



Population-based approaches to

CHILDHOOD OBESITY PREVENTION





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World Health
Organization

WHO Library Cataloguing-in-Publication Data

Population-based approaches to childhood obesity prevention.

1.Obesity - prevention and control. 2.Child welfare. 3.Exercise. 4.Food habits. 5.Community health services. 6.Consumer participation. I.World Health Organization.

ISBN 978 92 4 150478 2

(NLM classification: WD 210)

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Printed by the WHO Document Production Services, Geneva, Switzerland

Contents

	List of figures	7
	List of boxes	7
	Abbreviations	8
	Acknowledgements	9
	Executive Summary	11
1	Introduction	13
	1.1 Childhood obesity	13
	1.2 Key global strategies related to obesity prevention	13
	1.3 WHO Forum and Technical Meeting on Population-based Prevention Strategies for Childhood Obesity	15
	1.4 Purpose and structure of the document	15
2	Guiding principles for the development of a population-based childhood obesity prevention strategy	16
	2.1 Integrated strategy	16
	2.2 Policy support from multiple levels of governance	16
	2.3 Equity and inclusivity	17
	2.4 Environmental support	17
	2.5 Monitoring and surveillance	18
	2.6 Engagement with multiple sectors and settings	18
	2.7 Transparency	18
	2.8 Contextualization	19
	2.9 Sustainability	19
	2.10 Coordination	19
	2.11 Explicit priority setting	20
3	Key components of a population-based childhood obesity prevention strategy	21
4	Structures within government to support childhood obesity prevention policies and interventions	23
	4.1 Leadership	23
	4.2 "Health-in-all" policies	23
	4.3 Dedicated funding for health promotion	24
	4.4 NCD monitoring systems	24
	4.5 Workforce capacity	24
	4.6 Networks and partnerships	25
	4.7 Standards and guidelines	26

5**Population-wide policies and initiatives 27**

5.1	Policies influencing food environments	27
5.1.1	Marketing of unhealthy foods and non-alcoholic beverages to children	28
5.1.2	Nutrition labelling	28
5.1.3	Food taxes and subsidies	29
5.1.4	Fruit and vegetable initiatives	30
5.1.5	Other food policies	31
5.2	Physical activity policies	32
5.3	Social marketing campaigns	33

6**Community-based interventions 35**

6.1	What are community-based interventions?	35
6.2	Best practice in delivering community-based interventions	35
6.2.1	Community engagement	36
6.2.2	Programme design and planning	36
6.2.3	Implementation	36
6.2.4	Sustainability	37
6.2.5	Governance and transparency	37
6.2.6	Evaluation	37
6.3	Components of community-based interventions	40
6.4	What works in different settings	41
6.4.1	Early childcare settings	41
6.4.2	Primary and secondary schools	42
6.4.3	Other community settings	46

7**Conclusions 47**

References 48

List of Figures

Figure 1	Schematic model demonstrating the framework for implementation of DPAS at Member State level	14
Figure 2	Key components of a population-based childhood obesity prevention strategy	21

List of Boxes

Box A	Training teachers in the Caribbean to infuse diet and physical activity recommendations into the school curriculum	25
Box B	Front-of-pack traffic-light nutrition labelling	29
Box C	Restricting <i>trans</i> -fatty acids	31
Box D	Healthy food service policies in government institutions, Queensland, Australia	31
Box E	Encouraging physical activity in Bogotá, Colombia	32
Box F	Social marketing campaign promoting physical activity in Brazil	34
Box G	EPODE	38
Box H	The Pacific Obesity Prevention in Communities (OPIC) project	39
Box I	The Collaboration of Community-based Obesity Prevention Sites (CO-OPS Collaboration), Australia	40
Box J	Community-based obesity prevention in young children: "Romp & Chomp," Australia	41
Box K	A school-based, multi-component nutrition and lifestyle intervention in North India	43
Box L	An example of a school-based childhood obesity prevention intervention in Beijing, China	44
Box M	The school-feeding programme in Jamaica	45

Abbreviations

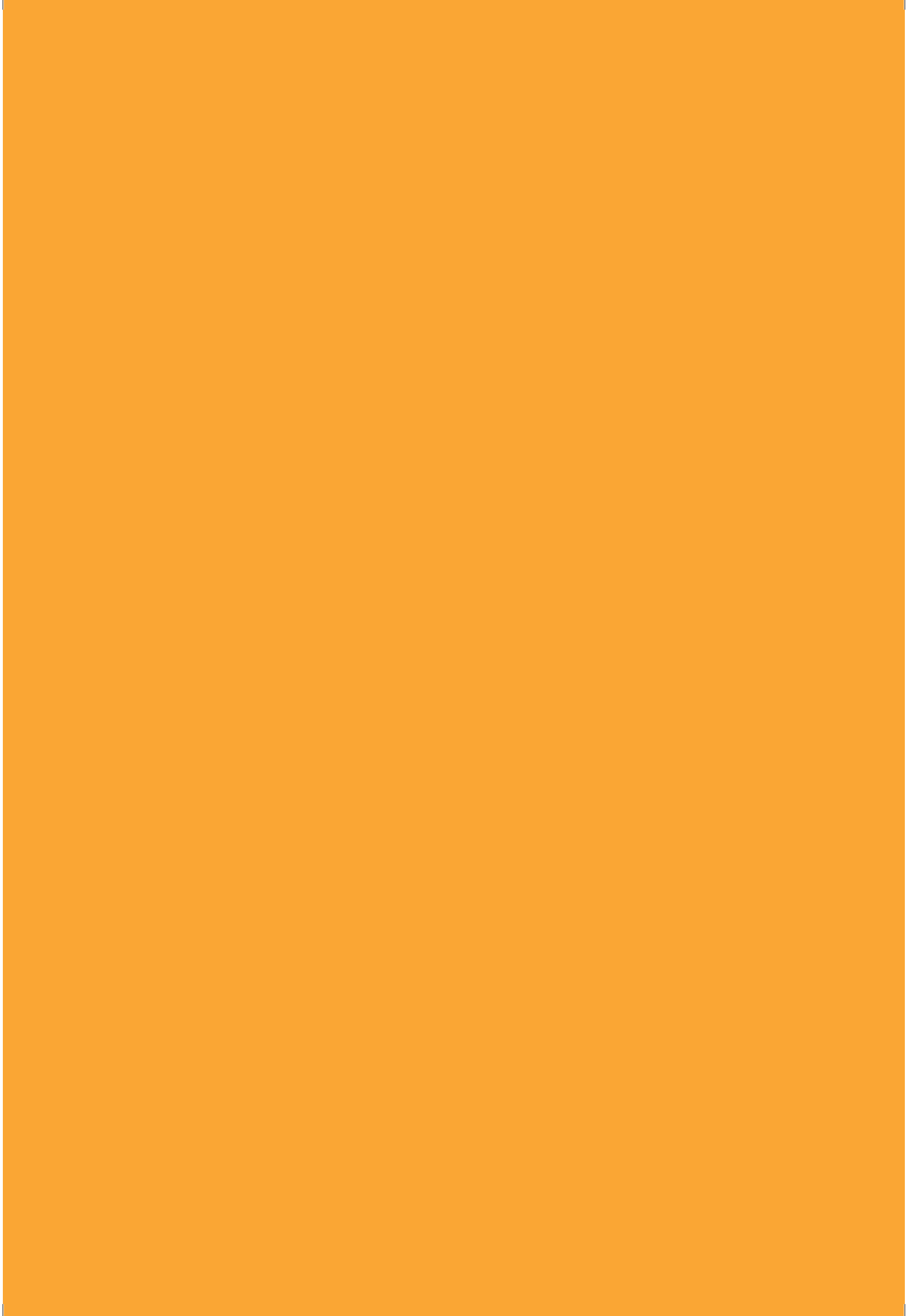
BMI	Body Mass Index
DPAS	Global Strategy on Diet, Physical Activity and Health
CVD	Cardiovascular disease
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GSHS	Global School-based student Health Survey
NCD	Noncommunicable disease
NGO	Nongovernmental Organization
ODA	Overseas Development Assistance
WHA	World Health Assembly
WHO	World Health Organization
UN	United Nations
USA	United States of America

Acknowledgment

This document was prepared by Gary Sacks, Boyd Swinburn and Godfrey Xuereb. The collaboration and input of Timothy Armstrong, Francesco Branca, and Paul Bloem are also acknowledged. Sections of this document are based on the World Health Organization publications: *Interventions on diet and physical activity: what works: summary report (2009)* and *Population-based prevention strategies for childhood obesity: report of a WHO forum and technical meeting, Geneva, 15–17 December 2009 (2010)*.

The development and production of this document was financially supported by the Ministry of Health and Solidarity, France and responds to their interest in ongoing collaborative work in the development and implementation of policies and programmes to support the prevention of childhood obesity. Their generosity is acknowledged.

World Health Organization
November 2012





Executive summary

The United Nations Political Declaration of the High-level Meeting of the General Assembly on the Prevention and Control of Non-communicable Diseases and the World Health Organization (WHO) Global Strategy on Diet, Physical Activity and Health both identify population-based prevention as being vital to addressing rising levels of noncommunicable diseases, with specific emphasis on childhood obesity.

As part of its commitment to providing technical advice to Member States in implementing the Global Strategy on Diet, Physical Activity and Health, WHO held a Forum and Technical Meeting on Population-based Prevention Strategies for Childhood Obesity in 2009. The overall aim of the Forum and Meeting was to identify priorities for population-based strategies to prevent childhood obesity, and to define roles and responsibilities for various stakeholders. As a follow-up to the Meeting, WHO was asked to develop a tool for Member States to determine and identify priority areas for action, and also develop examples of population-based approaches to preventing childhood obesity. This document addresses the latter of these requests and aims to provide Member States with an overview of the types of childhood obesity prevention interventions that can be undertaken at national, sub-national and local levels. Where relevant, the document also aims to indicate which prevention measures are likely to be the most effective.

The document first outlines guiding principles for the development of a population-based childhood obesity prevention strategy. It is clear that actions to prevent childhood obesity need to be taken in multiple settings and at all levels of government. They also need to incorporate a variety of approaches and involve a wide range of stakeholders. Moreover, childhood obesity prevention efforts need to be tightly integrated with other efforts to control the major noncommunicable disease risk factors. Policies for obesity prevention need to be inclusive and improve equity, with interventions tailored to suit local contexts. They also need to be carried out in a transparent and sustainable way. Surveillance, monitoring and evaluation are also critical to support effective action. The prioritization of policy actions needs to be explicit, with defined processes for selecting interventions for implementation in a step-based manner.

Approaches for population-based obesity prevention can be divided into three broad components:

The first component is the structures within government to support childhood obesity prevention policies and interventions. These are structural aspects such as leadership, “health-in-all” policies, dedicated funding for health promotion, noncommunicable disease monitoring systems, workforce capacity, and networks and partnerships that need to be in place in order to support and enhance the effectiveness of the more direct policy initiatives and community-based interventions.

The second component is population-wide policies and initiatives. These are direct policy actions that help to create environments that support healthy diets and physical activity. The types of policy instruments typically used as part of this component of a comprehensive childhood obesity prevention strategy are laws and regulations, taxes and subsidies, and social marketing campaigns that affect the population as a whole (or large population groups). Policies influencing food environments that are likely to be effective interventions include restrictions on the marketing of unhealthy foods and non-alcoholic beverages to children, nutrition labelling, and food taxes and subsidies. Policies influencing physical activity environments that have been demonstrated as effective include environmental interventions targeting the built environment, policies that reduce

barriers to physical activity, transport policies, policies to increase space for recreational activity, and school-based physical activity policies.

The third component is community-based interventions. These are multi-component interventions and programmes, typically applied across multiple settings, tailored to the local environment and implemented locally. Best practice principles for designing and implementing community-based interventions include strong community engagement at all stages of the process, careful planning of interventions to incorporate local information, and integration of the programme into other initiatives in the community. Community-based interventions have been demonstrated to be successful when applied in multiple settings, including early childcare settings, schools and other community settings. Importantly, single-component interventions may still form an important part of a step-based approach to obesity prevention – for example as the first step in implementing a multi-component, multi-setting intervention programme.

In summary, there is a broad range of population-level actions that governments can take to prevent childhood obesity. A comprehensive childhood obesity prevention strategy will incorporate aspects of each of the key components. Strategic investment is required to implement effective and culturally appropriate population-based childhood obesity prevention programmes and initiatives, and to ensure that they include vulnerable groups, such as children with disabilities. It is essential that such interventions occur across the whole population, in a variety of settings, and through multiple strategies.

Introduction

1.1 Childhood obesity

Over the past three decades the prevalence of overweight and obesity has increased substantially (1). Globally, an estimated 170 million children (aged less than 18 years) are now estimated to be overweight (2). The highest prevalence of childhood overweight is in upper-middle-income countries, and, when taken as a group, low-income countries have the lowest prevalence rate. However, overweight is rising in almost all countries, with prevalence rates growing fastest in lower-middle-income countries (1).

The high prevalence of overweight and obesity has serious health consequences. Raised body mass index (BMI) is a major risk factor for diseases such as cardiovascular disease, type 2 diabetes and many cancers (including, for example, colorectal cancer, kidney cancer and oesophageal cancer) (3, 4). These diseases – often referred to as noncommunicable diseases (NCDs) – not only cause premature mortality, but also long-term morbidity. In addition, overweight and obesity in children are associated with significant reductions in quality of life (5, 6) and a greater risk of teasing, bullying and social isolation (2).

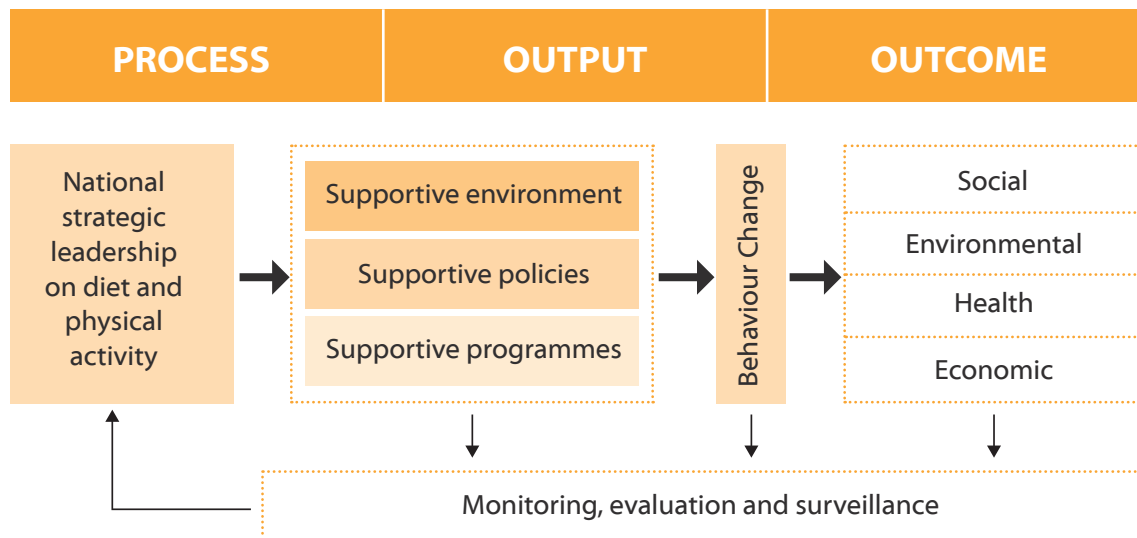
Due to the rapid increases in obesity prevalence and the serious public health consequences, obesity is commonly considered one of the most serious public health challenges of the early 21st century (1, 7).

1.2 Key global strategies related to obesity prevention

In 2004, the World Health Assembly endorsed Resolution WHA57.17 on the *Global Strategy on Diet, Physical Activity and Health (DPAS)* (8). The Global Strategy addresses the increasing prevalence and burden of NCDs, and, more specifically, global diet and physical activity patterns.

Subsequently, in 2008, WHO developed a framework to assist Member States in monitoring and evaluating the implementation of DPAS at Member State level (9) (see Figure 1). This framework proposes that national governments demonstrate leadership and facilitate collaborative action in the implementation of policies and programmes to promote supportive environments for health. These actions are expected, in turn, to facilitate positive changes in diet and physical activity behaviours, with related health, social, environmental and economic outcomes.

Figure 1 Schematic model demonstrating the framework for implementation of DPAS at Member State level (9)



In 2011, the United Nations (UN) General Assembly adopted the *Political declaration of the high-level meeting of the General Assembly on the prevention and control of non-communicable diseases* (UN Political Declaration on NCDs) (10). This UN political declaration recognises the scale of the NCD crisis, including obesity, and the urgent need for global action. By acknowledging the direct impact of noncommunicable diseases on social and economic development, and recognising that such diseases pose a major threat to the economies of many Member States, the UN Political Declaration on NCDs provides a strong impetus for governments to take preventive action and demonstrate sound leadership (10). Both DPAS and the UN Political Declaration on NCDs recognise that effective NCD prevention requires the involvement of many different stakeholder groups, and multisectoral approaches involving, amongst others, health, education, agriculture, industry and trade, and finance (10).

In 2012, the World Health Assembly endorsed Resolution WHA65.6 on the *Comprehensive implementation plan on maternal and young child nutrition* (11). The Resolution urges Member States to put into practice the implementation plan, including the strengthening of nutrition policies that address the double burden of malnutrition.

1.3 WHO Forum and Technical Meeting on Population-based Prevention Strategies for Childhood Obesity

As part of its commitment to providing technical advice to Member States in implementing DPAS, WHO held a Forum and Technical Meeting on Population-based Prevention Strategies for Childhood Obesity in 2009 (12). The overall aim of the meeting was to identify priorities for population-based strategies to prevent childhood obesity and to define roles and responsibilities for various stakeholders.

Participants of the meeting proposed a series of actions for addressing childhood obesity including the development of suitable tools for Member States (12). Specifically, WHO was asked to develop a tool for Member States to determine and identify priority areas for action as well as examples of population-based approaches to childhood obesity prevention. The latter of these is addressed by this document.

1.4 Purpose and structure of the document

This document aims to provide Member States with an overview of the types of childhood obesity prevention interventions that can be undertaken at national, sub-national and local levels. The main focus is on primary school-age children and adolescents, but several interventions also benefit younger children. Where relevant, prevention measures that are likely to prove most effective are indicated.

Guiding principles for the development of a population-based childhood obesity prevention strategy are outlined and the three key components of a population-based childhood obesity prevention strategy then identified. These are then discussed in turn and the types of approaches that Member States can take and considerations of design are laid out. Where possible, country examples are also provided.

In defining population-based prevention strategies to childhood obesity, this document is best used in conjunction with the document *Prioritizing areas for action in the field of population-based prevention of childhood obesity* (13) and other WHO documents related to childhood obesity and NCD prevention.

Guiding principles for the development of a population-based childhood obesity prevention strategy

The following guiding principles for the development of a population-based childhood obesity prevention strategy are based on those developed as part of the WHO Forum and Technical Meeting on Population-based Prevention Strategies for Childhood Obesity (12).

2.1 Integrated strategy

The determinants of obesity are complex and varied and it is important to recognise that no single intervention is likely to prevent childhood obesity (14). Actions to prevent childhood obesity need to be taken in multiple settings and incorporate a variety of approaches and involve a wide range of stakeholders. Sustained interventions are likely to be required at several levels – at an individual level in schools and community settings to effect behavioural change, and in sector changes within agriculture, food manufacturing, education, transportation, and urban planning (15). Each intervention may have minimal effects when assessed in isolation but can constitute significant components to an overall strategy.

Childhood obesity prevention efforts need to be tightly integrated with other efforts to control all major NCD risk factors (including tobacco use, alcohol intake, unhealthy diet and low physical activity) (1). This requires intervention at all levels of society, from communities through to governments, private organizations and nongovernmental organizations. Noncommunicable disease risk factors are embedded in the framework of society and influenced by many areas of national policy (1).

For many low- and middle-income countries, actions for obesity prevention – and NCD prevention more generally – need to be integrated with the related issues of food security and undernutrition (16).

Finally, interventions for childhood obesity prevention need to be part of existing plans and programmes that aim to improve diets and physical activity. Interventions that utilize specific settings should also strive for integration. In many cases schools, for example, have been able to integrate behaviour-modification education into their existing curriculum (12).

2.2 Policy support from multiple levels of governance

Obesity prevention interventions should be supported by policies at all levels of government – national, regional and local. National policies can create supportive environments; regional policies can facilitate pooling of resources; and local tailoring of interventions results in more effective targeted interventions. Global (intergovernmental) support for obesity prevention can help to address transnational environmental factors, such as creating a healthier food supply (12).

It is important to recognise that actions need not be separate. Different levels of government may wish to work together and local initiatives can and should be in line with the national and regional policies that support them.

2.3 **Equity and inclusivity**

Certain studies suggest that children of higher socioeconomic backgrounds, rather than more disadvantaged backgrounds, benefit more from interventions. Policy-makers and practitioners must therefore consider the potential impact of interventions to ensure that obesity prevention does not deepen existing inequalities. The focus of obesity prevention interventions should be on protecting the right of all children to a healthy start to life (12).

Strategies and programmes need to prioritize the inclusion of vulnerable groups, particularly children with disabilities. Children with special learning needs, for instance, can be provided for by recommendations and guidance on the modification of population-based strategies for specific groups (12). It is also important to ensure that children are not disadvantaged on the basis of gender.

2.4 **Environmental support**

There are several possible approaches to addressing public health issues. These are often classified as “upstream,” “midstream,” or “downstream,” based on the points of intervention and areas targeted (17). With respect to population-based childhood obesity prevention, most interventions are likely to be “upstream” and “midstream”.

The “upstream” or socio-ecological approach to obesity prevention aims to shape the circumstances and conditions which are the underlying determinants of health and social equity in society. Actions target the food environments, physical activity environments and the broader socioeconomic environments (including taxation, employment, education, housing and welfare), thus indirectly influencing population behaviours. Sectors targeted include all aspects of the food system (such as agriculture, food processing, food distribution, marketing, retail and food service sectors) and sectors that influence the physical activity environment (such as infrastructure, transport, and education sectors) (17).

“Midstream” or behavioural approaches to obesity prevention aim to improve population dietary and physical activity behaviour patterns. “Midstream” approaches will typically be targeted at the settings level, where programmes, social marketing, education, and other initiatives to motivate individuals to change diet and physical activity behaviours can be implemented (17). These settings may include childcare centres, schools, community and recreational facilities, households, or religious settings.

“Downstream” approaches are typically directed towards supporting health services and medical (clinical) interventions. In the context of childhood obesity prevention, these are typically individual-based, rather than population-based.

2.5 Monitoring and surveillance

Ongoing monitoring and surveillance at global, national and local levels is essential for understanding the nature of the problem and the context of the intervention. The information garnered can be used to inform policy, evaluate progress and enable advocacy. In addition, monitoring data can be used to build political will through diplomacy, bring research closer to policy, improve exchange of information, ensure proper distribution of funding, show early and quick wins, and identify the interests of other sectors (12).

2.6 Engagement with multiple sectors and settings

Effective obesity prevention depends on action by multiple sectors to create a healthier environment. The development of an environment supportive of physical activity will require policy support from sectors such as urban planning (built environment), education (school-based physical activity), sport (recreational activity and inclusivity) and transport (active transport and public transport). Improving the healthfulness of the food supply will require, among others, the involvement of those responsible for food standards (reformulation), communications (marketing), commerce (food retail), agriculture (investment in primary production) and education (school food environments). Other sectors, such as trade and finance, can also play a role by, for example, implementing changes to food taxation systems or fiscal policies on sporting goods and activities (12).

2.7 Transparency

Ensuring transparent and effective engagement with stakeholders outside government has been identified as a key factor in influencing the success of programme implementation. Approaches which help minimize conflicts of interest include public availability of information on partnerships and mandatory disclosure of potential conflicts of interest.

Transparency is particularly important when engaging with the private sector. While public–private partnerships can improve resourcing and help to ensure sustainability, concerns have been raised regarding the influence of for-profit companies – particularly from the food industry – on the priorities of obesity prevention interventions and the selection of strategies (12).

2.8 Contextualization

Depending on the area, region or country, some actions or policy options will be more important, appropriate and feasible than others. Hence, it is imperative that decisions regarding policy options and priority areas for action are made locally. Potential areas for action must be carefully analysed, and local, regional or country-specific factors considered. Historical, political, cultural, social and economic factors, available resources, and existing policies and systems all need to be taken into account.

Contextualization is also important when designing and implementing interventions – taking into account both the nature of the problem (e.g. the specific populations affected) and the cultural and social factors influencing health behaviours. The recent experience in France is a case in point – social marketing was far more effective when the importance of maintaining a healthy weight was framed positively, using messages focused not only on health but also on the pleasure derived from being active and eating well (12).

2.9 Sustainability

Long-term interventions have been shown to be most effective in preventing childhood obesity and sustainability of such interventions has proven a key component to their success. Strategies that improve programme sustainability include i) building on existing frameworks, recommendations, policies and datasets; ii) developing community ownership; and iii) influencing social norms (12).

Planning and budgeting for the longer term, as well as identification of cost-effective interventions, can improve both implementation effectiveness and programme sustainability. Creativity in funding is required to ensure long-term sustainability. This can include the development of strategies to uncouple funding by the private sector from direction-setting and intervention selection (12), as well as the use of ongoing targeted taxes such as tobacco, alcohol and unhealthy food taxes to sustain health-promoting initiatives.

2.10 Coordination

Relevant sectors can be identified as part of priority-setting processes at national and local levels, and should be engaged in a coordinated way to address shared goals regarding diet and physical activity. Clear definition of roles and responsibilities are critical for effective multisectoral engagement. It is important that ministries of health coordinate action through leadership and diplomacy, both across sectors and levels of government and between public and private actors. Clear goals – particularly the common goal of protection of children – help foster political will and increase public support. Involving implementers in planning is a critical aspect of coordination (12).

Explicit priority setting

While the need for preventive action is increasingly recognised, policy implementation often occurs in non-systematic, ad hoc ways. Policy actions are likely to be more cohesive and comprehensive if decision processes are more systematic, evidence-based and stakeholder-informed (13).

Given the wide range of potential options, finding the most suitable combination of approaches to childhood obesity prevention for a given context remains a key challenge. Consideration of country- and community-specific factors, such as availability of resources or socioeconomic differences in obesity prevalence, is likely to be significant in any decision-making process. Experience has shown that the use of transparent, tried-and-tested priority-setting processes and tools can be of considerable benefit in this regard (12, 13).

Importantly, prioritization processes can be designed for a step-based approach to policy implementation. This can enable Member States to take immediate action, as part of a longer-term plan.

The companion document, *Prioritizing areas for action in the field of population-based prevention of childhood obesity* (13) gives more details with regard to priority setting.

3

Key components of a population-based childhood obesity prevention strategy

Approaches for population-based obesity prevention can be divided into three broad components:

1. Structures within government to support childhood obesity prevention policies and interventions. These are structural aspects, such as leadership, workforce capacity and NCD monitoring systems that need to be in place in order to support and enhance the effectiveness of direct policy initiatives and community-based interventions.
2. Population-wide policies and initiatives, such as marketing restrictions on unhealthy foods and non-alcoholic beverages to children, nutrition labelling, food taxes and subsidies, physical activity policies, and social marketing campaigns. These are typically designed to alter the food and physical activity environments to make healthier choices the easier choices for individuals within the population.
3. Community-based interventions. These are multi-component interventions and programmes, typically applied across multiple settings, tailored to the local environment and implemented locally.

These key components of a population-based childhood obesity prevention strategy are shown in Figure 2.

Figure 2 Schematic model demonstrating the framework for implementation of DPAS at Member State level (9)

POPULATION-BASED APPROACHES TO CHILDHOOD OBESITY PREVENTION		
Structures to support policies & interventions	Population-wide policies and initiatives	Community-based interventions
<ul style="list-style-type: none"> • Leadership • 'Health-in-all' policies • Dedicated funding for health promotion • NCD monitoring systems • Workforce capacity • Networks and partnerships • Standards and guidelines 	<ul style="list-style-type: none"> • Marketing of unhealthy foods and beverages to children • Nutrition labelling • Food taxes and subsidies • Fruit and vegetable initiatives • Physical activity policies • Social marketing campaigns 	<ul style="list-style-type: none"> • Multi-component community-based interventions • Early childcare settings • Primary and secondary schools • Other community settings

It is important that a comprehensive population-based childhood obesity prevention strategy incorporates aspects of each of these three key components. In doing so, there is recognition that each of the components, and the particular aspects within them, are highly inter-related. For example, monitoring systems that indicate where cycling paths are most needed are crucial to support the implementation of a policy to invest in cycling paths, which in turn enhances the efforts of community-based interventions to encourage cycling in local settings. Furthermore, actions in one component (e.g. community-level actions to limit the marketing of unhealthy foods and non-alcoholic beverages to children) may help to raise political support for policy changes at other levels (e.g. national policies to restrict the marketing of unhealthy foods and non-alcoholic beverages).

The selection of particular options within each component should generally be informed by evidence of their likely effectiveness and cost-effectiveness. Significantly, however, not all of these components are suitable for cost-effective analysis and, more specifically, structures within governments to support policies and interventions should be viewed as necessary investments, or core infrastructure, for obesity prevention and not subject to cost-effectiveness analyses. For example, it is not readily possible to determine the cost-effectiveness of structures to monitor population diets and weight status (14). In contrast, it may be possible (albeit sometimes difficult) to evaluate the cost-effectiveness of many of the interventions in the other components.

Each of these key components is discussed in the sections that follow.

4

Structures within government to support childhood obesity prevention policies and interventions

Critical, and often overlooked, aspects of childhood obesity prevention efforts are the underpinning structural components within government that can help facilitate specific “direct” interventions. These include aspects such as leadership, workforce capacity and intelligence, as well as monitoring systems that need to be in place in order to support and enhance the effectiveness of policy initiatives and community-based interventions (14).

The significance of these structures is especially important for low- and middle-income countries that need to boost structures supporting workforce skills and knowledge creation for public health in general.

This section outlines some of the key structures that have previously been identified as important for supporting childhood obesity prevention efforts (4, 9, 14, 16, 18). The list is not designed to be comprehensive, but to indicate the types of structures considered important.

4.1 Leadership

High-level strategic leadership is crucial for gaining the required support to implement childhood obesity prevention initiatives, and for maintaining longer-term momentum. Ideally, high-level political leaders, such as prime ministers, presidents, and government ministers, will provide the necessary strategic leadership.

4.2 “Health-in-all” policies

In evaluating proposed government policies, their likely influence on health is not usually considered. “Health-in-all” policies can make mandatory an assessment of the likely health impact of all new policies being considered, and for policy proposals to be adjusted accordingly. Examples of the application of “health-in-all” policies include the following (14):

- The protection and promotion of health and sustainable food security are declared as overriding priorities in food policy development.
- The protection and promotion of health is ensured in trade agreements and agricultural and food fiscal policies (e.g. subsidies, taxes, import tariffs, quotas).
- Transport and urban planning policies and budget allocations place a priority on public transport, walking/cycling environments, and safe recreation spaces.
- Taxation and social policies support the reduction of socioeconomic inequalities which contribute to health inequalities.

4.3 Dedicated funding for health promotion

Childhood obesity prevention activities require dedicated funding and the necessary resources in order to be implemented. Examples of ways in which governments can incorporate the required funding within annual budgets are by:

- establishing health promotion foundations or agencies. These can be funded through taxes on tobacco, alcohol or unhealthy foods and non-alcoholic beverages;
- including a dedicated percentage of other relevant budgets for health promotion activities (e.g. treatment services, education, local government);
- committing funding for preventive health as part of the regular budget cycle;
- including the prevention of childhood obesity in health promotion activities funded through Overseas Development Assistance (ODA).

4.4 NCD monitoring systems

Governments need to ensure that monitoring systems are in place in order to track obesity trends in children and adults as well as key aspects of the food and physical activity environments (e.g. population dietary surveys, nutrient composition of foods, exposure of children to marketing). These systems provide critical information for targeting beneficiaries and prioritizing, implementing and evaluating different interventions. An example of a tool to assist with monitoring behavioural risk factors in school environments is WHO's *Global School-based Student Health Survey (GSHS)* (19).

Centres with expertise in obesity prevention research and evaluation need to be identified and supported within academic institutions. Governments also need to support knowledge exchange mechanisms to share evidence and experiences.

4.5 Workforce capacity

Governments need to ensure that sufficient, skilled staff are employed within the prevention workforce and that sufficient training opportunities are in place to guarantee a sustainable supply of necessary skills. Quality training and continuing professional development of current staff may require funding.

Furthermore, it would be beneficial for nutrition, physical activity and the prevention of obesity to be included in the curricula of health and related professionals (e.g. planners, teachers, childcare workers). Box A provides an example of a project in the Caribbean that provides teachers with the necessary skills to incorporate diet and physical activity recommendations into the school curriculum.

Box
A **Training teachers in the Caribbean to infuse diet and physical activity recommendations into the school curriculum (20)**

In 2007, the Caribbean Food and Nutrition Institute launched a school health programme, “Preventing Diabetes and Other Chronic Diseases through a School-based Behavioural Intervention” (20). The main outcomes expected were i) improved diet and physical activity patterns starting at secondary school level, and ii) a sustainable lifestyle intervention programme for secondary schools throughout the countries selected. The multi-component programme was implemented in four Caribbean countries: Grenada, Saint Kitts and Nevis, Saint Vincent and the Grenadines, and Trinidad and Tobago.

One of the components of the programme focused on the training of teachers to introduce concepts of healthy diet and physical activity, as specified in DPAS, to the school curriculum. Emphasis in this component was given to: self-assessment and monitoring; goal setting; and the development of the relevant cognitive, affective and behavioural skills required for the voluntary adoption of the targeted behaviours.

Training of teachers was conducted over a 3–5-day period during the summer vacation, prior to the start of each new school year. A manual was developed with all the relevant materials required for the teaching, including plans for adapting existing lesson plans to incorporate DPAS recommendations. In addition to the training sessions, teachers were also exposed to presentations and discussions on how to motivate students, teaching methods, and classroom management. This component was implemented with the other three components of the programme over the 3-year period of the project.

4.6 Networks and partnerships

Due to the multisectoral nature of childhood obesity prevention efforts, cross-sectoral governance structures (e.g. a cross-government obesity taskforce) are likely to be necessary to coordinate actions and gain support across different portfolios of government at national or state levels.

In addition, governments need to take the lead in coordinating relevant activities across different governmental ministries, nongovernmental organizations and private sectors. In particular, mechanisms need to be in place to limit the influence of commercial interests and potential conflicts of interest in the policy-making process. Partnerships and coordination structures also need to be in place at a local level to plan and coordinate local action on healthy food and physical activity environments.

4.7 Standards and guidelines

National guidelines for individuals on healthy eating and physical activity are the cornerstone of obesity prevention efforts. These need to be evidence-based, updated regularly, adapted for different population groups (e.g. children, adolescents, elderly communities, minority groups), and communicated effectively to the population.

A range of standards and guidelines are needed to support the implementation of particular policies. Systems that indicate which foods can be classified as “healthy” or “unhealthy” for example, are necessary to underpin food and nutrition policies such as front-of-pack traffic-light labelling and regulations on marketing to children (21–24). Local authorities also rely on guidelines (e.g. on the required ratio of open space to built space) to create environments for active transport and recreation. National targets for the food industry on food composition, marketing to children, and health claims can also greatly assist policy implementation.

Population-wide policies and initiatives

The creation of environments that support healthy diets and physical activity is an essential component of population-wide childhood obesity prevention strategies. Creating supportive environments typically requires policy changes particularly in the areas of food marketing and labelling, fiscal policy, urban planning, transport and agriculture. Moreover, there is evidence to suggest that multiple intervention strategies have the potential to achieve larger health gains than individual interventions, and often with greater cost-effectiveness (25).

The types of policy instruments generally used as part of this component of a comprehensive childhood obesity prevention strategy are laws and regulations, taxes and subsidies, and social marketing campaigns that affect the population as a whole (or large population groups). These policies typically affect both adults and children. Such initiatives are usually undertaken by national or state governments, in contrast to the community-based interventions (discussed in section 6) that tend to be undertaken at a local or community level. If implemented effectively, the policy initiatives will create supportive environments that reinforce educational and behavioural interventions tailored for the individual, and can improve outcomes across the socio-economic spectrum (12, 26).

The majority of evidence of effectiveness of policy-based initiatives is from high-income countries. As such, caution needs to be taken in adapting these initiatives to other contexts, such as in low- and middle-income countries.

Three categories of policies and initiatives are discussed in this section: policies influencing food environments, policies influencing physical activity environments, and social marketing campaigns (typically targeting both nutrition and physical activity behaviours). Broader policies that influence the social determinants of health are not discussed here. While policies in this area, such as income tax regimes, social security mechanisms, community housing, and education and migration policies undoubtedly influence overall health outcomes of the population including childhood obesity, addressing these issues is considered beyond the scope of an obesity prevention policy (17). They should, however, be a core part of an NCD prevention strategy.

5.1 Policies influencing food environments

The starting point for policies regarding food and nutrition in a particular country are the national dietary guidelines, food selection guides, and policies related to breastfeeding and infant nutrition. These need to be well communicated to the population in a relevant and accessible way.

There then follows a broad range of policy areas that influence food environments and the way in which the dietary guidelines are progressed. These include government policies on land-use, agriculture, food manufacturing and distribution, food marketing, food retail, and food service (17). These policies are typically the responsibility of national and state governments, although some aspects may fall under the responsibility of local authorities. Efforts to change policies in these areas will require strong engagement with highly influential and diverse stakeholders, particularly from the food industry (12).

While the range of potential policy interventions in food environments is vast, this section focuses on the interventions most commonly cited regarding obesity prevention, for which evidence of effectiveness and cost-effectiveness is promising. While policies to encourage breastfeeding are not discussed in this guide, it is recognised that they need to be included as part of a broader NCD prevention strategy (16).

5.1.1

Marketing of unhealthy foods and non-alcoholic beverages to children

The marketing of food and non-alcoholic beverages to children is very potent and highly influential (27). Particularly strong evidence exists that links television advertising to children's food knowledge, preferences, purchase requests and consumption patterns. Furthermore, television advertising is associated with increased consumption of snacks and drinks high in sugar, as well as excess calorie intake (1).

An analysis of the health benefits of several interventions in Australia found that limiting food and beverage advertising on television may be one of the most cost-effective public health approaches to reducing the prevalence of childhood obesity (28). Similarly, the American Academy of Pediatrics reported that there is sufficient evidence in the USA to warrant a ban on the advertising of certain types of foods and non-alcoholic beverages in children's television programming (29). Furthermore, WHO has identified that the reduction in marketing of foods and non-alcoholic beverages high in salt, fats and sugar to children is likely to be a cost-effective action to reduce NCDs (30).

Resolution WHA63.14 of the World Health Assembly urges Member States to take necessary measures to implement WHO recommendations on the marketing of foods and non-alcoholic beverages to children (31). The WHO document, *WHO framework for implementing the set of recommendations on the marketing of foods and non-alcoholic beverages to children* gives guidance on how to implement these recommendations (32).

5.1.2

Nutrition labelling

Nutrition labelling is the provision of nutrition information, in a standardised format, on foods sold. In many countries it is mandatory for processed foods to display nutrition information on the product packaging, including levels of energy, protein, total fat, saturated fat, carbohydrate, sugars and sodium. Many countries also place limitations on the kinds of claims that can be made regarding the nutrient content of products and the effects on function or health. Codex Alimentarius, for example, recommends that nutrition and health claims shall not generally be permitted for foods for infants and young children (33).

Nutrition labelling has been shown to encourage more healthy diets among people who read the labels (34) and adequate nutritional information through product labelling is seen as a necessary component of helping consumers make healthier food choices (1).

Interpretive labelling of food products that guide consumers in understanding the nutrition information, (e.g. through the use of colours, percentages and logos) are commonly cited as promising obesity prevention measures. Front-of-pack nutrition signposting systems include "traffic-light" systems where the nutrient contents such as fat, sugar and salt are colour-coded into high, moderate or low levels (see Box B). Endorsement schemes involve the use of a symbol that appears on a food label to indicate that the product has met particular standards set by that programme. Examples of these include the Australian Heart Foundation "Pick the Tick" programme (35) and in Sweden the "Green Keyhole" programme (36). Each of these schemes assists consumers in making healthier choices and provides incentives for food manufacturers to formulate healthier products. The labelling of calories in menus in quick-service restaurants has also been identified as a promising obesity prevention measure (17).

Government policies in this area can mandate the type of labelling required. The introduction of a government-mandated scheme can limit the number of alternative systems in place, and thereby reduce confusion for consumers (37).

Box B Front-of-pack traffic-light nutrition labelling (38–40)

Front-of-pack traffic-light nutrition labelling has been widely proposed as a potential tool for improving population diets. This labelling system uses colours (green, amber and red) to indicate the relative levels (low, medium or high) of fat, saturated fat, sugar and salt in the product. The aim is to increase consumers' awareness and understanding of the nutritional content of food. Traffic-light labelling may also encourage food producers to improve product formulation.

Studies consistently indicate that consumers prefer traffic-light nutrition labelling to other forms of nutrition labelling, and that it increases their understanding of nutritional information (38, 39). This is particularly true for people from low socio-economic groups (39). Modelling studies show that if front-of-pack traffic-light nutrition labelling were implemented on a broad range of products as part of a comprehensive obesity prevention strategy, only a small resultant change in food purchases at the population level would be required for traffic-light nutrition labelling to be considered excellent "value for money" for governments (40).

5.1.3

Food taxes and subsidies

There is strong evidence that price has a major effect on consumption choices and that changes in price can be used to improve population health (16). This has been widely demonstrated with the purchasing of tobacco products and alcohol, where pricing is recognised as a powerful influence on behaviour (41).

With respect to childhood obesity, food pricing is an emerging research area and currently only limited evidence exists indicating the effect that altering the relative prices of healthy and unhealthy foods is likely to have on children's consumption patterns (42). Laboratory-based studies indicate that increasing the price of unhealthy foods can decrease the purchases of those foods thereby leading to a reduced overall energy intake (43, 44). In addition, there is some evidence to indicate that monetary incentives to encourage the purchase of healthier items may be effective in improving the nutritional value of food purchases (45).

Favourable effects have been seen for the purchase of discounted low-fat snacks from vending machines (46) and fruit and vegetables in response to discount coupons (47). A longitudinal study of food prices and consumption in China found that increases in the prices of unhealthy foods were associated with decreased consumption of those foods (48). In the United States, programmes to reduce the price of healthy foods led to a 78% increase in their consumption (49).

Modelling studies suggest that a combination of tax reduction on healthy foods and tax increases on unhealthy foods may result in a stimulation of the consumption of healthy food, particularly for lower-income populations (50–52). Furthermore, taxes on unhealthy foods have been shown to be extremely cost-effective measures for governments (14, 26, 30, 40).

Several countries have explored fiscal measures, such as increased taxation on foods that should be consumed in lower quantities and decreased taxation, price subsidies or production incentives for foods that are encouraged. For example, in 2011, Denmark introduced a tax on foods containing

more than 2.3% saturated fat (53), and in France, legislation was passed recently for a tax on drinks containing sugar, with the resulting proceeds earmarked for programmes to help combat obesity (54).

In implementing food-related taxes, care needs to be taken that price changes do not increase socio-economic inequalities (41). Many taxes are likely to cause a greater financial burden on low-income consumers because they spend a larger share of their income on food than high-income consumers (55). This increased financial burden could be countered by coupling food taxes with subsidies (e.g. on fresh fruit and vegetables). In addition, the increased financial burden on low-income groups could be offset in the longer term by relatively larger health gains, which are likely to be higher in low-income than high-income groups (55).

5.1.4

Fruit and vegetable initiatives

Fruits and vegetables are an essential part of the human diet. The 2002 Joint WHO/FAO Expert Consultation on Diet, Nutrition and the Prevention of Chronic Diseases, recommends that the population consume at least 400 grams of fruits and vegetables per person per day (approximately equivalent to five servings) (56). Reducing this preventable burden of disease by increasing fruit and vegetable intake is one of the key recommendations of DPAS (8).

Emerging evidence suggests that increasing fruit and vegetable consumption may also assist dietary weight management strategies to prevent obesity (57). Energy density is reduced by higher intake of fruit and vegetables (58). Eating larger amounts of fruits and vegetables increases the feeling of satiety and results in the displacement of more energy-dense foods (58). People tend to eat a consistent daily volume of food, regardless of the energy content, therefore, the energy density of food has an impact on the daily energy intake (59). Incorporating more fruit and vegetables can reduce the overall energy density of the diet, promote satiety and decrease the total energy intake and increase diet quality (59, 60).

Evidence from systematic reviews of interventions to increase fruit and vegetable consumption indicate that, for the most part, interventions have not delivered the desired benefits, have relatively high costs and are mostly not cost-effective strategies (61). However, it is clear that comprehensive multi-component strategies, implemented strategically over sustained periods of time, are likely to have the greatest impact (62). The most successful interventions aim to improve the availability and accessibility of fruit and vegetables to children, as well as their taste preferences for them (63). Components that have been most successful include the use of multiple media channels (including the use of social media) to promote specific messages about the benefits of fruit and vegetable consumption, hands-on skill building, active provision of fruit and vegetables in schools, and the involvement of teachers, peers and parents in delivering the programme (62).

The European Union (EU) School Fruit Scheme is an EU-wide voluntary scheme that provides school children aged 6–10 with free fruit and vegetables, with the aim of encouraging good eating habits in young people. The scheme is funded through co-contributions from the EU and the Member State implementing the scheme, and requires participating Member States to set up strategies including educational and awareness-raising initiatives (64).

5.1.5

Other food policies

A range of other food policies exists that governments may wish to consider in their efforts to prevent childhood obesity. Two further examples of government policy actions are provided in Box C and Box D and illustrate the types of policies that can be implemented. It is recommended that Member States be guided by the best available evidence regarding effectiveness and cost-effectiveness as part of the process of prioritizing policy initiatives.

Box C Restricting *trans*-fatty acids (65, 66)

Denmark was the first country to implement stringent laws restricting the *trans*-fat content of foods. In 2003, the Danish Nutrition Council affirmed that there were substantial harmful effects on health of *trans*-fats, with no positive effects, and that they could be eliminated from food without adverse effect on taste, price or availability of foods (65). Legislation was enacted limiting *trans*-fats to 2% of fats and oils content in foods destined for human consumption (66).

Other countries and regions have since implemented restrictions on *trans*-fats in food including Canada and Switzerland, and in the United States of America, New York, California and Philadelphia, with many food-related companies implementing voluntary changes to their food compositions and preparation techniques.

Box D Healthy food service policies in government institutions, Queensland, Australia (67, 68)

The State of Queensland, Australia introduced the healthy food service policy "A Better Choice" in September 2008 (67). The "A Better Choice" initiative focused on the supply of foods and non-alcoholic beverages in facilities owned or operated by Queensland Health (e.g. hospitals, community health centres, clinics and rehabilitation centres). The policy aims to increase the healthier options available in government-run facilities to at least 80% of the total food and non-alcoholic beverages available in these facilities.

All commonly supplied food and non-alcoholic beverages were classified into three categories according to their nutritional value: "Green" (best choices), "Amber" (choose carefully) and "Red" (limit). Foods were correspondingly labelled, making it easier for consumers to choose a healthier food or beverage. The policy also recommended that, where possible, "Green" food and beverage choices be offered at reduced prices and be positioned in prominent areas of sale.

An evaluation of the policy was conducted in May 2009 to measure the extent of implementation of the strategy in Queensland Health facilities (68). Most facilities (78%) reported implementation of more than half of the requirements of the strategy, and 25% reported full strategy implementation (68).

5.2 Physical activity policies

WHO recommends that children and adolescents between 5 and 17 years of age accumulate at least 60 minutes of moderate- to vigorous-intensity physical activity every day (69). For children, physical activity includes play, games, sports, transportation, recreation, physical education, or planned exercise, in the context of family, school and community activities (69).

Member States can use WHO guidance correspondingly with national physical activity guidelines, as a starting point to implement and guide national physical activity policies and programmes. These policies need to ensure that the physical environment can promote active and safe methods of travelling to and from schools, provide adequate sports, recreation and leisure facilities, and ensure adequate safe spaces for active play, especially for children (16).

Both the Global Strategy on Diet, Physical Activity and Health (8) and the 2008–2013 Action plan for the global strategy for the prevention and control of noncommunicable diseases (16) urges Member States to implement a range of programmes and actions to increase levels of physical activity. Many types of public policies across sectors – which may include urban planning, transport, education and sport – can encourage physical activity and reach large portions of the population (18).

While relatively few policy and environmental interventions have been evaluated in peer-reviewed studies, there is, nevertheless, some evidence – predominantly from high-income countries – of policies that are effective in promoting physical activity (18).

Environmental interventions targeting the built environment, policies that reduce barriers to physical activity, transport policies and policies to increase space for recreational activity have been demonstrated to be effective (18). In addition, point-of-decision prompts – for example information on the benefits of physical activity positioned by elevators and stairs to encourage the use of stairs – are also effective (18). An example of this is shown in Box E.

Box E Encouraging physical activity in Bogotá, Colombia (70)

Bogotá, the capital city of Colombia, is considered a world leader in the promotion of active transport and regular physical activity. One of the initiatives in Bogotá, “Cicloviá” sees certain streets and main avenues closed to cars on Sundays and holidays from 7 am until 2 pm, to promote physical activity including cycling and walking. The initiative began in 1974 when residents protested at the lack of recreational opportunities and traffic congestion. The initiative had to overcome opposition from businesses and a lack of institutional commitment from the city, but by 2005, around 10% (approximately 400 000) of the residents of Bogotá were participating in the “Cicloviá” every Sunday (70).

A number of other initiatives have been implemented across the city to encourage physical activity. This includes a 300 km bicycle network known as the “Ciclorutas,” the expansion of square meters of green space per inhabitant from 2.5 m² to 4.5m², annual car-free days, and the creation of special bus-only lanes to promote use of public transport (70).

School-based physical activity interventions show consistent improvements in knowledge, attitudes, behaviour and, when tested, physical and clinical outcomes (18). Schools need to include a physical activity component taught by trained teachers in a supportive environment, and also include parental involvement (1). Benefits include mental health and behavioural improvements, and the physical activity habits developed appear to continue for many years. However, there is a scarcity of cost-effectiveness research in this area (18).

Physical activity components of multi-component community-based interventions have also been shown to be effective (18). These include community development campaigns with multisectoral cooperation that focus on a common goal, such as a reduction in CVD risk, as well as group-based physical activity programmes or classes for homogenous groups. These are discussed further in section 6.

5.3 Social marketing campaigns

Social marketing campaigns use paid and non-paid forms of media, across multiple channels, to increase knowledge and change attitudes towards diet and physical activity. These campaigns often run parallel with community-based activities and can serve to complement them (as set out in section 6). While there is limited data available to assess the effectiveness of social marketing campaigns, there is sufficient evidence to recommend multi-component mass media campaigns on a population basis in a wide variety of settings (18, 30).

Mass media social marketing campaigns are considered cost effective for physical activity promotion (25). Characteristics of the mass media physical activity campaigns that have been successful in changing awareness and behaviour include the use of a simple message with frequent exposure, especially when included as part of a multiple intervention strategy (18). An example of this is shown in Box F.

There is weaker evidence regarding the effectiveness of social marketing campaigns promoting healthy diets (18). The campaigns that make intensive use of mass media and promote a single simple message – for example to increase consumption of low-fat milk (71), or fruit and vegetables – have been shown to be the most effective (18). In addition, the use of national health brands or logos to assist consumers in making healthy food choices, and long-term, intensive mass media campaigns promoting healthy diets have shown some success (18).

Social marketing campaigns promoting diet and physical activity are all likely to be more successful if they are accompanied by appropriate “upstream” policy support and “midstream” community-based activities, including widespread community participation (12).

Box **F** Social marketing campaign promoting physical activity in Brazil (72)

The Agita São Paulo programme was launched in Brazil in 1996 to promote regular physical activity among the 37 million inhabitants of the State of São Paulo. Since its launch, the programme has been implemented throughout Brazil as well as other countries in Latin America (72).

The Agita São Paulo programme targets three main populations: students, workers and the elderly. The message is to encourage people to adopt an active lifestyle of at least 30 minutes of moderate to vigorous physical activity most days of the week.

The programme adopts a multisectoral approach, including partnerships with a wide range of organizations. Large events organized by the programme involve large numbers of participants and link to many ongoing activities with institutional partners.

(Further information about the programme can be found on the web site:
<http://www.agitasp.org.br>.)

6

Community-based interventions

6.1 What are community-based interventions?

Until recently, many obesity prevention interventions have focused on single settings – for example primary health-care settings, schools or religious settings – and were designed by policy-makers or academics, without community involvement (73). In addition, the majority of interventions implemented to date have been short-term (i.e. less than 1 year) (18). These types of interventions tend to have limited benefits and often prove expensive and unsustainable (73).

Evidence shows that the most successful interventions have multiple components and are adapted to the local context (18). Those that are culturally and environmentally appropriate are also far more likely to be implemented and sustained. Furthermore, interventions that use the existing social structures of a community, such as school systems or weekly meetings of older adults, reduce barriers to implementation (18). Crucially, the most successful interventions include substantial participation from all key stakeholder groups throughout the process (e.g. the involvement of community leaders in the planning and implementation of interventions affecting community or religious settings) (18). Listening and learning from these target populations ensures that the interventions address their needs. These interventions, involving strong community engagement or participation are commonly referred to as “community-based interventions.”

While multi-component interventions are considered best practice, it is important to note that single-component interventions may still form an important part of a step-based approach to obesity prevention, for example as the first step in implementing a multi-component, multi-setting intervention programme (12).

This section discusses the features of community-based interventions that are likely to be successful in different settings.

6.2 Best practice in delivering community-based interventions

In considering best practice in community-based obesity prevention, it is necessary to consider both the effectiveness of the content of the intervention, as well as the integrity and quality of the process that delivers the intervention. The particular context within which community-based interventions are designed and implemented is particularly important as communities are heterogeneous and operate as complex, dynamic systems, with varying cultural, economic, demographic and social characteristics (73).

Best practice principles for community-based obesity prevention are provided below, and based on those developed by King et al. (73). Box G and Box H provide prominent examples of large community-based interventions from around the world that have helped derive these best practice principles.

6.2.1

Community engagement

There are many meanings of the term “community” and different approaches to engaging with communities. These range from the implementation of a pre-designed intervention in a local setting to deep community participation in designing and implementing the intervention. It is important for programmes to be clear about their approach to community engagement, and the strengths and limitations of the chosen approach (73).

Regardless of the approach taken, it is recommended that interventions be designed to fit a community’s demographic, cultural, geographic and organizational characteristics (73). In addition, community initiatives typically require active partnerships across a mixture of agencies, to ensure complementary actions.

The process of engaging communities and working with partners seeks to build capacity and promote the sustainability of actions and changes.

6.2.2

Programme design and planning

In analysing the problem and establishing the focus of a programme, it is recommended that all available information about the problem and the target community is considered and used to guide the programme design. The programme is likely to be more effective if consistent with national, state or regional plans and linked to other initiatives within the same community. Programme objectives need to be focused on changes that are logically connected to weight status, as well as being specific, measurable and time-relevant. The planned programme must be commensurate with the available resources, including skills, community readiness, partners’ commitment and funds (73).

Target groups need to be clearly specified, and wherever possible an inclusive approach adopted so that no particular groups are excluded on the basis of cost, access, education, language or culture. In addition, the programme needs to consider carefully how the problem is framed and described in order to promote shared social responsibility, and avoid stigmatization and blaming (73).

It is recommended that the programme be based on the best available evidence. Theory and evidence can be used to ensure that the programme has strong leverage to produce the desired changes. A mixture of strategies involving education, persuasion and facilitation in working with community partners and target groups is generally required. Where available evidence is limited, it can be used to guide the development of innovative approaches. It is important for innovations to be investigated and evaluated in order to contribute to evidence building (73).

6.2.3

Implementation

It is recommended that all approaches, messages and resources implemented as part of the programme be “pre-tested” by consumers, either in previous programmes or through local checks and consultations (73).

While it is important for interventions to be implemented according to a prescribed plan, they also need to adapt and respond to new opportunities and emerging evidence, particularly where this has the potential to strengthen partnerships, and support partner agencies (73). In this regard, a system is necessary for monitoring the implementation of a programme and documenting where it varies from the plan.

6.2.4

Sustainability

While multi-component community-based interventions with high stakeholder participation in the intervention design and implementation have been demonstrated to be effective for childhood obesity prevention in some contexts (64, 74), it is crucial that the intervention effects are sustained in individuals and communities.

Throughout the design and implementation of the programme, issues of sustainability and scalability need to be addressed. Key approaches to ensuring sustainability are to: i) develop local capacity to deliver interventions as part of the initial implementation process; ii) integrate the interventions within existing system structures; and iii) share knowledge among different community groups. Box I provides an example of a “community of practice” for community-based obesity prevention that may assist in capacity building and knowledge exchange.

6.2.5

Governance and transparency

In order to minimize risks, it is recommended that clear structures for management and decision-making are established and maintained, including adequate community participation (73).

In addition, in order to avoid any actual or perceived conflicts of interest, the programme should have explicit guidelines for accepting sponsorship and managing any such conflicts (73).

6.2.6

Evaluation

Evaluation of the programme is important to provide accountability and to build evidence around programme effectiveness.

The size and scope of the evaluation needs to be commensurate with the scale of the project, and should fulfil a specific purpose. It is recommended that a documented evaluation plan be developed that specifies the appropriate evaluation indicators, measures and data collection methods. This is likely to require structured systems for collecting, checking, organizing and storing information, as well as ensuring confidentiality.

In addition, programme evaluation is likely to benefit from systematic information on other environmental, policy or social changes that are likely to influence the objectives. Disseminating information to stakeholders on successful and unsuccessful initiatives contributes significantly to evidence building.

Box **EPODE**
G

EPODE (Ensemble Prevenons l'Obésité Des Enfants/Together Let's Prevent Childhood Obesity) is a coordinated, capacity-building approach for communities to implement effective and sustainable strategies to promote healthier lifestyles and prevent childhood obesity. EPODE aims to reduce childhood obesity through a societal process in which local environments, childhood settings and family norms become more supportive and facilitate the adoption of healthy lifestyles in children – enjoying healthy eating, active play and recreation. The primary EPODE target groups are children aged 0–12 years, and their families, as well as a wide variety of local stakeholders who can initiate micro-changes in children and their families through local initiatives fostering better and balanced eating habits and greater physical activity in everyday life.

EPODE philosophy is based on multiple components: a positive approach to tackling obesity with no stigmatization of any culture or people; step-by-step learning and experience of healthy lifestyle habits tailored to the needs of all socio-economic groups; and a long-term programme enabling community stakeholders to implement effective and sustainable actions.

EPODE was first launched in 10 French pilot communities in 2004, and was based on the official French guidelines on diet and physical activity. EPODE methodology promotes the involvement of multiple stakeholders at central level (ministries, health groups, NGOs and private partners) and at local level (political leaders, health professionals, families, teachers, local NGOs, and the local business community). Funding for the support functions of EPODE (e.g. coordination, social marketing, monitoring and programme development) comes from a combination of public and private partnerships at national and local levels. National private sponsors have primarily come from the food industry, insurance and distribution sectors.

Five years after the launch of the EPODE programme in France, 90% of the original French pilot communities are still active and more than 500 communities across the world are now part of an EPODE programme – France (EPODE), Belgium (VIASANO), Spain (THAO), Greece (PAIDEIATROFI), South Australia (OPAL) and Mexico (EPODE-5Pasos). Other programmes, inspired by EPODE methodology, have been launched recently such as the JOGG programme in the Netherlands or the Healthy Weight Communities in Scotland.

(Further details and information can be found on the web sites: <http://www.epode.fr> and <http://www.epode-european-network.com>.)

Box **The Pacific Obesity Prevention in Communities (OPIC) project (74,**
H **75)**

The Pacific Obesity Prevention in Communities (OPIC) project (74) was a large, innovative, multi-site and multi-setting approach to the prevention of adolescent obesity at community level, aimed at determining the effectiveness of whole-of-community intervention programmes for obesity prevention in youth. OPIC was carried out over a period of 30 months, between 2004 and 2009, in four countries – Australia, Fiji, New Zealand and Tonga. Adolescents from eight ethnic and cultural groups were selected to participate in a complex community-based intervention which included 18 000 secondary-school children (aged 12–18 years), 300 stakeholders and partner organizations, 60 multi-professional research staff and 27 higher degree research students.

The processes to develop action plans for each intervention programme were the same across all intervention sites. Situation analyses were conducted with local stakeholders at each site to gain an understanding of the important contextual factors, relevant organizations and existing activities. In Fiji and Tonga, this included one-on-one interviews with adolescents to gain a preliminary understanding of the major socio-cultural barriers to healthy eating and physical activity. Through a guided process, each community then developed agreed action plans to address obesogenic behaviours and build community capacity to promote healthy eating and physical activity. The interventions that arose from the action plans varied somewhat across sites according to local conditions. This was a significant part of the participatory process and reflected the fact that local characteristics clearly differed in terms of food and activity environments, economic situations, obesity prevalence, research capability and technical resources. Nevertheless, there were many commonalities across all sites, such as targeting reductions in the consumption of high sugar content drinks and energy-dense snacks and increasing structured and unstructured physical activity.

Governance of the intervention programmes at each site involved a steering group of stakeholders from universities, government bodies and community bodies. The role of the universities was predominantly training, evaluation and support, aimed at building the capacity of communities and schools to implement obesity prevention interventions. Changes in anthropometric, behavioural and perception outcomes were evaluated at the individual level, and school environments and community capacity at the settings level. Additional analytical studies included economic, socio-cultural and policy studies.

Evaluation of the project indicated that efforts to prevent obesity through behaviour change can produce positive effects in diet and physical activity. However, a significant health outcome is only likely to be achieved with the support of national policies that support healthy diets and promote physical activity. The project also highlighted the importance of identifying values, attitudes and beliefs that influence what adolescents eat and how active they are. The project demonstrated success in engaging key stakeholder groups and fostering collaboration across the community. Key lessons learnt from the project include the need to focus on socio-cultural issues and concerns, and local capacity for programme implementation and evaluation (75).

Box I The Collaboration of Community-based Obesity Prevention Sites (CO-OPS Collaboration), Australia

The Collaboration of Community-based Obesity Prevention Sites (CO-OPS Collaboration) is an initiative funded by the Australian Government Department of Health and Ageing which aims to support community-based obesity prevention initiatives through a collaborative approach to promoting best practice, knowledge translation and by providing networking opportunities, support and advice.

The core aims of the CO-OPS Collaboration are to:

- identify and analyse the lessons learnt from a range of community-based initiatives aimed at tackling obesity, and
- identify the elements that make community-based obesity prevention initiatives successful and share the knowledge gained with other communities.

The CO-OPS Collaboration provides access to networks of health professionals, researchers and government employees all interested in community-based obesity prevention. The collaboration provides access to an operational framework for effective action, systems for learning from one another, advice on what works, for whom and why, and a platform for knowledge translation and exchange.

(Further information and details can be found at the web site: <http://www.co-ops.net.au>.)

6.3 Components of community-based interventions

As indicated above, the most successful community-based interventions for childhood obesity prevention have multiple components that are designed for and implemented according to the local context. Accordingly, it is not possible to provide a comprehensive, generic list of the components that are likely to form a community-based intervention. On the contrary, a fundamental tenet of best practice for community-based interventions is that the community determine the most appropriate components to suit their particular context, with flexibility and creativity encouraged (73).

The desired behaviours targeted by interventions typically include:

- increased fruit and vegetable consumption;
- reduced consumption of beverages high in sugar (e.g. “soft” drinks);
- reduced consumption of foods high in fat, saturated fat, salt and sugar;
- decreased television viewing and other screen-based activities;
- increased competitive and non-competitive sport participation;
- increased active transport to schools.

These behaviours may be targeted through education campaigns, changes to school and other organizational policies, activities and competitions, promotion programmes and the involvement of a broad range of stakeholders in the community.

6.4 What works in different settings

The majority of the evidence regarding community-based obesity prevention is derived from studies in high-income countries. The lessons learnt from these studies are likely to be valuable in implementing similar interventions in other contexts.

6.4.1 Early childcare settings

There is emerging evidence from high-income countries demonstrating the effectiveness of obesity prevention interventions targeting children attending early childcare settings, such as preschools or kindergartens (76). In Australia, recent multi-component intervention studies (77) have shown positive healthy eating outcomes for children attending preschool (and other children's services), including increases in fruit and vegetable consumption and decreases in energy-dense, nutrient-poor food and drink consumption compared to a control group (see Box J). In addition, curriculum-based preschool interventions in the United States of America have been shown to increase children's nutritional knowledge – although there is limited or no evidence of resulting behavioural change (78). Other studies have demonstrated the importance of parental involvement in achieving sustained behavioural change in preschool-aged children (76).

Box J Community-based obesity prevention in young children: “Romp & Chomp,” Australia (77)

“Romp & Chomp” was a “whole-of-community” obesity prevention demonstration project carried out from 2005 to 2008. “Romp & Chomp” promoted healthy eating and active play to achieve healthy weight in children less than 5 years of age in Geelong, Victoria, Australia (77).

“Romp & Chomp” focused on capacity-building and developing sustainable changes in early childhood environments, with particular attention on the policy, socio-cultural and physical environments. The key behaviour change messages were to:

- increase daily active play;
- increase daily consumption of water;
- increase daily consumption of fruit and vegetables;
- decrease television viewing time and screen-based activities.

Children in the intervention group had a significantly lower intake of packaged snacks, fruit juice and cordial, and a higher vegetable consumption compared to the comparison sample at follow up.

Critically, this intervention was delivered on a relatively low budget for a programme of its size (AUD 100 000 spent over 3 years for 12 000 children).

6.4.2

Primary and secondary schools

The large majority of childhood obesity prevention activities have taken place in primary and secondary schools (18). The most common studies involve comprehensive, multi-component programmes with interventions targeting the school environment, its food services and classroom curriculum. Many interventions combine diet and physical activity, and encourage parental involvement. Details of examples from different countries are shown in Box K, Box L and Box M.

Many school-based interventions show consistent improvements in knowledge and attitudes, behaviour and, when tested, physical and clinical outcomes (18). Based on the latest review of the evidence (79), the following should be implemented as standard practice in educational settings:

- Components on healthy eating, physical activity and body image should be integrated into the regular curriculum (see Box A).
- Sessions for physical activity and the development of fundamental movement skills should be included throughout the school week.
- The nutritional quality of foods made available to students, (e.g. in school canteens) should be closely monitored and improved.
- An environment and culture should be created that supports children eating nutritious foods and being active throughout each day.
- Support should be provided for teachers and other staff to implement health-promotion strategies and activities (e.g. professional development, capacity-building activities).
- Parents should be engaged to support activities in the home setting to encourage children to become more active, eat more nutritious foods and spend less time in screen-based activities.

The School Policy Framework: Implementation of the Global Strategy on Diet, Physical Activity and Health developed by WHO (80) provides guidance to Member States on how to implement policies that promote healthy eating and physical activity in the school setting through changes in environment, behaviour and education.

Box **A school-based, multi-component nutrition and lifestyle intervention**
K **in North India (81)**

Singhal et al report results of a community-based controlled trial aimed at assessing the effectiveness of a school-based, low-cost nutrition and lifestyle education intervention on behaviour modification and risk profile of Asian Indian adolescents (15–17 years) in a metropolitan city of North India (81).

The study was carried out from May 2008 to January 2009 in eleventh-grade adolescents in a co-educational school. The intervention consisted of multiple components, including nutrition education lectures, promotion of physical activity, individual counselling by a trained nutritionist, increased availability of healthier food choices in the school canteen, involvement of teachers and parents and a broad range of other activities to promote a healthy lifestyle. A control school received no intervention.

The evaluation of the programme showed increased nutrition and physical activity knowledge, healthier behaviours, and improved anthropometric outcomes among children in the intervention school (compared to the control group).

This was a very low-cost intervention, that harnessed the benefits of peer educators and student volunteers to make the programme sustainable. The interactive approach adopted to deliver the intensive and repetitive intervention was effective in preventing adolescent obesity even during a short study period. This study provides evidence that a comprehensive school-based nutrition and lifestyle education can motivate adolescents towards positive behavioural changes in this context.

Box **L** **An example of a school-based childhood obesity prevention intervention in Beijing, China (82)**

In Beijing, a 3-year, school-based, nutrition education and physical activity intervention involving children and their parents achieved promising results (82). Two primary schools in urban Beijing were involved in the intervention for 3 years and involved a range of strategies. These included the provision of educational materials to parents, classroom lessons on childhood obesity for students, a physical activity component and lectures to parents once a semester at the school on the health consequences of overweight and obesity, the food pyramid and elements of a healthy lifestyle (regular physical activity, balanced diet, reducing television viewing and computer use). Parents of overweight and obese children also had an additional meeting with the research team once a semester and a traffic light food item list was given to all parents. The physical activity component invited all overweight and obese children, along with children who failed routine school physical education tests, to run for 20 minutes after class.

Evaluation of the intervention revealed that overweight and obesity prevalence was significantly lower in the intervention schools compared to the control schools, (overweight 9.8% compared with 14.4%; obese 7.9% compared with 13.3%) after the 3-year period. In addition, remission of obesity was significantly higher in intervention than control schools. Although this study singled out students who were overweight or obese, (which is perhaps not best practice), the study has proved successful and could potentially be adopted in similar regions, cities, or countries in the developing world.

Box **M** The school-feeding programme in Jamaica (83)

The school-feeding program in Jamaica aims to provide good nutrition for children in the school environment. The programme was started in 1926, and is currently still in operation. As part of efforts to improve the nutritional quality of children's diets in Jamaica, a pilot school-feeding programme for basic school children (aged 4–6 years) was conducted in 2005–2006.

The main outcome of the project was to ensure that each basic school student received one nutritionally-balanced lunch meal each school day. Meals were prepared and served on site at each school daily, using a conventional foodservice operation. Standard menus, with accompanying recipes, and standard portion sizes using appropriate serving utensils, were supplied to each school as a guide for the preparation and portion control of the meals.

The design of the programme included the collection of background data on the health status of students, dietary practices and the current feeding programme in basic schools. Short-term information, education and communication strategies were developed which targeted the early childhood sector and community. These were carried out through meetings with education officers and members of the management committees of the schools and school staff, in order for them to become more familiar with the nutrition programme.

Nutrient standards for the meals were established based on available health data on the nutritional status of the basic school population in Jamaica. This was structured to ensure that the lunch meal provided 25% of the daily energy needs, with recommended distributions of carbohydrate, protein and fat and 30% of iron and vitamin C requirements. Nutrient standards were met by providing schools with menus and standard recipes.

All students attending the selected schools were provided with a standard lunch as prescribed by the project. The curriculum was modified to include information on healthy eating and a communication, information, and education component was incorporated to strengthen the involvement of teachers, parents and community, and increase the likelihood of its success.

6.4.3

Other community settings

As with school-based interventions, those most successful in community settings (e.g. primary health-care settings, religious settings, sporting centres) generally consist of a variety of activities; they usually include both diet and physical activity components and have a strong educational component. To date, however, few interventions have been evaluated in terms of their cost-effectiveness and sustainability (18).

Interventions in the primary health-care setting vary greatly in their intensity and thus in their effectiveness. Interventions with minimal contact, such as health checks, single-visit counselling or information distribution, typically have not been effective. Moderately intense interventions that provide chronic NCD consultations with follow-up by trained personnel and targeted information tend to be more effective at modifying risk factors (18). However, the costs, time and resources associated with performing interventions, such as those across the whole population, or even large population groups, makes them unattractive. Furthermore, the potential of this setting in low- or middle-income countries is largely unknown.

Only a small amount of evidence exists that indicates the effectiveness of conducting childhood obesity prevention activities in religious settings. Nevertheless, there is consistent evidence of positive psychosocial, behavioural and physical changes resulting from interventions in this setting. Using the existing social structure of a religious community appears to facilitate adoption of changes towards a healthy lifestyle, especially in disadvantaged communities. There are also great advantages in terms of cost to this type of intervention since the spiritual members themselves take responsibility for the intervention within the ambit of the religious environment (18).

7

Conclusions

There is a broad range of population-level actions that governments can take to prevent childhood obesity. These include structures within government to support policies and interventions; a wide range of population-wide policies and initiatives including policies influencing food environments, physical activity environments and social marketing campaigns; and community-based interventions that have multiple facets and are tailored to the local environment with the deep involvement of the local community. All components should be sufficiently adapted to the cultural context and involve community members – both in the formative assessment, design and implementation – in order to be effective (12).

A comprehensive childhood obesity prevention strategy will incorporate aspects of each of the key components, such that the range of interventions includes (12):

- a mixture of “top-down” and community-based actions in plans and programmes;
- a mixture of policy instruments, including legislative and financial tools, to ensure availability and affordability of healthy foods and physical activity opportunities;
- the integration of policies for childhood obesity prevention into existing structures as a measure to ensure sustainability of action;
- interventions across a range of settings, including early childcare settings, schools, and community organizations;
- the establishment of cross-sectoral platforms and a multisectoral approach to childhood obesity prevention.

While in many cases there is sufficient data to indicate that interventions are likely to be effective, this is not always the case. The ineffectiveness of some interventions may be due to insubstantial evaluation, or because evidence has been based on studies that are of too short a duration to detect appropriate outcomes, or, simply, for a variety of reasons they do not work. Importantly, little is known about the effectiveness of interventions in low- and middle-income countries, and on the sustainability of interventions over time. In addition, minimal information is available on the unintended impact of interventions.

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