

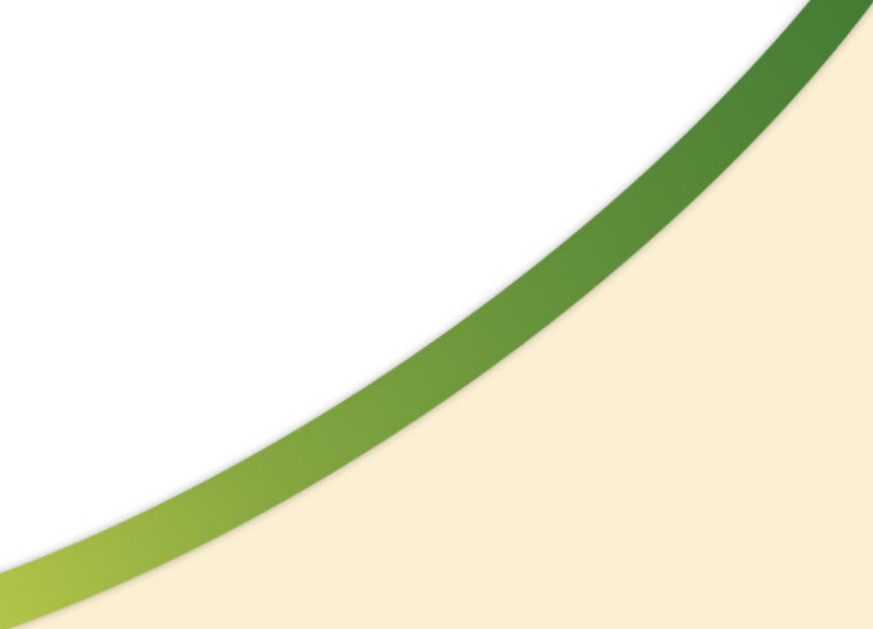
# Promoting healthy diets through nutrition education and changes in the food environment: an international review of actions and their effectiveness

by Corinna Hawkes



**BACKGROUND PAPER FOR THE  
INTERNATIONAL CONFERENCE ON  
NUTRITION (ICN2)**





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# List of Acronyms

CAC	Codex Alimentarius Commission
CaFAN	Caribbean Farmers Network
EFNEP	Expanded Food and Nutrition Education Program
ENACT	Education for Effective Nutrition in Action
EPODE	Ensemble prévenons l'obésité des enfants
EU	European Union
EUFIC	European Food Information Council
FAO	Food and Agriculture Organization of the United Nations
FBGDs	Food-based dietary guidelines
FSM	Federated States of Micronesia
ICN	International Conference on Nutrition
INP	Integrated Nutrition Programme
IFAVA	International Fruit and Vegetable Alliance
IFBA	International Food and Beverage Alliance
NCD	Non-communicable disease
NGO	Non-governmental organization
NFSI	Nutrition Friendly Schools Initiative
OECD	Organization for Economic Co-operation and Development
PAHO	Pan American Health Organization
SPC	Secretariat of the Pacific Community
UNESDA	Union of European Beverages Associations
UK	United Kingdom
US	United States
WASH	World Action on Salt and Health
WIC	Women, Infants and Children
WHO	World Health Organization





# Introduction

## Chapter 1

### Background

According to the World Health Organization (WHO), of the 57 million global deaths in 2008, 36 million, or 63%, were due to non-communicable diseases (NCDs), principally cardiovascular diseases, diabetes, cancers and chronic respiratory diseases (WHO, 2011a). Nearly 80% of these deaths occur in low- and middle-income countries. Deaths from NCDs are projected to continue to rise worldwide, with the greatest increases expected in low- and middle-income regions.

An unhealthy diet is one of the key risk factors for NCDs. For example, inadequate consumption of fruit and vegetables increases the risk for cardiovascular diseases and several cancers; high salt consumption is an important determinant of high blood pressure and cardiovascular risk and increases the risk of stomach cancer; high consumption of saturated fats and trans-fatty acids is linked to heart disease; a range of dietary factors have been linked with diabetes; red and processed meat consumption is linked with some cancers (WHO, 2003; Steyn et al., 2004; WCRF, 2007).

In addition, excessive energy intake leads to overweight and obesity, which is linked with a range of health problems, including NCDs (WHO, 2000). Diabetes has particularly strong associations with obesity (Steyn et al., 2004), and evidence shows associations between body fatness and some leading cancers (WCRF, 2007). The WHO estimates that 2.8 million people die each year as a result of being overweight or obese (WHO, 2011a). The prevalence of overweight is highest in upper-middle-income countries but very high levels are also reported from some lower-middle income countries in Europe, the Middle East and the Americas, and it is reported to be rising throughout low- and middle-income countries.

Since the FAO/WHO International Conference of Nutrition in 1992, unhealthy eating patterns have been increasing around the world. For example, fat intake has been rising rapidly in lower-middle-income countries since the 1980s (WHO, 2011a). Between 1992 and 2007, a disproportionate amount of the per capita increase in calorie availability<sup>1</sup> came from sugar and meat (Mazzocchi et al., 2012). Patterns of eating have also changed, with an increase in snacking, skipping meals, eating meals out of a family setting, and eating out of the home.

<sup>1</sup> The increase in per capita calorie availability between 1992 and 2007 ranged between 150 and 250 Kcal on average per day in developing countries, although availability remains stagnant in many countries, particularly in the African continent

In this context, governments, the private sector, and civil society have taken actions since 1992 to influence consumer awareness, attitudes, skills, preferences, and behaviour around food, diet and nutrition. These actions can all be considered part of the process of “nutrition education” when defined broadly as “any combination of educational strategies, accompanied by environmental supports, designed to facilitate voluntary adoption of food choices and other food- and nutrition-related behaviours conducive to health and well-being” (Contento, 2011).

This definition extends beyond perceiving “education” as purely a process of providing information, to one that encompasses information and communication strategies (motivational), the provision of skills (where the goal is to facilitate people’s ability to take action), and changes to the food environment (to support and reinforce the actions on information and skills). Under this definition, the ultimate goal of nutrition education is to change behaviour (thus the use of the term “behaviour change communication”).

### Objective

The objective of this paper is to provide an overview of:

- (a) nutrition education actions, in their broadest sense, that international organisations, governments, the private sector and civil society have been developing and implementing around the world to influence consumer awareness, attitudes, and skills around healthy eating;
- (b) the evidence of the effects of these actions.

The time scale is the 20 plus years since the International Conference on Nutrition (ICN) in 1992 and the present day. It focuses on the four groups of actions core to nutrition education in its broadest sense: public awareness campaigns; education in specific settings; skills training; and changes to the food environment. The paper aims to provide a general indication of the extent and nature of the actions and evidence around the world, rather than a completely comprehensive picture.

### Framework

As already outlined, nutrition education in its broadest sense has three components: providing information through communications strategies (e.g. information campaigns, dietary advice in health service settings), providing skills that enable consumers to



act on the information provided (e.g. cookery, growing), and providing an enabling food environment (e.g. marketing to children, making different foods available) (Contento, 2011). Nutrition education can be delivered through multiple venues from multiple stakeholders, and involves activities at the individual, institutional, community, and policy levels. This is consistent with the settings-based approach of health promotion, based on the premise that “health is created and lived by people within the settings of their everyday life; where they learn, work, play, and love” (WHO, 1986). Nutrition education actions take place in different settings, including the places where food is produced (e.g. agricultural settings/fields), sold (e.g. retailers, food service outlets, public sector catering in schools, workplaces etc.), consumed (e.g. households), and where information, education on food and diet is provided (e.g. health service settings).

The source of the nutrition education actions can also vary, involving the public sector, the private sector, civil society and public-private initiatives. Actions may involve a wide array of different foods and nutrients, from fruits and vegetables to dairy, from dietary fibre to fats, or be generic to healthy eating.

There are thus four key variables to nutrition education actions: core aim; setting; source; and food/nutrient, as shown in Box 1. In practice, it is difficult to separate out nutrition actions into these specific categories because they tend to be inter-linked. For example, they may involve both the provision of information and changing the environment, both the public and private sectors, and take place across a range of settings. However, they can be broadly categorised into four:

- Public awareness campaigns;
- Education in specific settings;
- Skills training;
- Changes to the food environment.

Each of these is now dealt with in turn, paying particular attention to the settings of the action, the main stakeholders involved and the food/nutrient of concern.

## **BOX1**

An analytical framework for nutrition education actions that influence consumer knowledge, awareness and attitudes about food, diet and nutrition

### **Aims/components of nutrition education actions**

- Providing information through communications strategies (e.g. information campaigns, dietary advice in health service settings)
- Providing skills that enable consumers to act on the information provided (e.g. cookery, growing)
- Providing an enabling food environment (e.g. marketing to children, making different foods available)

### **Settings for nutrition education actions**

- Where foods are produced (e.g. agricultural/field settings)
- Where foods are sold (e.g. retailers, public sector catering)
- Where foods are consumed (e.g. public sector catering in schools, workplaces, households)
- Where information, education and advice are provided (e.g. households, schools, health service settings)

### **Sources of nutrition education actions**

- Public sector (e.g. international organisations, governments, schools)
- Private sector (e.g. food companies, private health sector bodies)
- Civil society (e.g. non-governmental organizations; NGOs)

### **Foods/nutrients included in the nutrition education actions**

- Foods (e.g. fruits and vegetables, animal source foods)
- Nutrients (e.g. proteins, fats, vitamins and minerals)

# Public awareness campaigns

## Chapter 2

### Types of public awareness campaigns

**P**ublic awareness campaigns are an organised communication activity with the aim of creating awareness and changing behaviour among the general population. They are often characterised as mass media campaigns. The WHO (2011a) recommends mass media campaigns as one of their “Best Buys” for NCDs prevention and control – they also involve the provision of information to the general public through a variety of other channels, including:

- Health and education-related settings;
- Public relations events, such as talks, demonstrations and tours;
- Social media;
- Mass media.

Public awareness campaigns use a range of different awareness-raising techniques through these channels, ranging from materials with information to more sophisticated techniques, like social marketing, or using components developed in the psychological sciences, such as the Social Cognitive Theory.

Over the past 20 years, public awareness campaigns have typically had several different foci, namely:

- Food Based Dietary Guidelines;
- Generic healthy eating;
- Fruits and vegetables;
- Other “eat more” foods (wholegrain, low-fat milk);
- Salt;
- Other “eat less” foods (e.g. sugar-sweetened beverages, fats);
- Food labelling.

Each of these is now dealt with in more detail.

## Food-based dietary guidelines

### Actions

Food-Based Dietary Guidelines (FBDGs) are an information communication tool involving the translation of recommended nutrient intakes or population targets into recommendations of the balance of foods that populations should be consuming for a healthy diet. The development of FBDGs has been actively promoted internationally by the Food and Agriculture Organization of the United Nations (FAO) and WHO, who have been key players in promoting and supporting their development at a national level (FAO, 1997).

From a nutrition education standpoint, there are two aspects of FBDGs: developing the actual guidelines, and then communicating them. The development of FBDGs is not an easy task as different population groups have diverse nutritional needs and different lifestyles that may require adjustments in dietary intakes (WHO et al., 2011). According to information compiled by FAO and others, a large number of countries have developed FBDGs (Table 1). These FBDGs typically promote a variety of foods in the diet, physical activity and healthy weight, increased intake of fruits and vegetables, and limit the intake of salt/sodium and sugar. They often differ with regard to the specific target population groups and advice on fats, carbohydrates, water, and food safety (Albert, 2007).

There have been developments over the past 20 years with regard to the considerations incorporated into the guidelines. For example:

- **Different nutritional needs during the life cycle.** Some countries have created separate dietary guidelines for different age groups and others have incorporated advice for specific target groups in their general guidelines (Albert, 2007).
- **Sustainability.** Reports have been produced in several European countries (e.g. France, Italy, Sweden, United Kingdom; UK) that incorporate considerations of sustainability into the guidelines (Westland and Crawley, 2012). For example, the National Food Administration and Environmental Protection Agency in Sweden recommended a set of guidelines for consideration by the European Union (EU) which emphasised reduced meat intake due to climate change as well as health (Swedish National Food Administration, 2009). None of these recommendations have been translated into official government guidelines, although incorporation of sustainability criteria into national guidelines is currently being considered in Australia (NHMRC, 2012).
- **Obesity.** There is evidence that some countries are increasingly orienting their FBDGs towards obesity prevention. The seventh edition of the dietary guidelines in the United States (US), released in 2010, had a greater emphasis on obesity, being based on the principles on maintaining calorie balance over time to achieve and sustain a healthy weight and focusing on consuming nutrient-dense foods and beverages (USDA & USDHHS, 2010). In Latin America and the Caribbean, it has been reported that a total

of 13 Latin American and Caribbean countries have used their FBDGs for the purposes of obesity prevention (Molina, 2012).

- Other considerations taken into account include local foods in the Pacific Islands and affordability of food in Ireland (Flynn et al., 2012).

**Table 1: Examples of countries with food-based dietary guidelines**

FAO Region	Countries	
<b>Sub-Saharan Africa</b>	Namibia Nigeria	South Africa Malawi
<b>Near East (incl North Africa)</b>	Arab Gulf countries Iran	Oman Turkey
<b>Asia &amp; Pacific</b>	Afghanistan Australia Bangladesh China India Indonesia Japan Malaysia	Nepal New Zealand Philippines Singapore South Korea Sri Lanka Thailand
<b>North America</b>	Canada US	
<b>Latin America &amp; Caribbean</b>	Argentina Bahamas Belize Bolivia Brazil Chile Colombia Costa Rica Cuba Dominica Dominican Republic Ecuador	El Salvador Grenada Guatemala Honduras Mexico Panama Paraguay Santa Lucia Saint Vincent & Grenadines Uruguay Venezuela
<b>Europe</b>	Albania Austria Belgium Bosnia and Herzegovina Bulgaria Croatia Czech Republic Denmark Estonia Finland France Germany Greece Hungary	Ireland Italy Latvia Lithuania Netherlands Poland Portugal Romania Slovakia Slovenia Spain Sweden Switzerland UK

Sources: EUFIC, 2009; FAO, 2009; Musaiger et al., 2012; Shariatjafari et al., 2012

To communicate these FBDGs to consumers in an understandable, consumer-friendly format, countries have developed visual devices such as nutrition pyramids, circles or plates. However, one of the lessons learned over the past 20 years has been the need to promote and implement FBDGs beyond the development of a visual identify. Experiences suggest that policy makers and stakeholders involved in the development of FBDGs should also develop a comprehensive plan that includes implementation, assessment, monitoring and reformulation (Tanchoco, 2011).

FBDGs are now promoted to the public via written/electronic information (e.g. booklets, websites, posters) through health and/or education sector channels (e.g. Chile, South Africa) and the mass media (e.g. India, Thailand) (Krishnaswamy, 2008; Keller and Lang, 2008; Sirichakwal et al., 2011). They have also been promoted through alternative grass roots channels, such as women's, farmer's and youth unions (e.g. Vietnam), or to specific target groups, like children (e.g. Malaysia) (Hop le et al., 2011; Tee, 2011).

### Evidence

Evidence of the awareness, understanding and use of FBDGs comes from the US, with some evidence from Chile, China, the Philippines and Thailand (Brown et al., 2011; Tanchoco, 2011; Sirichakwal et al., 2011). The evidence suggests that consumers are aware of FBDGs where they exist, but this does not appear to automatically translate into understanding them. Few studies have explicitly measured consumer-intended or actual use of FBDGs (Brown et al., 2011), and the amount of research that evaluates the effect of FBDGs on diet is minimal (Keller and Lang, 2008). The only such study identified – a randomised trial of the effectiveness of a food skills and nutrition education program on FBDGs in urban women aged 26 to 54 years in Iran – found that the community-based intervention led to a significantly lower total daily energy intake (Shariatjafari et al., 2012). Despite these limitations in the evidence, it has been reported that FBDGs are perceived as valuable by key stakeholders (Keller and Lang, 2008).

### Generic healthy eating

#### Actions

Generic healthy eating campaigns involve the development and communication of messages that aim to make the public aware of the importance of healthy eating in general. Over the past 20 years, governments, NGOs, the private sector, and public-private



initiatives have been involved in generic healthy eating awareness campaigns all around the world. Public awareness campaigns to encourage healthy eating have been adopted widely in Europe and North America. In the EU, a survey in 2008-2009 by the European Food Information Council (EUFIC) identified 125 healthy eating campaigns being conducted during the time of the survey, and most countries had more than one (EUFIC, 2013).

The extent of generic healthy eating campaigns in other world regions has not been reviewed elsewhere. One example of a region known to have conducted several such campaigns is the Pacific Island Countries. In the context of very high rates of obesity as well as micronutrient deficiencies, governments have developed a range of activities in partnership with the Secretariat of the Pacific Community (SPC) and international organisations. These campaigns, which have also included the promotion of physical activity, have involved activities such as:

- **Mass media.** In Tonga, a mass (social) marketing campaign (Ma'alahi Youth Project) was implemented as part of the Pacific Obesity Prevention in Communities project between 2005 and 2008 (Fotu et al., 2011a). It involved healthy eating messages in advertising, jingles, interviews, banners, t-shirts and newspaper in TV, radio and print targeted specifically at adolescents in select villages and schools.
- **Dissemination and display of branded materials.** In the Cook Islands, the government developed an education campaign with the logo "Live smart-Be active-Eat wisely" in 2006; as described below, a branded "Let's Go Local" campaign was implemented in Pohnpei in 2005 (Netzler-lose, 2010).
- **Television programmes.** In New Caledonia, the health agency developed a television programme to promote healthy eating and physical activity as part of their "Manger mieux Bouger plus" (Eat Well Move More) public awareness campaign (ASS-NC, 2011). The programme, broadcast in 2011, featured families filmed once a month for six months who had been provided with nutrition education. Each programme assessed the successes and challenges of the families in losing weight and adopting healthier lifestyles.
- **Newspaper and radio.** Governments in some islands have regular slots in newspapers and radio to promote awareness about healthy eating. For example, there is a weekly nutrition-oriented page in one newspaper in Fiji, plus a weekly column by the National Food and Nutrition Centre (W. Swodon, personal communication, June 4, 2012).
- **Public relations events.** American Samoa holds an annual National Healthy Life Style week, which includes events and the distribution of educational materials (Netzler-lose, 2010). Fiji holds a nutrition month every year, with different themes.

Some of the campaigns in the Pacific Island Countries have focused on promoting the value of local foods in conjunction with skills training to promote local food production, as described in the section on Food production skills on page 41. For example, the “Let’s Go Local” campaign in Pohnpei in the Federated States of Micronesia (FSM) uses a social marketing campaign in conjunction with skills training and investment in production to increase consumption of specific cultivars/crops with higher beta-carotene (the focus is vitamin A deficiency rather than obesity/NCDs) (Netzler-Iose, 2010). Launched in 2005, public awareness is spread via T-shirts, billboards, posters, newspaper articles, radio releases, videos, recipes, brochures, pens and pencils, postcards, workshops, talks, and a “Let’s Go Local” song. The campaign also, until 2011, featured an email network – an analysis of all emails up to July 2009 showed that membership had expanded to over 600 listed people from all FSM states and beyond (Englberger et al., 2010a).

Public awareness campaigns focused on generic healthy eating messages have also been implemented by the private sector, i.e. the food industry and media companies, sometimes jointly with governments or NGOs, sometimes on their own. In 2008, the International Food and Beverage Alliance (IFBA) pledged to “promote physical activity and healthy lifestyles” and “raise awareness on balanced diets and increased levels of physical activity” (IFBA, 2012).

A notable example of a media company with a public awareness campaign is the Sesame Street Workshop. The television show features healthy eating messages in the US, and has also developed programmes for the Latin American market. Broadcast throughout the Americas since around 2006 and produced locally, “Plaza Sésamo” is reported to reach millions of kids (Sesame Workshop, 2012). The show has gained particular acceptance in Colombia, where it works in collaboration with well-known advocates for cardiovascular disease prevention, Colombian NGOs, government agencies, and Fundación Cardioinfantil. The shows aim to model positive behaviours in ways that engage children and draw on native foods, festivals, and dance traditions, as well as featuring celebrity guests.

In other cases, generic public awareness campaigns have been led by government in alliance with the private sector. These are increasingly taking the form of “social marketing” campaigns (Evans et al., 2010). A particularly large example is the Change4Life campaign in the UK. Change4Life is an ongoing social marketing campaign established in 2008 to create awareness around obesity (NHS-UK, 2012). It was developed in conjunction with marketing experts based on a programme of market research and academic reviews of behaviour change techniques. Working with entities in the public and private sector (e.g. large supermarket chains, food companies, convenience stores), Change4Life

involves a wide range of awareness-raising activities, including mass media (billboards, television spots), branded materials used by public sector and private sector “partners” and a website. The campaign is structured to enable families to join; when they do so, they receive a questionnaire asking about a typical day in the life of each of their children. Everyone who completes a questionnaire then receives a tailored action plan with advice for each child.

## Evidence

A small number of the campaigns in the Pacific Island Countries have been evaluated. For example:

- The Lets Go Local campaign was evaluated after two years on the basis of a 24-hour recall study. The study found that the average household diet in 2007 had significantly higher micronutrient intake, increased consumption frequency of promoted foods and greater dietary diversity than in 2005. Increased consumption of local food contributed to these changes but it was not clear to what degree the changes were due to changes in social awareness and changes in production, and production skills (Kaufer et al., 2010; Englberger et al., 2010b).
- The Ma’alahi Youth Project, targeted at adolescents in Tonga was evaluated with a longitudinal design (Fotu et al., 2011b). It found after 2.4 years that fewer teenagers in the intervention schools purchased snack foods from shops after school. However, they also reported reductions in regular breakfast consumption, fruit and vegetable consumption and lunchtime activity, and increases in sugar-sweetened soft drink consumption. Consumption of several after-school snacks and the resulting outcomes were more negative in the intervention relative to the control group. Both intervention and comparison groups showed similar large increases in overweight and obesity prevalence, with no significant differences between the groups.

In the UK, government-led evaluations of Change4Life suggest a high level of awareness of the campaign and a sustained level of interest; self-reported feedback also indicated that mothers who had joined the campaign had made changes to their children’s diet and/or physical activity levels (Department of Health, 2010). However, an independent study commissioned by the UK’s Department of Health (a community-based cluster-randomised control trial) found that while the campaign materials achieved increases in awareness of the campaign among the study participants, it had little impact on attitudes or behaviour (Crocker et al., 2012). No evaluations of private-sector led initiatives were identified. Studies specific to social marketing campaigns – both generic and food-specific – have

been subject to systematic review (McDermott et al., 2005). Out of the 28 studies included in the review, 23 reported a significant positive effect for at least one relevant outcome variable, including fruits and vegetable intake, fat intake, other dietary behaviours, and diet-related health variables.

## Fruit and vegetable campaigns

### Actions

On a global level, the number of campaigns specific to fruit and vegetables has grown considerably over the past 20 years. The WHO and FAO are supportive of national fruit and vegetable campaigns. In 2004, the two organisations hosted a conference in Kobe, Japan, the “Joint FAO/WHO Workshop on Fruit and Vegetables for Health” to bring together the evidence and develop a draft framework to guide the development of cost-efficient and effective interventions to promote adequate consumption of fruit and vegetables in Member States (FAO/WHO, 2005).

A key global advocate for the development of these campaigns is the International Fruit and Vegetable Alliance (IFAVA), an organisation with a membership of national campaigns groups and an internal board of directors. IFAVA aims to encourage and foster efforts to increase the consumption of fruit and vegetables globally for better health by supporting national initiatives, promoting efficiencies, facilitating collaboration on shared aims and providing global leadership (IFAVA, 2012).

At the national level, campaigns typically promote the consumption of a certain number of fruits and vegetables a day – such as “5 a day” or “6 a day” (Table 2). The campaigns aim to encourage general populations to increase their consumption of fruits and vegetables through promoting awareness of the benefits of consumption.

**Eat five fruits  
and vegetables  
per day**



**Table 2: Examples of 5 a day campaigns**

	<b>Country</b>	<b>Title</b>
Sub-Saharan Africa	South Africa:	Five a Day for Better Health Trust
Near East (incl North Africa)		
Latin America & Caribbean	Argentina	5 al día
	Brazil	5 ao dia
	Chile	5 al día
	Mexico	5*Dia
Asia & Pacific	Australia:	Go for 2&5®
	Western Australia	
	New Zealand:	The 5+ A Day Charitable Trust
North America	Canada	Fruits and Veggies - Mix it up!™:
	United States	5 a Day for Better Health & Fruits & Veggies More Matters & United Fresh Produce Association
Europe	Denmark:	6 a day
	Finland	Half a kilo a day
	France	10 a day
	Germany	5 am Tag
	Spain	5 al día
	UK	5 a day

Source: IFAVA, 2012

According to IFAVA (2012), these national and regionally based programs tend to be structured and delivered by four core models: public, private, NGOs and public/NGO private partnerships. The majority appear to be some form of public-private initiative. For example, the 5 a day Corporation, which manages the campaign in Chile, is a non-profit organization (founded in 2006) by the Institute of Nutrition and Food Technology and other academic institutions, in conjunction with private sector organisations such as the Association of Supermarkets in Chile, the Chilean Exporters Association, and the National Federation of Fruit Growers Chile. The campaign, which began in 2004, promotes the message “Eat at least two dishes of vegetables and three different coloured fruits every day”. The Corporation is responsible for the design and implementation of campaigns and other educational and promotional activities and public events and seminars, as well as helping to improve the level of horticultural activity. Materials developed to facilitate the achievement of the objective are booklets and leaflets, folders, pencils, notepads and magnets. During 2005-2006, the campaign provided technical advice to the Ministry of Health for the implementation of “5 a Day” through primary care centres (Vio et al., 2008).

It appears that over the past 20 years, not only have more campaigns been developed to promote fruits and vegetables, but, in some countries at least, they have become more sophisticated. In the US, for example, the original “5 a day” program was rebranded in 2007 into the “More Matters” campaign in order to make the message more compelling (Pivonka et al., 2011). Consumer research was conducted to facilitate the rebranding, finding that the most effective messages appealed to mothers’ emotional needs to be responsible.

In Western Australia, the approach to promoting fruits and vegetables has evolved on the basis of ongoing evaluations (Carter et al., 2011). The first campaign in the early 1990s provided information about the importance of consuming more fruits and vegetables. It led to increased awareness but no changes in consumer behaviour. The second campaign which started in 2005 (“Go for 2&5”) provided more specific information on the quantity people should be eating, but again, did not appear to have any behavioural impact beyond raising awareness. The campaign was then refined to include more “provocative” messages, which was attributed with boosting vegetable consumption.

### Evidence

Although evidence suggests that interventions to promote fruit and vegetable consumption can be effective in boosting consumption, the evidence specific to 5 a day and related campaigns has not been systematically reviewed independently of other approaches (Pomerleau et al., 2005). Campaigns in the UK, the US, Australia and Chile have been evaluated, with results that differ between the indicators of awareness and consumption.

- In the UK, an evaluation conducted in 2005 indicated substantial improvements in the awareness of the recommended number of fruit and vegetable portions, the assessment of fruit and vegetable portion size, and the health implications associated with fruit and vegetable consumption (Bremner et al., 2006). The evaluation also suggested an overall increase in fruit and vegetable consumption, but it was not statistically significant. A more recent economic analysis of the campaign disentangled the effects of the campaign from potentially conflicting price dynamics, finding that the awareness campaign could explain a rise in fruit and vegetable consumption by 0.3 portions per person, on average (Capacci and Mazzochi, 2011).
- As already described, in Western Australia, evaluations show that the “Go for 2&5” had a positive impact on knowledge of the recommended intake of fruits and vegetables and, over a three year period, was associated with a population net increase in the mean daily number of servings of fruit and vegetables (Carter et al., 2011; Pollard et al., 2008; Pollard et al., 2009).



- In the US, a recent cross-sectional study of the effects of “More Matters” found that only 2% of the 3021 adults surveyed were aware of the campaign and the 7-13 fruit and vegetable serving recommendations (Erinosho et al., 2012). However, participants were more likely to consume over 5 servings of fruits and vegetables per day if they were aware of the campaign.
- In Chile, the 5 a day campaign was tested on an adult sample (n=1897), finding after one year that recall of the materials was high and that the proportion of people saying they consumed 3-4 servings a day increased from 48.6% to 51.4% (Vio et al., 2008).

In addition, a review of the evidence base on all media and educational campaigns conducted by Mozaffarian et al. (2012), concluded that the weight of evidence suggests that sustained, focused media and educational campaigns, using multiple channels focused on increasing consumption of specific healthful foods (e.g. fruits and vegetables, as well as other “eat more” foods, as reviewed below) are likely to be effective.

### Other “eat more” campaigns

There are relatively few examples of public awareness campaigns aiming to increase consumption of foods and nutrients other than fruits and vegetables. One example comes from a low-fat milk campaign in the US run by an NGO (Reger-Nash et al., 2005). Implemented during a time-limited period in the mid-2000s in a specific community, the campaign was found to be both effective and cost-effective.

Food companies have also developed specific campaigns around “eat more” foods and nutrients. For example, mass marketing of whole grains by large food companies has emerged in the US since 2010 in line with the revision of the FBDGs (Olson, 2011; Daniels, 2012). Another example is the promotion of essential fats by Unilever in Latin America through the television cartoon “Clara in Foodland” (IFBA, 2012; Creamglobal.com, 2010). Created by Unilever and aired on Discovery Kids Channel in Latin America, its main objective is to promote the importance of a healthy nutrition with a strong focus on the importance of essential fats. The show, which aired in 2009 and 2010, was intended for children over 6 years old. Unbranded, it is accompanied by a space within the Discovery Kids website, mobile competitions, and interactive TV/online games. It was reported to be a high ranking show.

## Salt

### Actions

Another food/nutrient targeted by public awareness campaigns, particularly over the past five years, is salt. Campaigns about salt are distinct from the promotion of fruits, vegetables, and whole grains because the aim is to raise consumer awareness of the negative impacts of salt, and to encourage lower consumption. These campaigns have emerged in light of rising concerns about the health impacts of high salt consumption.

At the global level, the WHO (2011a) recommends salt reduction as one of its “Best Buys” for NCDs prevention. In 2006, they convened a technical meeting on salt reduction strategies (WHO, 2007). The report of the meeting identified three pillars for successful dietary salt reduction: product reformulation; consumer awareness and education campaigns; and environmental changes.

Two regional groups have emerged concerned with salt reduction:

- **The Pan-American Health Organization (PAHO), Regional Expert Group for Cardiovascular Disease Prevention through Population-wide Dietary Salt Reduction.** In 2010, this group produced a policy statement which endorsed the three pillars recommended by the experts convened by WHO (PAHO, 2010). It also called on national governments to educate people, including children, about the health risks of high dietary salt and how to reduce salt intake as part of a healthy diet, on NGOs to educate memberships on the health risks of high dietary salt and how to reduce salt intake, and on food companies to develop a web-based ‘toolbox’ with educational materials and programs on dietary salt for the public, patients, health care professionals that are culturally appropriate to sub-regions of the Americas.
- **The European Salt Action Network.** Led by the UK, this network brings together 24<sup>2</sup> countries to share experiences with salt reduction efforts and act as a resource for technical expertise.

Also in the EU, salt reduction was the initial focus of the European Commission’s High Level Group on Nutrition. In 2012, the Directorate for Health and Consumers published a “EU Salt Reduction Framework” with the aim of supporting and reinforcing national plans to reduce salt. The Framework endorsed the three pillars of: product reformulation; consumer awareness and education campaigns; and environmental changes (European Commission, 2012a). Regional meetings on salt reduction have also been held in the WHO Western Pacific Region in June 2010 and in the Africa Region in June 2012.

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<sup>2</sup> Belgium, Bulgaria, Croatia, Cyprus, Finland, France, Georgia, Greece, Hungary, Ireland, Israel, Italy, Malta, Netherlands, Norway, Poland, Portugal, the Russian Federation, Serbia, Slovenia, Spain, Sweden, Switzerland and the UK. WHO/Europe and the European Commission participate as observers

At the national level, the core focus on salt reduction initiatives has been to reduce the salt content of processed foods by the food industry through reformulation (initiatives typically set some form of target for reduction through voluntary agreements). The second key focus has been public awareness campaigns. As of 2010, at least 32 countries<sup>3</sup> had salt reduction initiatives, the vast majority of which – 28 – include public awareness campaigns (Webster et al., 2011). These consumer awareness campaigns have been almost exclusively implemented by governments or NGOs.

In civil society, a key actor here has been an NGO, World Action on Salt and Health (WASH). WASH was established in 2005 and is a global group with the mission to improve the health of populations throughout the world by achieving a gradual reduction in salt intake (WASH, 2012). WASH encourages multi-national food companies to reduce salt in their products, works with governments in different countries to advance the development of salt reduction strategies and raises public awareness through its advocacy activities. WASH has around 455 members from 85 countries, mainly hypertension experts. In Australia, the Australian Division of WASH has also been established to support salt reduction efforts in Australia and in the Western Pacific Region.

## Evidence

It has been reported that five countries – Finland, France, Ireland, Japan and the UK – have demonstrated some impact of salt reduction initiatives, including evidence of changes in population salt consumption (Webster et al., 2011). In Finland, for example, where efforts to reduce salt intake began in the late 1970s, mean population level salt intake fell by 3g (from 12 to 9 g/person per day) between 1978 and 2002 (Laatikainen et al., 2006). The evidence suggests that to effectively change consumer behaviour around salt and, therefore, intake, consumer awareness campaigns are needed, but only in conjunction with other activities including food reformulation, consumer awareness initiatives, and labelling actions.

## Other “eat less” campaigns

### Actions

With the exception of salt, there are few examples of public awareness campaigns designed to discourage the consumption of a specific product or nutrient around the world. Just two notable examples were identified: the anti-sugar campaign in Thailand; and the campaign against sugar-sweetened beverages in New York City, some other parts of the US and Mexico.

<sup>3</sup> Argentina, Australia, Barbados, Belgium, Brazil, Bulgaria, Canada, Chile, China, Cyprus, Denmark, Fiji, Finland, France, Hungary, Ireland, Italy, Japan, Latvia, Lithuania, Malaysia, Netherlands, New Zealand, Norway, Poland, Portugal, Singapore, Slovenia, Spain, Switzerland, UK, US.

In Thailand, the Thai Health Foundation supported the establishment of the “Sweet Enough Network” in 2003 (Thai Health Promotion Foundation, 2010). A group of dentists, paediatricians and nutritionists was concerned about high rates of sugar intake and the increase of obesity, diabetes and dental caries. The network aimed to create social awareness about the dangers of excessive sugar consumption as well as advocating for policies and monitoring. For their public awareness activities, the group developed a logo called Noynoi. Noynoi is used on books, games, and videos in order to entertain and educate children. Noynoi is also featured in some school curriculum materials. In 2004, the Network initiated a movement to eliminate sugar out of 6 months to 3 years old milk formula, which led to the development of a government regulation to prohibit it.

The New York City negative public awareness campaign also focused on sugar – in the form of sugar-sweetened beverages. Termed “Pouring on the Pounds,” the campaign focuses on the message that drinking one 20-ounce soda a day translates to eating 50 pounds of sugar a year. Managed by the New York City Department of Health and Mental Hygiene, the campaign was designed by an advertising agency and features TV spots, subway posters, healthy alternatives flyers and a logo saying “NYC Go Sugary drink Free” (New York City Department of Health and Mental Hygiene, 2013). Originally aired in 2009, the campaign has been implemented in three waves, and has now been used in other jurisdictions. Hawaii, for example, is now running the ad spots adapted to the Hawaiian market. The city government also launched a mass media campaign in 2012 to educate citizens about the links between sugary drinks, weight gain and diabetes as part of the Food Fit Philly campaign (Philadelphia Department of Public Health, 2013). It features TV and radio spots, subway posters and fact sheets, primarily aimed at parents and caregivers of overweight/obese young people.

In Mexico, a mass media campaign warning consumers about the effects of sugar-sweetened beverages was initiated in 2012 in the public transportation system (Alianza por la Salud Alimentaria, 2013). The campaign uses images of the complications of diabetes (e.g. amputations and blindness), querying the contribution of sweetened soft drinks towards these problems.

### Evidence

A review of the evidence base on all media and educational campaigns conducted by Mozaffarian et al. (2012), concluded there is some evidence that sustained, focused media and educational campaigns, using multiple channels focused on reducing consumption of specific unhealthy foods can be effective.

# Nutrition education in community settings

## Chapter 3

### Educational settings

#### Actions

Schools and other education settings have long been considered a primary target to deliver nutrition education. Along with the role of schools in providing education in general, this is based on the rationale that proper nutrition is essential for physical and mental development of children and adolescents; school children are at the phase of life when they are acquiring habits that will last a lifetime; and children are an important link between school and home and community (Olivares et al., 1998).

As such, schools have probably received more attention as a specific setting for nutrition education than any other over the past 20 years. At the global level, the WHO's Global Strategy on Diet, Physical Activity and Health recommends that school policies and programmes support the adoption of healthy diets and physical activity (WHO, 2004). In 2008, to assist Member States in implementing the Strategy at the country level, the WHO published a "School Policy Framework: Implementation of the Global Strategy on Diet, Physical Activity and Health" (WHO, 2008)". The objective was to guide policy-makers at national and sub-national levels in the development and implementation of policies that promote healthy eating and physical activity in the school setting, as well as to recommend changes in the school food environment. For example, the guide recommends the inclusion of nutrition education in school policies and programmes, as a means of:

- Providing knowledge and skills about the relationship between a good diet, physical activity, and health.
- Addressing the safe preparation of food and its consumption as an essential positive and enjoyable aspect of life.
- Allowing students to identify barriers to making healthy food choices and solutions to overcome the identified barriers.
- Providing media and marketing literacy to students, especially related to food and non-alcoholic beverages.
- Involving teachers in imparting health messages to students.

The WHO also hosts the Nutrition-Friendly Schools Initiative (NFSI), in partnership with a range of other international organisations. Developed in follow-up to the WHO Expert

Meeting on Childhood Obesity (Kobe, 20-24 June 2005), the NFSI was developed in the context of the WHO's "Health-Promoting Schools" initiative, founded in 1995 (WHO, 2011b). The main aim of the NFSI is to provide a framework for integrated school-based programmes to address the double-burden of nutrition-related ill health. The concept, similar to the Baby Friendly Hospital Initiative, is for schools to apply for NFSI accreditation status if they fulfil essential criteria, including the nutrition education criteria "developing a nutrition and health-promoting school curriculum" and "creating a supportive school environment." Pilot-tested in 21 countries during 2006–2007, the NFSI is still being developed. In Europe an official WHO EURO Member States Action Network on NFSI was launched in March 2010, with official roll-out and implementation in 2011–2012 involving 20 countries<sup>4</sup>. The NFSI is also reported to be in process of implementation in the WHO EMRO and AFRO regions.

The FAO's work on nutrition education has included building capacity for nutrition education in schools, such as through the following projects (FAO, 2012a):

- **Nutrition Education in Primary Schools in Argentina, 2006 to 2009.** This project aimed to address the inadequate incorporation of nutrition education in schools by strengthening the capacities of the education sector to deliver effective nutrition education, as a complement to the national initiative of the Scientific Alphabetization Project promoted by the Ministry of Education, Science and Technology. It included designing strategies and actions to integrate food and nutrition education into the curriculum of grades 1-7, and developing and promoting the use a set of educational materials for school directors, teachers and pupils. These materials were prepared, reviewed and subsequently reproduced and used in the training of teachers. They were tested in eight intervention schools in 2008.
- **Supporting the development of basic education curriculum to improve education in nutrition and food security in El Salvador, 2006 –2008.** This project aimed to enhance the development of a basic education curriculum in areas related to nutrition and food security beginning with 12 pilot schools and 3 controls in the three regions of the country. It incorporated the strengthening of basic education curriculum, teacher training, Healthy School Stores and a teaching tool for use with school gardens.
- **WHO/China School Nutrition Project.** As part of its technical assistance to the Government of China in the promotion of health-promoting schools, WHO collaborated with FAO in six pilot schools in Zhejiang Province with a focus on nutrition. FAO provided technical assistance in the field of nutrition education (curriculum and material development), capacity building among local education, nutrition and health professionals, as well as in project design, implementation, and monitoring and evaluation.

<sup>4</sup> Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Bulgaria, Croatia, Denmark, Finland, Georgia, Germany, Hungary, Ireland, Malta, Montenegro, Poland, Portugal, the Russian Federation, Serbia, Spain and Uzbekistan.



- **In the ENACT (Education for effective Nutrition in Action) project, which began in January 2012** FAO will produce, pre-test and disseminate a basic certificate at undergraduate level which will implement the best practices of professional training in dietary promotion. The materials will be available for online, face-to-face or blended use and will be piloted in all these formats with both national and international partners, in order to adapt them to local context and consumer needs. The project was developed based on a needs assessment conducted in 2010, which found, on the basis of a review of the literature and case studies in seven African countries (Botswana, Egypt, Ethiopia, Ghana, Malawi, Nigeria and Tanzania) suitable approaches and relevant training for nutrition education were lacking or irregularly available in most sectors and settings and for most professional groups (FAO, 2012b).

To provide insights into the degree to which nutrition education is taught in primary schools in middle- and low income countries, FAO and the Netherlands Nutrition Centre conducted a country survey in 1998 (Olivares et al., 1998). In the survey, FAO sent a questionnaire to 55 countries in Asia, Africa, Latin America, the Caribbean, and the Near East. Eighty replies were received from 50 countries, from ministries of education and health, universities and national programmes and NGOs involved in nutrition education. The percentage of countries in which there were official policies, rules or guidelines issued by the Ministry of Education for nutrition education in primary schools ranged from 53% (Latin America) to 83% (the Caribbean). Over 80% of the responses indicated that the nutritional contents were part of other subjects, courses or extracurricular activities (e.g. health education, biology, home economics, agriculture). Only in the Caribbean was there a significant percentage of countries (57%) where nutrition was taught as a separate subject. Overall, 49% of the managers and professionals who responded to the survey thought nutrition education in primary schools was poor or very poor (15 percent believed it to be good). The inclusion of nutrition in the training curriculum of primary education teachers was found to be 86% of countries in Africa, 67% of the countries of the Near East and the Caribbean, 47% in Latin America and 22% in Asia.

- The PepsiCo “Vive Saludable Escuelas” programme in Latin America (Mexico) launched in 2006 includes a “Healthy Schools” component with the stated objective of “promoting healthy lifestyles among children” (Vive Saludable, 2013). Along with promoting physical activity, it provides educational games installed on school computers to teach children “principles for a healthy life.” According to PepsiCo, the program has reached more than 1 million children in 4,000 schools.
- The EducAnimando con Salud programme in Peru is an example of a education programme delivered by an NGO, but funded by the private sector. Initiated in 2007 in Villa El Salvador, it is delivered in schools by the NGO (Prisma), with the financial support of Inca Kola and Coca Cola. It uses puppets, music and games to encourage

physical activity and healthy eating behaviours among children aged 6 to 9 years old. Materials are co-branded with the Inca Kola and Coca Cola logos (Fundacion Inca Kola, 2013; Coca Cola Peru, 2013; Prisma, 2013).

- The Nestlé Healthy Kids Global Programme started in 2009 with the objective of “raising nutrition, health and wellness awareness of school-age children around the world” (Nestlé, 2012a). At the end of 2011, there were reported to be 65 programmes operating in 60 countries (e.g. Belarus, Bulgaria, Czech Republic, Georgia, Jamaica, New Zealand, Nigeria, Panama, Serbia, Trinidad and Tobago) reaching more than six million children. Another 21 are planned for 2012 to 2014 (Nestlé say they intend to implement the scheme in all countries where they have direct operations). To implement the programme, Nestlé works with other organisations including NGOs, nutrition institutes, national sport federations and local governments. For example, in Nigeria the programme is supported by the Centre for Health, Population and Nutrition and the Nigerian Lagos State Government. Launched in 2011 for 8 to 10 year olds, it trains teachers and provides textbooks (Nestlé, 2011). In Ecuador, the “Nutrir” programme is implemented in partnership with government ministries, and provides teaching material in schools, with lessons given through a combination of games, songs and teaching materials (Nestlé, 2012a).

### Evidence

The evidence-base on actions taken in schools to change food and nutrition awareness, attitudes and skills mainly comes from research interventions rather than actual programmes initiated by government or the private sector. Recent examples include:

- In Trinidad and Tobago, a randomised controlled trial found that an education-only intervention in schools led to lower intake levels of fried foods, snack foods high in fat, sugar and salt and sodas (Francis et al., 2010).
- In Northern India, a controlled trial evaluating a multi-component nutrition intervention in urban adolescents (implemented in the context of concerns about obesity) showed that six months later, the intervention group had improved knowledge, lower consumption of sugar-sweetened drinks and energy-dense foods, greater fruit consumption, and lower BMI (Singhal et al., 2010).
- Randomized controlled trials in Brazil and the UK showed that educational interventions to reduce soft drink consumption were effective (James et al., 2004; Sichieri et al., 2009).
- In Norway, an intervention involving fact sheets to parents and classroom components, led to significantly lower intake of sugar-sweetened beverages among girls in the intervention group after 8 months; boys were not affected (Bjelland et al., 2011).
- In Brazil, a randomized controlled trial found that an education-only intervention involving monthly magazines and newsletters aimed at promotion of healthy eating in ten public schools in Brasilia had no impact on eating behaviours (Toral and Slater, 2012).

The evidence on the effect of school-based interventions to promote fruit and vegetable consumption (largely from Europe and the US) has been subject to systematic reviews. One of the questions addressed by these reviews is the effect of education-only interventions, versus those which change the fruit and vegetable environment. For example:

- A review published in 2012 concluded that the weight of evidence was generally in favour of the effectiveness of programmes which provide free fruits and vegetables in schools (Mozaffarian et al., 2012).
- In Europe, a systematic review of 42 research studies found limited evidence that education interventions can improve dietary intake in children, limited evidence that environmental interventions can boost fruit and vegetable intake, but strong evidence that multi-component interventions including both education and changes to the environment, increase fruit and vegetable intakes. In adolescents, there was moderate evidence that educational interventions can improve intake, inconclusive evidence from environmental interventions, and inconclusive evidence from multi component interventions (Van Cauwenberghe et al., 2010).
- A global review found that 70% of the evaluated interventions designed to increased fruit and vegetable intake reported positive outcomes. It was not possible to unravel the effect of the different components of the interventions, but it was noted that three single component studies were not successful (da Sa and Lock, 2008).
- In the United States, Howerton et al. (2007) concluded from a review of seven randomized controlled trials that interventions designed to increased fruit and vegetable intake have a modest but positive effect.

Some of these studies found that education had a weaker effect than environmental changes. Bere et al. (2006a) evaluated the effect of a program aimed at increasing consumption of fruits and vegetables in Norway. It involved education in the classroom and the provision of fruits and vegetables at low cost. The programme increased awareness but not intake. A later study found that when the program involved providing free fruits and vegetables consumption increased (Bere et al. 2006b).

Covering all foods rather than just fruits and vegetables, Mozaffarian et al. (2012) found consistent evidence in support of multi-component interventions focusing on both diet and physical activity in schools, including specialised educational curricula, supportive school policies, a parental/family component, and healthy foods and drinks in schools.

Given the variation in results of education interventions in schools, Van Stralen et al. (2011) conducted a systematic review to identify the psychosocial and environmental mediating mechanisms underlying behavioural change in school-based interventions. It found indications that pre-existing attitude, knowledge and habit strength to be mediators of dietary behaviour interventions in schools. Combined, this research suggests that the

effect of nutrition education in schools likely depends on subgroup, nature of intervention etc. leading experts to conclude that more reporting is needed of formative research, process findings and details about intervention trials in order to be able to identify why some interventions work and others do not (Gittelsohn and Kumar, 2007).

### Workplaces

#### Actions

Workplaces are other sites that have been used to change awareness, attitudes and skills towards healthy eating. Actions thus far tend to be incorporated into broader “workplace wellness” initiatives. These initiatives are reported to be growing in number and scope around the world in the context of growing prevalence of NCDs “as employers come to realise that addressing employee health and wellness is linked to increased productivity and reduced absenteeism, and that the return on this strategic investment and overall health cost savings are high” (C3 Collaborating for Health, 2011).

In contrast to schools, workplace initiatives tend to be led by the private sector. At a global level, the private-sector led World Economic Forum has an alliance dedicated to workplace health. Part of the World Economic Forum’s Health Initiative on Chronic Disease Prevention and Well-Being, the Workplace Wellness Alliance is a consortium of companies “committed to advancing wellness in the workplace” (World Economic Forum, 2012).

Delivering health initiatives at workplaces is an approach endorsed by the WHO’s Global Strategy on Diet, Physical Activity and Health, including initiatives to promote healthy eating (WHO, 2004). Workplace initiatives are also referred to in Political Declaration of the UN High-Level meeting on NCDs, which called on the private sector to “promote and create an enabling environment for healthy behaviours among workers” (United Nations General Assembly, 2011).

The degree to which nutrition education is embedded in workplace health initiatives varies, but overall, evidence suggests it tends not to be the dominant component. A survey of worksite initiatives at 1,248 organizations based in 47 countries (representing more than 13 million employees) found that healthy eating or NCDs were leading factors driving the growth of wellness initiatives in Australia, the US, Africa, and Latin America (Buck Consultants, 2010). However, lack of physical activity and stress were more important

driving factors overall. The survey also found that the proportion of programmes with “on-site healthy lifestyle classes/programmes” (likely, but not necessarily, to include some nutrition education) ranged from 44% in Australia to 65% in the US (Buck Consultants, 2010). Examples of workplace wellness initiatives with nutrition education components include:

- **Grupo Bimbo Healthy Company Program.** This programme of the Mexican transnational food company is reported to include health insurance incentives for nutritional counselling or gym memberships, on-site fitness centres and recreation areas, courses, talks, and publications on weight loss and nutrition, and a “Healthy Cafeteria” (IFBA, 2012).
- **Nestlé’s “Nutrition Quotient” nutrition training programme.** Initiated in 2007, this training programme aims to reach all of its 300,000+ employees around the world (Nestlé, 2012b). The programme involves nutrition literacy as well as more advanced training relevant to product design and communication. Some countries have their own specific initiatives. For example, in 2005, Nestlé India launched an internal programme targeted at employees called “Wellness in Action” with the objective of encouraging employees to make informed choices about their diet and to enjoy a more active life, including free diet counselling and specific campaigns about weight and heart health.
- **Novartis’ “Be Healthy.”** Launched in 2011, “Be Healthy” is based on four pillars: (1) Move: increase physical activity and decrease sedentary behaviour, (2) Choose: healthy foods and eat appropriately to keep in top shape at work and at home, (3) Know: know your numbers so that you can take control of your health, (4) Manage: provide support for associates with disabilities or illnesses to maintain or regain their ability to perform at home and at work (Novartis, 2013). Participating sites are reported to encourage the availability of healthy food options at Novartis on- and off-site events, accompanied by a labelling system.

## Evidence

The effects of worksite initiatives to encourage healthier eating have been subject to research, most of which comes from the US and Europe. This research has been systematically reviewed, including over 80 studies. Like the research literature on schools, these reviews consider the different effects of education-interventions relative to changes to the food environment in the workplace. The four most recent of these reviews found that:

- Educational interventions in the workplace produce a positive effect on dietary behaviour (found in all except two of the reviewed studies). The only environment-only interventions included in the review reported a significant effect on the consumption of fruit and vegetables. Out of seven multi-component studies, six reported positive changes and three of these programmes sustained the effect over the long term (Maes et al., 2011a).
- Worksite interventions are effective in improving fruit and vegetable and fat intake (the only outcomes measured), but the effects are relatively small, and the results are typically based on self-reported behaviours. Findings of environmental interventions, or environment combined with education interventions, were generally positive, but typically had smaller effects than individual level interventions (Mhurchu et al., 2010).
- Worksite interventions have positive impacts on employees' nutritional knowledge, food intake and health and on the firm's profitability, mainly in terms of reduced absenteeism and presenteeism (this review included only randomized control trials and quasi-experimental studies) (Jensen, 2011).
- Worksite interventions led to an increase of fruit and vegetable intake by 0.19 servings per day and vegetables of 0.17 g per day. Outcomes for fat were mixed. Two studies that considered fibre found increased intake; studies on meat consumption found no effects (Thorogood et al., 2007).

### Other community settings

#### Actions

Nutrition education can also be conducted in other community settings. One notable programme in Europe which involves a broad range of community settings is EPODE ('Ensemble prévenons l'obésité des enfants', or 'Together, let's prevent obesity in children'). Initiated in France in the early 1990s, EPODE is a community-based nutrition and lifestyle education programme aiming to reduce childhood obesity through a societal process in which local environments, childhood settings and family norms are directed and encouraged to facilitate the adoption of healthy lifestyles in children (Borys et al., 2012). EPODE started in 10 French towns, and has since spread to over 225 French communities, as well as Belgium, Spain, Greece and the Netherlands (Borys et al., 2012; Epode European Network, 2013). It includes a school-based nutrition education programme, as well as educational workshops and the provision of information in other community settings. EPODE involves stakeholders at all levels across the public and the private sectors through "public private partnerships".

A notable community-based programme in the US is the Expanded Food and Nutrition Education Program (EFNEP), delivered by Cooperative Extension services in a variety of sites, clinics, children's centres, family resource centres, job clubs, as well as individuals at home. EFNEP is designed to assist "limited-resource audiences in acquiring the knowledge, skills, attitudes, and changed behavior necessary for nutritionally sound diets, and to contribute to their personal development and the improvement of the total family diet and nutritional well-being" (USDA, 2009). The programme aims to reach low-income adults who are responsible for planning and preparing food at home, especially expectant mothers and those with young children. It also aims to address the nutritional needs of youth through the K-12 classroom setting and extracurricular programs.

### Evidence

The effect of the first EPODE programme initiated in France in 1992 has been evaluated using a repeated, cross-sectional study. The evaluation demonstrated reduction in childhood overweight among school-age children (5-12 years) in the pilot towns over 12 years (as shown by a) (Romon al., 2009).

EFNEP has also been subject to regular evaluations (USDA, 2012). These evaluations have found that over 90% of participants receiving the nutrition education reported more closely following the US FBDGs, including an increase of servings of fruits and vegetables; 88% reported improved nutrition practices, such as making healthier food choices and reading nutrition labels; and 83% improved food resource management practices, such as planning meals and shopping with a grocery list (USDA, 2010).





# Dietary advice to individuals

## Chapter 4

### Primary care settings

#### Actions

The Alma Ata Declaration on Primary Health Care stated specifically (paragraph VII.3) that “Primary health care [should] include at least: education concerning prevailing health problems and the methods of preventing and controlling them; promotion of food supply and proper nutrition” (WHO, 1978).

There is potentially a wide range of mechanisms for integrating nutrition education into primary care, including nutrition counselling: self-help material and computer-tailored messages (McKevith et al., 2005). Nevertheless, evidence suggests that the practice of dietary counselling in primary care settings is not very widespread on a global scale, whether provided by general practitioners, nurses, or dietitians. For instance, a survey of 185 countries by WHO in 2010 on country capacity to address NCDs showed that 60% of countries had developed management guidelines for dietary counselling in primary care – a reasonably high proportion, albeit far from 100%. Yet only 15% of countries reported that these guidelines were being implemented in the primary care setting (WHO, 2012b).

Examples of countries with national frameworks for integrating nutrition education into primary care are Brazil and South Africa. Brazil has a policy of providing nutrition education through its Universal Health System, the Sistema Único de Saúde (Ministry of Health Brazil, 2012). That this system should provide dietary guidance is written into law (Law 8.080/90), though the extent of the practice is not known. In 2011, the Ministry of Health deployed 31,900 Family Health Teams in 5,279 municipalities (representing 52.8% of the Brazilian population) to support the work of primary care providers, including in providing nutrition education. Recommended actions include promoting healthy eating in routine patient visits and promoting guidance on the consumption of foods high in fats, sugar and salt (Constante Jaime et al., 2011).

South Africa has an Integrated Nutrition Programme (INP) located within a primary health care framework. Adopted in 1994 after the election of the democratic government, the INP has three main components: health facility-based nutrition programmes and strategies; community-based nutrition programmes and strategies; and nutrition and HIV/AIDS support programmes and strategies. Nutrition education is, in theory, an important component of the INP, as is nutrition support and counselling during disease and recovery

using nutrition protocols and guidelines. However, despite the adequacy of written policy in these areas, analyses of selected interventions suggest that implementation of the INP overall in primary health care is sub-optimal (Swart et al., 2008).

In countries members of the Organisation for Economic Co-operation and Development (OECD), it has been reported that such nutrition education is not offered systematically, and is generally provided in response to specific individual demands (Sassi et al., 2009). For example:

- In a review of frequency of behavioural counselling in primary care settings for the prevention of cardiovascular disease, Bock et al. (2012) found that, mainly based on studies from the US, physicians in a range of primary care settings were far less likely to provide nutrition counselling than smoking cessation activities.
- A nationally representative survey in 2008 found that fewer than 50% of 1211 primary care practitioners in the US reported providing specific guidance on diet, physical activity, or weight control to overweight and obese patients (Smith et al., 2011).
- The amount of time dedicated to discussing dietary changes where education is provided varies between 55 seconds (from direct observation studies) and 5 minutes (for self-reported studies) (Bock et al., 2012).
- A survey of family practitioners in British Columbia, Canada, found that 58% believed their patients would benefit from nutrition counselling, but a relatively small proportion of these patients actually received counselling (Wynn et al., 2010).

### Evidence

There is a considerable research literature in the area of nutrition education in primary care settings, covering a wide range of questions and settings. Systematic reviews of this literature, which mainly consists of randomized controlled trials, have identified a variety of findings, which are summarised in Box 2.

### E-learning

#### Actions

A clear trend over the past 20 years has been the rising use of technology in nutrition education. E-learning refers to the use of Internet technologies to deliver knowledge and behaviour change<sup>5</sup>. Delivered to the end-user via a computer using standard Internet technology, e-learning can be delivered to groups in specific settings and to (and by)

<sup>5</sup> The term "e-learning" may also refer to distance-based learning at universities and other educational institutions.

**BOX2****Conclusions from systematic reviews  
of the literature on nutrition education in primary care settings**

Crouch et al. (2011) concluded that in rural Australia, dietary modification programmes delivered by primary care providers in primary care settings to patients at low risk do not sustain an effect over a longer period of time.

Dansinger et al. (2007) concluded from a meta-analysis that dietary counselling interventions of adults produce modest weight losses that diminish over time.

Fleming and Godwin (2008) concluded that lifestyle counselling interventions delivered in primary care settings to low-risk adult patients appear to have only a marginal benefit in changing factors related to cardiovascular risk.

Harris et al. (2012) concluded that one-to-one dietary interventions in the dental setting can change dietary behaviour; the evidence is greater for interventions aiming to change fruit/vegetable consumption than for those aiming to change dietary sugar consumption.

Hooper et al. (2004) concluded that intensive dietary advice and support to reduce salt intake in primary care settings leads to lower salt intake; it also lowers blood pressure, but only by a small and insignificant amount.

Oostdam et al. (2011) concluded that dietary counselling in a primary care settings can lead to reduce incidence of gestational diabetes.

Sargent et al. (2001) concluded that effecting behaviour change via a combination of counselling, education, written resources, support and motivation in primary care setting, can be effective in treating childhood overweight and obesity.

Schadewaldt and Schultz (2011) concluded that nurse led clinics involving health education, counselling behaviour change and promotion of a healthy lifestyle to cardiac patients have limited success in modifying diet adherence.

Taggart et al. (2012) concluded that group and individual interventions of varying intensity in primary health care and community settings are useful in supporting sustained change in health literacy for change in behavioural risk factors. However, community-based interventions aiming to improve health literacy for diet are more effective than those delivered in a primary care setting.

McKevith et al. (2005) concluded from a non-systematic review in the UK that interventions in primary care settings to encourage healthier food choices have generally been more successful with higher risk individuals and that primary care interventions are more likely to be useful in groups that have regular contact with their health care providers, such as pregnant women and older people.

individuals. E-learning approaches specifically tailored to individuals (“computer-tailored interventions”) have emerged as a new and potentially cost-effective type of health promotion programme because they enable personalisation of health education without the costs of interpersonal counselling (Maes et al., 2011b). No information was identified on the extent of e-learning for nutrition education around the world.

### Evidence

There is a research literature in e-learning, which has been subject to two systematic reviews. These reviews conclude that:

- Computer-tailored interventions can have significant effects (found in 20 of 26 of the randomised controlled trials reviewed). The evidence is most consistent for the effect of tailored interventions on fat reduction, though more research is needed (Kroeze et al. 2006).
- While e-learning interventions can be associated with increasing intake of fruits and vegetables, dietary fibre, and lower fat intakes, the current clinical and economic evidence base suggests that e-learning devices designed to promote dietary behaviour change do not produce clinically significant changes in dietary behaviour and are at least as expensive as other individual behaviour change interventions (Harris et al. 2011). This review included 43 e-learning interventions, all delivered in high-income countries (29 in the US, 5 in the Netherlands, 3 in Belgium). Many interventions were offered over the internet or via a mobile device without a specific setting. Of those that were delivered in a specific setting, nine were designed to be delivered in the home, eight in the workplace, three in community centres, four in schools/colleges and two in supermarkets.

# Policies and programmes on skills

## Chapter 5

### Cooking skills

#### Actions

There are several settings in which cooking skills can be taught as a means of nutrition education, such as through the school curriculum, classes for the general public, or community kitchens. There is a general lack of information on the extent of the teaching of cooking skills around the world, although some limited information was identified about community kitchens. Community kitchens are community-focused and initiated cooking programmes often involving low-income groups which aim to develop food skills and empower individuals in addition to basic nutrition education and cooking skills (Iacovou et al., 2013). They often operate in settings with existing kitchens accessible to community members, such as community centres, churches and schools.

Community kitchens have been established in Australia, Canada, the UK and the US (Community Kitchens Northwest, 2012). They are reported to have been initiated in Canada in the 1990s, in Vancouver, British Columbia (Fresh Choice Kitchens, 2012). The first Australian Community Kitchens began in Victoria in 2004, and have since expanded across the state and to other parts of Australia (Community Kitchens Australia, 2009).

A particularly notable example of a middle income country with community kitchens is Peru. Comedores Populares are an important channel for the provision of food to families living in poverty in Peru. They were originally established in 1978 by low-income women as a community-based strategy in response to the economic crisis and poverty (Li Chan, 2008). Today, there are more than 15,500 Comedores Populares producing hot lunches on a daily basis. It has been reported, however, that the foods served do not consider the high levels of NCDs in Peru – such as rarely incorporating fresh fruits and vegetables (Francisco Diez Canseco, personal communication). A research project initiated by the Centre of Excellence for Chronic Diseases at the Universidad Peruana Cayetano Heredia in Lima is exploring options to promote the adoption of healthy dietary habits among poor inhabitants of urban communities who are suppliers or consumers of Comedores Populares in Lima (Cronicas, 2012). The aim is to produce information to inform the design and implementation of interventions for promoting healthier diets in Comedores Populares through increasing the consumption of fruits, and reducing the use of products with high saturated fat and salt in the prepared food.

## Evidence

A systematic review published in 2012 explored the effects of community kitchens (Iacovou et al., 2013). The review, of ten studies (eight qualitative studies, one mixed-method study and one cross-sectional study) provides some evidence that community kitchens may be an effective strategy to improve participants' cooking skills, social interactions and nutritional intake. It also concludes that community kitchens may also play a role in improving participants' budgeting skills and address some concerns around food insecurity.

## Food production skills

### Actions

Food production skills, such as agriculture, horticulture and fishing skills, are another aspect of nutrition education. The development of these skills in a nutrition context has mainly concerned efforts to reduce undernutrition in poor communities in low- and middle-income countries, especially involving women and homestead/local gardening/livestock raising/aquaculture. The FAO Nutrition and Consumer Protection Division has played a role supporting these efforts at the global level through producing training materials such as "Improving Nutrition through Home Gardening" (FAO, 2010). Civil society has also been a key stakeholder in this area, with international NGOs such as Helen Keller International supporting homestead gardening projects (Hellen Keller International, 2013). Actions to encourage food production skills in this context have increased considerably in the past 20 years as part of "food-based" approaches to addressing undernutrition, particularly micronutrient deficiencies (Thompson and Amoroso, 2011).

Actions to promote food production skills as a means of encouraging healthier diets in a NCD context have been fewer, but are emerging. As for the undernutrition context, these initiatives typically involve NGOs. For example, in the Federated States of Micronesia, the "Island Food Community of Pohnpei" was established as an NGO in 2003 (Island Food Community of Pohnpei, 2013). Its mission is to promote the production, consumption, local marketing of locally grown island foods to both attain a greater degree of food security and help protect against vitamin deficiencies, diabetes, heart disease and anaemia. The NGO works to motivate local farmers to sustainably increase production of nutrient-rich crops for use in the home and sale at local markets. In Nauru, the Horticulture Project aims to address the high incidence of diabetes by encouraging a healthier lifestyle. Part of the project aims to promote five varieties of fruit and vegetable suitable for cultivation, as well



as “import substitution” (that is, the consumption of domestic rather than imported goods). It involves introducing horticulture skills that use local planting materials for cultivation and plans to support the Eat Healthy, Live Healthy program by distributing vegetables to provide free breakfasts to 800 schoolchildren per week (ICDF, 2011).

In the Caribbean, the Caribbean Farmers Network (CaFAN) is a regional NGO comprised of farmers’ organizations that collectively represent over 500,000 smallholder farmers across 15 Caribbean countries (CaFAN, 2011). Since 2002 with the support of the Technical Centre for Agricultural and Rural Cooperation, CaFAN has been working to enhance Caribbean food and nutrition security alongside enhancing farmers livelihoods in the context of very high rates of NCDs. One of their projects aims to promote the consumption of local roots and tubers among local people, while also contributing to import substitution. The project is reported to have successfully boosted the production of roots and tubers in four member countries through training and capacity building initiatives, sharing experiences and best practices, and identifying new market opportunities.

School gardens have also been developing over the past 20 years in what is termed “garden-based nutrition education.” FAO characterizes school gardens as having two things in common (FAO, 2006):

- School children actively help parents and other interested community member in creating and maintaining the garden, and;
- School children use the garden - for learning, for recreation and by eating what is harvested.

FAO has developed a set of tools and advocacy materials to promote garden-based learning and nutrition education and develop national capacities, i.e. Setting up and running a school garden – A manual for teachers, parents and communities (FAO, 2005); Setting up and running a school garden. Teaching Toolkit (FAO, 2010a) and A new deal for school gardens (FAO, 2010b). FAO has supported national school gardening initiatives in Bahamas, Brazil, El Salvador, Honduras, Nicaragua and South Africa, where the emphasis is typically on increasing fruit and vegetable consumption. In the high-income countries, garden-based nutrition education is gaining increasing credibility as a health intervention. Again, NGOs have played a critical role. In the UK, for example, the Royal Horticultural Society has a Campaign for School Gardening. In the US, NGOs have developed garden-based nutrition education curriculum for use in schools with the goal of encouraging greater fruits and vegetable consumption among children (Healthy School Environment, 2012). Home and school gardens have also been popularised by public figures like First Lady Michelle Obama and the chef, Alice Waters.

## Evidence

In the context of undernutrition, there is evidence that home gardening and related interventions can promote the consumption of food rich in protein and micronutrients (Berti et al., 2004; Masset et al., 2012). The evidence-base in this area is growing owing to the increasing amount of research into agriculture and nutrition linkages (Hawkes et al., 2012). There is also a modest literature on the effect of garden-based nutrition education in the US. A systematic review of the evidence – including three studies on school grounds integrated into the school curriculum, three studies of afterschool programs, and three in a community setting among youth –concluded that they have the potential to promote increased fruit and vegetable intake among youth and to increase willingness to taste fruits and vegetables among younger children (Robinson-O’Brien et al., 2009). The same conclusion was drawn in a non-systematic review published in 2010 (Oxenham and King, 2010).

# Changing the food environment

## Chapter 6

### Foods available in educational settings

#### Actions

**A**long with recommending actions to increase the amount of direct nutrition education in schools (see section Educational Settings on page 26), the WHO encourages schools to establish a healthy school food environment (WHO, 2008). The actions that can be taken to promote a healthy food environment partly depend on the channels through which foods are available in schools, which varies between different countries and regions. Channels include:

- School meal provision
- Food available at “tuckshops” and kiosks
- Foods such as sandwiches and drinks available at snack bars
- Vending machines
- Vendors and shops in the immediate vicinity of the school

Evidence suggests that over the past 20 years, national and local governments (e.g. state, city) around the world have been taking actions to improve school food environments, either through mandatory or voluntary mechanisms. Four types of actions have been taken (Hawkes, 2010a):

- I. Setting food- or nutrient-based standards for foods available in schools. This approach has been taken by a range of high and middle-income countries;
- II. Setting food- or nutrient-based standards for foods available through specific channels (e.g. meals, or vending machines). For example, the French government banned the use of vending machines in educational facilities in 2004.
- III. Setting standards for foods available in the immediate vicinity of school. Examples include Fiji and South Korea.

- IV. Restricting specific types of foods. This is most notable in the case of soft drinks. As of 2008, at least 30 countries around the world had taken action to restrict soft drink availability (Hawkes, 2010a). Some policies dictate which drinks are permitted and which are not; others categorise drinks according to how frequently they should be served (e.g. the “traffic light” system in Australia) or set limits on portion size and/or times of day when drinks can be sold (e.g. state laws in the US).
- V. Making specific foods more readily available. The most prominent actions here are fruit and vegetable initiatives. For example in 2008, the EU introduced a School Fruit Scheme. With a budget of €90 million per year, the scheme supports national initiatives to provide fruit and vegetables to school children. In 2010/11 it had been taken up by 24 of the 27 EU Member States (European Commission, 2012b).

Actions in schools have also been taken by the food industry, most notably the soft drinks industry. Between 2005 and 2012, the soft drinks industry developed a range of pledges covering the drinks available in schools, including:

- The US has the most comprehensive voluntary industry initiative. The American Beverage Association School Beverage Guidelines were published in 2006 following negotiations with the NGO, Alliance for a Healthier Generation, a Clinton Foundation initiative. The guidelines, which were signed by Coca-Cola, PepsiCo and Cadbury Schweppes, restrict all full calorie sugar-sweetened soft drinks from schools.
- In Canada, the trade association, Refreshments Canada, published “Industry Guidelines for the Sale of Beverages in Schools” in 2007, which are the same as the guidelines in the US. Coca-Cola Ltd Canada and PepsiCo Canada pledged to follow the guidelines.
- In Europe, the Union of European Beverages Associations (UNESDA) made a commitment to the EU Platform on Diet, Physical Activity and Health in 2006. In it, UNESDA members pledged to ensure a full range of drinks is available in secondary schools (that is, there were no restrictions). There are over 100 signatories to the commitment.
- In Australia, the “Commitment Addressing Obesity and Other Health and Wellness Issues” of the Australian Beverage Council Ltd states that companies will withdraw sugar-sweetened carbonated soft drinks from secondary schools where requested by government, school authorities or parents.
- In 2010, PepsiCo published a “Global Policy on the Sale of Beverages to Schools” in 2010 (PepsiCo, 2010). Scheduled to be implemented in early 2011, the policy set standards for their drink brands available in primary and secondary schools, including the exclusion of full calorie sugar-sweetened drinks.

## Evidence

The research on school-based interventions in general was reviewed in the section on Educational settings on [page 22](#) and [23](#). Though the focus of this research was on direct education interventions, it also indicated some positive results from environmental-only interventions, and interventions including both education and environmental change (Van Cauwenburghe et al., 2010). In addition, Jaime and Lock (2009) systematically reviewed the results of research-based interventions involving changes to the school food environment, finding that:

- In most cases, interventions lead to a decline in fat and saturated fat on meal menus
- In all cases, interventions lead to increased fruit and vegetable availability
- In the majority of cases, interventions are associated with changes in students' dietary intake (fat and fruit and vegetable intake).

These results are supported by an earlier evaluation of a multi-component intervention in schools in Finland. The randomized control trial found that the changes to the nutritional content of school meals alongside education and media campaigns led to reduced fat in school meals, fat intake, and cholesterol levels (Shepherd et al., 2001).

A more recent review of studies specific to the US also found positive results. It was found that policies which restrict the availability of unhealthy snack foods and beverages have the effects of reducing the availability, purchase and consumption of unhealthy snack foods and beverages, reducing caloric intake and increasing the availability of healthier options, such as fruits and vegetables (Snelling and Yezek, 2012; Chriqui, 2012). Policies that restrict unhealthy snack foods are also associated with lower proportions of overweight or obese students, or lower rates of increase in student body mass index. Policies that only apply to some venues but not all (e.g., to vending machines, but not school meals) are not as effective as comprehensive policies that apply to all venues. However, most studies show that school-based policies are not associated with students' dietary changes outside of school.

There are also a limited number of results from specific implemented initiatives. In the EU, it has been reported that the School Fruit Scheme has led to an increase in the amount of fruits and vegetables consumed by children (European Commission, 2012c). Evaluations of specific initiatives suggest that the consumption effect varies between different groups of children, such as girls consume more than boys. The soft drinks industry has also reported on results of their voluntary pledges. For example, in 2012, Wescott et al. (2012) reported that between 2004 and 2009/10, the soft drinks industry reduced calories shipped

to schools by 90% in the US; on a total ounces basis, shipments of full-calorie soft drinks to schools decreased by 97%.

### Food in workplaces

#### Actions

Workplace wellness initiatives have already been reported. These initiatives may include actions to improve the nutritional quality of foods available in the workplace in addition to direct education. The 2010 survey of 1248 initiatives by Buck Consultants (2010), found that the proportion of workplace wellness initiatives involving healthy food options in cafeterias ranged from 20% in Africa to 4% in Asia.

#### Evidence

Research studies of worksite interventions suggest that changes to the food environment in the workplaces can have a modest but positive effect on fruit and vegetable intake. These studies come largely from high-income countries. A more recent study from Brazil had the same finding (Bandoni et al., 2011). The randomized intervention of 29 companies found that menu planning, food presentation and motivational strategies to encourage the consumption of fruits and vegetables increased their availability and led to a slight but still positive increase in the workers' consumption of fruits and vegetables in the meals offered by the companies.

### Nutrition labelling

#### Actions

Nutrition labelling is a means of providing information to consumers on the nutrient content of foods. Nutrition labels can take the form of: (i) nutrient lists; (ii) interpretative, more graphical labels which aim to convey the information in a more consumer-friendly form. Over the past 20 years, there have been several trends in nutrition labelling:

- Increasing application of nutrients lists on packaged foods by food manufacturers;
- Increasing development of regulations on nutrient lists by countries in line with guidelines from the Codex Alimentarius Commission (CAC);
- An increasing number of regulations requiring nutrient lists to appear on all packaged foods;

- The increasing use of some form of interpretative, graphic label, and the extension of the use of these labels from food packaging to other locations like menus and store shelves.

Internationally, guidelines on the use of nutrient lists on packaged foods are provided by the Joint FAO/WHO Codex Alimentarius Commission (CAC). The CAC was established by FAO and WHO in 1963 to “develop harmonised international food standards, guidelines and codes of practice to protect the health of the consumers and ensure fair trade practices in the food trade” (WHO/FAO, 2013). Owing to the relevance of nutrient labelling as a trade issue, nutrition lists may also be regulated through regional trading blocs, including the EU and MERCOSUR. At the national level, most countries apply the CAC Guidelines on Nutrition Labelling (CAC/GL 2\_1985, revised 1993). The guidelines state that nutrition lists should only be required when a nutrition claim is made (Hawkes, 2010b). The General Standard for the Labelling of and Claims for Prepackaged Foods for Special Dietary Use (Codex Stan 146\_1985) also recommends that all foods with special dietary uses display a nutrition label. In 2012, the CAC Committee on Food Labelling suggested the adoption of a mandatory nutrition labelling Codex Standard. This change reflects the increasing number of countries with regulations requiring nutrients lists on packaged foods, or groups of packaged foods. The US has required mandatory labelling since 1994. Elsewhere, countries that have passed laws mandating nutrient lists on food packages since 2000 including Canada, Argentina, Brazil, Paraguay, Uruguay (as part of a MERCOSUR agreement), Hong Kong SAR, Malaysia (on most foods) and Thailand (on specified foods) (Hawkes, 2010b). Current regulations in the EU require labelling only where a nutrient claim is made, though food companies already apply nutrition lists on the majority of their products (Bonsmann et al., 2010).

In large part arising from concerns about lack of consumer understanding of nutrient lists, a range of different mechanisms have emerged for presenting nutrition information in ways that are more likely to be understood by the consumer, and/or directly influence their food choices. These “interpretative labelling” schemes take the form of:

- Labels that make nutrient information more prominent, e.g. calorie labelling on menus, Guideline Daily Allowance labelling on the front of food packages;
- Labels indicating that levels of nutrients are high, medium or low e.g. “traffic light” labels;
- Labels displaying symbols that integrate the presence/absence of selected nutrients into one symbol or score, e.g. the Choices symbol, the Green Keyhole, Guiding Stars etc.



Consumer-friendly labelling schemes have been developed by governments, including menu labelling in New York City, “traffic light” labelling in the UK, and the “Keyhole” scheme in Sweden, Norway, and Denmark. Partly in response to concerns about government-led approaches to interpretative labelling, food companies have also developed their own labels. Global food companies have developed specific company-specific symbols or for broader use, while many food companies apply the Guideline Daily Allowance labelling in the markets where they operate. These changes are representative of the IFBA commitment to “provide clear and fact-based nutrition information to all consumers” (IFBA, 2012). In 2010, IFBA published some Principles for a Global Approach to Fact-based Nutrition Labelling, which stated that nutrition labels should be objective, fact- and science- based and understandable to consumers to enable them to make informed dietary decisions about the foods and beverages they choose (IFBA, 2010).

In addition to the labels themselves, some governments, NGOs, and the food industry have developed public awareness campaigns to promote understanding of labelling. In 2008/2009, it is reported that there were 25 public awareness campaigns in Europe focusing on nutrition labelling, either generally or specific to particular labelling systems (Fernández Celemin et al., 2011). In Canada, the government initiated a “Nutrition Facts Education Campaign” in 2010 to educate consumers about reading the mandatory nutrition label (Health Canada, 2010). A collaboration between Health Canada and the industry body, Food and Consumer Products of Canada, the campaign uses on-package messaging, print advertisements, a television commercial and web-based interactive tools, to provide this information. In the US, educational tools have also been developed to support the nutrient label, and the calorie labelling law in New York City was accompanied by a public awareness campaign.

### Evidence

There is a significant body of literature on the effects of nutrient lists on foods, including five systematic reviews of around 300 papers (Cowburn and Stockley, 2005; Grunert, 2007; Mhurchu and Gorton, 2007; Campos et al., 2011; Mozaffarian et al., 2012). The largest proportion of evidence comes from the US, though a considerable amount has been gathered in Western Europe (Grunert et al., 2007). The available evidence typically measures the impact of nutrient lists on label use and understanding (dietary precursors) rather than dietary intake, although some more recent studies from the US have examined the effect on intake.

These existing studies show that consumers use nutrient lists. Consumers look more closely at nutrients they wish to avoid, notably fat and energy, but also different types of fat,

cholesterol, and sodium (salt) (Campos et al., 2011). But there is also strong evidence that label use is considerably lower along groups of lower socioeconomic status and people with little nutritional knowledge – suggesting that the application of nutrient lists in the absence of other measures may have negative implications for dietary inequalities. Evidence on how well nutrient lists are understood is not entirely uniform, although it is clear that consumers can find nutrient lists confusing and hard to understand (Cowburn and Stockley, 2005). With regard to dietary intake, a small number of studies from the US found positive associations between label use and intake of dietary fibre, and inconsistent results for saturated fat and cholesterol (Capacci et al., 2012).

Evidence available on the effects of interpretative labels is now emerging. Systematic reviews of the evidence suggest that consumers have a greater liking and understanding of simplified front-of-pack information (Campos et al, 2011; Hawley et al., 2013), although this varies between label formats (Grunert et al, 2007). A systematic review concluded that out of all the front-of-pack labels studied, “traffic light” labels were the most liked and readily understood by consumers (Hawley et al., 2013). Mozaffarian et al. (2012) and Hawley et al. (2013) also reviewed studies on the effect of front-of-package labels on sales and consumption, finding that results varied with study design, type of label, and context. Although finding insufficient evidence to draw conclusions, Hawley et al. (2013) reported that labels on supermarket shelves appeared to hold promise, while Mozaffarian et al. (2012) concluded that the most promising evidence to date was on the impact of nutrients lists and interpretative labels on industry behaviour and product formulation. On menu labelling, individual studies identified some limited positive effects (Bruemmer et al., 2012; Dumanovsky et al., 2011) but a systematic review of the evidence concluded that to date, calorie labelling does not have the intended effect of decreasing calorie purchasing or consumption (Swartz et al., 2011).

## Commercial food advertising and promotion

### Actions

The aim of restricting marketing from a nutrition education perspective is two fold:

- (i)** to reduce a negative flow of information and awareness of foods which should not be consumed in excess, and;
- (ii)** provide an environment more favourable of uptake of healthy eating messages.

Actions to restrict food marketing to children have been taken by all three sets of stakeholders: governments and the public sector at the international, regional and national

level; the private sector in the form of the food, media and advertising industries; and civil society. For the public sector, actions have been taken globally, regionally and nationally. In 2010, the WHO released a Set of Recommendations on the Marketing of Foods and Non-Alcoholic Beverages to Children (WHO, 2010), which called for global action to reduce the impact on children of marketing of foods high in saturated fats, trans-fatty acids, free sugars, or salt (WHO, 2010). The recommendations stated that governments should be the lead stakeholder in policy development, the policy objective should be to reduce exposure of children to marketing, and schools should be marketing-free zones. In follow-up, the WHO released a guide for countries to implement the Recommendations in 2012 (WHO, 2012a). The PAHO also convened an expert consultation to provide specific recommendations for the Americas to apply the WHO Set of Recommendations (PAHO, 2011). The Western Pacific Office of the WHO is also reported to be working on developing a regional approach.

At the national level, a significant number of countries are considering to take action, or have taken action, to mitigate the effects of food promotion on children's diets (Hawkes and Lobstein, 2011). At least 22 countries around the world have developed explicit policies on marketing to children, over half of which are in Europe. Although none are comprehensive, they impose specific restrictions and/or require messaging on advertising. The most restrictive approach is found in the UK, where broadcast advertising of high fat, sugar, salt foods is restricted to children aged under 16. Although mainly in Europe/North America/Australia, actions have been taken elsewhere, South Korea imposed some limited restrictions on food television advertising to children in 2012. During the 2000s, the national health regulatory agency in Brazil tried, but failed, to impose very comprehensive restrictions on all forms of food marketing to children; this has since been replaced by a regulation requiring warnings on food advertisements. Several other middle income countries are currently in process of developing statutory regulations, including Chile, Fiji and Peru.

The private sector has also been active in this area. One of the core commitments made by IFBA is to "Extend our initiatives on responsible advertising and marketing to children globally" (IFBA, 2012). The 10 members of IFBA have all made the commitment to restrict their advertising of food to children through specified communications channels. Food companies have also made pledges to reduce food advertising through over 20 regional/national pledges (Hawkes et al., 2012). Along with high income countries, these include pledges made in several developing countries, comprising Brazil, Gulf Cooperation Council countries, Mexico, India, the Philippines, South Africa and Thailand (Rudd Center for Food Policy & Obesity, 2013). A small number of media companies have also taken action. For example, in 2012, the Disney Channel introduced nutrient standards for the foods advertised on its television shows.

NGOs in high-income countries have been very active in campaigning against food marketing to children. At the international level, Consumers International have released a range of reports on the issue, and most recently published a guide to monitoring food marketing with a special emphasis on developing countries (Consumers International, 2011). In 2007, the International Obesity Taskforce Working Group on Marketing to Children released a set of “Sydney principles,” which stated that actions to reduce marketing to children should: (i) support the rights of children; (ii) afford substantial protection to children; (iii) be statutory in nature; (iv) take a wide definition of commercial promotions; (v) guarantee commercial-free childhood settings; (vi) include cross-border media; and (vii) be evaluated, monitored and enforced (Swinburn et al., 2008). There is also some advocacy activity in middle-income countries, such as Brazil, Chile and Peru.

## Evidence

Initial actions taken to reduce food marketing to children were based on the evidence that television food advertising influenced food purchase requests, preferences and consumption (Hastings et al., 2003; McGinnis et al., 2006). Since actions have been implemented, a range of studies have monitored and/or evaluated government- and industry-led policies on food marketing to children in a number of countries (PAHO, 2011). These use a wide range of different methodologies and include monitoring reports written or commissioned by the secretariats of voluntary industry pledges and self-regulatory organizations, academic studies by independent researchers, and reports by NGOs. In summary these studies found that:

- Compliance with existing regulations, self-regulations, and pledges is generally high, though with some exceptions for specific provisions (EU Pledge, 2010; Accenture, 2009; Romero-Fernández et al., 2009).
- There is a lack of clarity concerning the effect of approaches that attempt to reduce exposure on the outcome of exposure. This is a result of methodological differences (e.g. whether it includes all food companies or just some; how “unhealthy foods” are defined etc.). Thus, some monitoring reports identify declines in exposure following the implementation of regulation or pledges, while other do not, even within the same country for the same regulations or pledges (EU Pledge, 2010; Ofcom, 2010; Adams et al., 2012).
- Evidence on the effects of restrictions on consumption-related variables is limited to modelling studies at present. All available studies suggest that restrictions have positive outcomes for dietary intake (Dhar and Baylis, 2011) or obesity (Magnus et al., 2009; Veerman et al., 2009; Chou et al., 2008).



# Key emerging observations for further discussion

## Chapter 7

From this overview of nutrition education actions around the world over the past 20 years emerge several observations that warrant further scrutiny by all those involved in nutrition education in its broadest sense:

1. There has been action by **international organisations, governments, civil society and the private sector to promote healthy diets**. But the nature and extent of these actions vary considerably; consistent, concerted and comprehensive action is not yet in evidence across the globe.
2. **Considerable efforts have been made to evaluate the effects and effectiveness of different nutrition education actions, but much more is needed to obtain a clearer picture.**
3. Existing evaluations suggest that **all actions have the potential to be effective, but that the design and context can have a significant impact on the effectiveness of the action, meaning that some actions are rendered ineffective**. This leads to questions about what makes nutrition education actions work when, why, how and in what way in a healthy eating, obesity and NCD context? What are the characteristics and contexts that make successful actions effective? What are the reasons for failure?
4. One emerging possibility is that **actions are most effective when they involve multiple components**; e.g., information provision, behaviour change communication (including skills training), and policies to change the food environment. This is consistent with the widely cited conclusion of Contento et al. (2008) that, based on a systematic review, nutrition education actions are more likely to yield positive results when the broader definition of nutrition education is applied. That is, when actions are implemented as part of large, multi-component interventions, rather than information provision or direct education alone. It is notable that governments have been taking an increasing number of actions involving multiple components, such as combining policies on nutrition labels with education campaigns, public awareness campaigns with food product reformulation, and school food standards with educational initiatives in schools.

5. The results of studies of **public awareness campaigns** in all their different forms are mixed. This raises the question of whether countries have sufficient guidance on designing campaigns for their specific populations, what complementary actions they should be taking to reinforce the intended change in awareness, and which foods and nutrients to focus on. This latter point reflects the finding that “eat less” campaigns have tended, to date, to be less prevalent than “positive” foods and generic healthy eating campaigns.
6. **Schools** have received more attention as a specific setting for nutrition education than any other. Key emerging issues are:
  - a. Lack of clarity on the degree to which nutrition education is featured in schools around the world, the forms it takes, whether it aims to promote healthy diets in an NCD context, whether it is embedded in national policies or programmes, and the reasons why some actions are far more effective than others.
  - b. Whether school-based approaches should be accompanied by related efforts in the community and at the whole population level. One of the concepts driving school-based approaches – that what is learned in school then extends to the home and the wider community and over the life-course – is not yet supported by conclusive evidence, leading some experts to suggest that school-based approaches should be accompanied by broader community interventions (Gittelsohn and Kumar, 2007).
  - c. Furthering the promise of the “whole school approach” – the integration of nutrition education in several different forms throughout the whole school, including food served in schools, gardening etc. School gardening interventions appear to be becoming more popular as a way of integrating many different aspects of nutrition education into one.
  - d. The appropriate role for the private sector in delivering nutrition education in schools.
7. **Workplaces** have emerged as an increasingly important setting for the delivery of nutrition education messages accompanied by changes in the food environment. Other community settings, however, notably healthcare settings, appear to have been less of a focus of action.
8. There appears to have been inadequate effort to promote nutrition education as part of **primary health care**. Even in the US, where unhealthy diets, obesity and NCDs have been problems for over 30 years, primary care providers are reported to be less



engaged relative to smoking. At a global level there are generally very low rates of implementation of management guidelines for dietary counselling in primary care settings.

9. Despite emergent interest in school gardening and other agricultural skills, in the realm of nutrition education as a whole, less attention has been placed on skills training. This represents a significant gap given the skills needed to cope with changing life styles and the changing food environment.
10. At a national level, more actions are being taken to influence the **food environment**, notably labelling and food in schools. But these actions are far from being universally standard; nor does it appear to be standard practice to reinforce these efforts with direct educational campaigns, as is consistent with a multi-component approach.
11. The role of **government** has included legislation, statutory regulation, setting voluntary standards, guidelines and targets and direct engagement with the food industry. This raises questions about the most effective approach for the different range of actions. Where is legislation really necessary? Where should authority be placed at the local level? When is engagement with the private sector more effective? In addition, governments may not be aware that nutrition education involves more than direct education, raising the questions of what efforts are needed to communicate the message that nutrition education involves a broader range of multi-component actions. It also raises questions about the need for a broader policy framework for nutrition education – for example, in Latin America, it has been found that “there are no national nutrition education policies to properly structure initiatives with broad coverage and continuity, or to establish regulations to ensure healthy food environments” (FAO Nutrition Education and Consumer Awareness Group and Hunger-Free Latin America and the Caribbean Initiative Support Project, 2011).
12. One of the most striking trends is the increasing role taken by the **private sector** in nutrition education, including the development of educational campaigns for fruits and vegetables (fruit and vegetable industry), running nutrition education programmes in schools (transnational food companies), bringing messages into television programmes (media networks), developing worksite interventions (large private-sector employers), and introducing new forms of food labelling (food companies and retailers). This leads to questions about the most appropriate and effective role for the private sector in delivering nutrition education. What role should the private sector have in light of their potential to deliver change, but also in view of their vested interests, products

and messages that run frequently counter to government and civil society efforts to promote healthier diets, and their lobbying against government action? And how do these potential opportunities and risks differ between different types of action (e.g. worksite actions versus branded nutrition education in schools)? Answering these questions would be aided by more evidence into the effects, effectiveness and unintended consequences of the private sector's nutrition education actions to date on awareness, skills, preferences and dietary intake.

13. The role of civil society in nutrition education actions to promote healthy eating can be characterised by: (a) advocacy for policies to change the food environment, especially legislation; and (b) support for specific interventions, such as agricultural skills and in schools. At an international level, NGOs have tended not to engage with the nutrition education message, possibly because education-only interventions are perceived as less effective than policy change. This raises the question of whether there is an opportunity for international NGOs concerned with food and healthy eating to place their advocacy for policy change in a broader nutrition education framework – and for nationally based NGOs concerned with specific interventions to engage with calls for broader policy change.
14. Finally, what is the most effective role for **both FAO and WHO** in nutrition education? This review shows that both agencies have taken actions to support nutrition education. What impact have these actions had? Moving forward into the 21st Century, what would be the most useful role for these global entities in encouraging national and regional level actions? What is the comparative advantage of each of the organisations and what are they best placed to deliver?

# References

- Accenture. 2009. Compliance Monitoring of Global Advertising for Television, Print, and Internet for the International Food & Beverage Alliance. Available at: [www.ifballiance.org/sites/default/files/IFBA%20Compliance%20Monitoring%20Report%2010%20Nov09.pdf](http://www.ifballiance.org/sites/default/files/IFBA%20Compliance%20Monitoring%20Report%2010%20Nov09.pdf)
- Adams J, Tyrrell R, Adamson AJ, White M. 2012. Effect of restrictions on television food advertising to children on exposure to advertisements for 'less healthy' foods: repeat cross-sectional study. *PLoS One*;7(2):e31578.
- Albert J. 2007 Global patterns and country experiences with the formulation and implementation of Food-Based Dietary Guidelines. *Ann Nutr Metab*; 51(suppl 2):2-7.
- Alianza por la Salud Alimentaria. 2013. Conoce la campaña "Fue la obesidad, después la diabetes..." – Website. Available at: [alianzasalud.org.mx/conoce-la-campana-fue-la-obesidad-despues-la-diabetes/](http://alianzasalud.org.mx/conoce-la-campana-fue-la-obesidad-despues-la-diabetes/)
- ASS-NC. 2011. Emissions télé "Manger mieux Bouger plus". Agence Sanitaire et Sociale Nouvelle Calédonie - Website. Available at: [www.ass.nc/themes/prevention-de-surcharge/articles-et-interventions/2011/419-emissions-tele-qmanger-mieux-bouger-plusq](http://www.ass.nc/themes/prevention-de-surcharge/articles-et-interventions/2011/419-emissions-tele-qmanger-mieux-bouger-plusq)
- Bandoni DH, Sarno F, Jaime PC. 2011. Impact of an intervention on the availability and consumption of fruits and vegetables in the workplace. *Public Health Nutr*; 14(6):975-981.
- Bere E, Veierød MB, Bjelland M, Klepp KI. 2006a. Outcome and process evaluation of a Norwegian school-randomized fruit and vegetable intervention: Fruits and Vegetables Make the Marks (FVMM). *Health Educ Res*; 21(2):258-267.
- Bere E, Veierød MB, Bjelland M, Klepp KI. 2006b. Free school fruit- sustained effect 1 year later. *Health Educ Res*; 21(2):268-275.
- Berti PR, Krasevec J, FitzGerald S. 2004. A review of the effectiveness of agriculture interventions in improving nutrition outcomes. *Public Health Nutr*;7(5):599-609.

Bjelland M, Bergh IH, Grydeland M, Klepp KI, Andersen LF, Anderssen SA, Ommundsen Y, Lien N. 2011. Changes in adolescents' intake of sugar-sweetened beverages and sedentary behaviour: results at 8 month mid-way assessment of the HEIA study--a comprehensive, multi-component school-based randomized trial. *Int J Behav Nutr Phys Act*; 8:63.

Bock C, Diehl K, Schneider S, Diehm C, Litaker D. 2012. Behavioral counseling for cardiovascular disease prevention in primary care settings: a systematic review of practice and associated factors. *Med Care Res Rev*; 69(5):495-518.

Borys JM, Le Bodo Y, Jebb SA, Seidell JC, Summerbell C, Richard D, De Henauw S, Moreno LA, Romon M, Visscher TL, Raffin S, Swinburn B; EEN Study Group. 2012. EPODE approach for childhood obesity prevention: methods, progress and international development. *Obes Rev*;13(4):299-315.

Bonsmann SSG, Celemín LF, Larrañaga A, Egger S, Wills JM, Hodgkins C, Raats MM. 2010. Penetration of nutrition information on food labels across the EU-27 plus Turkey. *Eur J Clin Nutr*;64(12):1379-1385.

Bremner P, Dalziel D, Evans L. 2006. Evaluation of the 5 a day Programme: Final Report. London: Big Lottery Fund/TNS Social. Bremner P, Dalziel D, Evans L. 2006. Evaluation of the 5 a day Programme: Final Report. London: Big Lottery Fund/TNS Social.

Brown KA, Timotijevic L, Barnett J, Shepherd R, Lähteenmäki L, Raats MM. 2011. A review of consumer awareness, understanding and use of food-based dietary guidelines. *Br J Nutr*; 106(1):15-26.

Bruemmer B, Krieger J, Saelens BE, Chan N. 2012. Energy, saturated fat, and sodium were lower in entrées at chain restaurants at 18 months compared with 6 months following the implementation of mandatory menu labeling regulation in King County, Washington. *J Acad Nutr Diet*;112(8):1169-1176.

Buck Consultants. 2010. Working Well: A Global Survey of Health Promotion and Workplace Wellness Strategies Survey Report, November 2010. London: Buck Consultants.

C3 Collaborating for Health. 2011. Review - Workplace health initiatives: evidence of effectiveness. London: C3. Available at: [www.c3health.org/wp-content/uploads/2009/09/Workplace-health-initiatives-review-of-the-evidence-v-1-20111205.pdf](http://www.c3health.org/wp-content/uploads/2009/09/Workplace-health-initiatives-review-of-the-evidence-v-1-20111205.pdf)

CaFan. 2011. Caribbean Farmers Network – Website. Available at:

[www.caribbeanfarmers.org](http://www.caribbeanfarmers.org)

Capacci S, Mazzocchi M. 2011. Five-a-day, a price to pay: an evaluation of the UK program impact accounting for market forces. *J Health Econ*;30(1):87-98.

Capacci S, Mazzocchi M, Shankar B, Brambila Macias J, Verbeke W, Pérez-Cueto FJ, Koziol-Kozakowska A, Piórecka B, Niedzwiedzka B, D'Addesa D, Saba A, Turrini A, Aschemann-Witzel J, Bech-Larsen T, Strand M, Smillie L, Wills J, Traill WB. 2012. Policies to promote healthy eating in Europe: a structured review of policies and their effectiveness. *Nutr Rev*; 70(3):188-200.

Campos S, Doxey J, Hammond D. 2011. Nutrition labels on pre-packaged foods: a systematic review. *Public Health Nutr*;14(8):1496-1506.

Carter OB, Pollard CM, Atkins JF, Marie Milliner J, Pratt IS. 2011. 'We're not told why-- we're just told': qualitative reflections about the Western Australian Go for 2&5® fruit and vegetable campaign. *Public Health Nutr*; 14(6):982-988.

Chou S-Y, Rashad I, Grossman M. 2008. Fast-food restaurant advertising on television and its influence on childhood obesity. *J Law Econ*;51:599-618.

Chriqui J. 2012. Influence of Competitive Food and Beverage Policies on Children's Diets and Childhood Obesity. Healthy Eating Research Issue Brief Number 12, July 2012.

Minnesota: Healthy Eating Research. Available at:

[www.healthyeatingresearch.org/images/stories/her\\_research\\_briefs/Competitive\\_Foods\\_Issue\\_Brief\\_HER\\_BTG\\_7-2012.pdf](http://www.healthyeatingresearch.org/images/stories/her_research_briefs/Competitive_Foods_Issue_Brief_HER_BTG_7-2012.pdf)

Coca Cola Peru. 2013. EducAnimando con Salud - Website. Available at:

[viviendopositivamente.com/pe/](http://viviendopositivamente.com/pe/)

Community Kitchens Australia. 2009. About Community Kitchens - Website. Available at:

[www.communitykitchens.org.au/About/](http://www.communitykitchens.org.au/About/)

Community Kitchens Northwest. 2012. Community Kitchens Northwest- Website. Available at: [seattletilth.org/communitykitchensnw](http://seattletilth.org/communitykitchensnw)

Consumers International. 2011. Manual for monitoring food marketing to children. London: Consumers International. Available at: [www.consumersinternational.org/news-and-media/publications/coding-form-manual-for-monitoring-the-marketing-of-food-and-non-alcoholic-beverages-to-children](http://www.consumersinternational.org/news-and-media/publications/coding-form-manual-for-monitoring-the-marketing-of-food-and-non-alcoholic-beverages-to-children)

Contento IR. 2011. Nutrition Education: Linking Research, Theory, and Practice (2nd edition). Sudbury, MA: Jones and Bartlett Publishers.

Contento IR. Nutrition education: linking research, theory, and practice. 2008. Asia Pac J Clin Nutr;17 Suppl 1:176-179.

Constante Jaime P, Feldenheimer da Silva ACF, Calvacante de Lima AM, Bortolini GA. 2011. Food and nutrition actions in primary healthcare: the experience of the Brazilian government. Rev Nutr; 24(6):809-824.

Cowburn G, Stockley L. 2005. Consumer understanding and use of nutrition labelling: a systematic review. Public Health Nutr; 8, 21–28.

Creamglobal.com. 2010. Marketing brief: Clara in Foodland - Website. Available at: [www.just-food.com/comment/marketing-brief-clara-in-foodland\\_id113089.aspx](http://www.just-food.com/comment/marketing-brief-clara-in-foodland_id113089.aspx)

Croker H, Lucas R, Wardle J. 2012. Cluster-randomised trial to evaluate the 'Change for Life' mass media/social marketing campaign in the UK. BMC Public Health;12(1):404

Cronicas. 2012. Projects: Cooking for health: capitalizing on Comedores Populares to deliver healthy diets to low-income families in Peru for the prevention of non-communicable diseases - Website. Available at: [www.cronicas.pe/cronicasweb/en/Proyectos/Index/0010/comedores-populares](http://www.cronicas.pe/cronicasweb/en/Proyectos/Index/0010/comedores-populares)

Crouch R, Wilson A, Newbury J. 2011. A systematic review of the effectiveness of primary health education or intervention programs in improving rural women's knowledge of heart disease risk factors and changing lifestyle behaviours. Int J Evid Based Healthc;9(3):236-245.

de Sa J, Lock K. 2008. Will European agricultural policy for school fruit and vegetables improve public health? A review of school fruit and vegetable programmes. Eur J Public Health;18(6):558-568.

- Daniels S. 2012. Whole grain food market to hit \$27.6 billion by 2017, with U.S. leading the way. Food navigator.com Newsletter - Website. Available at: [www.foodnavigator-usa.com/Market/Whole-grain-food-market-to-hit-27.6-billion-by-2017-with-US-leading-the-way](http://www.foodnavigator-usa.com/Market/Whole-grain-food-market-to-hit-27.6-billion-by-2017-with-US-leading-the-way)
- Dansinger ML, Tatsioni A, Wong JB, Chung M, Balk EM. 2007. Meta-analysis: the effect of dietary counseling for weight loss. *Ann Intern Med*;147(1):41-50.
- Department of Health. 2005. National Healthy School Status: A Guide for Schools. London: Her Majesty's Government. Available at: [www.uclan.ac.uk/schools/school\\_of\\_health/research\\_projects/hstu/files/national\\_healthy\\_schools\\_status\\_guide.pdf](http://www.uclan.ac.uk/schools/school_of_health/research_projects/hstu/files/national_healthy_schools_status_guide.pdf)
- Department of Health. 2010. Change4Life One Year: In Support of Healthy Weight, Healthy Lives. London: Her Majesty's Government. Available at: [www.physicalactivityandnutritionwales.org.uk/Documents/740/DH\\_summaryof\\_change4lifeoneyearon.pdf](http://www.physicalactivityandnutritionwales.org.uk/Documents/740/DH_summaryof_change4lifeoneyearon.pdf)
- Dhar T, Baylis K. 2011. Fast-food consumption and the ban on advertising targeting children: the Quebec experience. *JMR*; 48, 5: 799–813.
- Dumanovsky T, Huang CY, Nonas CA, Matte TD, Bassett MT, Silver LD. 2011. Changes in energy content of lunchtime purchases from fast food restaurants after introduction of calorie labelling: cross sectional customer surveys. *BMJ*; 343:d4464.
- Englberger L, Lorens A, Pretrick ME, Spegal R, Falcam I. 2010a. "Go local" island food network: using email networking to promote island foods for their health, biodiversity, and other "CHEEF" benefits. *Pac Health Dialog*; 16(1):41-47.
- Englberger L, Kuhnlein HV, Lorens A, Pedrus P, Albert K, Currie J, Pretrick M, Jim R, Kaufer L. 2010b. Pohnpei, FSM case study in a global health project documents its local food resources and successfully promotes local food for health. *Pac Health Dialog*; 16(1):129-136.
- Epode European Network. 2013. Epode European Network – Website. Available at: [www.epode-european-network.com](http://www.epode-european-network.com)
- Erinosho TO, Moser RP, Oh AY, Nebeling LC, Yaroch AL. 2012. Awareness of the Fruits and Veggies-More Matters campaign, knowledge of the fruit and vegetable recommendation, and fruit and vegetable intake of adults in the 2007 Food Attitudes and Behaviors (FAB) Survey. *Appetite*; 59(1):155-160.

EU Pledge. 2010. EU Pledge Monitoring Report 2010. Brussels: Landmark Europe. Available at: [www.eu-pledge.eu/sites/eu-pledge.eu/files/reports/EU\\_Pledge\\_2010\\_Monitoring\\_Report.pdf](http://www.eu-pledge.eu/sites/eu-pledge.eu/files/reports/EU_Pledge_2010_Monitoring_Report.pdf)

European Commission. 2012a. Implementation of the EU Salt Reduction Framework - Results of Member States survey: Luxembourg: Publications Office of the European Union. Available at: [ec.europa.eu/health/nutrition\\_physical\\_activity/docs/salt\\_report\\_en.pdf](http://ec.europa.eu/health/nutrition_physical_activity/docs/salt_report_en.pdf)

European Commission. 2012b. European School fruit scheme: a success story for children. Brussels: European Union. Available at: [ec.europa.eu/agriculture/sfs/documents/leaflet\\_en.pdf](http://ec.europa.eu/agriculture/sfs/documents/leaflet_en.pdf)

European Commission. 2012c. Report from the Commission to the European Parliament and the Council in accordance with Article 184(5) of Council Regulation (EC) No 1234/2007 on the implementation of the European School Fruit Scheme{SWD(2012) 435 final}. Brussels: European Commission. Available at: [ec.europa.eu/agriculture/sfs/documents/documents/com2012-768\\_en.pdf](http://ec.europa.eu/agriculture/sfs/documents/documents/com2012-768_en.pdf)

EUFIC. 2009. Food-based Dietary Guidelines in Europe - Website. Available at: [www.eufic.org/article/en/expid/food-based-dietary-guidelines-in-europe/](http://www.eufic.org/article/en/expid/food-based-dietary-guidelines-in-europe/)

EUFIC. 2013. Interventions to Promote Healthy Eating Habits. Brussels: European Food Information Council. Available at: [www.eufic.org/article/en/rid/EATWELL-Interventions-Promote-Healthy-Eating-Habits-Evaluation-Recommendations/](http://www.eufic.org/article/en/rid/EATWELL-Interventions-Promote-Healthy-Eating-Habits-Evaluation-Recommendations/)

Evans WD, Christoffel KK, Necheles JW, Becker AB. 2010. Social marketing as a childhood obesity prevention strategy. *Obesity*; 18: S23–S26.

FAO. 1997. Nutrition education for the public. Discussion papers of the FAO Expert Consultation (Rome, Italy 18-22 September 1995) - FAO Food and Nutrition Paper 62. Rome; Food and Agriculture Organization of the United Nations. Available at: [www.fao.org/docrep/W3733E/W3733E00.htm](http://www.fao.org/docrep/W3733E/W3733E00.htm)

FAO. 2009. Food-based Dietary Guidelines - Website. Available at: [www.fao.org/ag/humannutrition/nutritioneducation/fbdg/en/](http://www.fao.org/ag/humannutrition/nutritioneducation/fbdg/en/)

FAO. 2006. School gardens - Website. Available at: [www.fao.org/schoolgarden/](http://www.fao.org/schoolgarden/)  
FAO. 2010. Improving Nutrition through Home Gardening - Website. Available at: [www.fao.org/ag/agn/nutrition/household\\_gardens\\_en.stm](http://www.fao.org/ag/agn/nutrition/household_gardens_en.stm)



FAO. 2012a. Capacity building for nutrition education. Available at: [www.fao.org/ag/humannutrition/nutritioneducation/69725/en/](http://www.fao.org/ag/humannutrition/nutritioneducation/69725/en/)

FAO. 2012b. Professional Training in Nutrition Education. Available at: [www.fao.org/ag/humannutrition/nutritioneducation/69725/en/](http://www.fao.org/ag/humannutrition/nutritioneducation/69725/en/)

FAO Nutrition Education and Consumer Awareness Group and Hunger-Free Latin America and the Caribbean Initiative Support Project. 2011. Regional Meeting Executive Summary. Food and Nutrition Information, communication and education to promote food and nutrition security (El Salvador, 6-9 December 2011). Available at: [www.fao.org/ag/humannutrition/29732-0cf1bdf0edeeffd4ab341bbff9ec287.pdf](http://www.fao.org/ag/humannutrition/29732-0cf1bdf0edeeffd4ab341bbff9ec287.pdf).

FAO. 2005. Setting up and Running a School Garden. A Manual for Teachers, Parents and Communities. Available at: [www.fao.org/docrep/009/a0218e/a0218e00.htm](http://www.fao.org/docrep/009/a0218e/a0218e00.htm)

FAO. 2010a. Setting up and Running a School Garden. A Teaching Toolkit. Available at: [www.fao.org/docrep/012/i1118e/i1118e00.htm](http://www.fao.org/docrep/012/i1118e/i1118e00.htm)

FAO. 2010b. A New Deal for School Gardens. Available at: [www.fao.org/docrep/013/i1689e/i1689e00.pdf](http://www.fao.org/docrep/013/i1689e/i1689e00.pdf)

FAO/WHO. 2005. Fruit and Vegetables for Health: Report of a Joint FAO/WHO Workshop, 1-3 September, 2004, Kobe, Japan. Available at: [www.fao.org/ag/magazine/FAO-WHO-FV.pdf](http://www.fao.org/ag/magazine/FAO-WHO-FV.pdf)

Fernández Celemín L, Genannt Bonsmann SS, Carlsson, E, Larrañaga A, Egger S. 2011. Mapping public health nutrition awareness campaigns across Europe. Brussels: European Food Information Council (EUFIC). Available at: [agro-food-industry.teknoscienze.com/pdf/Fernandez\\_AF1\\_2011.pdf](http://agro-food-industry.teknoscienze.com/pdf/Fernandez_AF1_2011.pdf)

Fleming P, Godwin M. 2008. Lifestyle interventions in primary care: systematic review of randomized controlled trials. *Can Fam Physician*;54(12):1706-1713.

Flynn MA, O'Brien CM, Ross V, Flynn CA, Burke SJ. 2012. Revision of food-based dietary guidelines for Ireland - Phase 2: recommendations for healthy eating and affordability. *Public Health Nutr*;15(3):527-537.

Fotu KF, Moodie MM, Mavoja HM, Pomana S, Schultz JT, Swinburn BA. 2011a. Process evaluation of a community-based adolescent obesity prevention project in Tonga. *BMC Public Health*;11:284. doi: 10.1186/1471-2458-11-284

Fotu KF, Millar L, Mavoia H, Kremer P, Moodie M, Snowdon W, Utter J, Vivili P, Schultz JT, Malakellis M, McCabe MP, Roberts G, Swinburn BA. 2011b. Outcome results for the Ma'alahi Youth Project, a Tongan community-based obesity prevention programme for adolescents. *Obes Rev*; 12 (Suppl 2):41-50.

Francis M, Nichols SS, Dalrymple N. 2010. The effects of a school-based intervention programme on dietary intakes and physical activity among primary-school children in Trinidad and Tobago. *Public Health Nutr*;13(5):738-747.

Fundacion Inca Kola. 2013. EducAnimando con Salud - Website. Available at: [www.fundacionincakola.com.pe](http://www.fundacionincakola.com.pe)

Fresh Choice Kitchens. 2012. History - Website. Available at: [www.communitykitchens.ca/main/?en&History](http://www.communitykitchens.ca/main/?en&History)

Gittelsohn J, Kumar MB. 2007. Preventing childhood obesity and diabetes: is it time to move out of the school? *Pediatr Diabetes*;8 Suppl 9:55-69.

Grunert K. 2007. A review of European research on consumer response to nutrition information on food labels. *J Public Health*; 15, 385-389.

Harris J, Felix L, Miners A, Murray E, Michie S, Ferguson E, Free C, Lock K, Landon J, Edwards P. 2011. Adaptive e-learning to improve dietary behaviour: a systematic review and cost-effectiveness analysis. *Health Technol Assess*;15(37):1-160.

Harris R, Gamboa A, Dailey Y, Ashcroft A. 2012. One-to-one dietary interventions undertaken in a dental setting to change dietary behaviour. *Cochrane Database Syst Rev*;3:CD006540.

Hastings G, Stead M, McDermott L, Forsyth A, MacKintosh AM, Rayner M, Godfrey C, Caraher M, Angus K. 2003. Review of Research on the Effects of Food Promotion to Children - Final report. Strathclyde: University of Strathclyde. Available at: [www.food.gov.uk/multimedia/pdfs/foodpromotiontochildren1.pdf](http://www.food.gov.uk/multimedia/pdfs/foodpromotiontochildren1.pdf)

Hawkes C. 2010a. The worldwide battle against soft drinks in schools. *Am J Prev Med*; 38(4):457-461.

- Hawkes C. 2010b. Government and voluntary policies on nutrition labelling: a global overview. In: Albert J, editor. *Innovations in Food Labelling*. Woodhead Food Series No. 184. Cambridge: Woodhead Publishing Limited.
- Hawkes C, Lobstein T. 2011. Regulating the commercial promotion of food to children: a survey of actions worldwide. *Int J Pediatr Obes*; 6(2):83-94.
- Hawkes C, Turner R, Waage J. 2012. Current and Planned Research on Agriculture for Improved Nutrition: A Mapping and a Gap Analysis - A report for DFID. Available at: [www.lcirah.ac.uk/sites/default/files/DfID%20report%20\(LCIRAH%20mapping%20and%20gap%20analysis\)%2021%20Aug%2012.pdf](http://www.lcirah.ac.uk/sites/default/files/DfID%20report%20(LCIRAH%20mapping%20and%20gap%20analysis)%2021%20Aug%2012.pdf)
- Hawley KL, Roberto CA, Bragg MA, Liu PJ, Schwartz MB, Brownell KD. 2013. The science on front-of-package food labels. *Public Health Nutr*;16(3):430-439.
- Health Canada. 2010. Learn about the % Daily Value - Website. Available at: [www.healthycanadians.gc.ca/init/dv-vq-eng.php](http://www.healthycanadians.gc.ca/init/dv-vq-eng.php)
- Healthy School Environment. 2012. Garden-Enhanced Nutrition Education - Website. Available at: [www.healthyschoolenvironment.org/training-resources/nutrition-education#TOC-Introduction-to-GENE](http://www.healthyschoolenvironment.org/training-resources/nutrition-education#TOC-Introduction-to-GENE)
- Healthy States Initiative. 2007. School Wellness Policies: Legislator Policy Brief. Lexington, KY: Healthy States Initiative. Available at: [www.healthystates.csg.org/NR/rdonlyres/C87EB28D-B2F6-4399-B1BD-BC5617940019/0/SchoolWellnessSources.pdf](http://www.healthystates.csg.org/NR/rdonlyres/C87EB28D-B2F6-4399-B1BD-BC5617940019/0/SchoolWellnessSources.pdf)
- Helen Keller International. 2013. Homestead Food Production – Website. Available at: [www.hki.org/reducing-malnutrition/homestead-food-production](http://www.hki.org/reducing-malnutrition/homestead-food-production).
- Hooper L, Bartlett C, Davey SG, Ebrahim S. 2004. Advice to reduce dietary salt for prevention of cardiovascular disease. *Cochrane Database Syst Rev* (1); CD003656.
- Hop le T, Van TK, Thanh HK. 2011. Food-based dietary guidelines in Vietnam: progress and lessons learned. *Asia Pac J Clin Nutr*; 20(3):495-499.
- Howerton MW, Bell BS, Dodd KW, Berrigan D, Stolzenberg-Solomon R, Nebeling L. 2007. School-based nutrition programs produced a moderate increase in fruit and vegetable consumption: meta and pooling analyses from 7 studies. *J Nutr Educ Behav*; 39(4):186-196.

Iacovou M, Pattieson DC, Truby H, Palermo C. 2013. Social health and nutrition impacts of community kitchens: a systematic review. *Public Health Nutr*;16(3):535-543.

ICDF. 2011. Horticulture Project (Nauru) - Website. Available at: [www.icdf.org.tw/ct.asp?xlt=em=4392&ctNode=30044&mp=2](http://www.icdf.org.tw/ct.asp?xlt=em=4392&ctNode=30044&mp=2)

IFAVA. 2012. International Fruits and Vegetables Alliance - Website. Available at: [www.ifava.org/](http://www.ifava.org/)

IFBA. 2010. Principles for a global approach to fact-based nutrition labelling. Available at: [www.ifballiance.org/sites/default/files/IFBA%20Nutrition%20Labelling%20Principles%20%28Nov%202010%29.pdf](http://www.ifballiance.org/sites/default/files/IFBA%20Nutrition%20Labelling%20Principles%20%28Nov%202010%29.pdf)

IFBA. 2012. Our Commitments - Website. Available at: <https://www.ifballiance.org/our-commitments.html>

Island Food Community of Pohnpei. 2013. Welcome! – Website. Available at: <http://www.islandfood.org/>

Jaime PC, Lock K. 2009. Do school based food and nutrition policies improve diet and reduce obesity? *Prev Med*;48(1):45-53.

James J, Thomas P, Cavan D, Kerr D. 2004. Preventing childhood obesity by reducing consumption of carbonated drinks: cluster randomized controlled trial. *BMJ*; 328: 1237-1239.

Jensen JD. 2011. Can worksite nutritional interventions improve productivity and firm profitability? A literature review. *Perspect Public Health*;131(4):184-192.

Kaufer L, Englberger L, Cue R, Lorens A, Albert K, Pedrus P, Kuhnlein HV. 2010. Evaluation of a “traditional food for health” intervention in Pohnpei, Federated States of Micronesia. *Pac Health Dialog*;16(1):61-73.

Keller I, Lang T. 2008. Food-based dietary guidelines and implementation: lessons from four countries -Chile, Germany, New Zealand and South Africa. *Public Health Nutr*; 11(8):867-874.

Krishnaswamy K. 2008. Developing and implementing dietary guidelines in India. *Asia Pac J Clin Nutr*;17(S1):66-69.

Kroeze W, Werkman A, Brug J. 2006. A systematic review of randomized trials on the effectiveness of computer tailored education on physical activity and dietary behaviors. *Ann Behav Med*; 31: 205–223.

Laatikainen T, Pietinen P, Valsta L, Sundvall J, Reinivuo H, Tuomilehto J. 2006. Sodium in the Finnish diet: 20-year trends in urinary sodium excretion among the adult population. *Eur J Clin Nutr*;60(8):965-970.

Li Chan C. 2008. Cooking up hope: empowering women through community kitchens in Peru. Global Envision Website. Available at: [www.globalenvision.org/2008/08/07/cooking-hope-empowering-women-through-community-kitchens-peru](http://www.globalenvision.org/2008/08/07/cooking-hope-empowering-women-through-community-kitchens-peru)

Maes L, Van Cauwenberghe E, Van Lippevelde W, Spittaels H, De Pauw E, Oppert JM, Van Lenthe FJ, Brug J, De Bourdeaudhuij I. 2011a. Effectiveness of workplace interventions in Europe promoting healthy eating: a systematic review. *Eur J Public Health*, 22(5), 677-683.

Maes L, Cook TL, Ottovaere C, Matthijs C, Moreno LA, Kersting M, Papadaki A, Manios Y, Dietrich S, Hallström L, Haerens L, De Bourdeaudhuij I, Vereecken C; HELENA Study Group. 2011b. Pilot evaluation of the HELENA (Healthy Lifestyle in Europe by Nutrition in Adolescence) Food-O-Meter, a computer-tailored nutrition advice for adolescents: a study in six European cities. *Public Health Nutr*;14(7):1292-1302.

Magnus A, Haby MM, Carter R, Swinburn B. 2009. The cost-effectiveness of removing television advertising of high-fat and/or high-sugar food and beverages to Australian children. *Int J Obes (Lond)*;33(10):1094-1102.

Masset E, Haddad L, Cornelius A, Isaza-Castro J. 2012. Effectiveness of agricultural interventions that aim to improve nutritional status of children: systematic review. *BMJ*;344, d8222. doi: 10.1136/bmj.d8222.

Mazzocchi M, Shankar B, Traill B. 2012. The Development of Global Diets since ICN 1992: Influences of Agri-Food Sector Trends and Policies. Rome: Food and Agriculture Organization of the United Nations. Available at: [www.fao.org/fileadmin/user\\_upload/agn/pdf/FAO\\_Commodity\\_and\\_Trade\\_Policy\\_Research\\_Working\\_paper\\_01.pdf](http://www.fao.org/fileadmin/user_upload/agn/pdf/FAO_Commodity_and_Trade_Policy_Research_Working_paper_01.pdf)

McDermott L, Stead M, Hastings G, Angus K, Banerjee S, Rayner M, Kent R. 2005. A systematic review of the effectiveness of social marketing nutrition and food safety interventions. Final report prepared for Safefood. Stirling: Institute for Social Marketing,

University of Stirling. Available at: [www.management.stir.ac.uk/research/social-marketing/projects/?a=19813](http://www.management.stir.ac.uk/research/social-marketing/projects/?a=19813)

McGinnis JM, Gootman JA, Kraak, VI. 2006. Food Marketing to Children and Youth: Threat or Opportunity? Washington DC: National Academies Press.

McKevith B, Stanner S, Butriss J. 2005. Food choices in primary care: a summary of the evidence. *Nurs Times*;101(40):38-42.

Mhurchu CN, Gorton D. 2007. Nutrition labels and claims in New Zealand and Australia: a review of use and understanding. *Aust N Z J Public Health*; 31(2), 105-112.

Mhurchu CN, Aston LM, Jebb SA. 2010. Effects of worksite health promotion interventions on employee diets: a systematic review. *BMC Public Health*; 10:62 doi:10.1186/1471-2458-10-62.

Ministry of Health of Brazil. 2012. PNAN: National Policy for Food and Nutrition (English version). Brasilia-DF: Ministry of Health of Brazil

Molina V. 2012. Guías Alimentarias de América Latina y el Caribe. Presented at the Pan American Conference on Obesity 2012, Aruba

Mozaffarian D, Afshin A, Benowitz NL, Bittner V, Daniels SR, Franch HA, et al. 2012. Population approaches to improve diet, physical activity, and smoking habits: a scientific statement from the American Heart Association. *Circulation*; 126(12), 1514-1563.

Musaiger AO, Takruri HR, Hassan AS, Abu-Tarboush H. 2012. Food-based dietary guidelines for the Arab gulf countries. *J Nutr Metab*; 905303. doi: 10.1155/2012/905303

National Healthy Schools Programme. 2010. National Healthy Schools Programme: Healthy Schools Update. London: National Healthy Schools Programme.

Nestlé. 2011. Nestlé Healthy Kids Programme helps teachers in Nigeria. News Release July 6, 2011 - Website. Available at: [www.nestle.com/Media/NewsAndFeatures/Pages/Nestle-Healthy-Kids-Programme-helps-teachers-in-Nigeria.aspx](http://www.nestle.com/Media/NewsAndFeatures/Pages/Nestle-Healthy-Kids-Programme-helps-teachers-in-Nigeria.aspx)

Nestlé. 2012a. Nestlé Healthy Kids Programme - Website. Available at: [www.nestle.com/CSV/NUTRITION/HEALTHYKIDSPROGRAMME/Pages/HealthyKidsProgramme.aspx](http://www.nestle.com/CSV/NUTRITION/HEALTHYKIDSPROGRAMME/Pages/HealthyKidsProgramme.aspx)

Nestlé. 2012b. Understanding nutrition is everybody's business at Nestlé – Website. Available at: [www.nestle.com/csv/nutrition/tasteandnutrition/understandingnutritioniseverybodysbusiness](http://www.nestle.com/csv/nutrition/tasteandnutrition/understandingnutritioniseverybodysbusiness)

Netzler-Iose J. 2010. Samoa's health minister leads the way. Secretariat of the Pacific Community. Available at: [www.spc.int/hpl/index.php?option=com\\_content&task=blogcategory&id=19&Itemid=48](http://www.spc.int/hpl/index.php?option=com_content&task=blogcategory&id=19&Itemid=48)

New York City Department of Health and Mental Hygiene. 2013. Sugary Drinks. Available at: [home2.nyc.gov/html/doh/html/cdp/cdp\\_pan\\_pop.shtml](http://home2.nyc.gov/html/doh/html/cdp/cdp_pan_pop.shtml).

NHMRC. 2012. Dietary Guidelines for All Australians. Australian Government - Website. Available at: [www.nhmrc.gov.au/guidelines/publications/n29-n30-n31-n32-n33-n34](http://www.nhmrc.gov.au/guidelines/publications/n29-n30-n31-n32-n33-n34)

NHS-UK. 2012. Change4Life - Website. Available at: [www.nhs.uk/Change4Life/Pages/why-change-for-life.aspx](http://www.nhs.uk/Change4Life/Pages/why-change-for-life.aspx)

Novartis. 2013. Be Healthy - Website. Available at: [www.novartis.com/corporate-responsibility/responsible-business-practices/caring-for-our-people/be-healthy.shtml](http://www.novartis.com/corporate-responsibility/responsible-business-practices/caring-for-our-people/be-healthy.shtml)

Ofcom. 2010. HFSS Advertising Restrictions. Final Review. London: Ofcom. Available at: [stakeholders.ofcom.org.uk/binaries/research/tv-research/hfss-review-final.pdf](http://stakeholders.ofcom.org.uk/binaries/research/tv-research/hfss-review-final.pdf)

Olivares S, Snel J, McGrann M, Glasauer P. 1998. Educación en nutrición en las escuelas primarias. In: Albert J, editor. Food, Nutrition and Agriculture. Rome: Food and Agriculture Organization of the United Nations. Available at: [www.fao.org/docrep/X0051T/X0051T08.HTM](http://www.fao.org/docrep/X0051T/X0051T08.HTM)

Olson E. 2011. And Down This Aisle, Many Whole Grain Options. New York Times, February 2, 2011. Available at: [www.nytimes.com/2011/02/03/business/media/03adco.html?\\_r=0](http://www.nytimes.com/2011/02/03/business/media/03adco.html?_r=0)

Oostdam N, van Poppel MN, Wouters MG, van Mechelen W. 2011. Interventions for preventing gestational diabetes mellitus: a systematic review and meta-analysis. *J Womens Health (Larchmt)*;20(10):1551-1563.

Oxenham E, King AD. 2010. School Gardens as a Strategy for Increasing Fruit and Vegetable Consumption. *JCNM*. 34 (1). Available at: [www.schoolnutrition.org/Content.aspx?id=14025](http://www.schoolnutrition.org/Content.aspx?id=14025)

PAHO. 2010. Policy Statement: Preventing Cardiovascular Diseases in the Americas by Reducing Dietary Salt Intake Population-Wide. Washington DC: Pan American Health Organization. Available at: [new.paho.org/hq/dmdocuments/2010/red-salt-policy-statement-eng.pdf](http://new.paho.org/hq/dmdocuments/2010/red-salt-policy-statement-eng.pdf)

PAHO. 2011. Recommendations from a Pan American Health Organization - Expert Consultation on the Marketing of Food and Non-Alcoholic Beverages to Children in the Americas. Washington DC: Pan American Health Organization. Available at: [new.paho.org/hq/index.php?option=com\\_content&task=view&id=6570&Itemid=39404](http://new.paho.org/hq/index.php?option=com_content&task=view&id=6570&Itemid=39404)

PepsiCo. 2010. PepsiCo Global Policy on the Sale of Beverages to Schools. Available at: [www.pepsico.com/Download/PepsiCo\\_Global\\_Policy\\_On\\_The\\_Sale\\_Of\\_Beverages\\_To\\_Schools.pdf](http://www.pepsico.com/Download/PepsiCo_Global_Policy_On_The_Sale_Of_Beverages_To_Schools.pdf)

Philadelphia Department of Public Health. 2013. Food Fit Philly: Media. Available at: [foodfitphilly.org/media/](http://foodfitphilly.org/media/).

Pivonka E, Seymour J, McKenna J, Baxter SD, Williams S. 2011. Development of the behaviorally focused fruits & Veggies--More Matters public health initiative. *J Am Diet Assoc*; 111(10):1570-1577.

Pollard CM, Miller MR, Daly AM, Crouchley KE, O'Donoghue KJ, Lang AJ, Binns CW. 2008. Increasing fruit and vegetable consumption: success of the Western Australian Go for 2&5 campaign. *Public Health Nutr*; 11(3):314-320.

Pollard C, Miller M, Woodman RJ, Meng R, Binns C. 2009. Changes in knowledge, beliefs, and behaviors related to fruit and vegetable consumption among Western Australian adults from 1995 to 2004. *Am J Public Health*; 99(2):355-361.

Pomerleau J, Lock K, Knai C, McKee M. 2005. Interventions designed to increase adult fruit and vegetable intake can be effective: a systematic review of the literature. *J Nutr*; 135(10):2486-2495.

Prisma. 2013. EducAnimando con Salud - Website. Available at: [www.prisma.org.pe/blog/educanimando-con-salud/](http://www.prisma.org.pe/blog/educanimando-con-salud/)

Reger-Nash B, Wootan MG, Booth-Butterfield S, Cooper L. 2005. The cost-effectiveness of 1% or less media campaigns promoting low-fat milk consumption. *Prev Chronic Dis*; 2(4):A05.



- Riley L et al. Assessing National Capacity for Prevention and Control of Noncommunicable Diseases: the report of the 2010 Global Survey. WHO unpublished report
- Robinson-O'Brien R, Story M, Heim S. 2009. Impact of garden-based youth nutrition intervention programs: a review. *J Am Diet Assoc*;109(2):273-280.
- Romero-Fernández MM, Royo-Bordonada MA, Rodríguez-Artalejo F. 2010. Compliance with self-regulation of television food and beverage advertising aimed at children in Spain. *Public Health Nutr*;13(7):1013-1021.
- Romon M, Lommez A, Tafflet M, Basdevant A, Oppert JM, Bresson JL, et al. 2009. Downward trends in the prevalence of childhood overweight in the setting of 12-year school-and community-based programmes. *Public Health Nutr*;12(10):1735-1742. Rudd
- Center for Food Policy and Obesity. 2013. Pledges on food marketing to children worldwide – Website. Available at: [www.yaleruddcenter.org/marketingpledges](http://www.yaleruddcenter.org/marketingpledges).
- Sargent GM, Pilotto LS, Baur LA. 2011. Components of primary care interventions to treat childhood overweight and obesity: a systematic review of effect. *Obes Rev*;12(5):e219-235.
- Sassi F, Cecchini M, Lauer J, Chisholm D. 2009. Improving Lifestyles, Tackling Obesity: The Health and Economic Impact of Prevention Strategies. OECD Health Working Papers, No. 48. Paris: OECD Publishing. Available at: [dx.doi.org/10.1787/220087432153](https://dx.doi.org/10.1787/220087432153).
- Schadewaldt V, Schultz T. 2011. Nurse-led clinics as an effective service for cardiac patients: results from a systematic review. *Int J Evid Based Healthc*; 9(3):199-214.
- Schwartz MB, Henderson KE, Falbe J, Novak SA, Wharton CM, Long MW, O'Connell ML, Fiore SS. 2012. Strength and comprehensiveness of district school wellness policies predict policy implementation at the school level. *J Sch Health*;82(6):262-267.
- Sesame Workshop. 2012. Creating heart-healthy habits with fun, fur, and games - Website. Available at: [www.sesameworkshop.org/our-impact/our-stories/colombia.html?](http://www.sesameworkshop.org/our-impact/our-stories/colombia.html?)
- Shariatjafari S, Omidvar N, Shakibazadeh E, Majdzadeh R, Minaei M, Gholamzade M. 2012. Effectiveness of Community-based Intervention to Promote Iran's Food-based Dietary Guidelines. *Int J Prev Med*; 3(4):249-261.

Shepherd J, Harden A, Rees R, Brunton G, Garcia J, Oliver S, Oakley A. 2001. Young People and Healthy Eating: a Systematic Review of Research on Barriers and Facilitators. London: EPPI-Centre, Institute of Education, University of London.

Sichieri R, Trotte AP, Souza RA, Veiga GV. 2009. School randomized trial on prevention of excessive weight gain by discouraging students from drinking sodas. *Public Health Nutr*;12(2):197-202.

Singhal N, Misra A, Shah P, Gulati S. 2010. Effects of controlled school-based multi-component model of nutrition and lifestyle interventions on behavior modification, anthropometry and metabolic risk profile of urban Asian Indian adolescents in North India. *Eur J Clin Nutr*; 64(4):364-373.

Sirichakwal PP, Sranacharoenpong K, Tontisirin, K. 2011. Food based dietary guidelines (FBDGs) development and promotion in Thailand. *Asia Pac J Clin Nutr*; 20(3), 477-483.

Smith AW, Borowski LA, Liu B, Galuska DA, Signore C, Klabunde C, Huang TT, Krebs-Smith SM, Frank E, Pronk N, Ballard-Barbash R. 2011. U.S. primary care physicians' diet-, physical activity-, and weight-related care of adult patients. *Am J Prev Med*;41(1):33-42.

Snelling AM, Yezek J. 2012. The effect of nutrient-based standards on competitive foods in 3 schools: potential savings in kilocalories and grams of fat. *J Sch Health*; 82(2):91-96.

Steyn NP, Mann J, Bennett PH, Temple N, Zimmet P, Tuomilehto J, Lindström J, Louheranta A. 2004. Diet, nutrition and the prevention of type 2 diabetes. *Public Health Nutr*;7(1A):147-165.

Swart R, Saunders D, McLachlan M. 2008. Nutrition: A Primary Health Care Perspective. In: Barron P, editor. *South African Health Review 2008*. Durban: Health Systems Trust. Available at: [www.hst.org.za/publications/south-african-health-review-2008](http://www.hst.org.za/publications/south-african-health-review-2008)

Swartz JJ, Braxton D, Viera AJ. 2011. Calorie menu labeling on quick-service restaurant menus: an updated systematic review of the literature. *Int J Behav Nutr Phys Act*;8:135.

Swedish National Food Administration. 2009. The National Food Administration's environmentally effective food choices. Proposal notified to the European Union. Livsmedels Verket National Food Administration. Available at: [www.slv.se/upload/dokument/miljo/environmentally\\_effective\\_food\\_choices\\_proposal\\_eu\\_2009.pdf](http://www.slv.se/upload/dokument/miljo/environmentally_effective_food_choices_proposal_eu_2009.pdf)

Swinburn B, Sacks G, Lobstein T, Rigby N, Baur LA, Brownell KD, Gill T, Seidell J, Kumanyika S; International Obesity Taskforce Working Group on Marketing to Children. 2008. The 'Sydney Principles' for reducing the commercial promotion of foods and beverages to children. *Public Health Nutr*;11(9):881-886.

Taggart J, Williams A, Dennis S, Newall A, Shortus T, Zwar N, Denney-Wilson E, Harris MF. 2012. A systematic review of interventions in primary care to improve health literacy for chronic disease behavioral risk factors. *BMC Fam Pract*;13(1):49.

Tanchoco CC. 2011. Food- based dietary guidelines for Filipinos: retrospects and prospects. *Asia Pac J Clin Nutr*; 20(3), 462-471.

Tee ES. 2011. Development and promotion of Malaysian Dietary Guidelines. *Asia Pac J Clin Nutr*;20(3):455-46.1

Thai Health Promotion Foundation. 2010. Sweet Enough Network persuades schools to avoid risk of "obesity". News Release, December 15, 2010. Available at: [en.thaihealth.or.th/events/sweet-enough-network-persuades-schools-avoid-risk-“obesity”](http://en.thaihealth.or.th/events/sweet-enough-network-persuades-schools-avoid-risk-“obesity”)

Thompson B, Amoroso L. 2011. Combating Micronutrient Deficiencies: Food-based Approaches. Rome: Food and Agriculture Organization and CAB International. Available at: [www.fao.org/docrep/013/am027e/am027e00.htm](http://www.fao.org/docrep/013/am027e/am027e00.htm)

Thorogood M, Simera I, Dowler E, Summerbell C, Brunner E. 2007. A systematic review of population and community dietary interventions to prevent cancer. *Nutr Res Rev*; 20(1):74-88.

Toral N, Slater B. 2012. Intervention based exclusively on stage-matched printed educational materials regarding healthy eating does not result in changes to adolescents' dietary behavior. *Scientific World Journal*;174640. doi: 10.1100/2012/174640

United Nations General Assembly. 2011. Draft resolution submitted by the President of the General Assembly - Political Declaration of the High-level Meeting of the General Assembly on the Prevention and Control of Non-communicable Diseases. New York NY: United Nations. Available at: [www.un.org/ga/search/view\\_doc.asp?symbol=A/66/L.1](http://www.un.org/ga/search/view_doc.asp?symbol=A/66/L.1)

USDA. 2009. About EFNEP - Website. Available at: [www.nifa.usda.gov/nea/food/efnep/about.html](http://www.nifa.usda.gov/nea/food/efnep/about.html)

USDA. 2010. The Expanded Food and Nutrition Education Program (EFNEP) - Brochure. Washington DC: United States Department of Agriculture. Available at: [www.nifa.usda.gov/nea/food/efnep/pdf/2010\\_Revrack\\_card.pdf](http://www.nifa.usda.gov/nea/food/efnep/pdf/2010_Revrack_card.pdf)

USDA. 2012. Expanded Food and Nutrition Education Program Impacts – Website. Available at: [www.nifa.usda.gov/nea/food/efnep/impacts.html](http://www.nifa.usda.gov/nea/food/efnep/impacts.html)

USDA and USDHHS. 2010. Dietary Guidelines for Americans, 2010 (7th edition) Washington DC: U.S. Government Printing Office.

Van Cauwenberghe E, Maes L, Spittaels H, van Lenthe FJ, Brug J, Oppert JM, De Bourdeaudhuij I. 2010. Effectiveness of school-based interventions in Europe to promote healthy nutrition in children and adolescents: systematic review of published and 'grey' literature. *Br J Nutr*;103(6):781-797.

Van Stralen MM, Yildirim M, te Velde SJ, Brug J, van Mechelen W, Chinapaw MJ; ENERGY-consortium. 2011. What works in school-based energy balance behaviour interventions and what does not? A systematic review of mediating mechanisms. *Int J Obes (Lond)*;35(10):1251-1265.

Veerman JL, Van Beeck EF, Barendregt JJ, Mackenbach JP. 2009. By how much would limiting TV food advertising reduce childhood obesity? *Eur J Public Health*;19(4):365-369.

Vio F, Zacarias I, Gonzales D. 2008. Implementación de un programa de promoción del consumo de frutas y verduras: Corporación 5 Al Día Chile. In: Olivares S, Leporati M, Barría L, editors. Contribución de la política agraria al consumo de frutas y verduras en Chile: un compromiso con la nutrición y la salud de la población. INTA/Government of Chile/ 5 a day Corporation.

Vive Saludable. 2013. Vive Saludable – Website. Available at: [www.vivesaludable-escuelas.com](http://www.vivesaludable-escuelas.com)

WASH. 2012. Welcome to World Action on Salt and Health – Website. Available at: [www.worldactiononsalt.com/](http://www.worldactiononsalt.com/)

Webster JL, Dunford EK, Hawkes C, Neal BC. 2011. Salt reduction initiatives around the world. *J Hypertens*; 29(6):1043-1050.

- Wescott RF, Fitzpatrick BM, Phillips E. 2012. Industry self-regulation to improve student health: quantifying changes in beverage shipments to schools. *Am J Public Health*;102(10):1928-1935.
- Westland S, Crawley H. 2012. *Healthy and Sustainable Diets in the Early Years*. London: First Steps Nutrition Trust. Available at: [www.firststepsnutrition.org/pdfs/sustainability.pdf](http://www.firststepsnutrition.org/pdfs/sustainability.pdf)
- WCRF. 2007. *Food, Nutrition, Physical Activity and the Prevention of Cancer: a Global Perspective*. Washington DC: World Cancer Research Fund / American Institute for Cancer Research. Available at: [eprints.ucl.ac.uk/4841/1/4841.pdf](http://eprints.ucl.ac.uk/4841/1/4841.pdf)
- World Economic Forum. 2012. *The Workplace Wellness Alliance - Investing in a Sustainable Workforce*. Geneva: World Economic Forum. Available at: [www3.weforum.org/docs/WEF\\_HE\\_WorkplaceWellnessAlliance\\_IndustryAgenda\\_2012.pdf](http://www3.weforum.org/docs/WEF_HE_WorkplaceWellnessAlliance_IndustryAgenda_2012.pdf)
- WHO. 1978. *Report of the International Conference on Primary Health Care, Alma-Ata, USSR, 6-12 September 1978*. Geneva: World Health Organization. Available at: [whqlibdoc.who.int/publications/9241800011.pdf](http://whqlibdoc.who.int/publications/9241800011.pdf)
- WHO. 1986. *Ottawa Charter for Health Promotion. First International Conference on Health Promotion, Ottawa, Canada, 17-21 November 1986*. Geneva: World Health Organization. Available at: [www.who.int/healthpromotion/conferences/previous/ottawa/en/](http://www.who.int/healthpromotion/conferences/previous/ottawa/en/)
- WHO. 2000. *Obesity: preventing and managing the global epidemic. Report of a WHO Consultation - WHO Technical Report Series 894*. Geneva: World Health Organization. Available at: [www.who.int/nutrition/publications/obesity/WHO\\_TRS\\_894/en/](http://www.who.int/nutrition/publications/obesity/WHO_TRS_894/en/)
- WHO. 2003. *Diet, nutrition and the prevention of chronic diseases. Report of a Joint WHO/FAO Expert Consultation - WHO Technical Report Series 916*. Geneva: World Health Organization. Available at: [whqlibdoc.who.int/trs/who\\_trs\\_916.pdf](http://whqlibdoc.who.int/trs/who_trs_916.pdf)
- WHO. 2004. *Global Strategy on Diet, Physical Activity and Health*. Geneva: World Health Organization. Available at: [www.who.int/dietphysicalactivity/strategy/eb11344/strategy\\_english\\_web.pdf](http://www.who.int/dietphysicalactivity/strategy/eb11344/strategy_english_web.pdf)
- WHO. 2007. *Reducing Salt Intake in Populations - Report of a WHO Forum and Technical meeting 5-7 October 2006, Paris, France*. Geneva: World Health Organization. Available at: [www.who.int/dietphysicalactivity/reducingsaltintake\\_EN.pdf](http://www.who.int/dietphysicalactivity/reducingsaltintake_EN.pdf)

WHO. 2008. School Policy Framework Implementation of the Global Strategy on Diet, Physical Activity and Health. Geneva: World Health Organization. Available at: [www.who.int/dietphysicalactivity/schools/en/index.html](http://www.who.int/dietphysicalactivity/schools/en/index.html)

WHO. 2010. Set of Recommendations on the Marketing of Foods and Non-Alcoholic Beverages to Children. Geneva: World Health Organization. Available at: [www.who.int/dietphysicalactivity/marketing-food-to-children/en/index.html](http://www.who.int/dietphysicalactivity/marketing-food-to-children/en/index.html)

WHO. 2011a. Global Status Report on Non-communicable Diseases 2010. Geneva: World Health Organization. Available at: [www.who.int/nmh/publications/ncd\\_report\\_full\\_en.pdf](http://www.who.int/nmh/publications/ncd_report_full_en.pdf)

WHO. 2011b. Nutrition-Friendly Schools Initiative (NFSI). Available at: [www.who.int/nutrition/topics/NFSI\\_Briefing\\_presentation.pdf](http://www.who.int/nutrition/topics/NFSI_Briefing_presentation.pdf)

WHO. 2012a. A framework for implementing the set of recommendations on the marketing of foods and non-alcoholic beverages to children. Geneva: World Health Organization. Available at: [www.who.int/dietphysicalactivity/MarketingFramework2012.pdf](http://www.who.int/dietphysicalactivity/MarketingFramework2012.pdf)

WHO. 2012b. Assessing national capacity for the prevention and control of non-communicable diseases: report of the 2010 global survey. Geneva: World Health Organization. Available at: [www.who.int/cancer/publications/national\\_capacity\\_prevention\\_ncds.pdf](http://www.who.int/cancer/publications/national_capacity_prevention_ncds.pdf)

WHO/FAO. 2013. Codex Alimentarius – Website. Available at: [www.codexalimentarius.org](http://www.codexalimentarius.org)

WHO, FAO & SEARO. 2011. Regional Consultation on Food-Based Dietary Guidelines for countries in the Asia Region. New Delhi, India, 6–9 December 20. Available at: [www.searo.who.int/entity/foodsafety/documents/sea\\_nut\\_180/en/index.html](http://www.searo.who.int/entity/foodsafety/documents/sea_nut_180/en/index.html)

Wynn K, Trudeau JD, Taunton K, Gowans M, Scott I. 2010. Nutrition in primary care: current practices, attitudes, and barriers. *Can Fam Physician*;56(3):e109-116.



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