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RESEARCH INSTITUTE

CHILD HEALTH PROMOTION RESEARCH CENTRE
EDITH COWAN UNIVERSITY

PREVENTING OVERWEIGHT AND OBESITY IN YOUNG CHILDREN: SYNTHESISING THE EVIDENCE FOR MANAGEMENTAND POLICY MAKING

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PREFACE

The alarming growth of overweight and obesity particularly among young children in Australia has been identified as a serious national problem with clear social and economic costs to the community, yet how to respond remains unclear. To date, the lack of compelling empirical evidence on effective interventions has been a key factor in the failure to convert policy into action. As such, this report aims to synthesise evidence on effective and/or promising interventions to strengthen the role of primary health care providers in the promotion of healthy weight among young children, with the aim of informing policy. The study was conducted by the Child Health Promotion Research Centre (CHPRC) at Edith Cowan University, on behalf of the Australian Primary Health Care Research Institute (APHCRI). Based at The Australian National University (ANU), APHCRI is an initiative of the Primary Health Care Research, Evaluation and Development (PHC RED) strategy, and is supported through a grant from the Australian Department of Health and Ageing. The mission of APHCRI is to provide national leadership in improving the quality and effectiveness of primary health care through the support of high quality priority-driven research and the promotion of best practice. In particular, APHCRI aims to make research more relevant to policy formulation, by bringing primary health care providers, decision makers, and researchers together in the early stages of their work to refine research questions and improve the collaboration between them. The expected outcome is the promotion of promising new primary health care initiatives that offer:

". . . socially appropriate, universally accessible, scientifically sound first level care provided by a suitably trained workforce supported by integrated referral systems and in a way that gives priority to those most in need, maximises community and individual self-reliance and participation and involves collaboration with other sectors."[1]

The CHPRC has as its objective to improve the overall physical, emotional and mental health of children and their families, through the:

- Research and development of effective interventions in areas of national priority for child health;
- Translation of research findings into policy and practice to increase their public health impact and enhance prevention and early intervention; and
- Strengthening the capacity of parents, teachers, primary health care providers, researchers, community workers, and other stakeholder groups, to reduce the time lag between knowledge development and effective community action.

In the area of childhood obesity, the CHPRC has recently completed two comprehensive literature reviews. One, completed on behalf of Queensland Health's Tropical Public Health Unit Network, assesses secondary school interventions to prevent and manage overweight/obesity, which may be used to draft an intervention model for secondary schools. The second, completed in 2004 on behalf of the Cancer Council of Western Australia, comprises successful strategies for improving physical activity and nutrition in primary schools, and will be used to prepare a best practice guide for schools throughout Western Australia. This study, however, looks at interventions aimed at children prior to reaching school age.

1. BACKGROUND AND RATIONALE

CONTEXT OF THE REVIEW

Australia was one of the first countries to produce an integrated national strategy for the prevention of overweight and obesity[2]. The landmark document 'Acting on Australia's weight: a strategic plan for the prevention of overweight and obesity' was published by the National Health and Medical Research Council (NHMRC) in 1997, and recommended the adoption of a series of primary health care strategies, including the promotion of physical activity, dietary monitoring, and the encouraging of nutritional polices in schools, childcare and day care centres. In more recent years, Australia's lead in this field has been resonated internationally through the rising concern for "globesity", with both the United States Surgeon General's Call to Action (2001) and the World Health Organisation's Global Strategy on Diet, Physical Activity and Health (2004), emphasising the need to create supportive environments to prevent overweight and obesity from a young age. Moreover, with recent longitudinal data indicating a strong correlation between childhood obesity and overweight in adulthood 3, the issue of tackling 'childhood' obesity has been targeted as a crucial component in the fight to prevent the more serious long term physical, social, emotional, and economic consequences of overweight

Yet despite the plethora of empirical literature that has emerged over the last decade highlighting both the magnitude of the problem, as well as the underlying causes and consequences of overweight and obesity in our society, recommendations for action have remained largely unaddressed, and the public policy response has been hampered by lack of empirical evidence concerning effective interventions to guide government action. Moreover, as with other health promotion efforts such as those in tobacco control, policies and strategies for the prevention of overweight and obesity are likely to face strong opposition from private industry around the nature and quality of evidence to support the implementation of interventions to tackle the problem. Overcoming such challenges are more likely to succeed if researchers, public health policy makers, and primary health care providers can work together to examine successful and/or promising approaches for enhancing the participation of families, parents, and children in programs for the prevention of overweight and obesity in young children. From this perspective, the current review aims to analyse the national political context for the development of interventions for the promotion of healthy weight among young children, to review key characteristics for successful and/or promising intervention options to strengthen the capacity of primary health care providers to engage parents and families, and to review the policy implications of their implementation in different key settings.

FOCUS OF THE REVIEW

The review focuses specifically on interventions to strengthen the participation of parents and primary health care providers in the prevention of overweight and obesity among children aged 2-6 years. This focus has been chosen given that most interventions conducted to date have been aimed at primary and secondary school children, once poor eating habits, sedentary behaviours, and unfavourable environmental factors have set in, and symptoms of overweight are already evident[4-6]. Since our emphasis is on primary prevention prior to the development of such lifestyle patterns, it would appear more appropriate to direct efforts towards this early age

group when parents may be more receptive than when children are older[5]. Furthermore, the past emphasis on school aged children fails to acknowledge the profound effect which the parents and primary health care providers can have in developing and shaping food preferences and lifestyle choices of children well before they reach school age[7]. Consequently, there is a growing consensus that effective preventative strategies require a shift away from short-term, individually focused, single strategy programs addressing either diet or exercise, towards more population based interventions involving the individual, family, community, and broader environment that can be developed and sustained over longer periods of time[8-10]. This requires encouraging primary health care providers to work with parents and families, and other child care providers, to strengthen their abilities to deal with perceived barriers so they can move successfully from contemplating healthy lifestyles to implementing them[11].

PURPOSE OF THE REVIEW

The overall goal of the review is to provide decision-makers with practical information on key characteristics of best practice or promising interventions for the prevention of overweight and obesity among children aged 2-6 years of age. In particular, the study aims to determine how interventions in different (clinical, child care, and community based) settings can strengthen the role of primary health care providers to overcome barriers and facilitate the participation of parents.

The specific objectives of the report are to:

Determine the nature and extent of overweight and obesity among young children in Australia and review/appraise the approaches presently being used to address the problem;

Analyse the national and political context for the development of primary health care interventions aimed at preventing overweight and obesity among young children and how to develop interventions within this context;

Develop a conceptual framework for the prevention of overweight and obesity among young children focused on how best to engage primary health care providers and parents in the promotion of healthy lifestyles;

Clarify possible obstacles and barriers to the implementation of interventions aimed at parents and primary health care providers and assess how best to overcome these;

Synthesise evidence from a variety of sources to guide action aimed at strengthening the role of primary health care providers, parents and communities in the prevention of weight gain among young children;

Provide rationale and evidence for determining ‘promising’ interventions within selected action areas;

Identify a range of promising areas for action to tackle the problem of overweight among young children; and

Develop a ‘portfolio’ of interventions detailing issues such as relevance and acceptability to the community; likely cost of implementation; staff and community

capacity building requirements; and implications for State/Commonwealth relationships and organisational linkages.

AUDIENCE FOR THE REVIEW

The findings of this review are aimed at:

Policy Makers: The information in this report is specifically oriented at staff involved in providing services and planning local, regional, state and national interventions for primary health care providers in Australia. While the development of effective interventions extends beyond the scope of the health sector and requires comprehensive, multi-faceted planning across government and non-government sectors, the health sector needs to provide leadership in the management, coordination and expertise of this process. While a significant amount of the action to address the prevention of childhood obesity will occur at the local level, it must be supported through upstream policy and environmental approaches. As such, decision makers working with primary health care providers at the local, state and national level are the target audience of this review.

Primary Health Care Providers: In the past general practitioners, dieticians, community nurses, child care providers and other primary health care providers have traditionally seen their roles as more treatment oriented, dealing with the outcomes of overweight and obesity. Yet if they are to have a significant long term impact in terms of slowing the obesity epidemic and encouraging healthier lifestyles, then their role must change to incorporate education, prevention, and political advocacy. From this perspective, this report aims to serve as a basis for identifying ways to increase their capacity to work with and encourage parents and communities in the prevention of overweight and obesity among young children.

Key Stakeholders in the Area of Childhood Obesity: Building local capacity in the understanding and use of preventative intervention strategies for the promotion of healthy weight gain will involve coordinated collaboration among a wide range of government sectors (school nurses, child care providers, pre/primary school principals, family and community services, etc.), as well as non-profit organisations, allied primary health care associations, legislative bodies, and private industry. This report aims to provide informed evidence and identify a portfolio of promising interventions for coordination across the sectors, highlighting areas of action in which the different stakeholder groups have potential influence.

Health Promotion Researchers: Despite growing awareness of the multiple causal pathways leading to overweight and obesity, and the need for multi-component interventions, much of the research within this area continues to be based on fairly rigid paradigms of analyses of risk factors in individuals and case control studies which are more suited to clinical trials, as they often mask the contexts in which these risk factors may be arising. Subsequently, this report aims to encourage researchers to adopt new methodologies to build a body of information about preventable modern chronic diseases, which enables decision makers to select an appropriate mix of strategies based on best ‘available’ evidence.

STRUCTURE OF THE REVIEW

The review begins with an historical overview of national, state and peak body policies, action plans and guidelines. The goal of this section is to review existing political and organisational structures for the development of interventions for the prevention of overweight and obesity in young children, thereby setting the scene within which any new or innovative programs will need to be developed.

Section 4 of the report then provides a short synthesis of the aetiology, causal pathways and mediating variables leading to overweight and obesity in young children in Australia. In particular, it argues the case for prevention rather than treatment, and provides evidence to support the need for greater emphasis on children aged 2-6 years. In doing so, it proposes the need to rethink our conceptual framework for intervention, arguing that in the past too much attention has been focused on health promotion campaigns that address mediating variables such as diet and exercise, rather than on interventions aimed at strengthening the capacity of primary health care providers, parents, child care providers, and communities to provide supportive environments for the prevention of overweight and obesity.

Section 5 then turns its attention to the most influential 'facilitators of change', and summarises available research literature on how best to engage these primary care providers to work with parents and families. To this end, the review focuses both on the barriers to, and enablers of, effective interventions based on shared goals and objectives.

Section 6 synthesises the evidence base on existing interventions for addressing the prevention of childhood obesity in Australia, other countries and among specific target populations. A critical appraisal of this evidence is then presented based on intervention settings (clinical settings, child care centres, community based setting, etc), primary health care provider needs, and level of parent participation, to assess the gaps, trends and strength of evidence, and to highlight any conflicting evidence where further research is required.

Section 7 draws on the findings of the previous section, and together with past experience in other public health areas such as immunisation, looks at 'promising' primary health care interventions for the promotion of healthy weight in children aged 2-6 years, and how these can be targeted to specific population groups. It then considers the policy implications of the implementation of the various interventions, taking into account State/Commonwealth relationships, funding arrangements for new and existing services, and the development of linkages within the primary health care sector. Particular emphasis in this section is placed on the strategies for the coordination, capacity building, and monitoring and evaluation requirements for the effective implementation of interventions for the prevention of overweight and obesity in young children.

Finally, Section 8 puts forward the argument in favour of developing a 'portfolio' of best practice interventions for different settings, so that decision makers can select and develop a range of interventions that together would make up a multi-faceted strategy targeted to the specific needs of their area or State. The goal of the portfolio is to overcome some of the implementation issues which have hampered the success of interventions to date, namely that: the prevention of weight gain is not perceived as the core business of most primary health care providers and is given low priority in the

face of competing demands; the child care sector is a fragmented and decentralised sector, and thus requires different interventions, formats and approaches for different sectors; the nature of general practice is disparate and there are limited tools for reaching and influencing all independent practices and practitioners, and to do so can be labour intensive; and the key primary health care providers for young children come under different government departments (Family and Children's Services, Department of Education and Training, Department of Health), and are funded at the state level making national strategies.

2. REVIEW METHODOLOGY

Recently, there has been a growing debate in Australia over the relevance of research evidence for 'informing' policy and practice[12]. The methodology used here will draw on the multi-method approach of Nicholas Mays and others[6, 13] in an attempt to collate different forms of evidence required to develop a portfolio of promising interventions with the aim of enabling decision-makers to select an appropriate mix of strategies based on best 'available' evidence. Using this methodology the review will assess 'effective' or 'promising' interventions and provide information on the conditions under which these are most likely to succeed.

THE NEED FOR INFORMED DECISIONS

Despite significant advances over the past decade in the methodological processes used for conducting systematic reviews[14-16] and their wide acceptance by scientific researchers, policy makers in the area of public health generally, and healthy weight more specifically, have been slow to use the findings of these reviews to inform their decisions17. In part, the reason for this is that decision makers in developing policy and promoting interventions must satisfy a range of stakeholders, avoid conflict, use resources wisely and ensure political and economic goals are met[2, 18]. Research as such is only one contributing factor, and in order for evidence to have a greater impact on policy, researchers need to better understand both the complexity of the policy making process and the diversity of different kinds of evidence[12, 19, 20].

Consequently, one question which the review must address is whether the existing evidence on overweight and obesity is actually relevant and useful within the context of current policy and practice? For example, as Rychetnick and colleagues[21] have noted, all too often there is a 'mismatch' between the magnitude and importance of a public health problem, and the adequacy of evidence on potential interventions to address the problem. In the case of childhood obesity, the alarming rise in numbers has been accompanied by an urgent policy response to initiate strategies to address the situation, prior to the establishment of a strong body of evidence on the effectiveness of interventions. While empirical evidence concerning the magnitude of the problem is significant and largely uncontested, the available evidence on how to address the problem is more limited. This at times has led to policy and practice decisions to be developed based on single, famous studies or expert opinion, which has triggered opposition from vested interests who require rigid evidence prior to the implementation of interventions, especially in the case of regulatory measures[2, 8].

A second question which the review must address is what type of information do policy makers need? While evidence-based decision making is widely accepted as the most appropriate process for determining where to apply resources when addressing health problems, it tends to be understood according to clinical frameworks of 'evidence-based medicine' that are based on a rigid hierarchy of scientific evidence collected from randomised control trials. However, there remains much debate over how this process should be applied to health promotion planning[22, 23]. A central element in this debate relates to the definition of evidence (process, impact, parallel, indirect/intuitive, or expert opinion) and how its quality and effectiveness is assessed[8]. As outlined in Section 4, there is a growing awareness that the multiple causal pathways leading to overweight and obesity are extremely complex, and that interventions to effectively reduce and prevent these require multi-disciplinary collaboration[24]. Yet despite this, the majority of research in health promotion continues to be based on fairly rigid

paradigms of analyses of risk factors in individuals and case control studies which are more suited to clinical trials that ignore the importance of a host of additional social, political and commercial considerations that drive decision making on policies and programs. Nevertheless, while the complex and interactive nature of health promotion interventions means that obtaining 'excellent' evidence according to a rigid hierarchy of rules for assessing quality of scientific evidence may be difficult[21], the absence of excellent evidence does not make evidence-based decision making impossible. On the contrary, increasingly it is recommended that multiple evaluation methods involving a mix of process and outcome information from a variety of sources be used to build a body of evidence about interventions, that enables decision makers to select an appropriate mix of strategies based on the best 'available' evidence[13, 25, 26].

Thus, from the perspective of what type of information do policy makers need from researchers, Rychetnik and Wise[27] have identified the following needs:

- Evidence on the magnitude and aetiology of the problem to support their bid for a greater share of resources.

- Evidence on the effectiveness of local interventions taking into account their replicability, political feasibility, community acceptability, service delivery needs, and proven ability to provide safe and lasting changes.

- Evidence of demonstrated impact of health policy initiatives and interventions across large populations. In the past, evidence in this area has focused on the impact of interventions to reduce behavioural risk factors relating to overweight and obesity, but increasingly decision makers also require evidence on how the contextual, structural and socio-economic factors create different health inequalities and what impact interventions can have on these so that other sectors can reinforce health sector-funded programs.

- Evidence on how to mobilise change among different health care providers, non-government organisations, and settings based environments, including evidence on the beneficial outcomes of intervention capacity building approaches, educational materials and implementation packages and toolkits.

- Evidence on the cost-effectiveness of proposed initiatives and interventions.

With the exception of the first category of evidence on the magnitude and aetiology of the problem, limited evidence has been synthesised to support decision makers in the development of interventions for the promotion of healthy weight among children aged 2-6 years. Thus the focus of this review will be on these latter types of evidence.

Building on these information needs, a third question which the review aims to address is what factors, beyond end outcomes alone, determine best practice? For example, who are the most appropriate primary health care providers for mobilising change within families and other settings to promote healthy lifestyles among young children, and what is required at each stage in the program development and implementation to encourage effective communication and interaction among them? While quantitative data may provide information on effective impact of programs, qualitative data may be better suited for understanding and describing how to mobilise change[5].

Finally, the last question which the review aims to address is how best to analyse and present the evidence to facilitate policy action? Given the limited availability of evidence on interventions for the prevention of overweight and obesity among children aged 2-6 years, decision makers need information on best available evidence, highlighting '*promising'* interventions. Moreover, given the significant differences between states and regions, a 'portfolio' of alternative intervention options[28] is required for use with different health care providers, so that each Health Service Area can select and develop interventions that target the specific needs of their area[29]. Thus, if a review is to present evidence in a way which facilitates policy action, it must assist policy makers to identify capacity building needs and other factors likely to enhance the dissemination, implementation and effectiveness of different interventions, enabling the optimal use of scarce resources, and ensuring congruent messages from different public health providers and other sectors. For example, the review should provide decision makers with information on:

- The appropriate role of different primary health care providers and spectrum of settings-based action areas and intervention points (eg. child care, preschools and kindergartens, general practices and clinics, child/community nurses, etc) where these primary health care providers may best influence the promotion of healthy weight among children aged 2-6 years, outlining strengths and difficulties of working with these action areas, as well as presenting gaps, needs, etc.

- Promising interventions for working with primary health care providers in each of the settings-based action areas, incorporating specific information that facilitates policy makers judgement of what constitutes the best mix of interventions for local portfolios of action:
  - Relevance and acceptability to the community
  - Feasibility and likely cost implications
  - Availability of appropriate resources and support materials
  - Staff capacity building needs
  - Required level of engagement of key partners
  - Relevance to specific target groups (rural/regional, low SES, culturally and linguistically diverse)

The process that policy makers could follow to assist the selection of an optimal mix of interventions in order to build both intensity and breadth of effort, as well as tailor interventions to their local needs and resources.

The most effective means of engaging primary health care providers, stakeholders and partners, the implementation and educational tools they require, and the key components that will enhance the effectiveness of the interventions.

DEFINING THE RESEARCH QUESTIONS

Thus in line with these research needs, the review has focused on four key research questions, each with a series of sub-questions:

Research Question 1: To what extent is overweight and obesity a problem among young children (2-6 years) in Australia?

- To what extent is overweight and obesity among children aged 2-6 years perceived as a problem by national/state governments in Australia?
  - How is it reflected in government policies?
  - How significant is it compared with other issues?
  - What actions have been taken to deal with the situation?
  - What government organisations exist to address the issue?
  - What barriers exist in translating policies into practice?

- To what extent is it a real problem among young children in Australia?
  - Prevalence (overall, in particular socio-economic sectors, and among culturally and linguistically diverse groups)
  - Long term impact (physical, social, emotional, financial costs)
  - Changes over time

- How and why the problem has come about and what frameworks are being used to address these?

Sections 3 and 4 analyse the various issues underlying this research question. Information for these sections has been synthesised from a review of: a) strategies, frameworks, policies, action plans, and guidelines on overweight and obesity in young children developed by national, state and international organisations, as well as peak bodies; b) data on the extent and prevalence of childhood obesity among children aged 2-6 years in Australia; and 3) systematic and non-systematic reviews on the promotion of healthy weight among children. The findings of this research question led the investigating team to query the appropriateness of existing policy frameworks, and resulted in a second set of research questions aimed at reviewing the key role primary health care providers could play in facilitating change.

Research Question 2: To what extent can primary health care providers facilitate the promotion of healthy weight among children aged 2-6 years?

- Who are the key primary health care providers in preventing overweight and obesity among children aged 2-6 years?

- What role are they presently playing in the promotion of healthy weight among this age group?

- What role could they play in promoting healthy weight among young children in different settings based action areas?

- What are the key barriers and enablers to engaging primary health care providers in interventions for the prevention of overweight and obesity among young children?

Section 5 has addressed the various issues underlying this research question. Information for this section has been synthesised from the systematic and non-systematic reviews on the prevention of overweight and obesity in young children.

Findings highlight the challenges that interventions must address with regards to: differences in definitions of overweight and obesity between parents and primary health care providers; the perceived roles of parents and primary health care providers; the attitudinal, skills and systems based barriers limiting collaboration between primary health care providers, parents and child health providers who fall under the jurisdiction of other government departments. Based on the findings of this research question, the investigators shifted their focus to a third set of research questions focusing on what alternative interventions exist to enhance the capacity of primary health care providers to promote healthy weight among young children.

<u>Research Question 3:</u> What 'successful' or 'promising' interventions exist to strengthen the capacity of PHC providers to work with parents and families to prevent overweight and obesity among children aged 2-6 years?

- What procedures have these interventions used for engaging primary health care providers?
- How effective have these interventions been in engaging primary health care providers and to what extent have they dealt the barriers and enablers outlined in Section 5?
- How successful have these interventions been in engaging parents and families in the promotion of healthy lifestyles?
- To what extent have they shifted the role of primary health care providers from focusing on the individual treatment of symptoms of overweight and obesity to the promotion of educational, environmental and policy approaches for the prevention and early intervention of overweight and obesity among children aged 2-6 years?
- How can primary health care providers use different settings-based action areas for engaging with parents and enhancing their participation in interventions?

To address the issues raised under this research question, Section 6 begins by reviewing and appraising interventions aimed at strengthening the capacity of primary health care providers to promote healthy weight among young children, based on criteria and procedures outlined in this section. In doing so, it looks at successful interventions from other areas of child health promotion to determine what can be learnt from them regarding key characteristics of "promising" interventions used to engage primary health care providers, parents and child care providers in other settings.

<u>Research Question 4:</u> How applicable are these interventions to different primary health care settings and what do they imply for Commonwealth/State relationships, organisational linkages, costs, etc.?

- What are the implications of implementing these different interventions in terms of:
  - Relevance and acceptability to the community
  - Feasibility and likely cost implications
  - Availability of appropriate resources and support materials
  - Staff capacity building needs

- Required level of engagement of key partners
- Relevance to specific target groups (rural/regional, low SES, culturally and linguistically diverse)

To address this issue, Section 7 provides an overview of the different intervention options as well as an assessment of the relevance and feasibility of different options taking into account State/Commonwealth relationships, funding arrangements for new and existing services, and the development of linkages within the primary health care sector.

METHODOLOGY

OVERVIEW OF STRATEGY

In order to look at 'promising' interventions for enhancing the ability of primary health care providers to engage parents in the promotion of healthy weight among young children, the review used a multi-method narrative approach to systematically synthesise complex evidence based on a model outlined by Mays and colleagues[13]. The approach involves synthesising primary studies, as well as extracting new data from different sources, to identify patterns and directions in findings, and to develop new explanations to inform best practice interventions, based on best 'available' evidence. To achieve this, the approach involved:

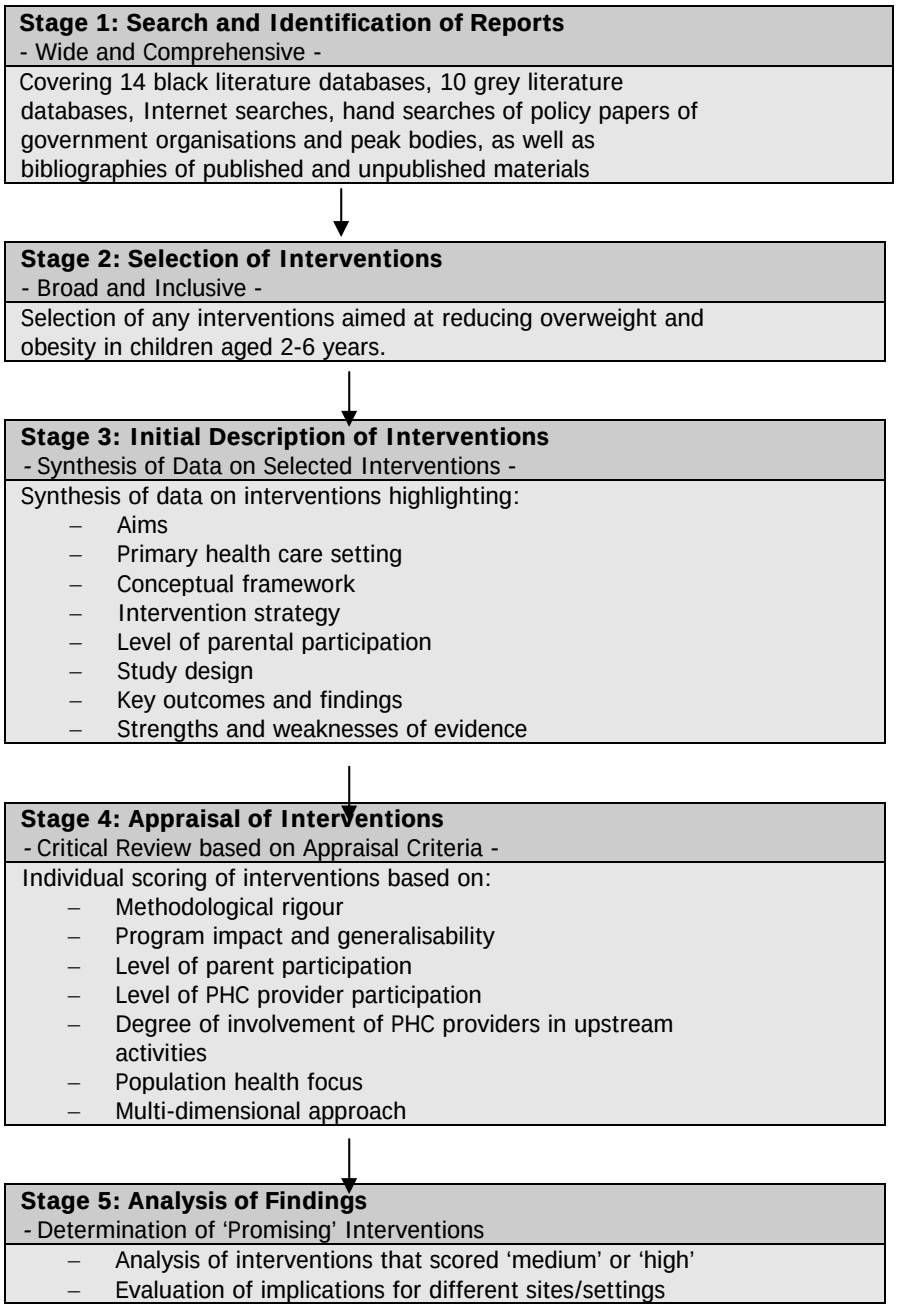
- Scoping of literature;
- Collection and hand searching of multi-layered, highly inclusive data from experts and consultants;
- Selection and initial description of interventions highlighting: aims, conceptual frameworks, primary health care settings, approaches to engaging parental participation, study design, key outcomes and findings, strengths and limitations;
- Detailed appraisal and scoring of interventions according to: methodological rigour, project impact and generalisability, level of parent participation, level and type of primary health care participation, type and level of focus;
- Analysis of findings and their implications for different settings based intervention points, as well as an evaluation of interventions from other public health areas that may be used to inform best practice;
- Obtaining qualitative data on feasibility, relevance, and costs, based on attitudes and concerns of primary health care providers and key stakeholders;
- Narrative synthesis of findings including identification of patterns, exploration of relationships, mapping of intervention alternatives, and synthesis of findings in terms of best practice solutions for policy makers, primary health care providers, key stakeholders, and researchers.

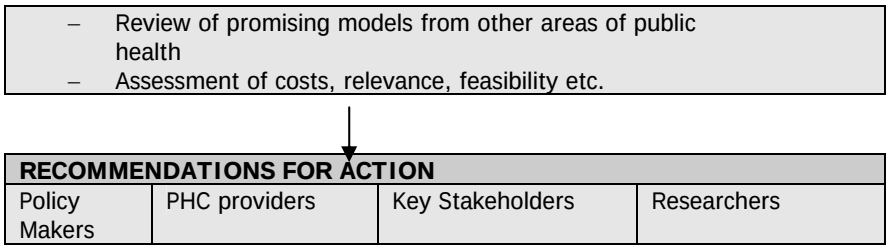
An algorithm of the overall synthesis process is presented in Figure 1.

RESEARCH TEAM AND NATIONAL/INTERNATIONAL ADVISORY GROUP

An advisory group of national and international researchers was set up, comprised of individuals with expertise in paediatrics and obesity, population health strategies and culturally and linguistically diverse groups, nutrition, physical exercise, health economics, health policy and governance, and family and community development. The group met formally on a number of occasions to review the direction of the project, define and redefine the research questions and review the process for analysing and evaluating best practice. The list of group members can be found in Appendix 1. In addition, staff from the advisory group met with policy makers and members of the National Obesity Taskforce to clarify the needs and interests of decision makers.

Figure 1: Algorithm of Review and Synthesis Process





SEARCH STRATEGIES

Electronic Databases Searches

The first stage of the search was conducted by a qualified librarian and involved scoping 14 black and 10 grey literature databases. The search covered published and unpublished articles from 1990 to February 2006. The primary and secondary key words used in the search are listed in Appendix 2.

Table 1: Search Databases

Black Literature Databases	Grey Literature Databases
– MEDLINE – CINAHL – Cochrane Database of Systematic Reviews – InfoTrac – Proquest 5000 – Highwire Press – Proquest Education Complete – Science Direct – Swetwise – Wiley InterScience – Ingenta – PubMed – ERIC – Expanded Academic ASAP	– GreyNet – SIGLE – WHOLIS – GrayLit Network – Partners in Information Access for Public Health University Libraries – Australian Collaboration for Health Equity Impact Assessment – Canadian Institute for Scientific and Technical Information – Universal Availability of Publications UNESCO – Canadian Health Research Database

Hand Searches

In addition to the systematic scoping of literature through library databases, a hand search was done by a team of investigators to obtain relevant information referenced in: government policy papers and reports; systematic and non-systematic reviews; conference proceedings; theses and dissertations; and multinational organisation reports. In addition, a researcher contacted key Australian and international stakeholders for information on recent reports and documents.

Internet Searches

Initially, researchers developed a list of national and international public health and child health agencies, government departments and research centres, and reviewed their websites for information on relevant interventions. Secondly, using the search engine Google, investigators sourced data with the terms ‘obesity’, ‘children’, ‘intervention’ ‘program’, ‘project’ and the five countries named under APHCRI’s areas of interest (Australia, New Zealand, UK, Canada, and US). This search produced such an enormous body of data, much of which was of a commercial nature, and thus this search was not completed.

Key Informants

Key informants at the local, national and international level were also consulted to obtain additional information and source unpublished materials.

INITIAL CATEGORISATION OF DATA

Once the initial scoping of data had been completed, investigators sorted and categorised the literature according to the following sub-headings:

- Australian government and non-government policies and reports
- Clinical guidelines for GP's, nurses, nutritionists, etc.
- Systematic and non-systematic reviews
- Australian based interventions targeting GPs, nutritionists, paediatricians, nurses, parents, etc.
- Australian settings based interventions
- International interventions targeting GPs, nutritionists, paediatricians, nurses, parents, etc.
- International settings based interventions
- Interventions targeted at special population groups

Initially, information was collated from policies and reports developed by Australian federal and state government departments and peak bodies, as well as clinical guidelines for GPs, nurses, nutritionists, paediatricians etc. to gain a clearer understanding of the extent to which overweight and obesity among children aged 2-6 years is a problem in Australia, and to determine what strategies are being used to address it. Secondly, systematic and non-systematic reviews were used to source further information on the barriers and facilitators to engaging parents and primary health care providers in programs aimed at prevention and early intervention. Then, with greater clarity over these two areas, the focus of the review shifted to the selection, synthesis and appraisal of 'promising' interventions

SELECTION AND SYNTHESIS OF INTERVENTIONS

Definition of Intervention

From the perspective of this review, an 'intervention' is defined as any non-commercial program, project, or activity, with either an individual, group or population focus that has been implemented with the aim of reducing overweight and obesity among children aged 2-6 years.

Inclusion/exclusion criteria

The inclusion and exclusion criteria used to select interventions are listed in Table **2**.

Table 2: Criteria used to select interventions for review

Inclusion Criteria	Exclusion Criteria
To be included interventions had to: ▪ Be aimed at reducing the risk factors for obesity in children aged 2-6 years; ▪ Be focused primarily on prevention and early intervention, rather than treatment, of overweight and obesity in young children; ▪ Involve primary health care providers as key facilitators of change; ▪ Encourage the participation of parents or other family members; ▪ Evaluate, research or review the	Interventions were excluded if they: ▪ Were of a commercial nature; ▪ Were aimed at children over the age of 6 years; ▪ Were aimed at children whose overweight/obesity was associated with other chronic physical or genetic conditions (diabetes, Downes Syndrome, etc.); ▪ Focused on treatment rather than prevention;

intervention's outcomes, process, and/or acceptability; ▪ Have been implemented since 1990	▪ Did not involve parents or primary health care providers; ▪ Did not include any indicators of program outcome or process

Description of interventions
Initially data on each intervention was extracted from different articles and program reports and synthesised into a series of spreadsheets. Details recorded in these spreadsheets included:

- Intervention characteristics (target behaviour)
- Country
- Target group (age, sex, race)
- Primary health care providers (GPs, nurses, dieticians, paediatricians, etc)
- Setting (clinic, child care centre, home, community)
- Parental participation
- Intervention strategy (primary/secondary prevention, goal/conceptual framework, strategy, study design, frequency of interaction, program duration)
- Assessment tools
- Intervention findings and conclusions
- Strengths
- Limitations

The spreadsheets with data from the different black and grey literature searches, as well as the national, international and target interventions, were then 'cleaned' and collated by investigators to ensure that similar descriptive criteria were used for all interventions (see Appendix 3).

APPRAISAL

All selected interventions were then appraised using a model based on that of Flynn and colleagues[5]. To this end, interventions were categorised as 'high', 'medium' or 'low' using a scoring system that assessed them according to their:
methodological rigour;

- program impact and transferability;
- capacity to engage primary health care providers;
- capacity to enhance parental participation;
- ability to encourage primary health care providers to adopt a more population based approach focusing not merely on individual but incorporating the family, community and broader environment;
- ability to shift the role of primary health care providers from emphasis on treatment towards prevention through involvement in more upstream activities (education, environmental policy and advocacy); and
- capacity to encourage parents and primary health care providers to deal with the complex, multi-dimensional risk factors associated with overweight and obesity in young children.

For each one of these categories, total scores were attained according to a series of pre-set criteria. Details of the scoring system are outlined in Appendix 4.

Methodological Rigour

Initially, the researchers reviewed the theoretical framework underlying the project and assessed whether an appropriate study design had been used. Then, depending on whether the intervention was seeking to assess quantitative or qualitative factors, a different set of scoring criteria were used. In the case of quantitative research,

interventions were scored according to selection bias, information bias, and the impact of confounding factors5. In the case of qualitative research, interventions were scored according to the credibility of the approach used for sampling, data collection and analysis.

Program Impact and Transferability

Program impact and transferability sought to score the interventions according to the size and scope of effect. Unlike the following categories, that sought to evaluate and review the process used for implementing interventions, this category appraised the projects according to the extent to which they provided sufficient information to determine whether they achieved their desired outcomes[5]. In addition, under this category interventions were scored according to the generalisability of their findings to the broader population, or their transferability to specific target groups and sites.

Engagement of Primary Health Care Providers

This category was designed to assess the capacity of interventions to engage primary health care providers to work 'with' parents to promote the healthy weight of their young children. Interventions were scored according to four standards: primary health care providers' duration, intensity, type and extent of involvement. Duration and intensity assessed the frequency and length of involvement of primary health care providers. While the type and extent of involvement sought to assess whether primary health care providers were merely 'passive' recipients of information on how to work with parents in this area (through fact sheets, written materials and guidelines, or presentations) or whether they played an 'active' role in all phases of the development and implementation of the project, and received skills development in how to communicate effectively with parents. Thus projects were appraised according to the theories and/or models underlying them (social marketing theory, social cognitive theory, health belief model, empowerment theory, social learning theory, organisational change theory, self-determination theory, trans-theoretical model, precede-proceed model, environmental change model, and the gatekeeper model). Furthermore, the scoring system reviewed the feasibility/practicality of the intervention for specific primary health care providers.

Parent Participation

This category used a similar approach to that of the engagement of primary health care providers, in that it scored parents' participation according to duration, intensity, type and extent of involvement. The difference however, was that in the case of primary health care providers emphasis was on raising their level of 'engagement' with parents, while with the parents, emphasis was on their level and degree of 'participation'[30], or the extent to which the intervention encouraged them to take 'ownership' of the issue and to develop sustainable lifestyle changes for the entire family. Moreover, as Abelson and Eyles[31] point out, if parent and family participation are considered to be crucial in their own right, then how projects are judged and evaluated may have to change, because while participation may not be 'efficient' from a cost perspective, it may be essential to strengthen parent, family and community commitment required for change.

Population Based Focus

This category sought to evaluate the interventions based on their ability to encourage primary health care providers to adopt a more population based approach, focusing not merely on the individual but incorporating the family, community and broader environment[32, 33]. Thus in this category, interventions where primary health care providers focused only on the needs of the child scored lowest, while those incorporating parents, as well as other family members, different settings based

environments, and/or sectors (homes, child care centres, preschools, clinical practices, etc) scored progressively higher.

Involvement in Upstream Activities

This category sought to evaluate the extent to which the interventions had attempted to shift the role of the primary health care provider from merely assessing (measuring BMI) and 'treating' the symptoms of overweight and obesity in young children, to educating and/or facilitating parents and other primary health care providers on how to promote healthy weight, or advocating for change at the policy level. Following, Kumanyika's model (cited in[34] the greater the level of involvement of the primary health care providers in upstream activities the higher the score given to the intervention.

Multi-dimensional Approach

This category refers to capacity of the intervention to address the multiple causal pathways and variables contributing to overweight and obesity. The vast majority of programs focus solely on diet and/or exercise and hence these projects scored lowest, while those interventions that attempted to deal more broadly with psychosocial behaviour modification (body image, self-esteem, peer support relations, etc), community and environmental issues, as well as health policy/advocacy, scored higher.

DRAWING ON FINDINGS FROM OTHER AREAS OF PUBLIC HEALTH

Given the limited availability of projects aimed at increasing the role of primary health care providers in engaging with parents and families to prevent overweight and obesity in children aged 2-6 years, the researchers also reviewed evidence from successful interventions in other similar public health areas (children's falls, road safety and helmet wearing, breast feeding, prevention of burns, sun safety, and drowning). This was carried out based on a review of past reviews, as well as an analysis of interventions which the team themselves had worked on. The same criteria were used to assess these interventions, as those outlined above for appraising interventions for the prevention of overweight and obesity in young children. However, in addition, the reviewers assessed how the successful interventions had used different settings based action areas (clinics, child care centres, preschools/ kindergartens, communities, etc) to engage primary health care providers and parents, and what these had implied in terms of capacity building, etc. This evidence was then used to identify 'promising' areas for action that could be extrapolated and built in to programs for the promotion of healthy weight among young children.

IDENTIFYING 'PROMISING' AREAS FOR INTERVENTION

Once the interventions had been appraised, the advisory group reconvened to assess the findings. In particular, the group reviewed:

- What were the key characteristics of those interventions that scored most highly and how had they engaged primary health care workers and enhanced the level of parents', families', and communities' participation?
- What were the major gaps in the evidence and what could be learnt from other public health areas? How relevant were these?
- What were some of the most 'promising' interventions? Which primary health care providers did they focus on and in which settings based action areas were they most effective?

ASSESSING IMPLICATIONS FOR POLICY

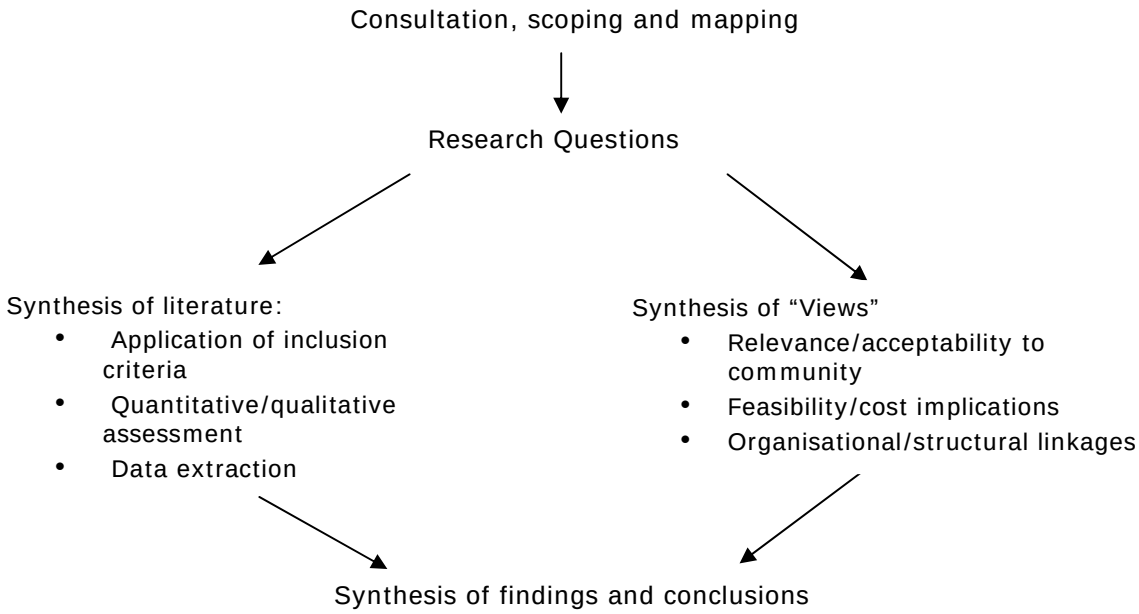
Having then determined a number of 'promising' interventions, the chief investigators conducted a review to determine their relevance and acceptability to the community; feasibility and likely cost implications and/or benefits; availability of appropriate resources and support materials; and implications for staff capacity building needs. To achieve this, a focus group meeting was held with key stakeholders to: 1) provide them with an overview of the interventions; 2) seek the stakeholder's feedback on the relevance and acceptability of the interventions; and 3) determine their opinions on what would strengthen the implementation of the interventions and what forms of support would they require. With this information, a broad overall review of the economic costs/benefits of the interventions was conducted, and an assessment was made on the type of information that would be required from future research and piloting of the interventions. From this perspective, the aim of the focus groups and economic assessment were to estimate the balance between the potential gain and risk of the intervention, according to criteria outlined by Flynn et al [6, 35]:

- Evidence of efficacy/effectiveness
- Evidence of feasibility of implementation
- Sound theoretical basis
- Scope for potential health gain
- Potential reach of intervention
- Ability to reduce health inequalities and related health issues
- Potential sustainability
- Policy relevance

SYNTHESISING THE FINDINGS

Finally, the evidence was synthesised for management and policy making based on a model described by Thomas and colleagues[36] and Harden and colleagues[37]:

Figure 2: Synthesis of Findings



The synthesis of findings weighed up the strength of research evidence and expose gaps in current knowledge, while additionally it sought to provide new insights into 'promising' interventions of dealing with the growing prevalence of overweight and obesity in young children. Finally it drew conclusions and made recommendations for different stakeholder groups (policy makers, primary health care providers, researchers, and relevant peak bodies).

LIMITATIONS

One of the key limitations for the review was the lack of practical interventions for this age group. Moreover, and even in the case where interventions were developed, there were problems with:

- Limited population level data
- Small sample size
- Lack of longitudinal data showing on-going change
- Shortage of studies with emphasis on primary prevention
- Shortage of studies on involving parents and primary health care providers
- Shortage of studies related to socio-economic, gender, and cultural influences
- Varying outcome measures related to impact of interventions on obesity, physical activity and health eating
- Limited evidence related to behavioural change rather than knowledge and attitude development
- Limited data on effectiveness of environmental changes
- Limited program impact and process evaluations
- Lack of explicit theoretical foundations

In the light of these limitations, any conclusions and findings of the review may offer potential solutions, but will require on-going research and piloting to test the effectiveness for the general population and for specific target populations.

3. NATIONAL CONTEXT FOR INTERVENTION

NATIONAL STRUCTURES AND POLICIES FOR THE PROMOTION OF HEALTHY WEIGHT

Australia was one of the first countries to produce an integrated national strategy for the prevention of overweight and obesity. The report 'Acting on Australia's weight: a strategic plan for the prevention of overweight and obesity', released in 1997, identified physical inactivity and poor diet as key risk factors for ill health, and set as key national and state health priorities the prevention of inappropriate weight gain in adults and the promotion of healthy weight in children. In particular, the plan recommended the adoption of a series of national primary health care initiatives, including the promotion of physical activity, dietary monitoring, and the encouragement of nutritional policies in schools, childcare and day care centres. In 1998 and 1999 the National Public Health Partnership Group (NPHP) of the Australian Health Minister's Advisory Committee set up two nationally representative sub-committees: the Strategic Inter-Governmental Nutrition Alliance (SIGNAL), and the Strategic Inter-Governmental Forum on Physical Activity and Health (SIGPAH), to drive initiatives to promote better nutrition and increased physical activity respectively.

In the area of physical activity, SIGPAH has built on the government's *Active Australia* policy, identifying increased awareness and understanding of the benefits of participation in physical activity, and the creation of structures to assist individuals to lead active and healthy lifestyles, as central for the prevention of overweight and obesity. Its policy papers *Getting Australia Active: Towards Better Practice for the Promotion of Physical Activity* and *Be Active Australia: A Health Sector Agenda on Physical Activity 2004-2008* review a series of actions and practical interventions for achieving these objectives. The papers also highlight the need to work at jurisdictional levels to enhance opportunities for collaboration. More specifically with regards to children, the Commonwealth Government has aimed to promote these policies through their physical activity recommendations for 5-12 year olds and 12-18 year olds (*Australia's Physical Activity Recommendations for 5-12 Year Olds* and *Australia's Physical Activity Recommendations for 12-18 Year Olds*). Yet, while these joint efforts have played a significant role in raising awareness of the importance of creating supportive environments that provide convenient opportunities for regular physical activity, such policies have fallen short of identifying and implementing comprehensive interventions for action.

Similarly, in the area of nutrition, SIGNAL has worked to promote the government's *Eat Well Australia* policy, identifying poor nutrition, obesity, a high fat intake and a low consumption of fruit and vegetables, as the most important preventable cause of ill-health in Australia, alongside smoking. More recently, the *Dietary Guidelines for Children and Adolescents in Australia* highlight the groups of foods and lifestyle patterns that promote good nutrition and health in later life, and incorporate infant feeding guidelines aimed at providing information to health professionals and the general population about healthy food choices. In support of these goals, in 2000, the Australian government initiated the National Nutrition Program, a 3 year community grants program to target the nutrition and long term eating patterns of children aged 0-12 years, and pregnant women. A total of $13.6 million in small grants was expended, with high priority given to projects involving rural and remote areas, Aboriginal and Torres Strait Islander communities, and lower socio-economic groups. Although this was the most significant amount of resources committed to child nutrition

in Australia, there has been no comprehensive evaluation of what was learnt from the initiative, nor of the policies or mechanisms for translating these efforts into sustainable action.

However, since then increasing evidence has pointed to the multiple causal pathways associated with childhood obesity[38-41], and subsequently there has been a growing awareness of the need for a more 'comprehensive' response to the nation's obesity crisis. As a result, in 2002, the Australian Government established the National Obesity Taskforce. Building on their framework *Healthy Weight 2008 – Australia's Future*, in 2005, the Taskforce developed a *National Agenda of Action for Young People and their Families*. An outcome of this paper has been the development of a $116 million initiative over four years, by the Prime Minister, the Honourable John Howard, to support *Building a Healthy, Active Australia* that aims to tackle the problem of declining physical activity and poor eating habits of Australian children.

In line with this policy, and working with the Australian Department of Family and Community Services, the National Obesity Taskforce has specifically targeted 'childhood' obesity as a crucial component in the national fight to prevent the more serious long term physical, social, emotional, and economic consequences of overweight. In the recent *National Agenda on Early Childhood*, the Australian Government recommends that health ministers, through the National Obesity Taskforce, focus on children aged 0-5 years, as research indicates the early years of children's life sets the foundations that will contribute to their future health and well-being[42]. Moreover, in its framework for the development of a national public health plan *Healthy Children – Strengthening Promotion and Prevention across Australia,* the Government places particular emphasis on the central role that parents, communities, teachers, child care workers, and primary health care providers can play in the prevention and early intervention of key health issues, such as overweight and obesity, and puts forward a plan for strengthening their capacity to meet children's needs. The special paper on the *Development of the Aboriginal and Torres Strait Islander National Public Health Action Plan for Children 2004-2008* focuses on the specific nutritional needs of this target population.

Table 3: Australian National Strategies, Frameworks and Guidelines for the Promotion of Healthy Weight and the Prevention of Overweight and Obesity

Focus	Strategy	Goals
Healthy Weight	Acting on Australia's Weight: A Strategic Plan for the Prevention of Overweight and Obesity[43]	The report identified physical inactivity and poor diet as key risk factors for ill health and set out a list of priorities of strategic initiatives to be implemented over a ten year period. The goal of these initiatives is to prevent further weight gain in adults who are overweight or obese and to ensure the healthy growth of children by combining approaches to physical activity and diet through public health action at a macro level.
	Healthy Weight 2008 – Australia's Future. The National Action Agenda for Young People and their Families[44]	This plan focuses on children and young people in recognition that the prevention of weight gain in childhood is likely to be the most effective way of achieving healthy weight and patterns of lifestyle. Healthy Weight 2008 aims to halt and then reverse the increasing rates of overweight and obesity via strategies that address healthy weight and physical activity in the broad social and environmental contexts. The report identifies different settings including child care, primary care services, maternal and child health settings.
	Building a Healthy Active Australia[45]	Building a Healthy, Active Australia is a $116million initiative over 4 years introduced by the Prime Minister to tackle the growing problem of declining physical activity and poor eating habits of Australian children. Importantly, the initiative is focused on children, because healthy and active children live better and learn better, and grow up to be more healthy and active adults. The initiative consists of four key components: Healthy School Communities; Healthy Eating and Regular Physical Activity – Information for Families; Active After-School Communities; and Active School Curriculum.
Overweight and Obesity	Clinical Practice Guidelines for the Management of Overweight and Obesity in Children and Adolescents[46]	These guidelines for children and adolescents are the result of a comprehensive assessment of the current scientific evidence. They provide detailed evidence-based guidelines for assessing overweight and obesity in Australia. The guidelines highlight health related risks and concerns associated with overweight and obesity in childhood and adolescence.
	Overweight and Obesity in Children and Adolescents – A Guide for General Practitioners[47]	This report provides a practical 8-step guide for general practitioners on how to assess/deal with overweight/obesity in children and adolescents. It includes a brief summary of each step with references in case further detail is required.
Physical Activity	Developing an Active Australia: A Framework for Action for Physical Activity and Health[48]	This document is a health sector response to the Active Australia concept. It is the outcome of a collaborative process involving all State and Territory health jurisdictions and many of Australia's leading academics in this field. Its underlying theme is that as little as 30 minutes of physical activity per day can play a part as a preventive factor in all of the current National Health Priority Areas (NHPAs) – cardiovascular disease, cancer, mental health, diabetes mellitus and, particularly in older people, injury.

Physical Activity	Getting Australia Active: Towards Better Practice for the Promotion of Physical Activity[49]	This report is a review of programs for the promotion of physical activity in Australia. It describes health benefits to Australia of an active population, the rationale to increase participation, and specific settings in which interventions should occur.
	Be Active Australia: A Health Sector Agenda for Action on Physical Activity 2005-2010[50]	This paper outlines a series of actions the health sector has agreed to undertake to address physical inactivity with the aim of improving health outcomes. It aims to add value to the work at jurisdictional levels as well as identifying clear links and opportunities for collaboration.
	Australia's Physical Activity Recommendations for 5-12 Year Olds[51]	These recommendations are designed for parents and carers of children and young people aged 5-12 years, teachers, policy makers and health and other professionals, and are aimed at promoting an increase in physical activity opportunities within their respective settings.
	Australia's Physical Activity Recommendations for 12-18 Year Olds[52]	These recommendations are designed for parents and carers of children and young people aged 12-18 years, teachers, policy makers and health and other professionals, and are aimed at promoting an increase in physical activity opportunities within their respective settings.
Nutrition	Eat Well Australia: An Agenda for Action for Public Health Nutrition, 2000-2010[53]	In relation to children, this strategy focuses on: ▪ increasing the consumption of vegetables and fruit; ▪ promoting breast feeding to the age of at least 6 months; ▪ encouraging the introduction of solids to babies according to national guidelines; ▪ increasing the availability of healthy snacks in schools and child care centres; and promoting good nutrition for vulnerable and disadvantaged groups.
	Dietary Guidelines for Children and Adolescents in Australia[54]	The dietary guidelines for children/adolescents highlight groups of foods and lifestyle patterns that promote good nutrition and health in later life, and aim to minimise the risk of developing diet-related diseases within the Australian population. Incorporated in these guidelines are the Infant Feeding Guidelines for Health Workers that are based on the best available scientific evidence and provide information for health professionals and the general population about healthy food choices.
Child Health and Development	Healthy Children – Strengthening Promotion and Prevention Across Australia Developing a National Public Health Action Plan for Children 2005-2008[55]	This paper outlines a framework for the development of a national public health action plan for children and seeks to highlight the importance of strengthening the capacity of parents, communities and primary health care providers in the prevention and early intervention of key health issues, including childhood obesity.
	Healthy Children – Strengthening Promotion and Prevention Across Australia Development of the Aboriginal and Torres Strait Islander National	This paper focuses on the specific needs of this target population, emphasising the nutritional and health needs of Indigenous children.

	Public Health Action Plan for Children 2005-2008[56]	
	A National Agenda for Early Childhood (Department of Family and Community Services, 2006)[57]	The Australian government is advancing the National Agenda for Early Childhood. The Agenda brings together the Department of Family and Community Services, the Department of Health, and the National Obesity Taskforce, to focus on healthy weight and active living in children aged 0-5 years, as research shows that early years of children's life build the foundations that will contribute to their future health and well-being.

Hence the national infrastructure and direction for action on overweight and obesity has been clearly set through the numerous policy papers, frameworks and guidelines. These have recommended as key strategies:

- The encouragement of healthy lifestyle patterns with emphasis on children aged 0-5 years;
- The strengthening of the capacity of parents, communities, teachers, child care workers and primary health care providers, as key moderators in the prevention and early intervention of overweight and obesity among young children;
- The development of healthy eating habits through the increased consumption of fruits and vegetables; the promotion of breast feeding to the age of six months; the introduction of solids to infants according to national guidelines; and the availability of healthy snacks in schools, child care and day care facilities; and
- The promotion of regular participation in physical activity.

The National Obesity Task Force is presently the peak body that guides government policy in the area of obesity prevention, but it has representation from the Australian and state government health departments, and receives advice from a scientific reference group and consultative forum with representation from a wide cross-section of NGOs, professional groups and private stakeholders. Currently, jurisdictions must report annually to the Australian Health Ministers' Council through the National Obesity Task Force on actions and progress to address obesity, and although the future of the National Obesity Task Force is under review, jurisdictional commitments for the prevention and management of overweight and obesity in children remain high and reporting at national level is likely to be addressed by the newly formed inter-jurisdictional Public Health Development Committee (APHDC).

Nevertheless, while the National Obesity Taskforce has played a major role in setting the national action agenda focusing on the prevention of overweight and obesity among young children, its key role has been to develop a framework and identify settings for action, including primary health care, however it has not provided guidance on implementation. A more recent government initiative, announced in February 2006, is the Council of Australian Governments' (COAG) *Better Health Initiative (ABHI)* that aims to strengthen action to address obesity and other modern chronic diseases, by the promotion of nationally consistent messages on health, and the implementation of local programs to facilitate and support lifestyle changes. As such, ABHI should provide the national organisational structure to convert these policies and guidelines into action.

STATE LEVEL POLICIES AND ACTION PLANS

Consistent with these Australian national initiatives, all states and territories have developed broad policy papers and strategic action plans to endorse and promote the goals of SIGNAL, SIGPAH and the National Obesity Taskforce. Table 4 presents an overview of the range of activities within each State of Australia aimed at promoting healthy weight among young children, and once again reflects the overwhelming emphasis on nutrition and physical activity policies. However, arguably, it was the New South Wales Childhood Obesity Summit held in Sydney in 2002 that set the agenda for action across the states and territories. The summit brought together a range of stakeholders to: listen to parents' and families' views and examine existing approaches to the problem of overweight and obesity; to consider new ideas and review evidence regarding promising strategies; to identify programs, services and resources required implement these strategies; and to build community consensus regarding future prevention policy. The Summit demonstrated the on-going challenges caused by lack of evidence regarding interventions on how to tackle overweight and obesity, and was pivotal in highlighting the need for policy action to move forward based on 'promising' interventions, and in this way it spurred the growth of state level campaigns across Australia.

Table 4: Australian State Childhood Obesity Prevention Policies, Strategies, Action Plans, Guidelines and Campaigns

STATE	STRATEGY
ACT	*Eat Well ACT: A Public Health Nutrition Plan 2004-2010*[58]
New South Wales	Breastfeeding in NSW: Promotion, Protection and Support[59] *Healthy and active kids*[35] *Eat Well NSW New South Wales strategic directions for public health nutrition*[60] *The NSW Government Response to the 2002 Obesity Summit*[61] *Prevention of Obesity in Children and Young People – NSW Government Action Plan 2003-2007*[62] *Dietary Guidelines for Children and Adolescents in Australia Guidelines: How to pack a healthy lunchbox for children under 5*[63]
Northern Territory	*Food and Nutrition Policy' action plan for 2001-2006*[64] *NT Infant Feeding Guidelines*[65] *Aboriginal Health and Families – A Five Year Framework for Action*[66] *NT Child Health Policy, Eat Well Australia, NATSINSAP*[67] *Growth Assessment and Action Plan Guideline (GAA)*[68]
Queensland	*Queensland Health and Education Queensland Joint Work Plan 2004-2007* Strategic Policy Framework for Children's and Young People's Health 2002-2007[69] *Queensland Health Optimal Infant Nutrition: Evidence Based Guidelines 2003-2008*[70] *Guidelines for Child Health Information: your guide to the first 12 months*[71] *What is Better food at Preschool?: guidelines for professional and parents*[72] *Growth Assessment and Action (GAA) Indigenous child health growth initiative*, which monitors the growth and weight of Indigenous children to identify early nutrition-related problems[73] *Eat Well, Be Active-Healthy Kids for Life*[74] *Active-Ate Campaign*[75] *Get Active Queensland: Children and Young People Strategy*[76] *Queensland Aboriginal and Torres Strait Islander Food and Nutrition Strategy*[77]
South Australia	*Eat Well South Australia Campaign*[78] *Healthy Food Choice in Family Day Care Policy*[79] *Guidelines for Developing a Food and Nutrition Policy in Child Care Centres*[80] *The Healthy Weight Strategy Draft*[81] *be active Strategy*[82] *Eat a Rainbow with Fruit and Vegetables Guidelines*[83] *Mai Wiru – Regional Stores Policy and associated regulations for the Anangu Pitjantjatjara Yankunytjatjara (APY) Lands*[84]

Tasmania	*Food and Nutrition Policy*[85] *Eat well Tasmania*[86]
Victoria	*Go for your Life Campaign*[87] *Kids Go for Your Life Campaign*[88] *Best Start Guidelines as part of the program supporting Child Health Workers*[89] *State-wide Community Education/Social Marketing Campaign*[90]
Western Australia	*Start Right-Eat Right Award Scheme: Food and Nutrition Policy in Child care Centres*[91] *Eat Well Be Active WA*[92] *Guidelines for Nutrition in Childcare*[93] *Go for 2 Fruit and 5 Vegetables Campaign*[94] *Crunch & Sip*[95] *Be Active Western Australia*[96]

AUSTRALIAN NATIONAL PEAK BODY POSITION PAPERS ON THE PREVENTION OF OVERWEIGHT IN YOUNG CHILDREN

In support of these, many states have developed professional guidelines and standards for general practitioners, paediatricians, nurses, midwives, dieticians, child care workers, and preschool teachers, to outline policy and set requirements, with much of this work promoted through national peak bodies, professional associations, and even private industry, such as the health insurance sector that is recognising the growing costs of overweight and obesity.

Table 5: Australian National Peak Bodies' Position Statements and Policy Papers on the Prevention of Overweight and Obesity in Children

Type	Peak Body	Policy / Position Paper
Non-profit organisations	Australian Breastfeeding Association	*National Clinical Guidelines for Weight Control and Obesity Management in Adolescents and Children*. (2003) Submission to the National Health and Medical Research Council.
	Australian Dieticians Association	*Overweight and Obesity the Problem* (2000)
	Australasian Society for the Study of Obesity	*Obesity in Australian Children*
	Cancer Council Australia	*Nutrition and Physical Activity*. The Cancer Council Australia's Position Statement
	Early Childhood Australia	*Childhood Obesity* Policy Statement (2005) is supported by a set of resources on overweight and obesity prevention for parents.
	National Heart Foundation of Australia	*Children and Physical Activity. A statement of Importance and a Call to Action* (2001) *Position Statement on Dietary Fat and Overweight/Obesity* (2003) *Position Statement on the Relationships between Carbohydrates, Dietary Fibre, Glycaemic Index/Glycaemic Load and Cardiovascular Disease* (2006)
	Nutrition Australia	*Food and Nutrition Guidelines for Child Care Centres* (2002) *Food Advertising directed at Kids* (2002) Position Statement
	Public Health Association of Australia	*The Promotion of Healthy Weight in Australia* (2004) adapted from *Prevention and Management of Overweight and Obesity*
Professional Associations	Australian Medical Association	*Nutrition 2005* AMA Position Statement *Breast Feeding 2004* AMA Position Statement *Body Image and Health 2002* AMA Position Statement
	Australian Nursing Federation	*Just for Parents*
	Australian Divisions of General Practice	*What are we feeding our children? A junk Food Advertising Audit* (2003). The National Division's Youth Alliance
	Dieticians Association of Australia	*Overweight and Obesity – The Causes* (2002) *Dietary Guidelines for Children and Adolescents in Australia*(2003)
	Royal Australian College of General Practitioners	*RACGP Breastfeeding Position Statement*. Endorsed 2000. *RACGP Prevention and Health Promotion*. Position Statement endorsed 1996.
	Sports Dieticians Australia	*The Overweight Child – A Family Approach* (2003).
Legislative bodies	Food Standards Australia New Zealand (FSANZ)	*Food Additives and Labels in the Australia New Zealand Food Standards Codes* (2000)
Private industries	Australian Food and Grocery Council	*Submission to WHO/FAO Diet, Nutrition, and the Prevention of Chronic Disease* (2002)
	HBF Medical Insurance	*Action for Healthy Kids*

INTERNATIONAL OBESITY PREVENTION STRATEGIES

In more recent years, Australia's lead in this field has been resonated internationally where there has been a rising concern for "globesity". Initially promoted in 2000 through the World Health Organisation's technical report entitled *Obesity: Preventing and Managing the Global Epidemic*, the international movement called for a major public health prevention initiative[97]. In response, both the United States' *Surgeon General's Call to Action* (2001) and the International Taskforce on Obesity's report *Obesity Prevention: The Case for Action* (2002) have emphasised the need to create supportive environments for the prevention of overweight and obesity in children from a young age. Since then, the WHO's *Global Strategy on Diet, Physical Activity and Health*[98], has called for:

- Stronger evidence for policy: through the synthesis of existing knowledge, science and interventions on the relationship between diet, physical activity and chronic disease;
- Advocacy for policy change: through the provision of accessible and relevant information to decision-makers and stakeholders on underlying problems, determinants, interventions and policy needs;
- Stakeholder involvement: through agreement on the roles and responsibilities of stakeholders in the promotion of healthy weight among children; and
- A strategic framework for action: through the introduction of appropriately tailored policies and interventions for countries and population sub-groups.

More recently, the International Association for the Study of Obesity called together an international panel of experts to synthesise the evidence and provide best practice recommendations on preventing childhood obesity and related risk of chronic diseases[5]. This 2006 review highlights that while empirical research evidence concerning the magnitude of the problem is widely reported and uncontested, there are a lack of programs to address the specific needs of children aged 0-6 years. Moreover, the report stresses this gap is of particular concern because the preschool years are a critical period for obesity prevention, while the lack of multi-component interventions focussing on the home and community as well as involving primary health care workers has meant that few international, national or state government policies have been converted into effective practical interventions.

Table 6: International Obesity Prevention Strategies, Plans and Guidelines

Strategy	Goals
Obesity: Preventing and Managing the Global Epidemic[97]	This document outlines the seriousness of the growth in overweight and obesity internationally and sets the scene for the promotion of an comprehensive public health strategic for its prevention.
US Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity[99]	This call for action outlines strategies that communities can use in helping to address the problem of overweight and obesity. It proposes increased provision of physical education at all school grades, the promotion of more healthy food options on school campuses, and creation of access to safe recreational facilities for residents of all ages.
Obesity Prevention: The Case for Action[100]	This paper again highlights concerns for the emerging global obesity crisis and calls for both short and long term measures to address the situation
World Health Assembly's Global Strategy on Diet,	This strategy was formally adopted in 2004 following a joint WHO/FAO report and a further 18 months of consultation with stakeholders to develop a strategy that collaboratively addressed the contributing factors of obesity through the

Physical Activity and Health[98]	promotion of environments that enable healthy dietary intake and increased levels of physical activity.
Obesity in Children and Young People: A Crisis in Public Health[24]	This document calls for action in the area of childhood obesity.
The Baby-Friendly Hospital Initiative[101]	To promote breastfeeding in hospitals and other health care centres worldwide.

At the individual country level, a number of nations have also built on Australia's lead but similarly while most have developed detailed policy papers, action plans and professional guidelines on childhood obesity, there is little evidence of effective national programs or interventions for change.
Table **7** highlights the key country-based childhood obesity policies and guidelines developed by Canada, New Zealand, the United States of America, and the United Kingdom. While many other nations have developed similar strategies, these four nations have been singled out as they represent APHCRI's area of focus.

Table 7: A Selection of Major International Country-Based Childhood Obesity Prevention Strategies, Plans and Guidelines

Country	Strategies, Plans and/or Guidelines
Canada	*Canada's Physical Activity Guide for Children*[102] *Primary Prevention of Childhood Obesity*[103]
New Zealand	*The 2002 National Children's Nutrition Survey*[104] *Healthy Eating – Healthy Action. Oranga Kai – Oranga Pumau: A Strategic Framework*[105] *Food and Nutritional Guidelines for Healthy Infants and Toddlers*[106] *Food and Nutritional Guidelines for Healthy Children aged 2-12 Years*[107]
United States	*US Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity*[99] *Healthy People 2010 – Objectives for the Prevention and Control of Childhood Obesity*[99]
United Kingdom	*Tacking Obesity in England*[108] *Managing Obesity in Children and Young People*[109] *Preventing Childhood Obesity*[110] *Nutritional Guidance for Early Years – Food Choices for Children aged 1-5 years in Early Education and Childcare Settings*[111]

Thus, it is within this national and international environment of growing calls for action, combined with an increasing urgency to identify and offer insight into how research can strengthen the evidence for obesity interventions aimed at prevention and healthy weight among children from 2-6 years of age that this review has been developed.

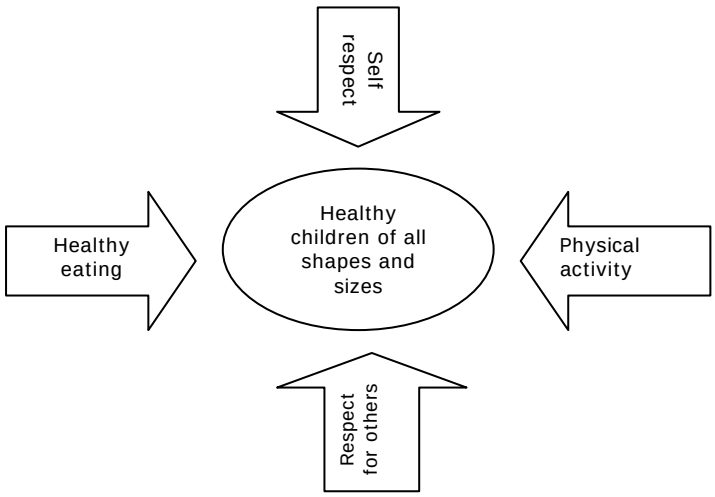
4. TOWARDS A CONCEPTUAL FRAMEWORK FOR THE PREVENTION OF CHILDHOOD OBESITY

DEFINING HEALTHY WEIGHT

Variations in the definition of childhood obesity have posed difficulties in the past for assessing the true extent of the obesity epidemic, as well as for reviewing the comparisons among different sub-population groups. For adults, obesity has been simply defined as a Body Mass Index (BMI), or weight in kilograms divided by the square of height in metres, of over 30 kg/m^2 [97]. However, for children BMI is not a static measurement, but varies from birth to adulthood, and is different between boys and girls. Interpretation of BMI values in children and adolescents therefore depends on international comparisons with population reference data, using cut-off points in the BMI distribution or percentiles[112, 113]. Using this definition, a child is classified as either clinically overweight or obese when their BMI exceeds the 85th or 95th percentile for age and sex, respectively, yet this classification is based only on statistical convenience not on known health risk[24].

While internationally BMI charts are widely accepted as a means of measuring and establishing a standard definition for childhood obesity, there has been much debate regarding their accuracy in measuring weight status of children aged 0-6 years[114], because of the complex growth patterns and rapid changes in development of this age group. In particular, research indicates that between the ages of 4-6 years there is a tendency towards natural increase in BMI referred to as the 'adiposity rebound' and while BMI charts do to some extent incorporate this, there are still clear limitations with this measurement tool[114]. Moreover, there has been increasing concern that such definitions of childhood overweight or obesity may lead to stigmatisation and low self-esteem[115-117], with research indicating that children as young as 4 years of age can sense prejudice towards their obesity[9]. Such social stigmatisation may lead to unhealthy body image, inappropriate weight reduction practices and the development of eating disorders[117-119].

Figure 3: The Concept Of 'Healthy Weight'



Source: Michigan Department of Education[120]

Consequently, in recent years there has been a growing emphasis in the use of the term 'healthy weight' which involves the promotion of healthy eating, active living, positive self-esteem, and acceptance of different shapes and sizes, rather than the search for an ideal body weight[121]. Such a shift in emphasis thus implies a general change in approach away from the individually focused, one-on-one weight reduction treatment for overweight and obese children, towards the more population focused, preventative approach for promoting healthy food choices, regular physical activity, and positive body image.

THE EXTENT AND IMPACT OF CHILDHOOD OBESITY IN AUSTRALIA

The most recent comprehensive national data on childhood obesity in Australia is that of the 1995 Australian Bureau of Statistics National Nutrition Survey [122], which indicates the prevalence of childhood overweight doubled in the decade from 1985, while childhood obesity rates trebled, with an estimated 20-25% of children being either overweight or obese. A review of three independent surveys of Australian children found similar rates with 21-24% of females, and 19-21% of males analysed being overweight or obese[123]. This means an estimated 1.5 million Australian children under 18 years of age can be categorised as being overweight or obese[45].

More specifically, among preschool children national figures indicate 18.5% of 2-4 year old girls and 14.6% of 2-4 year old boys are overweight, while a further 4.2% of girls and 2.2% of boys are obese[122]. More recent national figures will be available next year following a new survey, but data emerging from the Longitudinal Study of Australian Children being conducted by the Australian Institute of Family Studies on behalf of the Department of Family and Community Services, indicates 15% of preschool children are overweight, while a further 6% are obese[124]. Such figures are echoed at the state level, with a study of South Australian children showing a rise in obesity levels among preschoolers between 1995 and 2002, from 3.5% to 5.8% among girls and from 3.2% to 4.1% among boys, respectively[125].

In most Western societies, children from low socio-economic backgrounds have a greater risk of obesity than those who are more affluent[24, 34, 126, 127]. Yet, in Australia, to-date there is limited evidence that socio-economic status is an independent risk factor for obesity [46] and the existing evidence is conflicting. For example, while a number of studies have indicated a significant relationship between socio-economic status and obesity among adolescent females, few have encountered any significant relationship between socio-economic status and obesity among adolescent boys[39, 128, 129]. In contrast, a sample of 7 to 15 year-old Australian school children, indicated the prevalence of overweight and obesity was lowest for those with the highest household incomes, but only males from families with the lowest household income were significantly more likely to be overweight or obese compared with males from the highest household incomes[130]. Perhaps the most convincing evidence comes from a recent study of South Australian preschool children aged 4 years, where results indicate a strong correlation between socio-economic status and region, with overweight and obesity being highest among the most disadvantaged (1st quintile) and most rural[131].

Table 8: Children Aged 4 Years who are overweight or obese, by socio-economic position, South Australia, 2000-2001[131]

	Adelaide		Non-metropolitan areas	
Socioeconomic disadvantage	Boys	Girls	Boys	Girls
Lowest 20% (most disadvantaged)	16.0%	21.0%	16.8%	22.9%
Quintile 2	16.7%	20.2%	19.3%	20.8%
Quintile 3	16.8%	18.9%	16.2%	19.6%
Quintile 4	14.4%	19.1%	16.0%	19.8%
Highest 20% (least disadvantaged)	12.8%	17.0%	12.4%	16.9%
Rate Ratio (quintile 1 to quintile 5)	1.2	1.2	1.4	1.4

Data on the prevalence of obesity among Aboriginal and Torres Strait Islander children and adolescents is also scant. While the 2001 National Health Survey found that Indigenous adults are more likely to be overweight or obese (61%) than non-Indigenous adults[132], results for children have not shown similar patterns. On the contrary, the only available national data comes from the 1994 National Aboriginal and Torres Strait Islander Survey (NATSIS, 1994). This survey found that overweight and obesity is less of a problem among Aboriginal and Torres Strait Islander children, with only 13% of Aboriginal and Torres Strait Islander boys and 19% of girls aged 7–15 years being overweight, as compared to national figures of 20-25%[133]. In comparison, an Australian study of various ethnic groups indicated children of European and Middle Eastern ethnic origin are more likely to be obese than those of Asian background[128].

THE NEED TO FOCUS ON YOUNG CHILDREN

While increasingly research is demonstrating a link between childhood obesity and health risks, such as, high blood pressure and abnormal blood lipids[134], diabetes[135], and asthma and respiratory problems[136] of greater significance has been the growing evidence indicating that paediatric overweight is associated with an increased risk of overweight in adulthood[123, 137, 138] where the health risks of obesity have been firmly established[139, 140]. A recent Australian longitudinal study tracking levels of adiposity in persons between six and 20 years of age, suggests BMI at six is a good indicator of adult BMI[123]. While an international review estimates that about one-third of overweight preschool children and one-half of overweight school children remain overweight as adults[137]. Further studies have demonstrated a close correlation between childhood adiposity and age with overweight in adulthood[141, 142]. Thus the promotion of healthy lifestyles among young children and the prevention of childhood overweight may result in immediate benefits, not only in terms of modifying health risks in children, but also in terms of lowering rates of chronic disease in adults[143].

In addition to physical health risks, research demonstrates the sequela of emotional and social problems associated with overweight during childhood[116, 144-148], with evidence showing that children as young as 5 years of age can sense prejudice towards their obesity[9]. Well-documented studies reveal children who are overweight are more negatively stigmatised than almost any other social group[149-151], being liked to a lesser extent or being rejected by peers[148, 152, 153], and being the victims of various forms of peer aggression, such as teasing and bullying[154-156].

As a consequence of these physical, social and emotional costs, the direct financial burden of overweight and obesity in Australia has been estimated to be $1.2 billion/year, while the indirect costs range from $4.5 to $18 billion per year[45]. Hence primary prevention of overweight among children, prior to the onset of chronic health problems and risk related behaviours, is critical in stemming the obesity epidemic, with evidence indicating the development of healthy lifestyles at a young age may persist into adulthood, resulting in sustained protection against chronic disease and emotional/behavioural problems[143].

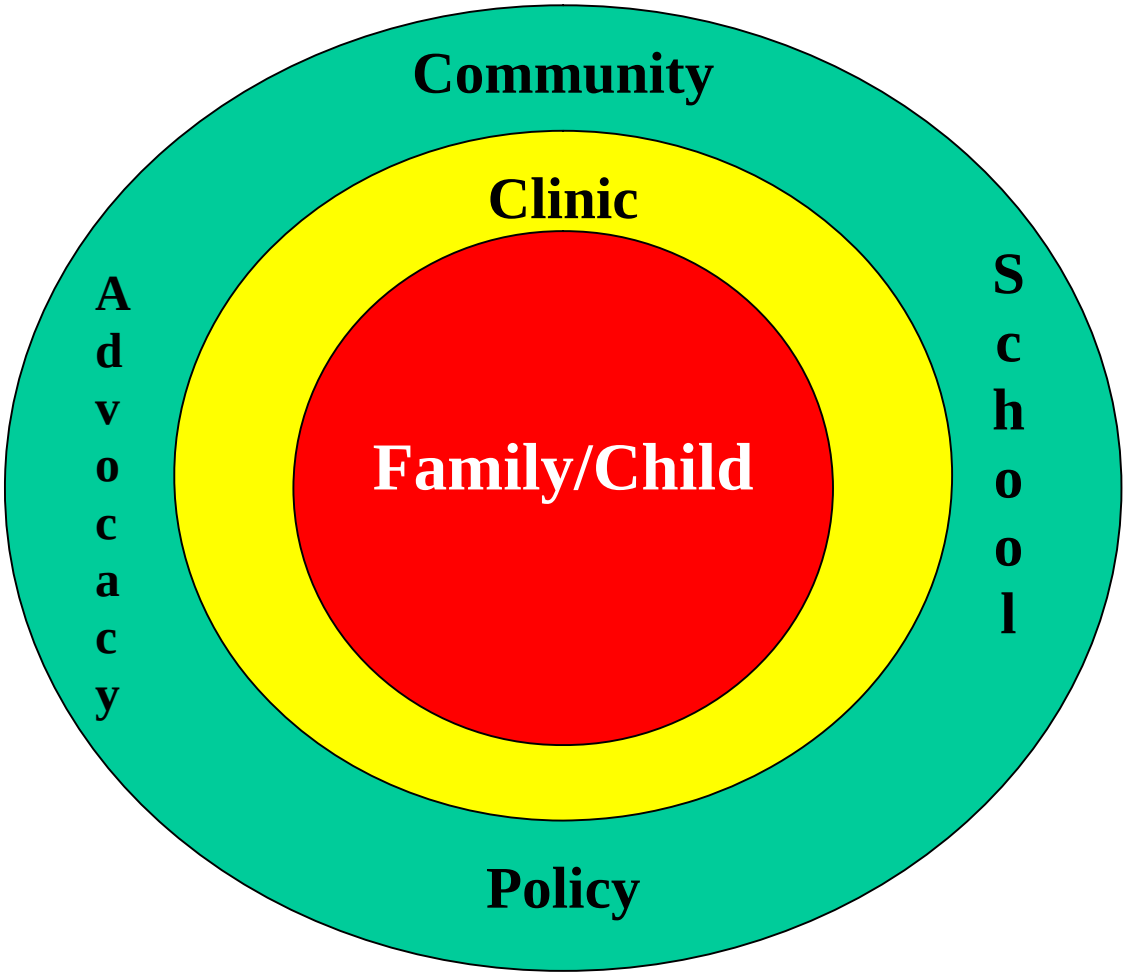
TOWARDS A CONCEPTUAL FRAMEWORK FOR PREVENTION

Yet despite growing evidence demonstrating the vital importance of developing primary prevention interventions for children aged 0-5 years[173, 174], together with the Australian government's present policy interests[57], an overview of systematic and non-systematic reviews on childhood obesity interventions illustrates the vast majority of support continues to be directed primarily towards secondary prevention and treatment of overweight and obesity among school aged children and adolescents. However, while treatment of the growing numbers of overweight and obese children already at risk of co-morbidities and reduction in quality of life should remain a concern, the health care system cannot afford to ignore the importance of implementing preventative measures. Moreover, such treatment programs should be carefully monitored by well-trained primary health care providers who are acutely aware that the child's health status involves mental and social dimensions rather than merely physical absence of disease[117].
Nevertheless, in placing childhood obesity 'prevention' on the agenda, policy makers, academics, practitioners and administrators need to examine carefully whether their well-intentioned, positive health messages are grounded in sound health education theory[117], as facilitating preventive interventions for addressing childhood obesity is complex and can result in the inadvertent production of undesirable effects[5]. For example, in their report *Acting on Australia's weight: a strategic plan for the prevention of overweight and obesity*[43], the government proposes a shift away from traditional individually-focused public health strategies, towards the promotion of structural changes for the creation of a 'macro-environment' that provides opportunities for healthy food choices and regular physical activity.

In considering strategies for 'ensuring the healthy growth of children', the Government has placed particular emphasis on the school as a key setting for changing access to food choices and activity. This emphasis on the school setting however, follows the conventional model of health promotion that assumes changes in knowledge, supported by changes in infrastructure, will lead to changes in behaviour[7]. Yet coercing unwilling students into physical activities or promoting eating patterns which are not easy for children to maintain in the home environment, may only serve to further exacerbate the apportioning of guilt and blame on overweight children and their parents[117]. Moreover, in doing so, such strategies are promoting overweight as a 'problem' or 'sick role' that needs treatment, resulting in a victim-blaming approach, in which the classical interpretation of populations becoming overweight, failing to care about their weight and appearance, and regaining weight after initial loss, are all deemed as failures on the part of the individual and the intervention[5]. Unfortunately, increasing research indicates that such feelings are echoed by key primary health care providers, including general practitioners, dieticians, public health educators and teachers[152, 165, 175, 176].

Furthermore, this growing emphasis on the macro-environment fails to acknowledge the profound effect which the family (micro-environment) has in developing and sustaining healthy lifestyles[7]. For example, in the case of healthy food choices, emphasis on school-based interventions does not adequately recognise that the food preferences of children are already likely to be well-established by the time they reach school age. As marketers well know, patterns of food choice and physical activity are determined early in life[39], with many advertisements targeting preschool children[177]. Birch[40] argues that early exposure to fruits and vegetables, and to foods high in energy, sugar and fats, plays an important role in establishing a hierarchy of food preferences. Not surprisingly, therefore, a strong relationship has been found between the food preferences of toddlers and those of their mothers, fathers, and older siblings, with children's preferences for high fat foods related to fat intake in their parents and siblings, with obese parents more likely to have overweight children[39]. Parents, and particularly mothers, are critical agents of change for obesity prevention programs because of their role in shaping their young children's diets[40] and physical activity patterns[178]. Accordingly, the World Health Organisation[179] argues that improving parents' eating habits may be one of the most effective ways to promote healthy eating for their children.

Figure 4: An Ecological Framework for the Promotion of Healthy Weight in Young Children

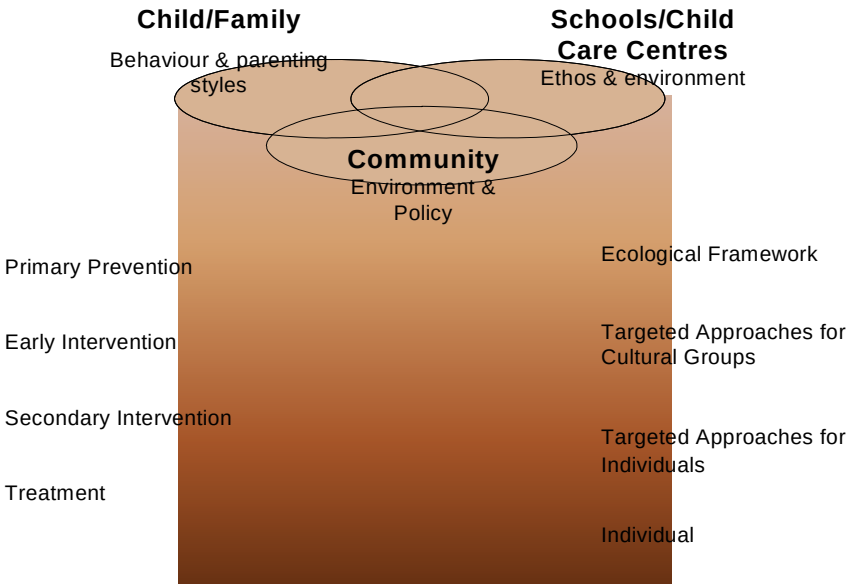


Thus increasingly, there is a growing consensus that to be effective preventative strategies require multi-strategic approaches involving all levels of society, both for the individual, family and community[9, 10, 180]. Defining and promoting 'healthy weight' in children needs to be interpreted within broader parameters than merely weight status. Sound nutrition and physical activity are essential for the overall health of all children, not just overweight children, and likewise absence of obesity does not necessarily ensure a healthy child. Achieving healthy weight requires comprehensive interventions, involving environmental, community, family, and personal strategies, that can be developed and sustained over long periods of time, rather than merely short-term, single strategy programs. This requires a balance between upstream, macro level changes to provide environments that make healthy choices easier; meso level changes aimed at communities and families; as well as downstream, micro level changes that meet individual needs (Figure 4).

In addition, there is a growing awareness of the need to tailor prevention programs to meet the needs of specific sub-groups of the population. For example, among some ethnic groups, cultural norms can significantly impact families' willingness to comply with dietary and exercise recommendations, with girls being particularly affected in relation to this latter point[24]. Similarly, those living in isolated or poorly serviced neighbourhoods, where families may not have easy access to healthy foods or safe

areas for children to engage in physical activity, or where single parents may work long hours and do not have either time, motivation or resources to adopt proposed healthy lifestyles, different models of intervention may be required. Under such circumstances, the research agenda should have a strong emphasis on understanding where the clear locus of control lies, and helping individuals, families and communities to work with critical stakeholders to ensure they have the strength and resilience to deal with perceived barriers so they can move successfully from contemplating change to acting upon it[11, 181]. Moreover, such strategies need to include societal changes in: food habits as a result of the proliferation of convenience and fast food chains, food preferences, television and media exposure, role modelling and parent, peer and school attitudes, child-parent interactions around eating and parenting styles, availability of sport and leisure facilities, transport, food prices, and labour structures.

Figure 5: A Model for the Effective Tailoring of Preventive Programs to meet the Needs of Specific Sub-Populations



ACHIEVING PREVENTION IN PRACTICE: MOVING AWAY FROM THE "WHY" AND "WHAT" TOWARDS THE "HOW"

With regards the prevention, already considerable research has been conducted to improve our understanding of the main determinants driving "why" children are gaining weight (see the Overview of Systematic and Non-Systematic Reviews on Childhood Obesity presented in Table 10 and Table 11) and it is now widely accepted that the key causal pathways are behavioural, environmental, societal, and to a lesser extent genetic. Certain specific genetic disorders, such as, Down syndrome, Prader-Willi syndrome, Duchenne muscular dystrophy, Albright hereditary osteodystrophy, and Fragile X syndrome have been linked to childhood obesity, yet these account for only 1-2% of the total cases of childhood obesity[24], and given that the prevalence of these conditions have remained relatively stable among the general population, they can not account for the large rise in obesity levels in recent years. Moreover, despite findings of a Danish Adoption Study that indicate adoptees' BMI show greater correlation with biological parents' BMI than with their adopted ones[182], there is limited evidence to indicate that the rise in obesity can be attributed 'purely' to genetic factors[24] but rather

where genetic factors are involved, most studies point to a strong interaction with other environmental contributions[139].

On the contrary, the majority of research into "why" prevalence rates of childhood obesity are rising has focused on the complex interaction between behavioural, societal and environmental risk factors that encourage greater consumption of food and more sedentary lifestyles. Diet, eating patterns, portion sizes, consumption of sweetened beverages and fast foods, reduction of physical activity, increased TV viewing and screen time, parental role modelling, food pricing, social deprivation, and family/parental support, have all been associated (if not conclusively) with rising levels of obesity. Moreover, it has been argued that within this broader 'obesogenic' environment of our modern industrialised societies, the family environment plays a particularly important role in determining risk for young children [7]. To deal with this broad range of 'dependent' and 'independent' mediating variables contributing to, or causing, overweight and obesity in children[183], extensive research has been conducted to assess potential interventions and much debate has revolved around "what" can be done to treat or prevent overweight and obesity in children. The key intervention categories for addressing these mediating variables are outlined in Table 9.

Table 9: Key Intervention Categories Addressing Mediating Variables

Level of Intervention	Intervention Categories	Selected Examples
Child	Diet	▪ Limit consumption of sweetened beverages, fats & carbohydrates ▪ Limit portion sizes ▪ Limit consumption of fast foods ▪ Increase consumption of fruits and vegetables ▪ Eat breakfast
	Physical activity	▪ Increase engagement in physical activities ▪ Reduce sedentary behaviour ▪ Reduce TV and screen time
	Psychosocial	▪ Focus on building positive self-esteem and body image
Parent/ Family	Behaviour Modification	▪ Encouragement of strong parenting ▪ Encouragement of role modelling through healthy eating and exercise ▪ Encouragement of family meals ▪ Provision of motivational reinforcement to encourage self-esteem and good body image
	Health education	▪ Education on healthy eating and active living ▪ Food preparation skills and knowledge
Peers	Behaviour modification	▪ Promotion of support peer relationships ▪ Prevention of bullying ▪ Promotion of positive communication
School and/or Child Care	Diet	▪ Removal of chocolate and sweetened beverage machines ▪ Creation of healthy cafeteria menus
	Physical Activity	▪ Expanded physical exercise curricula
	Environmental	▪ Greater accessibility and safe recreational facilities
Health Clinic	Clinical	▪ Provision of coordinated and supportive referral services ▪ Creation of clinical information systems ▪ Promotion of self-management support materials ▪ Encouragement of clinician counselling ▪ Reimbursement/insurance for referral services

Wider Community	Environmental	▪ Greater accessibility to safer use of public transport ▪ Environmental modification to enhance opportunities for physical exercise ▪ Increased availability of recreational facilities, parks etc.
	Health promotion	▪ Development of promotional campaigns on eating and exercise ▪ Provision of rewards, stickers and advertising on sports equipment
Policy	Legislative	▪ Introduction of laws on food labelling ▪ Restrictions on food advertising during children's TV viewing time ▪ Regulation of marketing ▪ Controls on food pricing and subsidies to favour healthier foods ▪ Introduction of agriculture and transport policies and subsidies

Nevertheless, despite the extensive nature of these research efforts, a review of both systematic and non-systematic reviews of childhood obesity interventions illustrates that the research has been devoted largely to the investigation of diet and physical activity categories for the secondary prevention and treatment of overweight and obesity among school aged children and adolescents with limited success (see Table 10 and Table 11). As these reviews indicate, of 16 longitudinal studies carried out between 2000 and 2004 into the effects of physical activity on young children only five directly measured energy expenditure and only one of these showed that exercise provided a significant protective effect. Likewise among a further 16 longitudinal interventions to assess the impact of limiting dietary fat intake, only 5 showed significant positive findings, 4 showed mixed findings and 7 showed no significant findings[184].

Table 10: List of Systematic Reviews

Year	Citation of Systematic Reviews	Target group(s)
2006	Doak, C. M., Visscher, T. L. S., Renders, C. M., & Seidell, J. C. (2006). The prevention of overweight and obesity in children and adolescents: a review of interventions and programs. *Obesity Reviews, 7*(1), 111-136.	Children (6–19 years)
2006	Flynn, M. A. T., McNeil, D. A., Maloff, B., Mutasingwa, D., Wu, M., Ford, C., et al. (2006). Reducing obesity and related chronic disease risk in children and youth: a synthesis of evidence with 'best practice' recommendations. *Obesity Reviews, 7*(S1), 7-66.	Children (0-17 years)
2005	Gill, T. (2005). *Best options for promoting healthy weight and preventing weight gain in NSW*. North Sydney: NSW Department of Health.	Children and adults
2005	Summerbell, C., Waters, E., Edmunds, L., Kelly, S., Brown, T., & Campbell, K. (2005). Interventions for preventing obesity in children. *The Cochrane Database of Systematic Reviews*(3).	Children
2004	McLaren, L., Shiell, A., Ghali, L., Lorenzetti, D., Rock, M., & Huculak, S. (2004). *Are integrated approaches working to promote healthy weights and prevent obesity and chronic disease?* Calgary, Canada: Centre for Health & Policy Studies, Dept Community Health Sciences, University of Calgary.	Children and adults
2004	Casey, L., & Crumley, E. (2004). *Addressing childhood obesity: the evidence for action*. Canada.	Children (0-18 years)
2004	Institute of Medicine (IOM). (2004). *Preventing childhood obesity: health in the balance*. Washington, D.C: National Academies Press.	Children
2003	Inglis, V., Waters, E., & Sewell, J. (2003). *To promote awareness of the risk factors that contribute to childhood obesity and assess the ability of parents to develop shared strategies to reduce such risks*. Parkville, Victoria: Centre for Community Child Health and Royal Children's Hospital.	Children (5 -14 years)

2003	Mulvihill, C., & Quigley, R. (2003). *The management of obesity and overweight: An analysis of reviews of diet, physical activity and behavioural approaches. Evidence briefing*.	Children, adolescents and adults
2003	Summerbell, C., Ashton, V., Campbell, K., Edmunds, L., Kelly, S., & Waters, E. (2003). Interventions for treating obesity in children. Oxford: The Cochrane Library.	Children (0-17 years)
2002	Ammerman, A. S., Lindquist, C. H., Lohr, K. N., & Hersey, J. (2002). The Efficacy of Behavioral Interventions to Modify Dietary Fat and Fruit and Vegetable Intake: A Review of the Evidence. *Preventive Medicine, 35*(1), 25-41.	Children, adolescents and adults
2002	Micucci, S., Thomas, H., Vohra, J. (2002). *The effectiveness of school-based strategies for the primary prevention of obesity and for promoting physical activity and nutrition, the major modifiable risk factors for Type 2 diabetes: review of reviews*. Hamilton, Canada: Public Health Research, Education and Development Program.	Children
2002	University of York, NHS Centre for Reviews and Dissemination (2002). The prevention and treatment of childhood obesity. *Effective Health Care: the N H S centre for reviews and dissemination, 7*(6), 1-11.	Children
2002	Reilly, J., Wilson, M., Summerbell, C., & Wilson, D. (2002). Obesity: diagnosis, prevention, and treatment; evidence based answers to common questions. *Archives of Disease in Childhood [NLM - MEDLINE], 86*(6), 392.	Children (obese)
2001	Jerum, A., & Melnyk, B. (2001). Evidence-based practice. Effectiveness of interventions to prevent obesity and obesity-related complications in children and adolescents. *Pediatric Nursing, 27*(6), 606-610.	Children and adults
2000	Hardeman, W., Griffin, S., Johnston, M., Kinmonth, A. L., & Wareham, N. J. (2000). Interventions to prevent weight gain: a systematic review of psychological models and behaviour change methods. *International Journal of Obesity, 24*(2), 131-143.	Children and adults
1999	Epstein, L. H., Goldfield, G.S. (1999). Physical activity in the treatment of childhood overweight and obesity: current evidence and research issues. *Med Sci Sports Exercise, 31*(S11), S553-S559.	Children
1999	Goran, M. I., K D Reynolds, K. D., & C H Lindquist, C. H. (1999). Role of physical activity in the prevention of obesity in children. *23*(Supplement 3), s18-s33.	Children and adolescents
1999	Jelalian, E. a. S., B. (1999). Empirically supported treatments in pediatric psychology: pediatric obesity. *Journal of Pediatric Psychology, 24*(3), 223.	Children
1997	Glenny, A. M., O'Meara, S., Melville, A., Sheldon, T. A., & Wilson, C. (1997). The treatment and prevention of obesity: a systematic review of the literature. *International journal of obesity and related metabolic disorders: journal of the International Association for the Study of Obesity, 21*(9), 715-737.	Children and adults
1996	Dishman, R., & Buckworth, J. (1996). Increasing physical activity: a quantitative synthesis. *Medicine and Science in Sports and Exercise., 28*(6), 706-719.	Children, adolescents and adults

Some studies suggest the management of overweight and obesity may be easier among younger children than older ones[185], their behaviour is easier to modify and control, they are less likely to be stigmatised, parents and other family members are more likely to be actively involved, and there may be more opportunities for medical observation [24]. However, on the negative side, as Caroli and Burniat[186] warn, dietary controls for the treatment of overweight and obesity in very young children can lead to

loss of muscle and lean body mass, and reduce linear growth, and hence few governments are willing to make any dietary control recommendations for except in extreme cases. On the contrary, strategies for raising energy expenditure and decreasing sedentary behaviour, such as television viewing, are more popular for this age group[187, 188]. Yet, participation of children aged 2-6 years in exercise programs is limited and tends to be more 'lifestyle' exercise, involving swimming, walking, running and climbing in the park, and playing games – activities which are affected to a degree by parents' availability of leisure time, as well as children's local environments and access to safe recreational facilities[189].

Thus, increasingly as the emphasis has moved towards childhood 'obesity prevention' and the promotion of 'healthy weight' through public health initiatives, arguments have shifted away from focusing only on diet, behaviour modification and exercise promotion among individuals, families and schools/preschools (the upper boxes of Table 9), towards population based approaches emphasising changes in community environments, as well as national and international legislative policies. Yet while research into "what" is causing the rising prevalence of overweight and obesity among young children is indicating multiple causal pathways, resources aimed at dealing with the problem continue to focus on diet and physical activity[24]. Even where healthy weight interventions have been modelled on successful strategies for tobacco control, road safety, sun protection, too often these interventions have failed to acknowledge that all these strategies involved a successful combination of consumer education and advocacy, legislative and policy changes, as well as community based programs[190].

Table 11: List of Non-Systematic Reviews

Year	Citation of Non-Systematic Reviews
2005	Sherry, B. (2005). Food behaviors and other strategies to prevent and treat pediatric overweight. *International journal of obesity, 29*, S116-S126.
2005	Swinburn, B., Gill, T., & Kumanyika, S. (2005). Obesity prevention: a proposed framework for translating evidence into action. *Obesity Reviews, 6*(1), 23-33.
2004	Fowler-Brown, A., & Kahwati, L. C. (2004). Prevention and Treatment of Overweight in Children and Adolescents. *American Family Physician, 69*(11), 2591.
2004	Irwin, L. G. (2004). *Preliminary review of the evidence base for healthy infant and early childhood development in British Columbia*. Vancouver, British Columbia, Canada: Human Early Learning Partnership (HELP) Affiliate & Researcher.
2004	Jain, A. (2004). *What works for obesity? A summary of the research behind obesity interventions*.
2004	James, W. P. T., & Gill, T. P. (2004). Prevention of obesity. In G. Bray, C. Bouchard & W. P. T. James (Eds.), *Handbook of obesity* (pp. 75-96). New York: Marcel Dekker.
2004	Rosenthal, J., & Chang, D. (2004). *State approaches to childhood obesity: a snapshot of promising practices and lessons learned*. Portland, ME.
2004	Zametkin, A., Zoon, C., Klein, H., & Munson, S. (2004). Psychiatric Aspects of Child and Adolescent Obesity: A Review of the Past 10 Years. *Journal of the American Academy of Child & Adolescent Psychiatry, 43*(2), 134-150.
2003	Saris, W. H. M., Blair, S. N., van Baak, M. A., Eaton, S. B., Davies, P. S. W., Di Pietro, L., et al. (2003). How much physical activity is enough to prevent unhealthy weight gain? Outcome of the IASO 1st Stock Conference and consensus statement. *Obesity reviews, 4*(2), 101-114.
2002	Swinburn, B., & Egger, G. (2002). Preventive strategies against weight gain and obesity. *Obesity Reviews, 3*(4), 289-301.
2002	Montague, M. (2002). *Public health nutrition policy in organised settings for children aged 0-12: an overview of policy, knowledge and interventions.*: Melbourne, Vic: Victorian Health Promotion Foundation, 2002, 49p, Online (MS-Word).
2002	Paxton, S. J. (2002). *Research review of body image programs*. Melbourne: Body Image and Health Inc and Psychology Department, University of Melbourne.

2001	Ritchie, L., Ivey, S., Masch, M., Woodward-Lopez, G., Ikeda, J., & Crawford, P. (2001). *Pediatric overweight: a review of the literature*. California: The Center for Weight and Health, College of Natural Resources, and the University of California, Berkeley.
2001	Campbell, K., & Crawford, D. (2001). Family food environments as determinants of preschool-aged children's eating behaviours: implications for obesity prevention policy. A review. (Statistical Data Included). *Australian Journal of Nutrition and Dietetics, 58*(1), 19-25.
2001	Dietz, W. H., & Gortmaker, S. L. (2001). Preventing obesity in children and adolescents. *Annual review of public health., 22*, 337-353.
2001	Steinbeck, K. S. (2001). The importance of physical activity in the prevention of overweight and obesity in childhood: a review and an opinion. *Obesity reviews, 2*, 117-130.
2001	Muller, M. J., Mast, M., Asbeck, I., LangnÃse, K., & Grund, A. (2001). Prevention of obesity--is it possible? *Obesity reviews: an official journal of the International Association for the Study of Obesity., 2*(1), 15-28.

As the ten principles of Kumanyika and colleagues[10] highlighted in Table 12 clearly point out, efforts to promote healthy weight among young children need to focus not merely on "what" programs work best, but perhaps more importantly "*how*" can regional, national and local interventions be stimulated to make them suitable for the local context. From this perspective, it involves a paradigm shift towards to focus on "*who*" are the key '*primary health care providers*' of young children[6, 34, 191] and how can they best be engaged in the process.

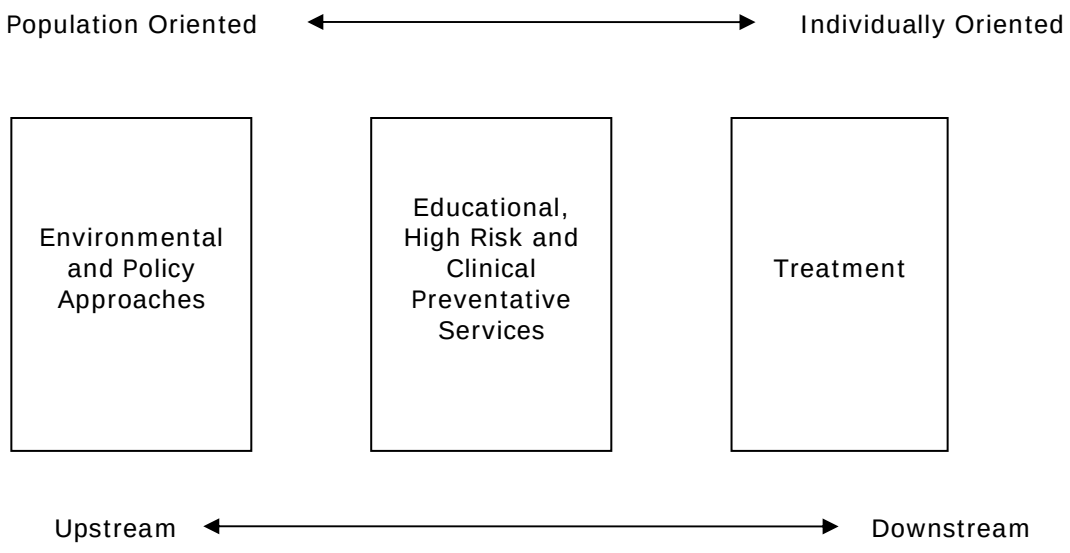
Table 12: Ten Principles of Obesity Prevention at the Population Level[10]

Principles
1. Education alone is not sufficient to change weight related behaviours. Environmental and societal intervention is also required to promote and support behaviour change.
2. Action must be taken to integrate physical activity into daily life, not just to increase leisure time exercise.
3. Sustainability of programs is crucial to enable positive change in diet, activity and obesity levels over time.
4. Political support, inter-sectoral collaboration and community participation are all essential.
5. Acting locally, even in national initiatives, allows programs to be tailored to meet real needs, expectations and opportunities.
6. All parts of the community need to be reached, not just the motivated healthy.
7. Programs must be adequately resourced.
8. Where appropriate, programs need to be integrated into existing initiatives.
9. Programs should build on existing theory and evidence.
10. Programs should be properly monitored, evaluated and documented, as this is important for dissemination and transfer of experiences.

Reviews by Glenny and colleagues[192] and Epstein and colleagues[193, 194] highlight the key role which parents can play in developing healthy weight among children, particularly when interventions involve changes to the lifestyle of the whole family. Yet while some

studies have focused on the central role of parents in the weight control of their children, others have emphasised the primary care level, demonstrating how practitioners can also assist by providing information on healthy eating, behaviour modification, physical activity and parenting skills, or specialised paediatric centres[195]. Similarly, outside of the health care sector, teachers, day care providers, administrators, politicians and proponents of recreational activities, could all become powerful allies for health care providers assisting them to engage parents in preventative interventions[24, 196]. Yet, as will be discussed in the Section 5, a series of barriers have to-date limited the engagement of paediatric primary health care providers in working with parents to support the prevention of overweight and obesity among children. Furthermore, as Kumanyika[191] points out, there are three key paradigms of action on obesity (see Figure 6), but their role until now has tended to fall within the category of 'individually oriented treatment of obesity'[6, 29, 34, 191]. Yet, if they are to have a major impact in terms of preventing overweight and obesity among young children, then increasingly they must shift their role to play an active part as educators and facilitators of healthy lifestyle changes within families and other child-centred related environments. Moreover, in the long term, they will have to engage with their peak bodies to become active protagonists for policy and environmental changes[34].

Figure 6: Action on Obesity – Three Different Paradigms[13]



This requires understanding "how" to: 1) overcome barriers and facilitate better communications between primary health care providers and parents; 2) engage health care providers with the capacity to perform their role at all three levels in the paradigm; and 3) optimise the use of scarce resources and ensure congruent messages across different public health sectors. As such, this report focuses less on the "why" and "what" to do to promote healthy weight among young children – issues which are already well-documented - and more on "how" to engage families, communities and primary health settings, "who" and which primary health providers are most appropriate for preventing overweight among young children.

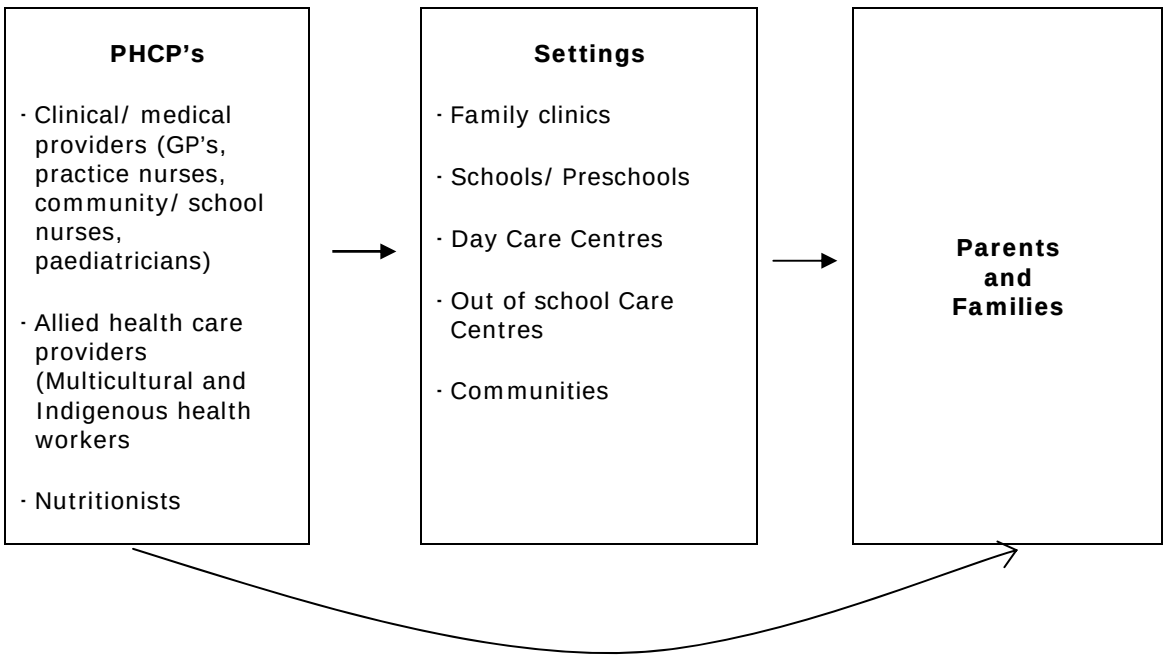
5. ENGAGING PRIMARY HEALTH CARE PROVIDERS: ENABLERS AND BARRIERS

DEFINING PRIMARY HEALTH CARE PROVIDERS

As opposed to 'primary care', that is generally limited to the treatment of illness and is provided predominately through the medical services of GPs and registered practice nurses, 'primary health care' incorporates a broader, more holistic concept of health that recognises the need to address the multiple determinants for the promotion of wellbeing and disease prevention, rather than merely treating the symptoms of illness [197]. From this perspective, primary health care providers (PHCPs) encompass a more comprehensive range of service providers, including not only GPs and nurses, but also allied health professionals and other health workers, including multicultural health workers, Indigenous health workers, health education/promotion and community development workers [198]. Moreover, theoretically, a key role of PHCPs is to eliminate the underlying causes of ill health, and hence education and prevention should represent central strategies in their efforts to assist individuals, families and communities gain understanding of and control over health issues. Maintaining inter-sectoral cooperation and coordination should also become significant aspects of primary health care providers work.

In the case of the prevention of overweight among young children, while GPs, practice nurses, child health nurses, paediatricians, and allied health care workers can have a significant influence[24, 199-201], it is ultimately the parents, carers, child care providers, and communities who affect whether children develop healthy lifestyles [202]. Thus, when offering decentralised, needs based health services consistent with the underlying philosophy of primary health care described above, PHCPs need to work closely with other settings based service providers to ensure continuity of care.

Figure 7: Strengthening the Link between PHCPs, Settings, Parents and Families



Furthermore, while the reversal of the rising prevalence of childhood obesity will require strengthening the links between PHCPs, child care providers, communities, and families to develop coordinated, multi-sector partnerships and interventions directed at health care settings, schools, child care centres, communities and the environment, many competing demands on primary health care providers have limited the uptake of this approach. But if we are to develop effective interventions to prevent overweight and obesity, then there is a critical need to understand the barriers preventing their engagement and to explore strategies to enhance the collaboration and participation of these groups.

BARRIERS TO PRIMARY HEALTH CARE PROVIDER INVOLVEMENT

Like the UK[203] and USA[112], Australia now has evidence based *Clinical Practice Guidelines for the Management of Overweight and Obesity in Children and Adolescents*[46], which recommend bi-annual BMI surveillance of all children, as well as other guidelines for monitoring, detecting and preventing overweight. Yet evidence indicates that health care providers in Australia fall far short of these recommendations with reports indicating that less than 25% of them regularly weighing and measuring children, and only one calculating children's BMI percentile [204]. Most depended on visual identification alone leading to under-recognition of overweight [3, 205], and this together with their likelihood to discuss overweight with parents or children to increase incrementally with the extent to which the patient is overweight[206], has resulted in missed opportunities for early intervention by primary health care providers.

However, despite these short-comings a recent study illustrated that health care professionals, and particularly paediatric practitioners, generally felt that intervention for the prevention of childhood obesity was an important issue [207]. Nevertheless, most PHCPs cited important parent attitudinal barriers and systems level problems, and highlighted that these together with lack of research and identified treatment futility were important barriers to their participation in efforts to intervene[207].

Systems Level Barriers

One of the major barriers identified by primary health care providers over the years has been lack of time and reinforcement [208, 209]. Primary health care providers, and general practitioners in particular, typically have a limited time with their patients and this is intensified by financial pressures to maximize productivity [206, 210, 211]. Thus, as prevention of weight gain is not perceived as the core business of most primary health care providers, it is given low priority in the face of competing demands. Added to this problem is practitioners' concern regarding patient compensation, with more than two thirds of registered dieticians and nearly half of paediatric nurse practitioners citing this as a major deterrent for intervention[207]. A study by Tershakovec et al.[212] an average reimbursement rate of only 11% across insurance providers, and illustrated that reimbursement was not associated with degree of risk, on the contrary, some children with medical consequences where denied support. Thus while primary health care providers do see children frequently up until the age of 4 years, unless insurance company policies and managed care policies change, health care professionals will have little incentive to provide childhood obesity prevention services.

Lack of resources is also cited as a limitation, with opportunities for preventative counselling in the health care setting being limited by lack of office support staff (practice nurses, etc) or systems for follow up interventions after GP visits, lack of availability of appropriate patient educational materials, and the limited number of specialists to whom referrals can be made[208]. Moreover, difference in socio-economic

status affects access to health care services, with children from lower income families less likely to receive preventative care than those from higher income families (Newacheck et al, 1988), despite being at greater risk of overweight[131]. Moreover, given the broader definition of PHCPs incorporates a variety of allied health care providers from both the government and non-government sectors which come under the supervision of different government departments (Department of Family and Community Services, Department of Education, Science and Training, and Department of Health), some of which are funded at the local or state rather than national level, making co-ordination of strategies difficult to implement[213]. Furthermore, the nature of general practice is disparate and there are limited tools for reaching and influencing all independent practices and practitioners, and to do so can be labour intensive.

Yet some researchers have argued that the major barriers to promoting interventions for the prevention of overweight and obesity among young children in health care settings, has been the lack of carefully designed, rigorously evaluated studies of the effectiveness of different intervention strategies, and that little progress is likely to be made in terms of overcoming the above systems barriers until effectiveness of interventions is demonstrated and cost effective methods developed and tested[208, 214]

Attitudinal Barriers

Added to these systems level barriers, is the growing evidence demonstrating the negative attitude of health professionals not only towards obesity as a condition, but also towards obese people. Studies have found that health professionals associate overweight with over-indulgence, laziness, poor hygiene, and even hostility [175, 215-218], with GPs tending to blame both the cause and the solution to the problem on the patient and their ability to control internal factors, rather than on a combination of individual and environmental factors[219]. According to a Glasgow based study by Mercer and Tessler[210], the combination of these overall attitudes together with existing systems level barriers have resulted in little enthusiasm on the part of health professionals to participate in weight management interventions, as they believe that the responsibility lies primarily with the patient.

Yet, to date the majority of studies into the attitudes, perceived barriers, skill levels, and training needs of primary health care providers have focused on the management of overweight in adults[220-223] with few focusing specifically on childhood obesity [207, 224]. However, a recent Australian study of paediatricians, paediatric nurse practitioners, and registered dieticians, showed far more positive attitudes towards managing childhood obesity[207]. In all three professional groups, respondents felt that childhood overweight was a condition that needs treatment (75-93%), as it affects their quality of life (83-93%) and increase their risk of chronic disease (76-89%). Moreover, nearly half the PHCPs questioned felt that childhood overweight was more amenable to management than adult overweight. Nevertheless, the most frequently cited barriers to the prevention of overweight in children were lack of parental involvement, lack of patient motivation, lack of reimbursement, and lack of support services.

More significantly, however, the study indicated that rather than ‘victim blaming’, the majority of respondents cited their own perceived low proficiency and lack of training in the use of behavioural management strategies, guidance in parenting techniques, or addressing family conflicts, as central in their lack of response to patients’ needs, and expressed a keen interest in additional training. These findings are consistent with other studies into physician attitudes and practices related to paediatric obesity that physicians do not feel comfortable in treating childhood obesity[206, 225].

Skills and Training Barriers

Primary health care providers working in family practice and general paediatric practice setting have been seen to be in a unique position to educate and counsel families regarding healthy lifestyles[226]. Preliminary data based on the treatment of adult obesity, indicates that periodic brief patient counselling by primary care physicians in clinical settings, can have positive outcomes in terms of weight loss and management[227]. Yet, when questioned only a quarter of PHCPs working with children felt either at all or slightly competent in the use of parental guidance techniques, behaviour management strategies, and methods for addressing family conflicts in dealing with paediatric obesity[204, 206, 207]. Moreover, they reported little confidence in their ability to change patient behaviour[228].

At present, PHCPs have few opportunities to strengthen their counselling and behavioural management techniques for childhood obesity, as these topics are rarely covered in medical, nursing, or dietetic school curricula, and there are few opportunities for postgraduate training[229]. Nevertheless, in a recent study paediatric practitioners and health care providers reported a high level of interest in training that would improve their skills in the use of better and more consistent methods for assessing and monitoring weight, and in the use of techniques for early prevention and treatment of obesity[207]. In particular, the study indicated that there is a growing interest to develop skills in behavioural management and in guidance in parenting techniques, with almost a half expressing interest in further training and on-going education in these areas. Female paediatricians and paediatric nurses, as well as those with more than six years experience were significantly more likely to want additional training. Moreover, the study highlighted their awareness and interest in promising new techniques such as stages of change counselling, motivational interviewing, negotiation, behavioural self management, and tailored messages[184, 230-233], with some of these approaches having already been adapted and simplified for use with patients in clinical settings[234, 235].

In similar study, Larsen et al[226] also showed a keen interest on the part of nurse practitioner to improve their skills in working with childhood obesity. In addition, they found that practice nurses had greater experience in working with parents than family nurse practitioners, and were more likely to encourage parents to offer nutritious snacks, model healthy food choices, allow their children to self-regulate meal intake, and promote physical activity. As the study pointed out, this finding was not unexpected as practice nurses receive more training and information on children's health than family nurse practitioners, yet it does offer important implications for policy. A final barrier which their study highlighted was the lack of resource, educational materials and handouts to reinforce patient teaching and to supplement their own knowledge, with a number of nurses disliking the existing Food Guide Pyramid, as current recommendations can lead to overeating as the number of servings suggested do not always correspond to actual portions and serving sizes eaten today.

Furthermore, research has indicated that increased knowledge and training among health care professionals may significantly reduce attitudes and stereotypes among medical students, and may promote greater empathy and interest on the part of PHCPs to work with parents and children to address the problem[236-238].
Thus, while positive trends are emerging regarding PHCPs attitudes towards the prevention of childhood obesity and their willingness to develop new knowledge and skills to deal with the problem, a large shift in their present approach emphasising

treatment rather than education and advocacy is unlikely to occur without significant investment in effort to improve their knowledge and technical ability to translate these concerns into practice.

BARRIERS TO PARENT PARTICIPATION

Most international research concurs that parents, as primary health care providers, play a critical role in developing children's habits regarding healthy living [7, 40, 202, 239, 240]. Several studies indicate that parents are important role models for their children, with parental obesity being one of the strongest predictors of childhood obesity[166, 241-243], as children often follow the lifestyle examples of their parents and families [244-246]. Research indicates that if both parents are obese, there is a 70% chance that their children will be obese; if one parent is obese, there is a 50% chance that their children will be obese; and if neither parents are obese there is only a 10% chance their children will be obese [166, 247, 248]. Nevertheless despite their key role, several barriers appear to discourage interventions from systematically involving parents and other family members.

Attitudinal Barriers

Despite mounting public concern about childhood obesity in Australia, a recent study indicated that most mothers surveyed were not concerned about their preschool children's weight and did not perceive their overweight children as different from their peers[249]. On the contrary, parents of preschool children, particularly boys, failed to accurately assess their children's weight, preferring to describe their children as big-boned, thick-set, sweet-toothed or with a pre-disposition to be large, findings that correlated with other UK and US studies[205, 250-253]. In part, parents and particularly mothers inability to recognise overweight in their preschool children may be related to the increasing prevalence of overweight among this age group, resulting in their condition being normalised, while additionally, stereotypes portrayed in the media have tended to focus on extreme examples, distorting the lay perception of overweight[249]. Moreover, ironically, parents of overweight preschool children perceived them as better eaters, while normal weight children were described as "picky eaters" when in fact this is developmentally normal. A study of three to five year olds showed that strong parental control over quantities of food eaten contributed to, rather than prevented overweight, as it interfered with children's internal cues of hunger and hence their abilities to accurately self-regulate[254].

Two similar studies showed mothers' ability to correctly recognise overweight in their children, as well as their subsequent concern regarding the weight of their children to be closely correlated with their children's sex[252, 253], with social values regarding body image making mothers more sensitive to overweight in girls than in boys, and therefore improving their ability to recognise overweight in their daughters than in their sons. Nevertheless, over 70% of mothers with overweight or obese children perceived their child's weight to be similar to that of their peers[249], with only 5% expressing concern[205, 251]. Moreover, misperception was exacerbated among mothers with lower levels of education, with only 11% of those mothers with an over-weight preschool child believing that their child was overweight[251], and among these same mothers, over 90% of those who were obese categorised themselves as only overweight. Thus health professionals have argued that programs to promote healthy weight should focus not only on diet and exercise, but should also aim to improve parents' ability to correctly identify overweight in their children[255].

Communication Barriers

Several studies indicate that mothers are sceptical about health professionals classification of their children as overweight based on height and weight charts, and BMI[126, 256]. Yet while mothers were not concerned about BMI, they acknowledged that they would become concerned if they felt their child were becoming inactive, or were being teased by peers as a result of their weight[126, 144]. For mothers, low self-esteem, bullying, and inactivity were the most critical factors affecting whether they would become worried and seek support to change their child's lifestyle patterns.

Increasingly, therefore, research is indicating that providing information on children's BMI and informing parents of the risks of overweight alone are rarely sufficient to bring about behavioural change [257]. People change if they believe there is both value in change and that it is achievable[258]. Thus improved understanding of how patients make sense of the causes and consequences of illness, such as overweight, will enhance our models of communication and methods for dealing with these[219]. Yet while establishing positive relationships between parents (and child) and health practitioners is critical to the prevention and early intervention of overweight in children, studies have shown that parents generally rated health professionals support in this area as either not very helpful to negative and dismissive[259]. The general attitude of health professionals to emphasis internal controllable factors for the cause and the solution and their failure to acknowledge environmental changes, resulted in poor communication and a lack of willingness on the part of parents to seek help from PHCPs[259]. Moreover, qualitative research suggests that parents may consider health professionals judgement of their child's weight according to BMI charts as a judgement of their parenting skills, and may be sensitive to their comments that their children were overweight. Thus, as international research is beginning to show[144, 260, 261], successful strategies to increase the effectiveness of parental involvement in preventative and early intervention programs should focus on goals shared with parents rather than on activities that "label" their children as overweight. Without improved opportunities for parents to openly express their views, this mismatch between parents and health care providers as to the causes and solutions to childhood obesity could create conflict over best practice approaches.

Table 13: Summary of Barriers to Parent and Primary Health Care Provider Participation

Barriers to Primary Health Care Provider Involvement	Barriers to Parent Participation
System level barriers ▪ Prevention of overweight not perceived as core business of PHCPs ▪ Time pressures on PHCPs, and in particular on GPs ▪ Lack of support staff and systems for follow-up ▪ Lack of resources or opportunities for preventative counselling ▪ Lack of referrals to specialists due to concern for patient compensation ▪ Too much emphasis on treatment rather than prevention ▪ Lack of time to participate in group training and counselling sessions ▪ Lack of appropriate support materials **Attitudinal/Lifestyle Barriers** ▪ Negative 'victim blaming' attitudes towards overweight people ▪ Lack of response from parents who feel PHCPs are negative/dismissive ▪ Fear of parents becoming sensitive to comments ▪ Feel uncomfortable dealing with issues of overweight ▪ Often PHCPs are poor role models which adds to their feeling of discomfort in dealing with issues of overweight **Knowledge, Skills and Training Barriers** ▪ Lack of knowledge/understanding of lifestyle/environmental factors affecting weight ▪ Low proficiency and lack of training in use of behaviour management strategies ▪ Lack of knowledge in parental guidance techniques or how to address family conflicts ▪ Lack of educational resources to supplement their own knowledge ▪ Dislike of existing clinical guidelines and materials for use with parents **Research Barriers** ▪ Lack of rigorously evaluated studies on the effectiveness of different interventions **Organisational/ Coordination Barriers** ▪ Nature of general practice is disparate, and there are limited tools for reaching and influencing independent practices ▪ Limited collaboration between outreach clinics with designated PHC specialists, and other allied health care providers and professionals working in child care and community settings	**System level barriers** ▪ Norms of different socio-economic and cultural groups affect willingness and ability of parents to comply with healthy lifestyles ▪ Families living in isolated or poorly serviced neighbourhoods, may not have easy access to healthy foods, or safe areas for children to play ▪ Fruit, vegetables and other healthy foods are often more expensive than less healthy foods and snacks **Attitudinal/Lifestyle Barriers** ▪ Parents are frequently poor role models with regards diet and physical activity ▪ Parents often don't perceive their children as overweight and are sceptical about BMI and height/weight charts ▪ Stereotypes in the media focus on extreme examples of obesity reducing the importance of dealing with early signs of overweight ▪ Parents can misinterpret overweight children as 'healthy' eaters and by exerting strong control of quantities of food eaten, do not allow children to learn skills in self-regulation ▪ Parents work and lifestyles limits time available to structure eating habits or prepare nutritious meals ▪ Parents often feel powerless in light of commercial advertising, and challenges from grandparents, friends, etc. ▪ Parents are more likely to take action if they perceive their children are suffering psychologically due to poor self-esteem or bullying **Knowledge, Skills and Training Barriers** ▪ Parents often receive conflicting messages regarding what is healthy ▪ Too much of the information provided emphasises 'what' to do rather than assisting parents/communities in 'how' to achieve it ▪ Information is often too general and not targeted to specific needs of different population groups ▪ Information and training often fails to take account of family conflicts in dealing with key issues around food, TV watching, etc.

Lifestyle Barriers

As marketers well know, patterns of food choice and physical activity are determined early in life[39] with many advertisements targeting preschool children[40]. In this increasingly market driven economy, mothers have expressed their concerns at establishing and maintaining healthy eating habits for children mothers' difficulties limiting or structuring their children's eating habits and their powerless to remedy the situation, struggling with children's endless appetites, or describing scenarios where their authority over the children's diets was challenged by fathers, grandparents, commercial adverts, visits to friends, and children's predisposition to be overweight[126]. Moreover, with increased financial needs for mothers to work, mothers have less time to prepare nutritional meals for their children and are less likely to receive the usual nutrition based health promotion message of the community nurse[262]. Moreover, providing ample nourishment to their children was considered by many to be an important and emotionally rewarding part of parenting that mothers were unwilling to relinquish[126]. In light of these very real modern lifestyle barriers, there is a need to move beyond behaviourist approach based change in diet and exercise, to include the whole community[263].

REDUCING THE BARRIERS TO THE PROMOTION OF HEALTHY WEIGHT AMOUNG YOUNG CHILDREN

Primary Health Care Providers

Despite these barriers, it is increasingly acknowledged that primary health care providers can play an influential role in promoting healthy weight among young children, given that they have regular contact with children and their parents up to the age of 4 years[24, 199-201], and as such can act as gatekeepers, monitoring and modifying factors that contribute to unhealthy weight gain to ensure early intervention[245, 264, 265].

Among the key enablers to enhancing their involvement is the call for improved clinical guidelines[200, 266, 267] and the establishment of better systems for monitoring of BMI within clinical settings[25, 114, 268, 269], including the setting up of patient registers with reminder systems[270] and smarter data-base tools for early recognition of 'at risk' patients[266]. Questions have also focused on who should best monitor and work with parents to provide age appropriate information to parents on their childrens' needs[199]. While time restraints on GPs, has lead to increasing emphasis on the need to integrate primary and secondary prevention into the role of practice nurses, paediatric/child health nurses and community nurses[199, 226, 268, 271], the need to improve training and up-skilling at all levels is generally acknowledged[204, 206, 207]. In addition, to short professional development courses on how to integrate primary prevention into routine care, new techniques for counselling, behaviour modification and motivational interviewing need to be built into the curricula of PHCPs [184, 230-232]. For example, nurses and GPs need to be able to listen to and understand parent perceptions so that strategies can be developed to evoke incremental behaviour changes that can improve the child's health outcomes[262]. Current thinking on how to counsel children and parents regarding behavioural change have be have guided predominantly by two theories. The first is the trans-theoretical theory (or stages of change theory) which suggests an individuals readiness for change develops along a continuum and hence health providers need to assess their patients situation to determine the most appropriate intervention depending on their stage along this continuum. The second is the social cognitive theory that places behaviour in a framework of personal, environmental and social influences. While PHCPs may not be able to change environmental factors, sensitivity to these factors can help inform the approach used. Greater understanding

of how these factors influence the patient's self-esteem, as well as how they will affect benefits and barriers, can help PHCPs more positive attitudes to dealing with the complex, multi-faceted problems leading to overweight and obesity[207, 208].

In addition to improved training, there has been a call for more hospital outreach clinics, with designated primary health care specialists and expanded referral schemes[266], as well as closer collaboration with allied health care providers and other health care professionals working in child care and community settings[272]. This requires strengthening team work among primary health care providers[266, 270, 273, 274], developing improved information systems across traditional sectoral boundaries [270], enhancing the use of patient, voluntary and community groups[114, 275], increasing family involvement[7, 276], and improving education resources for the dissemination of consistent, evidence-based information[277].

In the longer term, Divisions of General Practitioners and other peak bodies need to advocate for higher level changes, including the provision of incentives to encourage PHCPs to participate more in preventative action and quality care, through reimbursements for counselling time and for participation in activities for the prevention and management of childhood obesity[91, 184, 208, 266, 273, 278]. Other higher level changes include advocating for regulation of food production and marketing[125, 275, 277], incentives and subsidies for early intervention from health insurance companies and governments[277], and increased funds for research into large scale interventions and settings based studies[114].

Parents and Families

By strengthening their skills and overcoming systems level barriers to early intervention for the promotion of healthy weight among young children, PHCPs can assist parents and families to improve the eating behaviours, nutritional attitudes, mealtime practices and other lifestyle factors affecting their children's weight[279]. Traditionally educational strategies have involved information on how to eat less fat and more fruit and vegetables[280]. However, there is growing evidence from literature that knowledge alone is unlikely to change behaviour and particularly among this younger age group of 2-6 years olds, a parental or family rather than a child focused approach is more likely to have positive outcomes[281, 282]. From this perspective, it would appear that interventions that focus on the emotional atmosphere of the meal offer promising outcomes, and children should not be forced to finish their meals[283]. Children should be exposed to a range of foods from a young age and repeated exposure initially disliked food can breakdown resistance[284]. Thus, while traditional educational models have had limited impact[284], while conversely healthy parental nutritional attitudes with more pleasant mealtime experiences have coincided with fewer child eating problems[279]. Nevertheless, there is a need for further research to better understand how parents can achieve these changes within the framework of their everyday social and cultural environment.

ENHANCING THE ROLE OF ALLIED HEALTH PROFESSIONALS AND SETTINGS-BASED HEALTH CARE PROVIDERS

While strengthening the role of primary health care providers is crucial to enhance parenting skills, the process can also help parents influence child care centres and other settings based service facilities that have an impact on their children's health[213, 285]. The Longitudinal Study of Australian Children[286] showed that over 30% of very young children in Australia attend formal care, and this figure increases with age to the point where 95.7% of 4-5 year olds attend formal care at either long day care centres or preschools. In such cases, children's nutritional socialisation experiences are often formed within these settings, and as such, child care coordinators, carers and staff have often been targeted to increase their knowledge and skills, and modify the centres' practices relating to both the nutritional and physical activity needs of children[91, 287, 288], and as a result the promotion of good nutrition and physical activity has been common within child care settings across Australia[91, 288-293]. Nevertheless, there is a wide range of different types of child care[286, 294], which involve casual to more formal arrangements, this also means that there is variation in the extent and type of training among the providers, with lower income families often using informal care, which frequently means home settings.

Allied health professionals, including dieticians, community health promotion officers, multicultural health workers and Indigenous health officers, are also in a key position to influence parent and child practices[272]. While at present many feel unable to make a difference due to lack of training and skills in how to integrate behaviour modification into their work[210], research indicates that the majority of allied health care providers are keen to participate in further training[207]. To this end, the next sections look at how interventions have aimed to enhance the role of primary health care providers in engaging parents, child care centres and communities in the prevention of overweight and obesity among young children.

6. IDENTIFYING PROMISING INTERVENTIONS FOR THE PROMOTION OF HEALTHY WEIGHT

REVIEWING BEST PRACTICE

The goal of this section is to synthesise successful and/or promising interventions aimed at addressing the barriers to engaging primary health care providers in efforts to empower parents and child care providers to play an active role in the promotion of healthy weight among young children aged 2-6 years. Despite initially collating information on some 982 interventions aimed at the primary prevention of overweight and obesity among children, it was found that only 45 interventions were aimed specifically at children aged 2-6 years and met our inclusion criteria (see Table 11). A detailed summary of each of these 46 interventions is outlined in Appendix 4. While reference will be made to a number of these interventions, this section focuses more specifically on a discussion of the 11 most promising interventions from the perspective of their capacity to engage primary health care providers, encourage parent participation, broaden the emphasis from individual to population based approaches, and promote upstream policy changes.
As outlined in Section 2 on methodology, the inclusive nature of the selection process and the diverse appraisal criteria, has meant that interventions reviewed are not homogenous, but on the contrary, incorporate those tested using randomised control trials and published in peer reviewed journals, as well as those found through a grey literature search, many of which have no rigorous evaluation component but offer potential promise for future research and policy development. To review and compare all interventions together would assume each was designed, implemented and evaluated with equal rigour and would not accommodate variation in these factors which would influence the generalisability of findings. Public health interventions are often multi-component, require long time frames to observe behaviour change and engage whole communities. Therefore due to the complex nature of such interventions, it is often problematic and cost-prohibitive to employ rigorous evaluation designs such as randomised control trials. Hence many interventions have simply been evaluated using pre and post-test surveys of participants without the use of a control group or reliable and valid instruments. This wide variation in intervention design and evaluation within public health literature makes synthesising this literature and reviewing future policy directions challenging.

This research thus borrows from the recommendations of Flynn and colleagues[5, 295] described in section 2, who developed a scoring system for their review of overweight and obesity literature in order to account for variations within the published empirical, theoretical and grey literature. They found through their review of this literature that no one program represented best practice, however valuable information was sourced which represented innovative practice within each scoring criteria. As a consequence, different components of the interventions, and their research design or evaluation outcomes, were compared and promising policy options made for successful practice within each criterion. Similar to Flynn et al.'s approach, the criteria used in this review has included a secondary appraisal of the interventions based on a score for methodological rigour, program impact and generalisability, level of parental participation, level of primary health care provider participation, degree of involvement in upstream activities, population health focus, and multi-dimensional approach. Hence the application of a scoring system allowed the review of each intervention from many perspectives. That is, interventions were reviewed based on evaluations of their effectiveness, as well as reviewed according to the way in which they were implemented with different groups.

Table 14: Australian and International Based Interventions

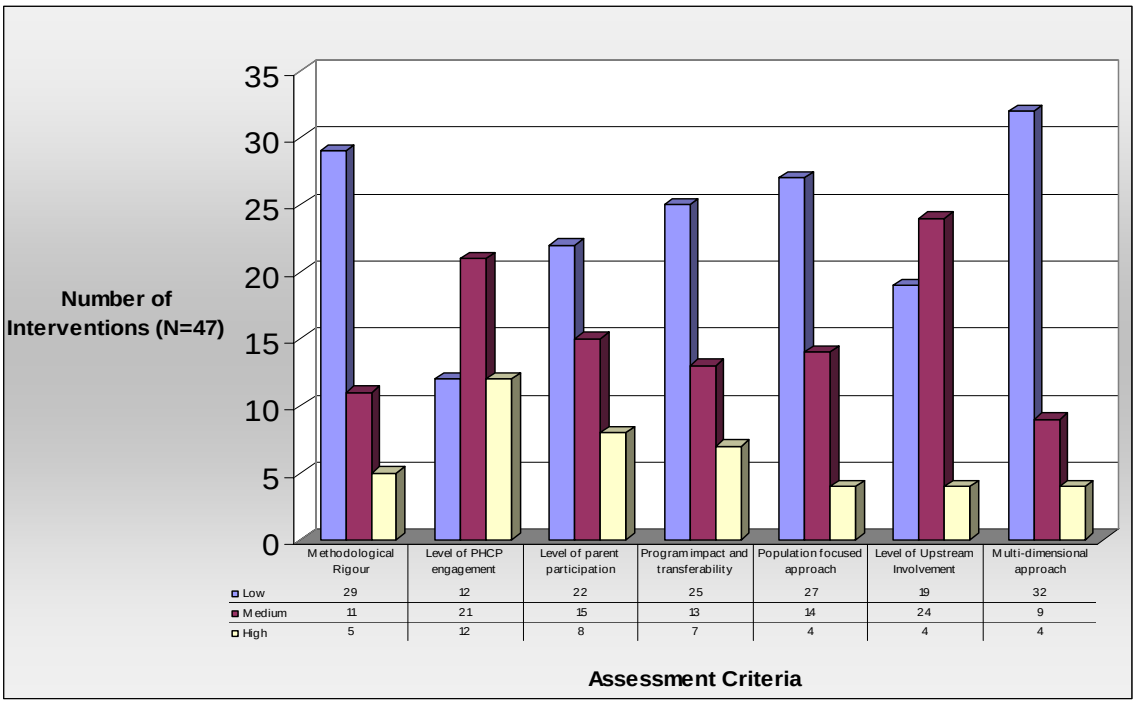
Country	Intervention Title	Primary Health Care Provider
Aus	**Start Right – Eat Right award scheme** [91]	Allied Health Professionals & Child Care staff
Aus	**Good Food for Children** [288, 290, 296]	Allied Health Professionals, Child Care staff & Parents/Carers
Aus	**Moving with Young Children** [291]	Allied Health Professionals, Child Care workers & Parents/Carers
Aus	**Romp & Chomp** [297]	Allied Health Professionals Child Care staff & Maternal Child Health Service providers
Aus	**Tastebuds** [298]	Dietician, parents and Child Care staff
Aus	**Crunch & Sip** [299]	Allied Health Professionals, Preschool staff & parents
Aus	**Food Facts for Preschoolers** [300]	Dieticians & Child Care/ Preschool staff
Aus	**Planning nutritious long day care menus** [287]	Allied Health Professionals, Child Care staff & Dieticians
Aus	**Talking with families about nutrition** [301]	Community Dieticians Early childhood staff and parents of 0-5 year old children
Aus	**Healthy Food Choices Family Day Care** [302, 303]	Nutritionists, Child care staff
Aus	**Sharing a picture of children's development** [304]	Multi-professional
Aus	**Caring for Children** [305]	Child care staff, allied health workers and parents
Aus	**The Karuah Family Nutrition and School Access Project** [306]	Allied Health Professionals, Mothers
Aus	**Afternoon with My GP** [307]	GPs
Aus	**Live Eat and Play** [308]	GPs
Aus	**Treating your Tot to Terrific Tucker** [309]	Community Nurses and 'natural helpers'
Aus	**Shop Smart for Home-Start** [310]	Dieticians and voluntary staff
Aus	**Filling the gap-what's there to eat?** [311]	Allied Health Professionals, Dieticians, Preschool /Childcare staff, Teachers and parents
Aus	**The Coorong Good Food Program** [312]	Nutritionists
Aus	**Lifestyle Triple P Program for addressing the Obesity Epidemic** [313]	Parents, paediatrics, exercise physiologists, nutritionists, dieticians, and clinical psychologists
Aus	**Growing Families Project** [314]	Dieticians and parents
Aus	**Parental Guidance Recommended** [315]	Child Health Nurses, Dieticians, Child Care staff, parents & volunteers

Country	Intervention Title	Primary Health Care Provider
Aus	**Quick Meals for Kooris** [316, 317]	Health Workers
Aus	**Family Food Patch** [318]	Dieticians & parent volunteers
Aus	**Be Active, Eat Well: Making it Easy** [319]	Multidisciplinary (Dieticians & GPs, parents/carers)
Aus	**Australian-Greeks Against Childhood Obesity Project** [320]	Health Workers and parents
Aus	**Give Me Five** [321]	Parents
Aus	**Growth Assessment and Action Program** [322]	Aboriginal Health Workers
Aus	**Strengthening Families in the Ngaanyatjarra Lands Project** [323]	Not clear- Aboriginal Health Workers
Aus	**Keeping Kids healthy Makes a Better World** [324]	Aboriginal Health Workers
US	**Fit WIC** [325]	Nutritionists, Nutrition Assistants
US	**Healthy Start: Healthy Start Program** [293, 326]	Preschool Teachers
US	**Healthy Start: Animal Trackers Preschool Program** [327]	Preschool Teachers & staff
US	**Healthy Start: Healthy Hops** [328]	Child Care staff & parents
US	**Hip-Hop to Health Jr** [292, 329, 330]	Child Care staff & parents
US	**Nutrition Aimed at Toddlers: An Intervention Study (NEAT)** [272]	Nutritionists, trained paraprofessional nutrition instructors
UK	**Food Dudes** [331]	Child Care staff
UK	**The School Fruit and Vegetable Scheme** [332]	Preschool Teachers
US	**Brocodile the Crocodile** [333]	Child Care staff & parents
US	**Puppetry in Nutrition Education** [334]	Child Care staff & Nutritionists
US	**Be Active Kids** [335]	Child Care & Preschool staff (trained by Researchers)
Thailand	**Thai Kindergarten Exercise Program** [336]	Research personnel
US	**Head Start program** [337]	Parents & Child Care staff
Finland	**Special Turku Coronary Risk Factor Intervention Project** [279, 338]	Multidisciplinary health team (Dr, Dietician, Registered Nurse)
US	**Native American Home Visiting Pilot** [339]	Trained Indigenous Peer Educator

AN OVERIVIEW OF PROMISING INTERVENTIONS

An appraisal of the projects according to the key criteria demonstrated a significant lack of application of the principles of engaging primary health care providers, parents and child care workers in comprehensive multi-strategic approaches by any of the projects. As illustrated in the graph below, only 33 scored either 'high' or 'medium' for primary health care provider involvement and similarly only 23 scored adequately for parental participation. Furthermore, only 13 made any reference to a theoretical or conceptual framework, and few were assessed using any rigorous evaluative procedures (Figure 8).

Figure 8: Summary of Appraisal Results based on Key Criteria



	Methodological Rigour	Level of PHCP engagement	Level of parent participation	Program impact and transferability	Population focused approach	Level of Upstream Involvement	Multi-dimensional approach
Low	29	12	22	25	27	19	32
Medium	11	21	15	13	14	24	9
High	5	12	8	7	4	4	4

Of the 45 interventions, the 11 projects which scored most highly are described below. While no one intervention represents best practice, each of the 11 interventions shows promise for achieving at least one of the key criteria. Furthermore, they have been selected to provide a range of intervention options for use with different settings based areas (clinical/primary health care settings, preschools, child care centres, and families/communities).

PROMISING INTERVENTIONS IN CLINICAL SETTINGS

There were few primary preventative interventions aimed specifically at GPs, paediatricians, nurses and dieticians. On the contrary, most interventions in this setting focused on secondary prevention and treatment. As such, the most common approach among this group was the use of dietary guidelines and the incorporation of clinical protocols for measuring the child's BMI, as well as the creation of manuals and resources, many of which focused on overweight in adults, such as those developed in the Lifescripts and SNAP programs, aimed primarily at adults. Lifescripts is a framework for GPs, practice nurses and Aboriginal health workers to discuss risk factors with patients, assist the formulation of patient goals, provide written lifestyle prescriptions, organise reviews of lifestyle risk factors and refer patients to other appropriate services. The resource comprises waiting room materials, assessment guides, medical record summary stickers, a practice manual, and a CD-ROM on motivational interviewing. While these represent valuable resources, they have done little to actively engage the participation of parents and primary health care providers.

In contrast, two programs within Australia which have focused specifically on engaging GPs through non-threatening family and lifestyle counselling are the *Afternoon with my GP* project [340, 341], and the *Live Eat and Play (LEAP)* project[308]. The *LEAP* project had a strong study design (RCT) and showed positive results, while a questionnaire of GPs involved in the *Afternoon with my GP*[307] project indicated self-reported behaviour change among GPs in dealing with cases of childhood overweight and obesity. Nevertheless, both the *LEAP* and *Afternoon with my GP* project had serious financial and time limitations due to the intensity of their counselling techniques. Nevertheless, within the international context, three interventions score highly according to our appraisal criteria. These were the *Fit WIC* program[325, 342], the *STRIP* intervention[340, 341, 343], and the *Nutrition Education Aimed at Toddlers* intervention. While the scale and nature of these three projects may not be compatible with the Australian context, they do provide a number of key policy implications, and hence have been described in greater detail below.

The FIT WIC Program

The Fit WIC program possibly provides the best evidence available on how to engage primary health care providers in the delivery of a parent and community based program[325, 342]. Thus while it is categorised here under clinical/allied health care settings, it also has a multi-strategic approach incorporating family and community based components.

Initiated in 1999, the Fit WIC program was funded under the Food and Nutrition Service of the US Department of Agriculture, with the goal of developing initiatives through which the Special Supplemental Nutrition Program for Women, Infants and Children WIC) could respond to the growing childhood obesity epidemic in America[325]. Initially, the program recognised that WIC teams, made up of public health nutritionists and dieticians, who worked closely with pregnant women, infants and preschool children, had widespread access to young children and families, particularly those from low socio-economic backgrounds who were at greater risk of obesity, and therefore represented a key mechanism for reaching young children prior to the onset of overweight and obesity. Therefore the focus of the program was on reorienting the service provided by these primary health care providers to better engage parents in the promotion of healthy weight among their young.

In 2001, following the US Surgeon General's *Call to Action to Prevent and Decrease Overweight and Obesity*[99], the Food and Nutrition Service made US$1.8 million dollars available for the broadening of the Fit WIC initiatives across five states of America. The key goals of the Fit WIC programs in each state were to[325]:

- Identify changes that local WIC agencies could make to their current structure to become more responsive to the public health problem of childhood overweight;
- Develop tailored intervention strategies based on needs assessments of local communities; and
- Collate an intervention manual of all Fit WIC strategies for use across all states of America.

Prior to designing and implementing an intervention for parents of young children, each WIC agency conducted a thorough assessment was conducted into needs of primary health care providers, parents and their communities. The findings of these baseline data, as well as the program objectives, were reviewed by each participating state's WIC team, and tailored strategies were developed, implemented and evaluated, in accordance with central goals to prevent the onset of obesity in women and children within each state. Key findings of this formative evaluation were that:

- Parents did not perceive overweight or obesity as a health concern for their preschool aged children;
- Parents had a good level of nutrition and physical activity knowledge, however most did not put this knowledge into action;
- Parents did not understand what, in practical terms, adequate levels of physical activity meant;
- Many participants faced social and economic barriers to implementing healthy behaviours; and
- Parents had previously received conflicting health information from health care providers

Furthermore, similar to the barriers outlined in section 5, WIC staff reported being uncomfortable discussing overweight and obesity with parents due in part to limited time and inadequate nutrition skills, but also due to staff's own weight status, as well as the general apathy of many parents. In addition, WIC staff cited the limited availability of resources for use in counselling parents of young children about overweight and obesity, and highlighted the lack of supportive environments in which most participants lived, that discouraged the adoption of healthy lifestyles, noting in particular the limited resources available for physical activity or lack of access to fresh foods.

These formative evaluation outcomes enabled *Fit WIC* staff in each state to develop tailored intervention strategies to ensure information for parents was relevant, necessary and presented in such a way that would encourage a change in behaviour,

rather than simply increasing knowledge for their local community. Therefore, while strategies across the five states varied according to local community needs, key strategies used across the five participating states included:

- The development of participant centred assessment and education procedures;
- The shift in focus of participant education from *weight* to *healthy lifestyle*;
- The use of practical group education sessions for parents and children using effective mechanisms for presenting information and engaging parents in groups discussions;
- The integration of physical activity into discussions about nutrition and lifestyle;
- The development of resources to encourage parents to implement active play strategies to meet physical activity requirements of young children;
- The expansion of training for WIC staff to improve not only their understanding of issues relating to overweight and obesity among young children, but also to strengthen their capacity to work with, engage and counsel parents, and to deal with culturally/socially sensitive issues;
- The promotion of activities to encourage WIC staff members to improve their own health, and thereby to act as role models for healthy behaviours;
- The establishment of partnerships with child care centres, schools and community agencies to develop comprehensive community wide interventions;
- The allocation of additional funding to increase staff levels that more time can be devoted to individual and group counselling; and
- The funding of rigorous research into the impact and cost effectiveness of WIC programs to ensure that resources are allocated to areas of greatest need and potential impact.

While the scale and finances available for the *Fit WIC* project were significantly greater than any project that could be implemented within the Australian some key policy implications can be drawn from this example. The first relates to the method through which the intervention sought to engage primary health care providers. From this perspective, a key strength of the *Fit WIC* program was that it was implemented by dieticians and public health nutritionists who formed part of an *existing agency*, that already had *regular contact with parents* of young children. By providing additional *training, support and resources* to these primary health care providers within their existing organisation the *Fit WIC* program was able to actively engage to parents, while effectively communicating nutrition, physical activity and healthy lifestyle messages into their existing programs and services.

The second major strength of the *Fit WIC* program was the method in which it actively and deliberately engaged both primary health care providers and parents from the start in all phases of program planning, design, implementation, and evaluation to ensure that messages and procedures for delivering these were salient and meaningful for parents of young children. While the overarching program goals were pre-defined by Food and Nutrition Service, this process enabled each state WIC agency to develop tailored strategies to address their specific state and that of their special population groups. Moreover, the involvement of primary health care providers from the program outset created a sense of ownership and responsibility on their part towards the identification of potential barriers to implementation and efforts to overcome these. Additionally, their participation in program design and evaluation forged stronger links between primary health care providers and local universities to strengthen the quality of research and evaluation, and to develop innovative training curricula and educational resources to enhance their ability to engage parents of young children in discussions about overweight and obesity.

The third major strength of the *Fit WIC* program was its comprehensive, multi-component approach. While initially offered to lower income parents through one agency, in many of the five states strong networks and partnerships were developed with other community agencies to develop broader environmental, policy and organisational changes to support the reduction of childhood overweight and obesity. This led to the development and implementation of following population focused, multi-component strategies:

- The establishment of local committees and taskforces to identify and implement other community based interventions to encourage healthy lifestyles;
- The provision of referral information and support that can be provided to parents through other community agencies;
- The establishment of consistent messages across different family, community and child care agencies to reinforce *Fit WIC* activities;
- The development of practical learner-centred educational experiences relating to childhood overweight, for children, parents, primary health care providers, child care workers, and community agencies;
- The promotion of individual and group education and counselling sessions for parents;
- The re-orientation of parent discussions to focus on parent-child feeding practices rather than actual foods consumed;
- The organisation of classes and activities for children to reinforce parent-based strategies;
- Note-books on how to increase active play for children, build links with community agencies, and develop an event calendar; and
- Low-literacy flash cards for use with special population groups

While it could be argued that the overall costs of the *Fit WIC* program limit its relevance to the Australian context, as does the lack of existing WIC agencies within Australia, other similar primary health care provider networks do exist which could easily be tapped into. From this perspective, the program shows great potential for the easy translation and delivery of program strategies into practice. One of the most important lessons however to be taken from the *Fit WIC* program is the need for the pre-service, in-service and postgraduate training for staff to ensure they have the skills to provide specific one-on-one counselling to parents of young children. Further, this intervention also provides a strong argument for increased support for conducting formative evaluation with the target group to identify messages which will be most salient. By utilising an existing health service, and re-orienting the role of the practitioners within this service, this intervention shows potential for a seamless translation of the trial to national policy and practice.

The Special Turku Coronary Risk Factor Intervention Project for Children

The Special Turku Coronary Risk Factor Intervention Project (*STRIP)* was part of a six year longitudinal, randomised control trial involving child-targeted nutrition counselling to affect the knowledge attidue and dietary habits of parents of young children[340, 341, 343]. Implemented in the city of Turku, in Finland, parents of five month old children were recruited into the study between 1990 and 1992 during their regular 'well baby' visit to a child health nurse. At this time consenting parents were randomised to the intervention or control group. The intervention was conducted during future routine visits to the child health nurse, however, unlike control participants intervention parents were met by a nurse, paediatrician and nutritionist who aimed to implement stepwise changes to a child's diet to reduce saturated fat and cholesterol intakes. Visits were conducted at eight, 13 and 18 months of age followed by six monthly visits until children were 7 years of age. Using a food recall diary, advice was given to parents to reduce saturated fat and cholesterol intakes by making small changes in a child's diet.

The *STRIP* project has been extensively evaluated and findings illustrate that overall nutrition knowledge scores and parental dietary intakes improved by the end of the six and a half year intervention[341]. What the study demonstrated was that insufficient understanding of concepts (eg. unsaturated fat) causes difficulties in understanding the practical value and usefulness of nutrition information on food package labels, and hence results in poor food choices. Nevertheless, further analyses revealed that while intervention parents had better nutritional knowledge and dietary intake scores than control parents, these results were poorly correlated suggesting factors other than an increased knowledge influenced parental dietary changes. Consequently, while the intervention was successful in changing parental knowledge, this change in knowledge was not solely responsible for behaviour changes. Moreover, the findings as such cannot be used to justify the use of individual counselling by primary health care providers as a strategy for changing parental knowledge and behaviour.

While this intensive, individually tailored nutritional counselling strategy implemented by credible primary health care providers did result in some positive changes with regards to parental knowledge and dietary behaviours, the two were not correlated. Therefore, while an increase in knowledge could be attributed to the intervention; parental behaviours appear to be independent of changes in knowledge. Thus, while this intervention showed promise in relation to enhancing the intensity and quality of parental involvement, the evaluation did not provide adequate support the implementation of this type of cost and resource intensive, tailored counselling for changing parent behaviour.

The *STRIP* project did, however, score highly based on its use of existing 'well baby' visits to a child health nurse which are routinely offered to all children in the population. Yet while the intervention focused on fat intakes rather than on healthy lifestyles, the concept of using an existing service such as 'well baby' visits with a child health nurse, which all parents in the community have access to, demonstrates excellent potential for future interventions to utilise these primary health care providers to deliver public health messages relevant to young children. Moreover, as previous research has shown [207], child and paediatric nurses show far more positive attitudes towards participating in obesity prevention programs than GPs, and hence could provide a far more positive channel for reaching parents and families of young children. However, given the limitations of the evaluation findings, caution should be taken when considering this type of individual tailored counselling as a stand alone mechanism for reducing the incidence and prevalence of childhood overweight and obesity. Instead, future interventions should consider individual counselling offered through existing 'well baby' visits, in conjunction with other community and environmental support programs.

Nutrition Education Aimed at Toddlers

The Nutrition Education Aimed at Toddlers (NEAT) intervention, base in Michigan, USA, has as its objective to improve the feeding practices of low income parents and carers of 11-36 month old children[272]. The initial study used a quasi-experimental approach to assess the effectiveness of the intervention and involved 43 parents in the intervention group and a further 53 in the control group.

The intervention initially comprised four 90 minute, nutrition group sessions (each involving 4-5 participants) for low income parent/carers to empower them to improve mealtime interaction with their children and to encourage them to respond to their children's verbal and non-verbal behaviours relating to food intake. These group sessions were provided by trained nutrition instructors and involved discussions, video tapes, and hands-on learning activities. After the group sessions, toddlers joined the caregivers in food tasting, simple food preparation, and family eating time. The group training sessions included concepts of adult modelling of positive eating behaviours for toddlers, processes for introducing new foods to toddlers, and discussion on parents' concerns regarding what and how much their toddlers eat. These group sessions were followed up by 18 tailored, home visits to parents over a six month period to discuss and reinforce issues raised during the group sessions. During the reinforcement activities, special emphasis was given to the toddlers self-regulation of food intake.

Results of the study indicated that *NEAT* intervention had a significant impact in changing parental knowledge of feeding behaviours and patterns of toddlers. However, like the *STRIP* program it appeared to have no significant impact in changing the actual feeding behaviours or self-efficacy of participants. The lack of a significant effect may be due in part to the limitations in the delivery of the reinforcement activities. While these were originally intended as a weekly event, the home visits could not always be scheduled as frequently due to participants' work and other schedules. In addition, some participants considered these visits as too long, and as such suggested they resulted in decreased interest. Nevertheless, the results of the study indicated that participants found the intervention to be helpful, suggesting that the use of peer educators and home visitors may result in improved feeding and healthier lifestyles. Moreover, like the *STRIP* program, the *NEAT* intervention highlighted the key role that paediatric/child nurses and other allied health professionals can play in working with parents to promote healthy weight among young children. Nurses can enhance

parents' self-confidence, give reassurance, guidance and suggestions that can be individualised according to the needs of their toddler's specific circumstances[344]. However, knowledge alone is inadequate for parents and caregivers to make behavioural changes. Consequently, any such program should be integrated with broader, community based efforts to provide comprehensive ongoing support to families.

PROMISING INTERVENTIONS IN THE CHILD CARE CENTRE AND PRESCHOOL SETTING

Many of the preventative interventions aimed at children between the ages of 2-6 years were targeted at preschools and child care centres, as the growing proportion attending these facilities has made them an ideal setting for reaching both children and their parents [300, 345]. Of the 23 interventions focusing on preschools and child care centres reviewed in this study, 13 were piloted in Australia, while a further 10 were international programs. While structurally child care centres and preschools fall under two different government jurisdictions - namely the Department of Family and Community Studies and the Department of Education, Science and Training, respectively – the two settings have been discussed together as each area could learn from and incorporate components of the promising policy options outlined below.

However, of the 23 interventions only 5 rated medium or high according to our overall appraisal criteria, 4 of which were based in child care centres, and a further one in a preschool setting. On the contrary, the majority of interventions lacked any solid conceptual framework to engage parents, primary health care providers, and child care staff beyond that of the straightforward diffusion of information through newsletters, information kits, and manuals. Nevertheless, some of these interventions, such as Good Food for Children, Food Facts for Preschools, Crunch and Sip, Romp and Chomp, and Start Right, Eat Right did begin by setting up a steering committees with key stakeholders to plan and direct the various stages of the intervention, and to ensure that the materials developed responded to the specific needs of their target group. Nevertheless, several projects focused primarily on planning nutritious menus, up-skilling cooks, and providing formal breaks to encourage children to eat fruit and vegetables. While a few others targeted centre directors and staff to provide a curriculum incorporating greater physical activity and simple education to children about nutrition in the form of stories, rhymes, songs and games. Few however successfully engaged parents other than through pamphlets and one-off workshops, while dieticians and nutritionists were the only primary health care providers involved in the majority of the interventions, and their involvement was largely limited to the development of menus and materials, and the training of cooks.

The five interventions which were appraised as 'promising' were: Caring for Children, Sharing a Picture of Children's Health, Good Food for Children, Start Right Eat Right, and Hip Hop to Health. The first four of these were Australian interventions that were developed in child care or family day care settings, and all involved the collaboration of public health/health promotion practitioners and researchers. The Hip Hop to Health program, however, is based in USA and focuses on the preschool setting, and targets the needs of special population groups.

Caring for Children

The *Caring for Children: Food, Nutrition and Fun Activities* was developed by the Lady Gowrie Child Care Centre in Sydney, Australia, as a holistic program to deliver healthy food choices by improving menu's, as well as developing centre nutrition policies,

strategies for communicating with parents, and activities to promote healthy eating among children[305, 346]. The program was developed in response to a perceived need on the part of centre staff to improve the nutritional quality both of the food provided by the centre and that which the children brought to the centre from home. To achieve its goals, the *Caring for Children* program has comprised three components. The first component has involved the training of staff in key aspects of nutrition, food safety, eating habits, menu planning and hygiene. The second component of the program has been the development by senior staff members of policies and standards on nutrition, hygiene and physical activity within the centre. The outcome of this policy has been the creation of menu checklists, hygiene standards, and the promotion of fun activities. Finally, the third component of the *Caring for Children* intervention has been involved the development of strategies to encourage parents to participate in and support the program. This component has involved the provision of newsletters and fact sheets to guide parents on issues relating to nutrition, as well as the recipes and lunchbox checklists to encourage parents to provide children with healthier food choices at home. In addition, parents have been invited to workshops and excursions, and samples of healthy foods prepared by children at the child care centres have been sent home.

A key aspect of the *Caring for Children* program was the production of a manual developed for the child care professionals by a team of health education officers and dieticians. The manual consists of three sections that correspond with the key components of the program. The first section of the manual focuses on nutrition and includes general information on the nutritional value of different foods, food safety, and children's eating habits. While the second section covers menu planning and hygiene, menu checklists, recipes, as well as references and resources on how to develop food policies within the centre and assess healthy food choices and menus for children. Finally, the third section of the manual provides the child care staff with a series of activities and ideas to encourage parents to participate in the centre's nutrition strategies.

The *Caring for Children* intervention has not been evaluated and therefore caution should be taken in terms of assessing its policy implications. Yet, while the lack of evaluation is problematic, there are many promising components of the manual worthy of consideration. Firstly, the handbook is a stand alone resource which can be used to assist child care staff to review, implement and tailor activities within their centre. Secondly, the manual features multiple strategies for child care staff to improve food provided to children, implement policies to encourage healthy eating, as well as engage children and parents in activities to improve knowledge and skills related to healthy eating. Further, the activities provided for child care staff are clearly described and are easily implemented without support, therefore, the manual could be made available to all child care centres at minimal cost. While the focus of most strategies is the improvement of food standards and quality in child care centres, *deliberate* and *active engagement of parents* has been embedded throughout the manual. Parents are engaged passively through the provision of newsletters and nutrition information and tasting healthy foods prepared by children, as well as actively by participating in group discussion and organising incursions/excursions. The manual also encourages child care staff to consider other resources available to enhance the health of young children by providing a full list of available resources, including contact information for each project.

Sharing a Picture of Children's Development

Sharing a Picture of Children's Development is an intervention that was developed and piloted in 2000 by the Centre for Community Child Health, at the Royal Children's Hospital in Melbourne[304]. Its aim was to forge a partnership between child care staff and parents and encouraging informed discussions on issues crucial to the healthy development of the children. At the heart of the program has been the development of a communication framework to:

- Encourage greater communication between child care staff and parents in order to identify issues of importance to parents and share information with parents;
- Promote better quality care through improved knowledge and understanding of the individual differences between children, as well as their family and cultural contexts;
- Provide better coordination of program planning, observations and individual child profiles;
- Encourage greater recognition of the professional role and developmental knowledge of staff by parents, so as to enhance their feeling of self-worth and to motivate them to work more closely with parents;
- Facilitate mechanisms through which parents and child care staff can work together to find solutions to enhance the health development of young children; and
- Strengthen the links made between child care centres and local primary health care services.

To achieve these goals the communication strategy implemented four core activities: the development of an individual communication plan between each parent with staff at the child care centre; the creation of a child folder for providing individualised feedback on the development of the child's health so as to tailor discussion towards their specific needs; the organisation of individual and group parent-staff discussions; and the promotion of links with primary health care networks. While initially staff and management were concerned that the intervention would increase their workload and costs, with time they acknowledged that the benefits in terms of increased parent feedback and participation and improve staff morale made these added costs worthwhile. Moreover, one way centres reduced the costs of parent-staff interviews was to hold them in hours when the service was open, or by adding a further 30 minutes to closing time. Furthermore, the setting up of individual child folders represented only an initial cost at the beginning of each year. Another concern was that not all children attend child care centres on a daily basis, and hence the cost of organising parent-staff interviews with those children who attended on one or two days a week was not realistic, has the approach was changed to focus primarily on those children who attended more regularly.

Like the *Caring for Children* program, the communication framework developed for the *Sharing a Picture of Children's Development* intervention is promoted through a key manual for program coordinators that includes: activities, case studies, sample communication plans, action plans, resources on how to strengthen networks with

other primary health care services, as well as staff worksheets. This manual is supported by individual child folders, five parent booklets, and posters. Four of the parent booklets deal with children of different age groups (prior to 9 months, 9-18 months, 18 months to 3 years, and 3-5 years), while a fifth parent booklet addresses the topic of how to strengthen communications with child care staff.

Between 2001 and 2003, an evaluation of the program was performed. In February 2001, a survey was sent to all long day care services in Australia (n=1758), and results demonstrated that 33% had already requested a copy of the resource manuals, with 18% using at least one component of intervention. By March 2003, over 60% of child care centres across Australia had requested the materials. While interest in the project has been high, its evaluation has been limited to the views of child care staff and parents on their use of and satisfaction with the resource materials, rather than on the impact it has had in terms of behavioural change among parents and children[304].

Nevertheless, like the *Caring for Children* program, the strength of this intervention is its focus on establishing effective, tailored and multiple communication channels with parents of young children, as well as identifying and promoting links to PHCPs within the community. Although the effectiveness of this resource is not known, it shows promise by dedicating resources toward improving communication between settings and parents to work together to reduce overweight and obesity in young children. Furthermore, as a stand alone resource available on request, it is easily accessible to all child care providers in Australia, enhancing the opportunities for them to develop innovative strategies to meet their particular local needs.

Good Food for Children

The *Good Food for Children* intervention aimed to improve the safety and nutritional quality of food provided to children in long day care centres[288]. The intervention has involved two projects, one aimed at providing good food within the child care centre, and the other aimed at improving the food provided in children's lunchboxes [290]. The projects have been implemented in community, council and privately owned child care centres across the Southern Sydney Area Health Service, while a number of centres in the South Western Sydney Area Health Service were used as a control group to evaluate the impact of the programs.

The *Good Food in Family Day Care Centres* project, the component of the intervention aimed at improving nutrition provided to children within the child care centres focused on individual centre, community and state level strategies. The individual strategies developed with each child care centre included:

- An initial baseline assessment of the nutritional quality of food provided by the centre, followed by feedback on policies for raising standards based on the findings of the assessment;
- The dissemination of a Nutrition Information Kit and Food Safety Training Manual to all child care centres including a *Good Food for Child Care* video;
- The organisation of three, two hour workshops for child care staff on food and menu planning and nutrition policy development;
- The dissemination of nutritional newsletters to parents;
- The compilation of a series of activities and 'Fruit and Vegetable' competitions for centres to develop with parents; and
- A reward system to recognise those centres with marked improvements.

At the community level, local networks were established for child care cooks to encourage them to share ideas and experiences with fellow colleagues. While in addition, collaborative links were developed with local training institutions and peak bodies in the area of nutrition, to provide regular professional development for cooks with the long day care centres. Furthermore, at the State level close liaison was established with the New South Wales Department of Community Services to build core components of the project into their quality improvement and accreditation system (QIAS) and licensing regulations for long day care centres

Pre and post-test studies (using T-tests, chi-squared and Fischer Exact tests) showed significant improvements in the menu and food serving practices of the intervention group, when compared with control sites. But no study was done to determine whether this had any impact either in terms of the promotion of healthy weight among children in the centres, or with regards parental knowledge, attitudes, and practice regarding the health related behaviour of their young children.

In addition to this program, the *Good Food for Children – Food from Home* project assessed the food provided in children's lunchboxes and developed a series of strategies for improving the quality based on the *Caring for Children*'s checklist. At baseline, results indicated that many children received inadequate quantities of iron, vegetables, dairy products and/or proteins. Nevertheless, by the end of the project overall the food provided in children's lunchboxes was significantly more appropriate for their age, with children receiving increased levels of cereal based food, and water was the preferred drink with fewer sweetened drinks being provided. Thus, while a key strength of this project has been its use of a multi-component, population focused approach, incorporating efforts to implement upstream changes to licensing regulations, there is no clear evidence of its impact to preventing childhood obesity.

Start Right-Eat Right Award Scheme

The *Start Right-Eat Right Award Scheme* implemented initially in Western Australia aimed to provide incentives to encourage child care centres to improve their food service in line with government policy and regulations in the child care industry[91, 304]. Organisational change stage theory provided a framework for identifying the processes and strategies to support the child care industry to adopt practices that align with government food and nutrition policy[347, 348]. The intervention therefore involved four phases:

- Phase 1 - Problem Definition: involved the conducting of a needs assessment survey to review the infrastructure and capacity of child care centres to participate in the program. In addition, a working group was established comprising representatives from local government, child care industry (private and community) and training. Its aim was to enhance the understanding of organisational factors that could support a change program within child care settings, and to define the roles and responsibilities of the key stakeholders in facilitating the implementation of the intervention.
- Phase 2 – Initiation of Action: involved the development and piloting of the award criteria, training, and resources in 8 child care centres. The award criteria were consistent with government regulations and accreditation guidelines. Nutritional training was provided to centre cooks, while existing resources including the *Caring for Children* manual and the *Good Food for Children* video, mentioned above, were used. In addition, two workshops on nutrition, menu design and assessment, and nutritional policy were piloted

with centre coordinators and cooks, resulting in a 9-hour short course and a structured *Menu Assessment and Planning Guide*[346]. To achieve a one year *FoodSafe certificate* the pilot centres were assessed by local government regulators, as well as independent dieticians.

- Phase 3 – Implementation of Change: involved the implementation of the intervention in long day care centres across Western Australia. Initially, to raise industry and public awareness, a media launch coincided with the presentation of the first seven awards to the pilot centres. An introductory brochure was sent to all 330 long day care centres across the state and the WA Department of Health committed funds to the administration of the program.
- Phase 4 – Institutionalisation of Change: involved the incorporation of the award scheme into the Western Australian State Governments Family and Children's Service's policy.

The evaluation of the *Start Right-Eat Right Award Scheme* indicated that by the end of 2 years of implementation, 40% of the 330 eligible centres had participated in the program, and 94% of coordinators indicated that they changed menu and food policies in accordance with the program. Nevertheless, as with other studies, the evaluation did not measure whether this had any significant impact on the overall weight of children or their eating habits at home. Nor did the project actively promote the participation of parents. Nevertheless, the intervention did provide some value insight into how to: 1) promote greater collaboration between industry, government and university researchers; 2) adapt interventions for the promotion of healthy weight to different settings based on a clearer understanding of industry needs and requirements; 3) draw on resources developed in other interventions; and 4) motivate primary health care providers and other child care providers to participate more actively in efforts to prevent overweight and obesity among young children.

Hip Hop to Health Junior

The *Hip Hop to Health Junior* intervention has been one of the most comprehensive projects[292, 329, 330]. It had as it key objective that of reducing the trajectory towards overweight and obesity among children aged 3-5 years [91], and has been targeted parents and children of low income, African-American and Latino backgrounds. The 14 week intervention has involved a developmentally, culturally, and linguistically sensitive approach to integrate improved diet and physical activity into the preschool curriculum. Moreover, a parent component has been incorporated to encourage broader change at the family level including the high level of habitual television viewing. A key aspect of the intervention has been the fact that it was grounded in a solid review of the specific dietary patterns and intakes of the different cultural groups and has based on a combination of the principles of social learning theory[349], self-determination theory[350], and the transtheoretical model that incorporates stages of change[231].

At the centre of the *Hip Hop to Health Junior* intervention was a 5 year randomised control trial conducted in 24 Head Start Centres within and around Chicago, with 12 sites randomly assigned to receive the intensive intervention, and with the other 12 receiving the general health program. During the first year the intervention serviced African-American communities within the 12 sites, while in the second year it serviced primarily Latino communities. The treatment intervention was modelled on the traffic light diet[351] and was tailored to the developmental and cultural needs of minority preschool children. This was then piloted with parents and children to explore feasibility and acceptability. The outcome of the pilot study was the development of an

intensive 14-week intervention consisting of a series of 45 minute classes, administered three times a week. The classes begin with a group rhyme followed by children's participation in a 20-minute activity related to healthy eating or exercise. Typically, the activities focus on one concept and involve interactive hands on learning. The final 20 minutes of the class involves aerobic exercise, encouraging children to act out motions of zoo animals and move to music.

The parent component consists of a weekly newsletter, homework assignments, and twice weekly aerobic classes. These are developed in two languages and tailored to the groups' specific cultural needs. Parents received a voucher from a grocery store for every homework assignment they completed and returned to the child's class.

The randomised control trial demonstrated that the *Hip Hop to Health Junior* intervention had a significant impact in reducing the BMI of participating children for up to two years after the intervention, when compared with the control group[292]. As such, the model represents a promising approach for the prevention of overweight and obesity among young children in preschool years.

PROMISING INTERVENTIONS IN HOME/COMMUNITY BASED SETTING

While a number of interventions had family and community components, few were aimed specifically at empowering local parents to become peer educators and advocates for healthy eating and physical activity within their own communities. From this perspective, the *Family Food Patch* program[318], the *Growth Assessment and Action* program[73], and the *Be Active, Eat Well* program[319] all scored highly in terms of engaging parent participation. Moreover, the latter two interventions provided important insights into the targeting of policy options towards special population groups, namely Indigenous groups, and rural and remote regions, respectively.

The Family Food PATCH Program

The *Family FoodPATCH*[318] program was implemented in 10 communities of Tasmania, Australia, and empowered local parents to become peer educators and advocates for healthy eating within their local community. To achieve its goal, the program has aimed to:

- To increase the nutrition and physical activity skills, knowledge and confidence of peer educators;
- To increase the reach of formal and information communication about nutrition and physical activity;
- To increase parent knowledge, skills and confidence related to their child(s) physical activity and nutrition; and
- To increase community advocacy and promotion of nutrition and physical activity.

To this end, volunteer parents underwent 20 hours of professional development to become peer educators. They were supported by a resource kit containing up-to-date nutrition information and ideas for engaging local parents in practical activities. These trained peer educators then worked to improve the knowledge of parents within their local communities with regards to healthy food preparation for young children. Different tailored strategies were used depending on the needs of their local communities, such as: cooking demonstrations, recipes, newsletters, displays at

community events, individual discussions with parents; and general advocacy for healthy eating within the local community.

A *Family FoodPATCH* Steering Committee and Project Officer was established to support the family food educators intervention. Some key activities carried out by the steering committee and projects officers included:

- Negotiations with the State Library for child nutrition resources to be distributed through the library system to enable easy access by family food educators;
- Collaboration with local health workers to maintain a system for supporting and coordinating joint efforts by family food educators and for advocating for additional resources;
- Development and distribution of the 'Eating Matters' newsletter to all family food educators, to provide them with current information; and
- Research into more appropriate ways to encourage and support parents in disadvantaged communities to improve their nutritional knowledge, skills, attitudes, and commitment towards change.

While this intervention has led to the training of 98 family food educators, who in turn have reached 1,732 parents individually, and a further 3,773 parents through group meetings, research on the program has been limited process evaluation and further research needs to be conducted to determine the impact these educators have had on changing parental knowledge, attitudes and skills relating to childhood nutrition and physical activity. Nevertheless, a key strength of the *Family FoodPATCH* program has been the process through which it has actively and deliberately involved parents in the planning, design and implementation of the parent-based strategies. Moreover, underlying the intervention has been the philosophy that by utilising parents as educators of other parents, program messages are likely to be more salient to participating parents. Furthermore, the use of peer educators has encouraged the development of local solutions to local problems. However potential shortcomings of the program which should be considered include the difficulties of managing a large network of volunteers, risk of program messages being diluted or even misrepresented, and need to continually recruit, train, and motivate volunteers.

Growth Assessment Action Program

Although not specifically targeted at overweight and obesity, the *Growth Assessment Action* program[73], has aimed to standardise growth monitoring of Aboriginal and Torres Strait Islander children under five years of age living in rural and remote communities in Central Australia, so as to detect and deal with early signs of overweight or underweight. Set up in 1996, by a group of health care professionals, the primary focus of the program has been on training and supporting Aboriginal Health Workers, with over 700 local people receiving training since the program's commencement.

Using the standardised monitoring practices, Aboriginal Health Workers are provided with action plans and other strategies to work with parents to support those children who are either over or underweight. Furthermore, pictorial information is reported back to each Aboriginal Community twice a year to enable communities to implement and evaluate tailored programs to improve the health of their young people.

The strengths of this *Growth Assessment and Action Program* are twofold. Firstly, three centrally located Project staff have trained, resourced and supported existing Aboriginal Health Workers based in Central Australia to implement wellness and nutrition initiatives within local communities. This demonstrates how re-training of existing health workers can be translated into a sector-wide intervention with meaningful outcomes. Secondly, the *Growth Assessment and Action Program* encourages collaboration between local communities and Aboriginal Health Workers to improve health, using a community development and capacity building approach, rather than delivering a pre-determined intervention. While not evaluated, the program holds much promise for engaging minority populations in Australia in the fight against overweight and obesity in culturally sensitive and appropriate manner

Be Active-Eat Well Program

The *Be Active-Eat Well* program is a comprehensive, community based program run and supported by GPs, dieticians, and allied health care workers with the overall goal of increasing physical activity and improving nutrition among children in the community of Colac, Victoria[319]. To achieve this goal, the key objectives of the program have been to:

- Achieve a high awareness of program messages, by engaging parents, children and the community in a social marketing campaign;
- Establish links and committees with school/preschool parents;
- Facilitate parent focus groups to discuss aspects related to the promotion of healthy lifestyles;
- Build community capacity to promote change, by establishing a steering committee so as to define roles, responsibilities, and set up a work plan and budget for the support of environmental changes to promote health eating and physical activity;
- Conduct a process, impact and outcome evaluation of the project involving communities in the collection and analysis of data;
- Decrease the time spent watching TV, playing on computer and with electronic games
- Decrease consumption of sugar drinks and increase consumption of water;
- Decrease consumption of energy dense snacks and increase consumption of fruit;
- Increase proportion of children who walk/cycle to school;
- Increase play outside school hours;
- Improve quality of deep fried chips; and
- Pilot a healthy lifestyle program for parents and carers of young children.

Thus while the *Be Active-Eat Well* program has used few strategies to actively encourage parent participation in the program, it does provide an example of a broad

comprehensive model, engaging fast food retailers, local fish and chip shops, recreational centres and other community wide stakeholders, in an effort to reduce and prevent overweight and obesity among young children. Moreover, recent data indicate that the project has had a significant impact on behavioural change with those children in the project showing less increase in BMI compared with those in the control group. Nevertheless, primary health care providers, other than those involved in the program's design, were not engaged in delivering the information to parents of young children.

7. POLICY OPTIONS AND IMPLICATIONS

DECIDING ON APPROPRIATE INTERVENTIONS

Preventative programs to promote healthy weight among young children appear to make sense conceptually and economically. The evidence of the rising tide of obesity despite the continuing popularity of dieting is that sustained weight loss is extremely hard for adults to achieve. Preventing people from becoming overweight in the first place or getting the weight off early may be the best strategy.

At present, the average annual cost per Australian age 15 years and over who is overweight or obese is about $1,830 (Caterson, 2006; Australian Bureau of Statistics, 2006). The price of obesity is paid year after year unless the obese lose weight and keep it off. During an overweight or obese person's lifetime, the costs will exceed $100,000 (with a present value around $36,000 if future costs are discounted to present value at a 5% discount rate).

Childhood weight control programs appear to make sense conceptually and economically. The evidence of the rising tide of obesity despite the continuing popularity of dieting is that sustained weight loss is extremely hard for adults to achieve. Preventing people from becoming obese in the first place or getting the weight off early may be the best strategy. If a childhood weight control program cost $500 per participating child and reduced the child's risk of a lifetime of obesity by 5 percentage points, the offsetting savings would exceed $1,800 ($36,000 times 0.05) including $600 in medical costs and $1,200 in earnings losses. The net cost savings of the program would be $1,300. Considerable quality of life would be preserved as well. Thus, even a childhood obesity program with modest effectiveness would offer a strong return on investment.

Yet if new government structures, like the Australian Better Health Initiatives (ABHI), are to implement programs to encourage the prevention of overweight and obesity among young children, then they will need to provide decision makers and primary health care providers with flexible tools and practical information not merely on whether or not an intervention may work, but under what conditions and whether the results are applicable locally in terms of feasibility, acceptability, costs and risk.

Subsequently, the key objective of this review has been to identify a selection of policy options to guide state and area level policy makers and to provide them with information to assist them in the selection and development of multi-faceted interventions to address childhood obesity through the primary health care setting. To this end, this section aims to draw on the findings of those interventions reviewed as successful and/or promising and to highlight some of the key policy options and their implications for implementation, taking into account State/Commonwealth relationships, funding arrangements for new and existing services, and the development of linkages within the primary care sector. Particular emphasis is placed in this section on the strategies for the coordination, capacity building, and monitoring and evaluation requirements for the effective implementation of interventions for the prevention of overweight and obesity in young children.

CLINICAL OPTIONS

Table 13 highlights some of the key barriers which interventions need to address in clinical settings and summarises some of the key policy options for consideration. Most interventions in this setting focused on secondary prevention and treatment. However, many of the strategies could feasibly be used in a primary prevention mode. For example, resources developed for *Lifescripts* such as waiting room materials, self assessment guides, protocols for measuring BMI, and practice manuals could equally be applied with normal weight children and their families in a prevention context. However, engagement by both practitioners and clients and their families is the greatest challenge. The *LEAP*[308] and *Afternoon with my GP*[307] programs have serious financial and time limitations due to the intensity of their counselling techniques. Alternative approaches could involve practice nurses or group sessions to reduce these constraints. This approach is already used widely in Australian medical practices to address other health issues, particularly lifestyle related health problems in adults. Nevertheless, the key challenge for implementing these program approaches for the prevention of childhood obesity is that of engaging parents to attend when they do not perceive an immediate health problem for their child.

The culture of preventive health checks for children with their GP is not strong in Australia, and particularly not among low income families where cost is a barrier. Although, the Australian government has recently introduced a new Medicare item allowing free annual health checks for Aboriginal and Torres Strait Islander children, its focus is not on prevention of obesity. Moreover, while child health clinics funded by State and Territory governments are more universally accessed for routine well-baby checks and immunisations, attendance falls off rapidly after 2 years of age.

Table 13: Clinical Policy Options

SETTING	BARRIERS	POLICY OPTIONS
CLINICAL	**System level barriers** ▪ Prevention of overweight not perceived as core business of PHCPs ▪ Time pressures on PHCPs, and on GPs in particular ▪ Lack of support staff and systems for follow-up ▪ Lack of resources or opportunities for preventative counselling ▪ Lack of referrals to specialists due to concern regarding patient compensation ▪ Limited access for children from lower SES families to preventative care despite greater risk ▪ Too much emphasis on treatment rather than prevention ▪ Lack of time to participate in group training and counselling sessions ▪ Lack of appropriate support materials	▪ Increased emphasis on prevention of modern chronic diseases (including overweight and obesity) to be seen as a core business of PHCPs ▪ Establishment of better systems for monitoring BMI of children within clinical settings, by encouraging practice nurses to take measurements during children's routine visits to GP ▪ Broadening of the roles and responsibilities of practice nurses, paediatric/child health nurses, and/or community nurses to include: the conducting initial screening and follow-up; the provision parental guidance, counselling, and support; and the identification of at risk children and their referral to GPs ▪ Re-orientation of tasks of child health nurses, paediatric nurses, and practice nurses so as to allow them to play an active role in delivering public health messages and in counselling parents on promoting health weight among young children

	▪ Inadequate links with community and child care groups	▪ Development and introduction of standard systems for setting up individual patient registers to store and monitor data with reminder systems, and smarter database tools for early recognition of 'at risk' patients (particularly those whose parents are overweight) ▪ Introduction of longer appointment times to encourage the promotion of initial brief preliminary counselling by physicians, followed up by periodic counselling provided by a practice nurse, paediatric nurse, child/community nurse, or dietician, thereby allowing for bulk billing or reimbursement through private health funds ▪ Greater involvement of clinical health care providers in development of improved clinical guidelines aimed at younger children (2-6 years) ▪ Increased availability of parent oriented educational resource materials on the promotion of health lifestyles among young children and families in general practice waiting rooms, and for distribution by GPs and practice nurses, as well as information on other community resources and support services ▪ Introduction of information on the promotion of healthy weight, developing healthy menus, creating pleasant mealtime environments to pregnant women during regular check-ups. ▪ Organisation by GP /paediatric clinics of group education sessions for pregnant mothers and family members, and/or parents of young babies and toddlers to provide them with education on the promotion of healthy weight and lifestyles ▪ Increasing the number of hospital outreach clinics with designated PHCPs specialising the promotion of health weight and expanded referral systems ▪ Provision of support for Divisions of GPs and other peak bodies to advocate for higher level changes, including: the provision of incentives to encourage PHCPs to participate more in preventative actions; the promotion of private health insurance reimbursements for the prevention of overweight and obesity in young children; the encouragement of policies to regulate food production and marketing. ▪ Broaden roles and responsibilities of

		dieticians, nutritionists and other allied health care providers, and allocate time for these allied health professionals to plan and provide group workshops to the broader population through community organisations, child care centres, local community newspapers, action groups, etc. ▪ Encouragement of greater participation on the part of peak bodies of allied health care providers in the development of government sponsored manuals and resources ▪ Development of structures to link dieticians and allied health care providers to child care centres and to encourage them to play a more active role in assisting directors and child care cooks to develop menu and physical activity policies, etc.; as well as in providing educational workshops for parents.
	Attitudinal/Lifestyle Barriers ▪ Negative 'victim blaming' attitudes on part of GPs towards overweight people ▪ Lack of response or interest from parents who feel PHCP's are either negative or dismissive ▪ Parents sensitivity to comments ▪ Feel uncomfortable dealing with issues of overweight ▪ Often PHCPs are poor role models which add to their feeling of discomfort in dealing with issues of overweight	▪ Introduction of mechanisms to increase GPs and allied health care providers awareness of the broader environmental and lifestyle factors affecting overweight and obesity particularly among lower socio-economic groups ▪ Emphasis on shifting focus of patient/parent education from *weight* to *lifestyle* ▪ Re-orientation of discussions between parents, GPs and/or nurses to focus on parent-child feeding practices, improving the atmosphere around mealtimes, and encouraging healthier lifestyles, rather than on actual foods consumed ▪ The promotion of home visits to parents by child health nurses, community nurses, and Aboriginal and Torres Strait Islander and multicultural health workers, to enhance motivation and reinforce the messages provided during group meetings and clinical appointments and to interact more closely with parents ▪ Promotion of staff wellness programs to encourage them to improve their own health so they can act as role models/advocates of change
	Knowledge, Skills and Training Barriers ▪ Lack of knowledge and understanding of lifestyle and environmental factors affecting weight ▪ Low proficiency and lack of training in use of behaviour management	▪ Increased support for short professional development courses on how primary/secondary prevention can be integrated into routine care, through use of non-threatening family and lifestyle counselling. ▪ Introduction of stages of change counselling, motivational interviewing negotiation, behavioural

	strategies ▪ Lack of knowledge in parental guidance techniques or how to address family conflicts ▪ Lack of educational resources to supplement their own knowledge ▪ Dislike of existing clinical guidelines and handout materials for use with parents	self management, parental guidance and conflict management , as well as environmental change theory, into university curricula, particularly that of practice nurses, paediatric nurses, community and child nurses ▪ Greater participation of PHCPs, and particularly nurses and paediatricians, in the development of government educational materials and handouts for use with parents ▪ Greater funding for, and dissemination of, materials emphasising parent-child feeding practices, improving the atmosphere around mealtimes, and encouraging healthier lifestyles, rather than on actual foods consumed
	Research Barriers ▪ Lack of rigorously evaluated studies on the effectiveness of different interventions; ▪ Lack of information on cost effectiveness	▪ Greater support from NHMRC and or major funding bodies to conduct high quality RCTs to test the effectiveness of engaging different PHCPs in interventions with parents for the primary prevention of overweight and obesity in young children ▪ Encouragement of greater collaboration between PHCPs and universities to conduct joint research into different intervention options ▪ Develop stronger data on the enormous longer term economic burden to the health care system of not engaging in primary prevention of overweight and obesity in young children ▪ Encouragement of private funding to support research and pilot interventions for the prevention of overweight and obesity focussing on the participation of parent and PHCPs ▪ Provision of easy access (via web-site and newsletters) to latest research findings into primary prevention of childhood overweight and obesity prevention programs ▪ Development and distribution of annual document and seminars to disseminate the findings of research in this area
	Organisational / Coordination Barriers ▪ Nature of general practice is disparate, and there are limited tools for reaching and influencing independent practices ▪ Limited collaboration between those outreach clinics and with designated PHC specialists, and other	▪ Establishment of partnerships between local general practice clinics and child care centres, schools and communities, to run joint group educational workshops for parents, develop culturally/contextually appropriate support materials, share knowledge and experiences, encourage early referrals. ▪ Development of improved information systems across

	allied health care providers and professionals working in child care and community settings.	traditional sectoral boundaries ▪ Establishment of committees at the national, state and local area level to ensure parent s receive consistent messages from different health care and child care providers ▪ Strengthening of networks and referrals between GPs and practices nurses to encourage greater follow-up and early detection/prevention of overweight among young children

A new Medicare item has also been introduced for health checks for adults aged 45 years and over, with identifiable risk factors for chronic disease[352]. Given the contribution of early onset obesity to the development of chronic disease, routine free health checks or growth screening for all children may be a sound investment. The average annual cost per Australian age 15 years and over who is overweight or obese is about $1,830[353, 354]. The price of obesity is paid year after year unless the person loses weight and keeps it off. During an overweight or obese person's lifetime, the costs will exceed $100,000 (with a present value around $36,000 if future costs are discounted to present value at a 5% discount rate).

The *Fit WIC* program is a multi-strategic approach incorporating family, primary care and community components that builds on the infrastructure of the well-established WIC program for disadvantaged mothers and children in the US. Extra funding was made available to expand the existing program to better engage parents in prevention of overweight and obesity. Specific interventions were developed locally based on local needs assessment. A key strength of *Fit WIC* is that it was implemented by staff in an existing agency that already had regular contact with parents of young children. In the Australian context, the closest organisational model would be the mother and baby clinics available universally to young families and run at State or Territory level. High risk families may also be reached through existing state and locally based welfare programs. With modest investment, training packages could be developed and implemented with these staff to better equip them to counsel families to adopt healthy lifestyles. Barriers to implementation, similar to those observed in the *Fit WIC* program, are also predictable in the Australian context. This includes constraints on the time of primary health care providers (predominantly child health nurses in the Australian context), variable knowledge and motivation of staff and parents, and social and economic limitations for parents attempting to implement healthy lifestyles. Following the *Fit WIC* model, to overcome these barriers, extensive consultation with primary health care staff and parents should guide development and implementation of effective resources and training.

Another strength of *Fit WIC*[325], and a deficiency of other promising primary health care interventions such as *STRIP*[341] and *NEAT*[272], was the development of strong local networks and partnerships with various community agencies to develop broader environmental and organisational change to support prevention of obesity. In the Australian context, this approach is well developed in local government community development portfolios and in the health promotion and population health units of State and Territory Health Departments. However, due to the traditional focus on individual counselling and the constraints of time, this is still an emerging role for many primary health care providers. Adoption of this approach may require some reorientation of service delivery models and would require consultation at national, state and local level.

CHILD CARE AND PRESCHOOL POLICY OPTIONS

Regulations and mechanisms for delivery of health and nutrition services in childcare vary between Australian states and territories. For example in some states, such as New South Wales, parents have an option to provide food for their children, in much the same way as packed lunches are provided in a school setting. In other states, such as Western Australia, parents are actively discouraged from sending packed food to childcare centres unless the child has specific dietary needs. Integration of childcare with primary health care services also varies between and within states and territories. Whilst state government funded child or community health nurses may routinely visit

child long day care and preschool centres to conduct standard health checks and immunisations, involvement of other primary health care staff, such as dieticians and health promotion officers, is variable depending on program priorities and resource levels.

Despite state and territory differences in implementation methods, there is potential for development of nationally consistent quality standards and resources for use in childcare and preschool settings to promote healthy growth and prevention of childhood obesity, through the use of a variety of different programs and policy options. For example, despite state-based development, extensive national distribution of *Sharing a Picture of Children's Development* has already occurred, with change made to meet local needs. Similarly, the *Start Right Eat Right* program, which was developed by the Department of Health in Western Australia has been adopted and adapted for use by several other state health departments including those in Tasmania, South Australia, Queensland and Victoria[355]. Table 14 outlines some of the potential options as well as the barriers they seek to address.

A strength of those Australian programs that rated highly in this review has been their emphasis on on-site capacity building of child care staff. Nevertheless, the provision of professional development to childcare staff is problematic due to staff rostering issues, particularly in small centres, and lack of financial and career path incentives to invest personal time in training. Pre-service training is highly recommended as a policy option for potential centre directors and principals, while on-site, self paced training linked to achievement and maintenance of quality standards has additionally been proposed as an efficient and effective approach to professional development, particularly for support staff in child-care centres such as catering staff[91].

In addition, the *Caring for Children* program provided a detailed manual for child care staff which was a stand alone resource that could be used to assist staff to review, implement and tailor food and nutrition activities in their centre. The activities are designed to be easily implemented without external support. With current levels of resources both within the childcare sector and the healthcare sector, this may be a cost-effective option for staff training. The disadvantages of a stand alone manual are the lack of a referral point for probing or clarifying of issues is not addressed, and the need for regular review and update of materials in the manual to maintain currency and relevance. This may be partly addressed by establishment of relationships with relevant individual specialists or advisory teams in the community, including primary health care providers such as medical practitioners, dieticians and child health nurses.

The *Good Food for Children* and *Start Right Eat Right* Award schemes addressed sustainability of staff training, particularly in the light of high staff turnover in the childcare industry, by establishing accredited courses with local training institutions and incorporating minimum training requirements in childcare quality improvement award schemes and licensing regulations.

Most programs in childcare settings identified by this review have food and nutrition as a primary focus, without consideration of physical activity promotion nor identification of obesity prevention as a primary objective. This is consistent with the philosophy of promoting development of healthy eating behaviour and healthy growth in early childhood rather than emphasis on weight management. It probably also reflects food provision as a traditional core responsibility of childcare centres, in Australia at least, whereas lifestyle education programs are a relatively new concept in this setting.

The importance of incorporating age-appropriate, structured active play in child-care and preschool programs is recognised by recent child development, physical activity and sport promotion as well as obesity prevention policies and strategies[50, 54, 55]. Development of fundamental movement skills in preschool years underpins competence and confidence to participate in sporting activities in later childhood and adolescence.

Only one of the four programs in childcare or preschool settings rated medium to high in this review placed a strong emphasis on physical activity promotion. The US based *Hip Hop for Health Junior* in preschool included, along with nutrition interventions, structured physical activity sessions as part of the curriculum and programs to increase parent participation and motivation to exercise. A well designed evaluation showed lower BMI in those involved in the comprehensive program, compared to controls, for at least two years after the intervention. In the Australian context, preliminary evaluation of the *Romp and Chomp* child care program in Victoria shows promise, although difficulties were experienced in engaging parents.

Table 14: Child Care Policy Options

SETTING	BARRIERS	POLICY OPTIONS
CHILD CARE CENTRES/ PRESCHOOLS	**System level barriers** ▪ Lack of time to engage with parents or to provide them with individualised feedback on child's health ▪ Difficulties in collecting individual data on each child as some children only come one day per week and this varies per child ▪ Centre cooks pressured to provide meals within limited times and according to strict budgets	▪ Setting up of steering committees with principals, child care providers, PHCPs, and government stakeholders, to plan and direct the various stages of implementation, and to ensure that they were compatible with the QIAS ▪ Development of ways to stream line communication between parents and chid care providers about overweight and obesity ▪ Provision of parent-staff meetings during service hours or extension of staff hours by 30 minutes to allow for great interaction with parents ▪ Organisation of individual child folder at the beginning of the year in pupil free days ▪ Creation of a reward system to recognise those centres with high standards or marked improvements in the promotion of healthy weight through established mechanisms, such as QAIS
	Attitudinal/Lifestyle Barriers ▪ Prevention of overweight and obesity not seen as a core part of their job nor necessarily as something to worry about at this early age	▪ Promotion of parent participation and PHCPs on the steering committee and on boards to ensure their participation and support in

	▪ Often child care workers are poor role models with regard healthy weight gain ▪ Difficult to gain parent participation due to increasing time pressures	every aspect of the planning, design, implementation, and evaluation of interventions to enhance understanding of underlying issues affecting lifestyles and behavioural change and to encourage them to take ownership ▪ Use of initial baseline assessments to review the infrastructure and capacity of child care centres to ensure that interventions are tailored local needs and conditions of participating groups ▪ Use of stages of change and ecological/environmental change methodologies to ensure that interventions engage child care providers and parents through approaches that are appropriate to the environmental/lifestyle factors affecting healthy living ▪ Involvement of centre cooks in the planning of nutritious meals as well as in activities with the children and parents ▪ Encouragement of networks of centre cooks so that they can provide support for one another and share recipes and experiences ▪ Development of notebooks on how to increase active play for children and develop an event calendar to encourage parents and child care providers to support centre policies ▪ Facilitation of mechanisms to motivate staff and increase their self-worth so that they will work more actively with parents and children ▪ Development of individual communication plans between parents and staff to engage in individual discussion on child needs and to offer parental counselling ▪ Creation of a child folder including information on weight, food habits, etc. to enhance tailored feedback

		to parents ▪ Organisation of workshops on child centre policy to encourage parent understanding and participation in its aims and goals ▪ Encouragement of parental involvement in the compilation and development and dissemination of materials, activities, recipes, and competitions, and homework assignments to promote healthy weight among young children and their families ▪ Development of referral systems to GPs, paediatricians or dieticians of children who are showing early signs of overweight and obesity ▪ Introduction of similar activities and nutrition policies in vacation and after hours care ▪ Implement staff wellness programs to enhance their self-esteem and encourage them to become role models promoting healthy lifestyles
	Knowledge, Skills and Training Barriers ▪ Lack of knowledge and understanding of lifestyle and environmental factors affecting weight ▪ Lack of understanding of the importance of involving parents in efforts to promote change ▪ Lack of educational resources to supplement their own knowledge	▪ Integration of information on the causes and consequences of childhood obesity and on policies for overcoming it, into the university/TAFE training of child care providers ▪ Development programs for training principals/directors in policy planning related to key aspects of nutrition, food safety, eating habits, menu planning and hygiene ▪ Dissemination of information on how to develop a communication framework to al child centre directors across Australia outlining how to develop communication plans, action plans, checklists, worksheets, policies, as well as providing case studies, resources, etc. ▪ Development of programs for child care cooks, and the creation of menu checklists

		▪ Development of programs for child care workers incorporating the promotion of fun activities, including the preparation of healthy food that children can take home ▪ Development of programs to encourage and support health child care workers to engage parents through improved communication and greater understanding of their contextual/social needs ▪ Development of curriculum for incorporating greater physical activity and simple education for children about nutrition through stories, rhymes, songs, activities and games, ▪ Distribution of stand alone manuals, such as those of the *Caring for Children* or *Sharing a Picture of Children's Development,* to all child care centres across Australia to assist child care staff to tailor their activities to meet local needs ▪ Promotion of similar support materials for preschools on lunchbox and snack policies, fun activities for encouraging children to engage in food tasting, nutritional knowledge, and physical activities, as well as on strategies for engaging parent participation and support. ▪ Organisation of small group sessions with parents and PHCPs, to assist parents to learn about simple food preparation, encourage food tasting, respond to their children's verbal and non-verbal behaviour relating to food intake, and to promote health lifestyle ▪ Development and use of appropriate materials for different contexts, including low literacy flash cards for use with special population groups, as well as materials adapted to different language groups

	Research Barriers ▪ Lack of rigorously evaluated studies on the effectiveness of different interventions with regard to prevention of overweight and obesity and particularly with regards to how to achieve behavioural change among parents and families	▪ Provision of support not only for the development and implementation of interventions but also for their evaluation, emphasising key components of process, impact and outcomes. ▪ Increased emphasis on the evaluation of behavioural change and promotion of healthy weight among parents and children and less emphasis on the use/satisfaction with of manuals and new techniques ▪ Review/evaluation of strengthens of different programs for different population groups (low SES, Indigenous, rural and remote) ▪ Assessment of the impact in terms of cost and funding arrangements of promising interventions
	Organisational/Coordination Barriers ▪ Child care is a fragmented, decentralised sector and varies greatly by state ▪ Lack of coordination between different PHCPs who come from a variety of government and non-government groups that fall under the supervision of different government departments (FACS, DEST, DoH) ▪ Incompatibility between initiatives funded and coordinated at different federal, state or local levels	▪ Establishment of strong partnerships between centre care centres and allied health care providers, peak health bodies and local general practice clinics, to run joint group educational workshops for parents, develop culturally/contextually appropriate support materials, share knowledge and experiences, encourage early referrals. ▪ Promotion of stronger links between child care centres to share successes and encourage them to work together to address problems in implementing weight prevention programs ▪ Encouragement of greater participation of allied health care providers on boards and committees and in the development of centre's nutrition policies in line with government QAIS ▪ Development of improved information systems across traditional sectoral boundaries ▪ Establishment of committees at the national, state and local area level to ensure parent s receive

		consistent messages from different health care and child care providers ▪ Establishment of collaborative links between child care cooks and local training institutions and peak bodies in the area of nutrition to provide regular professional development for cooks in child care centres ▪ Promotion of greater participation between child care centre directors and preschool principals to encourage preschools to learn about some of the lunchbox checklists, fun activities and parental participation efforts introduced by child care centres to promote healthy weight
	Policy Barriers ▪ Need for QAIS and other policies to support changes and reward centres for compliance	▪ Promotion of national efforts to ensure the development, implementation and monitoring of comprehensive food service and physical activity policies within preschool and child care centres

Despite limited evaluated examples of implementation of physical activity promotion in the child care/preschool setting, the implementation issues are likely to be similar to those experienced for nutrition and other areas of health promotion. Theoretical frameworks suggest that the fundamental components of a successful health promotion intervention in childcare and preschool centres would be appropriate policies, support and commitment of management, and support and modelling by staff; training of staff and provision of resources to implement programs; engagement of parents to support and reinforce program messages and activities at home; and a supportive community environment and partnerships to facilitate implementation and sustainability.

While this review has identified examples of good practice that address various combinations of these components, the critical success factor is the uptake and maintenance of the intervention by child care centres. At a system level, the most efficient method to effect universal implementation is to introduce minimum standards for these components in childcare licensing agreements. Approaches in this direction have already been taken in most Australian states in the nutrition arena with the *Good Food for Children* and *Start Right Eat Right Award* programs. Establishment of partnerships with licensing bodies was a key component of successful implementation of these programs. A significant weakness, however, of the Start Right Eat Right Award program, was the lack of active engagement of parents. This was addressed in resources to support Good Food for Children but has not been fully evaluated. Although it is assumed that children participating in these and similar programs would experience immediate benefits from better nutrition and regular physical activity,

without maintenance by parents in the home environment and during school years, the benefits may be short-lived. An Australia wide review of implementation and impact of these programs, including impact on growth, would assist further policy development in this area.

HOME AND COMMUNITY BASED POLICY OPTIONS

Home and community based programs are essential in a comprehensive mix of interventions to prevent childhood obesity. Without modelling by parents and creation of a supportive home and community environment for healthy eating and physical activity, efforts in the clinical and childcare settings will have minimal impact on healthy lifestyle knowledge, attitudes and behaviours of 2 to 6 year olds. Table 15 highlights some of the policy options for providing support within home and community settings. Research into sources of nutrition knowledge repeatedly shows that friends and family are the most significant source of nutrition and health information for parents, particularly those with low education levels. Based on this observation, the *Family FoodPATCH* program trains and empowers local parents to become peer educators and advocates for healthy eating in their own communities. The immediate intended benefits is the development of local solutions to local problems, with delivery of salient messages to potentially hard-to-reach groups by a low cost volunteer workforce. However, the hidden costs of recruitment, training, motivation and management of a continually renewing volunteer workforce have not been evaluated against the potential gains, and should not be under-estimated. Experience with the *Food Cents* program, a similar volunteer based initiative developed by the Department of Health WA, and targeting low income groups, has shown the use of volunteer leaders to be most sustainable by conducting training and recruiting volunteers through agencies whose core business is to deal with the target group[356]. Translating this concept to the early childhood target group, suggests recruitment of volunteer parents to work in conjunction with primary health care and child-care settings.

The *Growth Assessment Action* Program also suggests an opportunity for primary health care and childcare settings to work collaborative with local communities to address obesity prevention in young children. This program had its origins in growth monitoring, mainly for under-nutrition, undertaken by State government primary health care workers. Monitoring of child growth fell into disfavour in many state health departments due to inadequate growth monitoring standards and tools, poor training of staff in measurement and subsequent poor quality control, and low prevalence of growth failure in the mainstream population. With the emergence of the current childhood obesity epidemic, there has been renewed interest in some state health departments, notably Queensland and South Australia, in mainstream growth monitoring of young children. Some of the previous barriers have been removed with the release of new growth standards for children and easy to use electronic methods of data collection, storage and analysis. A new barrier is a potential deficiency in services to deal with children identified at risk. Nevertheless, national discussion between state governments and providers in the primary health care and child care sectors, as well as review of the potential for wider implementation of the concepts in programs like the Growth Assessment Action program in the current context, is warranted.

Table 15: Home/Community Based Policy Options

SETTING	BARRIERS	POLICY OPTIONS
COMMUNITY BASED	**System level barriers** ▪ Fragmented nature of community based organisation ▪ Diverse nature of needs in different socio-economic, regional and cultural groups ▪ Lack of resources ▪ Difficulty in coordinating volunteer/parent based groups	▪ Development of steering committees and the encouragement of coordinated messages across departmental boundaries and to enhance the participation of different community stakeholders ▪ Use of community members as peer educators and advocate for the implementation of community based programs ▪ Careful supervision of volunteers to avoid messages being diluted or misrepresented ▪ Ongoing efforts to find innovative means to recruit and motivate new participants to act as volunteers
	Attitudinal/Lifestyle Barriers ▪ Parents are frequently poor role models with regards diet and physical activity ▪ Parents often don't perceive their children as overweight and are sceptical about BMI and height/weight charts ▪ Parents can misinterpret overweight children as 'healthy' eaters and by exerting strong control of quantities of food eaten, do not allow children to learn skills in self-regulation ▪ Parents work and lifestyles limits time available to structure eating habits or prepare nutritious meals ▪ Parents often feel powerless in light of commercial advertising, and challenges from grandparents, friends, etc. ▪ Parents are more likely to take action if they perceive their children are suffering psychologically due to poor self-esteem or bullying	▪ Introduction of programs to empower parents to become peer educators and advocates for promoting healthy weight within their community ▪ Increased community advocacy programs for supporting nutrition and physical activity ▪ Encouragement of local Aboriginal and Torres Strait Islander health and educational officers or multicultural health officers in the design, development , planning, and implementation of programs to ensure they are tailored to meet their specific needs and target local participation ▪ Reporting back of information on the healthy development of children to parents using pictorial and other means to enhance understanding of findings. ▪ Promotion of interventions that encourage parents to participate in the assessment of their child's weight and overall health and to discuss their concerns with an appropriate allied health care provider. ▪ Introduction of community marketing campaigns to increase public awareness and alter community attitudes using key local contact points such as community centres and parent committees ▪ Work with local newspapers and media to promote the dissemination of research findings to increase awareness and encourage parents and community members to take a more active role in prevention

	Knowledge, Skills and Training Barriers ▪ Conflicting information and messages ▪ Too much information emphasises 'what' to do rather than assisting parents/communities in 'how' to achieve it ▪ Information too general and not targeted to specific needs of different population groups ▪ Information and training often fails to take account of family conflicts in dealing with key issues around food, TV watching, etc.	▪ Development of professional development programs to increase the knowledge and confidence of parents to become leaders and peer educations in programs for the promotion of healthy weight in young children ▪ Development of methods to increase the reach of formal and informal communication about nutrition and physical activity ▪ Development of parent skills training programs to educate parents on issues such as negotiating dietary change, and setting limits on TV use ▪ Development of resource kits containing up-to-date information and ideas for engaging parents, as well as links for obtaining further support and resources. ▪ Distribution of information on local support services in community newspapers, centres and through other well used local sites ▪ Tailoring of local materials to the specific needs of different population groups ▪ Introduction of comprehensive, multifaceted community wide healthy weight initiatives, with participatory action research component
	Research Barriers ▪ Lack of rigorously evaluated studies on the effectiveness of different interventions; ▪ Lack of information on cost effectiveness ▪ Need for solid research to support government efforts to introduce unfavourable policies in the light of strong private industry opposition	▪ Greater support from NHMRC and or major funding bodies to conduct high quality RCTs to test the effectiveness of engaging different PHCPs in interventions with parents for the primary prevention of overweight and obesity in young children ▪ Encouragement of greater collaboration between PHCPs and universities to work collaboratively to carry out research into community based, multi-dimensional intervention options ▪ Production of economic data on the enormous longer term burden to the health care system of not engaging in primary prevention of overweight and obesity in young children ▪ Development of research to support government policy changes in light of strong opposition from private industry
	Organisational, Policy and Coordination Barriers ▪ Need for great access to resources and support services in to implement multi-dimensional programs	▪ Greater collaboration among local health workers to maintain systems for coordinating joint efforts at the local level and to advocate for additional resources ▪ Encouragement of negotiations with local libraries to enhance the

		distribution of nutritional and other support materials and resources through the library system; ▪ Review and development of a central structure for coordinating different federal, state, and local level operations and for enhance collaboration between these groups, as well as different private and government departments
	Policy Barriers ▪ Need for upstream support and reward systems	▪ Review of the present processes by which federal, state and local level governments work in partnership to enhance the participation of PHCPs, child care providers and parents work in partnership to prevent childhood obesity ▪ Encouragement of local health areas to develop a policy statement and a portfolio of appropriate interventions for preventing childhood obesity within their context ▪ Promotion of efforts by local governments, parent, PHCPs and key stakeholder to develop local action plans to develop policies that address issues of supply and access to appropriate foods at affordable prices ▪ Development of local coalitions to improve the range of local systems for supplying food ▪ Introduction of local audits to review the quality of food and physical activity environments ▪ Introduction of activities with local governments to develop local physical activity plans and access to safe enjoyable opportunities to be active ▪ Build on NHFA award system for local government to promote the development of local environments that support appropriate eating and physical activity ▪ Introduction of regulation of food production and marketing ▪ Incentives and subsidies to encourage health insurance companies to introduce reimbursement for preventative measures to reduce overweight and obesity

The *Be Active-Eat Well* Program is one of the first community based interventions in Australia to attempt to engage key stakeholders in prevention of childhood obesity. Although still evolving, process evaluation to date has identified some major challenges in wider engagement of families and primary care providers. Further analysis and testing of potential solutions to these difficulties is desirable to provide valuable lessons and a way forward for implementation of similar programs in other communities.

RESEARCH AND TRAINING OPTIONS

Further to the organisational, financial, and managerial considerations, the strengths of any policy options will be dependent on the capacity of staff to implement them. From this perspective, increased support is required to promote and encourage primary health care providers (and particularly paediatric, community and practice nurses) to participate in short, in-service professional development courses on how to integrate primary and secondary prevention into routine care through the use of non-threatening family and lifestyle counselling. In addition, universities need to review undergraduate and postgraduate curricula for GPs, nurses, dieticians and other allied health care providers, with the goal of introducing topics relating to stages of change counselling, motivational interviewing, negotiation, behavioural self management, parental guidance and conflict management, as well as environmental change theory so that primary health care providers feel more comfortable dealing with parents and have a greater understanding of the broaden aspects affecting the uptake of preventative health care. Short-term university and TAFE courses for child care workers, and particularly potential directors of child care centres or principals of preschools/schools, also need to be developed to provide training in policy planning on key aspects relating to: nutrition and physical activity planning; communication frameworks for enhancing parent participation; networking and support; and curriculum development to enhance healthy lifestyles. Moreover, this needs to be supported through increased funding for the production and dissemination of education materials, developed with greater participation from primary health care providers and child care providers.

In addition to education and training, at the research level, the Australian Research Council and the National Health and Medical Research Council need to provide support for high quality research to evaluate the effectiveness, impact and outcomes of different interventions for engaging primary health care providers. Furthermore, in order to make the best use of scarce health resources, a clearer understanding of the cost-effectiveness of different approaches is desirable. The question of the cost-effectiveness of alternative interventions has received little scientific attention[357], and is an area of increasing importance given the growing prevalence of childhood overweight and obesity and the related costs associated with its treatment.

8. TOWARDS A "PORTFOLIO" OF PROMISING INTERVENTIONS

As indicated in the previous section, when determining which preventative programs are most appropriate for their local health area, policy makers must assess the benefits in the light of the existing political, social, structural, and economic context. While this review has highlighted the vital importance of developing primary prevention programs focusing on young children, while at the same time reinforcing the need to address a broad range of environmental, social and emotional factors including body image, self-esteem, food preferences and energy balance, more importantly, it has drawn our attention to a critical gap in relevant information and evidence on the effectiveness of interventions for this age group. On the contrary, what the review has demonstrated is that all too often in the past, interventions have focused on school aged children and have failed to adequately recognise that food preferences and lifestyle patterns of children and families are well established by the time they reach school age.

But perhaps most importantly, what this review has highlighted is that despite the growing national consensus that sustainable initiatives to stem the alarming growth in overweight and obesity in Australia should focus on children and engage a wide variety of primary health care providers (parents, communities, child care providers, teachers, nurses, GPs, paediatricians, allied health care providers, etc.), in practice a number of issues have hampered their success, namely: 1) primary health care providers for young children involve a variety of government and non-government groups which come under the supervision of different government departments (FACS, DET, DoH), many of which are funded at the local and/or state level making national strategies difficult to implement; 2) prevention of weight gain is not perceived as the core business of most primary health care providers and is given low priority in the face of competing demands; 3) the child care sector is a fragmented and decentralised sector, and thus requires different interventions, formats and approaches for different states; 4) the nature of general practice is disparate and there are limited tools for reaching and influencing all independent practices and practitioners, and to do so can be labour intensive; and 5) the lack of evidence on effective interventions has entrenched childhood obesity to the policy level and has limited the funds allocated to interventions.

Nevertheless, this review has provided a list of promising interventions for use in different action areas. The next stage of this project, which is presently in development, is the creation of a "portfolio" of interventions, that will enable local policy makers to select and develop multi-faceted interventions that address the needs of their particular target areas, taking into account available resources and local acceptability. To this end, the project will:

- Test the feasibility of the various policy options with key stakeholders;
- Review mechanisms for fostering collaboration among institutions so as to facilitate their wider use with the community;
- Assess the cost effectiveness of different interventions; and
- Develop a portfolio of interventions directed at state and local policy makers to provide them with information on how to select and develop appropriate partnerships for the implementation of interventions, what factors might contribute to their success, what capacity building and other structures need to be put in place to enhance effectiveness/acceptability, and how to ensure consistent messages across different sectors.

The portfolio will be accompanied by a selection guide that will include:

- An introduction to the settings-based action areas and primary health care intervention points for working with children aged 2-5 years (eg. child care, preschools and kindergartens, general practices and clinics, child/community nurses, etc) outlining strengths and difficulties of working with these action areas, present gaps, needs, etc.

- An outline of 'candidate' interventions for each of the settings-based action areas, incorporating specific information relating to each of these that enables policy makers to make a judgement on best mix of interventions for local portfolios of action, including:
  - Relevance and acceptability to the community
  - Feasibility and likely cost implications
  - Availability of appropriate resources and support materials
  - Staff capacity building needs
  - Required level of engagement of key partners
  - Relevance to specific target groups (rural/regional, low SES, culturally and linguistically diverse)

- A review of the process policy makers could follow to assist them to select the optimal mix of interventions in order to build intensity and breadth of effort tailored to their local needs and resources

- An examination of how to identify who are the best PHC providers to implement these interventions, what are the most effective means of engaging stakeholders and partners, what tools could they use, and what key components are necessary to enhance the effectiveness of the interventions.

The portfolio will involve the use of multiple evaluation methods and will integrate the process and outcome information collected in this review, to build a body of evidence about interventions, thereby enabling policy makers to select an appropriate mix of strategies, allowing policy action to move forward based on best 'available' evidence.

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10. APPENDICES

APPENDIX 1: List of Group Members

APPENDIX 2: Summary of primary and secondary words used in search

APPENDIX 3: Detailed Description of Interventions (2-6 year olds)

APPENDIX 4: Criteria for Appraising/Scoring Interventions

APPENDIX 5: Scores of Interventions (2-6 year olds)

Appendix 1: List of Group Members

Name	Position and Organisation
Professor Donna Cross	Professor of Adolescent and Child Health, Director, Child Health Promotion Research Centre, Edith Cowan University
Ms. Margaret Miller	Manager, Nutrition and Physical Activity Program, Department of Health WA
Professor Ken Resnicow	Professor of Public Health, University of Michigan
Dr. Lydia Hearn	Co-Director, Child Health Promotion Research Centre, Edith Cowan University
Ms. Delia Hendrie	Lecturer in Health Economics, School of Population Health, University of Western Australia
Ms. Sue Hutchinson	Assistant Director, Overweight, Obesity and Physical Activity Section, Department of Health and Ageing, National Obesity Taskforce
Associate Professor Cobie Rudd	Head of School, School of Nursing and Postgraduate Medicine, Edith Cowan University
Ms. Renee Campbell-Pope	Program Coordinator, Child Health Promotion Research Centre, Edith Cowan University
Ms. Stacey Waters	Child Health Promotion Research Centre, Edith Cowan University
Ms. Lyn Leslie	Librarian, ECU Library Services
Ms. Sharon Middleton	Child Psychology, Edith Cowan University
Dr. Jenny Downes	Occupational Health and Safety, Curtin University
Ms. Joanne House	Formative Research Project Director, Child Health Promotion Research Centre, Edith Cowan University

Appendix 2: Summary of Primary and Secondary Words Used in Search

Primary key words:

- Overweight
- Obesity
- Young children
- Young children or Pre-primary/primary school children or 0-6 years
- Prevention and Early Intervention Models
- Prevention and Early Intervention Policy
- Prevention and Early Intervention Programs
- Primary Health Care Intervention
- Australia
- New Zealand
- United Kingdom
- United States of America
- Canada
- Europe
- Developed countries
- Low SES
- Rural populations
- Ethnic groups
- Aboriginal and Indigenous groups
- Parent involvement or parent participation
- Parent and family based models
- Community based models
- Integrated models
- Universal models
- Integrated models
- Targeted models
- Obstacles and Constraints
- Educational and support materials
- Curriculum development
- Behavioural models
- Socio-ecological models
- Psycho-social models
- Multi-component models
- Single component models
- Parent based models
- Parent participation
- Parental readiness
- Parental self-efficacy
- Healthy lifestyles
- Effectiveness of, efficiency or impact
- Cost effectiveness
- Child care/ day care / out of school models

Secondary key words:

- Longitudinal weight data
- Links with overweight and obesity in adolescence and adulthood
- Body mass index
- Body image
- Childhood mental health
- Physical health
- Self esteem
- Intellectual development
- Long-term related health issues
- Key causal pathways
- Mediating variables
- Moderating variables
- Independent variables
- Dependent variables
- Food preferences
- Diet
- Parent perceptions
- Parental awareness
- Parental lifestyle factors
- Parental diets
- Parent roles
- Parent modelling
- Nutrition
- TV media
- Child care/ day care nutrition programs
- Nutritional education
- Maternal employment
- Prevalence
- Urban lifestyles
- Secondary Intervention

Appendix 3: Detailed Description of Interventions (for 2-6 year olds)

Australian-based Interventions

	Intervention	Target Group and Setting	PHCP	Intervention Strategy (1-5) 1. Type of prevention 2. Study design 3. Goals 4. Strategies 5. Frequency & duration	Assessment Tools	Findings Conclusions Strengths and Limitations MR: Methodological rigour PIT: Program Impact & Transferability UI: Upstream involvement MA: Multidimensional approach PP: Parental Participation PHCP: Primary Health Care Participation PF: Population Focus
1.	Good Food for Childcare – Food from Home [290]	0- 5 year old children n = 15 childcare centres Child care: long day care centres	Parents and child care centre staff	1. Primary, universal prevention 2. Pre-test, post-test comparison, one group only 3. Improve nutrition prepared from home 4. Strategies included: - An assessment of each centre's menu with individual feedback to each centre - Advice on the development of policies - Workshops for child care staff to improve nutrition knowledge and skills - Training and support for child care cooks - Provision of nutrition information for parents - Collaboration with government departments 5. Frequency and duration of workshop not provided, outcome evaluation conducted 3 months post-intervention.	Food in lunchboxes assessed using a food checklist based on the Caring for Children checklist; observation of staff food handling practices using a checklist based on current recommendations for child care centres; policies collected and assessed with a checklist based on current recommendations; food safety and nutrition knowledge assessed in a face-to-face interview; process evaluation questionnaires to assess the workshops; all assessments based on assessments used in previous child care studies.	**Findings** Improvements in the nutrition score of the food provided in lunchboxes, especially in the provision of foods containing iron and calcium, and appropriate drinks and snacks; improved handling of food and content of policies; no change in the levels of staff knowledge of nutrition and food handling practices; attendance at workshop was poor, with only 6 of the 21 centre representatives present; no power analysis. **Conclusions** The intervention was effective in improving food provided to children and food handling practices in this setting. **Strengths** MR: t-tests and McNemar tests conducted; formative, process and impact evaluation conducted providing solid groundwork for improved communication between staff and parents; measurement tools (pre-piloted) used for evaluation; outcome evaluation demonstrated improved nutritional lunches brought from home (3 months post-intervention) and improved food handling policies in the child care centre. UI: briefly discussed the policy development; inter-sectoral involvement to improve primarily nutrition, which involved developing personal skills and building public policy. MA: single message and multiple components **Limitations** MR: poor study design; no control group; poor demographic description of sample; no psychometric description of measures; no theoretical framework discussed; no long-term evaluation; power analysis and participation rate not discussed. PIT: frequency and duration of workshop not provided; outcome evaluation conducted 3 months post-intervention with poor increase of knowledge and no change in food handling practices

	Intervention	Target Group and Setting	PHCP	Intervention Strategy (1-5) 1. Type of prevention 2. Study design 3. Goals 4. Strategies 5. Frequency & duration	Assessment Tools	Findings Conclusions Strengths and Limitations MR: Methodological rigour PIT: Program Impact & Transferability UI: Upstream involvement MA: Multidimensional approach PP: Parental Participation PHCP: Primary Health Care Participation PF: Population Focus
1a.	Good Food in Family Day Care [288]	0- 5 year old children (average age = 2.1 years) n = 8 Centres (1060 children, 1000 families, 18 FDC staff & 230 carers) Child care: family day care	Parents and child care centre staff	1. Primary, universal prevention 2. Pre-test, post-test comparison, one group only 3. To improve nutrition provided to children 4. Development of nutrition and food safety resources: - Nutrition Information Kit and a Food Safety Training Manual disseminated through the FDC - Newsletters and workshops (3 x 2 hour workshops) - Feedback on policies - 'Fruit and Vegetable Activity' competition and activities compiled into a book and distributed to participating centres - Baseline assessment findings were distributed to centres and improvement in knowledge from questionnaires were also distributed to reward improvements 5. Two year implementation phase, which involved a range of activities listed above, and the post evaluation was conducted one year later.	Carer recall of food offered whilst in care – interviewers trained and provided with an interview script, developed for this project, data was scored and the score was converted to a percentage of the maximum possible score; 25% of food history forms were also coded by another data collector and a panel was used to resolve items where there was disagreement; no detail of psychometric properties. Food safety and nutrition policy checklists – developed for this project but based on a referenced model of practice. Policy scoring was checked by another researcher Nutrition and food safety knowledge questionnaire – developed for study but based on a previously developed questionnaire, conducted in an interview, tested for reliability but no details reported. Evaluation questionnaires for workshops and Kit evaluation forms were also used.	**Findings** At baseline, many children were receiving inadequate iron, vegetables, or inadequate dairy and protein in vegetarian meals. at the end of the project, the proportion of infants who met the criteria of adequacy of food provided during care increased. For infants, there were significant improvements in that cereals were offered every day and fruit juice was diluted. For children aged 1 to 5 years, food was significantly more appropriate for age, cereal based foods were offered daily, sweetened drinks were avoided, and water was the preferred drink. All schemes had a policy at post-test. The least improvements were in increasing provision of foods with iron, dairy, vegetables and protein foods with a vegetarian meal; increased staff knowledge of food safety and nutrition but NO change in knowledge score of dealing with fussy eaters positive process evaluation for the workshops and resources kit were reported. **Conclusions** Some improvements in food offered to children attending DC centres was achieved, there was improved knowledge and policies were developed and these represent successes. **Strengths** MR: T-tests, chi-squared & Fisher Exact test were conducted, theoretical framework based on the Hierarchy Model, confounding factors taken into consideration, generalisable to 0-5 target population, activities clearly described with limitation considered, and strong transferability, formative, process, impact and outcome evaluation conducted. UI: inter-sectoral action, development of personal skills, creating a supportive environment, building public policy were scored highly MA: multi-dimensional approach high in terms psychosocial, behavioural modification and promotional incentives. **Limitations** MR: poor study design, no control group, small number of infants in the group (n=20 at baseline and 22 at post-test), no blinding for exposure, staff turnover did not allow for matched sampling, relied on recall of food provided in centre, poor psychometric analysis of measures, parent knowledge and health-related behaviour was not assessed and cost effectiveness not discussed. MA: Single component with a focus on nutrition. PP: involvement with workshops and information dissemination (low level of interaction).

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1b.	Good Food for Children [296]	0-5 year old children Child care centre	Allied Health Professionals, Child Care staff & Parents/Carers	1. Primary universal prevention 2. Quasi-experimental, pre-test post-test comparison study Ix group (40 centres) & control group (19 centres) 3. To improve nutrition & food standards in Long day Care Centres 4. Education, psychosocial & policy development strategies included: - Assessment of child care centres' menu - Workshops for child care staff and cooks - Information newsletters for parents - Intersectoral collaboration - Developed recommendations for policy development 5. Pre and post test conducted over 14 months and evaluated on a two week menu; the activities for staff & parents involved a one half day workshop	Additional development of a 15-item menu checklist previously developed specifically for child care centres was conducted so that a percentage score of nutritional adequacy could be obtained; psychometric properties not reported.	**Findings** 14 months pre-test assessment: significant improvement in menu scores, and a significantly greater proportion of centres receiving the intervention served 3 portions of dairy foods, 2 or more serves of bread each day, and fruit juice was dilated 50:50; 41% of Ix centres still not providing enough dairy food; visiting child care centres to collect menus was time consuming but missing data was avoided but the intervention seems to be time efficient; 21% of Ix centres still not providing enough red meat; power analysis and participation rate not discussed. **Conclusions** The GFFC improved menus and the nutritional quality of food available to the children attending the child care centres. An Accreditation Scheme commenced during the course of this study and since control centres showed no improvements in the food provided, it suggests that the accreditation in itself did not have an effect on the nutritional quality of the food. The highly specific guidance to menu planning given in this study could be more effective than the general guidelines contained in the Accreditation Scheme. **Strengths** MR: Data analysis: t-tests & McNemar's test of paired proportions; PIT: age specifies nutritional guidelines; outcome evaluation: piloting of the evaluation tool to 5 centres & the menu checklist may be a useful tool to apply; overall outcome: improvement in nutritional food supplied to children in child care; 100% response rate – good generalisability MA: multiple component (involved policy development, discussed in other articles) MI: multi-strategic but uni-component PHCP: involved educating cooking staff and some parents **Limitations** MR: SES background of children not described; credibility- no theoretical paradigm discussed; potential observer bias with no detailed description of Project Workers objectivity (no intra inter-rater tests reported); possible Hawthorne effect (Centre provides more favourable reports than the reality); actual intake of target group not evaluated; power analysis & participation rate not discussed PIT: sustainability of the program not known, more research on the efficacy of this program is required PP: minimal parent participation

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2.	Start Right-Eat Right Award Scheme [91]	0-5 year old children Child care centres	Allied Health Professionals & Child Care staff	1. Primary, universal prevention 2. Descriptive study 3. To motivate and encourage Long Day Care Centres to provide: a food safe environment, a high level of nutrition & food standards, which involves providing at least 50% of the recommended daily dietary intake for children, and to ensure a supportive healthy eating environment 4. Education, policy development and psychosocial strategies were used, including: - Awards provided to LDC's when Co-ordinator, Cook and/or staff attended a nutrition training course - Dissemination of food safety competencies - Review of the menus and policies in the child care centre - A dietician assessed the centres preparation and provision of food, with awards given for 12 months 5. 12 months duration.	Description of centres participating in the award scheme Data analysis: descriptive statistics	**Findings** Increased number of child care centres participating in the award scheme – 40% of 330 eligible centres registered for the award within 2 years of the launch Positive feedback received from child care centres Perceived benefits (relating to centre, staff and child advantages) and barriers (finances, staff support during training sessions and staff support fro training long term) documented **Conclusions** The award scheme was an effective health promotion strategy **Strengths** MR: Paired t-tests and McNemar's test of paired proportions; underpinned by the Organisational Change Theory to implement strategies to support the adoption of nutrition awards that align with the national standards PIT: training and dissemination model described; positive process, impact & outcome evaluation; strong generalisability UI: addresses the upstream factors MA: single component PHCP: high level of PHCP involvement with incentives PF: addressed nutritional policy in Child Care Centres **Limitations** PP: no parental involvement

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3.	Moving with Young Children [291]	People who work in the childhood sector (early childhood) Child care centre	Allied Health Professionals, Child Care workers & Parents/Carers	1. Primary, universal prevention 2. Post test study design 3. To inspire and educate early childhood practitioners about the importance of physical activity of children and methods to incorporate activity into children's lives 4. The main strategy was to inform and educate phcp's using the following activities: - Workshops with health professionals conducted and topics include, incorporation of physical activity into the day, suitable equipment for young children, the development of physical skill, and increased awareness of special needs of some children - The development and dissemination of resources provided for childhood practitioners (booklet, video on developing movement skill proficiency in young children, and a statement of attendance) 5. 3 hour or 6 hour one-off workshop.	Not provided	**Findings** Not provided **Conclusions** Not provided **Strengths** PIT: high generalisability & transferability UI: high levels of sectoral and community involvement **Limitations** MR: formal evaluation not disseminated UI: sectoral and community involvement MA: single component focusing on physical activity with psychosocial approaches and recognition of attendance

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4.	Romp & Chomp [297]	0- 5 year old children (n=1200 children) Child care centres and wider community	Allied Health Professionals, Child Care workers & Parents/Carers	and information they need to care for the health of children 4. The overall strategies involve mass media, educational, psychosocial, environmental & policy development. The specific strategies proposed include: - Development of an action plan - Develop a strategic alliance with the Kids – Go For Your Life state-wide strategy - Establishment of strategic alliances with community partners - Implementation of a communication strategy to inform and support the community towards making healthy food and play choices - Collection of information at all stages of the project - Development of a consistent drinks policy across settings - Development of a consistent snack policy across settings - Providing healthy snack choice information to families - Development of an active play policy - Maximising staff training opportunities - Development of resources - Promotion for the regular use of BMI and Maternal and Child Health growth assessments 5. Varies according to activities	Measurement tool: setting-based audits, data collection using existing Maternal and Child Health data (ongoing) and questionnaires targeting M & CH parents over a 12 month period and, questionnaires targeting early childhood staff pre and post program. 2005	**Findings** Training not yet started, implementation phase during 2006 Progress report – May 2005 Focus group of mothers developed the title of the program Accessed maternal child health centre weight and height data for 2yr olds from 1998 through to 2004 Developed a number of questionnaires and survey tools Baseline assessment – July **Conclusions** No conclusion as yet **Strengths** (to date) MR: thorough baseline assessment; use of past programs aspects that enabled best practice; Diffusion of Innovations Theory underpins the intervention. UI: intersectoral collaboration, creating supportive environments, strengthening community action & developing personal skills. MA: multi component **Limitations** (to date) PP: low parent involvement with the provision of information

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5.	Tastebuds [298]	0- 5 year old children Child care centre	Dietician, parents and Child Care staff	1. Primary, universal prevention 2. Post-test 3. Develop & implement nutrition training & resources to centre-based and home-based child care services across the state of TAS. Also, mobilise changes to enable an assessment of the eligibility for the Start Right-Eat Right Award Scheme 4. Policy development along with educational strategies based on the Start Right – Eat Right Award. The activities involved: - Provision of training and resources to child care centres - Direct support given to individual child care centres and centres assessed for eligibility for the Award - Incentives provided to centres meeting the Award criteria 5. Not provided	Benchmarks set for impact and outcome evaluation	**Findings** Participants have reported increased confidence and knowledge when communicating with parents about food and nutrition issues 63% of centre-based services across the state had particpated in training; of those services 91% of all Family Day Care Centres attended; 32% reported that they had received the Start Right-Eat Right Award Scheme **Conclusions** Not provided **Strengths** MR: high generalisability and transferability (31% of state were involved), impact evaluation showed that 63% of all centre-based services across the state were involved in training, 32% received the Start Right-Eat Right Award Scheme, 91% of the FDC's participated in the training; increased knowledge & self efficacy in relation to nutrition UI: high levels of sectoral and community involvement. **Limitations** MR: study design and formal evaluation not disseminated, lack of detailed information made available. MA: single component focusing on physical activity with psychosocial approaches and recognition of attendance.

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6.	Crunch & Sip [299]	4-5 year old children Preschool	Allied Health Professionals, Preschool staff & parents	1. Primary, universal prevention 2. Post test 3. Increase consumption of fruit and vegetable 4. Mass media, educational, psychosocial and to some extent environmental strategies in place. Examples include: - Formal break to eat fruit and vegetables and drink water in the classroom - Teachers and parents encouraged to role model the eating of fruit and vegetables 5. Not applicable	Not currently available	**Findings** Anecdotal reports from teachers suggesting that children were happier, better behaved and learnt more on crunch & sip days **Conclusions** Not applicable, as intervention is still in progress **Strengths** MR: positive general feedback UI: addressing PHCP: preschool teachers encouraged to incorporate program into classroom PP: Parents supply fruit and vegetables and a bottle of plain water, and are encouraged to role model the eating of fruit and vegetables PF: universal , population focus **Limitations** MR: information not accessible to date PIT: still in progress, so unable to assess the impact MA: does not focus on physical activity

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7.	Food Facts for Preschoolers [300]	0 - 5 year old children (300 parents & 600 early childhood staff) Child care centres/Preschool	Dieticians & Child Care/ Preschool staff	1. Primary, universal prevention 2. Not provided 3. Improve the nutrition among 0-5 year olds across Victoria 4. Provision of nutrition training and information to preschool and child care staff as well as parents: disseminate nutrition resource information to 3000 early childhood services within VIC; nutrition training for staff; establishment of a steering committee; representation and state wide consultation, with the objective to increase the capacity of early childhood services to deliver consistent, relevant & up-to-date information on nutrition for children & their parents 5. Not provided	Not available	**Findings** Reported increased knowledge and positive changes to practice and policies **Conclusions** Not provided **Strengths** MR: large sample size (97% of children in VIC attend childhood services, general outcome showed success with meeting strategies UI: intersectoral involvement with University, Government Dept, Kindergartens & Dieticians PP: parents attended training sessions and also received resources **Limitations** MR: details of evaluation not available UI: high level of intersectoral involvement MA: single component focus on nutrition with psychosocial aspects

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8.	Planning nutritious long day care menus [287]	0- 5 year old children Child care centres	Allied Health Professionals, Child Care staff & Dieticians	1. Primary, universal prevention 2. Not described 3. Improve nutritional intake among children 0-5 years of age 4. Informational and educational strategies targeted at child care staff, including: - The development of a resource, e.g. a nutritional checklist to be used by cooks and other staff to assist in the development of child care menus. The checklist is for planning menus over two weeks and aims to meet half of the average 2 to 5 year old child's nutritional requirements when in care for 1 day. It assumes that 1 main meal and 2 snacks are provided and recommends the number of serves and quantity in a serve of each food group to include in the menu over the 2-week period. 5. The support materials (resource) vary in frequency and duration.	Feedback from 42 cooks, directors and child care workers from 28 LDC's who participated in the workshops over July and August in 2002	**Findings and Conclusions** 2001: evaluation consisted of self complete surveys disseminated to 127 centres (with a 30-50% response rate), and a further 23 centres randomly selected participated in telephone interviews. February, 2001, of the sample (n= 1758) 33% had requested for the resource, with 18% (of this group?) using some component of it. After the 6 months (post-launch), 12% of services had changed some aspect of their operation as a result of using the resource. 2002: Victoria and South Australian Child Care Centres were evaluated, the 'Relaxed and Social' resources was positive, but not specific. "The messages regarding healthy eating are being promoted via posters in the foyers, booklets in the homes and staff rooms, fact sheets in centre newsletters, parents observing practices in their centres, and via the children's day to day experiences." (2003 Evaluation report). 2003: 512 services were provided the 'Relaxed and Social' resource, with 30% of these services returning there evaluation (self-complete survey). From these responders, 75% (n=156) reported using the resource to some extent, with 60% intending to use the resource in the future. The most useful areas were: improving communications with parents about healthy eating, dealing with fussy eaters, motivating children to eat healthy food, and information about eating fruit and vegetables, and dairy foods. **Strengths** MR: Evaluation of the resources was conducted across Victoria and South Australia. UI: Aims to develop personal skills and increase awareness of nutritional needs of children with a positive holistic approach, especially with the 'Relaxed and Social' resources. **Limitations** MR:the evaluation is not clearly presented with general outcomes and the centres self reporting the changes they made to service operation. MA: single component, not involving activity needs

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9.	Talking with families about nutrition [301]	Early childhood staff and parents of 0-5 year old children Child care centres	Community Dieticians and/or Nutritionists	1. Primary, universal prevention 2. Pre & post test from 2000 to 2003 3. The main focus of the project is free training offered to early childhood staff state-wide to update information on nutrition issues and also explore ways to talk about these with families. The objectives including: a) To increase the capacity of health, child care and preschool sectors to work collaboratively to promote improved nutrition b) To increase awareness and confidence of early childhood staff to include discussion on nutrition with individual children's families c) To increase the capacity of the health sector to provide relevant nutrition training. 4. Informational and educational strategies, the activities include: - A 3 hour training session to childhood staff, delivered in two parts: how to establish and maintain relationships with families, and general nutrition information - The *Sharing a Picture of Children's Development: communication framework in child care services* resource was used throughout the program. This resource was used to support staff and parents to work in partnership and communicate effectively about child health and development on an informal day-to-day basis. It sets out a - A communication plan for each family - individual folder for each child - Provides guidance on how to carry out parent-staff interviews - Provides links between child care service and primary health care services 5. 3 hour workshop for staff working in child care centres, which has been implemented from 2001 to 2003	Staff feedback surveys	Findings Changes made as a result of the training: Inviting parents to join in cooking experiences Running short information sessions on a range of nutrition topics Children being referred to local dieticians or nutritionists Evaluating menu planning and nutrition policies Setting up displays promoting healthy eating Conclusions Many staff felt more comfortable and confident in sharing and discussing nutrition issues with families. Strengths PIT: The framework used for the project has been piloted and evaluated elsewhere and has been widely disseminated. It also includes the component of linking to primary health care providers. PHCP: the workshop was at no cost for attendees and demonstrated the ability to increase the self-efficacy among the PHCP's to effectively deal with this issue, it also provided simple guidance on how to address the issue sensitively, and; it includes a component on how to develop links with other PHCP's Limitations MA: does not include a physical activity component

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10.	Healthy Food Choices Family Day Care [302, 303]	0- 5 year old children Family Day Care Management, 80 Fieldworkers 1300 Care Providers and the 16,000 children and their families who use FDC. Child care centres	Nutritionists, Child care staff	1. Primary, universal prevention 2. Pre & post test from 2000 to 2003 3. To increase the confidence and capacity of care providers to provide healthy nutrition to children whilst in their care. 4. The main strategies included: - 18mths consulting, including focus groups and piloting of activities - Training of fieldworkers to facilitate targeted care providers and each scheme launched their local policy. - Resources were provided and were used to help create supportive environments 5. Not provided	Evaluated by the South Australian Community Health Research Unit (SACHRU) Pre and post project surveys of around 300 family day care providers and 100 fieldworkers	**Findings** Increased awareness and knowledge about healthy eating in the Family Day care setting Increased confidence and skills in promoting healthy food choices to parents and children The Food policy will be embedded within Family Day Care and will help support the implementation of a DEC(?) food policy. **Conclusions** Success was due to a solid partnership and commitment, actioning all the principles of the Ottawa Charter and ensuring everyone is involved and informed. **Strengths** MR: extensive pre and post evaluation to a large sample; developed on the OTTAWA Charter UI: strong upstream investment with the development of a food policy MA: did not address the physical activity needs required to enable children in care to meet recommendations **Limitations** PP: Unclear as to the extent of the parents involvement

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11.	Sharing a picture of children's development [304]	0-5 year old children Child care centres	Multi-professional	1. Primary universal prevention 2. Not a study 3. Informational and educational strategies which included: - Dissemination of the resource to all child care centres aimed to improve communication between PHCP's and parents. - The resource focused on communication strategies and is designed to facilitate the use of other resources by child care staff 5. Varies according to the extent the recipient uses the resource	A resource, therefore, assessment of the efficacy of the resource not reported	**Findings** Not available **Conclusions** Not available **Strengths** PIT: pulls together existing practice into a framework; focuses on quality of communication by developing trust and being sensitive to others; presents detailed communication strategies to improve communication between PHCP's (e.g. sample action plans, letters to parents; and questionnaires); the communication strategy has now been adopted in South Australia and incorporated into other programs **Limitations** MR: Low response rate 30-50% from the written surveys delivered to Child Care Centres

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12.	Caring for Children [305]	Children aged 0-5 years attending childcare Child care centres	Childcare staff and parents	1. Primary universal prevention 2. Not a study 3. Resource aimed to provide simple, accurate information age-specific nutrition information and activities 4. The resource incorporated a wide variety of informational, educational and psychosocial strategies presented in three main sections. It included: - Recommendations on how to deliver healthy food choices and improving menu's - Extensive information about nutrition for young children - Recommendations and ideas on how to prepare nutritious food - Development of nutrition policies - Strategies for communicating with parents, and activities to promote healthy eating among children, e.g. provision of newsletters and fact sheets to guide parents on issues relating to nutrition, recipes and lunchbox checklists. In addition, parents have been invited to workshops and excursion, and samples of healthy foods prepared by children at the child care centres have been sent home. - Examples of activities that can increase the awareness of healthy food needs and developing healthy food habits 5. Varies according to the extent the recipient uses the resource	A resource, therefore, the formal assessment of the efficacy of the resource has not evaluated	**Findings** Not applicable **Conclusions** Not applicable **Strengths** PIT: If used, the information provided is up-to-date, easy to read and very suitable PHCP: provides staff with practical information and ideas on how to involve parents **Limitations** MA: focus is chiefly on nutritional needs

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13.	The Karuah Family Nutrition and School Access Project [306]	Mothers of infants (with Indigenous background) Child Care centres & Preschool	Allied Health Professionals, Mothers	1. Primary selective prevention (rural, Indigenous groups) 2. Not provided 3. To improve the nutrition status of aboriginal families and to increase the attendance levels among children living in Karuah (developed from the Hunter Aboriginal Nutrition Project) 4. Education, psychosocial & environmental strategies: - Cooking skills program focusing on healthy after school snacks, parent - Workshops on healthy eating and food choice - A breakfast program incorporated into the school - Modifying food supply in food store to enable cultural healthy alternatives - Smart food budgeting program - Up skilling the Aboriginal health worker - Sessions to promote breastfeeding - Develop a resource to promote breastfeeding, nutrition and oral health 5. Not available	Not available	**Findings** Not available **Conclusions** Not available **Strengths** PP: parental involvement UI: one of the few programs that changes availability of food supply to create a supportive environment, also involved budgeting for healthy foods, and intersectoral involvement with the school by promoting an incentive to attend school MA: diet with psychosocial, environmental strategies **Limitations** MR: no information on evaluation available

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14.	Afternoon with My GP [307]	1-9 year old children & their parents/carers attending routine consultation at their GP N= 220 (62% 1-4 year, 38% 5-9 years of age) Clinical	GPs	1. Primary & secondary universal prevention 2. Clinical Audit Cycle Project design (adapted from RAGCP based on a cycle of continuous improvement) 3. Clarifies role of the GP in preventing & treating childhood obesity, assist to identify barriers & formulate realistic solutions to overcome challenges; the long term goal is to reduce the prevalence of childhood obesity 4. The primary prevention strategies include: - Delivery of health information to groups of approximately 10 to 20 patients in a non-threatening and familiar venue. The topic is determined according to patient needs and appropriate guest speakers are invited to attend The secondary prevention strategies include: - Regular screening of children by GPs during health visits 5. 1 x 1 hour session (not clear if target group attended more than once)	Patient and GP report questionnaires; recording of attendees; action and reflection form for impact; and outcome evaluation based on the GPs self-reported behaviour change when dealing with childhood obesity cases	**Findings** Benefits suggested including for the GP: Cost effective delivery of information, patients often return t clarify information, gives insight into patient needs and knowledge, builds relationships. For patients: Opportunity to interact with other patients, receive quality health education and opportunity to interact with presenters during afternoon tea **Conclusions** Highlighted the value of empowering the role of GPs to contribute to the prevention of obesity among children and increase opportunistic screening **Strengths** MR:based on the diffusion of innovation theory PIT: education based on target groups needs from formative (questionnaire), process (parent questionnaire, clinical audit kit, multiple recruitment methods recorded), impact (action & reflection form), and outcome evaluation based on the GPs behaviour was carried out resulting in conclusion that the program was cost effective and particpants felt that the health issues were addressed PHCP: provided the GPs' with better insight into patient needs and knowledge, & relationship of trust was enhanced; target group reported that it gave opportunity to interact with GP and other patients & they felt they received quality health education PP: parents are the active participants in the program **Limitations** MR: No systematic (with) control group) evaluation of the effectiveness of the program; no outcome evaluation of target groups weight status or behaviour due to patient confidentiality, financial and time constraints PIT: difficulties with recruitment of target group (especially from at risk groups)

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15.	Live Eat and Play [308]	5-9 year old children (n= 163 overweight/obese children) Clinical	GPs	1. Secondary, selective prevention (overweight and obese children) 2. Randomized controlled trial (RCT) 3. To test the feasibility for GPs to recruit and deliver a 12 week solution-focused behaviour change consultations to overweight or obese children aged 5-9 years and their family. 4. The RCT compares a physical activity Ix, nutrition Ix and a combination of the physical activity and the nutrition Ixs. - The physical activity strategy- weekly 2-hour session with a range of activities for 10 weeks and weeks 11 to 26 involve parents identifying barriers and setting short term goals. - The nutrition strategy- weeks 1 to 10 empower parents to make lifestyle changes to meet family needs and in weeks 11 to 26, parents identify barriers and implement changes. Aims to decrease restrictive eating and the negative feelings with the diet approach 5. 2 hour sessions (with two groups focusing on different strategies) over ten weeks	For the child and their family: BMI at 6 and 12 months after the initial consultation also Anthropometric measures of the child "Child health-related quality of life; behaviour, self-esteem and family activities, parental concern regarding child's weight and readiness to change; child physical activity and sedentary behaviour, child and family nutrition and relationship with GP" (p.490). GP: reporting of the demographics the practice deals with; the GP's practice and attitude relating to the management overweight and obesity among children, and feedback relating to the study	**Findings and Conclusions** To date, the trial demonstrated families are keen to address this issue using GPs as their primary health care provider. GPs felt more confident in dealing with, and achieving outcomes for childhood obesity after the education sessions that equipping them to use solution-focused therapy. There is still further analysis of the results from the trial to be reported. **Strengths** MR: strong study design PIT: promising results at 6 and 12 months follow-ups; intending to conduct a cost analysis and test the applicability to a larger sample group of GPs PHCP: engaged GPs in the education sessions; provides evidence-based direction for GPs, particularly within an Australian context PP: The involvement of parents was a major part of the program with home activities that encourage parent support and participation **Limitations** Efficacy and cost-effectiveness of the trial is still to be reported

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16.	Treating your Tot to Terrific Tucker [309]	Mothers with 0-5 year olds from a small rural community (Tumut) Community	Community Nurses and 'natural helpers'	1. Primary, selective prevention 2. Quasi-experimental pre-test post-test comparison with no control group 3. To increase the duration of breast feeding within the first 3 months, ensure appropriate introduction of solids and increase awareness of food habit development 4. Psychosocial and educational and media strategies included: - Group workshops with 10 participants and with 4 to 6 participants if women were from complex social backgrounds or ATSI, this gave an opportunity for attendees to liaise with experts, information and hands on cooking activity - The intervention later evolved to provide workshops for hospital nursing staff - The program was promoted using media sources (TV, radio, newspaper), and posters were displayed in selected public places to gain support and awareness among the wider community 5. A 3 year project, the workshops were one off 4 hour sessions	Surveys and face to face interviews of the general community – psychometric properties no described, assessment not repeated at post-test. Rather pre-test assessment used to assess need for the interventions For hospital nursing staff – Breastfeeding Attitude Score, psychometric properties no described	**Findings** No post-test for natural helper workshops except some positive comments Some improvement in the hospital nursing staff attitude to breast feeding Anecdotal evidence of increased awareness of the issue among other sectors of the community. The group sessions with the gatekeeper gave participants non-threatening access to health professionals which was particularly appreciated by the ATSI community which prefers a personal introduction before accessing formal health organisations some improvement in hospital nursing staff attitude to breast feeding **Conclusions** The awareness of the community on the benefits of breast feeding and healthy food choices was raised, many women were reached through the gatekeeper model and some improvement in health worker attitudes was obtained Training/implementation model Gatekeeper model Dissemination model Not discussed but the intervention evolving to influence a broader range of people in the community **Strengths** MA: multiple components with a simple message UI: attempts to involve the wider community and government bodies about the issue PP: members of the community who were supporters of new parents rather than parents were targeted – therefore, no specific strategies for parents PHCP: community Nurses and 'natural helpers' (women from special needs playgroups) were well supported and provided skills and opportunities to attend reunions (although there was poor turn out due to various barriers) PF: addressed many of the levels of the community and the OTTAWA Charter principles **Limitations** MR: Weak study design and limited evaluation PIT: no post-test for natural helper workshops except some positive comments; significant difficulty with evaluating the outcomes from the workshops with Nurses working out in the community; some improvement in the hospital nursing staff attitude to breast feeding; reported that 3 years of implementation was not long enough to initiate and sustain cultural change within the community; cost effectiveness not discussed

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17.	Shop Smart for Home-Start [310]	0-5 year old children from low income families attending the agency (total no. not provided) Community	Dieticians and voluntary staff	1. Primary, universal prevention (low SES backgrounds) 2. Opportunistic 3. Not provided 4. Educational and psychosocial strategies included: - Dieticians train volunteers who then conduct a home visiting or small group session program comprising 4 sessions on nutrition and budgeting - Home visiting - A manual has been developed to support community agencies in their delivery of the program - Develop a cookbook of favourite family recipes 5. 4 x nutrition & food budgeting sessions, 12 month program	Not reported	**Findings and Conclusions** Program developed and adapted from the 'training the trainer model' (diffusion of innovation). Appears to be similar to the 'Foodcents' program but not as well designed **Strengths** MR: underpinned by the diffusion of innovation theory; captures opportunistic recruitment of at risk groups (less time intensive) **Limitations** MR: poor study design; no evaluation readily available, no measurement tool reported; unknown number of participants involved *Reliance on volunteers to visit families of children (0-5)

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18.	Filling the gap- what's there to eat?[311]	Parents of 0- 8 year old children Community	Allied Health Professionals, Dieticians, Preschool /Childcare staff, Teachers and parents	1. Primary, universal prevention 2. Pre & post-test study 3. Reduce the prevalence of childhood obesity within Victoria 4. Nine child nutrition information sheets that target parents and a practical guide and 'What's there to eat?', a nutrition resource manual for professionals working in the area of early childhood, maternal and child health nurses, preschool teachers and child care staff being targeted was developed. The resource contained background information, handouts for parents and age-appropriate activities for children. The kit: - Delivered a supportive framework with professional development and training guidelines - Provided links with local services were also fostered for continuing support and services - Disseminated professional development updates also provided 5. Not applicable (dissemination of resources for the community to act upon)	The evaluation from the reported most useful parts of the kit resulted in tailoring the most frequently used sections	**Findings** Not available **Conclusions** Not available **Strengths** PIT: Useful information for professional development; the kit addressed the most common concern reported by mother's of toddler's, which was fussy eating PHCP: aims to involve and up-skill primary health care providers and parents **Limitations** PIT: Unable to accurately test the outcome from the intervention

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19.	The Coorong Good Food Program [312]	0-12 year old children Community	Nutritionists	1. Primary, universal (and selective) prevention 2. Post test study design (not clear) 3. To improve the supply and consumption of 'good food' in the Coorong District Council area and, to increase local govt and community involvement in nutrition improvement and foster linkages to a wide range of community organisations to encourage collaborative action in nutrition related issues. The activities included: 4. Educational, psychosocial and environmental strategies across various settings: - Food retail outlet accreditation scheme - Activities to encourage good food for kids - Promotion of locally produced healthy foods through events and media - Recognition awards program for schools establishing edible gardens - Development of a Food Co-op and community kitchen 5. Two year implementation phase (2001-03) with different times for various strategy activities	Reported on the activities initiated and the participation rate	**Findings** 140 members of the Food Co-op, which operates 2 days per week, and 30 local agencies refer people to it. From the needs assessment conducted at the end of 2001, the community kitchen was launched, which enabled people to develop healthy cooking skills and to establish social networks. **Conclusions** Impact reports also commented on the lack of space where the community kitchen took place. In reflection, the report discussed the importance of the volunteer assistance for the success of the program, and their help should be reciprocated where possible. **Strengths** PIT: impact and to some extent outcome evaluation reported UI: involvement from food suppliers MA: multiple settings and strategies PP: some involvement, but not clearly reported PHCP: unclear of details but seems to include referrals and participation of some kind PF: all level of the OTTAWA Charter were achieved **Limitations** MR: study design not clearly described PIT: not generalisable to all Australians; not able to report on the actual behaviour change PP: not sure whether empowerment for individual action among parents was achieved PHCP: not clearly described

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20.	Lifestyle Triple P [313]	Parents and children aged 5 to 10 years who are overweight or obese Clinical/Community (E.g. community healthcare facilities, hospitals and schools)	Multi-professional (family doctors, paediatricians, community nurses, dieticians, psychologists and teachers)	1. Type of prevention 2. Study design 3. Goals 4. Strategies 5. Frequency & duration 1. Primary and secondary, selective prevention 2. RCT (in progress) 3. Two main goals include: - Prevent chronic weight problems by improving children's nutritional intake and activity levels. - Increase parenting skills and confidence in managing children's eating, exercise and general behaviour. 4. Behavioural, educational, psychosocial and media strategies used based on the Triple P-Positive Parenting Program tailored to focus on nutrition and physical activity. The activities involve: - 9 x Parent training sessions (in groups of 8-10 parents). Activities include: weekly goal setting for parents to make realistic, long term changes in the household. Other activities during the sessions involve role-play activities to practise parenting skills. - 3 x individual telephone counselling consultations with parents - Parent workbook disseminated relating to information discussed in the sessions and additional home-based activities 5. A 12-week program consists of 9 x 90-minute parent training sessions (groups of 8-10 parents) and three 15- to 30-minute individual telephone consultations.	Assessments have been collected at six and 12months to evaluate impact and outcome of the program. Participation rates of the parent sessions, completion of a questionnaire booklet, also examining the extent parents monitored their child's food intake and activity levels. Dependent variables include clinical status, child adjustment, child food consumption and activity levels, parenting practices, relationship satisfaction and parental adjustment.	**Findings** Not yet available **Strengths:** MR: strong study design PIT: extensive plans for evaluation of the impact from the program MA: a holistic approach to address the issue with strong grounding from the previous Triple P Programs PHCP: high level of involvement PP: key target group for the intervention **Limitations:** Results not yet available

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21.	Growing Families Project [314]	Parents of children (all ages) Community	Dieticians and parents	1. Primary, universal prevention 2. Pre and post study design (2 years) 3. To support other projects in Tasmania to increase opportunities for families to access practical food and nutrition information, physical activity and social opportunities within the Launceston Northern Suburbs-East Tamar region 4. Capacity building, educational and psychosocial strategies. During first 6 months plan is to: - Offer food and nutrition training to the northern suburbs work places who deal with young children and their families. - Supports existing projects, e.g. the CHAT'n'play, Pramwalking Groups, and the successful state-wide Family Food Patch Program (which has been formally evaluated, with 100 parents were trained to be peer educators) 5. Different frequency and duration for various strategies	Unable to conduct formal evaluation due to limited funding.	**Findings and Conclusions** 15 Pram walking groups around the State, which produced an unexpected outcome of more positive attitudes to exercise by the children involved. **Strengths** MR: not conducted but the other programs have been formally evaluated, with promising outcomes PP: parents are active participants and facilitate uptake of the program to other parents PF: supports other projects that address all action areas identified in the OTTAWA Charter **Limitations** MR: no formal evaluation as yet PIT: Not clear as to the extent that this program supports others in the state

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22.	Parental Guidance Recommended [315]	2- 12 year old children and their parents/carers Community	Child Health Nurses, Dieticians, Child Care staff, parents and volunteers	1. Primary, universal prevention 2. Pre and post test 3. Improve and promote the consumption of vegetables, fruits, breads and cereals to WA children 2-12 years of age 4. Educational & psychosocial strategies: - Free workshops for all people involved with children - Training of educators to deliver the PGR program, which are then delivered in a variety of community settings - Topics cover: management of fussy eating, healthy eating, how to change eating and physical activity habits, how to stretch the food dollar further, and the preparation of quick healthy meals involving children 5. One off workshops, however, volunteers can be involved on a long term basis	To date, the number of volunteers involved and number of workshops presented have been reported.	**Findings and Conclusions** No evaluation report as yet **Strengths** MR: large target group involving different stakeholders, based on the Diffusion of Innovation Theory MA: strengthening of community action, which may influence change of upstream factors, information and order forms for the resources available on their website PP: specific information for parents, promotion of parents being involved in advocacy related to health (development of advocacy video and action groups); promotion for being a volunteer speaker; workshop involvement appears interactive and adaptable for different situations; there is no cost for attending the workshop **Limitations** MR: N/A as currently not available UI: limited upstream factors directly addressed PP: long term intervention not apparent except for volunteer speakers and action groups under development

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23.	Quick Meals for Kooris [316, 317]	Parents of children (all ages) Community	Health Workers, community leaders and parents	1. Primary, selective prevention (Indigenous) 2. Post test study design 3. Improve healthy cooking skills using the pre-piloted program as a Train-the-trainer kit resource 4. Educational & psychosocial strategies which included: - A practical program that enabled food skills to be learnt in an informal environment using healthy food on a budget. It consisted of a 2 x 3-hour sessions beginning with a demonstration, cooking a meal and then eating it together. The first session was on family meals and the second on feeding children and filling teenagers. Throughout the sessions discussion was encouraged to develop an interactive atmosphere, thus building relationships within the groups. 5. The frequency and duration of the workshop varied according to the group, however, the resource proposed 2x 3 hour sessions	Telephone survey to assess the impact of the strategies to disseminate the information about QM4K, also to evaluate the extent the organisations used the resource	**Findings and Conclusions** Some positive feedback described in regards to the casual atmosphere and opportunity for community members to come together and have fun learning about nutrition. **Strengths** PIT: piloted the program in 1999 with promising results; conducted process and impact evaluation; can be adaptable and possibly integrated as part of another intervention; addresses a population at need UI: attempted to address upstream factors MA: addressed needs at family level and aimed to initiate capacity building within the community **Limitations** PIT: relatively low uptake of the resources due to time and other priorities within the communities

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24.	Family Food Patch [318]	Young children (age not specified) Community	Dieticians & parent volunteers	1. Primary, universal prevention 2. Pre & post test study design 3. To increase the child nutrition knowledge and skills of key community members in Tasmania, specifically parents attending the meetings/sessions facilitated by Family Food Educators 4. Educational & psychosocial strategies involving: - Consultation regarding nutrition and topics for the sessions - Formulation of a recruitment strategy of Family Food Educators - Development of a training program - Training implementation and evaluation - Coordination of community requests - Family food educators to facilitate nutrition sessions in their community and fieldwork supervision of Family Food Educators when necessary - Establishment of commitments from organisations at the end of the project to provide a supportive network - The sessions aim to develop confidence, knowledge and develop practical food activities 5. A 20 hour course in nutrition to become a volunteer community educator, and from there parent volunteers become involved based on their own availability	Records of number of Family Food Educators and numbers of attendance to the workshops	**Findings** 98 Family Food Educators trained Reached 1732 parents individually Reached 3773 parents in 272 groups **Conclusions** Limited description of evaluation but good program reach and Food Educators participated in many community events **Strengths** MR: peer educator model used PP: high level of parental involvement with parents as peer educators, thus developing a stronger advocacy direction at a local level **Limitations** MR: outcome of behaviour change with parents of children from 0-5 not available PIT: risk of program messages being diluted or even misrepresented, and need to continually recruit, train, and motivate parent volunteers UI: solely doe not address upstream factors, but is a part of the Growing Families Project PP: does not discuss the generalisability of the parents that became involved

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25.	Be Active, Eat Well: Making it Easy (BAEW)[319]	2-12 year old children & their parents Community	Multidisciplinary (Dieticians, GPs and parents/caregivers)	1. Primary, universal prevention 2. Pre & post study design 3. To increase physical activity and improve nutrition among children in Colac 4. Social marketing, advocacy building, educational, psychosocial and to some extent environmental strategies: - Walking school bus program - After school activity program - School Nutrition Network supported by Dieticians to promote healthy eating in schools –$500 grants - *Happy Healthy Families,* a six week course for parents being piloted for parents and carers of 2-12 year olds. 5. This is a 3 year project with different times according to the activities; the course for parents is a 6 week course	Steering committees, focus groups, and baseline data collection (by Deakin University) were conducted for the formative stages Training/implementation model: ANGELO workshop process	**Findings** Process evaluation: identified 27.5% of 1001 children as overweight or obese; 17% of parents were concerned with their child's weight; on average there were 3.1 serves of 'junk fod' per lunchbox; 37% of families have no rules regarding time spent watching TV; parents of school-aged children in this project were informed of their child's BMI and given a category of under/healthy weight, overweight or obese. * Parents who were told that their child was obese often did not believe this information and were extremely angry and anxious. Impact: 93% of parents had heard of BAEW; 68.2% were reducing sweet drinks to their children; 67.9% were involved in the ASAP; 57.1% of parents had reported changing their children lunches with healthier foods Outcome evaluation: in progress **Conclusions** The views and concepts of parents and general sensitivity to the issues surrounding the concept of obesity are important to consider during any interventions in the area of obesity, as it was a considerable setback to the project and is an important lesson. Using a multi-strategic, comprehensive approach, they are examining the possibilities to extend the project state-wide **Strengths** MR: baseline data collection, formative, process and currently impact and outcome evaluation being conducted; timeline for project of a 3 year duration; use of the social learning theory, high credibility with intersectoral collaboration from Deakin University, Dept. of Health, Health facilities and the Colac shire; relatively high generalisability MA: multiple settings and multiple strategies PP: relatively high involvement at all phases of the project PF: intersectoral collaboration with key stakeholders, in particular with the community shire **Limitations** PIT: the focus of strategies seem to focus more on primary school children; relied on self-reporting from parents (Hawthorne effect); no data analysis provided to date PHCP: the level of involvement from other PHCP was not clear

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26.	Australian-Greeks Against Childhood Obesity Project [320]	0 -14 year old children & their parents Community	Health Workers and parents	1. Primary, universal prevention 2. Not provided 3. Reduce the prevalence of childhood obesity among the Greek community in Victoria 4. Education & psychosocial strategies involving: - Provision of linguistically appropriate prevention information - Interactive community workshops, raising awareness of childhood obesity - Incorporation of obesity prevention activities into Greek Grandparents week 5. Not provided as yet	Not available	**Findings and Conclusions** No findings to date **Strengths** PIT: appears to be addressing the health issue in a culturally appropriate way and involving the family MA: promotes a holistic health promotion message PP: seems to promote the messages to the extended family that may be influential to young children, i.e. grandparents **Limitations** PIT: No details of the evaluation of the program available to date

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27.	Give Me Five [321]	0-12 year old children and their parents/carers with low SES backgrounds Community	Allied health workers and parents (not clear)	1. Primary and secondary, selective prevention (low SES and cultural minority groups) 2. Not provided- probably pre & post test 3. The program aims to promote nutrition, physical fitness, personal and dental hygiene and weight management for parents or children 0-12 years of age from low SES backgrounds 4. Educational & psychosocial strategies comprises of the following activities: - Development of a training model to up-skill educators to carry out the workshops. This involved a manual and kit - Weekly children's groups at a Community Centre with cooking, games and outdoor (it links the 5 fingers with the 5 food groups and play based on the 5 food groups) - Fortnightly parents groups about family nutrition - One-off nutrition sessions provided to local preschools, schools and community based organisations 5. A three year program involving a variety of activities, thus different intensity levels mentioned above	Not provided	**Findings and Conclusions** The program aided in the development of trust, respect and commitment from parents and other community members. Strengths MR: attending to high risk group PIT: the program was awarded a 'Vitality award for excellence in Health Promotion in the non-health sector' at the 2003 Health Promotion Awards. MA: promoted healthy nutrition, physical activity, dental hygiene, personal development and increasing social capital; the program has been incorporated into the *Growing Gorgeous Smiles* project. Limitations MR: details not available; no behaviour change reported UI: lack of upstream factors being addressed PP & PHCP: information and some interactive education only PF: addresses only family level

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28.	Growth Assessment and Action Program (GAA)[322] *Note.* This program aims to address primarily malnutrition; however, this type of program could also address obesity-related issues.	0- 5 year old children & their parents Community	Aboriginal Health Workers	1. Primary, selective prevention (Indigenous) 2. Not a study 3. The main strategies include: - Monitoring of height and weight of children with information and education when required - A protocol in place to identify and then provide support to children who are not growing well, e.g., supply high chairs and lockable tucker boxes - The provision of information to communities on the nutritional status of their children in a pictorial format and then support community initiatives resulting from this feedback 5. Frequency and duration varies according to individual situation	Twice a year anthropometric data on children from each community is presented in a pictorial format	**Findings and Conclusions** General evaluation: increase in the number of health checks **Strengths** MR: the style of presenting the information seems to be culturally appropriate PIT: attempts to address growth and weight issues earlier and monitors the health of children more closely, which inturn may provide attention for more action in this area from policy makers The program attends to high risk group and aims to deliver information in pictorial formats to show the community the general health issues occurring MA: appears to tackle all related health issues affecting the growth development of young children PHCP: involves primary health care providers in the local area PP: involves parents and carers when necessary **Limitations** MR: evaluation outcomes not available PIT: the extent of the support to community members is unclear

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29.	Strengthening Families in the Ngaanyatjarra Lands Project [323]	0-6 year old children & their parents Community	Aboriginal Health Workers and parents (not clear)	1. Primary, selective prevention (Indigenous) 2. Post study design 3. This initiative aimed to improve the nutrition of preschool children, provide a supportive environment to promote general development, and increase parenting skills. 4. Strategies comprised of four action areas across various setting (incl. the bush): - Setting up and supporting playgroups (developing social capital) - Using the Growth Assessment and Action Program (monitoring children's health) - Working with food stores to provide more nutritional foods (improve accessibility and affordability for healthy food) - The provision of support and education as part of the *Keeping Women Strong* project (empower the primary carers of children) - teaches young girls and women about their bodies, healthy lifestyle, nutrition, pregnancy and looking after children. This strategy used teaching resources from the health clinics together with traditional storytelling, dance and singing. 5. Varies according to activities, the specific details of the activities were not available	General feedback - details not available	**Findings** Perceptions that the community has responded positively, and the bush was most effective setting for the sessions **Conclusions** The report concluded that due community development and capacity building being difficult to measure and the people do not understand the value it can provide, these projects can be overturned. Consequently, health workers and those working with them need to be educated to understand it so they are motivated to continue their efforts. In addition, it was concluded that what may be a priority from the health workers perspective may not be for the community. **Strengths** PIT: qualitative evaluation reports that the women were in support of the project; appeared to initiate the provision of healthy food within local stores PP: the program targeted the main care providers of young children, providing an opportunity for the women to unite and learn in the sessions using culturally appropriate activities. **Limitations** PIT: No clear measurable outcomes relating to actual behaviour change available

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30.	Keeping Kids healthy Makes a Better World [324]	0-5 year old children & their parents Community	Aboriginal Health Workers	1. Primary, selective prevention (Indigenous) 2. Pre and post test 3. To improve healthy eating and address risk factors among Indigenous children aged 0-5 years across four remote communities in central Australia. 4. The intervention was directed at all families in the community, the child care centre was involved, local nutrition workers were employed and local participation was important to shift ownership of projects to the community to ensure sustainability. Strategies included: - Supporting communities to provide healthy lunches or dinners - Establishing community gardens - Cooking demonstrations to promote healthy foods - Information days and workshops - Elders educating young people about health skills 5. Not available	Quantitative data was not reported due to confidentiality; nevertheless, general changes in community were observed and reported. For example - knowledge and awareness of nutrition within the community reported to be improved by community members. The program initiated the establishment of new facilities (a child care centre), community gardens. In addition, activities were conducted, consisting of workshops and demonstrations, information days, storytelling, creation of a cookbook, and modification of food stock in stores.	**Findings** Increased discussion by community members with other organisations (other than GPs and nurses) regarding nutrition for their children. Increased awareness, knowledge and enthusiasm to improve nutrition for children from adults Improvement of food supplies Enhanced skills to provide nutritious meals for children Increased collaboration among community groups **Conclusions** This programs highlights the value of collaborating with other organisations, and the necessity to be flexible in regards to the design and implementation of similar types of programs in this context. The projects were most fruitful when there was time to get to know the community and the local groups and grassroots organisations were given the capacity to be involved, which develops into a sense of ownership of the program. Developing and connecting with the Indigenous culture, and tailoring the approach to the community's expressed needs was also reported to facilitate improvements. **Strengths** PIT: qualitatively there appeared to be improvements within the community without any harm; inclusion of low risk and high risk families aided to minimise feelings of shame and focused on the protective factors opposed to the 'risk' factors. UI: development of food store policy MA: there was a focus on overall wellbeing and a range of components involved according the community's need PP and PHCP: involvement and promotion towards developing ownership of the projects PF: addressed most action areas in the OTTAWA Charter **Limitations** PIT: unable to collect quantitative data due to confidentiality, even the identification of numbers would disclose individuals due to the small numbers within the community MA: unable to verify the extent the areas were carried out PP & PHCP: details of the frequency and duration

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31.	Fit WIC [325] (USA)	Parents of 0-5 year old children from low SES backgrounds (70% Hispanic; 30% a mixture of other diverse ethnic and racial backgrounds) 1.3 million people at 650 sites across the state throughout 2002 Child care centre and community	Nutritionists, Nutrition Assistants	1. Primary, selective prevention (high risk communities) 2. Quasi-experimental pre-test post-test comparison study 3. To identify new techniques to prevent overweight in young children 4. Strategies to strengthen knowledge and skills and educate providers as part of a larger Ix: - Handouts for parents - WIC parent classes on nutrition and physical activity and facilitated discussions - Educating providers involved staff wellness activities and training, community education to promote overlap of messages 5. Over one year group meetings were held every 2 months and an individual meeting with a nutritionist at 6 month intervals.	Parent-report questionnaire of child behaviours (relating to the 6 key messages) during the previous 24 hours or 7 days with items adapted for use with preschool children from an existing child and adolescent questionnaire based on the Social Cognitive Theory. The frequency of most behaviours was measured on a 5-point scale. Psychometric properties were not presented.	**Findings** Based on the pre and post intervention evaluation the intervention parent group showed significant improvements in two particular behaviours: frequency of offering water to their child and increased frequency of being actively involved in physical activity with their child. Also, the intervention parent group were significantly more likely than the comparison group to report seeing WIC staff engaging in healthy behaviours and were more likely to use community activity centres. Other indicators (health behaviours) measured were not significantly different. 65% of the intervention and 43% of the control group completed the study **Conclusions** The intervention strategy simultaneously improved a food-related behaviour and a physical activity behaviour and this is relevant to the multi-dimensional causes of obesity **Strengths** MR: use of control group; based on the self-efficacy and social cognitive theory ; generally a promising intervention with changes in some behaviours relevant to the development of obesity MA: multiple component PF: aimed to develop personal skills and strengthen community action **Limitations** MR: no power analysis; no randomisation of control group; potential selection and information bias; high attrition rate and relatively small sample size, the study did not have longitudinal follow-up and BMI as and outcome was not measured; validity of outcome measure not known PIT: may not be generalisable to Australian populations; seemed to be culturally appropriate for the Hispanic population; cultural differences in response to the intervention need to be further examined; intervention may be time intensive; training/implementation model & dissemination model were not discussed in detail; educational materials were cost effective, whereas the staff time needed for contacting community partners, educating staff on appropriate use of the educational materials and mentoring them to participate in appropriate role modelling behaviours was described as costly UI: although there was examination of local and legislative policies related to the social and physical environment, no significant strategies accomplished at this level

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				2. Study design 3. Goals 4. Strategies 5. Frequency & duration		Strengths and Limitations MR: Methodological rigour PIT: Program Impact & Transferability UI: Upstream involvement MA: Multidimensional approach PP: Parental Participation PHCP: Primary Health Care Participation PF: Population Focus
32.	Healthy Start: Healthy Start Program [293, 326] (USA)	3 - 5 year old children (N= 827, average age of 3.6 years; low SES, mix of non-Latino black, Latino, non-Latino white, Asian and other ethnicities; 6 intervention centres and 3 control centres) Preschool	Preschool Teachers	1. Primary & secondary prevention (low SES & ethnic backgrounds at higher risk of obesity) 2.Quasi-experimental pre-test post-test comparison study. Three centres that could not modify their food service operations were allocated to the control group and received standard health education plus standard health education plus safety education. The other 6 centres were randomised to determine allocation to receive either food service modification and health education including nutrition education or food service modification and standard health education plus safety education. 3. To reduce saturated fat content in preschool meals and reduce consumption of saturated fat. 4. Strategy activities involved: - Menu assessed and modified at each centre - Training of preschool teachers - An orientation session for parents - Take home activities and newsletters - The control group received standard health and safety curriculum (materials include: songs, poems, story & activities 5. Lessons of (45minutes duration) taught 3 times per week for 30 weeks, outcome evaluation conducted 2 years post-intervention.	Dietary intake assessment adapted from previous validated assessments – total dietary intake for the day obtained by direct observation of meals and snacks at the centres and telephone contact with primary caregivers to determine intake at meals outside of the centres; analysis of menus for nutrient content. Blood cholesterol and anthropometric data of the children were also collected.	**Findings** Consumption of saturated fat from school meals decreased significantly at the intervention centres compared to a marked increase of fat consumption at control centres, however, total caloric intake were similar for both groups. The menus at the intervention centres showed a significant decrease in total fat and saturated fats compared to control centres. **Conclusions** The intervention was effective in reducing fat and saturated fat content of preschool meals and reducing consumption of fat at preschool without compromising energy intake or intake of essential nutrients. **Strengths** MR: T-test conducted; high credibility with the use of the PRECEDE model, Piaget's first 2 stages of intellectual development, the social cognitive theory and the high/scope theory of active learning guided development of health education curriculum MA: Multiple components with innovative materials. **Limitations** MR: No randomisation to intervention or control groups, power analysis not discussed. PIT: participation rate, dissemination model and cost effectiveness not discussed

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33.	Healthy Start: Animal Trackers Preschool Program [327] (USA)	N= 370 3-4 year old children (average age 4.6) N= 32 teachers and 16 classrooms (Particular focus on disadvantaged minority children Attending the 9 Head Start Centres) Preschool	Preschool Teachers & staff	Secondary, selective prevention (high risk population) 2. Quasi-experimental, pre-test post-test comparison with no control group 3. To improve children's physical activity and nutrition behaviours 4. Strategy activities involved: - The physical activity component comprised of a 10-minute daily period of structured physical activity to promote the development of gross motor skills - The nutrition component aimed to increase variety of vegetables on menu and consumption using educational activities and promotional posters 5. 10-week curriculum for 3 to 5 year old children * Based on the Healthy Start Program	Baseline frequency of fruit and vegetable consumption per week by children reported by parents Observation of food consumption in the classroom and survey of teachers and school food service personnel to determine classroom consumption of vegetables Teacher surveys, tracking lesson implementation and classroom observation of physical activity of the children Pedometer and physical activity self-report for teacher physical activity No psychometric details discussed	**Findings** - Slight decrease in consumption of vegetables and fruits - Increased variety of vegetables on the school menu with 8 new vegetables - The physical activity component was implemented by teachers and process evaluation was positive - Per week increase in child physical activity participation - The teachers increased slightly the number of steps per day (NS) that they took and were significantly more physically active on the self-report measure - Power analysis or participation rate not discussed **Conclusions** The program was implemented as intended, and some positive findings. Teachers reported that they intended to use the program again and would recommend it to another teacher **Strengths** MR: large sample group of children from selective population (disadvantaged backgrounds) PIT: pre & post-test conducted showing some impact, outcome evaluation showed some improvement in levels of physical activity; budget details provided; the sample of children's' activities look innovative and promising UI: integrating PE into curriculum seems a feasible and viable strategy to create a supportive environment and to some extent develop personal skills MA: multiple components, however, no psychometric details discussed **Limitations** MR: weak study design; no comparison group, poor description of target group; may not be generalisable to Australian population; theoretical framework not discussed; outcome evaluation showed no significant improvement in nutrition PP: not discussed

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34.	Healthy Start: Healthy Hops [328] (USA)	3-5 year old children Child care centre	Child Care staff & parents	1. Primary, universal prevention 2. Not provided 3. To provide healthy nutrition and physical activity curriculum and teaching strategies for children 3-5 4. Strategy activities involved: - Teacher or co-ordinator training workshops - Curriculum materials: 25 classroom activities, 7 worksheets, take home activities 5. Not applicable for resources (the activities can be integrated into lessons plans to varying degrees), duration and intensity of the workshop to train the teachers' is not provided * Based on the Healthy Start Program	Not provided	**Findings and Conclusions** Not available **Strengths** PIT: curriculum materials have been based on prior research by Healthy Start Researchers MA: multi-component PHCP: trains and provides resources for preschool teacher **Limitations** PIT: evaluation of the materials and teacher workshop are not available

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35.	Hip Hop to Health Jr [292, 329, 330] (USA)	N=197(Ix)+212 (crtl) 2- 5 year old children (average age= 30 months attending Head Start Centres from low income families) Child care centre	Child Care staff & parents	1. Primary, selective prevention (low income population) 2. RCT 3. To reduce the trajectory towards overweight among preschool minority children 4. Strategy activities involved: For children- - 45 minute class using a rhyme book - A 20-minute nutrition or physical activity followed by an aerobic activity For parents- - Weekly newsletter - Homework assignments (with incentives of $5.00) - Aerobic classes twice a week The control group received a: - 20-minute class each week for 14 weeks on general health (to children) and their parents received a weekly newsletter 5. 14 weeks (45 min class 3 x week), post-intervention follow-up at 2 years	BMI and BMI z scores, parent interview to identify 24-hour dietary intake, parent report of the time and intensity of physical activity and hours per day that their child watched television	**Findings** The two groups were comparable at baseline for gender, BMI, BMI z score, percentage of children overweight, hours of TV viewing, physical activity and dietary characteristics Intervention children had significantly smaller increases in BMI compared with control children at 1-year follow-up and 2-year follow-up The intervention children consumed a smaller percentage of calories from saturated fat compared to the control children and 1-year follow-up All other dietary and physical activity outcomes were similar for the two groups Power analysis described 73% of participants contributed data at 2-year follow-up assessment **Conclusions** Strong study design, multiple messages and multiple components, intensive Ix with strong parental involvement, overall a successful program. **Strengths** MR: RCT study design; T tests, chi-squared test; Social Learning Theory, Self-determination Theory and the Trans-theoretical Model underpinning program; success at reducing increases in BMI found for low-income minority children in the US in both genders and across the weight distribution PIT: overall an innovative, successful program arguably addressing most at risk UI: family involvement and culturally adaptable MA: multiple messages and multiple components addressing nutrition, physical activity PP: parental involvement **Limitations** MR: training/implementation model not discussed; may not be generalisable to all populations; no significant difference among Ix & crtl group in respect to dietary and physical activity, there is the potential for the physical activity and diet recall measures were insensitive to the population being studied, and a specifically trained educator was used for the lessons. This level of skill and enthusiasm may not replicate if delivered by busy classroom teachers. There was also a sizeable amount of missing data and cost effectiveness not discussed.

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36.	Nutrition Aimed at Toddlers: An Intervention Study (NEAT)[272] (USA)	Parents with toddlers from low SES backgrounds (pre-dominantly rural areas) Preschool	Trained paraprofessional nutrition instructors	1. Primary, selective prevention (rural) 2. Quasi-experimental pre-test post-test comparison study 3. To evaluate the effects of NEAT on caregiver knowledge, attitudes, mealtime practices and dietary intake 4. Education/information and psychosocial strategies, with activities involving: For parents- - Lessons discussing child development and positive parenting practices, which also involved videotapes and hand on learning activities. For children- - The toddlers joined the second half of the lesson for food tasting, simple food preparation and family eating time (details of the materials are not given). 5. 3 x 90-minute lessons were given to groups of 4 to 5 caregivers	Mealtime observation 24-hour diet recall Child-Parent Mealtime Behaviour Questionnaire – factor analysis reported Facts on Feeding Children questionnaire – no psychometric properties reported Feeding Self-Efficacy Questionnaire - no psychometric properties reported	**Findings** 43 participants in the intervention group and 53 participants in the control group; 71% of participants completed the study; no significant difference of overall scores between groups reported from the Child-Parent Mealtime Behaviour Questionnaire Caregiver knowledge of toddler feeding improved significantly in the intervention group compared with the control group Self-efficacy improved in both the intervention and control groups There was a trend towards decreasing frequency of watching TV during mealtimes in the intervention group compared to the control group **Conclusions** NEAT was successful in improving caregivers' knowledge but did not improve child feeding behaviours. Process evaluation suggested that the reinforcement activities were too long and participants lost interest in the program **Strengths** MR: control group; trained data collectors PIT: improved knowledge MA: multiple components with use of incentives ($10 for the 1st & 2nd data collection, $20 for the post-test) PP: Mid level of parental involvement **Limitations** MR: selection bias (non-English speaking families excluded); group allocation not discussed, no anthropometric measures, poor description of measures, no psychometric properties described

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37.	Food Dudes: Changing the nation's diet: a program to increase children's consumption of fruit and vegetables [332] (UK)	2 - 4 year olds (n=450, no other demo characteristics given) Child care centres	Child care staff	1. Primary, universal prevention 2. Multiple baselines study 3. To increase fruit and vegetable consumption 4. Education/information and psychosocial strategies, with activities involving: For children- - Educational classes teaching children to name and categorise fruits and vegetables - Self-monitoring of fruit and vegetable consumption over several days - Shown a video featuring the 'Food Dudes' giving information and role modelling in the context of a story - Rewards for children who consumed sufficient quantities of fruit and vegetables 5. Weeks 3, 6, 9 & 6- 15 months	Measurement tools & psychometric information not clearly described Descriptive data analysis	**Findings** Increased consumption of fruit and vegetables at snack and lunch times both immediately and 15 months after the Ix Similar improvements at lunchtime even though the intervention was only conducted at snack times **Conclusions** 'Food Dudes' impacts on the culture of eating and has large generalising effects over the short and long-term **Strengths** MR: increased consumption of fruit & vegetables among intervention group MA: multiple component with use of incentives and education **Limitations** MR: overall study details not clear; no control group; training, implementation and dissemination model not discussed; theoretical paradigm not discussed PIT: measurement tools not clearly described; cost effectiveness not discussed PP: not described

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38.	The School Fruit and Vegetable Scheme [333] (UK)	4- 6 year old children (n= 2 million children) Preschool	Preschool Teachers	1. Primary, universal prevention 2. To increase fruit and vegetable consumption & to determine the impact of this scheme on consumption, nutrient intake and attitudes to healthy eating by children before and after participating in the scheme 3. Quasi-experimental study 4. The main strategy involved: - Providing children aged 4-6 with a free piece of fruit or vegetables each school day 5. Not applicable	CADET used to measure 24 hour dietary intake of pupils in reception and years 1 and 2 and a questionnaire, no psychometric properties discussed. Additional interviews with some pupils and teachers conducted.	**Findings** Increased consumption and of fruit and vegetables over the course of the intervention, along with trying a wider variety of produce; increased awareness of the importance of this health behaviour **Conclusions** Long-term delivery of this program could have produced better outcomes, yet in this case there was no long term outcome reported in regards to diet change. **Strengths** MR: stratified girls and boys; impact evaluation found that children tried a wider variety of fruit & vegetables UI: intersectoral involvement with food producers/suppliers **Limitations** MR: large sample size; no theoretical paradigm discussed; data analysis not described in detail but within and between group comparisons made; long term outcome evaluation: food consumption decreased below baseline level post-intervention; relies on significant financial support, with the sustainability of this being unclear; dissemination model not discussed; may not be generalisable to Australian population MA: single component PP: no parent involvement

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39.	Brocodile the Crocodile [334] (USA)	2-5 year old children N= 77 Average 3.9 and 4.0 years in Ix and control groups respectively, range = 2.6 to 5.5 years (8 centres in Ix group and 8 centres in control group) Child care centres	Child Care staff & parents	1. Primary universal prevention 2. RCT 3. To reduce television viewing in preschool children 4. Informational & behavioural components for the child, parents and staff, which involved: - Educational sessions - Home activities sent home after each session - Stickers given to reward children for refraining from watching TV at home 5. 7-week course of 1 x 1-hour session each week, outcome evaluation conducted at the end of intervention (not clear)	Anthropometric measurements (height, weight, triceps and skin-fold thickness)	**Findings** Intervention group watched fewer hours of TV per week and the percentage who watched more than 2 hours per day decreased Less difference between Ix & control group with older children **Conclusions** A more intensive and longer intervention may yielder better and more long term outcomes of reducing TV watching time, and further research is required to find out how to reach and motivate parents to facilitate the behaviour among their children **Strengths** MR: strong study design UI: family involvement MA: multiple components **Limitations** MR: small sample size, high rate of attrition re turnover in day care centres, not generalisable due to most of sample group from rural areas & of Caucasian background; outcome evaluation had no change in BMI among Ix group and no long term change of behaviour. MA: single message (TV viewing behaviour), thus does not address other mediating factors to obesity

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40.	Puppetry in Nutrition Education [335] (USA)	0-5 year old children n =161 Child care centres	Child Care staff & Nutritionists	1. Primary, universal prevention 2. Experimental study design 3. To examine the difference of children's willingness to try different foods from a nutrition education with a puppet the later (control) without 4. Based on the social cognitive theory framework, psychosocial and educational strategies were used, involving: - Nutritional lessons to the children - A tasting activity 5. 4 x nutrition lessons & tasting activity, follow-up outcome evaluation preceding post-intervention	Children's willingness to taste test at pre and post intervention Observational reporting of children during food tasting	**Findings** No statistically significant difference between nutrition education with and without a puppet **Conclusions** Puppet animation within a nutrition lesson made no impact to the children's willingness to sample different foods, however, this conclusion warrants caution as there are several limitations for the evaluation of this study. **Strengths** MR: even representation of gender; innovative idea underpinned by the theoretical framework from the Social Cognitive theory (credibility) **Limitations** MR: no improvement reported between Ix and control group; not generalisable as sample group were mostly Caucasian UI: does not address upstream environmental influences PP: nil

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41.	Be Active Kids [336] (USA)	4- 5 year old children N= 154 4.5 year old children (av. Age = 4.5 years, sample including a mix of Caucasian and African American children) 8 child care centres – 5 child care centres with 100 children in Ix group and 3 child care centres with 54 children in the control group Child care centre and Preschool	Child Care & Preschool staff (trained by Researchers)	1. Primary, universal prevention 2. Quasi-experimental pre-test post-test controlled study 3. To give children the tools to develop positive physical activity and healthy eating habits and attitudes 4. Education and behavioural exercises: - 15 lessons each with a nutrition or physical activity theme and using math, science, music and make believe activities - Development of a kit that included a felt food pyramid, Be Active Kids characters, food photo flash cards, posters and a video - Family newsletters were disseminated to parents about healthy nutrition & exercise for children - Training of child care staff also included support/promotion to adopt a healthy lifestyle (self-empowerment) 5. 15 interactive lessons to children, post-intervention evaluation was sent out 8 weeks later	Evaluation of the training sessions – no psychometric properties discussed; a survey sent to participants in training program 8-weeks later to address usage and future plans for the program; pre-tested for clarity Individual child interviews – approximately 15 minutes, children were asked several open-ended questions, were asked to identify 10 fruits or vegetables and if child had not tasted the food, they were asked if they would be willing to try it – pre-tested for clarity and appropriateness.	**Findings** Positive process evaluation – kits useful and being used, carers perceived that children increase physical activity and healthy eating behaviours – no comparison data children in the intervention group recognised significantly more fruits and vegetables, were more likely to be able to name 3 healthy foods, named healthy eating and physical activity as healthy and understood what physical activity was compared with the control group outcomes related to knowledge power analysis and participation rate not discussed. **Conclusions** The authors conclude that the program is being used in classrooms and is having positive effects on children with regard to fruit and vegetable recognition and knowledge about healthy eating and physical activity **Strengths** MR: study design (use of control group); ANOVA & T-test conducted; promising outcome MA: multiple components, kit may be useful, the training component is also complementary **Limitations** MR: no theoretical basis described; no randomisation, attitudes or behaviours not measures, poor psychometric testing of measures, parent involvement not clear, ethnic groups of participants in each group not generalisable to Australian populations, time of post-test not stated, BMI not included as an outcome, limitations not discussed. UI: low

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42.	Effects of controlled trial [337] (THAILAND)	3-5 year old children N= 147 in the intervention group and n= 145 in the control group Preschool	Research personnel	1. Primary universal prevention 2. RCT 3. To examine the effect of a school-based aerobic exercise program on the obesity indexes of preschool children 4. Strategies for the intervention group included: - 15-minute walk before classes commenced and - A 20-minute aerobic dance session after the afternoon nap 3 times per week over a duration of 30 weeks - 1 hour of PE per week - Control group continued with only 1 hour of PE per week 5. Intervention group participated in a 15 minute walk before class and a 20 minute dance session 3 times a week over 30 weeks	BMI and skin fold measurements, psychometric properties discussed Data analysis: Linear regression analysis to calculate the slope for change in BMI and skin fold measurement over time t-test, ANOVA, chi-squared and Spearman correlation to describe baseline characteristics and explore relationships Wilcoson signed rank test, multiple linear regression and logistical regression	**Findings** The prevalence of obesity decreased in the intervention group (p = 0.058) but not in the control group (p = 0.179) Girls in the exercise group had a lower likelihood of having an increased BMI slope than control girls **Conclusions** A 29-30 week course of exercise in a preschool setting can prevent BMI gain, especially in girls and may induce a remission of obesity in preschool-aged children **Strengths** MR: Utilised the environmental change model to underpin the trial PIT: outcome showed promising results, especially among girls **Limitations** MR: dietary intake not measured, no dietary intervention, post-test conducted after the intervention period was completed; training and implementation model, the dissemination model and cost effectiveness not discussed

	Intervention	Target Group and Setting	PHCP	Intervention Strategy (1-5) 1. Type of prevention 2. Study design 3. Goals 4. Strategies 5. Frequency & duration	Assessment Tools	Findings Conclusions Strengths and Limitations MR: Methodological rigour PIT: Program Impact & Transferability UI: Upstream involvement MA: Multidimensional approach PP: Parental Participation PHCP: Primary Health Care Participation PF: Population Focus
43.	Head Start Program [279] (USA)	Mothers of 0- 5 year old children (n=46 parent-child pairs and 8 Head Start teachers) Groups: 2 groups - intervention (5 centres: 3 New York + 2 Maryland) and control (6 centres: 3 New York + 3 Maryland). Child care centres Preschool/Community	Parents & Child Care staff	1. Primary, universal prevention 2. Quasi-experimental pre-test post-test controlled study 3. To explore the socialisation process relating to children's early nutrition experiences, also gathering insight into how adult nutrition attitudes and mealtime behaviours impact on young children's eating behaviours and weight-for-height. 4. Educational and to some extent psychosocial strategies used, which included the following activities: - Educational workshops for mothers - Nutritional newsletters - Learning activities - Food demonstrations to improve the dietary intake of children 5. Intervention groups received 4 x 2 hour workshops, weekly newsletters over 13 weeks with follow up evaluation at the end of the intervention	Anthropometric measures of children taken pre and post intervention Parents' reported child eating behaviours, nutrition attitudes, and the foods consumed during mealtimes Preschool teachers reported their own nutrition attitudes and were observed during mealtimes.	**Findings** There appeared to be a correlation between 'negative' mealtime practices and children with higher weight-for-height measurements. In addition, parents with positive nutritional attitudes generally reported more favourable mealtimes and, less negative child behaviours and practices. Observations by researchers at the Head Start Centres found that many opportunities for preschool teachers to promote positive nutrition socialisation were missed. **Conclusions** Overall, this study emphasised the significant role parents and preschool staff have in influencing children's nutritional behaviours. **Strengths** MR: Ix & control group used to evaluate the efficacy of the program PIT: Incentives provided: gift certificates & free babysitting PP: Aimed to up-skill mothers on recommended nutritional needs of children and ways to incorporate the recommendations into action **Limitations** PIT: Outcome measures reported minimal behaviour improvement in relation to nutrition; no long-term outcome evaluation; low generalisability for the Australian context UI: Limited upstream involvement MA: Focused only on nutrition PHCP: Did not report on how or whether the child care staff were involved in the intervention group

	Intervention	Target Group and Setting	PHCP	Intervention Strategy (1-5) 1. Type of prevention 2. Study design 3. Goals 4. Strategies 5. Frequency & duration	Assessment Tools	Findings Conclusions Strengths and Limitations MR: Methodological rigour PIT: Program Impact & Transferability UI: Upstream involvement MA: Multidimensional approach PP: Parental Participation PHCP: Primary Health Care Participation PF: Population Focus
44.	STRIP (Special Turku Coronary Risk Factor Intervention Project) Baby Trial [341, 343] (FINLAND)	7 months- 7 years of age N= 1062 (848 completed) (mixed gender, ethnicity not described) Clinical	Multidisciplinary health team (Dr, Dietician, Registered Nurse)	1. Primary, universal prevention 2. Prospective randomised trial 3. To examine the effects of dietary intake (Ix group with moderated fat (less saturated fat intake) between 7-36 months and the differences of growth rate between the control and intervention group 4. Educational and psychosocial strategies: The intervention group received- - One to one dietary & lifestyle counselling, promoting breastfeeding and to minimise their infant/child's saturated fat intake, along with age-specific recommendations for their child's level of physical activity The control group received- - Basic education in relation to health, promoting breastfeeding during infancy and later consumption of cows milk 5. The intervention group attended the counselling team once ever 1-3 months, after the child was 2 years, the visits were once every six months	Nutritional Knowledge Test Questionnaire Anthropometric measures: growth rate, dietary intake (fat)	**Findings and Conclusions** Growth rate was not different among Ix and control groups Therefore, no adverse developmental effects from the moderation of fat intake among the intervention group (25-30% total daily fat intake) compared to the control (40-55% total daily fat intake) **Strengths** MR: strong study design (RCT); long term (6 year) follow-up; may not be generalisable to low SES groups; possible information bias (no blinding of groups), resulting in differential Hawthorne Effect PIT: outcome demonstrated no adverse height growth effects from reduced fat consumption PHCP: high **Limitations** MR: cost and resource intensive PIT: poor generalisability, yet may be required for at risk groups UI: does not address upstream factors

	Intervention	Target Group and Setting	PHCP	Intervention Strategy (1-5) 1. Type of prevention 2. Study design 3. Goals 4. Strategies 5. Frequency & duration	Assessment Tools	Findings Conclusions Strengths and Limitations MR: Methodological rigour PIT: Program Impact & Transferability UI: Upstream involvement MA: Multidimensional approach PP: Parental Participation PHCP: Primary Health Care Participation PF: Population Focus
45.	Native American Home Visiting Pilot [339] (USA)	Overweight mothers with infants Parents/carers of children 9mths-3 years n=43 (Gender: 51% male, 49% female, ethnicity: Native American) Home	Trained Indigenous Peer Educator	1. Primary & secondary, selective prevention (high risk population) 2. RCT 3. Compare obesity prevention Ix plus parenting support with parenting support alone to reduce the prevalence of obesity among children 4. Strategy activities involved culturally appropriate education, psychosocial action in relation to nutrition and physical activity: The intervention group received- - 1:1 sessions with peer educators facilitating brainstorming & planning activities to develop realistic ways to increase physical activity - Lessons to mothers on age-specific recommendations for dietary intake and feeding behaviours The intervention and control group received- - Sessions on goal setting and ways to increase motivation toward goals (eg. Rewards) 5. The peer educator received 120 hours of training, the parents were involved in 11 sessions (of one hour duration) over 16 weeks with outcome evaluation closely after the last intervention	Weight-for-height scores for children and BMI for mothers Parent reported 3-day food record – one each for the mother and the child Accelerometer – children and mothers each wore an accelerometer for the same 3-day period they were recording food intake Maternal outcome expectations – asked to report their agreement with 10 items regarding outcome expectations about participation in physical activity and dietary modification Maternal self-efficacy – asked to report their level of belief I their ability to overcome 10 barriers to physical activity and dietary modification on a 10-point scale Intentions – asked to report on a 10-point scale on the probability that they would engage in physical activity and control their calorie and fat intake over the next 4 months Dietary exposure and regulation of children's eating behaviours – Child Feeding Questionnaire Referenced but no psychometric properties reported Data analysis: Paired students t-test used to assess differences from week 0 to week 16. ANOVA used to assess difference between groups in change scores. Differences between groups in categorical variables assessed with chi-squared test	**Findings** Decreased weight status among maternal and child weight in Ix group compared to controls Reduction of energy intake of children in the Ix group compared to controls No significant differences in maternal eating behaviours **Conclusions** The results of the home-visiting program showed some improvement in relation to the development of parenting skills and lifestyle behaviours for obesity prevention among a high-risk group (Native-American children). For example, restrictive food practices of parents in the intervention group decreased significantly. The findings from the intervention also noted a decrease of weight-for-height among the intervention group, along with an overall reduction in energy intake by children. **Strengths** MR: study design PIT: small size and scope; at first glance appears to be limited in terms of transferability, however, well established parenting principles were integrated with issues of physical activity and healthful eating, and this could have more universal application. PP: considerable parental involvement with incentives provided to parents completing the program ($25 gift voucher) **Limitations** PIT: materials provided in the sessions not described; no significant difference in outcome evaluation: physical activity, nutrition, body composition & psychosocial components; potentially time intensive intervention to deliver; only short term measurement of outcomes MA: single components UI: Does not directly address upstream environmental factors contributing to obesity

Appendix 4: Criteria for Appraising/Scoring Interventions

Methodological Rigour

Criteria for Assessing Theoretical Framework	
– Existence of theoretical framework	
o No theoretical framework and/or inappropriate theoretical framework given goals of study	Low
o Poorly defined but appropriate framework	Medium
o Well defined & appropriate framework	High
– Adequacy of theoretical framework to engage primary health care providers/parents	
o Health belief model	Medium
o Self determination theory	High
o Reversal theory	Medium
o Protection motivation theory	Low
o Theory of reasoned action	High
o Theory of planned behaviour	Medium
o Trans-theoretical model	High
o Social learning/social cognitive theory	High
o Diffusion of innovations theory	Low
o Communication-behaviour change model	Low
o Social marketing	Low
o Precede/proceed model	High
o Health promoting schools model	High
o Ecological system's theory	Medium
o Bronfenbrenner's Ecological Model	High

Criteria for Scoring QUANTITATIVE Factors		
Selection Bias	• The sample was population based	Yes = 1 No = 0
	• Eligibility criteria were specified	Yes = 1 No = 0
	• The sample was randomly selected	Yes = 1 No = 0
	• Dropout rates and reasons reported	Yes = 1 No = 0
	• Reasons for loss the same in each group	Yes = 1 No = 0
	• Follow-up was for >80%	Yes = 1 No = 0
	• Subjects were randomly allocated (RCT)	Yes = 1 No = 0
	• There was intention to treat analysis if RCT	Yes = 1 No = 0
Information Bias	• Assessment procedure consistent for all groups	Yes = 1 No = 0
		Yes = 1 No = 0
	• Blinding for exposure/outcome assessment	Yes = 1 No = 0
	• Blinding for primary health care providers	Yes = 1 No = 0
	• Blinding for parents	Yes = 1 No = 0
	• Blinding for participants	Yes = 1 No = 0
	• Concealed allocation for RCT	Yes = 1 No = 0
	• Prognostic, exposure baseline assessments valid and reliable	Yes = 1 No = 0
	• Outcome assessments valid and reliable	
Confounding Factors	• Groups similar on prognostic factors at baseline	Yes = 1 No = 0
		Yes = 1 No = 0
	• Groups comparable on confounding factors	Yes = 1 No = 0
	• Confounding factors taken into consideration in analysis	
	Total Score	0-6 = Low 7-12 = Medium 13-19 = High

Criteria for Scoring QUALITATIVE Factors		
Sampling	• Approach clear and consist with aims • Biases in selection articulated • Sampling is theoretically justified	Yes = 1 No = 0 Yes = 1 No = 0 Yes = 1 No = 0
Data Collection	• Activities are clearly described • Limitations are identified	Yes = 1 No = 0 Yes = 1 No = 0
Analysis Approach	• Is systematic • Transparent • Consistent with qualitative traditions and norms	Yes = 1 No = 0 Yes = 1 No = 0 Yes = 1 No = 0
Total Score		1-2 = Low 3-4 = Medium 5-8 = High

Program Impact and Transferability

Criteria for Scoring IMPACT/TRANSFERABILITY		
Outcomes	• Did the study provide enough information to determine whether it achieve its desired outcomes? • Was of the size of outcome significant? • Was the overall reach of the program large?	Yes = 1 No = 0 Yes = 1 No = 0 Yes = 1 No = 0
Generalisability	• Is the intervention applicable to the general population?	Yes = 1 No = 0
Target (transferability)	• Was the intervention suitable considering the context, target group and setting	Yes = 1 No = 0

Engagement of Primary Health Care Providers

Criteria for Scoring Engagement of PRIMARY HEALTH CARE PROVIDERS		
Duration	• 0 – 6 months • 7-12 months • Over a year	Low Medium High
Intensity	• One-off • Monthly • Weekly	Low Medium High
Type	• One way communication (fact sheets, presentations, video, etc) • Two way communication (focus groups, consultation, councelling, etc) • Two way communication plus skills development (worshops, skills development, motivational interviewing, etc)	Low Medium High
Extent of Engagement	• Passive recipient (low level interaction) • Facilitative/educational role • Active in development, implementation and promotion of intervention	Low Medium High

Parent Participation

Criteria for Scoring Engagement of PARENT PARTICIPATION		
Duration	• 0 – 6 months • 7-12 months • Over a year	Low Medium High
Intensity	• One-off • Monthly • Weekly	Low Medium High
Type	• One way communication (fact sheets, presentations, video, etc) • Two way communication (focus groups, consultation, counselling, etc) • Two way communication plus skills development (workshops, skills development, motivational interviewing, etc)	Low Medium High
Level of Participation	• Passive recipient of intervention • Evidence of 'involvement' in design and implementation of intervention • Evidence of participation in and 'ownership' of process to develop sustainable lifestyle changes	Low Medium High

Population Based Focus

Criteria for Scoring POPULATION BASED FOCUS		
Society	Incorporated components on national, state, local policy development (economic, welfare, health, housing, transport, taxation related policies)	High
Sector-system	Incorporated changes in settings based action areas, eg. Child Care Centres, Preschools, Commercial market sector	High
Community	Incorporated changes to the wider community through the establishment of supportive environments (at local council level)	Medium
Family	Family involvement in the promotion of health related behaviours	Medium
Individual	Involvement only parents and children 2-6 years of age	Low

Involvement in Upstream Activities

Criteria for Scoring INVOLVEMENT IN UPSTREAM ACTIVITIES	
Assessment of child's weight (BMI etc.) and/or treatment of symptoms of overweight	Low
Involvement of primary health care providers in efforts to educate and/or facilitate parents/families to develop more healthy lifestyles	Medium
Involvement of primary health care providers in activities aimed at educating/facilitating parents to develop more healthy lifestyles, as well as activities to advocate for policy change to address broader socio-environmental issues	High

Multi-Dimensional Approach

Criteria for Scoring the Extent to which the Intervention addressed MULTI-DIMENSIONAL FACTORS	
Focus of intervention is only on diet and/or exercise	Low
Focus of intervention is on diet and/or exercise, but also incorporates 1 or 2 other issues such as TV, behaviour modification, environmental issues, health education etc.	Medium
Intervention focuses on several inter-related aspects of the child's, family's and community's behaviour, policies, attitudes, etc.	High

Appendix 5: Scores for Interventions (focusing on 2-6 year olds)

INTERVENTION TITLE	METHODOLOGICAL RIGOUR	PHCP INVOLVEMENT	PARENT PARTICIPATION	IMPACT & TRANSFERABILITY	POPULATION FOCUS	UPSTREAM INVOLVEMENT	MULTI-DIMENSIONAL APPROACH
Good Food For Children	Low	High	Medium	High	Low	High	High
Start Right-Eat Right Award Scheme	Medium	High	Low	High	Low	High	High
Moving with Young Children	Low	Medium	Low	Medium	Low	Low	Low
Romp and Chomp	Low	Low	Low	Low	Low	Low	High
Tastebuds	Low	Low	Low	Medium	Medium	Low	Low
Crunch & Sip	High	Medium	Medium	Low	Low	Low	Low
Food Facts for Preschoolers	Low	Low	Low	Low	Medium	Low	Low
Planning Nutritious Long Day Care Menus	Low	Medium	Low	Medium	Low	Low	Low
Talking with Families about Nutrition	Low	Medium	Medium	Low	Medium	Medium	Medium
Healthy Food Choices for Family Day Care	Low	Medium	Low	Low	Medium	Low	Low
Sharing a Picture of Children's Development	Low	Medium	High	Low	High	Medium	Low
Caring for Children	Low	Low	Medium	Medium	Low	Medium	Low
The Karuah Family Nutrition and School Access Project	Low	Low	Low	Low	Low	Low	Low
Afternoon with My GP	Low	Medium	Medium	Low	Low	Medium	Low
Live, Eat and Play (LEAP)	High	High	High	Medium	Low	Medium	Medium

INTERVENTION TITLE	METHODOLOGICAL RIGOUR	PHCP INVOLVEMENT	PARENT PARTICIPATION	IMPACT & TRANSFERABILITY	POPULATION FOCUS	UPSTREAM INVOLVEMENT	MULTI-DIMENSIONAL APPROACH
Treating Your Tot to Terrific Tucker	Low	Medium	Medium	Low	Low	High	Medium
Shop Smart for Home Start	Low	Medium	Medium	Low	Low	Medium	Low
Filling the Gap – What's there to eat?	Low	Low	Low	Low	Low	Medium	Low
Growing Families Project	Low	Low	Low	Low	Low	Medium	Medium
Cancer Council Parental Guidance Project	Low	Medium	Low	Low	Low	Medium	Medium
Quick Meals for Kooris	Low	Medium	Medium	Low	Low	Medium	Low
Family FoodPATCH	Low	Medium	High	Low	Low	Medium	Low
Be Active, Eat Well	Medium	Low	Medium	Low	Medium	Medium	Low
Australian-Greeks Against Childhood Obesity Project	Low	Low	Low	Low	Low	Low	Low
Give Me Five	Low	Low	Low	Low	Low	Low	Low
Growth Assessment and Action Program	Low	Medium	Medium	Low	High	Medium	Medium
Strengthening Families in Ngaanyatjarra Lands Project	Low	Low	Low	Low	Medium	Medium	Medium
Keeping Kids Health Makes a Better World	Low	Low	Low	Low	Low	Low	Low
Coorong Good Food Program	Low	High	Low	Low	Medium	Medium	Medium
Lifestyle Triple P Program for Addressing the Obesity Epidemic	High	High	High	Medium	Medium	Medium	Medium

INTERVENTION TITLE	METHODOLOGICAL RIGOUR	PHCP INVOLVEMENT	PARENT PARTICIPATION	IMPACT & TRANSFERABILITY	POPULATION FOCUS	UPSTREAM INVOLVEMENT	MULTI-DIMENSIONAL APPROACH
FitWIC	Medium	High	High	Medium	High	High	High
Healthy Start Program	Medium	High	Low	High	Low	Low	Medium
Healthy Start Animal Trackers Preschool Program	Medium	High	Medium	Medium	Low	Medium	Low
Healthy Hops Program	Low	Medium	Medium	Low	Low	Medium	Low
Hip-Hop to Health Jr	High	Medium	High	High	Medium	Medium	Low
Nutrition Education Aimed at Toddlers (NEAT)	Medium	High	High	Medium	Medium	Medium	Low
Food Dudes	Low	Medium	Low	Medium	Low	Low	Low
The School Fruit and Vegetable Scheme	Low	Medium	Low	Medium	Low	Low	Low
Brocodile the Crocodile	Medium	High	Medium	High	Medium	Medium	Low
Puppetry in Nutrition Education	Medium	Medium	Low	Low	Low	Low	Low
Be Active Kids	Low	High	Low	Low	Low	Low	Low
Thai Kindergarten Exercise Program	High	Medium	Low	High	High	Low	Low
Head Start Program	Medium	Medium	Medium	Medium	Medium	Low	Low
Special Turku Coronary Risk Factor Intervention Project (STRIP)	High	High	High	High	Medium	Medium	Medium
Native American Home Visiting	Medium	Medium	Medium	Medium	Medium	Low	Low