Interim Report of the Commission on Ending Childhood Obesity

Geneva, SWITZERLAND

WHO/NMH/PND/ECHO/15.1

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Glossary and definitions

Adolescents	Aged 10 to under 19 years of age
BMI	Body mass index weight (kg)/height (m) ^{2}
BMI-for-age	BMI adjusted for age, standardized for children
Children	Under 19 years of age
Infants	Under 12 months of age
NCDs	Noncommunicable diseases
HICs	High-income countries
LMICs	Low- and middle-income countries
Movement behaviours	Physical activity, inactivity (sedentary) and sleep
WGSE	Ad hoc Working Group on Science and Evidence for Ending Childhood Obesity
WGIMA	Ad hoc Working Group on Implementation, Monitoring and Accountability for Ending Childhood Obesity
unhealthy foods	i.e., foods high in saturated fats, trans-fatty acids, free sugars or salt. i.e., energy-dense, nutrient-poor foods
Young children	Under 5 years of age

BACKGROUND

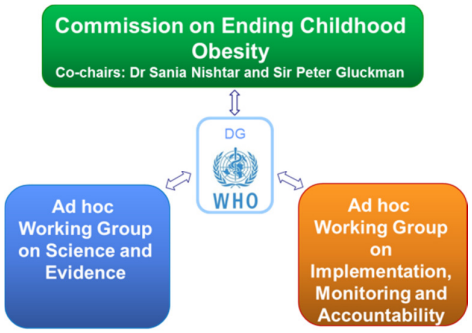
1. Over the past decade, the World Health Assembly, the governing body of the World Health Organization (WHO), has adopted a series of resolutions that strengthen the Organization's mandate in the area of noncommunicable diseases[1], and have increased the profile of noncommunicable disease prevention and control as a core priority.

2. Among the noncommunicable disease risk factors, obesity is particularly concerning in children (aged under 19 years), as it is associated with a wide range of health complications and an increased risk of premature onset of illnesses, including diabetes and heart disease. Childhood obesity is complex and the effectiveness of interventions, to date, indicate that novel approaches are required. A combination of community partnerships, government support and scientific research is necessary in order to develop the best recommendations and implement them worldwide.

3. To better inform and develop a comprehensive response to childhood obesity, the Director-General of WHO established the high-level Commission on Ending Childhood Obesity (ECHO), which comprises 15 accomplished and eminent individuals from a variety of relevant backgrounds.[2] The Commission will review, build upon and address gaps in existing mandates and strategies. The Commission will raise awareness and build momentum for action to address childhood obesity.

4. The Commission is supported, via the Director-General, by two ad hoc working groups, one on science and evidence for ending childhood obesity (WGSE), comprising 21 experts, and one on implementation, monitoring and accountability for ending childhood obesity (WGIMA), comprising 23 experts, as shown in fig. 1.

Fig. 1: The structure of the Commission on Ending Childhood Obesity



[1] Resolutions WHA53.17 on prevention and control of noncommunicable diseases; WHA57.17 on the global strategy on diet, physical activity and health; WHA61.14 on prevention and control of noncommunicable diseases: implementation of the global strategy; WHA63.14 on marketing of food and non-alcoholic beverages to children; WHA65.6 on the comprehensive implementation plan on maternal, infant and young child nutrition; and WHA66.10 on the follow-up to the political declaration of the high-level meeting of the General Assembly on the Prevention and Control of Non-communicable diseases.

[2] The biographies of the commissioners are available at http://www.who.int/end-childhood-obesity/commissioners/echo-commissioners/en/ (accessed 10 October 2014).

5. The Commission has been tasked with producing a report specifying which approaches and combinations of interventions are likely to be most effective in tackling childhood and adolescent obesity in different contexts around the world and outlining a comprehensive strategy, including policy options and an accountability framework to address this growing epidemic.

6. This interim report has been developed following the second meeting of the Commission held in Geneva from 13 to 14 January 2015. At this meeting the Commissioners considered the report of the second meeting of WGSE, and the first meeting of WGIMA. The WGSE had considered a number of areas previously identified by the Commission and prepared evidence reviews to inform the development of a potential preliminary package of interventions. In addition to considering the reports from the ad hoc working groups, the Commission reviewed and considered a number of other relevant reports and recently published data.

7. In this interim report, the Commission discusses key issues and outlines potential policy options, which will be open to an online public consultation. During this consultative period, the Commission will also hold regional consultations in each of the WHO regions, as well as hearings with non-state actors. Following analysis and consideration of the feedback received during this consultation period and additional inputs from the ad hoc working groups, the Commission will finalise its recommendations and is expected to deliver the final report to the Director-General towards the end of 2015.

INTRODUCTION

8. Worldwide, the prevalence of combined overweight and obesity rose by 27·5% for adults and 47·1% for children between 1980 and 2013. The obesity epidemic has the potential to negate many of the health benefits that have contributed to the increased longevity observed in the developed world. Childhood obesity prevalence rates are higher in high-income countries (HICs) compared to low- and middle-income countries (LMICs). However, in absolute numbers there are more overweight and obese children living in LMICs than in HICs *(1)* and the rate of increase in some LMICs is particularly concerning. Childhood obesity is under-recognized as a public health issue.

9. Childhood obesity is a complex condition, and increases the child's risk for psychological effects, gastrointestinal complications, cardiovascular disease and diabetes as well as the comorbidities of the latter two noncommunicable diseases (NCDs). Three of these comorbidities, namely high blood pressure, insulin resistance and dyslipidaemia form the key elements of the metabolic syndrome and are increasingly being observed in children *(2)*. Being obese as a child increases the likelihood of being obese as an adult and obesity in adulthood is strongly associated with comorbidities that contribute to cardiovascular disease and diabetes *(2, 3)*. Longitudinal studies suggest that for some NCD-related comorbidities the increased risk for morbidity and mortality in adulthood are independent of adult body mass index (BMI) *(4)* i.e., the negative health consequences may present even if normal weight is attained in adulthood, suggesting that childhood obesity leaves a permanent imprint.

10. Interventions aimed at preventing childhood obesity would lead to both a reduction in comorbidities in children and to a reduction of the long-term burden of NCDs. Life-course studies suggest that interventions in early life, when biology is most 'plastic' and amenable to change, are likely to have the greatest positive sustained effects on health, particularly because they may influence responses to later challenges, such as living in an obesogenic environment *(5)*. This life-course model applies to both HICs and LMICs, and to populations in transition.

11. There is not a dichotomous relationship in populations between obesity and its absence, or a threshold for measures such as BMI. Many children not currently defined as obese by BMI-for-age, may nonetheless be on a pathway to obesity. In many populations individuals across the distribution of BMI are fatter than before, i.e., the obesogenic environment has adverse effects on those not conventionally defined as obese *(6)*. Body image and the perception of healthy body weight, especially for infants and young children, can be influenced by cultural values and norms, and these will be important considerations in the development of interventions. In addition, overweight and obesity are becoming social norms and, thus, contributing to the perpetuation of the obesogenic environment.

12. New scientific evidence highlights the need for a multifaceted approach including a focus on the life-course dimension; thus the need to intervene even before conception and also to reduce the exposure of the pregnant woman, infant, child and adolescent to an obesogenic environment. Risks once thought to be either genetic or acquired may be a combination of both, i.e., environmentally induced effects on gene expression (epigenetic effects). Epigenetic influences may be detectable in early life even in the absence of pathological changes and may persist after the inducing stimulus, during a sensitive period, has passed. Nonetheless some of these epigenetic changes may be modifiable or reversible through appropriate interventions *(7, 8)*.

13. The intergenerational passage of obesity risk, such that obesity begets obesity, is a newly recognized issue. It reveals how the epidemic of obesity now evident in adults will be perpetuated into future generations. Transgenerational passage of obesity risk to children occurs both by the 'mismatch' pathway, of undernutrition during fetal and early childhood development followed by overnutrition and sedentary lifestyle later, and by sustained risk transmission associated with parental obesity, diabetes (including gestational diabetes) and unhealthy diet, activity pattern and lifestyle. The subsequent comorbidities result in the erosion of the improvements in social and health capital. Effective interventions are, thus, likely to have long-term financial and wider benefits.

14. There are a number of current WHO and other United Nations agencies strategies and implementation plans related to optimizing maternal, infant and child nutrition and adolescent health that are highly relevant to key elements of a comprehensive approach to obesity prevention[3]. Relevant principles and recommendations can be found in a number of documents providing guidance throughout the life-course [4].

[3] Resolutions WHA53.17 on prevention and control of noncommunicable diseases; WHA57.17 on the global strategy on diet, physical activity and health; WHA61.14 on prevention and control of

The overarching goals of the Commission on Ending Childhood Obesity are to provide guidance on policy options to:

a) prevent children and adolescents from developing obesity; and

b) treat pre-existing obesity in children and adolescents,

in order to reduce the risk of morbidity and mortality due to noncommunicable diseases, the psychosocial effects of obesity both in childhood and adulthood and the trans-generational risk of developing obesity.

WHY IT IS CRITICAL TO ADDRESS THE CHALLENGE OF CHILDHOOD OBESITY

15. The prevalence of infant, childhood and adolescent obesity is increasing in all countries, with most rapid rises occurring in LMICs. An estimated 42 million children were affected by overweight or obesity in 2013. In Africa, the estimated prevalence rate of child overweight and obesity of 8.5% in 2010 (or 12 million children) is projected to increase to 12.7% by 2020. In Asia, the 2010 prevalence rate of 4.9% equates to approximately 18 million children *(9-11)*. If current trends continue, over 70 million infants and young children will be overweight or obese by 2025, the vast majority living in LMICs*(1)*. These countries have had high rates of child undernutrition and stunting, but now the rates of childhood adiposity are also rising rapidly.

16. Populations undergoing rapid socioeconomic and/or nutritional transitions are at particular risk. In HICs the risks of childhood obesity are greatest in lower socioeconomic groups but the converse is true in most LMIC. Within countries certain population subgroups, such as migrant children or indigenous children are at particularly high risk of developing childhood obesity *(12)*. Of even greater concern are the numbers of children who, even from birth, are on the pathway to develop obesity, even if they are not yet at the BMI-for-age threshold for the current definition of childhood obesity.

17. Childhood obesity itself is a direct cause of morbidities including asthma, musculoskeletal impairment and early onset of comorbidities usually associated with adult obesity, such as type-2 diabetes, hyperlipidaemia, non-alcoholic liver disease and hypertension *(13)*. In addition, childhood obesity can contribute to behavioural and

noncommunicable diseases: implementation of the global strategy; WHA63.14 on marketing of food and non-alcoholic beverages to children; WHA65.6 on the comprehensive implementation plan on maternal, infant and young child nutrition; and WHA66.10 on the follow-up to the Political Declaration of the High-level Meeting of the General Assembly on the Prevention and Control of Non-communicable diseases.

[4] Meeting to develop a global consensus on preconception carte to reduce maternal and childhood mortality and morbidity, WHO, 2013; The optimal duration of exclusive breastfeeding. Report of an expert consultation, WHO, 2001; Complementary feeding. Report of global consultation: summary of guiding principles, WHO, 2002; Global recommendations on physical activity for health, WHO, 2012; Population-based approaches to childhood obesity prevention, WHO, 2010.

emotional difficulties, lead to stigmatization and poor socialization and appears to impair learning *(14, 15)*. Critically, childhood obesity is a strong predictor of adult obesity and the multitude of associated morbidities leading to lost productivity and increased health costs *(2)*. Further, obesity begets obesity across generations through increasingly well understood biological processes and thus, if the cycle is not broken, the cost to future generations will be compounded.

18. The data on the economic consequences of childhood obesity is scarce compared to that on the economic burden of adult obesity and has concentrated primarily on healthcare expenditure, ignoring other costs. Evidence on the life time cost of childhood obesity is developing, encompassing the cost of the accelerated onset of "adult" diseases and the tendency for childhood obesity to continue into adulthood, with the attendant economic costs *(16)*. Early onset of noncommunicable diseases impair the individual's life-time educational attainment, labour market outcomes and place a significant burden on health care systems, family, employers and society as a whole *(17)*. The economic and health arguments for action are further supported by the manifest spill-over benefits from effectively addressing childhood obesity. These include improved maternal and reproductive health and a reduction in obesogenic exposure for all members of the population.

19. Childhood obesity originates from the interplay between biological and contextual factors. The biological factors include parental factors such as maternal over- and under-nutrition prior to conception and during pregnancy, which change the way the child responds to nutritional experiences in early life *(18)*. During infancy, eating and exercise behaviours are established including the biological set-points for appetite and food preference *(19, 20)*. These developmental influences, some biological and some behavioural, have profound long-term consequences. Patterns of exercise and eating behaviours are reinforced in childhood by schooling and other experiences.

20. Children today are developing and growing within an increasingly obesogenic environment that results in energy imbalance. Nutrition and physical activity transitions have resulted in the exposure of children to ultra-processed, energy-dense, nutrient-poor foods, reduced opportunities for physical activity both in and out of school and an increase in the time spent on sedentary leisure activities. With globalisation and urbanisation, the exposure to the obesogenic environment is increasing in both HICs and LMICs.

21. Addressing childhood obesity requires attention to both the developmental (life-course) and environmental considerations. Of the latter, important factors include exposure to inappropriate infant and young child feeding, and the influence of the marketing of unhealthy foods (i.e., foods high in saturated fats, *trans*-fatty acids, free sugars or salt) directly to children. No single intervention can halt the rise of the growing epidemic, therefore, actions that address both the obesogenic environment and developmental factors are required.

22. However, it is instructive that *none of these causal factors are in the control of the child and childhood obesity cannot be seen as the result of lifestyle choices by the child* – this distinction contrasts with common perceptions of adult obesity (even though this

perception is also faulty). Rather, children are the unwitting actors who become obese as a result of entrapment by contextual factors operating within society and by their developmental history influencing both their biology and behaviour. Thus, the argument that the State need not act because obesity may be the result of individual lifestyle choices cannot apply to childhood obesity. Addressing childhood obesity must be seen as independent from considerations of political philosophy. This does not negate the critical role that parents and caregivers can play in encouraging children to engage in healthy behaviours.

23. This singular conclusion places a moral responsibility on all societies to act on the child's behalf to reduce the risk of obesity through a variety of actions. Tackling childhood obesity clearly resonates with the universal acceptance of the rights of children to a healthy life as well as the obligations assumed by State Parties to the Convention of the Rights of the Child. There are also direct linkages to the Millennium Development Goals through the focus on maternal and infant heath, and to the proposed Sustainable Development Goals.

24. The challenge of childhood obesity is one that must be taken as urgent and serious in all populations. The increasing rates of childhood obesity cannot be ignored and governments need to accept their central role as the principal agents in addressing the issue. A failure to act will have medical, social and economic consequences of major magnitude.

Childhood obesity must be accepted as an urgent and global challenge of major significance to global health and to all countries that requires leadership by governments and coordinated action with other actors.

OVERARCHING POLICY CONSIDERATIONS

25. The Political Declaration adopted at the United Nations General Assembly High-level Meeting on Prevention and Control of Non-communicable diseases[5] in 2011 highlighted the importance of multi-sectoral action in reducing the global burden of NCDs.

26. The Commission emphasizes that childhood obesity is a complex issue that is influenced by various sectors outside of the health sector, including the built environment, education, agriculture, trade, food and nutrition, sport and recreation, and finance. As this is increasingly being recognized, it has become clear that a multisectoral approach to preventing obesity is needed. Addressing the challenge of childhood obesity through integrated actions across different sectors and levels of society, including government, the private sector and civil society, will prove more effective than any stand-alone measure. Governments have primary responsibility for establishing good governance and supporting measures through appropriate regulatory, statutory and policy

[5] A/RES/66/2 Political Declaration of the High-level Meeting of the General Assembly on the Prevention and Control of Non-communicable Diseases

frameworks. The Political Declaration as well as relevant World Health Assembly resolutions recognise the important role that the private sector can play in addressing NCDs. Although policy formulation remains the prerogative of governments, an opportunity exists for constructive engagement with the private sector, while avoiding conflict of interest and ensuring appropriate safeguards, in implementing and supporting healthy lifestyle policies.

27. Obesity prevention and treatment requires a whole of government, multi-sectoral lens, which could include the Health in All Policies approach to policies that systematically takes into account the health and health-system implications of decisions, seeks synergies, and avoids harmful health impacts to improve population health and health equity. Food, trade and investment policies and trade and agriculture agreements all have the potential to protect public health. The effect of agriculture, trade and globalisation of the food system on consumption patterns through their impact on food affordability, availability and quality at national and local levels is increasingly recognized. A number of agricultural policies and interventions have been recommended to promote healthy diets globally. The adoption of fiscal measures for obesity prevention has also received a great deal of attention, based on successes with tobacco, although the considerations in the case of food and non-alcoholic beverages, for governments, are more complex. The evidence for fiscal measures having desirable effects is emerging from observational data from countries that have recently adopted such measures *(21)*.

28. Governments should ensure equitable coverage of approaches to prevent and treat childhood obesity. There should be a particular focus on excluded, marginalised, or otherwise vulnerable population groups, who are at high risk of the double burden of malnutrition and developing obesity. These populations are particularly susceptible to nutrition and physical activity transitions and often have poor access to healthy foods, safe places for physical activity and preventative health services and support.

29. Childhood obesity must also be considered in the context of psychosocial and broader societal determinants. Parental, family or caregiver health knowledge and ability to act on this knowledge, responses to environmental influences, socioeconomic factors and cultural norms about eating and feeding, movement (physical activity, inactivity and sleep) and body image all contribute to the development of childhood obesity. These need to be carefully considered when developing effective intervention packages for different contexts and population groups.

Overarching policy considerations

I. Governments have the essential role in coordinating and addressing the challenge of childhood obesity and providing an appropriate regulatory and statutory framework.

II. Consistent and coordinated multi-sectoral and multi-stake-holder approaches are required to address childhood obesity.

III. New approaches to addressing the challenge will require constructive, transparent and accountable relationships between government, the private sector and civil society.

IV. Policy implementation requires consideration of different contexts not only between regions and countries but also within countries, taking into account issues of gender and equity.

V. A monitoring and accountability framework will be required at a national level to ensure effective policy implementation and action.

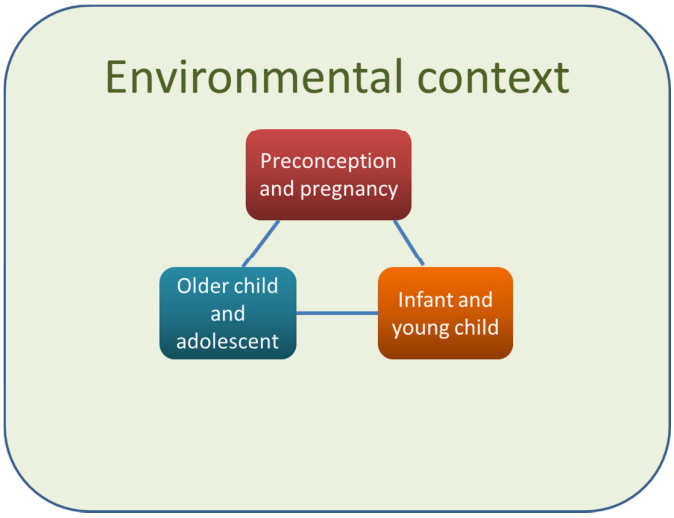
TOWARDS A COMPREHENSIVE STRATEGY

30. Addressing childhood and adolescent obesity necessitates a life-course approach as well as consideration of the obesogenic environment. In addition to overarching policy considerations, specific recommendations for concurrent actions, tailored to the developmental context, are required. Here the Commission proposes policy options for consideration. These have been developed following the review of evidence on effective interventions and with consideration of the implications for governments, civil society, NGOs and the private sector. A set of concurrent recommendations tailored to the developmental context as well as the physical, social, economic and wider environments are required.

31. A conceptual framework for intervention perspectives is shown in fig. 2. As indicated, three sensitive periods of the life-course are identified as new or enhanced points of intervention that can influence obesity risk in the context of the encompassing obesogenic environment. Path dependency for obesity risk develops across the life-course, from before conception through infancy and childhood, adolescence and into the preconception and pregnancy periods for the next generation. The life-stage groups require specific, coordinated intervention packages, the specific components of which are tailored to the population characteristics and needs. These intervention packages should be viewed as sequential and cumulative, as are the underlying risks within each period. Interventions in preconception and pregnancy include those addressed to potential parents of any age and gender. Environmental context refers to interdependent, multi-level and multi-sectoral modifiable influences on feeding, eating and movement behaviours across life-stages. Selected influences in this realm are key

targets for change in any efforts to end childhood obesity. Simultaneously addressing modifiable aspects of these environmental influences is an important part of the strategy.

Fig. 2: Schematic overview of the ECHO conceptual framework



Note: Environmental context includes: global, regional and national; public and private sector; economic and social policies and political and social environments related to food systems and movement behaviours; residential, community, family and cultural environments related to health; health and social services; education, employment, gender roles, resources and living conditions.

32. There is a need for an expanded perspective on identifying relevant evidence on the effectiveness of interventions to prevent childhood obesity. In some cases, policy recommendations are based on early or mixed evidence, reflecting the urgency to take action to stem the epidemic rather than wait for definitive evidence of what works, especially in the many areas where interventions are low risk. There needs to be continued emphasis on policy research and programme evaluation.

Strategic objectives of an action plan to end childhood obesity

33. The Commission has concluded that it is imperative that a multifaceted approach be taken encompassing attention to critical periods of the life course and simultaneously addressing the obesogenic environment. Effective intervention will require coordinated action across both these domains. Singular approaches will not be effective. Further, there will be major spill-over benefits, from this holistic approach, to other components of the maternal-neonatal-child health agenda, and to the broader effort to tackle noncommunicable diseases in the whole population. National circumstances will determine the prioritization of such interventions. For maximal effectiveness in tackling childhood obesity, countries should adopt the most comprehensive plan possible.

1: Tackle the obesogenic environment and norms

34. While a focus on the obesogenic environment alone will not be sufficient, neither would any strategy that did not address it. The major goals of addressing the environmental component include improving healthy eating and physical activity behaviours.

a. Reduce intake of unhealthy foods and promote intake of healthy foods and non-alcoholic beverages by children and adolescents

35. The challenge is to find effective ways of ensuring the appropriate intake of healthy foods and non-alcoholic beverages from infancy through adolescence and adulthood. A sound basis for action is ensuring that healthy eating habits are established from infancy and this requires caregiver understanding of the relationship between diet and health, and behaviours to encourage and support this. As the child enters the educational environment nutrition and physical activity education and the acquisition of health and nutritional literacy should be included in the curriculum and supported by a health-promoting school environment.

36. Multisectoral approaches to improving the intake of healthy foods and non-alcoholic beverages can be strengthened through the use of international norms and standards, such as those developed by the Codex Alimentarius Commission[6] and could include a standardised system of food labelling to support efforts promoted through nutritional and health literacy education.

37. Influencing the food environment requires a collaborative approach to food production, processing and accessibility, availability, affordability and marketing. Where access to healthy foods is limited, ultra-processed foods are often the only alternative available and affordable. There is ample documentation of aspects of food production and distribution systems that can be potential targets for change, and a number of public and private sector initiatives to promote healthier food behaviours have already been developed.

38. There is unequivocal evidence that unhealthy food and non-alcoholic beverage marketing is related to childhood obesity *(22, 23)*. The increasing number of voluntary efforts by industry and communities suggest that the need for change is widely agreed. Any attempt to tackle childhood obesity should, therefore, include a reduction in exposure of children to, and the power of, marketing *(24)* as endorsed by the World Health Assembly [7].

39. These strategies are critical for changing the mix of foods available for purchase, their availability and ease of acquisition, the mix of food products promoted, and food pricing, (including pricing in relation to portion size) at the point of purchase. Given the wide variation in attitudes and behaviour within the food and non-alcoholic beverage and marketing industries, voluntary initiatives are likely insufficient, as compliant companies will be at a disadvantage to non-compliant entities. There also needs to be clarity as to

[6] WHA56.23

[7] WHA63.14 on marketing of food and non-alcoholic beverages to children

the range of healthy products that can be marketed and consideration of both direct and indirect marketing strategies. This suggests that regulatory and statutory approaches are needed to ensure that changes reach the desirable level and apply to forms of marketing that are not currently covered under voluntary codes. Such regulatory approaches will require identifying healthy and unhealthy foods using independent nutrient profiling. These considerations must also take into account issues of food security, where this is relevant either at a national, sub-national or sub-population level.

40. Reducing the exposure of children to marketing of unhealthy foods should be accompanied by the appropriate marketing of healthy foods in order to achieve the goals of healthier eating norms and behaviours. Incentives need to be considered that may promote such marketing at the expense of unhealthy foods.

41. There is increasing interest in the application of fiscal measures to shift food purchase behaviours. Overall, the rationale for and effectiveness of taxation measures to influence consumption are well-supported by the available evidence *(21)*. The available evidence makes a case for applying this approach to products such as sugar-sweetened non-alcoholic beverages and energy-dense, nutrient-poor foods *(25)*. Debate continues about the priority that should be given to taxation measures in terms of feasibility, and whether the societally positive effects are sufficient to offset the potential regressive effects on low-income consumers. The potential effectiveness of subsidies for healthy food products is also supported by modelling *(26)*. Some countries have introduced policies that require taxation revenues to be earmarked for health*(21)*.

Policy options for strategic objective 1a.

Governments could take action to reduce the intake of unhealthy foods and non-alcoholic beverages and promote the intake of healthy foods by children and adolescents, and could:

Inform by:

i. Providing guidance on education for healthy living for children, adolescents, parents, caregivers, teachers and health professionals. This should include a component of nutritional literacy and be combined with appropriate nutrition information and front-of-pack labelling.
ii. Effecting health promotion through a variety of marketing strategies to counter the current unhealthy commercial marketing environment.

Enable by:

iii. Implementing policies, such as subsidies and pricing mechanisms to reduce the affordability barrier, and increase the consumption of healthy foods.
iv. Improving access to healthy foods by taking measures to create healthy food environments in settings (such as schools, child-care settings, villages and cities) and communities, including disadvantaged communities.
v. Providing guidance and support for a standardized global food labelling system and appropriate accompanying nutritional education and literacy.

Protect by:

vi. Considering fiscal policies, such as taxes to reduce the consumption of unhealthy foods such as sugar-sweetened non-alcoholic beverages and energy-dense, nutrient-poor foods.
vii. Implementing restrictions on the marketing of unhealthy foods, such as sugar-sweetened non-alcoholic beverages and energy-dense, nutrient-poor foods to children and adolescents.
viii. Eliminating the provision or sale of unhealthy foods such as sugar-sweetened non-alcoholic beverages and energy-dense, nutrient-poor foods in the school environment.

b. Reduce sedentary behaviour and promote healthy living through physical activity in children and adolescents

42. Recent evidence shows that physical activity declines from the age of school entry, and less than 20% of the global population is sufficiently active, as defined by WHO guidelines of physical activity *(27)*, by the age of 13-15 years *(28)*. Low physical activity is fast becoming the social norm in most countries, and is an important driver of the obesity epidemic, with a wide range of other adverse consequences (e.g., risk of diabetes, cardiovascular disease, obstetric complications, mental health and wellbeing). Urban planning and design has the potential to both contribute to the problem and the

opportunity to form part of the solution, through increased recreational space and by supporting walking and cycling for active transport. Recent evidence suggests that obesity, in turn, reduces physical activity, creating a vicious cycle of increasing body fatness and declining physical activity. There is also evidence to suggest exercise behaviours across life are heavily influenced by childhood experience. The rationale for, and effects of, various strategies are supported by numerous association studies (cross sectional), a more limited number of evaluation studies (e.g., using controlled, before and after designs), and also by logic that may foster consensus even in the absence of overwhelming evidence of causality *(29, 30)*.

Policy options for strategic objective 1b

Governments could take action to reduce sedentary behaviours and promote physical activity in children and adolescents and could:

Inform by:

i. Providing guidance on education for healthy movement and sleep behaviours and appropriate use of screen-based entertainment for children, adolescents, parents, caregivers, teachers and health professionals.
ii. Running sustained social marketing programmes with the aim of replacing the current unhealthy sedentary lifestyle with more healthy physical activity.

Enable by:

iii. Creating safe, gender-friendly, physical activity-friendly communities, which enable, and actively encourage the use of active transport (walking, cycling etc.).
iv. Improving access to natural spaces, places and facilities for active living and encourage participation in physical activities, with special consideration given to gender-constraints where these are applicable.
v. Ensuring that physical activity is included in the school curriculum and providing adequate facilities to support this.
vi. Ensuring adequate facilities are available on school premises for physical activity during recreational time for all children, including the provision of gender-friendly spaces where these are appropriate.

2: Ensure the risk of obesity is reduced by addressing critical elements in the life-course.

43. While the above measures are aimed at reducing the burden of the obesogenic environment, it is apparent from recent scientific findings that these measures must be accompanied by attention to the early stages of life-course, for sustained benefit to be achieved. The basic paradigm is that developmental factors change both the biology and behaviour of the individual, such that they are at greater or lesser risk in the obesogenic environment. The core strategies must, therefore, focus on removing factors that enhance risk and shifting development towards a lower risk trajectory. There are major spill-over benefits to other parts of the maternal, reproductive and child health agendas.

a. Preconception and pregnancy:

44. The recommendation to target this phase of the life-course is also based on substantial basic science evidence and expert opinion that it will contribute to improving health and nutritional literacy and preparation for pregnancy and parenthood. Evidence shows that maternal undernutrition (whether global or nutrient specific), maternal overweight or obesity, excess pregnancy weight gain, maternal hyperglycaemia (including gestational diabetes), smoking or exposure to toxins are preconceptional or gestational influences that increase the likelihood of obesity during infancy and childhood *(31-36)*; clear strategies exist, or can be developed, to modify each of these. Current guidance for preconception and antenatal care incorporates measures to prevent fetal undernutrition, but guidelines that address undernutrition and later obesity risk in the offspring are clearly needed. There is as yet no evidence on the content or effectiveness of interventions that do this in settings where undernutrition is prevalent. Some evidence is available to support the development of interventions to address subsequent childhood obesity risk commencing during preconception and pregnancy in HICs; these interventions also prevent other adverse pregnancy outcomes *(37)*.

45. There is evidence for the beneficial effects of exercise programmes in pregnancy on maternal BMI, gestational weight gain and birth outcomes linked to risk of childhood obesity, although the effect size varies*(38)*.

46. There is limited, but growing, evidence that paternal nutrition and toxin exposure prior to conception also has some impact on offspring health and, thus, there are direct reasons to also target paternal behaviour and health, as well as the contextual issues concerning the maternal environment, if shared with her partner.

47. Interventions that integrate guidance related to all forms of malnutrition should address undernutrition, overnutrition and specific nutritional deficiencies, relevant to the double burden associated with transitions to urban and westernised lifestyles in LMICs. Implications include: the need to screen for, and appropriate management of, pre-existing diabetes mellitus and hypertension in pregnant women; early diagnosis and effective management of gestational diabetes and pregnancy-induced hypertension, depression and mental health issues; gestational weight gain pattern, dietary quality and movement behaviours; and avoiding elective caesarean section deliveries for non-medical reasons wherever possible *(39)*.

48. This period is also a good opportunity for promoting awareness of the importance of exclusive breastfeeding and healthy complementary infant feeding, and other aspects of caregiving that affect the development of infant appetite, food preference, cardio-metabolic control, growth and neurocognitive development.

Policy options for strategic objective 2a

Integrate and strengthen current guidance for preconception and antenatal care with guidance for NCD prevention applicable to this life stage, with particular focus on:

i. Appropriate guidance and advice on nutrition, physical activity, smoking cessation and avoidance of toxins before and during pregnancy, for both prospective mothers and fathers.
ii. The early diagnosis and management of infection, hyperglycaemia and hypertension in women before conception.
iii. The early diagnosis and management of infection, gestational diabetes and pregnancy-induced hypertension, and monitoring and management of gestational weight gain during pregnancy.

b. Infant and young child:

49. Breastfeeding is core to optimising infant development and evidence supports its potential value as part of a comprehensive strategy for childhood obesity prevention *(40)*. It may also be beneficial for postnatal weight management in women. Given changes in women's lifestyles and roles, the ability to breastfeed outside of the home and sustain breastfeeding when a mother returns to work is critical to enable achievement of recommendations. Policies that establish rights of women and responsibilities of employers are needed. Some are in place, but they should be universal in contexts where needed.

50. Established global guidance for infant and young child feeding primarily targets undernutrition. It is now important to consider the risks created by overnutrition, in infancy and childhood, in different contexts. Guidelines that address both undernutrition and obesity risk are clearly needed for some countries where both conditions co-exist. A body of research has focused on salt, sugar and fat content of, and manner in which, complementary foods are introduced in relation to the development of taste and appetite in young children. Current complementary feeding guidelines *(41)* provide guidance on the timing of introduction, responsive feeding, amount and types of foods needed. Family attitudes to eating and perceptions of body shape also appear to be important.

51. The evidence to support early interventions to prevent obesity in HICs is still emerging, but looks very promising. Evidence supports interventions in pre-school and child care settings for children aged 2 to 5 years for early child feeding, activity patterns, media exposures, and sleep that help to promote healthy behaviours and weight trajectories in this period of life *(42)*. These recommendations are compatible with recommendations for the prevention of undernutrition, while adding additional dimensions.

52. Breastfeeding and appropriate complementary feeding (timing of introduction, nature of the foods used and responsive feeding) are favourable for preventing all forms of malnutrition in infancy and early childhood. Several strategies in this age group have also supported parents and caregivers to ensure minimal television/screen viewing, encourage active play, establish healthy eating behaviours and diets, promote healthy

sleep routines and role-model healthy caregiver and family lifestyles. Each element of this suite of interventions appears important, and all support healthy child growth and development.

53. The evidence shows that interventions to improve child nutrition and movement behaviours are most effective if these are comprehensive and involve caregivers and the community at large *(42)*. Societal changes and transitions require a more deliberate and concerted approach to interventions in this domain, including support for parents and other caregivers to enable them to contribute to the recommended behaviour changes.

Policy options for strategic objective 2b

Integrate actions related to healthy eating and feeding practices, physical activity and sleep behaviours with current guidance on best practices for parenting and child-care during the first 5 years of life, with particular focus on:

i. Protecting, promoting and supporting breastfeeding, according to guidelines, using regulatory measures as needed. These include: protection through measures such as the Code of Marketing of Breast-milk Substitutes and subsequent World Health Assembly resolutions, and protection of the right to breastfeed in public; promotion of the benefits of breastfeeding for mother and child through broad-based education to parents and community at large; and support to enable mothers to breastfeed, through regulatory measures such as maternity leave, facilities and time for breastfeeding in the work place (ILO C183 - Maternity Protection Convention, 2000).

ii. Endorsing existing Infant and Young Child Feeding guidelines on the timely introduction of appropriate complementary foods. This could involve strengthening the focus on specific categories of foods (e.g., sugar-sweetened non-alcoholic beverages or energy-dense, nutrient-poor foods) for prevention of excess weight gain.

iii. The use of whole-of-community approaches to empower parents, other caregivers, educators and community leaders to foster healthful eating and physical activity and sleep behaviours for young children (2-5 years of age) in environmental contexts that currently support and promote unhealthy behaviours through:
   - the curricula and eating and physical activity environments in formal child care settings or institutions;
   - health care delivery (e.g., primary or paediatric care); and
   - through social institutions and community leaders (e.g., religious leaders).

iv. Integrating advice on healthy eating, physical activity and sleep behaviours for children with services that address other social and health needs of families and children.

c. School-age child and adolescent:

54. There is an evidence base to support interventions in school settings and the wider community for pre-adolescent and adolescent children as an obesity prevention strategy. Qualitative assessments suggest that their effectiveness on obesity prevention behaviours and outcomes is related to: a) quality of implementation; and b) positioning of school-based efforts within the context of broader community efforts. The most frequently mentioned challenge to implementation is the competition with the schools' primary mission *(42)*.

55. Energy-dense, nutrient-poor foods and sugar-sweetened non-alcoholic beverages are important drivers of the obesity epidemic in school-age children and adolescents globally, acting to both cause and maintain overweight and obesity. Increasing access to, and promotion of, lower energy-density foods, and to water as an alternative to sugar-sweetened non-alcoholic beverages, are actions necessary to make the environment less obesogenic, and to establish healthier behavioural norms.

56. Physical activity provides fundamental health benefits for children and adolescents, including increased cardiorespiratory and muscular fitness, reduced body fatness and enhanced bone health, as well as reduced symptoms of depression and improved psychosocial outcomes. Increasing the opportunities for safe, appropriate and gender-friendly structured and unstructured physical activity, both in and out of school, including active transport (walking and cycling), will have positive health and spill-over effects for all children and adolescents.

Policy options for strategic objective 2c

Strengthen the infrastructure for implementing comprehensive school programmes that promote healthy eating, physical activity and reduce sedentary behaviours. These could include measures to ensure:

i. Environmental modification of school premises and facilities (e.g., addressing available food choices, ensuring access to potable water and recreational spaces).
ii. Improve access to healthy foods and restrict that of unhealthy food around schools. The option of "zoning" around educational establishments could be considered.
iii. Engagement with families, caregivers and the community, including health care providers and community health workers.
iv. Programmes should use evidence-based approaches, appropriately adapted to context.
v. Partnerships and resource-sharing between education and health ministries.
vi. The provision of appropriate training and resources for schools and school-based community activities. They should ensure clarity of message and economy of scale by building on existing platforms, for example science education and other components of health education.
vii. The engagement of older children and adolescents as actors in the development and implementation of interventions to reduce childhood obesity.

3: Treat children already affected by obesity to improve their current and future health

57. When children are already overweight or obese, additional goals include reduction in the level of overweight, improvement in obesity-related comorbidities and improvement in risk factors for excess weight gain. Evidence reviews of childhood obesity show that family-focussed behavioural lifestyle interventions can lead to positive outcomes in weight, BMI and other measures of body fatness. This is the case for both the adolescent (~12-18 years) and pre-adolescent (~5-12 years) age groups *(43)*. Such an approach is the foundation for all treatment interventions. However, very few studies have been undertaken in low- and middle-income countries.

58. The health sector in each country varies considerably and will have different challenges in responding to the need for provision of treatment services for those affected by obesity. Primary health-care services are important for the early detection and management of obesity and its associated complications, such as diabetes. Low energy diets are effective in the short term for the management of obesity, but reducing inactivity and increasing physical activity can increase the effectiveness of interventions. There is little written on models of health service delivery for the provision of obesity treatment in children and adolescents, but it is clear that these efforts can only be effective with the involvement of the whole family or care environment. The 2013 United Kingdom National Institute for Health and Care Excellence guidelines on lifestyle weight management services for children and young people make a number of recommendations in this regard *(44)*. While they are United Kingdom-based, many of the key recommendations would apply to other countries.

Policy options for strategic objective 3

a. Health care systems should provide family-based/care-environment-based, multi-component (including nutrition, physical activity and psychosocial aspects) lifestyle weight management services for children and young people affected by obesity.

b. Health professional staff should be trained and have the necessary knowledge and skills to provide these services.

ISSUES AND RESPONSIBILITIES

59. The Commission recognizes that the scope of policy options to address childhood obesity is broad and contains a number of novel elements including a focus on the life-course dimension. A multisectoral approach will be essential for sustained progress, but the Commission is mindful of the significant challenges that currently exist for governments, civil society and the private sector. It is also cognizant of the potential spill-over benefits and costs from these issues to many other areas of policy formation. Indeed, reconciling these issues creates major challenges for stakeholders and in some cases will challenge established perceptions and thinking. In this section the Commission highlights some of these matters, without definitive recommendations to assist the consultation, while it deliberates further.

Governments:

60. It is clear that to effectively address childhood obesity, active engagement of multiple agencies of government would be required. There is an understandable tendency to see obesity as a problem for the health sector, but preventing childhood obesity demands the coordinated contributions of government ministries and institutions responsible for policies on education, food, agriculture, commerce and industry, finance/revenue, sport and recreation, media and communication, environmental and urban planning, transport and social affairs. There are also implications for areas such as trade in unhealthy foods. It is suggested that the issue of childhood obesity is imminently urgent for governments to establish appropriate whole-of-government approaches. Equally, regional and local governments must understand their obligations and harness resources and efforts to ensure a coordinated and comprehensive response.

Civil society and nongovernmental organizations (NGOs):

61. There are many ways in which civil society and NGOs can play an important and supportive role in addressing the challenge of childhood obesity. As this report shows, childhood obesity is greatly influenced by food, physical activity and eating behaviours, by the school environment, by cultural attitudes to body image, and by the behaviour of adults. Civil society and NGOs can help ensure that consumers ask governments to provide support for healthy lifestyles and that the food and non-alcoholic beverage industry provide healthy products, and do not market unhealthy foods and non-alcoholic beverages to children. This can be achieved through advocacy efforts and the dissemination of information to raise the profile of childhood obesity prevention. Civil society and NGOs also have a role to play in developing a monitoring and accountability mechanism, and in ensuring the monitoring of policy implementation by all actors.

The private sector:

62. The private sector is not a homogeneous entity. It is, therefore, important to consider those entities whose activities are directly or indirectly related to addressing childhood obesity. These include the agricultural food production sector, the food and non-alcoholic beverage industry, retailers, catering companies, sporting-goods manufacturers, advertising and recreation businesses, and the media. As many companies operate globally, international collaboration is vital. However, attention must also be given to local and regional entities and artisans. Cooperative relationships with industry have already led to some encouraging outcomes related to diet and physical activity. Initiatives by industry to reduce fat, sugar and salt content, and portion sizes of processed foods, and to increase the production of innovative, healthy and nutritious choices, could accelerate health gains worldwide. The Commission believes that real progress can be made by constructive, transparent engagement with the private sector, and encouraging policies that support the production of, and facilitate access to, foods and non-alcoholic beverages that contribute to a healthy diet, and facilitate access to, and participation in, physical activity.

IMPLEMENTATION, MONITORING AND ACCOUNTABILITY

63. It is recognized that implementation is a key challenge for all countries and requires further consideration of the critical enablers that are needed to ensure optimal implementation. It is essential that priority be given to the strengthening of monitoring systems, as they constitute an integral part of a multisectoral population-based strategy for obesity prevention. Similarly, an effective, transparent, robust and inclusive accountability framework is imperative, if commitments made are to translate into concrete actions and achieve tangible outcomes. The Director-General of WHO established an Ad hoc Working Group on Implementation, Monitoring and Accountability for Ending Childhood Obesity(WGIMA), to provide technical advice on an implementation and accountability framework, relevant to all stakeholders, and mechanisms required to monitor recommended policy options. As such, the substantive work of WGIMA will follow on from the proposed policy options detailed in this interim report and will be discussed at the next meeting of the Commission, for inclusion in the final draft report.

RESEARCH GAPS

64. In the course of the Commission's work and that of its working groups, a number of research gaps were identified. Many of these have been alluded to already, but are listed here to focus the research, public health and education communities.

Childhood obesity and NCDs

a. What is the attributable risk for various NCDs resulting from different pathways to childhood obesity?
b. What are the associations between different patterns of body fat deposition in childhood (in relation to gender, age, ethnicity, developmental influence) and NCD risk?
c. Are there biomarkers of enhanced NCD risk in childhood?
d. To what extent, and until what age, are the effects of childhood obesity reversible with respect to adult NCD risk?

Economic consequences of childhood obesity

e. There is a need for better longitudinal data to gain a clearer understanding of BMI trajectory, health risks and associated health care and other costs over an individual's lifetime.
f. Is there a causal relationship between obesity and lower education/skills attainment, and what are the associated costs?

Psychosocial determinants of childhood obesity

g. Further evidence on the psychosocial determinants of overweight and obesity in LMICs, in particular the gendered differences, health knowledge among caregivers and children, impact of peers, social networks and media on diet, physical activity behaviours and perceptions of body image.
h. How and when does the inversion between childhood overweight and obesity and socioeconomic position take place in societies in transition?

Preconception and pregnancy interventions

i. Evaluation of the relative impact of pre-, peri- and post-conception interventions, and the "window" of opportunity.
j. Evaluation of differential effects of interventions on the most nutritionally or otherwise "at-risk" women.
k. The influence of poor environmental conditions, including access to safe drinking water, hygiene and sanitation on fetal health, priming and outcomes.
l. Further elucidation of small-for-gestational-age definition in different population groups (e.g., 50% of all newborns in South Asia) and related issues of prevention and interventions with respect to childhood obesity.

Children and adolescents – prevention and treatment

m. What makes for effective nutritional literacy education (especially for young people) and the links with food and nutrition labelling?
n. What are the factors that influence the development of taste, appetite and food preferences?
o. The relationship between stunting and childhood obesity.
p. What are effective interventions in infants, young children and adolescents?
q. Evidence on effective interventions in LIMCs and sub-populations in HICs and LMICs.
r. Evidence on effective treatment strategies for children affected by overweight and obesity in both HICs and LMICs, at different ages and levels of severity .
s. What are the most cost-effective and resource-efficient methods for treating obesity in different health care settings?
t. What are the training needs of health professionals and educators in different settings, countries and regions?
u. What are the factors that influence the development of physically active behaviours?

QUESTIONS FOR CONSULTATION

1. Are there issues or strategies that have been overlooked in the Commission's interim report?
2. How can your sector/entity contribute to the proposed policy options to end childhood obesity?
3. What are the important enablers to consider when planning the implementation of these proposed policy options?
4. What are the potential barriers to implementation to be considered for these proposed policy options?
5. How would your sector/entity measure success in the implementation of these proposed policy options?
6. How would your sector/entity contribute to a monitoring and accountability framework for these proposed policy options?

ANNEX 1: Commissioners serving in the Commission on Ending Childhood Obesity

Sir George Alleyne
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Dr Sania Nishtar (co-chair)
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Coordinator, Scaling up Nutrition (SUN) Movement

Special Representative of the UN Secretary General for Food Security and Nutrition

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*** unable to attend**

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