever possible, with other tobacco-control program components, including community mobilisation, social support, quit line counselling, provider initiatives, tax increases, free nicotine-replacement therapy distribution, and policy changes;
(4) Media campaigns should conduct formative research to understand the media-use preferences and health-related behaviour among low-SES smokers to ensure that this population is adequately exposed to, and motivated by, the campaign;
(5) Media campaigns should consider the literacy needs, language preferences, and cultural values of low SES smokers.

Michie et al (2009) recently conducted a review to identify evidence underpinning the effectiveness of any health-behaviour intervention aimed at reducing smoking and unhealthy eating or increasing physical activity. Behavioural outcomes relevant to the intervention target (e.g. increased healthy eating and physical activity) were used to evaluate the effectiveness of the intervention. The most frequently used interventions in the studies reviewed were those: providing general information; providing information about the consequences of a particular behaviour; helping to form an intention to change a behaviour; setting specific goals; identifying barriers to changing behaviour; planning social support or social change; and providing rewards contingent on performing the behaviour. Results have shown that effective interventions tended to be more focused, involving only a small set of techniques. It was argued that as the number of component techniques increases, the possible variation in the quality of intervention delivery also increases. Hence, inconsistent effects were also likely to occur. These findings highlighted the need to monitor the fidelity of intervention delivery. A range of techniques were found helpful for low-income groups and these included providing information (e.g. general information, consequences of the behaviour and information about others approval), facilitating goal setting and

[3] Earned media refers to favorable publicity gained through promotional efforts other than advertising.

prompting barrier identification. The authors claimed that these techniques may be working additively, in that providing more information about the benefits of changing behaviour may increase motivation to change, while helping people to form specific, realistic goals, identify barriers and draw on social support may help people to translate motivation into action. Moreover, studies which had long-term follow-up generally reported only positive intervention effects, with non-significant effects demonstrated by studies with short-term follow-up. As a result, Michie et al (2009) hypothesised that effects of interventions targeting low-income groups may take longer to emerge and/or have effects that may be more durable or sustainable over time. However, it must be noted that mass media-specific evidence was not explicitly reported and as such extrapolation was difficult. Results from this review should therefore be considered with caution.

Theoretical framework

There have been widespread calls for health-behaviour interventions to be underpinned by theories of behaviour and behaviour change in their development (Michie et al 2009; Noar et al 2007; Randolph and Viswanath 2004). Behaviour-change theories help in understanding theoretical variables that serve as a determinant of any given behaviour. By using theories of behaviour change, they help us understand these variables and their roles in behaviour prediction and play a vital role in design, implementation and evaluation of interventions aimed at achieving health-behaviour change (Fatusi and Jimoh 2006). Table 3 provides an overview of commonly used theories of behaviour change.

Table 3 Overview of commonly used theories of behaviour change (adapted from Fatusi and Jimoh 2006).

Level	Theory	Behavioural determinants
Individual	Health Belief Model	*Perceived susceptibility* *Perceived severity* *Perceived benefits and barriers* *Cues to action*
	Theory of Reasoned Action / Theory of Planned Behaviour	*Attitudes* *Subjective norms* *Behavioural intentions*
	Social Cognitive Theory / Social Learning Therapy	*Outcome expectancies* *Self-efficacy*
	Stages of Change	*Pre-contemplative* *Contemplative* *Preparation* *Action* *Maintenance*
Social and community	Diffusion of Innovation	*Change agent* *Communication channels* *Context*
	Social Influences	*Context of social interaction* *Social norms* *Social rewards and punishments*
	Social Network Theory	*Social networks* *Social supports*

	Empowerment	*Community organisation* *Community building*
	Social Ecological Model for Health Promotion	*Intra-personal (knowledge, attitudes, risk perception)* *Social, organisational and cultural (social networks)* *Political factors (regulations)*
	Socioeconomic and environmental factors	*Policy* *Resources and living conditions* *Access to prevention*

While there was a plethora of theories used, a gap in the evidence exists with regards to how the stated theories were used as a basis for selecting the techniques utilised in the interventions (especially when it was a complex intervention involving many components). Similarly, current research does not regularly match theories of change with evaluation data. Evidence from two recent systematic reviews across a range of health behaviours indicate that there were few to no linkages between use of theory and its impact on the effectiveness of the intervention (Noar et al 2007; Michie et al 2009).

Noar et al (2007) reported the effect size of "theory only" to be modest (r = 0.65) while the combination of "behaviour plus theory plus demographics" (for tailored interventions) to be the highest (r = 0.122). This rapid review identified a range of theoretical frameworks and many were used in combination. In fact Noar et al (2007) identified that tailoring of four to five theoretical frameworks, or more, were more effective when compared to tailoring of 0-3 theoretical frameworks. Figure 2 provides a diagrammatic overview of theoretical frameworks identified in this rapid review.

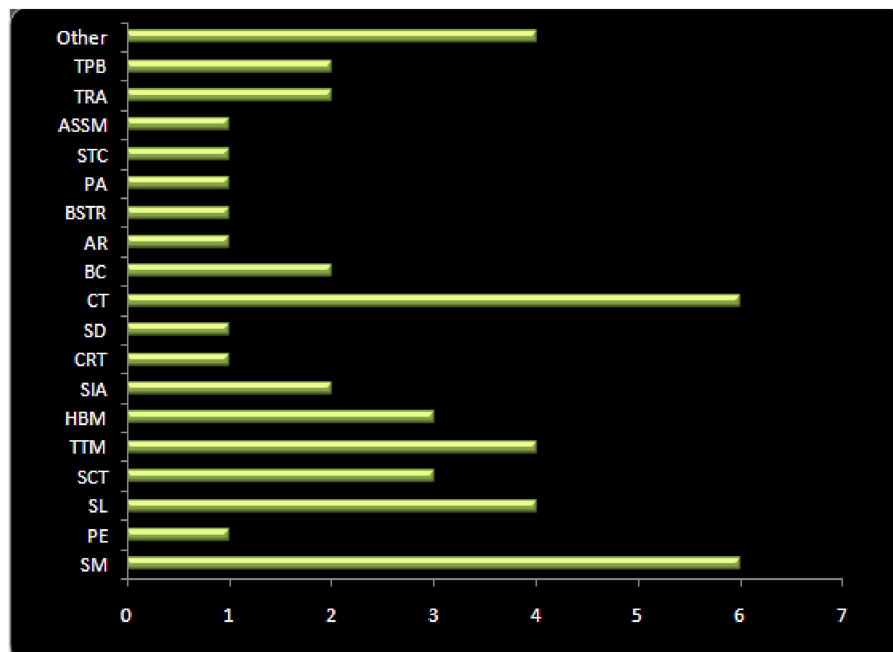


Figure 2 Theoretical frameworks

Legend: SM – Social Marketing; PE – Public Education; SL – Social Learning; SCT – Social Cognitive Theory; TTM – Transtheoretical Model; HBM – Health Belief Model; SIA – Social

Influences Approach; CRT – Communications Research and Theory; SD – Social Diffusion Model; CT – Communication Theory; BC – Behaviour Change Theory; AR – Analogical Reasoning Theory; BSTR – Behavioural Science Theory and Research; PA – Psychosocial Approach; STC – Stages of Change Model; ASSM – Attitude-Social Influence-Self-Efficacy Model; TRA – Theory of Reasoned Action; TPB – Theory of Planned Behaviour; "Other" – Adherence Model, Elaboration Likelihood Model, Lay Health Advisor Model, Precaution Adoption Process Model, Decision-Making Theory, Knowledge-Attitude-Behaviour Model and Social Inoculation Theory.

Media products

Mass media campaigns also utilised a range of different media products to promote their message. Most reviews provide an overview of different media products used by primary research studies. While this is useful information, especially in terms of identifying the structural elements underpinning mass media campaigns, there is often a gap in literature describing the content included in these products, which were intrinsic to the campaign. This is vitally important because the production, the content and the manner in which it is transmitted will very likely influence the meaning it conveys to the audience (Finlay and Faulkner 2005). Figure 3 provides a diagrammatic overview of media products identified in this rapid review.

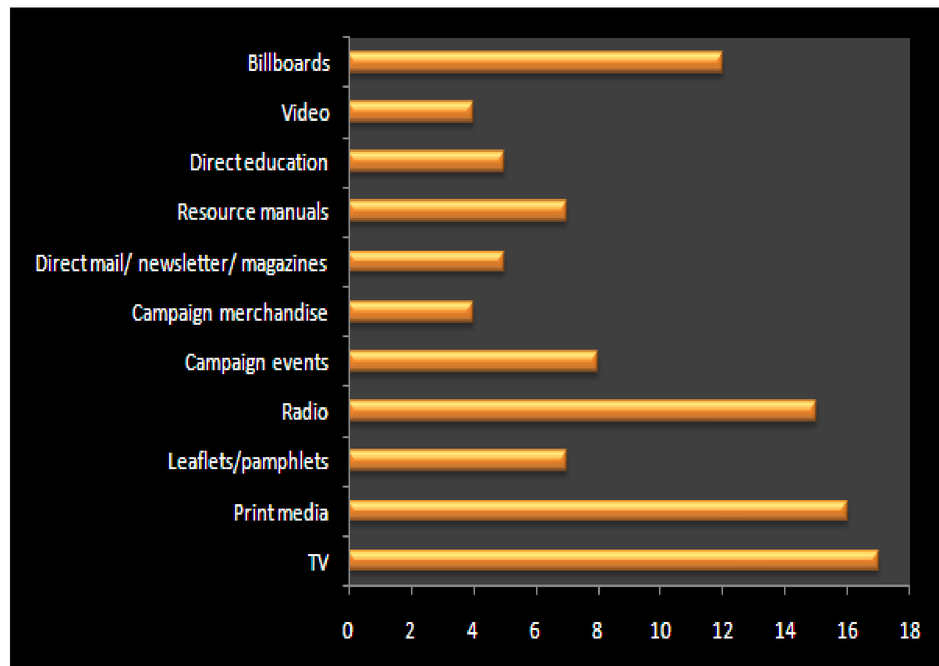


Figure 3 Media products

Legend:

TV advertising/programs; Print media (newspaper, magazine, newsletter); Radio advertising/programs; Campaign merchandise, posters; Direct mail, public service announcement (PSA); Resource manuals, publicity tours; Direct education, websites, workplace flyers; Video, professional papers, telephone information lines; Billboards, cinema advertising, postcards, book.

NHMRC Body of Evidence Matrix

A synthesis of evidence from a range of literature sources has been summarised using the NHMRC Body of Evidence Matrix (2005). This framework takes into account different dimensions of research evidence and ranks them accordingly. After

considering various dimensions of evidence, underpinning the rapid review questions, the overall body of evidence using this matrix was **good (B**) (see Appendix 6).

Component	Evidence Grading
Evidence base *The evidence base is assessed in terms of the quantity, level and quality (risk of bias) of the included studies.*	A
Consistency *The consistency component of the 'body of evidence' assesses whether the findings are consistent across the included studies.*	B
Clinical impact *Clinical impact is a measure of the potential benefit from application of the findings to a population.*	B
Generalisability *This component covers how well the subjects and settings of the included studies match those of the recommendations.*	B
Applicability *This component addresses whether the evidence base is relevant to the Australian health care setting generally.*	B

Core learnings

The aim of this rapid review was to provide a brief synthesis and judgement of available research evidence related to the effectiveness of mass media interventions for healthy eating, increasing physical activity and reducing smoking. It is beyond doubt that large amounts of money, time and resources are committed each year, locally, nationally and internationally, to encourage the general population to eat healthily, get moving, and stop smoking (among the plethora of other messages) (Randolph and Viswanath 2004). Given this is the case, it is only appropriate to investigate what actually works for whom when it comes to behaviour-change interventions (Norman 2008). However, this is not a simple question as past experiences clearly indicate that the success of these interventions, which are often complex, has varied greatly and their effectiveness is difficult to measure.

There is now consistent evidence which indicates that mass media can act as a viable tool for addressing a range of health behaviours. Much of this evidence is derived from the body of literature which focuses on smoking, which is not surprising. There is, however, emerging evidence such findings can be generalised to healthy eating and physical activity. This is, however, a too simplistic answer to a very complex question. If one was to deconstruct the "black box" of mass media interventions, it becomes apparent that for a mass media intervention to be effective, it must be supported by a range of other interventions which influences social, environmental and policy factors, just to name a few. Most mass media interventions, recognising this complex interplay of factors, deliver mass media interventions as one of many concurrent interventions. While this is to be expected, it is then often difficult to isolate the impact of mass media on outcomes. This is clearly evident from the social-marketing literature where mass media is merely one of many strategies (such as educational

sessions, local events etc) utilised to impact on health behaviour (McDermott et al 2006). This information is crucial for funders, policy makers and clinicians, when planning to implement such strategies, or for future interventions, to ensure resources are targeted on the most effective aspect of the strategy. Another complexity when unpacking the "black box" of mass media interventions is the inability to attribute positive outcomes to individual components, or to "packages" of interventions, or to secular trends. For example, it is not clear which messages (i.e. fear, education, deglamourising) portrayed by mass media are most effective for prevention of smoking.

While recognising these limitations, there are some trends which are worth reflecting on. It is widely acknowledged that mass media interventions using more than one medium are more likely to effective. Evidence from this review clearly highlights that many research initiatives have used a plethora of media products and techniques. While the content used in these media products and interventions is rarely divulged, which is a significant drawback, use of a range of products and techniques are recommended. This finding aligns with another key finding of this review which indicates that mass media messages need to be tailored to the target audience. For example, mass media which targets culturally and linguistically diverse groups need to consider use of ethnic media channels. There is mixed evidence with regards to effects over time, with some studies associating shorter follow-up periods with larger effects on health behaviour and others claiming no evidence of time-dilution effects. Given these are based on small numbers of studies, caution is required when interpreting these results.

This review identified a clear paucity of evidence regarding the effectiveness and cost-effectiveness of mass media strategies for disadvantaged populations. As highlighted before, in order to create an evidence base for "what works for whom", it is imperative such evidence gaps are closed. This rapid review identified two systematic reviews focusing on low-income populations, which is one index of disadvantage. Key findings common to both systematic reviews include the need for focused interventions which target a range of factors as they are more likely to be effective in achieving behaviour change. Universal programs are rarely effective in achieving behaviour change in low-income populations and at times can increase disparities between low-income and high-income populations (especially for smoking). Similar evidence gaps persist for cost-effectiveness research with only one recent study providing emerging evidence supporting the use of mass media for physical activity.

This review also identified a plethora of theories on health behaviour reported across many reviews. Some common ones include the health belief model, social cognitive theory, transtheoretical model, theory of reasoned action, theory of planned behaviour, just to name a few. While many studies acknowledge these theories/frameworks, few explicitly identify theories which underpin their mass media strategies (such as message development, campaign strategy). While there is emerging evidence which highlights the importance of theory-based mass media campaigns, with the key message being "the more the better", there is still a disconnect between the use of theory, development of interventions informed by theory and evaluation of interventions relative to theory.

The literature also highlights a range of **critical success factors**, which could be considered as part of mass media interventions. These critical success factors were extracted, in a narrative form, from the retrieved literature. The following list of factors was identified from a range of reviews as being consistently critical in ensuring the success of mass media interventions. In the section below, each critical success factor is presented along with a *Recommended Implementation Plan (RIP)*.

Critical success factor one: Use of theory

The use of theory to inform and underpin mass media campaign, while supported by a growing body of evidence, continues to be overlooked (Noar et al 2007, Randolph and Viswanath 2004, Sowden 2009). Use of behaviour-change theory in mass media campaigns can influence target audiences' behaviour by influencing the determinants leading to that behaviour.

Recommended Implementation Plan

- Any mass media campaign should be underpinned by a sound theoretical framework and a careful understanding of determinants of behaviours targeted in the mass media campaign.
- Consider a range of theories of behaviour change when developing appropriate message strategies and when considering the right media products to place these messages. Currently, there is no "one size fits all" approach and the evidence supports the use of many theories to inform the development and implementation of mass media campaigns.
- Theory-based mass media campaigns should also extend into ongoing and regular evaluation in order to ensure appropriate outcomes are attained.

Critical success factor two: Community involvement

Any population-based campaign should be underpinned by community involvement, engagement and partnership with key stakeholders (Marshall et al 2004, Milat et al 2005, Quigley et al 2007, Niederdeppe et al 2008, Wakefield et al 2003). This overarching success factor builds on, and complements, the previous critical success factors.

Recommended Implementation Plan

- The community must be involved in the development, implementation and evaluation of mass media campaigns.
- Mass media campaigns and programs can be informed by communities' knowledge of "what works" in their communities.
- Active involvement of communities may be in the form of developing social approval for health-enhancing behaviours, promoting access (such as leisure activities) and developing and maintaining networks.

Critical success factor three: Targeted and tailored

There is a growing body of evidence (Friend and Levy 2002, Marshall et al 2004, Milat et al 2005, Noar et al 2007) which recommends mass media interventions should be targeted and tailored to suit the requirements of those whose behaviour it aims to influence. There is good evidence which indicates that targeted and tailored programs

are more successful than those without clarity over targeting, which are hence considered to be generic.

Recommended Implementation Plan

- Identify key groups of people whose behaviour mass media campaign aims to influence. Once this is defined, the content and products of communication could be defined.
- With specific population groups, such as culturally and linguistically diverse groups, mass media campaigns should be tailored in culturally appropriate ways. Similarly, for low-income groups targeted, small sets of interventions may be more effective than a generic approach.

Critical success factor four: Consider all influencing factors

There is consistent evidence (Niederdeppe et al 2008, Michie et al 2009, Quigley et al 2007, Randolph and Viswanath 2004, Sowden 2009) from the literature which recommends the need to understand and consider all factors that will, or are likely to, influence the target group. There are examples from the literature where failure to address these factors has been a barrier to effective mass media campaigns.

Recommended Implementation Plan

- Undertake formative research to understand target audience perspectives on media use preferences and health-related behaviour. This will ensure the target audience is particularly exposed to, and motivated by, the mass media campaign.
- As part of the influencing factors, it is important to consider the literacy needs, language preferences and other cultural values of the target audiences.
- Consideration of these issues is particularly relevant in socially disadvantaged population groups

Critical success factor five: Appropriate and supportive environment

There is good evidence (Randolph and Viswanath 2004, Sowden 2009) from the literature which recommends the need to create an appropriate and supportive environment for the target audience to be exposed to, and to make, the recommended change.

Recommended Implementation Plan

- Ensure processes are in place to identify, and target, barriers (social, environmental, policy) that prevent the target audience from making the recommended change.
- This may include the social and environmental context in which the proposed behaviour change is expected to occur. Structural (physical environment) and process (access to services) changes may need to be considered.
- An appropriate information environment[4] and maximising the exposure of campaign messages to the target audience are vitally important. Media campaigns can achieve this via paid or donated media time or space. This

[4] The aggregate of individuals, organisations, or systems that collect, process and disseminate information.

could be complemented with other media products and media mix such as pamphlets and other promotional materials.

Critical success factor six: Comprehensive and integrated strategy

There is consistent evidence from the literature (Marshall et al 2004, Milat et al 2005, Niederdeppe et al 2008, Noar et al 2007, Sowden 2009) which recommends mass media interventions should be supported by multiple interventions and a range of products. An integrated strategy which utilises a range of creative and concomitant interventions should be considered.

Recommended Implementation Plan

- Mass media campaigns should be complemented by other programs such as community mobilisations, social support, counselling, policy changes and access, just to name a few.
- Other elements (such as new and improved structures and processes) should be part of any mass media strategy in order to assist people to take the action stated by the mass media messages (such as healthy food available in canteen, availability of quit counsellors).
- This may also include opportunities via legislation and regulation to make mass media campaign effects strong and sustainable.

Critical success factor seven: Assessment and analysis

The need for rigorous assessment and ongoing analysis of any mass media campaigns, as part of process analysis and exploring opportunities for change, has been identified in the literature (Michie et al 2009, Quigley et al 2007, Randolph and Viswanath 2004). While it is important to identify any expected behaviour change, other process markers of success (or lack thereof) of campaigns, such as exposure, are equally important to capture. Inadequate analysis during the developmental and implementation stages of a mass media campaign can be a significant barrier to success.

Recommended Implementation Plan

- Assess campaign objectives and set out key indicators (process and outcomes) of success.
- Ensure there is clear justification (based on evidence) for any mass media campaign (design, development and implementation).
- Clearly set out which process and outcomes will be measured and how they will be captured.
- Ensure provisions for ongoing and regular evaluations are considered and lessons from these processes “fed back” into the campaign.
- The evaluation may focus on effectiveness (including cost-effectiveness), equity, safety, acceptability and feasibility of the mass media campaign. Many of these elements also form the core elements of health care quality.

Literature gaps	This rapid review identified key gaps in the literature which require further reflection. They are: • When unpacking the “black box” of mass media interventions, it is still unclear which strategies work best for which groups. It is imperative that future research investigates which interventions are appropriate to which groups of populations to achieve optimal outcomes. As part of quality health care, of which primary prevention is an integral component, the right intervention, at the right time, for the right population group, for the right outcome is an important consideration. • There is a scarcity of data on the cost-effectiveness of mass media interventions for general populations and special-interest groups such as socioeconomically disadvantaged populations. • While there is abundant information on various media products used as part of mass media campaigns, literature is scant on the content used in these products. • Emergence of new technology brings new challenges. The introduction of user-control technology such as TiVo (where you can fast forward through advertisements), the internet (social networking sites) and mobile phones (an all- in-one entertainment centre) challenge the traditional understanding of “mass media” and its use as an intervention medium. Future research should investigate the influence of these new technologies as facilitators, or barriers, for health behaviour interventions.
Limitations of this rapid review	There are some limitations to this rapid review and the evidence reported in these reviews. Firstly, while all attempts were made to interrogate and access all relevant literature, it is possible some publications may have been missed in the search process. This could have been due to access to relevant databases, use of alternate key words and varying terminologies. Secondly, while the processes underpinning this review were systematic and transparent, for pragmatic and contextual reasons, publications which reported on the process of undertaking mass media interventions (the “how to”) were also included. Thirdly, one of the recurrent issues when interpreting these systematic review findings was the imperfect primary research designs included in these reviews. Several of the primary research studies had poor evaluations with several methodological issues (such as lack of adequate descriptions of interventions, and poor long-term follow-up).

References

Included publications

Bala, M, Strzeszynski, L, & Cahill, K 2008, Mass media interventions for smoking cessation in adults, *Cochrane Database of Systematic Reviews*, Issue 1. Art. No.: CD004704. DOI: 10.1002/14651858.CD004704.pub2.

Cobiac LJ, Vos T and Barendregt JJ 2009, Cost effectiveness of interventions to promote physical activity: a modelling study, *PLoS Med* 6(7): e1000110 doi:10.1371/journal.pmed.1000110.

Farrelly, MC, Niederdeppe, J, & Yarsevich, J 2003, Youth tobacco prevention mass media campaigns: past, present, and future directions, *Tobacco Control*, vol.12, no. Suppl 1, pp. i35-i47.

Finlay, S, & Faulkner, G 2005, Physical activity promotion through the mass media: Inception, production, transmission and consumption, *Preventive Medicine*, vol. 40, pp. 121-130.

Friend, K, & Levy, DT 2002, Reductions in smoking prevalence and cigarette consumption associated with mass-media campaigns, *Health Education Research*, vol. 17, no. 1, pp. 85-98.

Gordon, R, McDermott, L, Stead, M, & Angus, K 2006, The effectiveness of social marketing interventions for health improvement: What's the evidence?, *Public Health*, vol. 120, pp. 1133-1139.

Gordon, R, McDermott, L, Stead, M, Angus, K, & Hastings, G 2006, *A review of the effectiveness of social marketing: Physical activity interventions*, NSMC Report 1, Institute for Social Marketing (ISM), University of Stirling & The Open University, London.

Hastings, G, McDermott, L, Angus, K, Stead, M, & Thomson, S 2006, *The extent, nature and effects of food promotion to children: a review of the evidence*, World Health Organization, Switzerland.

Marshall, AL, Owen, N, & Bauman, AE 2004, Mediated approaches for influencing physical activity: update of the evidence on mass media, print, telephone and website delivery of interventions, *Journal of Science and Medicine in Sport*, vol. 7, no. Suppl 1, pp. 74-80.

McDermott, L, Stead, M, Gordon, R, Angus, K, & Hastings, G 2006, *A review of the effectiveness of social marketing: Nutrition interventions*, NSMC Report 2, Institute for Social Marketing (ISM), University of Stirling & The Open University, London.

McDermott, L, Stead, M, Hastings, G, & Angus, K 2005, *A systematic review of the effectiveness of social marketing nutrition and food safety interventions*, *safe*food Final Report, Institute for Social Marketing (ISM), University of Stirling & The Open University, London.

Michie, S, Jochelson, K, Markham, WA, & Bridle, C 2009, Low-income groups and behaviour change interventions: a review of intervention content, effectiveness and theoretical frameworks, *Journal of Epidemiology and Community Health*, vol. 63, pp. 610-622.

Milat, AJ, Carroll, TE, & Taylor, JJ 2005, Culturally and linguistically diverse population health social marketing campaigns in Australia: a consideration of evidence and related evaluation issues, *Health Promotion Journal of Australia*, vol. 16, no. 1, pp. 20-25.

Niederdeppe, J, Kuang, X, Crock, B, & Skelton, A 2008, Media campaigns to promote smoking cessation among socioeconomically disadvantaged populations: What do we know, what do we need to learn, and what should we do now?, *Social Science & Medicine*, vol. 67, no. 1343-1355.

Randolph, W, & Viswanath, K 2004, Lessons learned from public health mass media campaigns: marketing health in a crowded media world, *Annual Reviews in Public Health*, vol. 25, pp. 419-437.

Silver, MZ 2001, Efficacy of Anti-Tobacco mass media campaigns on adolescent tobacco use, *Pediatric Nursing*, vol. 27, no. 3, pp. 293-296.

Sowden, AJ 1998, Mass media interventions for preventing smoking in young people, *Cochrane Database of Systematic* Reviews, Issue 4. Art. No.:CD001006. DOI:10.1002/14651858.CD001006.

Stead, M, Gordon, R, Angus, K, McDermott, L 2007, A systematic review of social marketing effectiveness, *Health Education*, vol. 107, no. 2, pp. 126-191.

Stead, M, McDermott, L, Gordon, R, Angus, K, & Hastings, G 2006, *A review of the effectiveness of social marketing: Alcohol, tobacco and substance misuse interventions*, NSMC Report 3, Institute for Social Marketing (ISM), University of Stirling & The Open University, London.

Thornley, L, Quigley, R, Watts, C, Conland, C, Meikle, R, Ball, J, & Quigley and Watts Ltd 2007, *Healthy Eating: rapid evidence review of nutrition social marketing interventions to prevent obesity,* Health Sponsorship Council (HSC), Ministry of Health, New Zealand.

Wakefield, M, Flay, B, Nichter, M, & Giovino, G 2003, Effects of Anti-Smoking advertising on youth smoking: a review, *Journal of Health Communication*, vol. 8, pp. 229-247.

Wellings, K, Crosier, A, McVey D, & Jennings, T 2006, *National Health-related Campaigns Review: a review of 11 national campaigns*, NSMC Report 7, National Social Marketing Centre, Department of Health and Consumer Focus, London.

Background literature

Fatusi AO and Jimoh A 2006, The Roles of Behaviour Change Communication and Mass Media, in *Aids in Nigeria: A Nation on the Threshold*, eds O Adeyi, PJ Kanki, O Odutolu and JA Idoko, Harvard University Press.

Gross PF, Leeder SR, Lewis MJ 2003, Australian confronts the challenge of chronic disease, *The Medical Journal of Australia,* vol. 179, pp. 233-234.

Moodie R, Daube M, Carnell K, Connors C, Larkin S, Roberts L, et al 2008, Australia: the healthiest country by 2020: a discussion paper, *National Health Preventative Task Force.*

Mass media

Bertrand JT, O'Reilly K, Deninson J, Anhang R, Sweat M 2006, Systematic review of the effectiveness of mass communication programs to change HIV/AIDS-related behaviours in developing countries, *Health Education Research,* vol. 21, no. 4, pp. 567-597.

Norman GJ 2008, Answering the "what works?" question in health behaviour change, *American Journal of Preventive Medicine,* vol. 34, no. 5, pp. 449-450.

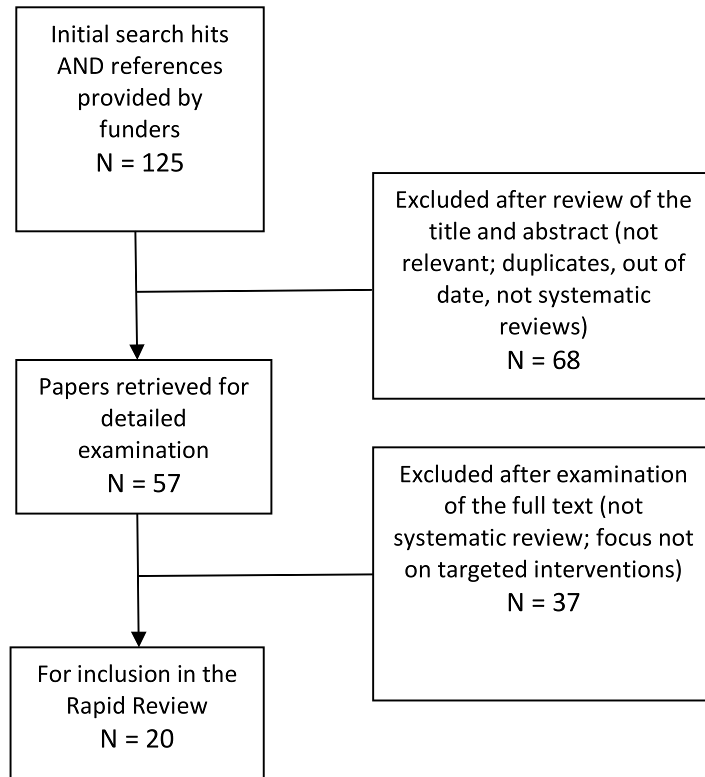
World Health Organisation 2008, Prevention and control of non-communicable diseases: implementation of the global strategy. World Health Organization.

Technical literature

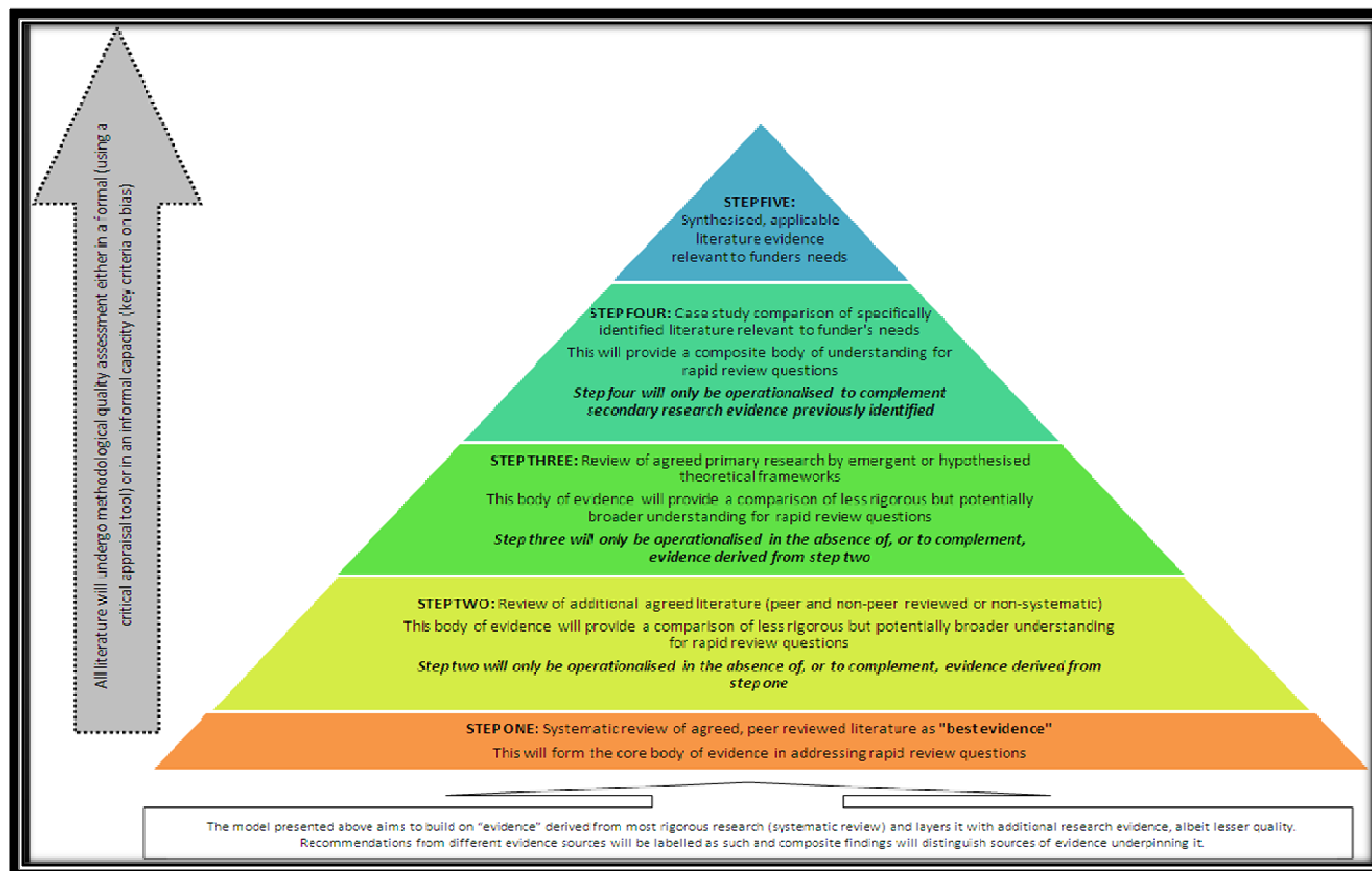
National Health and Medical Research Council (2005): NHMRC additional levels of evidence and grades for recommendations for developers of guidelines, PILOT PROGRAM 2005 - 2007 (accessible at http://www.nhmrc.gov.au/_files_nhmrc/file/guidelines/Stage%202%20Consultation%20Levels%20and%20Grades.pdf)

Critical Appraisal Skills Program (CASP) http://www.phru.nhs.uk/pages/PHD/CASP.htm

Appendix 1: Flowchart of review selection process



Appendix 2: CAHE approach to literature inclusion in Rapid Reviews



Appendix 3: Critical appraisal (reviews)

Criteria
1: *Did the review ask a clearly-focused question?*
2: *Did the review include the right type of study?*
3: *Did the reviewers try to identify all studies?*
4: *Did the reviewers assess the quality of the included studies?*
5: *If the results of the studies have been combined, was it reasonable to do so?*
6: *How are the results presented?*
7: *How precise are these results?*
8: *Can the results be applied to the local population?*
9: *Were all important outcomes considered?*
10: *Should policy or practice change as a result of the evidence contained in this review?*

Study	1	2	3	4	5	6	7	8	9	10
Tier 1 Publications										
Bala, Strzeszynski & Cahill (2008)	√	√	√	√	NA	N T	P % S	√	√	?
Farrelly, Niederdeppe & Yarsevich (2003)	√	√	X	X	X	N T	#	X	√	?
Finlay & Faulkner (2005)	√	√	√	X	NA	N T	#	√	?	?
Friend & Levy (2002)	√	√	X	X	NA	N T	P %	X	√	?
Marshall, Owen & Bauman (2004)	√	X	X	X	NA	N	#	?	?	?
Milat, Carroll & Taylor (2005)	√	√	√	X	NA	N T	#	√	√	X
Niederdeppe et al. 2008	√	√	√	X	NA	N T	%	**?**	√	X

Study	1	2	3	4	5	6	7	8	9	10
Noar, Benac & Harris (2007)	√	√	√	X	√	N T Meta-analysis performed	P S	√	√	√
Randolph & Viswanath (2004)	√	√	X	X	NA	N	#	?	?	X
Silver (2001)	√	?	√	X	NA	N	#	X	X	X
Sowden (2009)	√	√	√	X	NA	N T	P % S	X	√	?
Wakefield et al. (2003)	X	√	X	X	NA	N T	#	X	√	?
Tier 2 Publications										
Gordon et al. (2006) ***Physical Activity Interventions***	√	√	√	?	NA	N T	#	√	√	X
McDermott et al. (2006) ***Nutrition***	√	√	√	√	NA	N	P % S	?	√	?
McDermott et al. (2005)	√	√	√	√	NA	N T	P E S	?	√	√
Michie et al. (2009)	√	√	√	X	NA	N T	P S	?	√	√
Quigley et al. (2007)	√	√	NA	√	NA	N T	#	√	√	?
Stead et al. (2006) ***alcohol, tobacco, substance misuse***	√	√	X	X	NA	N T	P % S	√	√	?

Study	1	2	3	4	5	6	7	8	9	10
Kahn et al. (2002)	√	√	√	√	NA	N T	#	√	√	√
Wellings et al. (2006) ***National Health-related campaigns***	?	?	?	?	NA	N T	#	√	?	?

√: Yes
X: No
?: Can't tell
NA: Not Applicable
N: Narrative form
T: Tables used
P: P values included
%: percentage change
E: Effect sizes
S: Sound statistical analysis
#: no statistical analysis data displayed

Appendix 4: Critical appraisal (cost-effectiveness)

Cost-Effectiveness Evaluation

<table>
<tr><td colspan="2">CASP</td><td>Cobiac, Vos & Barendregt (2009)</td></tr>
<tr><td colspan="2">Was a well-defined question posed?</td><td>Yes</td></tr>
<tr><td colspan="2">Was a comprehensive description of the competing alternatives given?</td><td>Yes</td></tr>
<tr><td colspan="2">Does the paper provide evidence that the program would be effective (i.e. would the program do more harm than good)?</td><td>Yes</td></tr>
<tr><td rowspan="3">Were all important and relevant resource use and health outcome consequences for each alternative:</td><td>A) Identified?</td><td>Yes</td></tr>
<tr><td>B) Measured accurately in appropriate units prior to evaluation?</td><td>Yes</td></tr>
<tr><td>C) Valued credibility?</td><td>Yes</td></tr>
<tr><td colspan="2">Were resource use and health outcomes consequently adjusted for different times at which they occurred (discounting)?</td><td>No.</td></tr>
<tr><td colspan="2">Was an incremental analysis of the consequences and costs of alternatives performed?</td><td>Yes</td></tr>
<tr><td colspan="2">Was an adequate sensitivity analysis performed?</td><td>Yes</td></tr>
<tr><td colspan="2">Did the presentation and discussion of the results include enough of the issues that are required to inform purchasing decision?</td><td>Yes</td></tr>
<tr><td colspan="2">Were the conclusions of the evaluation justified by the evidence presented?</td><td>Yes</td></tr>
<tr><td colspan="2">Can the results be applied to the local population?</td><td>Yes</td></tr>
</table>

Appendix 5: Data extraction

Publication details	Issue addressed	Target participants	Population group	Process measures	Outcome measures	Key findings
Bala et al (2008)	Smoking	≥15 year olds	Smokers and non-smokers Afrikaners White, Hispanic, Asian, African Americans, Chinese, Vietnamese, Korean. Vietnamese-American male current smokers Male veterans	Media weight Intervention costs Campaign awareness/ reach Cost-effectiveness	Smoking prevalence Quit rates Number of cigarettes smoked Knowledge of risk factors, diet and attitudes Point prevalence of daily smoking. Per capita cigarette consumption (based on aggregated sales data) Smoking behaviour Relapse rate Abstinence rate Smoking/not smoking at 18m.	Tobacco-control programs that include mass media campaigns may change smoking behaviour in adults, but the evidence comes from studies of variable quality and scale. The specific contribution of the mass media component is unclear. The duration and intensity of an intervention may affect its impact on smoking behaviour, but evaluations need to extend for long enough to detect lasting changes, and to allow for confounders and for secular trends. No consistent relationship was observed between campaign effectiveness and age, education, ethnicity or gender.
Farrelly et al (2003)	Smoking	Youth	Girls Hispanic African-American Asian-American	Media recall	Smoking initiation Smoking prevalence	The current experimental research indicates that mass media prevention campaigns are effective and suggests that they may be most effective when complemented with school or community-based programs. Mass media campaigns have the advantage of reaching a large fraction of target audiences relatively inexpensively compared with community-based programs. There is only limited evidence that counter-marketing is a cost-effective strategy in isolation and the current literature provides little guidance toward designing successful campaigns. In

Publication details	Issue addressed	Target participants	Population group	Process measures	Outcome measures	Key findings
						addition, subtler questions about the effects of message theme, emotional content, and stylistic features remain unanswered. Finally, the home media environment has become increasingly complex in recent years. Reaching teens through television is increasingly difficult, as technology such as TiVo allows viewers to avoid viewing commercials, and other media (video games, internet) compete for their attention. How will broadcast media campaigns continue to reach teens?
Finlay & Faulkner (2005)	Physical activity	16 – 65+ year olds or population not stated	Groups with high prevalence of obesity	None stated	Determinants of physical activity behaviour Audience knowledge Recall of media message	Overall, recent studies support mass media interventions in influencing short-term physical activity message recall and to a lesser extent associated changes in physical activity knowledge. In these studies the media is viewed simply as a means to reach a large audience and not as a meaning-making institution on its own. It is conceived as a conduit rather than as a constructor and interpreter of meaning.
Friend & Levy (2002)	Smoking	Youth Adults	None stated	Not stated	Smoking prevalence measured in terms of the number of smokers as a percent of the population Cigarette consumption was measured as a percent of the population as per capita cigarette consumption	Well-funded and implemented mass-media campaigns targeted at the general population and implemented at the state level, in conjunction with a comprehensive tobacco-control program, are associated with reduced smoking rates. Youth-oriented interventions have shown more mixed results, particularly smaller, community-level media programs, but indicate strong potential. The role of an ad's content, meaning the message or theme portrayed is unclear. Additional research is needed on the relationship of different types of content to changes in smoking behaviour.
Marshall et al (2004)	Physical activity	Not stated	Not stated	Not stated	Physical activity behaviour	Public health strategies to promote and support PA for whole populations and higher risk subgroups require that we learn more about mediated forms of program delivery and how to make these different approaches more effective and more widely available. The central Issue for 'mediated' approaches to the delivery of PA programs Is that none of the Individual media (mass media, print, telephone or Internet) Is likely to be optimally effective when used in Isolation. In the context of a comprehensive and adequately resourced campaign, mediated approaches are likely to be

Publication details	Issue addressed	Target participants	Population group	Process measures	Outcome measures	Key findings
						relevant and potentially effective ingredients of wider population-based strategies. In the context of smaller scale programs well-planned combinations of two or more media may be practical and effective.
Milat et al (2005)	Smoking	Adults	Culturally and linguistically diverse groups	Not stated	Smoking prevalence Daily consumption of cigarettes Knowledge and attitudes	Given the paucity of CLD evaluation studies, it is difficult to draw clear conclusions in relation to the characteristics of effective CLD population health social marketing campaigns in Australia. However, there is tentative evidence supporting the potential efficacy of social marketing campaigns that specifically target CLD communities. CLD communities access campaign-related information from both mainstream and ethnic media channels.
Niederdeppe et al (2008)	Smoking	Adults	Low income Rural populations Lower SES African-American women Rural female blue collar employees Lower-middle and working class pregnant women Hispanic-Latino smokers, primarily low income	Message recall Message exposure	Quit rates Smoking prevalence Relapse rates	First, there is considerable evidence that media campaigns to promote smoking cessation at the overall population level are often less effective, sometimes equally effective, and rarely more effective among low SES populations relative to high SES populations. Second, disparities in the effectiveness of media campaigns between SES groups may occur at any of three stages: differences in meaningful exposure, differences in motivational response, or differences in opportunity to sustain cessation in the long-term. Third, media campaigns appear most effective among low SES smokers when they are implemented alongside larger tobacco-control programs that include community mobilization, free NRT, telephone counselling, social support, or policy changes to change the social and structural context of cigarette use.
Noar et al (2007)	Generic (preventative, screening, vaccination) Smoking cessation	All population	All population	A range of different measures (but focus on outcome measure)	Health behaviour	Tailored print interventions have been effective in cessation of smoking, adoption of healthy diet and adoption of exercise. Tailored messages can positively affect, in comparison to non-tailored messages, health behaviour change.

Publication details	Issue addressed	Target participants	Population group	Process measures	Outcome measures	Key findings
	Diet Mammographic screening Exercise Vaccination / immunisation Pap test "Other" (e.g.: sunscreen use, safe sex, seatbelt use etc)					
Randolph & Viswanath (2004)	Smoking Physical activity Healthy eating	Youth Adults	Not stated	Message recall	Behaviour and attitude change	
Silver (2001)	Smoking	Youth (7-18 years old)	Girls	None stated	Progression to established smoking Smoking behaviour Smoking initiation	Provides data that suggest that mass media anti-tobacco campaigns targeted at children are effective in preventing tobacco use. Advertisements that target school-age children and take into account the audience's psychological maturity (analogical reasoning ability) are effective and anti-tobacco mass media advertising campaigns may be most effective in reducing use in children when used as part of a multifaceted approach, including community health education in schools.
Sowden (2009)	Smoking	9-18 year olds	Hispanic Asian African-American Girls	Recall of media campaign Program reach	Perceptions of consequences of smoking, attitudes of friends to smoking, intention to smoke, and smoking behaviour. Knowledge about smoking Refusal expectations Smoking behaviour of	There is some evidence that the mass media can be effective in preventing the uptake of smoking in young people, but overall the evidence is not strong. Two studies were associated with reductions in smoking behaviour. One found that a mass media campaign was effective in influencing smoking behaviour compared with no intervention. (Hafstad 1997). One found that a mass media campaign combined with a schools-based program was more effective than a schools-based program alone (Flynn 1995). The two successful campaigns were similar in terms of intensity and duration, which was not common across the studies which did not report positive findings.

Publication details	Issue addressed	Target participants	Population group	Process measures	Outcome measures	Key findings
					student and parents Level of TV viewing, and parental involvement. Daily smoking Perception of friends' smoking Perception of friends' approval of smoking	
Wakefield et al (2003)	Smoking	5th-9th graders 12-15 year olds	Girls	Not stated	Smoking prevalence Smoking initiation Daily prevalence of smoking Smoking quit rates Odds of smoking	These studies suggest that anti-smoking advertising can have an effect on smoking uptake, and may be strengthened by concomitant exposure to school-based smoking prevention programs. Effects seem more reliable when exposure occurs early among youth in pre-adolescence or early adolescence than later in adolescence by preventing commencement of smoking. Consistent with communications research and theory, anti-smoking advertising has more reliable positive effects when it leads to emotional arousal and when the target audience discusses the message. Overall, the findings of this review indicate that there is no single ''recipe'' for anti-smoking advertising that leads to reductions in youth smoking. Anti-smoking advertising can influence youth smoking, but whether it does in the context of individual anti-smoking campaigns needs to be the subject of careful evaluation.

Publication	Theoretical framework	Campaigns	Media products										
			TV	Print medium	Leaflets / pamphlets	Radio	Campaign events	Campaign merchandise	Direct mail	Resource manuals	Direct education	Video	Bill-boards
Finlay & Faulkner (2005)	SM; PE; SL; SCT; TTM; HBM	**Stanford Five-City Project**; **Active Australia**; **ACTIVE for LIFE; Fighting Fat, Fighting Fit**; **Small Steps**; **Wheeling Walks Yuma on the Move**.	√	√	√	√	√	√	√	√	√	√	√
Wakefield et al (2003)	SIA; CRT	**North Karelia**; **Minnesota Heart Health Program**; **Stanford Five City Project**; **Vermont Study**; **Project Sixteen**; **South Eastern US**; **Southern California**; **Norway.**	√	√		√	√		√				√
Bala et al (2008)	SD; SL; TTM; CT; SM	**CORIS**; **California Tobacco Control**; **Smoking Cessation among Vietnamese-American Men – II**; **Massachusetts Tobacco Control Program**; **Texas Tobacco Prevention Pilot Initiative; Smoking Cessation among Vietnamese-American Men - I; Health Education Authority for England's anti-smoking TV campaign**; **Mogielnicki**; **Stanford 3-City Project.**	√	√	√	√	√	√	√	√	√	√	√
Friend & Levy (2002)	None stated	**California Tobacco Control Program**; **Massachusetts Tobacco Control Program**; **Michigan**; **Oregon Tobacco education and Prevention Program**; **Florida Tobacco Pilot**	√			√							

Publication	Theoretical framework	Campaigns	Media products										
			TV	Print medium	Leaflets / pamphlets	Radio	Campaign events	Campaign merchandise	Direct mail	Resource manuals	Direct education	Video	Bill-boards
		Program.											
Silver (2001)	SL; BC; AR	**Massachusetts; Peracchio; Worden**.	√	√		√							√
Marshall et al (2004)	None stated	None stated	√	√	√	√					√	√	
Sowden (2009)	BSTR; SIA; CT; SL	**Bauman**; **Flay**; **The Television, School and Family Smoking Prevention and Cessation Project**; **Hafstad** ; **Worden**.	√		√	√	√	√		√			√
Niederdeppe et al (2008)	BC; SCT; TTM; CT	**Free NRT promotion**; **MA anti-smoking Campaign**; **Quit to win contest; Stanford 5-city project**; **Quit date '88**; **Large-scale state programs with media campaigns** ; **Australian 2-city anti-smoking media campaign**; **Free NRT**; **Freedom from smoking**; **Quit line campaign**; **CDC anti-smoking PSA campaign**; **Smoke line Campaign**; **Community coalitions to help women quit smoking**; **Freedom from smoking for you and your family**; **Victoria state antismoking**; **Quit and win**; **Freedom from smoking in 20 days**; **California anti-tobacco media campaign**; **Mailed behaviour change intervention**; **Health works for women**; **Smoking and pregnancy**	√	√		√	√		√	√		√	√

Publication	Theoretical framework	Campaigns	Media products										
			TV	Print medium	Leaflets / pamphlets	Radio	Campaign events	Campaign merchandise	Direct mail	Resource manuals	Direct education	Video	Bill-boards
		campaign; **Neighbours for a smoke free north side**; **Bluegrass 2001 quit and win contest**; **Tailored intervention**; **Programa latino para dejar de fumar**; **Programa a su salud**; **Si, puedo**; **Coeur en sante' St.-Henri**; **Kick it!**; **Alliance of black churches health project**; **Adios al fumar**.											
Farrelly et al (2003)	PA;	**Flynn** ; **Minnesota Heart Health Program**; **Norway** (media campaign); **Texas Tobacco Prevention Initiative**; **Minnesota state-wide anti-smoking campaign**; **Massachusetts tobacco control programme**; **Truth campaign.**	√	√			√						√
Milat et al (2005)	Not stated	**Good Heart Good Life**; **Australian Government 1997 National Tobacco Campaign**.	√	√		√				√	√		
Randolph & Viswanath (2004)	TTM;	**American Legacy Foundations' "truth"**; **Phillip Morris' "Think. Don't smoke"**. **"Yuma on the Move"**; **Reger**.	√	√							√		√
Noar et al (2007)	STC, TTM, HBM, SCT, ASSM, TRA, TPB, Other	Print only		√	√			√	√				

Theoretical framework legend:
SM—Social Marketing; PE—Public Education; SL—Social Learning; SCT—Social Cognitive Theory; TTM—Trans theoretical Model; HBM—Health Belief Model; SIA – social influences approach; CRT -communications research and theory; SD -Social diffusion Model; CT – communication theory; BC – Behaviour change theory; AR – Analogical reasoning theory; BSTR -Behavioural science theory and research; PA -psychosocial approach; STC - Stages of change model: ASSM - Attitude-social influence- self-efficacy model; TRA - Theory of reasoned action; TPB – Theory of planned Behaviour; "Other" – adherence model, elaboration likelihood model, lay health advisor model, precaution adoption process model, decision-making theory and social inoculation theory).

Media products legend:
TV advertising/ programs; Print medium (newspaper, magazine, newsletter); Radio advertising/programs; Campaign merchandise, posters; Direct mail, public service announcement (PSA); Resource manuals, publicity tours ; Direct education, websites, workplace flyers ; Video, professional papers, telephone information lines; Billboards, cinema advertising, postcards, book.

Publication details	Issue addressed	Target participants	Population group	Measures	Mass media findings	Overall SR findings
Michie et al (2009)	Smoking, physical activity and healthy eating	Adults	Low-income groups African-Americans	Process: Not stated Outcome: Smoking prevalence Tobacco use Quit rates	None stated	There is evidence that behaviour change interventions can be effective in low-income groups. The first is that more focused interventions involving a small set of techniques may be more effective than interventions combining a large number of different techniques. The second suggestive finding is that the most common techniques—providing information, facilitating goal setting and prompting barrier identification—may be helpful for low-income groups.
Gordon et al (2006) NSMC-R1	Physical activity	9-13 year olds	Not stated	Process: Outcome: Frequency of physical activity Knowledge about the importance of physical activity	Significant positive effect on behaviours	Overall the findings demonstrate that social marketing interventions can increase levels of physical activity and knowledge of the benefits, and dangers of inactivity. In cases where interventions comprised several components, overall results were reported, making it difficult to assess the relative contribution of different intervention elements. There was evidence that social marketing physical activity interventions were effective at influencing behaviour, knowledge of the benefits of physical activity and psychosocial variables such as self-efficacy and social support, and physiological measures such as BMI, cholesterol and blood pressure. The tendency for physical activity interventions to be part of wider studies targeting a reduction in cardiovascular disease risk reduction can dilute the effectiveness of the physical activity element. In many such interventions there is a prioritisation towards smoking cessation or improving diet, and often physical activity elements are added at a later date and/or given less weight in the strategy of the overall program. Although there is no strong evidence to suggest that multi-component interventions are any less effective there may be a danger that interventions on physical activity can lose priority or messages are lost when competing with other components.
McDermott (2006) NSMC-R2	Healthy eating	Not stated	Not stated	Not stated	Not stated	Overall, the review has found strong evidence that nutrition interventions developed using social

Publication details	Issue addressed	Target participants	Population group	Measures	Mass media findings	Overall SR findings
						marketing principles can be effective. The interventions adopted a range of targeting strategies. Some targeted relatively broadly, while others targeted a more narrowly defined group. Both types of intervention could be effective. There was also evidence that social marketing can work in variety of different settings including schools, churches, and within wider community settings. There is evidence that social marketing can multi-task. We examined whether interventions that targeted behaviours within a single nutritional (e.g. fruit and vegetable intake only) were more effective than those that targeted multiple behaviours (e.g. fruit and vegetable intake *and* other dietary behaviours). In fact, we found that interventions which sought to target several domains at once could be just as effective as those concerned with a narrower range of behaviours. In cases where the interventions comprised a large number of components, in the majority of cases, overall results were reported and the research designs did not allow for the efficacy of different components to be compared (e.g. educational sessions, mass media, local events). This makes it difficult to get a sense for what is actually working and what components are responsible for producing the observed effects.
Stead et al (2006) NSMC-R3	Smoking	Youth Adults	Vietnamese men Hispanic adults	Process: Not stated Outcome: Weekly smoking Smoking prevalence Quit rates Odds of being a smoker Knowledge and attitudes	The 2 significantly effective interventions for smoking cessation were mass media-based programs. The other mass media intervention had modest effect.	Overall, the review has found reasonable evidence that substance use interventions developed using social marketing principles can be effective. A majority of the interventions which sought to prevent youth smoking, alcohol use and illicit drug use reported significant positive effects in the short term. Effects tended to dissipate in the medium and longer term, although around half of the tobacco and alcohol interventions still displayed some positive effects 2 or more years after the intervention. The evidence is more mixed for adult smoking cessation, although small numbers of programs were nonetheless effective in this area. A Cochrane Review of mass media interventions for

Publication details	Issue addressed	Target participants	Population group	Measures	Mass media findings	Overall SR findings
						preventing smoking in young people found two out of six interventions effective. In large-scale multi-component and community interventions and mass media programs, it is impossible to control fully for other factors which might influence outcomes, even where matched comparison cities or communities are used. It is also difficult, where effects *are* found, to identify whether these are attributable to particular intervention components, or to the combination of activities, or to other factors such as secular trends.
Thornley et al (2007) (*only extracted on mass media as primary intervention*)	Healthy eating	General population	Not stated	Process: Outcome: low fat milk sales Low fat milk consumption	One study found that a sole media approach appeared to be sufficient to encourage change in consumption behaviour. This would imply that there may be effective alternatives to full social marketing campaigns, which may also be cheaper to run. It should be noted, that a sole media approach may not be appropriate for all food behaviours (e.g., a campaign to increase consumption of whole grain foods would be more challenging, due to the difficulty in identifying a simple message).	It seems that significant achievements could be made with relatively small budgets for mass media health promotion, as part of a more comprehensive program. This may need to continue for several years if change is to be achieved. Mass media campaigns work for low SES and low occupational status relative to campaign budget.
Cobiac (2009)	Physical activity	25-60 years	Australian general population	Cost Increase in PA (hrs per week) Disability-adjusted life years (DALYS)	Two interventions stand out as being most effective and most cost-effective - the mass media campaign and the pedometer program. Both of these interventions are	It is also possible that there will be synergistic effects with implementation of multiple interventions, which could improve the sustainability of intervention effects on physical activity over time, thus increasing cost-effectiveness of the intervention package. However, this may well be countered by a decrease in effectiveness of each additional intervention,

Publication details	Issue addressed	Target participants	Population group	Measures	Mass media findings	Overall SR findings
					dominant and have a 100% probability of being cost-saving. We found that these interventions have the potential to deliver large health benefits to the population, despite the seemingly small or non-significant effects on physical activity behaviour when measured at a population level	due to the increasing proportion of the population less willing or able to change their physical activity behaviour.
Wellings et al (2006) NSMC-R7	Smoking and healthy eating	General population and families with young children (healthy eating)	Not stated	Process: Message recall Outcome: Quit attempts Quit rates Smoking prevalence Knowledge	Overall, the impression of the Testimonials campaign is mixed. On the positive side, the campaign was extremely successful in the following important areas: · Integration: 'joining up' communications strategy with all aspects of tobacco-control policy · Effective linking of communications with the delivery of stop smoking services · Making excellent use of international experience and evidence · The use of good research evidence to identify key target groups · The production of powerful	The conclusions about the impact of mass media campaigns to prevent uptake of smoking and to promote smoking cessation are mixed. Although there were documented intentions and attempts to use diverse media routes respondents felt there was a disproportionate focus on the high profile and visible elements of the campaign – i.e. TV advertising - to the neglect of other aspects of the marketing mix. Substituting creative development research for strategic research – leading to a fixation with particular executions and encountering impasses over how to roll out executions designed for one medium into another. This success appears to have been attributable to getting a number of things right, including: · The quality of the execution · The media spend and media mix achieved a highly visible presence on TV, print media and billboards – with a teaser campaign to stimulate press interest · The integrated nature of the campaign – combining high visibility with activity to ensure GPs, other local health professionals, teachers etc had access to campaign materials. Factors that appear to have assisted the campaign development include:

Publication details	Issue addressed	Target participants	Population group	Measures	Mass media findings	Overall SR findings
					communications in a style that appeals to, and is respectful of smokers portrayed. On the negative side, a number of fundamental concerns were also identified, many of which are inter-related · It was felt the strategic research could have been stronger · Ministers and DH Policy welcomed the research base and it is used broadly. However, there was concern that strategic decisions were taken by Ministers without sufficient reference to consumer research, and that consumer research was used mainly to test executions rather than to inform the strategic direction of the campaign. · Budgets were not guaranteed over a long term – leading to short-termism. · Some possibilities to join up the campaign were not exploited as they occurred.	· Clarity of purpose · Clarity over targeting – the identification of a specific group of smokers helped to define the content of the communication. With regards to "Give up before you clog up" campaign, the success of this campaign could be attributed to the quality of the execution, the media spend and media mix achieved in highly visible presence on TV and the integrated nature of the campaign. Furthermore, clarity of purpose, clarity over targeting and partnership with Department of Health had also assisted this. With regards to "five a day" the positives were good value for money and planning and organisation.
Kahn et al (2002)	Physical activity	All population	All population	Change in percentage of people doing a specified level of	Three studies were identified evaluating effectiveness of mass media campaigns.	There is insufficient evidence to assess the effectiveness of mass media campaigns, when used alone, to increase physical activity or improve fitness. Media campaigns are, however, a

Publication details	Issue addressed	Target participants	Population group	Measures	Mass media findings	Overall SR findings
				physical activity Change in energy expenditure Percentage of overall population categorised as sedentary	However, due to the small numbers of available studies and limitations in the designs and executions of available studies, insufficient evidence was available to assess the effectiveness of mass media campaigns, when used alone, to increase physical activity or improve fitness.	component of other effective interventions (such as social support, risk factor screening, counselling, and education, creating or walking trails) and might provide additional benefits.

Publication	Theoretical framework	Campaigns/ components	Media products										
			TV	**Print media**	**Leaflets / pamphlets**	**Radio**	**Campaign events**	**Campaign merchandise**	**Direct mail / newsletters / magazines**	**Resource manuals**	**Direct education**	**Video**	**Bill-boards**
Michie et al (2009)	STC, TTM, SCT, TRA, precaution adoption model, precede-proceed model, behaviour modification principles and organisation al- theory	Smoking: **Fisher** ; **Hahn**.	√	√	√	√							√
Wellings et al (2006) NSMC-R7	HBM	Smoking: **Testimonials; Give up before you clog up** Healthy eating: **Five a day**	√	√		√			√				√
Gordon et al (2006) NSMC-R1	SCT, TTM, BCT, Stage theory of innovation, organisation al change theory; others	**VERB**											
McDermott (2006) NSMC-R2	CT; SM; SIA	None cited using mass media as primary intervention											
Stead et al (2006) NSMC-R3	CT; SM; SIA	**The North Coast Quit for Life program; Vermont mass media plus school intervention**; **Media program for Vietnamese American men; Hispanic Americans mass media-based program.**	√	√		√							√
Thornley et al (2007)	Knowledge-Attitude-	**1% or Less campaign** (media campaign only)	√	√		√	√						

Mass media

Publication	Theoretical framework	Campaigns/ components	Media products										
			TV	**Print media**	**Leaflets / pamphlets**	**Radio**	**Campaign events**	**Campaign merchandise**	**Direct mail / newsletters / magazines**	**Resource manuals**	**Direct education**	**Video**	**Bill-boards**
	Behaviour Model, HBM, TRA, TPB,SOC *(not specific to mass media)*												
Cobiac (2009)	Not stated	A six-week campaign combines physical activity promotion via mass media, distribution of promotional materials, and community events and activities.	√	√		√	√						

Theoretical framework legend:
SM—Social Marketing; PE—Public Education; SL—Social Learning; SCT—Social Cognitive Theory; TTM—Trans theoretical Model; HBM—Health Belief Model; SIA–Social influences approach; CRT-Communications research and theory; SD -Social diffusion Model; CT–communication theory; BC–Behaviour change theory; AR–Analogical reasoning theory; BSTR-Behavioural science theory and research; PA -psychosocial approach; STC-Stages of change model: ASSM-Attitude-social influence- self-efficacy model; TRA - Theory of reasoned action; TPB–Theory of planned Behaviour; "Other" – adherence model, elaboration likelihood model, lay health advisor model, precaution adoption process model, decision-making theory and social inoculation theory).

Media products legend:
TV advertising/ programs; Print medium (newspaper, magazine); Radio advertising/programs; Campaign merchandise, posters; Direct mail, public service announcement (PSA); Resource manuals, publicity tours ; Direct education, websites, workplace flyers ; Video, professional papers, telephone information lines; Billboards, cinema advertising, newsletters, postcards, book.

Appendix 6: NHMRC evidence grading table

	A	B	C	D
Component	**Excellent**	**Good**	**Satisfactory**	**Poor**
Volume of evidence	several level I or II studies with low risk of bias	one or two level II studies with low risk of bias or a SR/multiple level III studies with low risk of bias	level III studies with low risk of bias, or level I or II studies with moderate risk of bias	level IV studies, or level I to III studies with high risk of bias
Consistency	all studies consistent	most studies consistent and inconsistency may be explained	some inconsistency reflecting genuine uncertainty around clinical question	evidence is inconsistent
Clinical impact	very large	substantial	moderate	slight or restricted
Generalisability	population/s studied in body of evidence are the same as the target population for the guideline	population/s studied in the body of evidence are similar to the target population for the guideline	population/s studied in body of evidence different to target population for guideline but it is clinically sensible to apply this evidence to target population	population/s studied in body of evidence different to target population and hard to judge whether it is sensible to generalise to target population
Applicability	directly applicable to Australian healthcare context	applicable to Australian healthcare context with few caveats	probably applicable to Australian healthcare context with some caveats	not applicable to Australian healthcare context

This page has been left intentionally blank