

# Evidence for gender responsive actions to prevent and manage **overweight and obesity**

Young people's health as a whole-of-society response



**World Health  
Organization**

REGIONAL OFFICE FOR **Europe**

Address requests about publications of the WHO Regional Office for Europe to:

**Publications**  
**WHO Regional Office for Europe**  
**Scherfigsvej 8**  
**DK-2100 Copenhagen Ø, Denmark**

Alternatively, complete an online request form for documentation, health information, or for permission to quote or translate, on the Regional Office web site (<http://www.euro.who.int/pubrequest>).

**© World Health Organization 2011**

All rights reserved. The Regional Office for Europe of the World Health Organization welcomes requests for permission to reproduce or translate its publications, in part or in full.

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by the World Health Organization in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

All reasonable precautions have been taken by the World Health Organization to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either express or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall the World Health Organization be liable for damages arising from its use. The views expressed by authors, editors, or expert groups do not necessarily represent the decisions or the stated policy of the World Health Organization.

## **Keywords**

GENDER IDENTITY  
SEX FACTORS  
ADOLESCENT  
OBESITY  
BODY WEIGHT

# Abstract

The WHO Regional Office for Europe supports Member States in improving adolescent health by recommending comprehensive, multisectoral and evidence-informed adolescent health approaches; by delineating the critical contribution of the health sector; by fostering actions towards reducing inequalities; and by addressing gender as a key determinant of adolescent health. This publication aims to support this work in the framework of the *European strategy for child and adolescent health and development*, and is part of the WHO Regional Office for Europe contribution to the development of a new policy framework for Europe, *Health 2020*, for which the WHO Regional Office for Europe has been mandated by the 53 Member States.

The publication summarizes current knowledge on what works in preventing and managing overweight and obesity. It is part of a series that includes social and emotional

well-being, chronic conditions and disabilities, adolescent pregnancy, HIV/STIs, overweight and obesity, violence, injuries and substance abuse.

The publication assumes the position that young people's health is the responsibility of the whole society, and that interventions need to be gender responsive in order to be successful. It therefore looks at actions at various levels, such as cross-sector policies, families and communities actions, and interventions by health systems and health services. The publication does not prescribe nor recommend any particular course of action, which needs to be informed by the country specific context. It rather provides a basis to stimulate countries to further refine national policies so that they contribute effectively to the health and well-being of young people.

# Acknowledgement

This publication was developed under the guidance of Valentina Baltag (Adolescents' health) and Isabel Yordi Aguirre (Gender and health) from the WHO Regional Office for Europe.

Many international experts and WHO staff members have contributed to the series **Young people's health as a whole-of-society response**, and we are very grateful for their valuable inputs, support and guidance. The conceptual foundation for this publication was based on the Action Tool of the European strategy for child and adolescent health and development [http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0011/81848/Action\\_Tool.pdf](http://www.euro.who.int/__data/assets/pdf_file/0011/81848/Action_Tool.pdf).

For the Overweight and obesity part of the series, we are particularly grateful to prof. Pierre-Andre Michaud and EUTEACH group [http://www.euteach.com/euteach\\_home/euteach\\_network.htm](http://www.euteach.com/euteach_home/euteach_network.htm) who developed the first draft of the summary table of interventions and good practices, Lourdes Cantarero who conducted literature reviews on gender, adolescents and obesity, Joao Breda and Petra Kolip for her valuable comments during the peer review process.

# Foreword

In May 2011, the World Health Assembly adopted a resolution urging Member States to accelerate the development of policies and plans to address the main determinants of young people's health.

This series of publications, advocating a whole-of-society response to young people's health, and looking at the evidence for gender responsive actions, will be a timely resource for Member States as they implement both the resolution and the European strategy for child and adolescent health and development. The publications clearly show that not only are the health, education, social protection and employment sectors jointly responsible for the health of adolescents, but that effective interventions do exist. Ensuring that adolescents who are pregnant or have children can stay in or return to school, or enacting regulations to limit unhealthy snacks and soft drinks in school cafeterias are examples of policies that are beyond the mandate of health systems and yet generate health. By bringing evidence to the attention of policy-makers, these publications take a practical step toward achieving one of the core aims of the new European policy for health, Health 2020: to promote and strengthen innovative ways of working across sector and agency boundaries for health and well-being.

A common shortcoming of adolescent health programmes across the WHO European Region is that they often look at adolescents as a homogeneous cohort. Far too often programmes are blind to the fact that boys and girls differ in their exposure and vulnerability to health risks and conditions, such as depressive disorders, injuries, substance abuse, eating disorders, sexually transmitted infections, violence and self-inflicted injuries, including suicide. They are affected differently not only by the socioeconomic circumstances of their community and their ethnicity but also by gender norms and values. Research shows this, yet there is insufficient progress in transforming knowledge into policy action. I hope this publication will be a useful tool to facilitate this transformation.

Dr Gauden Galea  
Director  
Division of Noncommunicable Diseases  
and Health Promotion

# Introduction

The WHO Regional Office for Europe supports Member States in improving adolescent health in four main ways: by recommending comprehensive, multisectoral and evidence-informed adolescent health approaches; by delineating and supporting the critical contribution of the health sector, including the leadership role of ministries of health to influence other sectors, such as education, employment and social protection policies; by fostering actions towards reducing inequities in health both within and between countries; and by addressing gender as a key determinant of adolescent health.

By bringing together and coherently interconnecting knowledge and evidence on effective interventions and good practices for the better health, equity and well-being of young people, this publication aims to support this work using the framework of the European strategy for child and adolescent health and development. It is also part of the WHO Regional Office for Europe's contribution to the development of a new policy framework for Europe, Health 2020, for which the WHO Regional Office for Europe has been mandated by the 53 Member States (resolution EUR/RC60/R5).

The publication summarizes current knowledge on what is effective in preventing and managing overweight and obesity. It is part of a series that includes social and emotional well-being, chronic conditions and disabilities, adolescent pregnancy, HIV/STIs, mental health, overweight and obesity, violence, and injuries and substance abuse.

The publication includes two parts. The first part is a summary table of effective interventions and good practices for preventing and managing overweight and obesity. The table emphasizes intersectoral governance and accountability for young people's health and development, and takes a whole-of society approach to young people's health. It therefore looks at actions at various levels such as cross-sector policies, families and communities actions, and interventions by health systems and health services. It demonstrates that health systems in general, and health

ministries in particular, can work proactively with other sectors to identify practical policy options that maximize the positive health effects of other policies on young people's well-being, and minimize any negative effects. Interventions need to be gender responsive in order to be successful; the publication therefore looks at presented practices through a distinct gender perspective.

The second part explains the impact of gender norms, values and discrimination on the health of adolescents relevant to prevention and management of overweight and obesity. Through a review of the existing evidence, it looks at why is it important to look at gender as a determinant of adolescence health, what are the main differences between girls and boys in exposure to risk, norms and values and access to services, and what are the different responses from the health sector and the community. It complements the Gender Tool of the European strategy for child and adolescent health and development [http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0020/76511/EuroStrat\\_Gender\\_tool.pdf](http://www.euro.who.int/__data/assets/pdf_file/0020/76511/EuroStrat_Gender_tool.pdf). It gives the readers a deeper understanding of the gender dimension of actions listed in Part I.

The evidence base of this publication includes a review of existing literature, such as scientific and research articles and books, policy reviews, evaluations, and 'grey' literature. It needs to be emphasized that this is not a comprehensive and systematic review of the evidence in the area of prevention and management of overweight and obesity, nor of approaches to support policies and their implementation. The publication does not rank presented interventions and good practices in any priority order, and does not assess them against the strengths of the evidences behind them. The publication does not prescribe nor recommend any particular course of action, which needs to be informed by country specific context. It rather provides a basis to stimulate countries to further refine national policies and strategies so that they contribute effectively to the health and well-being of young people.

## Overweight, obesity and eating disorders

PRIORITY	CROSS SECTOR ACTIONS		FAMILY & COMMUNITY ACTIONS	HEALTH SYSTEM ACTIONS	HEALTH SERVICES ACTIONS
	HEALTH IN ALL POLICIES	SCHOOL SETTING			
<b>Prevent and manage overweight, obesity and eating disorders</b>	<p>Implement gender-specific public health strategies to prevent and reduce obesity that incorporate cultural norms [20]</p> <p>Enact regulations to avoid distribution of unhealthy snacks and soft drinks in school cafeterias and vending machines [1-4]</p> <p>Ensure financial support for the provision of play and physical activity in neighbourhoods/schools [1-3]</p> <p>Support environmental changes that remove barriers and enhance safety for girls in order to reduce gender differences in physical activity [19]</p> <p>Ensure equitable access to healthy foods at reasonable prices [6]</p> <p>Enact legislation to regulate food advertising in the media [1-3]</p> <p>Influence food advertising to prevent reinforcing gender variations in food choice, and support producers of more healthy food to effectively market their products [18]</p> <p>Promote positive body image messages in media aimed at young people [5, 24]</p>	<p>Increase opportunities for suitable and safe play and physical activity at school [1-4, 7, 8]</p> <p>Suppress the distribution of unhealthy snacks and soft drinks in school cafeterias and vending machines [1-4]</p> <p>Incorporate nutritional and physical activity education in school curricula [1, 2, 4, 9, 10]</p> <p>Pay special attention to overweight adolescent girls, taking into account that self-esteem tend to be lower in girls [21]</p> <p>Integrate interventions to reduce bullying at school with those aiming to prevent overweight, considering that preadolescent obese boys and girls are more likely to be victims of bullying [22]</p>	<p>Advocate for comprehensive gender sensitive community sport and recreation programs and increase opportunities for physical activity in the community to prevent overweight [2-4, 7, 8, 23]</p> <p>Increase parents' literacy in healthy nutrition practices and encourage parents to behave as role models through the adoption of healthy diets and an active lifestyle [1, 4]</p>	<p>Implement interdisciplinary teams within ambulatory practices who provide education and tools in the area of nutrition and sports activity [11]</p> <p>Ensure that youth friendly health services include overweight issues [12]</p> <p>Train professionals to identify, provide anticipatory guidance and treat adolescents at risk for or experiencing overweight, using motivational approaches [3, 4, 11, 14, 15]</p> <p>Train professionals to promote a positive body image [9, 11, 16]</p> <p>Ensure that ambulatory health care facilities are youth friendly [12, 13]</p>	<p>Promote comprehensive multidisciplinary care to adolescents enrolled in weight management programs [3, 7, 11]</p> <p>Support health professionals in the assessment of adolescents' body images [3, 7, 11]</p> <p>Incorporate the stages of change theory in the cognitive and behavioural strategies [14, 15, 17]</p> <p>Promote parental involvement in weight control programs [3, 11]</p> <p>Question adolescent boys and girls about concomitant substance abuse and other psychiatric disturbances such as depression [16]</p> <p>Systematically plot &amp; provide BMI percentiles and explore what it means for adolescents and their parents [3, 11]</p>

## References

1. Barlow SE. Expert committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: summary report. *Pediatrics*, 2007, 120:S164-92.
2. Davis MM et al. Recommendations for prevention of childhood obesity. *Pediatrics*, 2007, 120:S229-53.
3. Kohn M et al. Preventing and treating adolescent obesity: a position paper of the Society for Adolescent Medicine. *J Adolesc Health*, 2006, 38:784-7.
4. Branca F, Nikogosian H and Lobstein T. *The challenge of obesity in the WHO European Region and the strategies for response*. Copenhagen, WHO Regional Office for Europe, 2007 ([http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0010/74746/E90711.pdf](http://www.euro.who.int/__data/assets/pdf_file/0010/74746/E90711.pdf), accessed 19 December 2011).
5. Jordan AB, Kramer-Golinkoff EK and Strasburger VC. Does adolescent media use cause obesity and eating disorders? *Adolesc Med State Art Rev*, 2008, 19:431-49, viii-ix.
6. Butland B et al. *Foresight; Tackling Obesities: Future Choices*. London, United Kingdom Government Office for Science, 2007.
7. *Obesity: Preventing and Managing the Global Epidemic*. Report of a WHO Consultation (WHO Technical Report Series 894). Geneva, World Health Organization, 2000 ([http://whqlibdoc.who.int/trs/WHO\\_TRS\\_894.pdf](http://whqlibdoc.who.int/trs/WHO_TRS_894.pdf), accessed 19 December 2011).
8. *A guide for population based approaches to increasing levels of physical activity: Implementation of the WHO global strategy on diet, physical activity and health*. Geneva, World Health Organization, 2007 (<http://www.who.int/dietphysicalactivity/PA-promotionguide-2007.pdf>, accessed 19 December 2011).
9. Pratt BM and Woolfenden SR. Interventions for preventing eating disorders in children and adolescents. *Cochrane Database Syst Rev*, 2002:CD002891.
10. Summerbell CD et al. Interventions for preventing obesity in children. *Cochrane Database Syst Rev*, 2005:CD001871.
11. Spear BA et al. Recommendations for treatment of child and adolescent overweight and obesity. *Pediatrics*, 2007, 120:S254-88.
12. *Adolescent Friendly Health Services*. Geneva, World Health Organization., 2002 ([http://whqlibdoc.who.int/hq/2003/WHO\\_FCH\\_CAH\\_02.14.pdf](http://whqlibdoc.who.int/hq/2003/WHO_FCH_CAH_02.14.pdf), accessed 19 December 2011).
13. Sanci L et al. Evaluation of the effectiveness of an educational intervention for general practitioners in adolescent health care: randomized controlled trial. *British Medical Journal*, 2000, 320:224-30.
14. Peterson JA. Get moving! Physical activity counselling in primary care. *J Am Acad Nurse Pract*, 2007, 19:349-57.
15. Resnicow K, Davis R and Rollnick S. Motivational interviewing for pediatric obesity: Conceptual issues and evidence review. *J Am Diet Assoc*, 2006, 106:2024-33.
16. Neumark-Sztainer D et al. Weight-related concerns and behaviors among overweight and nonoverweight adolescents: implications for preventing weight-related disorders. *Arch Pediatr Adolesc Med*, 2002, 156:171-8.
17. Flodmark CE. and Ohlsson T. Childhood obesity: from nutrition to behaviour. *Proc Nutr Soc*, 2008, 67:356-62.
18. Adams J and White M. Socio-economic and gender differences in nutritional content of foods advertised in popular UK weekly magazines. *Eur J Public Health*, 2009, 19:144-9.
19. Hawkins SS et al. Regional differences in overweight: an effect of people or place? *Arch Dis Child*, 2008, 93:407-13.
20. Groth MV et al. Dimensions of socioeconomic position related to body mass index and obesity among Danish women and men. *Scand J Public Health*, 2009, 37:418-26.
21. Nowicka P et al. Self-esteem in a clinical sample of morbidly obese children and adolescents. *Acta Paediatr*, 2009, 98:153-8.
22. Griffiths LJ, Wolke D, Page AS, Horwood JP. Obesity and bullying: different effects for boys and girls. *Arch Dis Child*, 2006, 91:121-5.
23. Te Velde SJ et al. Patterns in sedentary and exercise behaviors and associations with overweight in 9-14-year-old boys and girls—a cross-sectional study. *BMC Public Health*, 2007, 7:16.
24. Domine F et al. Disordered eating behaviors: what about boys? *J Adolesc Health*, 2009, 44:111-7.

# Gender impacts on adolescent health with focus on overweight, obesity and eating disorders

*“In order to ensure that women and men of all ages have equal access to opportunities for achieving their full health potential and health equity, the health sector needs to recognize that they differ in terms of both sex and gender. Because of social (gender) and biological (sex) differences, women and men face different health risks, experience different responses from health systems, and their health-seeking behaviour, and health outcomes differ.”*

Source: Strategy for integrating gender analysis and actions into the work of WHO. Geneva, World Health Organization, 2009.

## Overweight and obesity among adolescent girls and boys – what do we know?

Worldwide the number of children at risk for overweight/obesity has increased dramatically in the last decade, varying between boys and girls, culture and socioeconomic positions. southern European countries and the United

Kingdom report higher rates than those in middle, northern and eastern Europe, and the greatest gaps between boys and girls are observed in Estonia, Finland, Malta, Greece and Sweden (Fig. 1).

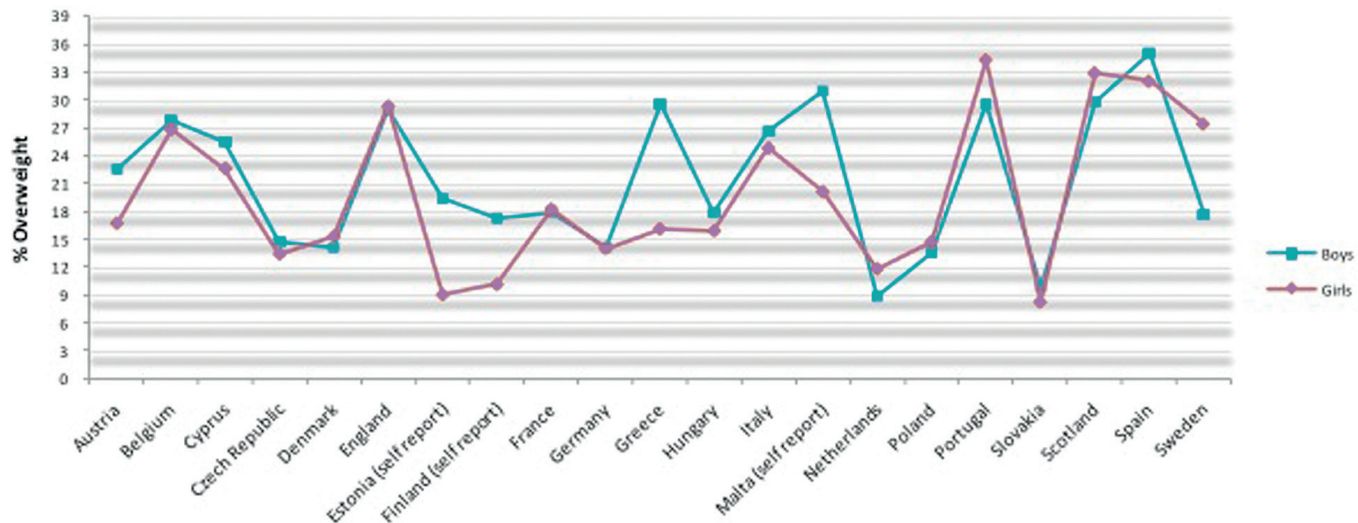


Fig. 1: Overweight in 5 to 17\* yrs children and adolescent in 21 European countries, several years of date collection\* Source: International Association for the Study of Obesity, 2007 \* Age range and year of data may differ. Not all the figures are based on national representative studies.



For adolescents, the few studies that collected national representative BMI data (based on measured height and weight) showed the highest prevalence of overweight in Irish girls (27.3%, 9–12 years) (O’Neil et al., 2007) and in Spanish boys (31.7%, 10–17 years) (Aranceta-Batrina, 2005). The lowest prevalence of overweight adolescents was in the Czech Republic (9.0%, both sexes, 14–17 years) (Lobstein, 2003).

The prevalence of pre-obesity and obesity in the 13- and 15-year-olds from the Health Behaviour in School-aged Children survey indicated that, among 13-year-olds, up to 34% of boys and 24% of girls were overweight; among 15-year-olds; the corresponding figures were 28% and 31%, respectively. Up to 9% of both 13- and 15-year-old boys were obese, as were 5% of both 13- and 15-year-old girls (Currie et al., 2004).

Ischaemic heart diseases, cerebrovascular and diabetes mellitus are associated with risk factors such as a low fruit and vegetable intake, physical inactivity and obesity and being overweight.

A study conducted in Spain showed that women had a lower prevalence of all cardiovascular risk factors. The study also showed that being overweight and obesity were independently associated with all cardiovascular risk factors, except low high-density lipoproteins in women and that a significantly higher association was found in women between obesity and diabetes (OR: 13.6; 95% CI 3.8-48.6), Metabolic Syndrome (OR: 10.6; 7.6-14.8), hypertriglyceridemia (OR: 8.6; 95% CI 5.6-13.1), and impaired fasting glucose (OR: 3.7; 95% CI 2.7-5.3) thereby showing that obesity has higher association to insulin-resistance related risk factors in women (Cordero et al., 2009).

Another study which focused on investigating whether the relationship between arterial stiffness and body mass index (BMI) was consistent across an age range from 10 to 86 years, showed that in men and women the relationships of brachial and femoral properties with BMI were consistent across the whole age range and that carotid distensibility

decreased more with BMI at young rather than old age. In middle-aged and older women, but not in men of any age, pulse wave velocity increased with higher BMI. The study therefore shows that in elastic arteries, the relationship between arterial stiffness and BMI was more complex and varied with both sex and age (Zebekakis et al., 2005).

According to the 2004 data for EURO region on disability adjusted life years (DALYs) the greatest sex differences for ischaemic heart disease (attributable to low fruit and vegetable intake) can be found among adults, with a peak in the 45-59 age group (Figures 2 and 3). This pattern changes for elderly populations and for DALYs lost for cerebrovascular diseases (Fig. 5) (WHO, 2009). As DALYs lost for diabetes mellitus (attributable to physical inactivity) the sex gap starts increasing in middle adult populations and from then remains stable.

# What are the explanations behind the differences in overweight, obesity and eating disorders among adolescent girls and boys?

Understanding the way in which biological factors (sex hormones) and social factors (gender norms) interact in different aspects of health related behaviours and health outcomes is central to our understating of how gender operates in health and health related behaviours (Sen and Ostlin, 2008). An integration of social and biological perspectives is needed to reach a better understanding of the processes involved, and to achieve progress in primary and secondary prevention.

In order to be able to provide guidance to identifying appropriate responses it is also important to bear in mind that as biological factors might remain the same across different populations, gender norms and other social factors are context specific and therefore it is important to underline the need of population specific epidemiological studies that may help to define risk factors for specific regions, and consequently provide the correct information to design specific intervention strategies.

Data from the HBSC study showed a different regional pattern for children. Among 11-year-olds, more than a third of boys and girls in England, Israel, Malta, Scotland and Slovenia report consuming soft drinks daily, while less than a tenth do so in many northern countries.

For example, a study conducted in south-eastern Poland with the aim of determining socio-economic parental factors affecting the development of obesity in school-age children showed that socioeconomic factors affecting the gap in prevalence of obesity between boys and girls were different from those in western Europe or the United States. Having a small number of siblings was a risk factor for obesity and an intact family had a protective effect. However no correlation was found between child's obesity and parental

education, income per capita or mother working outside the home. In any case, parental obesity was a risk factor for obesity in children and a high BMI at birth was also a risk factor for obesity (Mazur et al., 2008).

A study conducted in France with the aim of investigating the relationship between early life conditions and adult obesity in France, showed that although no salient factor emerged in men, in women, after controlling for current socio-demographic characteristics, a relation was found between obesity and the following factors: father's occupation (higher risk for women whose father was a clerical worker, versus those whose father was in a higher-level occupation); experience of economic hardship in childhood; and high parity (for parities of more than 3 versus parity of 1). Neither early family history nor mother's working status surfaced as significant factors. Those findings highlight a definite gender pattern, with a strong association between early disadvantage and obesity in women, but not in men. Potential mechanisms were discussed, particularly the "habitus", the "thrifty phenotype" and the "feast-famine" hypotheses, and possible interactions with childbearing and motherhood (Khlat, Jusot and Ville, 2009).

Advertising in magazines contributes to nutritional knowledge and social norms and may play a role in food choice and adiposity. In contrast to food advertising on television, that in magazines has received little research attention. A studied conducted in the United Kingdom with the aim of describing the type and nutritional content of foods advertised in popular United Kingdom weekly magazines and explore variations in these according to the socio-economic and gender profile of readers, showed the following results: the most common categories of foods advertised were meals, combination foods, soups and sauces (26%) and

foods containing fat/sugar (23%). Advertised foods had a lower percentage of energy from carbohydrate (43%), lower fibre density (2 g/MJ), but higher percentage of energy from sugars (24%) and higher sodium density (0.5 g/MJ) than a diet recommended to avoid diet-related disease. There were variations in the type of foods advertised according to the socio-economic profile of readers and in the nutritional content of advertised foods according to the socio-economic and gender profile of readers (Adams and White, 2009).

In Greece, a study aiming to describe overweight and obese adolescents and to determine any correlations between an adolescent's body mass index (BMI) with personal (age, sex), lifestyle (sedentary/sport activities, smoking status) and parental (smoking status, BMI, number of cars) characteristics, showed that almost 1 in 5 (19.2%) boys and 1 in 7 (13.2%) girls 12-17 years of age were overweight while 4.4% of the boys and 1.7% of the girls were obese. The adolescents' age, mother's smoking status, father's and mother's BMI predicted boys' and girls' BMI. Univariate analysis revealed that television watching/using personal computer/playing video games and playtime were not correlated with BMI, while an inverse association of exercising for  $>$  or  $=$  5 h/week and BMI was found in both boys and girls. Age and parental unhealthy behaviour (increased BMI and maternal smoking status) were positive predictors of increased BMI of adolescents in both sexes (Mihás et al., 2009).

Studies have also shown an inverse relationship between obesity and self-esteem. For example, a study conducted to study self-esteem in a clinical sample of obese children and adolescents showed that age and gender, but neither the child's BMI z-score nor the BMI of the parents were significant covariates. Self-esteem decreased ( $p < 0.01$ ) with age and was below the normal level in higher ages in both sexes. Girls had significantly lower self-esteem on the global scale ( $p = 0.04$ ) and on the two subscales physical characteristics ( $p < 0.01$ ) and psychological well-being ( $p < 0.01$ ). Therefore it was concluded that self-esteem is lower in girls and decreases with age and thus in treatment

settings special attention should be paid to adolescent girls (Nowicka et al., 2009).

Mediterranean dietary pattern have been a protective factor against obesity for generations. However, young generations seem to give up the traditional Mediterranean dietary pattern, adopting new dietary trends. Being overweight appears to be related not only to a low level of physical activity, but also to the poor Mediterranean diet quality index. A study conducted in Spain and Italy with the aim of evaluating the correspondence of diet and lifestyle to the Mediterranean model showed that the frequency of consumption of some food groups showed differences relating to nationality and gender. Some classic Mediterranean foods such as cereals and vegetables were generally consumed more frequently by Italian students; others such as fish and pulses by Spanish students. Percentage of adolescents who were overweight was higher among Spanish students, especially boys, in spite of their higher physical activity level (Baldini et al., 2009).

Before starting interventions addressing energy-balance related behaviours, knowledge is needed about the prevalence of sedentary behaviours and low physical exercise, their interrelationships, and possible gender differences. Therefore this study aims to describe gender differences in sedentary and physical exercise behaviours and their association with overweight status in children from nine European countries. Additionally, it seeks to identify clusters of children sharing the same pattern regarding sedentary and physical exercise behaviour and compare these groups regarding overweight status. The results of the study suggest that boys spent more time on sedentary behaviours but also more on physical exercise than girls. High TV viewing and low exercise behaviour independently increased the risk of being overweight. Based on the behaviours, five clusters were identified. Among boys, clear associations with being overweight were found, with the most unhealthy behaviour pattern having the highest risks of being overweight. Among girls, high TV viewers and high PC users had increased risk of being overweight. In girls sedentary behaviours seemed more important than physical exercise

with regard to overweight status. The associations between clusters and overweight in boys were therefore clear, and the differences between boys and girls regarding the behaviours and risks for overweight are noteworthy (Te Velde et al., 2007).

Studies have also suggested the predictive role of overweight and obesity and the risk of bullying. A prospective cohort study conducted in southwest England with the aim of investigating whether weight category predicts bullying involvement showed that after adjustment for parental

social class, compared to average weight boys, obese boys were more likely to be overt bullies and more likely to be overt victims. Obese girls were more likely to be overt victims compared to average weight girls. Obesity is predictive of bullying involvement for both boys and girls. Preadolescent obese boys and girls are more likely to be victims of bullying because they deviate from appearance ideals. Other obese boys are likely to be bullies, presumably because of their physical dominance in the peer group (Griffiths et al., 2006).

## Are policies and programmes aiming at preventing overweight, obesity and eating disorders gender sensitive?

Although there is growing evidence showing gender-specific patterns in overweight and obesity, few public health strategies have been designed to prevent and reduce obesity. Studies also show that there is a stronger social gradient for women, and indicated that a high relative body weight was associated with less favourable social and material conditions for women, but not for men. A public health strategy to prevent and reduce obesity should be gender-specific, focus on groups with short education, and incorporate cultural norms (Groth et al., 2009).

Moreover, when policies or guidelines are implemented they are rarely evaluated from a gender perspective. Continuous or regular monitoring is crucial to allow for trend analyses and to plan effective education and gender sensitive intervention strategies. A study conducted in Belgium with the aim of evaluating the gap between food-based dietary guidelines (FBDG) and the usual food consumption showed that food intakes deviated significantly from the recommendations. In particular, the consumption of fruit (118 g/d) and vegetable (138 g/d) and the intake of dairy

and Ca-enriched soya products (159 g/d) were inadequate. Consumption of energy-dense, nutrient-poor foods (soft drinks, alcohol and snacks) was excessive (481 g/d). There were important age and gender differences. Fruit, vegetable and spreadable fat consumption was lowest, while the consumption of dairy, starchy and energy-dense, nutrient-poor foods was highest among the youngest age group. Men consumed more animal and starchy foods than women, who consumed more fruits. There were only slight differences by education level. Improvement of the Belgian food pattern, in particular among the youngest age group, is necessary for better prevention of diet-related diseases (Vandevijvere et al., 2009).

The growth surveillance of children in school health services is routine in some European countries. To identify children with obesity in a routine school health survey could be a crucial initial step in the management of childhood obesity and gender patterns (Meriaux, Hellstrom and Marild, 2008).

Only one randomized trial was identified with the aim of evaluating the effects of the Pro Children intervention on schoolchildren's fruit and vegetable (FV) intake after 1 and 2 years of follow-up. The intervention combined a FV curriculum with efforts to improve FV availability at schools and at home. Effects were examined in a group-randomized trial among 1,472 10-11-year-old children from sixty-two schools in Norway, the Netherlands and Spain. FV intake was assessed by means of validated self-administered questionnaires completed before the intervention (September 2003), immediately after the first year of the intervention (May 2004) and 1 year later (May 2005). Data were analysed using multilevel linear regression analyses with age and sex as covariates. Significant intervention effects for FV intake were found at first follow-up in the total sample. The adjusted FV intake reported by the children from intervention schools was 20% higher than FV intake reported by children from control schools. At 1 year later, a significant impact was only observed in Norway. Positive intervention effects on FV intake occurred both at school and outside school. The study concluded that the Pro Children intervention is a promising means to promote European schoolchildren's FV intakes, but mainly fruit intake, in the short term. As shown in Norway, where the intervention was best implemented, the intervention might also result in longer-term effects. Further strategies need to be developed that can improve implementation, have an impact on vegetable intake and can secure sustained effects. However, nothing was mentioned about the gender gap (Te Velde et al., 2008).

Educational level affects the risk of developing obesity and associated co morbidities. The strong relationship between the educational track attended and increased BMI as well as elevated blood pressure in schoolchildren implies that comprehensive prevention activities should start during school years and should be implemented in all educational establishments to target the increasing epidemic of childhood obesity. A study conducted in Germany showed that 'Hauptschule' or 'Realschule' "pupils had markedly increased body fat compared to age- and gender-matched peers attending 'Gymnasium'. Higher BMIs seen in children attending 'Hauptschule' or 'Realschule' were associated

with an earlier onset of puberty. The differences in body fat mass persisted after adjustment for puberty. In addition, children attending 'Hauptschule' or 'Realschule' had higher systolic blood pressure compared to their age and gender matched peers. This effect vanished when adjusting for BMI (Gelbrich et al., 2008).

Studies have also suggested regional differences in being overweight. These regional differences may interact with gender and other social factors. In United Kingdom for example, regional differences in the levels of people overweight are independent of individual risk factors. This suggests a role for policies to support environmental changes that remove barriers to physical activity or healthy eating in young children. A study conducted in the United Kingdom to examine regional differences in childhood overweight (including obesity) showed that children from Northern Ireland were more likely to be overweight than children from England. There were no differences in overweight between children from Scotland and England. Within England, children from the East and South East showed no differences in overweight between children from other English regions and children from London. These differences were maintained after adjustment for individual socio-demographic characteristics and other risk factors for being overweight (Hawkins et al., 2008).

## References

- Adams J and White M (2009). Socio-economic and gender differences in nutritional content of foods advertised in popular UK weekly magazines. *Eur J Public Health*, 19:144-149.
- Aranceta-Batrina J et al. (2005). Prevalencia de obesidad en Espana [Prevalence of obesity in Spain]. *Medicina Clinica*, 125:32–38.
- Baldini M et al. (2009). Is the Mediterranean lifestyle still a reality? Evaluation of food consumption and energy expenditure in Italian and Spanish university students. *Public Health Nutr*, 12:148-155.
- Cordero A et al. (2009). Gender differences in obesity related cardiovascular risk factors in Spain. *Prev Med*, 48:134-139.
- Currie C et al., eds. (2004). *Young people's health in context. Health behaviour in school-aged children (HBSC) study: international report from the 2001/2002 survey*. Copenhagen, WHO Regional Office for Europe, 2004 ([http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0008/110231/e82923.pdf](http://www.euro.who.int/__data/assets/pdf_file/0008/110231/e82923.pdf), accessed 19 December 2011).
- Gelbrich G et al. (2008). Prevalence of obesity and elevated blood pressure as well as onset of puberty in German school children attending different educational tracks. *Horm Res*, 70:340-348.
- Griffiths LJ et al. (2006). Obesity and bullying: different effects for boys and girls. *Arch Dis Child*, 91:121-125.
- Groth MV et al. (2009). Dimensions of socioeconomic position related to body mass index and obesity among Danish women and men. *Scand J Public Health*, 37:418-426.
- Hawkins SS et al. (2008). Regional differences in overweight: an effect of people or place? *Arch Dis Child*, 93:407-413.
- Khlat M, Jusot F and Ville I (2009). Social origins, early hardship and obesity: a strong association in women, but not in men? *Soc Sci Med*, 68:1692-1699.
- Lobstein T, Frelut ML (2003). Prevalence of overweight among children in Europe. *Obesity Reviews*, 4:195–200.
- Mazur A et al. (2008). Risk factors for obesity development in school children from south-eastern Poland. *Ann Agric Environ Med*, 15:281-285.
- Meriaux BG, Hellstrom AL and Marild S (2008). Identification and follow-up of obesity in ten-year-old school children. *Int J Pediatr Obes*, 3:102-108.
- Mihás C et al. (2009). Overweight/obesity and factors associated with body mass index during adolescence: the VYRONAS study. *Acta Paediatr*, 98:495-500.
- Nowicka P et al. (2009). Self-esteem in a clinical sample of morbidly obese children and adolescents. *Acta Paediatr*, 98:153-158.
- O'Neill JL et al. (2007). Prevalence of overweight and obesity in Irish school children, using four different definitions. *Eur J Clin Nutr*, 2007, 61:743–751.
- Sen G and Ostlin P (2008). Gender inequity in health: why it exists and how we can change it. *Glob Public Health*, 3:1-12.
- Serra Majem L et al. (2003). Obesidad infantil y juvenil en España: resultados del estudio enKid (1998–2000) [Childhood and adolescent obesity in Spain: results of the enKid study (1998–2000)]. *Medicina Clinica*, 121:725–732.
- Te Velde SJ et al. (2007). Patterns in sedentary and exercise behaviors and associations with overweight in 9-14-year-old boys and girls—a cross-sectional study. *BMC Public Health*, 7:16.
- Te Velde SJ et al. (2008). Effects of a comprehensive fruit- and vegetable-promoting school-based intervention in three European countries: the Pro Children Study. *Br J Nutr*, 99:893-903.
- Vandevijvere S et al. (2009). The gap between food-based dietary guidelines and usual food consumption in Belgium, 2004. *Public Health Nutr*, 12:423-431.
- World Health Organization (2009). *Global health Risks. Mortality and burden of disease attributable to selected major risks*. Geneva, World Health Organization ([http://www.who.int/healthinfo/global\\_burden\\_disease/GlobalHealthRisks\\_report\\_full.pdf](http://www.who.int/healthinfo/global_burden_disease/GlobalHealthRisks_report_full.pdf), accessed 19 December 2011).
- Zebekakis PE et al. (2005). Obesity is associated with increased arterial stiffness from adolescence until old age. *J Hypertens*, 23:1839-1846.

## **All topics in the series**

Young people's health as a whole-of-society response.  
Evidence for gender responsive actions:

**mental health**

**overweight and obesity**

**violence**

**chronic conditions**

**adolescent pregnancy**

**HIV/AIDS and STIs**

**injuries and substance abuse**

**well-being**

## The WHO Regional Office for Europe

The World Health Organization (WHO) is a specialized agency of the United Nations created in 1948 with the primary responsibility for international health matters and public health. The WHO Regional Office for Europe is one of six regional offices throughout the world, each with its own programme geared to the particular health conditions of the countries it serves.

### Member States

Albania	Lithuania
Andorra	Luxembourg
Armenia	Malta
Austria	Monaco
Azerbaijan	Montenegro
Belarus	Netherlands
Belgium	Norway
Bosnia and Herzegovina	Poland
Bulgaria	Portugal
Croatia	Republic of Moldova
Cyprus	Romania
Czech Republic	Russian Federation
Denmark	San Marino
Estonia	Serbia
Finland	Slovakia
France	Slovenia
Georgia	Spain
Germany	Sweden
Greece	Switzerland
Hungary	Tajikistan
Iceland	The former Yugoslav
Ireland	Republic of Macedonia
Israel	Turkey
Italy	Turkmenistan
Kazakhstan	Ukraine
Kyrgyzstan	United Kingdom
Latvia	Uzbekistan

ISBN

WHOLIS number

Original:

## World Health Organization Regional Office for Europe

Scherfigsvej 8, DK-2100 Copenhagen Ø, Denmark  
Tel.: +45 39 17 17 17. Fax: +45 39 17 18 18. E-mail: [contact@euro.who.int](mailto:contact@euro.who.int)  
Web site: [www.euro.who.int](http://www.euro.who.int)