



Mapping the health system response to childhood obesity in the WHO European Region

An overview and country
perspectives



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Abstract

Childhood obesity is a major public health problem globally, which could undermine progress towards achieving the Sustainable Development Goals. Prevention is recognized as the most efficient means of curbing the epidemic; however, given the scale of the problem and the many children who need professional support due to the severity of the disease and/or obesity-related complications, health systems all over Europe must take steps to develop obesity management systems. The aim of this project was to assess the response of health care delivery systems in 19 countries in the WHO European Region to the childhood obesity epidemic. Although there is no doubt about its importance, prevention was not the focus of the work. We used mixed methods. Primary data were collected by administering a questionnaire to relevant stakeholders and experts through the WHO Childhood Obesity Surveillance Initiative network; this was complemented by a literature review and semi-structured interviews in selected countries. Overall, we found that a health system response to childhood obesity is lacking. Several shortcomings were identified in the areas of governance, integrated delivery of services, financing and education of the health workforce. The most commonly mentioned barriers were fragmentation of care (no clear pathways), a shortage of adequate personnel (e.g. childhood obesity specialists, nutritionists, psychologists), inadequate funding for childhood obesity management or health care in general, insufficient collaboration among sectors and settings and the lack of parental support and education. Nevertheless, we also report several practices and examples that may inspire other countries.

Keywords

Childhood obesity
Management
Health systems
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Patient pathway

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Foreword from the WHO Regional Office for Europe

Childhood obesity is one of the most serious global public health challenges of the 21st century. It affects almost every country in the world. The facts speak for themselves: in the past 40 years, the global prevalence of overweight and obesity in children has increased tenfold.

Childhood obesity has been described as a ticking time bomb, and the projected impact on individuals and society is immense. It is predicted that the current generation of children may have a shorter life expectancy than their parents due to the high prevalence of obesity and its health consequences. Physicians are now diagnosing type 2 diabetes in children – a disease previously found only in adults. This is shocking. If this issue is not properly tackled in childhood, these children will also be at much higher risk of suffering from a range of conditions in adulthood, such as type 2 diabetes, cardiovascular diseases, cancers and musculoskeletal disorders. The associated health and social costs to governments come at a time when few countries can afford them. The prevention of childhood obesity remains a priority; in addition, we must also actively engage in the challenge of managing and treating obesity.

We estimate that about 800 000 children in the WHO European Region suffer from severe obesity. It is likely that these children, and their families, have already been through various programmes and treatments to try and lose weight. Some children do not achieve the outcome they had hoped for, and this is frustrating, not only for them and their families, but also for the health care professionals who support them.

We have prepared this report against this background, because we care about supporting children with obesity and we wanted to assess whether current health systems are ready to respond to the challenge. The report has identified several shortcomings in the countries studied, but there are also examples of inspiring practices and some well-functioning systems that are worth sharing with experts and decision-makers in other countries.

In order to deliver more effective childhood obesity services, it is necessary to build a well-skilled, competent, multidisciplinary health care team. We are also aware that, without good governance, adequate financing and integrated care, we will not win the battle. We hope that this report will provide readers with a better understanding of the strengths and weaknesses of current childhood obesity management systems and, in turn, will contribute to WHO's longer-term goal of more efficient, equitable, coherent, accessible childhood obesity services as part of a comprehensive response to the epidemic of childhood obesity.

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Foreword from the European Association for the Study of Obesity

The prevalence of childhood obesity in the WHO European Region has reached alarming proportions and is a cause for concern. The number of children and adolescents with obesity who need medical support and treatment is rising. As childhood obesity is commonly not recognized as a chronic disease, it is typically not considered a reason for seeking medical attention. The responsibility for discussing obesity with a child and his/her family thus rests on care providers, who tend to “conveniently” avoid the issue or fail to diagnose it. Unlike for other common paediatric diseases, there is no “silver bullet” for the management of obesity; it requires time and intensive effort by health care professionals and parents to understand the underlying factors and agree on a plan of action. To date, the development and uptake of treatment strategies has been limited due to lack of recognition of obesity as a medical problem and a shortage of dedicated resources for its treatment.

The European Association for the Study of Obesity considers that recognition of childhood obesity as a chronic disease will improve treatment for those children who need it. Treatment will complement other health policies for preventing obesity at societal and individual levels. It will strongly encourage both families and physicians to take childhood obesity more seriously.

Of course, such an approach will also create a significant number of “new patients” and may increase the workload of health professionals and the immediate health care costs. Some transformation will therefore be required in health care delivery systems, including adequate training for professionals and appropriate financial resources.

Health insurance organizations, for example, might have to extend coverage to include the costs of multicomponent behavioural treatment, which has been shown to be effective in reducing both the degree of obesity and co-morbid conditions. Until now, such care is generally provided only for children with other chronic diseases, such as type 1 diabetes.

Little was known about access to care for children and adolescents with obesity in the WHO European Region. This report reviews the health system response to the challenge of childhood obesity in countries in the Region and demonstrates significant gaps in governance and funding of obesity treatment options. In addition, screening, referral and integrated management pathways for obesity are lacking in most countries, particularly at the primary care level.

The effectiveness of health care services in managing childhood obesity has not been evaluated in most countries. This report will undoubtedly inform policy-makers, health care professionals and other service providers about current approaches to the management of childhood obesity. We hope it will drive action in countries to improve access to care and reduce inequalities in care for children and adolescents with obesity. Childhood is a unique window of opportunity, when treatment can have a lifetime impact on health and quality of life and prevent long-term disability and reduced work productivity.

Nathalie Farpour-Lambert

President of the European Association for the Study of Obesity

Abbreviations and acronyms

BMI	body mass index	MGP	multidisciplinary group programme
CCG	clinical commissioning group	PCP	primary care paediatrician
COSI	Childhood Obesity Surveillance Initiative	SDS	standard deviation score
GP	general practitioner	SHS	school health services
HMO	health maintenance organization		

Glossary

Childhood obesity management comprises organized screening, diagnosis, assessment, treatment and follow-up.

Diagnosis consist of verification of the presence of overweight or obesity and comorbid conditions.

General practitioner (GP), also referred to as a “family physician”, is the provider of comprehensive, continual care to individuals in the context of their family and community (adapted from reference 1).

Health care delivery systems are formal structures for delivering clinical and public health care services to a well-defined population both individually and collectively. They include access (for whom and to which services), organization of providers and resources (health care workers, settings and facilities).

Health systems consist of all the resources, organizations and actors that undertake or support health service delivery, including for care, resourcing, governing and financing (adapted from reference 2).

Integrated approach is a method incorporating diet, physical activity, mental health and environmental change (at home, at school, in the community) and parenting practices.

Multi-disciplinarity is the involvement of several disciplines, e.g. medical, nutrition, exercise, psychology, in the management of obesity.

Overweight, obesity and severe obesity are conditions of abnormal or excessive fat accumulation that present a risk to health (3). Various definitions have been proposed to classify the weight status of children. According to the WHO definition, children aged 5–19 years are overweight if their body mass index (BMI)-for-age is > 1 standard deviation above the WHO growth reference median, obese if their BMI-for-age is > 2 standard deviations above the WHO growth reference median and severely obese if their BMI-for-age is > 3 standard deviations above the WHO growth reference median.

Progressive care is use of a stepwise algorithm for childhood obesity management.

Screening comprises systematic invitation and follow-up of identified individuals and access to treatment.

Executive summary

In recent decades, childhood overweight and obesity have become much more prevalent throughout the WHO European Region and are of increasing concern for public health, as they have negative effects on health, the economy and society both immediately and later in life. It has been predicted that the current generation of children will have a shorter life expectancy than their parents because of the high prevalence of obesity and its health consequences (4). Although prevention is critical, the problem of overweight and obesity in children is unlikely to be fully resolved without the involvement of the health care delivery systems. Furthermore, excess weight continues into adulthood, often with several associated chronic diseases (5).

The aim of this work was to describe the response to the problem of health systems in Europe, especially in health care delivery. The report includes mapping and description of the situation in countries and some of the most promising solutions. We used mixed methods – a literature search, a questionnaire survey in 15 countries and semi-structured interviews in four countries – to answer the following questions.

- Which professionals are involved in childhood obesity management, and what is their role therein?
- What are the clinical pathways for the management of childhood obesity, from screening to diagnosis, treatment and follow-up?
- In which settings is childhood obesity managed and what are the entry points into the health system?
- What are the provisions for long-term care and follow-up?
- What are the funding arrangements for childhood obesity management, and what services are covered?
- What support is available for childhood obesity management?
- To what extent do the current systems address inequalities in health and the specific needs of groups with low socioeconomic status?
- How do informants perceive the functioning of the system, and what challenges have they identified?
- Are there promising initiatives and practices in childhood obesity management?

Overall, the findings indicate that countries are taking some action to tackle the problem, but there is a delay in the health system response and several constraints.

Recognition of childhood obesity as a chronic disease: In most countries, childhood obesity is recognized as a chronic disease by both the responsible authority and health professionals; however, the interviews indicate that childhood obesity is not always considered and treated as a chronic disease in practice, particularly in primary care.

Professionals and other personnel: Primary care services are provided mainly by nurses and physicians in the participating countries, and there are few multidisciplinary care teams.

Governance: Lack of good governance is reflected in the absence of strategic documents on the management of childhood obesity and in the rarity of coordinated action. Although awareness appears to be increasing among the general public, health professionals and governments, decision-makers focus much more on prevention than on organizing disease management.

Guidelines: Most countries reported that they had guidelines on childhood obesity management, but only a few reported having a single, nationally accepted, widely used, regularly updated document. As the aim is to improve the quality and consistency of care, the use of multiple guidelines in one country will decrease the likelihood that all patients receive treatment and care in the same manner.

Screening and referral for care: All the participating countries reported some kind of national or regional mechanism for evaluating the weight of all children regularly. Some of the mechanisms, however, are considered to be monitoring or surveillance, and only a few can confidently be categorized as screening programmes for obesity management. The pathways are often unclear and are based on individual decisions (personal or by clinicians) in most countries. There are, however, some examples of clear referral criteria and well-described pathways.

Diagnosis and assessment: Overweight or obesity in children is usually diagnosed in primary care or in specialized care by physicians or medical specialists. If risk stratification is performed, it is also done by physicians when they are screening for underlying causes and for obesity-related comorbid conditions. The result of risk classification is included in planning management in only half of the surveyed countries.

Primary care: Unnecessary referrals and lack of multidisciplinary teams were reported by some countries. Primary care paediatricians and general practitioners require more education on childhood obesity. There is insufficient communication between primary and specialized care providers.

Specialized care: Multidisciplinary teams are more common in specialized than in primary care. One challenge in specialized care appears to be the heterogeneity of service provision in a country in terms of content and implementation (e.g. inpatient versus outpatient care, length of treatment, availability of multidisciplinary teams). Several countries highlighted the need for better communication between primary and specialized care providers as well as among specialists, as care is often fragmented. There are not enough specialized centres to care for the growing number of children who are obese or severely obese.

Management of patients with severe obesity: Despite its increasing prevalence and the serious immediate and long-term physical and psychological consequences, current treatment options for children with severe obesity are limited, in terms of both effectiveness and availability. This is particularly the case for younger children. The services available in the participating countries are characterized by short-term inpatient care with no defined after-care services. Structured management pathways are critically needed.

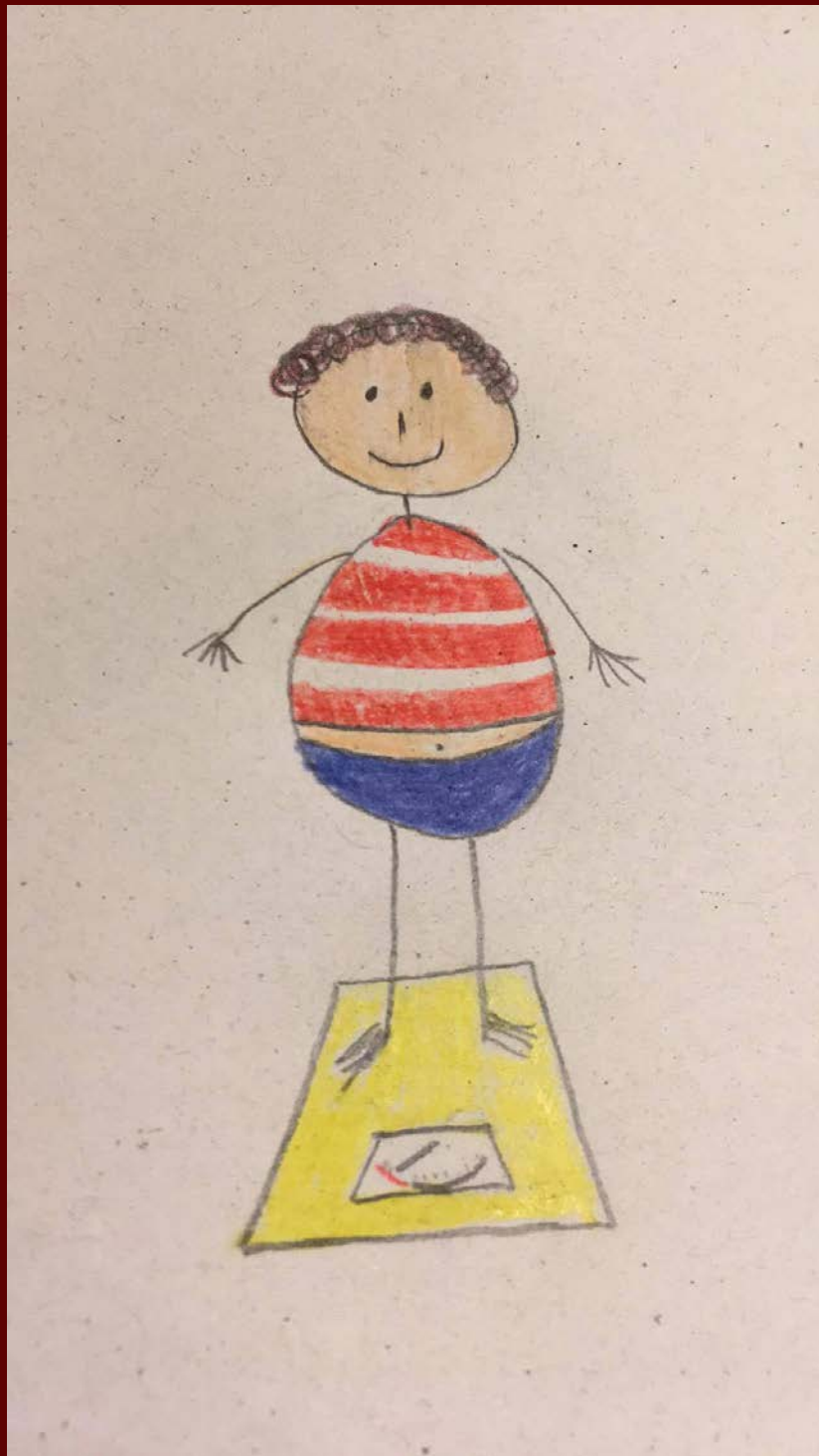
Education: In most countries, medical students do not receive systematic curricular education on childhood

obesity, and the availability of post-graduate training and courses on childhood obesity management is limited.

Inequalities: Although countries reported various actions to reduce inequality and ensure equal access to care, the characteristics of current childhood obesity management systems in many participating countries imply the possibility of population inequity. Differential access to services was described as both regional (i.e. urban–rural differences) and in the health care system (i.e. social and language barriers). The current systems are unable to address economic and social inequalities or respond to the special needs of families with the highest burden.

Challenges and barriers: The countries reported many similar challenges and barriers in the functioning of their childhood obesity management systems, despite their different contexts. Most of the challenges and barriers are related to governance, including lack of an integrated strategy for both prevention and care. The organization of care and structural issues in the childhood obesity management system, such as weak vertical and horizontal integration of care providers and a lack of clear care pathways and guidelines, were identified as additional barriers. An important challenge for current systems is to ensure equal access to services and the capacity to adequately respond to the social and cultural needs of the population most in need of childhood obesity management.





1. Introduction and context

1.1 The epidemic of childhood obesity

Childhood obesity is one of the most serious public health issues of our time. The prevalence of obesity has increased sharply worldwide, fuelled by a profound nutritional transition to processed foods and high-calorie diets and an increasingly sedentary lifestyle characterized by mechanized transport, urbanization and information technology (6). Globally, the number of girls with obesity increased from 5 million in 1975 to 50 million in 2016 (7), and the number of boys with obesity increased from 6 million in 1975 to 74 million in 2016; 73% of the increase in absolute numbers can be explained by an increase in the prevalence of obesity, rather than population growth (7).

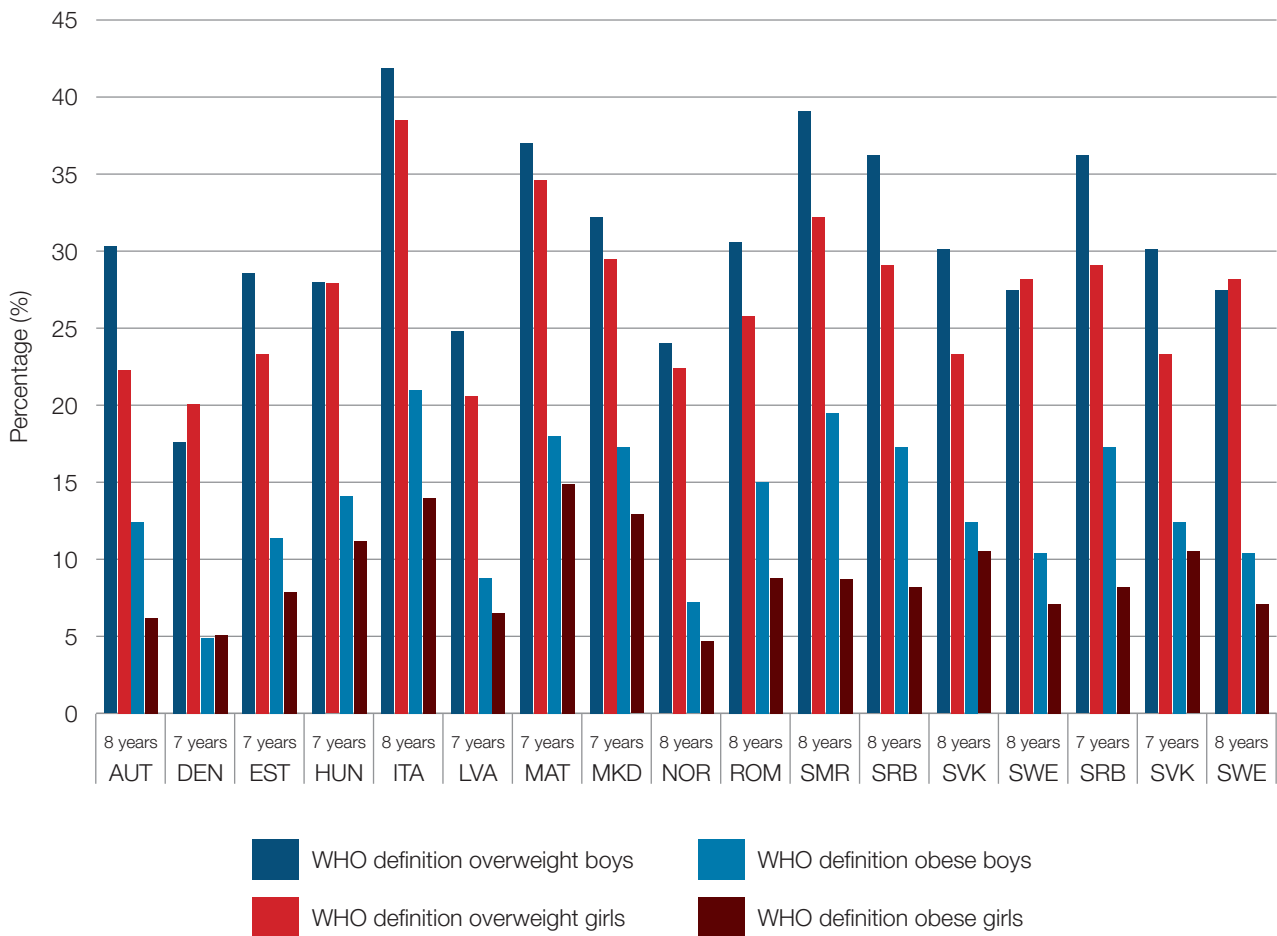
In Europe, the most accurate comparable data on the prevalence of childhood obesity are provided by the WHO European Childhood Obesity Surveillance Initiative (COSI) (8). COSI was established in 2007 in response to lack of standardized surveillance data. Within COSI, countries

collect measured data on the height and weight of children aged 6–9 years, and prevalence rates are calculated according to WHO definitions. In the latest round, data were collected in 41 countries between 2015 and 2016. Of the 19 countries that participated in the current study, 14 contribute to COSI. In these countries, the prevalence of overweight and obesity ranged from 17.6% to 41.9% for boys and from 20.1% to 38.5% for girls, and the prevalence of obesity was 4.9–21% among boys and 5.1–14.9% among girls¹ (Fig. 1).

The number of children with obesity worldwide has increased 10 times in the past 40 years.

COSI data suggest an increasing north–south gradient, with the highest prevalence of overweight and obesity in southern Europe. In the countries that collected data for more than one age group, the prevalence of overweight and obesity tended to increase with age (9). The

Fig. 1. Prevalence of overweight and obesity in the 14 countries that contribute data to COSI, 2015–2016



AUT, Austria; DEN, Denmark; EST, Estonia; HUN, Hungary; ITA, Italy; LVA, Latvia; MAT, Malta; MKD, North Macedonia; NOR, Norway; ROM, Romania; SMR, San Marino; SRB, Serbia; SVK, Slovakia; SWE, Sweden

¹ Unpublished data

prevalence of severe obesity varied from 1% to 5.5% among the COSI countries.²

Eurostat data (10) show that the number of children aged 0–14 years in countries in the European Union in 2016 was approximately 79 million. In the “best case” scenario of COSI data (i.e. a prevalence of 18% overweight and obesity for boys and 20% for girls and a prevalence of 1% for severe obesity), about 7.1 million boys and 7.8 million girls are living with overweight and obesity in Europe. This exceeds the total population of Belgium (11.5 million inhabitants) (11). The number of children with severe obesity is estimated to be almost 800 000, which is close to the total population of Cyprus (11).

A recent projection indicated that the prevalence of adult obesity in Europe will have risen by 2025 (12). As a result, concern has been raised about the future burden of non-communicable diseases linked to overweight and obesity, which will have serious implications for the financial viability of national health care delivery systems. Prevention is recognized as the most efficient means for curbing the obesity epidemic in the long-term; however, given the large number of children with obesity and severe obesity, health systems should act now.

1.2 Targets for professional support

Overweight and obesity in childhood and adolescence are associated with several adverse consequences (13). These can be grouped into those manifested in child-

Childhood obesity has extensive medical, social and psychological effects. Most complications are not diagnosed.

hood, long-term medical effects and those that affect adult weight. First, obesity itself directly causes morbidity in children, including gastrointestinal and musculoskeletal complications, sleep apnoea, asthma and accelerated onset of cardiovascular disease and type 2 diabetes, with their additional comorbid conditions (14). The psychological consequences at this age typically include bullying, reduced quality of life, loneliness, anxiety and depression. Moreover, obesity affects academic performance because of a higher rate of absenteeism and poorer educational attainment than would otherwise be expected (15). Secondly, current evidence links childhood obesity with an increased lifetime risk for cardiovascular diseases, due to adverse changes in cardiovascular structure and function (16), and the risk remains elevated even if weight is lost. Thus, obesity in childhood or adolescence has been associated with twofold or higher risks of hypertension, coronary heart disease and stroke in adulthood (17). Thirdly, as it is difficult to slow weight gain during

growth and achieve and maintain weight loss at the end of growth, especially without appropriate professional support, a substantial number of children who are currently overweight or have obesity will become adults with obesity. As adults, they will have a greater likelihood and earlier onset of nearly every chronic condition, including cardiovascular diseases, several types of cancer and type 2 diabetes (17).

Given these immediate and long-term consequences, appropriate, early identification of children who need professional support is essential. For several reasons, however, decisions about who requires professional support are not straightforward. In 1979, WHO declared obesity a disease and provided a code for obesity in the International Classification of Diseases. In 2015, the Childhood Obesity Task Force of the European Association for the Study of Obesity issued a position statement and advocated that childhood obesity be considered a chronic disease that demands specific health care (18). In practice, however, there is still discussion about whether childhood obesity is a risk factor, a condition or a disease. As a result, in many countries, there is still lack of clarity about responsibility for service delivery (19). Furthermore, some clinicians and primary care providers argue that cases of mild overweight that are not associated with any comorbid conditions do not necessarily require a medical intervention (20). Genuine concern has been raised about “over-medicalization” of obesity in children and the potential risks of stigmatization (21). The lack of a European guideline on screening, assessment and treatment of childhood obesity further complicates the field. Parents seldom seek professional help for their children with obesity (22), and obesity is rarely the primary reason for a medical consultation. Children with severe obesity are more likely to receive proper medical attention and treatment. Severe obesity is becoming more frequent, and medical complications of obesity are observed at much higher rates than before (12). These children are disproportionately affected by the health consequences of obesity and often experience premature onset of multiple morbid conditions. Therefore, for severe obesity, all treatment options, including more

There is sizeable socioeconomic inequality in obesity.

intensive strategies, should be explored, regardless of whether comorbid conditions are present (23).

1.3 An issue of inequality

There is sizeable socioeconomic inequality in obesity. Obesity is more common among poor, less educated people (24). Ethnicity is also a correlate of obesity, and greater metabolic consequences have been observed for some ethnic groups, such as significantly increased risks for type 2 diabetes and hypertension (25, 26).

A recent review of studies in the USA (27) showed that socioeconomic inequality in obesity has narrowed, but the gap has not been closed for all minorities. The same review concluded that severe obesity continues to affect the poor disproportionately. Furthermore, people who are poor and have severe obesity are still at overall greatest risk, as they suffer from the double burden of poverty and obesity-related health conditions (14).

Comprehensive, upstream policies are ultimately required to reduce inequality and prevent obesity, as research suggests that calling exclusively on personal responsibility is likely to be less effective, increase stigmatization and widen inequality (28, 29). Nevertheless, the needs of children with overweight and obesity should be addressed in health care settings, with adequate, appropriate management. Poor and less well educated people and ethnic minorities often have limited time, fewer coping skills, less health literacy and financial constraints that limit them from taking advantage of certain public health interventions or management programmes (30). These aspects should be considered in designing strategies and care plans to achieve and maintain significant improvements in weight and, consequently, their health.

1.4 Brief background to childhood obesity management

Obesity has changed from being rare to a disease that is increasingly common all around the world. Surprisingly, in broad terms, dietary and lifestyle recommendations have not changed that much since Hippocrates' time, when

physicians suggested that individuals with overweight should “reduce food and avoid drinking to fullness” and take regular exercise, particularly “running during the night” and “early-morning walks” (31).

Research on childhood obesity began with medical studies of the natural history and physiological sequelae of obesity. These were followed by individual, family and school interventions, and, more recently, environmental correlates of and policy approaches to the prevention of childhood obesity, as well as complex community programmes (32). Although much has been learnt about the nature of childhood obesity, the problem remains difficult to treat. In recognition of the need for a greater, more sustained impact, recent work has focused on obesity prevention, in particular on modification of the built and social environments, food systems and education that influence diet and physical activity. This has led to debate and policy action, such as school food procurement standards, food marketing restrictions, product reformulation and taxation of soft drinks (33, 34). As long as the prevalence of obesity remains high, however, individuals with obesity will have to be treated to improve their health and well-being and to reduce health care costs and the negative consequences on economies and societies. Currently, there are three major types of treatment for obesity: lifestyle intervention, pharmacotherapy and bariatric surgery. Unfortunately, no “silver bullet” solution has been found for obesity management in children and adolescents. Success is limited with the available conservative therapies for children (35), even in younger children, who have substantially better outcomes (36, 37).





Multi-component behavioural programmes (diet, physical activity, psychology) are generally considered to be the gold standard treatment for childhood obesity (38). Family behavioural therapy was initially developed to modify the shared family environment, provide role models and support child behaviour changes. A recent analysis of six high-quality Cochrane reviews evaluated the effectiveness of behaviour-change interventions in children and of interventions that target only parents of children, in addition to interventions with surgery and drugs (37). The evidence suggests that multi-component behaviour-change interventions may achieve small reductions in body weight for children of all ages, with few adverse events reported. In addition, despite the small effects of multi-component behavioural interventions on BMI z-score, the reduction in risk for comorbid conditions is an important, achievable result (35). Cardio-metabolic changes are related to reductions in fat mass, especially in the abdomen. As BMI is not a direct measure of body composition and fat mass may be confounded with fat free mass, therapeutic options should address body composition and comorbid conditions instead of only weight loss and BMI reduction.

A growing, rapidly changing portfolio of anti-obesity drugs is being marketed as manufacturers continue to develop new, safer, more tolerable medications that can also be prescribed for children (which are not currently available) (39). Pharmacological interventions for obesity in children and adolescents have been assessed in a Cochrane systematic review (40). Some of the trial drugs were used off license (orlistat) or have been withdrawn (sibutramine, fenfluramine, benfluorex, dexfenfluramine and rimonabant) in some countries. As there was no long-term follow-up and no data on safety, no conclusive recommendations could be made. Only orlistat, liraglutide and naltrexone-bupropion have been approved for weight management in adults by the European Medicines Agency, when used with diet and exercise. These medications are possible candidates for paediatric obesity treatment, and short-term studies have been conducted of the safety, pharmacokinetics and pharmacodynamics of 3.0 mg/day liraglutide in 12–17-year-old adolescents with obesity and Tanner stage 2–5 (41). These studies demonstrated that the medication is well tolerated by adolescents, with safety and pharmacokinetics profiles similar to those in adults. These medications are not, however, the “silver bullet” but are designed to support individual attempts to change behaviour.

Surgery has been used, with behavioural change. Several safe, effective surgical techniques have been used in the past 50 years; however, surgery is still not widely considered to be beneficial or safe for younger children (42). Bariatric surgery is an effective intervention for losing weight and ameliorating obesity-related comorbid conditions, but it is associated with greater risks and higher

costs than nonsurgical interventions. The restrictive (gastric band or sleeve) or malabsorptive (gastric bypass) nature of some forms of bariatric surgery requires additional consideration with regard to growth. Psychological maturity, ability to provide informed consent and the availability of family support and continuing post-operative lifestyle support should be considered (43).

Conceivably, the main therapeutic value of current treatments may be the reduction in risks for cardiovascular and other comorbid conditions and improved quality of life and psycho-social well-being. Significant improvements in insulin sensitivity, blood pressure and lipid profiles have been reported with even mild or moderate non-surgical weight loss (35). These observations may justify wider discussion and re-evaluation of current approaches that appear to be less effective. As the evidence accumulates and the problem is exacerbated, health care providers may wish to consider new, more efficient treatment modalities. The current gaps in childhood obesity management are mainly in the areas of integrated care, personalized approaches and systems thinking that incorporates individual, environmental and policy change.

1.5 Towards integrated care in multiple settings

Childhood obesity management services may include systematic screening, consistent criteria for diagnosis and assessment, stepwise care with clear pathways and equal access and long-term follow-up. Establishing and organizing these services will probably place pressure on health care delivery systems, as they require dedicated human and financial resources from an already stretched situation. Governments should therefore take a political decision to reorganize care and eventually to allocate additional resources to tackle these issues.

Although there is still lack of consensus on the definition of “integrated care” (44), such care is attracting attention as a framework for better, more effective health care delivery (45). For this publication, we defined an integrated approach as “a method incorporating diet, physical activity and mental health as well as environmental change and parenting practices”. Diet, physical activity and mental health and the home, school and community environments are separate but interconnected components of childhood obesity management. Addressing all these components at the same time is likely to have complementary effects on weight gain reduction or weight maintenance. Integration is thus the “glue” for achieving common goals and optimal results (45). When applied to health services, this refers to institutions, settings, providers, health and social services and the related systems in which they operate.



2. Objectives and methods

The objectives of the project were to identify the elements and aspects of health system actions, promising examples and lessons from these experiences. The group based their work on the following questions:

- Which professionals are involved in childhood obesity management, and what is their role therein?
- What are the clinical pathways for the management of childhood obesity, from screening to diagnosis, treatment and follow-up?
- In which settings is childhood obesity managed and what are the entry points into the health system?
- What are the provisions for long-term care and follow-up?
- What are the funding arrangements for childhood obesity management, and what services are covered?
- What support is available for childhood obesity management?

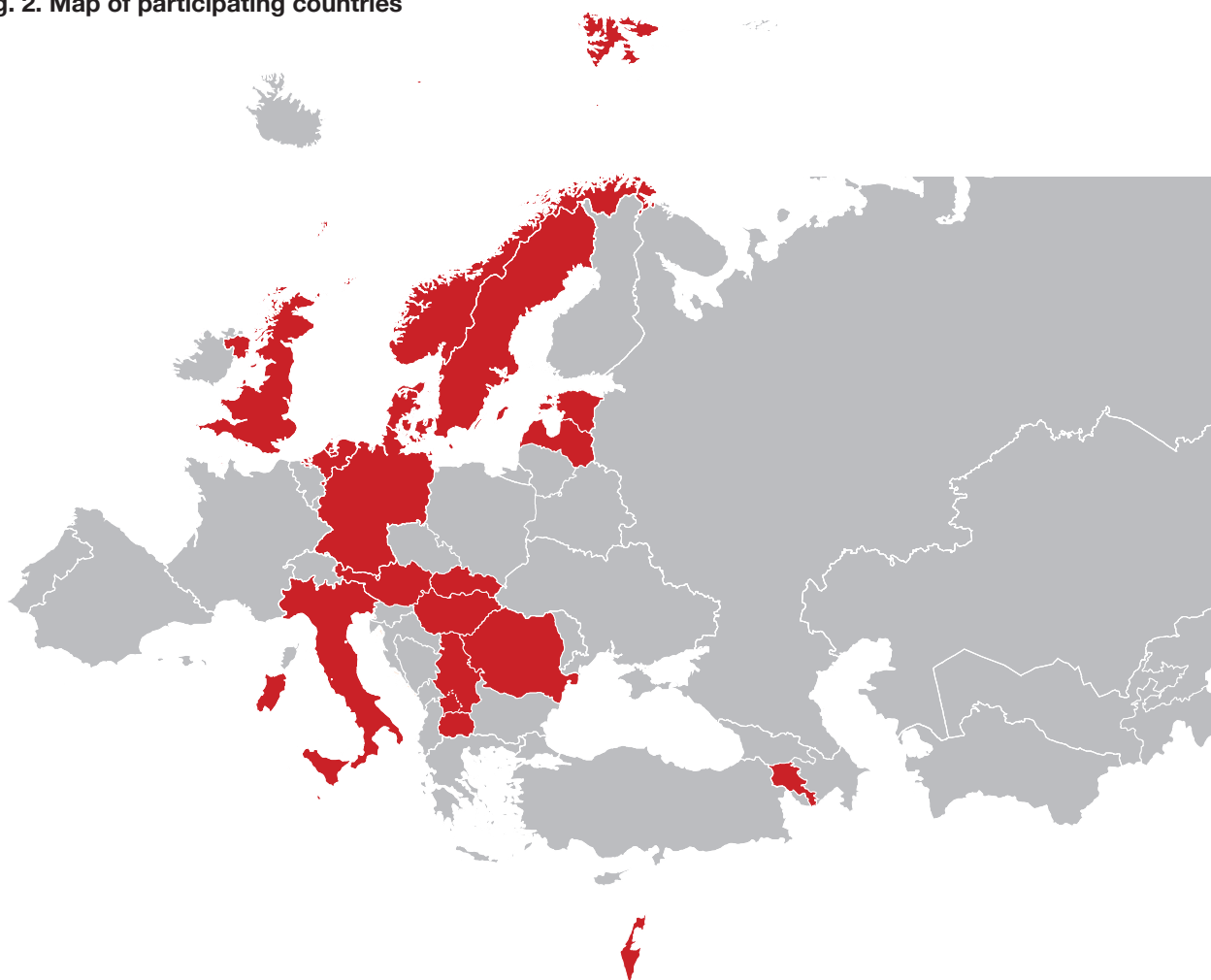
- To what extent do the current systems address inequalities in health and the specific needs of groups with low socioeconomic status?

- How do informants perceive the functioning of the system, and what challenges have they identified?

- Are there promising initiatives and practices in childhood obesity management?

We reviewed childhood obesity management in 19 countries in the WHO European Region, mainly from answers to a questionnaire distributed to the principle investigators of the WHO COSI who expressed their willingness to contribute (Fig, 2). The countries were: Armenia, Austria, Denmark, England, Estonia, Germany, Hungary, Italy, Israel, Latvia, Malta, the Netherlands, North Macedonia, Norway, Romania, San Marino, Serbia, Slovakia and Sweden. Slovenia also sent an example of a good practice, which is included in this report. The geographical coverage of the countries is limited with regard to the 53 Member States in the WHO European Region, and the results are merely illustrative rather than representative of the Region.

Fig. 2. Map of participating countries



Mixed methods were used for data collection. A comprehensive literature review was undertaken by the main researchers to identify key themes and to select countries for case studies. The themes identified provided the basis for the data collection forms (i.e. country questionnaire and semi-structured interview guide). We searched PubMed and Google Scholar with relevant subjects and free text terms related to childhood obesity management. The search results were limited to freely available full texts published in English in the past 10 years. We grouped the articles by both country and theme (e.g. screening, primary care, community care). We also used supplementary searching techniques, by following up articles cited in these papers and performing additional searches to explore emerging themes further.

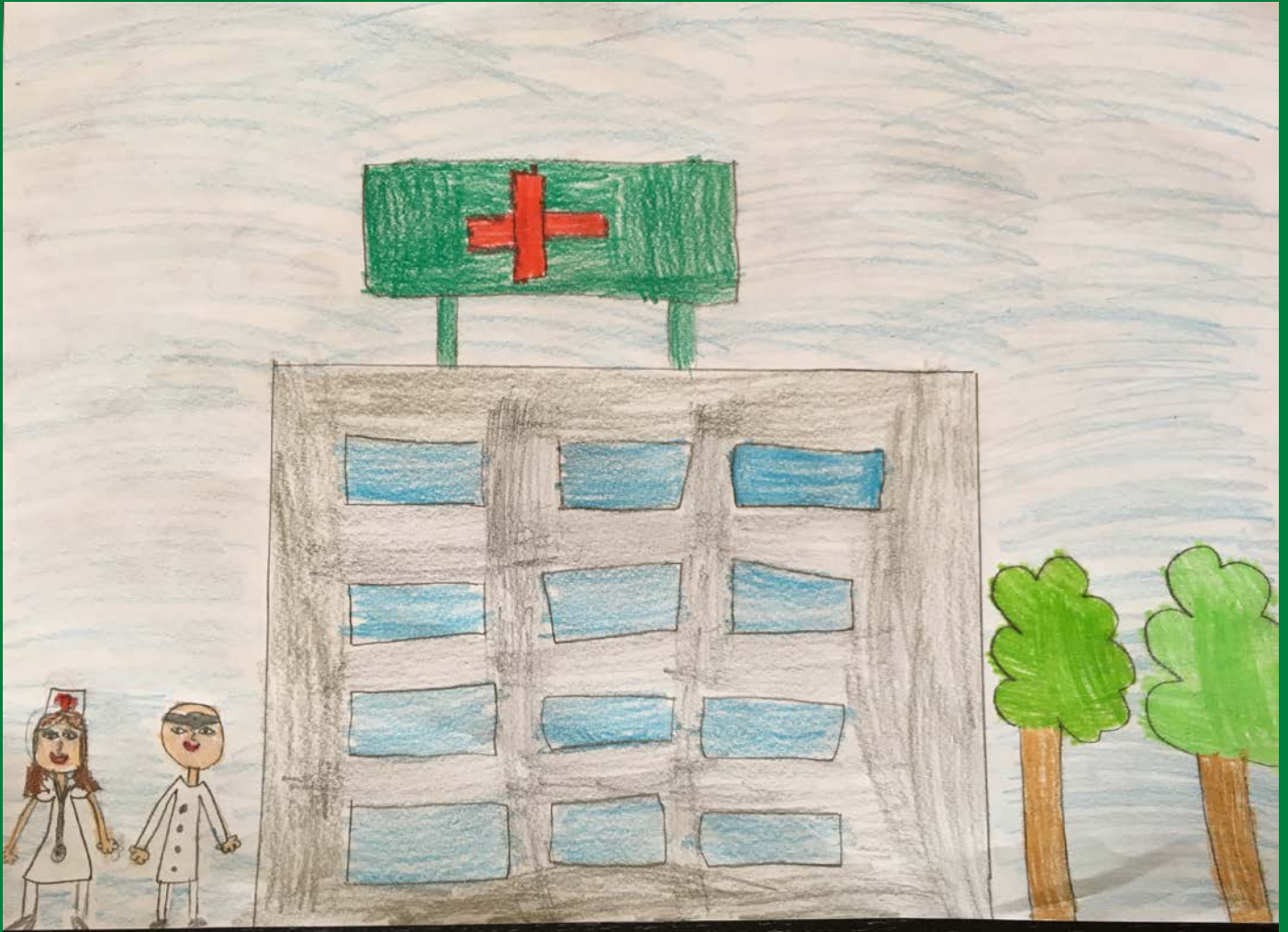
Eight broad themes were identified in the literature review, from which the framework of the country questionnaire was developed. The main terms were defined to ensure common understanding by respondents. The framework was then discussed and refined in an online consultation among the research team, and the feedback was used to finalize the document, which was sent to all COSI principal investigators in May 2018 (see Annex 1 for the final questionnaire). The first deadline was the end of May 2018, but as more countries expressed their intention to contribute we extended the end of data collection until the end of September 2018 to allow for holidays. Because of the complexity of the questionnaire and to ensure

standardized responses from countries, the principal investigators were encouraged to distribute the questionnaire to various experts in childhood obesity management in their countries. They then collected and summarized the answers. For open-ended questions, they listed all the answers they received; for pre-set answers, they sent back the consensus of a group of experts. If there was a direct conflict (i.e. the answers contradicted each other), the principal investigator was asked to find agreement.

Four countries (England, Hungary, Italy and Sweden), representing different geographical areas of the WHO European Region and with different health systems, were selected for more in-depth study in semi-structured interviews. The interview protocol and guide were developed and piloted by the Hungarian team between March and May 2018. England, Italy and Sweden conducted interviews during the summer and autumn of 2018. Data collection was closed in mid-October. Annex 2 includes more details of the methods used in each case country.

In this document, results are usually reported first as collected via the questionnaire from 15 countries and then information from the semi-structured interviews. Unless otherwise noted, the tables are based on the responses to the questionnaire. The case studies and country examples were either identified in the literature review or suggested by countries as practices that could inspire others.





3. Results

The 15 countries that participated in the questionnaire survey were: Armenia, Austria, Denmark, Estonia, Germany, Israel, Latvia, Malta, Netherlands, North Macedonia, Norway, Romania, San Marino, Serbia and Slovakia. COSI principal investigators were asked to invite a group of representatives of childhood obesity stakeholders in their countries to fill in the questionnaire on the basis of group consensus. The multidisciplinary teams generally comprised representatives of four different professions. The professions most frequently mentioned as answering the questionnaire were, in order: paediatricians, public health specialists, dietitians, representatives of the ministry of health or of education, paediatric endocrinologists, GPs, psychologists, school doctors, health visitors and researchers. The respondents typically worked in the following areas of the health care delivery system (in order of frequency): specialized care, primary care, public health, health authority, medical universities, school health and community care.

The number of experts who took part in the semi-structured interviews ranged from 6 in Sweden to 20 in Italy, with a total of 50 participants. Country coordinators were asked to involve experts representing various disciplines in multiple care settings. The participants included researchers, ministry representatives, primary care paediatricians (PCPs), paediatric endocrinologists, public health specialists, dietitians, nurses, psychologists and health care managers. Most had several roles in the obesity management system.

Obesity was declared a disease by WHO in 1979 and by the American Medical Association in 2013. In 2015, the European Association for the Study of Obesity published a position paper in which they stated that childhood obesity is a chronic disease. The declaration of childhood obesity as a disease is important for a number of reasons. When a condition is defined as a disease by a responsible authority, it can lead to the development of official protocols, organization of care and allocation of funding to implement the protocol. Additionally, if childhood obesity is managed as a disease by health care providers it may be diagnosed and treated rapidly. As childhood obesity tends to last into adulthood, early intervention is crucial for reducing lifetime risks and burden.

In our survey, 13 of the 15 countries reported that both the ministry of health and health professionals recognize childhood obesity as a chronic disease, while in two (*Denmark* and *North Macedonia*) it was not. Denmark reported that, in line with recommendations from the Danish Health Authority, professionals regard childhood obesity as a risk factor; however, this opinion is not shared by all physicians.

In the results of the semi-structured interviews, the team in *Hungary* reported that, although childhood obesity is

recognized as a chronic disease by both the responsible authority and health professionals in theory, the reality is different, in terms of the probability of correct diagnosis or identification, particularly in primary care, and of the availability of treatment and policy implementation. In *Italy*, obesity is on a list for “essential levels of assistance” specified by the Ministry of Health, as it is considered to be a lifestyle risk factor. Thus, each region is urged to develop specific preventive activities. In practice, as in *Hungary*, childhood obesity is not considered or treated as a chronic disease by most health care professionals. This is true particularly in southern Italy, where the prevalence of childhood obesity is so high that “health professionals are so used to being surrounded by children with overweight and obesity that they underestimate the problem”. This attitude raises concern, as it jeopardizes the likelihood of early intervention. In *England*, stakeholders reported that they considered that the central Government underestimated the complexity of obesity. They suggested that this contributes to limit the urgency to act in the management and treatment of childhood obesity. There was a sense that the Government focuses primarily on prevention (as reflected in the recently launched Childhood Obesity Plan) and has not taken similar steps to invest in management and treatment.

3.1 The childhood obesity management system

3.1.1 Main professionals and other personnel in childhood obesity management

In the 19 participating countries, different professionals are involved at various stages of the management pathway, and the types of professionals involved vary between and within countries. In principle, activities associated with childhood obesity management are implemented in three settings in the countries: in schools, in primary care and in specialized care (as inpatient or outpatient services). Nurses and physicians usually play key roles in each setting. Although evidence suggests that childhood obesity should be managed by teams of people in different disciplines, not all the countries reported that professionals in various areas (dietitians, psychologists, physical therapists or exercise physiologists) are available in primary care. The countries that reported that they had multidisciplinary primary care teams were Denmark, Estonia (not in all locations), Israel, Malta, Netherlands, Romania (not in all locations), San Marino, Serbia, Slovakia and Sweden. In these countries, the additional team members involved in childhood obesity management in primary care (besides doctors and nurses) were usually dietitians and/or psychologists. Exercise physiologists were more often available in specialized care. The Netherlands is an exception, as a wide variety of professionals are available in primary care, including in community services (see Fig. 3).

Fig. 3. Professionals involved in the primary care team in the Netherlands



Social workers are rarely involved in any phase of childhood obesity management, and, if they are, it is usually during long-term care and follow-up (e.g. in *Estonia, Romania*). Exceptions are *England, Israel* and the *Netherlands*, where social workers were mentioned as part of primary care (the Netherlands), tier 3 services³ (England) or specialized care (Israel).

We identified certain country-specific features in childhood obesity management infrastructure. In *Denmark*, school nurses known as “health visitors” are trained in performing examinations and talking with schoolchildren and their parents. In *North Macedonia* and *Romania*, screening is done with the help of public health specialists. Similarly, in *Norway*, screening is done by nurses with an additional master’s degree in public health (i.e. nurses with a nursing master’s degree in health promotion and prevention). In *Slovenia*, screening of school-aged children is

the responsibility and task of physical education teachers. Similarly, in *Serbia*, physical education teachers participate in screening with primary care providers, although their role is not widely recognized. At *Italian* national health service family care clinics, people receive advice and counselling on their health and lifestyle, and children with obesity and their families receive free basic recommendations on a healthy lifestyle, counselling, basic nutritional advice and, if necessary, medications such as anti-diabetic pills or antihypertensive drugs prescribed by a PCP or specialist for complications of obesity. In *Sweden*, child health care centres play an important role in childhood obesity management. More than 2000 primary care centres provide primary preventive health care for children up to the age of 4 years (46). The centres are financed by counties, are free of charge and cover 99% of children. The centres are run by either a district nurse or a paediatric nurse, and family physicians or paediatricians act as

³ For details of tier 3 services, see the case study on p. 33.

consultants. The care of older children is ensured in family or residential health centres (*vårdcentral*), which have both GPs and nurses.

3.1.2 Structures and processes

3.1.2.1 Governance and organization of care

“Governance” in the health sector pertains to a wide range of steering and rule-making functions of governments and decision-makers for achieving national health policy objectives conducive to universal health coverage (47). Governance is a political process for balancing competing influences and demands. It includes: maintaining a strategic direction in policy development and implementation; detecting and correcting undesirable trends or distortions; putting the case for health in national development; regulating the behaviour of a wide range of people, from health care financiers to health providers; and establishing transparent, effective accountability mechanisms. Beyond the formal health system, governance involves collaboration with other sectors, including the private sector and civil society, to promote and maintain population health in a participatory, inclusive manner. Good care depends on good governance. Therefore, care providers must ensure that their patients receive safe, good-quality care; clearly allocate responsibility and tasks within the organization; and ensure good financial management (48).

None of the questions on the questionnaire explicitly asked about governance, but some parts addressed aspects or elements of the process, e.g. “Who is responsible for the organization and coordination of care of overweight and obese children in your country?”. Respondents also commented either directly or indirectly on governance throughout the questionnaire. In the interviews, a section was dedicated to overall management and coordination, including questions such as “Which are the coordinating bodies and what are their respective roles and responsibilities?”. The existence of policies or other strategic documents and their implementation in practice were not covered. Bearing in mind these limitations, the findings with regard to governance and organization of care can be summarized as below.

In general, governance and coordination among providers in childhood obesity management appeared to be problematic in all the participating countries. Some countries explicitly reported a “missing structured system” (*Austria*), “lack of systematic approach for childhood obesity care” (*Estonia*), inexistent system (*Latvia*), “no national coordination of the paediatric obesity centres scattered over the country. Each centre works in isolation” (*Italy*), “lack of centralized coordination and support” (*Sweden*), “coherent intersectoral strategy and related action plans are lacking that would coordinate the actions against childhood obesity in an integrated and complex manner” (*Hungary*) and “whilst the obesity care pathway is depicted, there is little operational clarity, financial commitment or

governance enforcing it” (*England*). Insufficient coordination results in fragmented care and significant regional differences at every level of management. In *Austria* and *Germany*, fragmented care for childhood obesity is partly the result of the complexity of their health systems, in which responsibilities are shared between national and regional authorities.

Respondents also mentioned elements that could improve governance in their countries:

- operational and centralized coordination of the entire system of screening, diagnosis and treatment (*Italy*);
- integration of health care service providers for children with overweight and obesity into one national network (*Austria, Italy and Serbia*);
- a national database of obesity management service providers, with national evaluations (*Denmark*);
- obesity registries analogous to cancer registries (*Germany and Serbia*);
- interconnection of primary and specialized care (*Austria and Italy*);
- direct connection between hospital treatment and social care (*Denmark*); and
- a national programme with relevant indicators and monitoring (*Italy*).

A number of mechanisms were identified that could help to overcome fragmentation of services.

In *Israel*, a national registry of bariatric surgery was established at the Israel Center for Disease Control in order to compile data on all bariatric surgery performed in all treatment centres in the country. The registry began operation in June 2013 and receives information from 28 medical centres; data on pre- and post-surgical indicators are received from health maintenance organizations (HMOs) and from questionnaires sent to people who have undergone bariatric surgery. In *Denmark*, a national network of primary and secondary health care professionals working with children and adolescents with overweight or obesity was established in 2013 (49). The members are nurses, doctors, dietitians, physiotherapists, psychologists, secretaries, social workers, health care practitioners and exercise counsellors. Initially, members met once a year for 1 day to share their experiences. Since 2015, the event has lasted for 2 days, and members discuss treatment options, results, various interventions and research projects and develop new projects for treatment of overweight in children and adolescents. In the *Netherlands*, there is a national multidisciplinary model for integrated

Country example: Developing, implementing and scaling-up a standard childhood obesity management programme at country level: the Swiss childhood obesity management programme

The main aims of the project were to: (i) establish Swiss guidelines for the treatment of childhood obesity; (ii) change national policies to recognize childhood obesity as a chronic disease that requires specific health care, reimbursed by basic health insurance; (iii) establish multiple health care centres for childhood obesity management and a Swiss network of professionals; (iv) develop a structured, family-based multidisciplinary programme for the treatment of children with obesity to be disseminated throughout the country; (v) devise instruments and procedures to assess the quality of therapeutic programmes and individual changes in adiposity parameters, comorbid conditions, health-related quality of life and associated psychosocial variables before, and during therapy up to 2 years of follow-up; and (vi) identify predictors of success and failure. The steps required to establish this national programme and the results at 1 year are presented below.

A childhood obesity working group was created by the Swiss Society of Paediatrics, which included representatives of the Swiss Professional Association of Obesity in Childhood and Adolescence and the main professional associations (paediatrics, general medicine, nutrition, psychology, physical education and physiotherapy). The mission of the group was to fulfil objectives (i) and (ii) of the project and to apply for funding for a multicentre national cohort study: the KIDSSTEP study. The Swiss definition of overweight and obesity in children, based on WHO references and the Swiss Childhood Obesity Management Guidelines, were published in 2007 by the working group and approved by the Swiss Society of Paediatrics and the Federal Office of Public Health.

The national strategy for childhood obesity management was then established with relevant stakeholders, health care workers, obesity associations, the Federal Office of Public Health, health insurance companies, hospitals and medical centres. Structured multidisciplinary treatment in both individual and group settings was initially proposed. On the basis of the scientific evidence available at that time and because of financial limitations, however, the Federal Office of Public Health and health insurance companies agreed to reimburse only the expenses of the multidisciplinary group programme (MGP).

The structured high-intensity MGP comprised 116 sessions of 45–60 min (88 h of contact) distributed over 1 year. The cost was fully covered, if the programme fulfilled the certification criteria; attendance of patients

and of at least one parent or caregiver exceeded 90%, and at least anonymized data on gender, age and BMI were provided for monitoring. The intensive phase (108 sessions) lasted 4–9 months and was followed by eight sessions to ensure maintenance of behavioural changes. Group sessions were organized every week or every 2 weeks by dietitians, psychologists and physical education teachers or physiotherapists under the supervision of a paediatrician or a GP. Most sessions for children (total, 54 h) and for parents (24 h) were held separately, while six were held together (4.5 h). Each group consisted of 8–14 children or adolescents and their parents. Families received information on healthy nutrition, physical and sedentary activities, family habits, behaviour-change techniques, parenting and coping with the psychosocial problems commonly experienced by children with obesity, such as teasing and concern about body image. Cognitive and behavioural management techniques were used, including self-awareness, problem-solving, goal-setting, stimulus control, training in coping skills, healthy thinking about food and the body and prevention of relapse. At the end of each session, individual goals were set. The health care workers reported regularly to the Obesity Working Group of the Swiss Society of Paediatrics and the Professional Association of Obesity in Childhood and Adolescence on progress or failure in order to improve the efficacy of treatment.

A national certification procedure was used to ensure compliance with standards and the quality of care for patients, which comprised treatment by specialized health care workers, adapted material for overweight children, assessment of obesity and early detection of comorbid conditions, the content of the therapeutic programme, educational tools, behavioural intervention techniques, institutional setting, and medical, technical and personnel quality control.

To establish a network of paediatric obesity management centres, Swiss regional multidisciplinary health care groups and paediatricians who provided specialized obesity consultations were invited to create MGPs according to the Swiss Childhood Obesity Management Guidelines and to apply for national certification. All the centres were then visited by at least two members of the Paediatric Obesity Certification Commission to assess the quality of the programme. A national education programme for health care workers was set up, with curricula adapted from international standards and financed by the health care workers themselves and by professional associations, hospitals, cantons

and public–private partnerships. A national network of health care workers was created under the aegis of the Professional Association of Obesity in Childhood and Adolescence.

In 2008, the Federal Office of Public Health requested and financed a prospective multi-centric cohort study (the KIDSSTEP study) to evaluate MGPs in Switzerland and to assess individual clinical changes in overweight children and adolescents (aged 3–6 years) after the MGP. Between 2008 and 2013, 32 centres were certified for MGP, but only 25 had enough patients and resources to start treatment programmes. Only 30% of 3482 children referred for therapy started the MGP, as 54% of the patients referred did not meet the inclusion criteria, had no time or motivation for weekly sessions or had severe co-morbid conditions; 10% missed all consultations, and 6% did not provide their initial BMI. After 4 years of the study, only 0.8% of the patients who needed care could be included in a group programme.

Before the start of the MGP, BMI was available for 1053 children and adolescents with a mean age of 12.2 ± 2.5 years. Parents reported the onset of obesity at the age of 6.3 ± 3.3 years, and 70% of patients had at least one comorbid condition (mainly orthopaedic conditions, hypertension, dyslipidaemia, mental health problems). After the 1-year MGP, BMI was available for 689

of the 1053 patients (65%), which showed a significant decrease in BMI z-score (-0.24). The BMI of 71% of patients was reduced; the proportion of children with a normal BMI increased from 0.3% to 4.1%, and the proportion with extreme obesity (BMI \geq 99.5th centile) decreased from 78.3% to 64.2%. The proportion of children with a normal waist circumference increased from 9.9% to 18.1%. Systolic blood pressure, physical capacity, family eating and activity habits, craving for or addiction to overeating and health-related quality of life improved significantly. The most important predictor of a reduction in BMI z-score was age: the decrease was greatest in children before puberty and the least in adolescents over 14 years.

The KIDSSTEP study illustrates the process of developing, implementing and scaling-up standardized childhood obesity management programmes to country level and the determinants of success. As access to MGP remained limited, the Federal Office of Public Health accepted in 2013 to cover the costs of individual group programmes, including a fixed number of consultations with dietitians ($n=6$), psychologists ($n=6$) and physiotherapists ($n=9$), which can be repeated under the supervision of a primary care physician. Children and their family can now participate in multidisciplinary programmes in individual or group settings, or both, depending of their needs and evolution.

care for childhood overweight and obesity, which is being pilot-tested in eight Dutch municipalities. The model consists of (i) the vision (a broad assessment of children and their environment); (ii) the process (six steps in the trajectory: diagnosis, broad assessment, discussion of approach, making plan and dividing tasks, getting to work, sustaining the changes); (iii) partners (from health care and social care for the different steps); and (iv) financing (local or national funding of all parts of integrated care). The Dutch Ministry of Health, Welfare and Sports plans to have integrated care for children with overweight and obesity in all municipalities in the Netherlands by 2030. The next step is introduction of integrated care in 35 municipalities by 2020. In *England*, a national childhood obesity plan was published in 2016 and updated in 2018; however, both chapters of the plan are focused on obesity prevention, with no reference to the treatment of childhood overweight and obesity.

3.1.2.2 Guidelines

Guidelines make care more consistent and efficient and close the gap between health care provider practice and scientific evidence (50). They provide recommendations for the diagnosis, treatment and longer-term management of diseases, which are usually based on a combination of

evidence and discussions by experts in the area. Their aim is to improve practice by ensuring that individual health care professionals are aware of the best available evidence on treatments.

Of the 15 countries, 6 stated that they have one, nationally accepted, widely used guideline for managing childhood obesity (*Estonia, Germany, Israel, North Macedonia, San Marino and Slovakia*), and 6 stated that they follow several parallel guidelines (*Armenia, Denmark, Malta, Norway, Romania and Serbia*). The *Netherlands* listed several joint guidelines for adult and childhood obesity. *Austria* and *Latvia* reported that they have no guidelines. Many Austrian health care professionals rely on the German guideline, while in *Latvia* attempts have been made to develop such guidelines but without success. Of those countries that have national guidelines, six updated them in the past 5 years (*Denmark, Germany, Israel, Netherlands, North Macedonia and Serbia*). Most of the countries reported that several disciplines worked together in developing the guideline, whereas in *Germany* and *North Macedonia* only physicians were involved. The guidelines indicated by respondents are listed by country with their access in Annex 3.

Country example: Multidisciplinary, intersectoral roundtable for planning and coordinating health promotion and educational activities in schools in San Marino

A multidisciplinary, intersectoral roundtable for planning and coordinating health promotion and educational activities in schools was established by a resolution of the State Congress in 2013 and reiterated in 2016. The resolution states that “The 2015–2017 health and social health plan of the Republic of San Marino reaffirms the importance of health promotion and education and the need to develop multidisciplinary actions to contrast lifestyles related to an increase in morbidity and mortality.”

The roundtable is composed of delegates of prominent national institutes for both health and education, relevant experts and external collaborators. Members meet once a month at the head office of San Marino elementary school. The constituent members share agendas and discuss the organization of activities. The collaboration recently supported important activities in relation to childhood obesity, such as:

- promotion of healthy lifestyles in children, both by periodic international surveillance surveys to which San Marino adheres (e.g. OKkio alla Salute, Health Behaviour of School-aged Children and the Global

Youth Tobacco Survey) and addressing the issues of obesity, smoking, alcohol and physical activity in meetings between health experts (e.g. paediatricians, dietitians), teachers and families. For example, a project is under way for the involvement of sports structures to encourage physical activity among children;

- checking the menus in full-time schools (nursery and primary) and providing training for kitchen staff; and
- addressing bullying, cyber-bullying and psychic distress.

In 2017, a State Congress resolution set up a working group to define specifications for food in school canteens, composed of health workers and managers of primary schools. Its mission is to promote the consumption of healthy food, preferably from San Marino or neighbouring regions, produced organically and with respect for the environment and ethical principles, which also favours the adoption of correct eating and nutritional behaviour and therefore improves the quality of school catering.

The areas currently covered by guidelines are listed in Table 1. Treatment and prevention were the two areas mentioned most frequently, while long-term care and organization of service provision were those listed least. The principles are shown in Table 2. Family involvement is included in each guideline, except in *Estonia*. An integrated approach and multi-disciplinarity were mentioned frequently, while – surprisingly – the principles of self-management and progressive care are applied by less than half the countries.

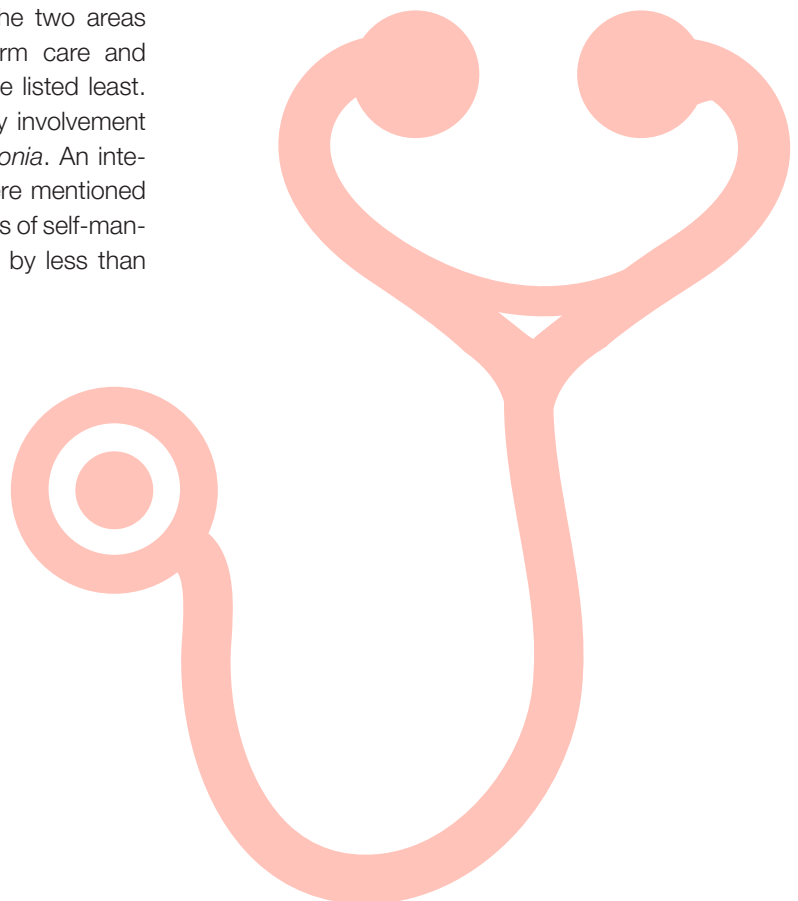


Table 1. Areas covered by guidelines for childhood obesity in the 15 surveyed countries

Country	Diagnosis	Classification	Referral	Treatment	Long-term care	Organization of care	Prevention	Other areas
Armenia	x	x					x	
Austria	NA	NA	NA	NA	NA	NA	NA	NA
Denmark	x		x	x			x	
Estonia	x	x	x			x	x	
Germany	x	x		x			x	Quality control, severe obesity
Israel				x			x	
Latvia	NA	NA	NA	NA	NA	NA	NA	NA
Malta				x		x	x	
Netherlands	x	x	x	x	x	x		Early detection, financing of care
North Macedonia			x	x				Definition, risk factors, investigation
Norway			x	x			x	Assessment, investigation
Romania	x	x	x	x	x		x	Early identification
San Marino	x	x	x	x	x	x	x	
Serbia	x	x	x	x	x	x	x	
Slovakia	x	x	x	x	x	x	x	Spa treatment

NA, not available

^a As there are no national guidelines, many health professionals in Austria use the German guideline.

^b Although several attempts have been made, Latvia has no national guideline.

Table 2. Principles applied in guidelines for childhood obesity in 15 surveyed countries

Country	Integrated approach	Family involvement	Community involvement	Universal access	Multi-disciplinarity	Progressive care	Self-management support	Other
Armenia ^a	NA	NA	NA	NA	NA	NA	NA	NA
Austria ^b	NA	NA	NA	NA	NA	NA	NA	NA
Denmark	x	x	x	x	x			
Estonia	x							
Germany	x	x			x			Behaviour therapy
Israel	x	x	x	x	x	x	x	
Latviac	NA	NA	NA	NA	NA	NA	NA	NA
Malta	x	x			x	x	x	
Netherlands	x	x	x	x	x	x	x	Matched cared
North Macedonia		x						
Norway	x	x	x	x				
Romania		x			x			
San Marino	x	x	x	x	x	x	x	
Serbia	x	x	x	x	x	x		
Slovakia	x	x	x	x	x	x	x	

NA, not available

^a Armenia did not answer this question.

^b As there is no national guideline, many health professionals in Austria use the German guideline.

^c Although several attempts have been made, Latvia has no national guideline.

^d The Dutch model is a system of progressive (stepped) care on "matched care" principles, with a wide variety of options offered for support and care. A child might require a high level of care for one aspect and a lower level or no care for another. Furthermore, not all the necessary support and care might be required simultaneously. Together, this results in care that matches the needs of the child.

In the four countries in which interviews were conducted, *Italy* reported that it had several national and regional childhood obesity guidelines, which are well known to health professionals. The guidelines are “medical-oriented and less social-oriented”, but they are comprehensive and updated regularly. There are no national guidelines for childhood obesity in *Hungary*; both obesity guidelines concern adults, but there are written local assessment and treatment protocols for paediatric endocrine departments and obesity units (i.e. in-house procedures), and interviewees also mentioned the use of other guidelines (such as those of Germany or the USA). *Sweden* also reported that it had no national guidelines, while several guidelines are available in *England* for obesity management services providing mainly tier 2 and 3 services.⁴

3.1.2.3 Screening, points of entry and referral for care

Children’s weight can be assessed regularly for the purposes of both surveillance and screening. While data from surveillance are collected and analysed regularly and systematically to provide information for actions to prevent and control disease (51), the main aim of screening is early diagnosis and provision of individual support (52).

The first step in management of childhood obesity is assessment of the child’s weight (53), e.g. during preventive medical check-ups. Therefore, an effective national childhood obesity management system should provide routine assessment programmes and central registries for early identification of children who are overweight or have obesity, preferably with subsequent clear pathways (e.g. treatment, intervention or temporary monitoring) and parental feedback. Ideally, health administrations and

paediatricians work together with personnel in ambulant settings (e.g. sports clubs, nongovernmental organizations, private organizations), school nurses, intervention programmes and parents to ensure a holistic, continuous approach to weight reduction, maintenance or monitoring. Assessments of a child’s weight are often a component of formal child developmental health checks, at specified ages. The process should include provision of the results of assessments to parents, with advice on what should be done next. This ensures that data on childhood overweight and obesity are collected, stored centrally and accessible and that the results are distributed to individuals to trigger behaviour change.

In our survey, all the countries reported some national or regional mechanisms for evaluating the weight of all children regularly. Some of the mechanisms, however, resembled monitoring or surveillance (e.g. *Armenia*, *Latvia*, *Germany* and *San Marino*), while others fulfilled all the criteria (i.e. including systematic invitation, follow-up of identified children and access to treatment) to be considered screening programmes (e.g. *Denmark*, *Netherlands*, *Norway* and *Romania*). The frequency of data collection was similar in the participating countries: several measurements in the first year of life, followed by less frequent assessments from 2 to 5 years of age, then annual or biannual examinations at school. This approach is reflected in the settings in which measurements were usually made: primary care in the first period of life and school later.

Table 3 summarizes the main characteristics of the national and regional mechanisms for evaluating the weight of all children in the 15 surveyed countries.

⁴ For details of tier 2 and 3 services, see the case study on p. 33.



Table 3. Main characteristics of national or regional mechanisms for evaluating the weight of children in the 15 surveyed countries

Country	Screening	Surveillance	Age at measurements	Professionals who take part in screening before school age	Professionals who take part in screening at school age	People notified after screening
Armenia	Yes		0–18 years > 2 years: once a year			Parents or carers, if medical assistance is required
Austria	Yes		Pre-school children: 0–2 years, 2, 3, 4 and 5 years All school-aged children	PCP	School doctors	Parents or carers, if medical assistance is required
Denmark	Yes (national)		Pre-school children: 0–2, 2, 3, 4 and 5 years School-aged children: year 2 of primary school (6–8 years), middle school (9–13 years) and last year (14–16 years)	PCP, family nurse	School nurses (health visitors)	Parents, PCPs Depending on age: for children, GPs or local services
Estonia	Yes (referral is not the main goal, varies by region)		Up to 1 year: monthly Up to 2 years: twice a year Up to school age: yearly In school: every 2 years	Family nurses, family doctors	School nurses, school doctors	Children, parents, family doctors
Germany	No	Part of wider assessment of development (5–6 years, at school entrance)	All children who are 6 years old by 31 August each year	PCP	Paediatricians	Parents (individual decision of paediatrician)
Israel	Yes		BMI of infants in well-baby clinics Monitoring of school-age children at 6 and 12 years National health indicators programme (5–6 and 14–18 years)	PCPs in HMOs	School nurses, dietitians	For infants: mothers, PCP and HMO nutritionist; for school-age children, PCP, physician
Latvia	No		NA	NA	NA	NA
Malta	Yes		7 weeks, 8 months and 18 months at well-baby clinics in primary care; 3–16 years at school; COSI at 7–8 years every 3 years	Community nurse	School nurse	Children, parents, school health team

Country	Screening	Surveillance	Age at measurements	Professionals who take part in screening before school age	Professionals who take part in screening at school age	People notified after screening
Netherlands	Yes	Yes	Overall, 0–18 years 0–1 years: 10 assessments 1–4 years: 5 assessments 4–12 years: 3 assessments 12–18 years: 2 assessments	Professionals in youth health care system: nurse and doctor	Professionals in youth health care system: school nurse	Parents or caregivers, children (from 12 years), GP (with permission of parent and of child if ≥ 12 years)
North Macedonia	Yes (by primary health care system)	Yes (by public health system)	Screening: nursery school, 1st, 3rd, 5th and 7th grades Surveillance: Annually for age 4–5 years in nursery schools, 2nd grade (COSI, every 3 years), 5th grade, 1st year of high school	Screening: Health professionals employed at kindergartens Surveillance: Public health specialists	Screening: Specialists in primary health centres. Surveillance: Public health specialists	Screening: Schools and parents Surveillance: Ministry of Health
Norway	Yes		0–13 years	0–5 years, nurses and PCP in child health clinics as part of primary care	> 5 years, public health nurses in school health service as part of primary care	Children, parents, PCP if necessary
Romania	Yes		1–36 months: monthly Annually thereafter	PCP, public health specialist	School doctors, school nurses	Children, parents, school health team, PCP

NA, not available; PCP, primary care paediatrician; HMO, health maintenance office.

After-screening referral practice varies among the countries that participated in the survey. For example, no formal referral system was noted by *Germany*, while pathways are clearly outlined in the guidelines in *Norway* (Table 4).

In many countries that responded to this question, after screening, children are referred by PCPs or primary care (depending where screening was done) to nutritionists. *North Macedonia*, for example, reported that children

Table 4. After-screening referral pathways in Norway

Level	Classification	BMI	Main initiatives
1	Normal weight	BMI < iso-BMI 25	Focus on structural and individual health promotion and prevention in the community (including nursery schools and schools)
2	Overweight	BMI ≥ iso-BMI 25	As level 1, with individual investigation and consultations by public health nurses in child health clinics and/or school health service, depending on age
3	Obese	BMI ≥ iso-BMI 30	As level 2, with cross-sectoral cooperation among various professionals for individual follow-up. Investigations by primary physician or family doctor. Possible referral to a specialist.
4	Seriously obese	BMI ≥ iso-BMI 35	As level 3, with referral to a specialist

iso-BMI, BMI adjusted for age and gender

are rarely referred for treatment only because they are overweight or have obesity but are referred by a PCP to specialized paediatric health care if they have comorbid conditions. In *Israel*, children are referred to primary care physicians who then refer them to a nutritionist or an obesity treatment clinic, as deemed necessary. *Romania* indicated that, after screening and assessment of BMI, children are asked by school doctors to return every month; if no change is seen after 3–6 months, the child and the parents are referred to a paediatrician specialized in endocrinology, metabolism or nutrition. In *Slovakia*, a four-stage treatment programme is recommended, as set out in the Expert Committee Recommendations Regarding the Prevention, Evaluation and Treatment of Child and Adolescent Overweight and Obesity.⁵ The programme starts from the lowest grade. If overweight or obesity does not improve within 3–6 months, primary care providers refer children to specialized care (such as a paediatric endocrinologist).

In the *Netherlands*, after screening, children and parents are invited for a consultation with staff of a youth health care centre, either at the school or in the centre. The nurse or doctor makes a broad assessment of factors that may have caused and/or maintain the excess weight: lifestyle, physical factors, psychological factors, psychosocial factors, parenting skills, family dynamics. If necessary, the paediatrician, physical therapist, dietitian, psychologist or youth care worker will undertake additional research. Depending on the results and the needs and requests of the child and the parents, steps are agreed upon to acquire

the desired lifestyle behaviour change, and the most suitable interventions are applied.

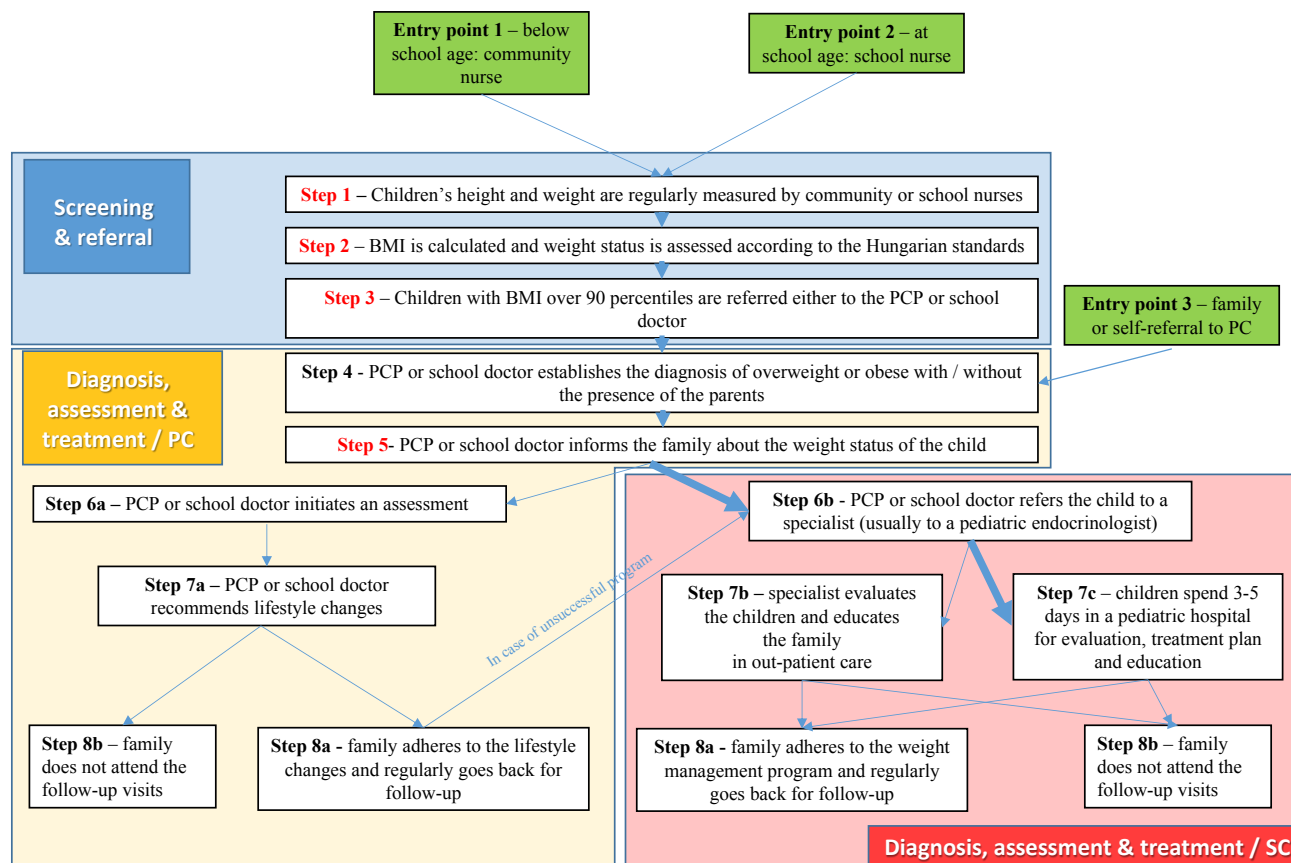
In *Malta*, while children with weight problems are referred to primary care nutritionists, their parents may be referred to a “community lifestyle clinic” (54), as deemed necessary. The health promotion and disease prevention services of the clinics are free for the adult population and based on self-referral.

In the interviews, each of the four countries reported a national mechanism for regular assessment of children’s weight. *Hungary* has a long-standing history of school health examinations, which are carried out biannually by school nurses, starting from the 2nd grade. For younger children, community nurses take measurements according to a standard timeline. These check-ups are mandatory and regulated by law. In this procedure, community and school nurses measure body height and body weight and assess weight according to national standards. The related regulation orders notification of parents, although this is not always done in practice. If a child has excessive weight, the PCP or school doctor establishes a diagnosis of overweight or obesity. If necessary, the school doctor refers the child to a PCP, a school psychologist or specialized care, although direct referral to specialized care is rare and is usually done through a PCP. Fig. 4 summarizes the Hungarian referral system and patient pathways.

In *England*, the National Child Measurement Programme ensures that all children in public schools at reception (aged 4–5 years) and in year 6 (aged 10–11 years) are

⁵ Unpublished.

Fig. 4. Paediatric obesity referral system and pathways in Hungary.



weighed and measured. Although the Programme is referred to as a national surveillance tool as opposed to a screening and diagnostic tool, there is a mechanism for informing parents about the weight classification of their child (i.e. optional feedback either in a letter or by telephone), with links to self-help information and/or support services (when available) as a step to directing children to diagnosis in a care establishment. The gaps in childhood obesity screening in England include lack of routine data collection in adolescence and for children in private schools or with special educational needs.

In *Italy*, there is no mandatory screening for childhood obesity at national level; however, PCPs measure the height (length) and weight of all children at various ages, from birth to pre-adolescence. “As PCPs are present all over the country, screening for paediatric overweight and obesity should in theory be possible at almost no (additional) cost.” There is also no established procedure for referring children with overweight for treatment. Generally, if overweight is not excessive and there are no metabolic complications, PCPs treat children and counsel the family. For more severe cases, the PCP or GP refers children

to a second-level childhood obesity treatment service in hospital, where multi-professional, multi-component treatment may be offered. As these centres are available in only a few cities, children may be referred to a local paediatric endocrinology service. Not all parents agree to referral to a second level, because of a low perception of the risk of obesity, and children often do not receive any treatment or more in-depth diagnosis. Many families decide to visit or a referred by a PCP to private nutritionists. The well-defined treatment pathway in Emilia Romagna Region is described in the box below.

In *Sweden*, weight and height are measured regularly, in child health care centres for children aged 0–4 years and in schools for those aged 6–18 years. The system works mainly as monitoring or surveillance rather than screening, as there is no integrated means for exploiting the outcome data, which usually remain inside school organizations. School nurses can refer students to primary health centres for obesity counselling; however, this is often avoided for fear of stigmatization and family reactions. Self-referral to health care centres is possible for the families of children with overweight.

Country example: The childhood obesity management model in Emilia Romagna.

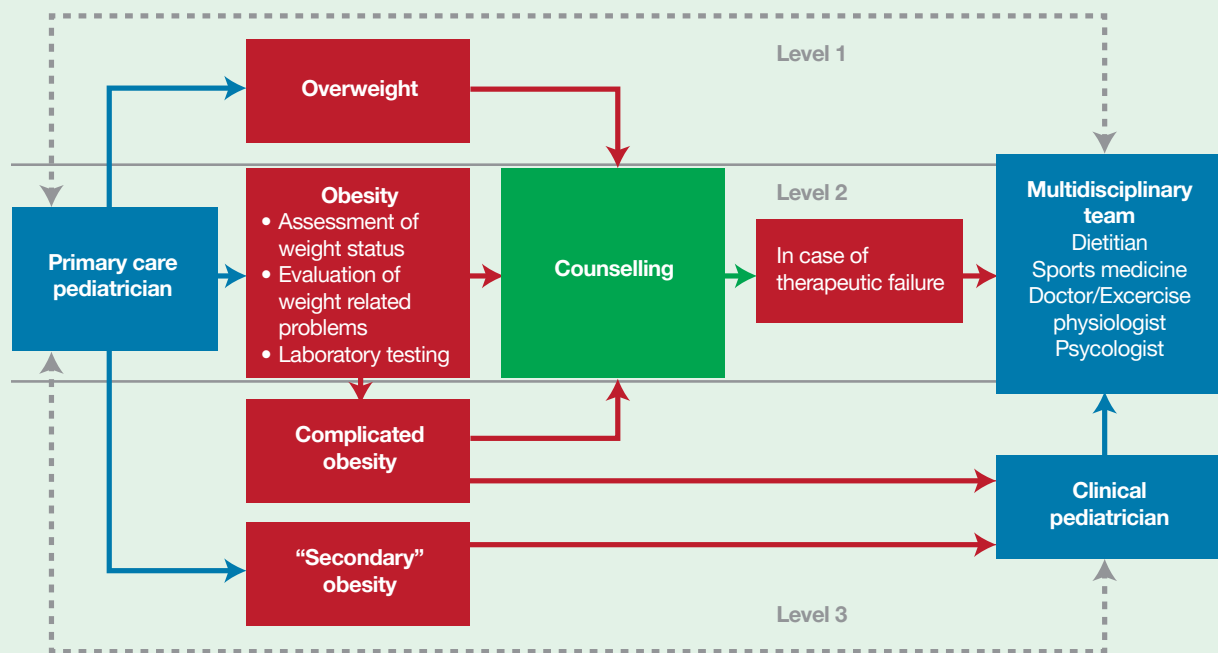
Emilia-Romagna is an administrative region in north-east Italy, with a population of almost 4.5 million, of whom 21% are overweight, with a prevalence of obesity in children aged 8–9 years of 8%. Most parents of children with overweight have a wrong perception of their children’s weight, 7 of 10 parents consider that their children eat a fair or even insufficient amount of food, and 3 of 5 mothers of sedentary children consider that their children have an adequate level of physical activity.

Obesity prevention and treatment require a holistic approach, with policies in many sectors to improve population health and reduce inequity. In Emilia-Romagna, a network of service providers for children with overweight and obesity was established, and a family-based, multi-component intervention including nutrition, physical activity and psychosocial support is delivered by trained

multidisciplinary teams. The approach requires regional leadership and good communication and collaboration among all care providers. The regional “Guidelines for early detection, assessment and treatment of childhood obesity” were launched in 2013 (regional regulation D.G.R 783/ 2013). Training in childhood obesity prevention and management was organized for all PCPs in Emilia-Romagna, in which 35 dietitians, 15 sports medicine doctors and various public health specialists and psychologists have participated.

The project is based on three levels (Fig. 5): level 1: PCPs; level 2: multidisciplinary team consisting of a dietitian, sports medicine doctors, an exercise specialist and a psychologist (on request) expert in childhood obesity; level 3: tertiary care intervention by a clinical paediatrician and a dietitian in hospital.

Fig. 5. The three stages of obesity management in Emilia Romagna.



The stages of treatment include a progressive increase in the degree of supervision, counselling and intervention. The first and second levels are provided in primary care; from stages 2 to 3, treatment is tailored to the needs and status of each patient. The second-level assessment and intervention are conducted at public health centres or at departments of public health by the multidisciplinary team.

The level of treatment is based on the child’s age, BMI percentile and success in previous stages of treatment. The initial assessment includes diagnosis of

weight-related comorbid conditions and assessment of dietary history, physical activity and any significant behavioural components. During treatment, each team member uses the same tools, such as motivational interviewing and behavioural modification. Families meet the team experts together.

In cases of therapeutic failure, the PCP refers the child to the second-level multidisciplinary team. The third-level intervention involves 10 interventions by the dietitian (75 min for the first contact, 30 min for follow-up visits) and 4 interventions by the sports doctor (60 min for the

first contact, 30 min for follow-up visits), with supervision by a trained paediatrician. Children with secondary obesity, severe obesity or obesity-related comorbid conditions are referred directly to a clinical paediatrician in hospital for the tertiary care intervention.

A standard evaluation framework is in place to assess the quality and effectiveness of the weight management

services, with three types of regional evaluation indicator: anthropometrics, lifestyle changes (eating habits, sedentary and physical activity) and equity. A reduction in mean BMI z-score was observed in both children and adolescents with overweight and obesity. The practice of childhood obesity management has been evaluated in an equality impact assessment, a health equity audit and a health impact assessment.

Case study: The SLOfit system for surveillance, screening and case-finding by use of advanced information technology for integrated services (systematic recording, data management and data-sharing)

Rationale: The SLOfit system is the Slovenian population-based surveillance system of children’s anthropometric and fitness. It is based on a standardized protocol and can also identify individuals who are overweight or have obesity, track their weight trajectories and give them feedback. It can share the data with primary care providers if necessary and if the family gives the permission.

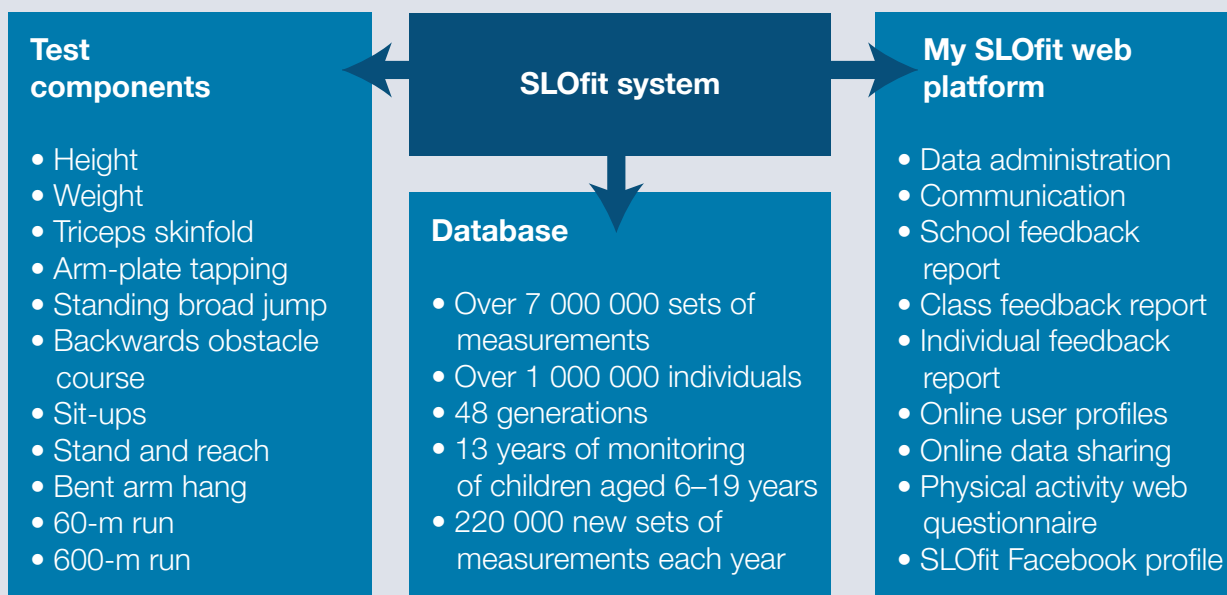
SLOfit consists of three parts: the database, the test components and the My SLOfit web platform (Fig. 6).

The test components consist of three anthropometric measurements and eight fitness tests. The components have been unchanged for the past 31 years and allow

direct comparison of results among generations and, importantly, between parents and children. All schools are equipped with the standardized equipment, and all physical education teachers receive theoretical and practical information on the measurement procedures and data management and interpretation in four different subjects during their 5-year university course.

At present, the database contains the data of more than half the Slovenian population. Every year, over 95% of all primary-school children (6–14 years) and over 80% of all secondary-school students (15–19 years) are measured and their data included in the database.

Fig. 6. Overview of the SLOfit system.



The My SLOfit web platform was developed in 2017 and was pilot-tested in 2018. Schools can input data directly online. It also functions as a direct communication channel between the data centre at the Faculty of Sport and teachers in schools. The platform enables automated generation of school, class and individual reports on the status of physical development, the status of physical fitness and the history of physical and fitness development at all three levels. Besides feedback on all tests, the platform also provides an analysis of nutritional status based on BMI and triceps skinfold.

Institutional integration: The SLOfit system is financed by the Ministry of Education, Science and Sport, and the cost of data processing is around 0.15 € per child per year. It is mandatory for all schools to measure children every April and to send the data to the Faculty of Sport for analysis. The participation of children is voluntary and based on written positive consent. Parents give consent in the first grade of primary school and can withdraw it any time; in secondary schools, students give consent every year. Only the data of children for whom consent has been given are sent to the Faculty of Sport and included in the SLOfit database.

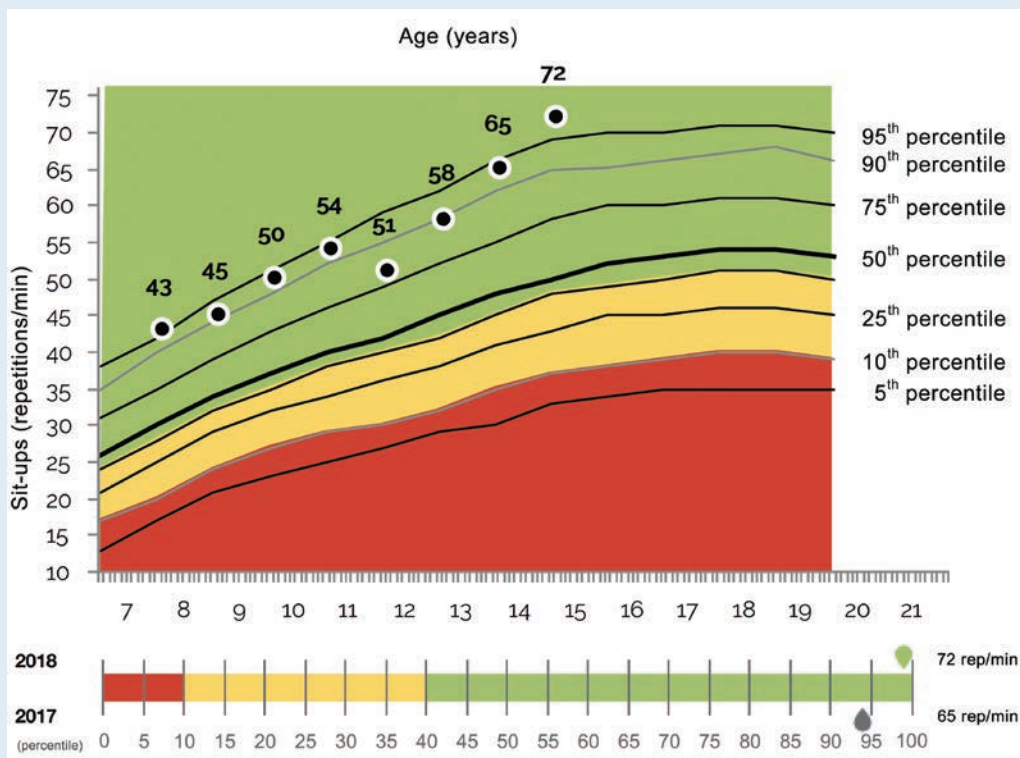
The measurements are linked to the physical education curriculum, as physical education teachers monitor children's somatic and fitness development annually and educate them about it. The Ministry of Health does not provide any funding to the SLOfit system, although it

uses national and regional data on the nutritional status of children through the National Institute of Public Health.

Data management: Management of the data follows an official protocol, bound to legislation on school data management and personal data protection. Every child with positive consent has a personal SLOfit chart, an official paper document, signed and stamped by the school. This document is kept in school throughout schooling and is given to children when they leave the school.

Data collection and input: Data collection is prescribed by a uniform protocol. Data can be entered through four different channels. Previously, schools used paper sheets to send the data to the Faculty of Sport, where the information was digitalized by double input. Currently, only 15 schools still use paper. In 2007, an Excel® sheet was introduced, so that schools now enter data in digital form and send it to the Faculty of Sport on discs or by password-protected e-mail. In 2014, E-assistant and LoPolis – the two providers of software for school administration – developed the Sports Chart module that allows schools to enter data from smartphones or portable computers during measurements and to prepare the data to be sent to the Faculty of Sport by password-protected e-mail. As this module presented an additional cost for schools, a SLOfit administrative module was developed, which

Fig. 7. Example of SLOfit individual report on sit-up results.



allows schools to enter data directly into the SLOfit database via secure connections, free of charge. This module also changed communication into a two-way form, as My SLOfit provides direct communication between school administrators and the national level.

Data cleaning: When data are received on paper sheets, Excel® sheets or via E-assistant or LoPolis, they are cleaned at the Faculty of Sport with specially designed software that enables semi-automated cleaning and logical control of data. A new My SLOfit system has also been developed, in which data are checked and cleaned during input, and the system automatically warns a teacher if the attempted input is not realistic, outside the expected values or considerably different from the child's previous results. After initial cleaning, the data are checked and cleaned again by the national administrator at the Faculty of Sport.

Data analysis: After the data have been checked and cleaned, all test results are standardized and compared with national norms. In standard data analysis, z-scores per age and sex are calculated for each test result, and a physical efficiency index is calculated as a mean value of all fitness test z-scores.

In the new My SLOfit analysis, data are standardized as percentiles, and a physical fitness index is calculated as a percentile of the mean of percentiles of the results of all fitness tests plus BMI and triceps skinfold. Additionally, the data are graphically represented in health-risk zones, in red: high health risk, orange: increased health risk and green: low health risk (Fig. 7).

Feedback: The standard printed reports include a list of children in each class, with raw and standardized z-score data. Z-scores are also calculated per class, grade and school and compared with national norms. The reports are printed and sent back to the schools. Schools that use the E-assistant or LoPolis administrative tools automatically receive cleaned data on their school profile and can use the integrated feedback tools to construct graphical feedback for each child. In the new My SLOfit system, school data can be used to produce feedback reports after they have been checked and confirmed by the national administrator. After confirmation, the school administrator is automatically informed that the data are ready for feedback; simultaneously, parents receive an automated message that the data of their children for the current year are accessible in their personal My SLOfit profile. In schools, the administrator and all authorized teachers can produce reports on the school, class or individuals. The reports are quite elaborate and focus on children who are facing difficulty in somatic and fitness development.

Data utilization: The primary function of the SLOfit system is to provide standardized, objective data on children's somatic and fitness development for physical education teachers as a basis for informed planning of lessons, individualizing teaching, identifying children with developmental difficulties and monitoring their progress. It also enables schools to implement and monitor all sorts of intervention programmes for reducing obesity and improving physical fitness through increased physical activity.

The secondary function of the system is to provide feedback to parents and make them aware of their children's advantages, disadvantages, risks and opportunities of anthropometrics and fitness development. Parents may decide to share the data on their children with school physicians, paediatricians, family physicians or sport coaches to give them a better insight into their child's development and progress.

A tertiary function of the system is to provide local and state governments with objective data that can be used for planning policy, implementing interventions, evaluating them and steering actions.

Personal data protection: As described above, the data are collected and uploaded by one physical education teacher in each school who is authorized to submit data and communicate with the national administrator at the Faculty of Sport. The owners of the data are the schools and the parents (in primary school) or students (in secondary school). Schools must keep data for 1 year after a child leaves and then destroy the data. In the new My SLOfit system, students may ask for permanent storage of their data in their profiles. SLOfit data are stored on a secure server, on which each school (and parents of children at that school) can access only their own data. Only the national administrator can access all the data. School administrators manage only the data from their own school. My SLOfit follows the General Data Protection Rules of the European Union in contracts between schools and the Faculty of Sport and between the Faculty of Sport and the Ministry of Education, Science and Sport. Parents and secondary-school students provide consent for the data to be stored and used for research purposes. The Faculty of Sport does not share personal data with third parties under any condition, and no violation of personal data has been recorded in the past three decades. Schools are also not allowed to share the personal data of children with third parties. Third parties such as school physicians can access a child's data only upon electronic invitation, sent by the parents or by secondary-school students or by official, written parental authorization.

3.1.2.4 *Diagnosis, assessment and risk stratification*

Appropriate care for overweight and obesity begins with recognition of elevated BMI by a health care provider and screening for obesity-related comorbid conditions (55). Currently, multiple, slightly different definitions are in use in the countries in the WHO European Region to diagnose overweight and obesity in children (56). National guidelines refer to various frameworks for classifying weight status but are mainly based on the WHO standards (57), the International Obesity Task Force reference (58) and/or national criteria. Previous studies showed that identification of overweight and obesity is problematic in practice, particularly for younger children and those with milder obesity (55, 59). Challenges are also found in screening for obesity-related comorbid conditions and assessment of risk associated with the severity of obesity and on the presence of comorbid conditions (i.e. risk stratification).

In most of the countries analysed, overweight or obesity in children is diagnosed in primary care or in specialized care by physicians or medical specialists. *Armenia, Denmark* and *Malta* mentioned that school nurses may also diagnose childhood obesity, and public health nurses in *Norway*, dietitians and nurses in *San Marino*, nurses in *Romania* and nutritionists in *Israel* are also authorized to make a diagnosis. *The Netherlands* has a unique system, Youth Health Care, in which all children are screened regularly for overweight or obesity by a youth health care nurse or doctor. GPs and specialists such as paediatricians may also establish a diagnosis at specialized care level, and dietitians and physical therapists may diagnose obesity. The professionals involved in diagnosis in the different countries are listed in Table 5.

If risk stratification is performed at all, it is done predominantly by physicians in primary or specialized care to screen for underlying causes and assess obesity-related comorbid conditions. Screening for obesity-related cardiovascular risk factors such as hypertension or type 2 diabetes is more common than searching for mental comorbid conditions like anxiety or depression. Risk classification is taken into account in planning the management plan in only half the survey countries (*Netherlands, North Macedonia, Norway, Romania, San Marino, Serbia, Slovakia*, and in some institutes in *Denmark*).

In *Hungary*, diagnosis of obesity is the sole responsibility and task of medical doctors, mainly in primary care by school doctors or PCPs. This depends, however, on the individual commitment of the doctor and the possibility of local referral to treatment services. Classic cardiovascular risk factors are given some attention in primary care, while mental comorbid conditions are rarely sought; therefore, assessment or evaluation is usually conducted in specialized care (at an in- or outpatient department), where specialists assess the underlying causes and/or weight-related comorbid conditions more comprehensively.

In *England*, overweight or obesity may be diagnosed by a school nurse (according to the National Child Measurement Programme), a GP or another health care professional. The severity of obesity is defined from the International Obesity Task Force growth reference charts. For example, a child with a BMI standard deviation score (SDS) > 2.00 is classified as having obesity, and a child with a BMI SDS > 2.67 units as having severe obesity.

In *Italy*, generally, PCPs diagnose overweight and obesity, and, if the obesity is mild and there are no metabolic complications, they treat the child and the family. At specialized childhood obesity clinics, expertise is available from paediatricians, dietitians, psychologists, nurses, physiotherapists, physical activity trainers and other specialists. Generally, paediatricians diagnose obesity and its complications and decide on the treatment plan.

In *Sweden*, diagnosis of overweight and obesity is the responsibility of health professionals in child health care centres or in health centres for older children, according to a wide range of criteria among centres and regions. There are no regulations or recommendations for stratification of risk in the diagnosis, and treatment strategies are decided locally, at every level of care, on the basis of internal procedures, regional standards and the availability of evaluation measures (e.g. psychological and socioeconomic parameters might affect strategies if health professionals have access to such data). In specialized clinics and specialized obesity health teams, age- and gender-adjusted BMI is the main measure for stratification of children's overweight and obesity, with cut-off points usually at > 30 or > 35 kg/m².

3.1.2.5 *Treatment of children with overweight or obesity*

The report of the WHO Commission on Ending Childhood Obesity (13) urges implementation of an integrated package of recommendations along the life-course to provide prevention and management services. The provision of appropriate family-based, multi-component, lifestyle obesity management services through universal health care is one of six evidence-informed recommendations from WHO for the support of families of children who are already overweight or have obesity.

(i) *Primary care*

Primary care providers are generally the first point of contact with the health system for children with overweight or obesity. Thus, primary care has a unique role in both the prevention and the identification, assessment and treatment of childhood obesity. For example, primary care providers may be expected to screen children for overweight and obesity by regular evaluation of their BMI percentile (60). The European Society of Endocrinology recommends (61) that children or adolescents with a BMI ≥ 85th percentile be evaluated for potential comorbid conditions (pre-diabetes, diabetes, dyslipidaemia, pre-hypertension,

Table 5. Professionals involved in the diagnosis of childhood obesity by country and by setting in the 15 surveyed countries.

Country	School	Community	Primary care	Hospital or out-patient clinic
Armenia	School nurse		GP	Endocrinologist
Austria	School doctor		GP, PCP	Paediatrician
Denmark	School nurse (health visitor)		GP psychologist	Paediatrician
Estonia			GP	Paediatrician, endocrinologist
Germany			PCP	Paediatrician
Israel			GP, nutritionist	Paediatrician
Latvia			GP, PCP	Paediatrician, endocrinologist
Malta	School nurse		GP	
Netherlands		Youth health care nurse and doctor	GP, dietitian, physical therapist	Paediatrician, other medical specialist
North Macedonia			GP	Paediatrician
Norway			GP, public health nurse (except for severe obesity)	Above iso-BMI 30: referral to specialist for diagnostic work-up is recommended Above iso-BMI 35 and/or in the presence of comorbid conditions: specialized care is recommended
Romania	School doctor		GP, nurse	Paediatrician or endocrinologist, diabetes, nutrition and metabolic diseases specialist (evaluation of weight-related problems, laboratory testing)
San Marino			PCP, nurse, dietitian	Paediatrician, nurse, dietitian
Serbia			PCP	Paediatric dietitian, endocrinologist, psychologist, other special care providers
Slovakia			PCP	Paediatrician, endocrinologist or, for comorbid conditions, diabetologist, cardiologist

GP, general practitioner, referred to as a “family physician” in some countries; PCP, primary care paediatrician

hypertension, non-alcoholic fatty liver disease, polycystic ovary syndrome, obstructive sleep apnoea and psychiatric disorders). They also recommend that clinicians prescribe and support intensive, age-appropriate, culturally sensitive, family-centred lifestyle modifications (dietary, physical activity, behavioural) as a first step. Unfortunately, in practice, the likelihood of diagnosis and management of childhood obesity in primary care is low, particularly in the absence of comorbid conditions (59).

Interviews in *Hungary* reinforced this conclusion. Interviewees reported that the majority of children with obesity are referred to and managed in specialized care. They commented that many PCP referrals to specialists are unnecessary and could have been managed in primary care with better professional training and awareness programmes for PCPs, thereby saving time and resources

for the overall system. This example suggests that a more competent primary care workforce could manage children with obesity and reduce the pressure on secondary care; however, managing childhood obesity requires time and skills, thus increasing the work of PCPs, which is a valid consideration that should be addressed with resources and professional development.

In contrast, in *Denmark, England, Norway, Romania, Serbia* and *Slovakia*, childhood obesity care is organized according to risk classification in a stepwise manner. For example, in *England*, children with overweight or first-grade obesity without complications (i.e. tier 2 obesity management) are cared for mainly in the community by para-professionals, and referrals to the next level of care are made only according to clear criteria. An example of progressive stages of care from *Norway* is shown in Table 6.

Table 6. Stages of progressive care in Norway.

Stage	Brief description	Setting	Referral criteria
1	Lifestyle counselling	Child health clinic, school health service Focus on health promotion and prevention	Public approach (all) but also group and individual approaches for follow-up (secondary prevention)
2	Family-based care: individual counselling for patient and families, focus on healthy food, physical activity, reduction in screen time	Child health clinic, school health service, rarely a family doctor	Children with overweight or milder forms of obesity
3	Anti-obesity drugs	Specialist care	Iso-BMI > 35 when other treatment has failed and comorbid conditions are present
4	Bariatric surgery	Rare, only in specialist care	Iso-BMI > 35 when other treatment has failed and comorbid conditions are present

In the *Netherlands*, progressive care is provided on matched care principles, i.e. in a flexible network around the child and parents. This approach results in a wide variety of options for support and care, according to the circumstances of each child and family.

Apart from concern about unnecessary referrals to specialized care, the other significant difficulty in primary care identified in this survey is the shortage of multidisciplinary teams. Even if most countries recommend an integrated, multidisciplinary approach in their childhood obesity guidelines, only *Sweden* (not in all centres or counties) and the *Netherlands* adhere to this principle comprehensively in primary care practice (see section 3.1.1). Dietitians and psychologists were rarely available in primary care. Exceptions were *Denmark, Estonia* (only dietitians in some places), *Israel* (only dietitians), *Malta* (only dietitians),

the *Netherlands* (only dietitians), *Romania* (only in some places), *San Marino, Serbia* (only dietitians) and *Slovakia* (only psychologists). Moreover, only *Slovakia* reported that exercise therapists are available in primary care, and respondents in the *Netherlands* listed social and community workers, who encourage exercise and sports in schools and neighbourhoods. In some countries, physicians are not part of the core primary care team for the management of childhood obesity, and the services are led by either nurses (*Denmark*) or dietitians (*Israel*). A good example of multidisciplinary teams was identified in the largest HMO in *Israel* (see country example below). Lack of communication among primary and specialized care providers was another challenge mentioned by countries.

Table 7 summarizes the obesity management services in primary care in the 15 surveyed countries. Basic healthy

Country example: An intensive family intervention clinic for reducing childhood obesity in Israel

Maccabi Health Care Services is the second largest HMO in Israel, providing primary care services to two million beneficiaries throughout the country. A recent internal analysis indicated that 11.4% of boys and 12.2% of girls aged 2–18 years were overweight, and 8.7% of boys and 7.4% of girls had obesity. These findings were the impetus for development of an intervention programme.

The goal was to establish an intensive, 6-month parent–child treatment programme in family health care. Four Maccabi primary care clinics (combined family and paediatric care) were chosen to host a multidisciplinary team, comprising a paediatrician, a dietitian, a physical activity expert and a social worker. The designated family clinics were operated separately from routine care, with a special space for meetings and physical activity. Parents can approach the clinic but should have a physical referral. Costs are co-paid by the Government and by the parents, who pay only a small amount.

The programme consists of: (i) parent groups for nutrition and healthy behaviour with a dietitian and a social worker every 2 weeks for 6 months; (ii) individual therapy for children, consisting of six individual meetings with a family physician, a physical therapist specializing in children’s physical activity and a dietitian; and (iii) physical activity groups for

children, with individual physical fitness monitoring, twice a week for 6 months. Follow-up is provided by an assigned paediatrician near the children’s home.

Role of each profession in the intervention

The family physician evaluates each child’s capacity for physical activity, diagnoses obesity-related comorbid conditions and orders blood tests if necessary. The physician also explains the risks related to excessive weight to the children and their parents. The dietitian interviews the parents and the child at enrolment, assesses the family’s eating patterns and helps each family to design a programme for a healthier home environment, tailored to their individual needs. In addition, the dietitian monitors each child’s BMI. The physical therapist diagnoses musculoskeletal abnormalities related to obesity and helps each family to plan how to increase the amount of physical activity in their weekly routine. The physical activity coach organizes and facilitates the physical activity groups, often including activities tailored to the specific needs of the children. The social worker, trained in psychosocial counselling, interviews the parents to evaluate their parenting style and helps them to promote a healthier family structure and to increase parental authority if necessary.

lifestyle education and counselling were the two most frequently reported services, while dietary therapy (or advice) was the second. Exercise therapy and drug prescriptions for weight control or for comorbid conditions were rare. Psychosocial counselling was mentioned only by the *Netherlands*.

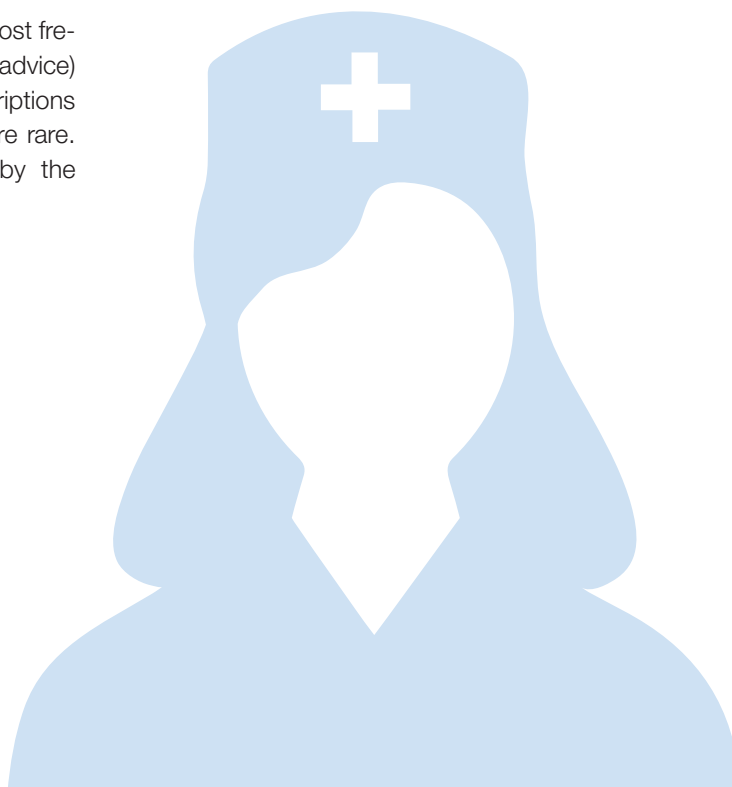


Table 7. Obesity management services available in primary care in the 15 surveyed countries.

Country	Basic education on healthy lifestyle	Counselling	Diet therapy	Exercise therapy	Anti-obesity drugs	Other drugs	Other services
Armenia		x					
Austria ^a	x	x	x	x			Local projects and workshops in some regions
Denmark	x	x	x	x			
Estonia	x	x	x	x	x	x	
Germany		x					
Israel			x				
Latvia	x						
Malta	x	x					
Netherlands	x	x (psychosocial)	x	x			Combined lifestyle interventions
North Macedonia	x	x	x			x	
Norway	x	x	x (advice)	x (advice)			
Romania	x	x	x		x	x	
San Marino	x	x	x	x	x	x	
Serbia	x	x	x		x		
Slovakia	x		x	x			

^a Counselling, dietary therapy and exercise therapy are mainly "out-of-pocket" services and unstructured

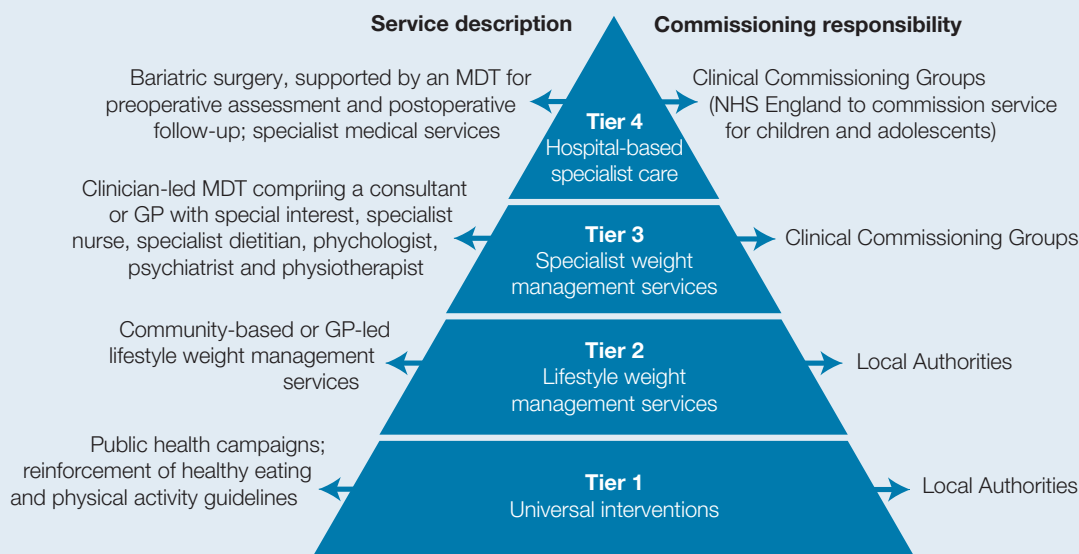
Case study: A clear structure for progressive care: the Obesity Care Pathway for the prevention and treatment of obesity (child and adult) in England.

In England, 20% of children aged 4–5 years, one third at the age of 10–11 years (62) and approximately 36% of adolescents aged 11–15 years (63) have overweight or obesity. Health inequalities have also been widening in recent years, almost twice as many children having overweight and obesity in the most deprived areas as contrasted with least deprived areas. These statistics indicate that childhood obesity in England is among the highest in Europe.

The Department of Health and Social Care oversees health and health care. The Department has an approximate annual budget of £120 billion (137 billion €), most of which is allocated to NHS England, the provider of English health care services. In light of the varied demographics of England and as part of a 2012 devolution

agenda (through the Health and Social Care Act 2012), greater responsibility for health and health care was given to local areas. As a result, 209 clinical commissioning groups (CCGs) oversee local delivery of the National Health Service, and 152 local authorities (i.e. local government organizations) support delivery of public health. Each local authority is coterminous with one or more CCGs. CCGs receive the greatest proportion of funding from NHS England (> £70 billion [80 billion €] per year), and local authorities receive approximately £3 billion (3.4 billion €) per year from the Department of Health and Social Care in the form of a public health grant. Additional monies are retained by NHS England to provide specialist services. These three bodies, NHS England, CCGs and local authorities, are central to the obesity management system in England.

Fig. 8. Tiers in the obesity care pathway and commissioning responsibilities in the United Kingdom.



Source: reference 64
MDT, multidisciplinary team; GP, general practitioner; NHS, National Health Service

England has a four-tiered approach to the prevention and treatment of obesity (child and adult), commonly referred to as the “obesity care pathway” (see Fig. 8). This pathway is widely adopted in England to describe and commission various services for preventing and treating obesity. Tier 1 interventions are primarily for obesity prevention, and tiers 2–4 encompass obesity treatment whereby the degree of support is intensified and becomes more clinical, according to the complexity and severity of a child’s obesity. Tier 2 services are for weight stabilization and maintenance rather than weight

loss. Where funding has been dedicated to weight management, tier 2 services tend to have the following commonalities: (i) community rather than clinically based; (ii) delivered by weight management practitioners (i.e. trained para-professionals); (iii) group-based; (iv) family oriented (e.g. information targeted at both the parent or carer and the child); (v) designed to modify dietary intake, physical activity and sedentary behaviour through behaviour change; (vi) offer weekly sessions lasting 1–2 h for 10–12 weeks; and (vii) no follow up. Other models include school programmes, structured home sessions

with a health visitor and ad-hoc support by a health care professional. The aim of tier 3 services is to bring about clinically meaningful weight loss to improve associated comorbid conditions. Service provision is limited by financial constraints. When tier 3 services are offered (by CCGs or local authorities), they have the following characteristics: clinically based or supervised (e.g. a weight assessment and management clinic); multidisciplinary input; case-based, one-to-one appointments; family oriented; as at tier 2 but also address underlying or presenting complexities and/or comorbid conditions (social or psychological issues); infrequent (e.g. monthly or bimonthly) and continuing appointments, moving between practitioners (e.g. dietitian to endocrinologist to exercise specialist); and possible follow-up (depending on funding). Some services funded through charitable donations deliver tier 3 services in the community in a model similar to tier 2 but providing longer, more intensive support. These services are also designed to address underlying biopsychosocial issues. Tier 4 services are designed to ensure rapid, extensive weight loss by bariatric surgery and/or in residential weight management camps.

Families can access weight management by two routes: active referral by a health care professional or self-referral (usually only for tier 2 services). Some local authorities have started to commission integrated healthy lifestyle services, whereby triage (or a single point-of-access) is used to place the child and family in the most appropriate care. Similarly, other providers may adopt a stepped care approach, in which the intensity and type of support offered depend on the needs of the family. Triage and stepped care approaches are uncommon in England. Tiers 3 and 4 are accessed mainly by referral from health care professionals.

Children have to meet certain criteria to be eligible to access tier 2 weight management, often with an age- and gender-standardized BMI above a given percentile (> 85th or 91st centile). For access to tier 3, children should have severe obesity (> 99.6th centile) or obesity (> 95th or 98th centile) with associated comorbid conditions (e.g. type 2 diabetes, fatty liver disease or hypertension diagnosed according to appropriate clinical protocols). Tier 4 services are usually available when previous treatment efforts have been deemed unsuccessful.

This pathway serves multiple purposes. First, it enables weight management services to be classified into one of the three treatment tiers. Secondly, it helps practitioners to identify the appropriate treatment for children with obesity and to maintain a record of the results of treatment. Lastly, and from a more strategic perspective, it facilitates the coordination and funding of obesity management systems (e.g. who provides which tier of intervention).

There is no national or ring-fenced funding for managing childhood obesity. Local authorities and CCGs are predominantly responsible for delivering the obesity care pathway, and local areas are left to decide whether services should be provided and who should commission which services. Some services may be sustained by charitable donations and/or research grants. On transfer of public health into local authorities during 2013 (after instatement of the Health and Social Care Act in 2012), they were required to provide several mandatory services, which did not include the prevention and treatment of obesity (child and adult), so that local authorities can choose whether to commission services for obesity. CCGs and the National Health Service are also not mandated to provide obesity treatment per se but may help manage and treat associated comorbid conditions.

There is no formalized framework for commissioning which body (local authorities, CCGs or NHS England) should fund the four tiers of intervention. Tier 1 services – often referred to as obesity prevention – are coordinated and funded primarily by local authorities, and tier 2 weight management services are also often coordinated and funded by the local authority public health function. The commissioned providers, procured by competitive tendering, usually deliver community- or school-based weight management services. At tier 3, the picture is more complex, as this is a grey area for commissioning; some CCGs and some local authorities may commission this service. Given that the commissioning framework is not formalized, political and financial tensions mean that tier 3 services are rarely provided. Tier 4 services are commissioned by NHS England sub-regionally and may include access to bariatric and metabolic surgery. Access to tier 4 is very limited (four or five centres in England) and is always allocated case by case. Children up to 18 years are rarely referred for surgical procedures.

(ii) *Specialized care*

Children with obesity, particularly those with severe obesity and comorbid conditions, are generally referred to paediatric endocrinologists or to obesity specialists for further evaluation and management. Specialists can help to identify the underlying causes, if any, search for comorbid

conditions and deliver treatment plans. If nonsurgical treatment fails, they can consider the possibility of bariatric surgery, although, because of its risks, this option is available only for older children in a few countries (see Table 8). In some cases, specialists also oversee follow-up visits.

Table 8. Obesity management services available in specialized care in the 15 surveyed countries.

Country	Basic healthy lifestyle education	Counselling	Diet therapy	Exercise therapy	Anti-obesity drugs	Other drugs	Bariatric surgery	Other
Armenia		×						
Austria	×	×	×	×			×	Psychosomatic treatment (not specific to obesity)
Denmark	×	×	×	×	×	×		Psychological counselling
Estonia	×	×	×	×	×	×	×	× (for adults)
Germany	×	×	×	×	×	×		
Israel	×							
Latvia	×	×	×	×		×	×	× (one case)
Malta	×	×	×	×	× (advice)		×	× (for adults)
Netherlands	×	×	×	×				Cognitive therapy
North Macedonia	×	×	×					
Norway	×	×	×	×	×	×	×	× (advice) × (advice) × (after unsuccessful treatment) × (after unsuccessful treatment)
Romania	×	×	×		×	×	×	
San Marino	×	×	×	×	×	×	×	× (for adults)
Serbia	×	×	×	×	×	×	×	
Slovakia			×	×		×	×	× (only for adolescents with exception from Ministry of Health)

Multidisciplinary teams are more likely to be available in specialized than in primary care (Table 9) in the participating countries. The challenge appears to be the heterogeneity of service provision in terms of content and implementation (e.g. inpatient versus outpatient care, length of treatment, availability of multidisciplinary teams) in each country. Various reasons were given. For instance, *Sweden* mentioned lack of a national guideline, *Austria* lacks a national network of service providers, while interviewees

in *Italy* reported lack of a national quality assessment system. Several countries highlighted poor communication among primary and specialized care providers as well as between specialists, so that care is often fragmented. Countries emphasized the inadequate number of specialized centres in light of the growing number of children with obesity and severe obesity.

Table 9. Professionals available in specialized care in the 15 surveyed countries.

Country	Nurse	Paediatrician	Childhood obesity specialist	Dietitian	Exercise therapist	Psychologist	Other
Austria	×	×	×	×	×	×	Social worker, social pedagogue
Denmark	×	×	×	×	×	×	Medical laboratory technologist
Estonia	×	×	×	×	×	×	
Germany	×	×	×	×	×	×	
Israel		×		×	Physical activity trainer	×	Social worker; team managed by a nutritionist
Latvia	×	×	×	×	×	×	Paediatric endocrinologist
Malta	×	×		×			
Netherlands	×	×		×	×	×	Rehabilitation specialist
North Macedonia	×	×		×		×	
Norway		×		×			
Romania ^a	×	×		×	×	×	Endocrinologist; cardiologist; diabetes, nutrition and metabolic diseases specialist
San Marino	×	×		×		×	
Serbia	×	×	×	×	×	×	Physical education teacher
Slovakia	×	×		×	×	×	Endocrinologist, diabetes specialist, cardiologist

^a The professionals listed are not available in every school.

Country example: DELTA: a collaboration between Delmenhorst Institute of Health Promotion and the Paediatric Clinic Delmenhorst in Germany: integration of specialized and community care

DELTA was established in the late 1990s by a local non-governmental organization and private association for obesity prevention, Verein GIK e.V., as an inter-disciplinary, multi-component programme for obesity care and management, in cooperation with a public paediatric hospital and a private advocacy group (Verbraucherzentrale Bremen). The activity was started in the endocrinology outpatient clinic for children, which specialized in diabetes care, and was driven by the lack of therapeutic options for children with obesity. Since 2009, the programme has followed the German guidelines for the diagnosis, treatment and prevention of obesity in childhood and adolescence of the Adiposity in Children and Young Adults Working Group and has been certified as an outpatient institution.

The approach evolved from classical models of counselling and changes to dietary behaviour towards a more holistic approach that also included psychology and exercise. Multi-component cognitive behavioural therapy involves meetings of groups of 12–14 children

(and their parents) for at least 12 months, with bi-weekly 90-min lessons and many weekend activities, such as shopping and cooking healthy food in a group workshop.

Patients are recruited by the specialized outpatient clinic for paediatric diabetes and endocrinology and are referred to this institution by GPs and PCPs (in private medical offices). Follow-up is for at least 1 year; longer follow-up is preferred. The development of individual weight status is documented in a nationwide database (Adipositas Patienten Verlaufsdokumentation), which is a scientific initiative of the University of Ulm (65).

The team comprises nurses, medical doctors, psychologists, nutritionists, exercise physiologists and trainers in various sports, all of whom are specially trained. A contractual fixed network of sports clubs and one private trainer have been established to guarantee sustainability. Partners are the local hospital (outpatient clinic), the nurses' training school and private therapists.

In the questionnaire survey and the interviews, only 3 of the 19 countries reported that they had a quality assessment system. That in *Norway*, however, run by the Government, has limited scope, only monitoring implementation of national guidelines at community level by sample screening. *England* has a more comprehensive evaluation framework, first published in 2009 and updated in 2018 (66) and widely used throughout the country. The aim is to provide support for tier 2 obesity management interventions and to identify successful programmes. Of the participating countries, *Sweden* has the most advanced evaluation system, a national registry for childhood obesity (BORIS), which is a database for paediatric treatment of childhood obesity, administered by the National Centre for Childhood Obesity at Karolinska University Hospital. BORIS was launched in 2005 and has been used widely since 2008. The platform is supported financially by the National Board of Health and Welfare and the Swedish Association of Local Authorities and Regions. While its content and the process for registering treatments and patients in the system could be improved, it is often mentioned as an important resource by the health professionals working in the field.

(i) Management of severe obesity

Currently, there is lack of consensus on a definition of severe obesity in children (severe obesity may be a synonym for “morbid obesity” or “extreme obesity”) and on

the method used to define it (69). The WHO growth reference curves (70) allow extrapolation of a cut-off to define severe obesity at +3 z-scores relative to the median, while the Centers for Disease Control and Prevention in the USA use the age- and gender-specific 99th percentile and above of their growth curves to identify children with severe obesity (69). In 2012, the International Obesity Task Force provided revised cut-offs, including the criteria for defining morbid (severe) obesity (58). According to the latest COSI data, severe obesity affects 1–5.5% of 6–9-year-old children in the WHO European Region.⁶ The prevalence of severe obesity is increasing with age (71).

In severe obesity, all treatment options, including intensive strategies, should be explored, regardless of the presence of comorbid conditions (23). The main rationale for this stance is that obesity is a disease that continues strongly from childhood to adulthood, is an independent risk factor for early mortality and is of a duration and severity that further compound the development of risk factors and chronic disease. Despite the serious immediate and long-term consequences, however, current treatment options are limited in effectiveness and widespread availability. For younger children with severe obesity, lifestyle modification therapy incorporating dietary and physical activity modification supported by behavioural change strategies is the only option. Studies have, however, demonstrated only modest improvements in BMI status, and participants

⁶ Unpublished data. Rates are calculated according to the WHO definition.

Country example: The BORIS registry: a national registry for childhood obesity in Sweden

The BORIS registry is designed to cover the whole range of medical treatments for childhood obesity offered in Sweden, mainly by child primary health care centres, paediatric clinics or specialized obesity clinics and centres (67). It does not include data from school-based obesity interventions, although there are plans to extend its scope once the resources become available. Children up to 18 years of age who are receiving treatment are registered on the platform.

The main aim of the registry is to concentrate, evaluate and follow up the outcomes of obesity treatments in the long-term. The registry is also a repository of obesity treatments available in the country, which are indexed by region, often with a summary of the protocols used by the health professionals involved. The long-term aim is to assure the quality of the treatment available country-wide in order to minimize inequalities in the resources available in different Swedish regions. Another aim is to identify the best-performing treatment strategies for children in different age groups and to trace treatment interruptions and drop-outs. The registry provides support for medical centres that offer childhood obesity treatment and for new centres that plan to initiate specialized obesity interventions.

The registration of new treatments, centres and patients is voluntary, and the administration of BORIS has limited control over which patients are registered and how often their reports are recorded. Each year, notifications for participation in the initiative are sent to treatment centres across the country, but registration of their patients in the database is not guaranteed.

Technically, the registry offers a test environment to familiarize health professionals with its use and interfaces with the widely used *TakeCare* journal for semi-automatic input of patient information. The registry supports the logging of many different types of entry, allowing the creation of patient profiles and registration of initial and follow-up visits, thus creating a longitudinal record of the progress of children during many meetings. The registered data are either obligatory or optional (see reference 67), the obligatory ones including height, weight and BMI-SDS. The system also supports input of common comorbid conditions, body composition measures, circumference, medications, blood pressure, biochemical variables determined by laboratory examinations, reported level of physical activity, relevant family history, socioeconomic and family information and various logs for standardized questionnaires for children and parents used in the field. The registry can therefore be used for monitoring patient progress over time.

Quality indicators

Process measurements:

- At what age was the child's obesity identified in BORIS, and how severe is the obesity in BMI SDS?
- At what age and severity of obesity was the patient referred to a children's clinic?
- Did the patient go to a children's clinic from a general medical office?
- Are school and school health care involved in treatment?
- At what age and severity of obesity were samples taken to measure markers of comorbidity (e.g. solid insulin, blood lipids, blood pressure)?

Performance measurements:

- Percentage of children undergoing treatment who reach a BMI for age and gender below the limit of obesity according to Cole et al. (68)
- Change during treatment expressed in BMI SDS
- Changes in markers for comorbidity
- Percentage of children who interrupt or fail to receive planned care

have generally remained in the severe obesity category and often regained weight after the treatment programme. In adolescents, pharmacotherapy is approved for the treatment of obesity in limited, specific circumstances. In the current survey, for instance in the *Netherlands*, pharmacotherapy is not available for children or adolescents, while in *England* orlistat is the only approved medication but is seldom recommended.

Bariatric surgery, which is generally effective in adults, is at an experimental stage (72) and is therefore not allowed for adolescents in all countries. In the current survey, bariatric surgery is not available for children or adolescents in many countries; e.g. in the *Netherlands*, it is available only for scientific studies, and in *Estonia* it is allowed only from the age of 18 years. If it is permitted and if an adolescent with severe obesity qualifies for surgery, public insurance covers the procedure in *Austria, Estonia, Israel, Italy, Norway, San Marino, Serbia* and *Slovakia*. In *Israel*, there is a national registry of bariatric surgery (see section 3.1.2.1 for more details).

Severe obesity is a complex lifelong disease. Therefore, structured chronic management pathways should be provided to all children and adolescents with severe obesity, ideally by multidisciplinary teams in close collaboration with social care. Our results, however, indicate that this is not the case in the participating countries. Instead, in most countries that reported services for children with severe obesity (*Austria, Denmark, England, Estonia, Hungary, Israel, Italy, Norway, Romania* and *Slovakia*), the typical characteristics of programmes are that they short-term (usually between 1 week to 1 month), provided for inpatients and with no clear concept of after-care. The positive features were multidisciplinary teams, parental involvement and therapeutic education.

For instance, respondents in *Austria* reported that there is no holistic care pathway for children with morbid obesity. Bariatric surgery for adolescents is offered in only a few centres; however, there is no inpatient rehabilitation centre in Austria, and many patients are sent to southern Germany.

In *Romania*, children with severe obesity are managed jointly by the public and private sectors. Children with severe obesity are evaluated and treated in public paediatric hospitals (tertiary care centres) by a multidisciplinary team (general paediatrician, cardiologist, endocrinologist, pulmonologist, dietitian, psychologist). Bariatric surgery is available only in private hospitals. The children are then followed-up in an outpatient clinic (in urban areas) or in the primary care network (in rural areas), with regular (every 3–6 months) check-ups in tertiary care centres. Paediatricians refer children to a dietitian, a psychologist and a coach, and this team offers advice and help to the family

of a child with obesity. The costs are paid by parents, and this service is available only in the private medical system.

Similarly, in *Italy*, the only centre specialized in the treatment of children with severe obesity is not part of the national health service but has a provider agreement. Patients with complications or who are non-responsive to behavioural treatment and patients with secondary obesity (e.g. genetic, endocrine) receive long-term inpatient treatment. The centre is an outpatient day hospital and/or service facility, although hospitalization and residential intensive rehabilitation are possible. The centre also has a regular school service. Bariatric surgery and pre- and post-operative care are offered free of charge to eligible adolescents.

In the *Netherlands*, services for children are based not only on the severity of their obesity but also on other factors that are included in the broad diagnostic phase. An additional option for children with severe obesity is admittance for 1 month to a hospital for extensive diagnosis and assessment. As such patients often have “troubled families”, a systemic treatment approach is used. The inpatient phase is now an intensive (often systemic) intervention that is part of longer outpatient treatment. Nationally, only three centres are authorized to refer children for this inpatient programme. The elements of the 1-month intervention are diagnosis of the underlying mechanisms as far as possible; preparation of a complete, integrated plan, including the goals and post-admission network of care; and, in the case of a serious life-threatening condition, rapid weight loss. Follow-up is weekly during the first period, following by monthly group sessions. The pathway for severe paediatric obesity is usually from community or school health services to primary care (where a primary evaluation is made), then to specialized care (e.g. paediatric endocrine department in hospitals, child obesity clinics or bariatric surgery clinics).

Regional differences in the availability of services were frequently mentioned (e.g. by *Denmark, Estonia, Hungary* and *Sweden*). In general, larger cities offer more treatment options for children with severe obesity, and some facilities (e.g. centres for bariatric surgery) are not present in rural areas.

3.1.2.6 Long-term care and follow-up

The persistence of obesity and of the levels of risk factors over time was first demonstrated in longitudinal studies of children and adolescents, such as those in Muscatine and Bogalusa (USA) (69). Even when BMI was measured at 6 years, children with obesity had the highest prevalence of adult obesity measured 18 years later (nearly 80%) as compared with those in the overweight category. Therefore, there is growing consensus that paediatric obesity, particularly severe obesity, requires chronic management. Data from adult behavioural intervention trials

suggest that continuing behavioural weight management is associated with sustained weight loss and health benefits. Although data on paediatric interventions are limited, when an intervention or professional support lasted longer, the outcomes were significantly better (69).

Most countries (11 of 15) reported that professionals in primary care, community care and specialized care are

those mainly involved in long-term care and follow-up. School health teams were mentioned by *Estonia*, the *Netherlands*, *Romania*, *San Marino* and *Slovakia*. Only 7 of the 15 countries answered the survey question on organization of long-term care. In the *Netherlands*, the integrated care plan ensures long-term care and follow-up when needed. In *Norway*, primary care (in child health clinics and school health services) and family doctors are

Country example: The Čigotica programme: a multidisciplinary, individualized approach for adolescents with severe obesity in Serbia

Faced with a dramatic increase in paediatric obesity, the Serbian Paediatric Association founded the Centre for Prevention and Treatment of Obesity in Children and Adolescents, at the Zlatibor Hospital for Thyroid Gland and Metabolism Diseases in 2008 (73). The Centre developed the Čigotica programme for adolescents with obesity, named after the well-established Čigota programme for adults with obesity, which has been operating since 1989 (74).

Once a young person with severe obesity (BMI > 95th percentile or +2SD for age and gender) is referred by an authorized medical committee, the National Health Insurance Fund provides 21 days of free treatment and rehabilitation in the Centre. Adolescents aged 12–18 years may participate in the Čigotica programme twice, but not in the same year. Children with overweight or mild obesity can enter the programme by self-referral, but they must provide the necessary medical documentation (a paediatrician's opinion and laboratory test results) and pay for their stay. Since foundation of the Centre, about 5700 adolescents with obesity from Serbia and the region have participated in the programme, of whom 15–20% covered their costs.

The Čigotica programme is multidisciplinary, delivered by a team consisting of medical doctors, exercise scientists and psychologists. The programme focuses not only on weight reduction but also on empowering participants to develop and maintain a healthier lifestyle. On the basis of the admission check-up, an individual programme is designed, and the outcomes are evaluated at the end of the programme. During the stay, adolescents with obesity follow a pre-set daily schedule, which consists of 180–210 min of physical activity (hiking, swimming and pool exercises, games, fitness and postural exercises, outdoor activities), workshops, lectures and social activities spread throughout the day.

Čigotica builds up peer support and team spirit, as participants are assigned to peer groups to face the

programme challenges together. The programme enhances participants' fitness and motor skills, and they learn about obesity, a healthy diet and physical activity in interactive ways (e.g. they prepare healthy meals themselves). Psychological support is provided for both short- and long-term effects. Counselling involves both parents and children, as parents are recognized as important partners, even after the end of the programme. A vital part of the programme is a healthy, well-balanced, low-calorie diet (1200–1700 kcal) designed according to current dietary recommendations and individual needs and consisting of three main meals and two snacks each day.

After finishing the programme, each participant receives a certificate and oral and written advice on future health behaviour, including diet (with recipes for their favourite healthy dishes), physical activity and further supervision by their primary care specialist (paediatrician), psychologist and nutritionist. Participants and their families are encouraged to stay in touch with the Centre, which continues to provide guidance and support.

Positive short-term effects of the programme on anthropometrics, body composition and fitness are well documented (74–77). The average weight reduction is 5.39–6.83 kg, the percentage fat loss is 1.42–1.82%, and BMI z-scores decreased by ≤ 0.32 . After completion of the programme, high blood pressure was normalized in about 30% of participants, and triglyceride and total cholesterol levels were significantly decreased. Positive changes in psycho-social functioning have also been reported, although there are no published data on long-term effects. The Centre and the hospital have shared their expertise and experience at professional meetings, collaboration with paediatric units and hospitals and by training and lectures for medical professionals, parents and young people. They publicly advocate for the prevention and treatment of childhood obesity.

at the front line of service, depending on weight status and the comorbidity of the children. Care for overweight and non-morbid obesity is provided at primary care level, in cooperation with the school, nursery school or parents. It is recommended that comorbid conditions and severe obesity be monitored in specialized services at hospitals or outpatient clinics. In *North Macedonia*, clinical paediatricians and dietitians provide long-term care or, if needed, inpatient treatment for children who have obesity and comorbid conditions such as type 2 diabetes. *Austria* and *Estonia* reported that there are no specific rules for structured long-term care for obesity, and practices vary. In *Latvia*, follow-up is performed by outpatient clinics at the hospital in which children were treated.

Of the 12 countries that responded, 6 reported less than one contact per month (*Austria, Estonia, Israel, Latvia, Norway* (usually) and *Serbia*). *North Macedonia, Romania* and *San Marino* reported monthly contacts. In *Slovakia*, follow-up is once a month for the 6 months immediately after diagnosis and once every 3 months thereafter. In *Germany* and the *Netherlands*, the frequency of follow-up meetings is tailored to the child's needs.

In the country interviews, *Hungary* stated that long-term care is the responsibility of PCPs, but, because of insufficient capacity and skills for running obesity management programmes, long-term care and follow-up are usually provided in specialized care in outpatient departments. The frequency of follow-up visits is typically once every 3–6 months for children with comorbid conditions and 6–12 months in the absence of comorbid conditions (only about one third of patients attend these appointments). There are, however, rare examples in which therapy is prescribed and monitored regularly (at 2, 6 and 12 months) by a specialist (e.g. at the lipidology outpatient department of a paediatric clinic in the Budapest), supported by PCPs, physical education teachers and public health nurses. When PCP–public health nurse cooperation works well, public health nurses check regularly whether the children and their families are following the recommended lifestyle changes and attend follow-up appointments.

In *England*, there is no guidance for long-term care and follow-up for childhood obesity management, and it is reported to be infrequent and underfunded. Some services provide longer-term support (e.g. 6–18 months) of different intensities in order to further embed behavioural lifestyle changes. Other services re-engage families at 12 months to obtain follow-up data but not to provide additional support. Long-term support is more likely to be provided at tiers 3 and 4 of the obesity care pathway than at tier 2.

Sweden stated that long-term follow-up is regarded as the responsibility of all health professionals in the chain of care but is rarely prioritized because of a chronic lack of resources. Follow-up of children who exceed the target age range of each centre is an additional challenge. In practice, regions with more resources (e.g. Stockholm County) have more capacity to follow up patients for longer. The duration and frequency of follow up differ by centre, ranging from 3 and 6 months to 3 years and up to 18 years. The Swedish report emphasized that, as in Hungary, the drop-out rates of children and families (especially those that are not performing well) is a serious challenge.

In *Italy*, long-term care and follow-up depend on regional regulations. All the professionals in an obesity centre are involved, according to their expertise, in following up children with obesity. The frequency of follow-up depends on the severity of obesity and the presence of complications. Children without complications are checked monthly and those with severe or complicated obesity once every 2 or 3 weeks. The Italian report also reported a low level of compliance by families, especially after 1 year of treatment. PCPs are important as they often act as a bridge between a clinical centre and patients.

3.1.2.7 School health services

Schools are perhaps the only institutions that reach the majority of children and adolescents almost every day. School health services (SHS) are therefore well placed to contribute to children's and adolescents' health and development and to be an integrated part of preventive and curative obesity management. SHS have a primary care component, as they are the first contact with health care delivery for many children. A previous survey in the WHO European Region (78) indicated that SHS are generally present in the Region but that their potential is underexploited in most countries. While most countries reported that SHS are involved in health promotion (mainly in classroom or group education), they deliver direct medical care in only half the countries (51%) and manage pupils with chronic illnesses or special health care needs in less than half (43%). Most SHS personnel time is spent on screening, then on vaccination and group or classroom health promotion, in that order.

To illustrate the context, we have adapted a table from the previous publication (78) about the organization of SHS in the 19 participating countries, complemented with information from Germany, San Marino and Serbia (Table 10). Most countries reported that their SHS are based in schools, and providers from primary care facilities are involved in some. In the *Netherlands*, SHS is part of a preventive youth health programme.

Table 10. Organization of SHS in the 19 participating countries.

Type of organization	Countries
A. SHS is based in schools	Austria, Denmark, Latvia, Norway, Sweden
B. SHS is a distinct entity or structure in the health system, but SHS personnel are not based in schools; they visit schools in the catchment area according to plans and schedules	England, Israel, Italy, Malta, Netherlands
C. Certain health services are offered by health care providers in primary health care facilities	None
D. Mixture of A and C	Armenia, Estonia, Hungary, Romania
E. Mixture of B and C	North Macedonia, San Marino, Serbia
F. There are no SHS in the country	Germany, Slovakia

In the current survey, the most frequently mentioned professionals in schools were nurses, followed by physicians and psychologists (Table 11). Dietitians were available only in *Romania* and *San Marino*, and exercise physiologists were available only in *Israel*.

Basic education and counselling on a healthy lifestyle are provided in the majority of the participating countries,

while exercise therapy was reported less frequently (Table 12). Dietary therapy was part of the school health system only in *Romania* and *San Marino*, where dietitians were mentioned as members of the SHS team. None of the countries reported the availability of pharmacotherapy (for obesity management or other purposes), in line with the findings of the previous report (78).

Table 11. Professionals available in schools in the 15 surveyed countries.

Country	Nurse	Paediatrician	Physician	Dietitian	Exercise therapist	Psychologist	Other
Armenia	×						
Austria			×			×	GP
Denmark	× (health visitor)		×				
Estonia	×					× (only in some schools)	Social pedagogue
Germany ^a							
Israel		×		×	×	×	
Latvia	×					× (only in some schools)	
Malta	×		×			×	
Netherlands	×		×				
North Macedonia						×	
Norway	×		×				
Romania ^b	×		×	×		×	
San Marino		×		×			
Serbia						×	
Slovakia							Public health professional

^a The professionals listed are not present in all schools in the country.

^b The professionals listed are not available in every school.

Table 12. Services provided in the school health system in the 15 surveyed countries.

Country	Basic healthy lifestyle education	Counselling	Dietary therapy	Exercise therapy	Anti-obesity drugs	Other drugs	Other
Armenia		×					
Austria	×			×			
Denmark	×	×					Dietary advice, exercise advice
Estonia	×	×		×			
Germany							
Israel	×						Nutrition syllabus
Latvia	×						
Malta	×	×		×			
Netherlands	×						
North Macedonia	×	×					
Norway	×	×					
Romania	×	×	×				
San Marino	×		×	×			
Serbia	×	×		×			× (provided by physical education teachers)
Slovakia	×						

^a The professionals listed are not present in all schools in the country.

In the four countries in which interviews were conducted, respondents in *Italy* stated that SHS are less important than paediatricians, who follow every child from birth to 16 years; therefore, neither nurses nor other health professionals are routinely available in schools. Schools are not involved in the treatment of children with obesity, but they offer preventive measures such as guidance for a basic healthy lifestyle. In contrast, *Hungary* has a long-standing history of SHS, and there are currently about 200 full-time school physicians, who provide services on 1 or 2 days a week for one third of all students, and 2500 part-time physicians, who provide services for a minimum of 2 h per week. School nurses and psychologists are also frequently present. In many schools, exercise therapy is provided for children with overweight and obesity, in small groups, who practise adapted physical education as prescribed by the school doctors. The doctors also diagnosis overweight and obesity in children at biannual screening and can refer the children either to PCPs,

school psychologists, adapted physical education groups or therapeutic swimming. In *Sweden*, interventions in schools are usually limited to lifestyle advice and periodic follow-up by school health professionals (mainly nurses); physical educators and school psychologists sometimes participate. Practice varies significantly by school and region. In *England*, school nurses are frequently available, who provide a wide range of measures but mainly health promotion. The informants generally called for a greater contribution of school services to obesity management.

3.1.2.8 Prevention and treatment in the community

While some intensive treatment regimens may provide clinically meaningful results in the short term, maintenance requires a comprehensive approach that closely involves the socio-environmental context (38). Currently, there are few examples of complex, integrated interventions embedded in a community (32).

Case study: The Amsterdam Healthy Weight Programme: an efficient integrated community care model with attention to high-risk social groups

In 2013, the Amsterdam Healthy Weight Programme was introduced in response to rates of childhood overweight and obesity that were substantially above the national average. In 2013, 27 000 children in the City were overweight or had obesity, comprising 21.0% of children under 18 years, as compared with 15.0% nationwide (79). Amsterdam resolved to eliminate overweight and obesity in the City by 2033.

The Programme is a structured, interventionist approach integrated among various departments of local government. A crucial aspect is that it is designed and delivered as an urban policy. The Programme

targets all children under the age of 19 years and their parents, caregivers and teachers, particular those in high-risk social groups. Most of its activities are preventive, but helping children who are overweight or have obesity is another priority. To meet the complex needs of families, every neighbourhood has collaborative agreements among paediatricians, GPs, other health care professionals, parent and child professionals, youth health care nurses, youth counsellors, welfare professionals and community organizations. The aim of the coordinated approach is to increase family autonomy and self-management.

Preventive, curative and related activities

Preventive approaches	Policies and actions
1. A “first 1000 days” approach (from the start of pregnancy until age 2 years)	<ul style="list-style-type: none"> ● Screening of infants at risk of obesity ● Counselling for expectant mothers ● Information provided to pregnant women about healthy diets
2. Schools approach (including pre-schools and primary schools)	<ul style="list-style-type: none"> ● Mothers supported in breastfeeding ● Additional support for adolescent parents and deprived mothers
3. Neighbourhood and community approach	<ul style="list-style-type: none"> ● Primary schools made healthier
4. Healthy environment approach (healthy urban design, healthy food environment)	<ul style="list-style-type: none"> ● Cycle routes made safer ● After-school activities arranged for children
5. Focus on adolescents	<ul style="list-style-type: none"> ● Subsidies for sports club membership for low-income families
6. Focus on children with special needs	<ul style="list-style-type: none"> ● Community health ambassadors assigned ● Working with supermarkets and local food suppliers to modify menus, reduce portion sizes, manage stock better, create healthier checkout environments, use traffic-light labelling posters ● Banning sponsorship of City sports events by companies that sell unhealthy food and drinks ● Reducing the advertising of unhealthy foods in council-owned locations ● Curative approach
7. Helping children who are overweight or have obesity to regain a healthier weight	<ul style="list-style-type: none"> ● Assigning youth health care nurses ● Drawing up care plans ● Ensuring that children with overweight and obesity receive an appropriate level of care ● Communicating behavioural insights



For the “curative” approach (helping children with obesity), more than 20 umbrella civil society, sports, welfare, care and health care organizations were engaged through a “healthy weight pact”, an initiative of Zilveren Kruis and the Amsterdam Healthy Weight Programme team in 2012. Signatories to the pact committed themselves to ensuring that children with overweight receive appropriate care and were introduced to the preventive work of the Programme. The initial commitment did not include funding, but this changed in 2015, when annual funding of 2.5 million € was assigned to the Programme from the City

budget. This is supplemented by about 2.81 million € from the national Government, consisting mainly of short-term funding for specific projects or objectives.

While it is still too early to judge the success of the Programme, the indications are promising. Monitoring of outcomes has shown that the prevalence of overweight and obesity is levelling off, with a 10% decrease in children of all age groups between 2012 (just before the programme began) and 2014, and an even greater decrease, of 18%, was found in very low socioeconomic groups (80).

Key actors and roles (80)

Actor	Roles
Alderman van der Burg	<ul style="list-style-type: none"> ● Made childhood obesity a political priority ● Instigated the Amsterdam Healthy Weight Programme
Mayor and College of Alderpersons	<ul style="list-style-type: none"> ● Provided political commitment and funding ● Required all City departments to contribute to addressing obesity
Department of Social Development	<ul style="list-style-type: none"> ● Provided initial programme leadership to demonstrate that obesity is not just a public health issue
Working groups	<ul style="list-style-type: none"> ● Enable integrated day-to-day work across government departments and other City strategies
Academics	<ul style="list-style-type: none"> ● Contributed to conceptual model of the Programme ● Participate in expert team to provide new evidence, practice and evidence-based insight
Sarphati Amsterdam	<ul style="list-style-type: none"> ● Reviews the efficacy and sustainability of childhood obesity measures
Central care managers (from youth public health team)	<ul style="list-style-type: none"> ● Work with parents and caregivers of children with obesity to coordinate care and listen to individual needs
Schools and teachers	<ul style="list-style-type: none"> ● Support the Programme objectives ● Implement the Jump-in programme to promote healthy eating and drinking and exercise in schools
Parents and caregivers of children with obesity	<ul style="list-style-type: none"> ● Reinforce policies outside the school environment ● Work with health care professionals to ensure individualized care for children with obesity ● Empowered to improve families’ lifestyles by professionals who listen and respond to their needs
Community groups	<ul style="list-style-type: none"> ● Participate in public meetings to provide local information to the Programme ● Make decisions about their own healthy environment

3.1.2.9 Service coverage, reimbursement and funding

While scientific evidence supports the necessity and efficacy of obesity management services, a major barrier to successful implementation in practice is often lack of adequate reimbursement (81).

Table 13 provides an overview of the methods of service coverage in the 15 surveyed countries. Some kind of assessment and obesity management service is ensured by national public insurance in all the participating countries. In some, however, the number of activities covered is very limited (e.g. *Armenia*), while in others a wide variety of services can be used as part of national basic health care covered by public insurance (e.g. *Norway*, *San Marino*, *Slovakia*). Some services are covered by public insurance only if provided in a hospital and not in primary care. For instance, in *Austria*, lifestyle counselling is reimbursed by public insurance only if it provided as an inpatient activity.

Assessment of weight status is covered by publicly funded health care in all the countries, and evaluation of comorbid conditions and lifestyle and obesity management counselling for children with overweight or obesity are reimbursed by public insurance in all the countries except *Armenia* (evaluation of comorbid conditions). Physical activity is covered by public insurance in 9 of 15 countries, although in some countries the availability is limited to cases in which movement restriction is diagnosed (e.g. *Netherlands*). Anti-obesity medications are fully covered by public insurance only in *Estonia*, *Germany*, *Norway* and *San Marino* and are partially funded in *Austria* and *Romania*, while bariatric surgery and the necessary pre- and post-operative services are paid by public insurance in *Austria*, *Israel*, *Norway*, *San Marino*, *Serbia* and *Slovakia*. In *Israel*, each case of bariatric surgery under 16 years of age must be discussed and approved by the national ministerial multidisciplinary bariatric committee. In *San Marino*, the procedure is theoretically covered for children and adolescents; however, paediatric patients are sent to a partner hospital in another country, as surgeons in *San Marino* do not have the necessary expertise. Whereas most countries reported either that there is no private health insurance in the country or childhood obesity management services are not included on the list of services covered by private insurance, a wide variety of services in *Denmark*, *Germany* and *Serbia* are reimbursed by private companies.

Out-of-pocket payment was rarely mentioned as a reimbursement mechanism, but in *Austria*, *Estonia* and *Latvia* a substantial number of childhood obesity management services may be covered out of pocket. Some services are partially covered by the public system but require co-payment; in others, out-of-pocket payment is an option for those who are not eligible for public reimbursement for a certain service.

Only *Estonia*, *Israel*, *Latvia* and *Norway* stated that they have incentives for preventive measures in primary care. In *Israel*, HMOs receive extra funds for organizing multi-disciplinary workshops as part of overweight and obesity treatment. In *Latvia*, primary care providers receive additional payment if they assess weight status. In *Estonia*, the Estonian Health Insurance Fund pays family physicians additional remuneration each year within a quality system that has some obesity-related aspects (see country example below).

The interviews revealed major issues in service coverage, reimbursement and funding in these four countries. In *Hungary*, no obesity management for a child with overweight or obesity is reimbursed publicly, except for cases with complications such as type 2 diabetes. Regular assessment of weight status in primary care and evaluation of comorbid conditions in public hospitals are publicly funded. In *Sweden*, health care for children is provided free of charge to all residents; however, there are significant regional differences in health care budgets and reimbursed services. In *England*, all services for children are free; however, the National Health Service, CCGs and local authorities do not have the resources to commission services at the required scale, and because of the lack of proper funding, services are often not provided in some regions. The issue is further compounded by the fact that obesity is not a mandated responsibility of local authorities or CCGs, whereas mandated services are a priority for public spending. The best situation is probably that of *Italy*, where assessment of weight status and counselling for children and families at the offices of PCPs and evaluation of comorbid conditions in inpatient departments of public hospitals are free of charge. Treatment in obesity clinics is also provided for free for disadvantaged families, while others pay about 20 € for an outpatient visit as co-payment.

3.1.2.10 Education and training

Previous research has shown that the knowledge and attitudes of PCPs and GPs to childhood obesity management are incomplete (82). While there are individual exceptions, there are clear gaps in terms of the components of childhood obesity management, evidence-based guidelines and referral for this disease. Physicians often report lack of information about the causes and comorbid conditions directly linked to childhood obesity. Knowledge, training and education in counselling and behavioural management and techniques for initiating consultations sensitively are other significant gaps. Similar shortcomings have been identified among other health professionals, such as school nurses (83), dietitians and paediatric nurse practitioners (84). A comprehensive curriculum that gives students a solid working knowledge of childhood obesity and its management and the skills required for treatment would create more positive, confident attitudes to patients who are overweight or have obesity (85).

Table 13. Methods of obesity-related service coverage in the 15 surveyed countries.

Country	Assessment of weight status	Evaluation of co-morbidities	Lifestyle counseling for the child	Lifestyle support to parents	Physical activity	Anti-obesity drugs	Bariatric surgery ^a	Long-term care	Follow-up	Other out-patient services	Other in-patient services
Armenia	Public		Public								
Austria	Public, OOP	Public, OOP	Public ^b , OOP	Public, OOP	OOP	Public, OOP	Public, OOP	OOP	OOP	OOP	Public, OOP
Denmark	Public, private, OOP	Public	Public, private, OOP	Public, private, OOP	Private, OOP				Public	Public	Public
Estonia	Public, OOP	Public, OOP	Public, OOP	Public, OOP	Public, OOP	Public, OOP	Public ^c , OOP	Public, OOP	Public, OOP	Public, OOP	Public, OOP
Germany	Public, private	Public, private	Public, private	Public, private	Public, private	Public, private		Public, private	Public, private		
Israel	Public	Public	Public	Private	Private, OOP	Public					
Latvia	Public, OOP	Public, OOP	Public, OOP	Public, OOP	OOP	OOP	OOP	Public, OOP	Public, OOP	Public, OOP	Public, OOP
Malta	Public	Public	Public	Public	Public					Public	
Netherlands	Public	Public	Public	Public	Public ^d						
North Macedonia	Public	Public	Public	Public	Public		OOP	OOP	Public, OOP	Public, OOP	OOP
Norway	Public	Public	Public	Public	Public	Public	Public	Public	Public	Public	Public ^e
Romania	Public	Public	Public	OOP	OOP	Public ^f	OOP	Public	Public	Public	Public
San Marino	Public	Public	Public	Public	Public	Public	Public	Public	Public	Public	Public
Serbia	Public, private, OOP	Public, private, OOP	Public, private, OOP	Private, OOP	Public, private, OOP	Private, OOP	Public, private, OOP	Private, OOP	Public, private, OOP	Public, private, OOP	Private, OOP
Slovakia	Public	Public	Public	Public	Public	Public	Public	Public	Public, OOP	Public	Public

Public, covered by publicly funded health care; private, covered by private insurance; OOP, covered by out-of-pocket payment.

^a Including the necessary pre- and post-operative services

^b Reimbursed if offered in hospital

^c Not for children

^d If movement restrictions are diagnosed

^e In-patient treatment only for some cases of severe obesity

^f Partially

Country example: Pay-for-performance system for Estonian family physicians: a financial incentive for preventive measures in primary care.

Estonia started a pay-for-performance system for family physicians in 2006. Joining the programme is voluntary, and no sanctions are applied for physicians who do not wish to join. The programme is part of family physicians' contracts, as a reward for excellent outcomes, but it comprises a small (2–4%) proportion of the total budget allocated for these physicians. The number participating each year in pay-for-performance has increased, and coverage is now 100%. The system is based on monitoring quality indicators, and the Estonian Health Insurance Fund pays additional remuneration to family physicians each year if a certain number of indicators are met; thus, gaining > 480 points out of the maximum of 640 (> 75%) is considered a “good outcome”. For those with a good outcome, two payments are foreseen: those who achieved 480–539 points (75–84.4% of the maximum) receive 2975 €, and those with 540–640 points (84.5–100% of the maximum) earn 3720 €. Family physicians who achieve < 479 points (< 75% of the maximum) receive no extra payment. As a result, the number with a good outcome increased from 6% to 53% within the period 2006–2012. In addition, each year, the Estonian Association of Family Physicians announces the best family physicians – those

who have attained the most quality indicators – and awards a “quality label” to their practices. In 2018, 85 of 452 practices were awarded, and 15 obtained a maximum quality mark.

The Primary Health Care Quality System consists of three main parts: prevention, monitoring of patients with chronic diseases according to national guidelines and professional competence. Two of the 20 indicators are directly related to weight status assessment of children in the system: examinations of children and general medical examinations of children ≤ 3 years; and examination of pre-school children and health checks at 6, 7 and 8 years of age. Both include anthropometrics for monitoring children's growth according to weight–height charts. Other indicators that can be linked to obesity are monitoring of type 2 diabetes patients, prescription of metformin or combinations of metformin for patients with type-2 diabetes and monitoring of low-risk patients with hypertension. In 2018, two further indicators were added, although they are not directly related to obesity: determination of the albumin:creatinine ratio in the urine of patients with diabetes and hypertension and referrals for e-consultations.

Many of the participating countries stressed the importance of educating health professionals to improve care and reduce stigmatization. Adequately trained and educated professionals was identified as a key element to improve current childhood obesity management. Countries mentioned that, although there is increasing awareness among the general public and health providers, both patients and professionals still often do not recognize childhood obesity as a health problem. North Macedonia reported that “Childhood obesity is still not recognized as an important health problem among primary care physicians, so referrals are usually made for other diseases, and obesity is treated as a side-effect, not the cause of the problem”. The adequacy of education remains a concern in most countries, where students do not receive robust education on childhood obesity. Both the survey and the interview results indicate that less than half of the countries (8 of 19) have mandatory curricular education on childhood obesity for health professionals. Those countries that reported routine, embedded education on childhood obesity, however, described it as either “limited” or as “very limited” in scope and content. Curricular education on childhood obesity is more frequent for physicians (*Denmark, Hungary, Israel, Latvia, Norway, Romania, Serbia and Sweden*) than for other health professionals, such

as nurses (*Israel, Romania*) and dietitians (*Israel, Latvia, Romania*).

If they are interested, professionals can access post-graduate training and courses on childhood obesity management in *Austria* (privately), *England, Israel* (only dietitians), *Malta, Netherlands* (only in some places), *Norway* (public health nurses, GPs and paediatricians) and *Slovakia* (physicians, nurses, dietitians and exercise therapists). In *Romania*, professionals can obtain a master's degree in nutrition and dietetics that includes education on childhood obesity management.

Specific training in obesity management (including childhood obesity) is available in *Denmark* (for health visitors and only privately), *Germany* (for psychologists), *Israel* (for dietitians and nutritionists), *Netherlands* (local initiatives), *Norway* (for public health nurses, GPs and paediatricians) and *Romania* (for physicians, nurses and dietitians). In *Denmark*, private companies also organize courses for clinicians. Respondents from *Denmark* (e-learning) and *Malta* (personnel) also mentioned courses of the European Association for the Study of Obesity. In *Hungary* and *Slovakia*, physicians can acquire specialization in “obesitology” (see country example below), and, in *Italy*, specific

courses are organized by scientific societies, universities and local health units for paediatricians, dietitians, psychologists and, sometimes, nurses. The courses are not mandatory and are free of charge. The content of the courses widely varies, and they are not offered regularly throughout the country.

3.1.2.11 How care management systems address inequalities and the needs of low socioeconomic groups

In most countries in the European Region, low socioeconomic groups are the most vulnerable to obesity (86), and inequities in obesity are passed from generation to generation. Therefore, infancy and childhood are critical periods for interventions to reduce such inequities, including universal access, tailored services, organization of care and capacities in line with local needs and local prevalence. WHO also concluded (86) that there are inequities in access to health care services throughout the European Region, including the prevention and treatment of obesity, which could explain why certain groups fare less well. WHO emphasized the importance of offering both universal and targeted health services, as the latter are based in primary health care and are more sensitive to the perceptions of service users.

In our survey, we attempted to map how countries address these issues. We received few answers to this question, but the issue of inequity arose in other answers and in the interviews. Many countries emphasized the importance of universal access to health care for children in addressing inequalities (e.g. *Denmark, Malta, Norway and Sweden*). Yet, in some countries, important elements of multidisciplinary obesity management programmes, such as dietary and psychological counselling and physical activity for treatment, are not reimbursed if delivered by primary care providers (e.g. *Austria, Hungary*). Geographical differences within countries in the distribution, organization, resourcing and consequently access to obesity treatment services were reported by many countries

(*Austria, Denmark, England, Israel, Italy, Romania, Sweden*). *Denmark* pointed out for example that referral criteria vary within the country, and not all paediatric departments or municipalities offer treatment programmes; therefore, the distance to a treatment setting and services may be significant in some parts of the country and may be a problem for parents who cannot take a day off work or plan appointments. *Austria* reported that weight loss programmes in the country are usually short and are rare in the community. *Romania* also highlighted lack of information and the availability of adequately trained specialists in rural areas, creating inequity in access to high-quality services. In *Israel*, while the HMO that provides the full range of services also has clinics in areas of low socioeconomic status, not all children with obesity can receive treatment because, of the four HMOs in the country, only one offers the full range of obesity management services. *Italy* emphasized that the “regionalization” of health care services obviates standard treatment in all regions. Thus, specialized centres are scattered haphazardly around the country and do not reflect local health needs. There are more centres in the north of the country, where childhood obesity is less prevalent, and fewer in the south, where childhood obesity is a major public health problem. The current health care delivery system is seen as one that does not address issues such as inequalities and specific needs, except for free treatment for patients with low socioeconomic status. In *Sweden*, while health care for children is provided free of charge to all residents, local priorities and motivations strongly affect the management of resources for the treatment of childhood obesity, resulting in significant differences in health practices among regions.

Little sociocultural sensitivity and inadequate attention to the needs of vulnerable groups were mentioned as issues for obesity management systems by a few countries. For example, *Austria* stated that inadequate attention to the needs of low socioeconomic groups is often

Country example: License examination in obesitology in Hungary

The topic of obesity is underrepresented in medical education and continuing medical training in Hungary. Therefore, a framework and conditions for obesitology education and licensing were established in 2012. The license examination for obesitology (regulated by 23/2012, IX. 14, EMMI Decree and by 69/2013 EMMI Decree) is for a specialization, awarded for comprehensive knowledge and skills in a certain area of medicine. It is available for internal medicine specialists, paediatricians, cardiologists and endocrinologists. Training lasts for 16 months, consisting of 12 months in an obesitology inpatient or outpatient clinic (6 months of

obesitology and movement therapy, 1 month of dietetics), 2 months of endocrinology and 2 months of diabetology. The first examination was held on 31 October 2014. About 50 physicians in Hungary have this license, but fewer than 10 practise with children. The expense of the training programme (about 130 € per month) is paid by the candidate to Semmelweis University, which runs the course. Recently, a fellowship programme was initiated to decrease the expense of license training and thus encourage paediatricians to enter the programme.

due to language or other barriers. *Norway* said that it has no general plan for motivating people to change or to tailor treatment strategies for the needs of disadvantaged groups.

Many countries nevertheless mentioned general or specific efforts to tackle inequalities. For example, *Austria* described a health promotion and prevention funding mechanism that includes the issue of health inequities. The National Health Promotion Strategy, part of Austrian health reform, provides a framework for coordinated action and funding in health promotion, especially for State Health Promotion Funds, a new financial pot, and “prevention funds”. To receive funding, measures must be in line with the Strategy and be designed to reduce health inequities (87).

Estonia described several support systems, e.g. schools for children with special needs have more funding, so that more professionals can be involved. Other programmes are available for projects on the management of childhood obesity, such as a personalized approach to child obesity management (included in the Joint action on nutrition and physical activity of the European Union (88)) conducted since August 2014 at the Tallinn Children’s Hospital and Children’s Hospital Foundation.

North Macedonia reiterated that use of public health care services is free of charge to groups with low socioeconomic status. *Malta* said that disadvantaged children have free health care, free school meals and free food packs subsidized by the European Union for families. Malta is conducting research on social determinants of health, including correlations with eating patterns, physical activity and obesity. *Romania* has a national strategy for vulnerable groups. *Serbia* reported that local communities issue annual reports on health and health inequalities in the country, and measures are developed at local level to decrease health inequalities. Reaching vulnerable groups with adequate services is nevertheless seen as a challenge.

In *Hungary*, childhood obesity is considered a complex problem, with strong sociocultural determinants. Parents in low socioeconomic groups often do not have the knowledge, skills or motivation to sustain a lifestyle change. Interviewees said that the health care delivery system has neither the capacity nor the means to consider sociocultural differences and cannot respond adequately to special needs. A “one-size fits all” intervention is used, characterized by a few sessions of lifestyle counseling that are poorly tailored to age, literacy or motivation. It often fails and has a low return, resulting in frustration for both health care professionals and patients. A remark from a public health nurse captures the situation:

The largest population affected by obesity are poorly educated, disadvantaged families and children, in which the parents are already overweight, so these are the families at high risk. It is in vain to tell a child how to do physical exercise or eat if the family does not eat or move that way and if they consider physical activity or running to be high-society fashion. It is certain that this approach will not work for these groups.

In the interviews in *England*, there was consensus among informants that:

the current system is not reducing but conversely widening health inequalities due to lack of access and funding. Given that the obesity prevalence is socially patterned, many tier 2–4 services are not available in areas of greatest deprivation, and, accordingly, have the highest rates of childhood obesity.

In reviewing who accesses current services, some informants noted that recruitment typically reflects people from less deprived backgrounds, the rates of attrition being higher among those from more deprived areas. Recruitment of Black and minority ethnic groups continues to be low in the current system. While efforts have been made, overall engagement is poor. Similarly, little has been done for children with special educational needs and disabilities who are also at increased risk of overweight and obesity. The opportunities for families living in rural areas to access obesity management are also limited.

3.2 Perceived functioning of the system and the main challenges

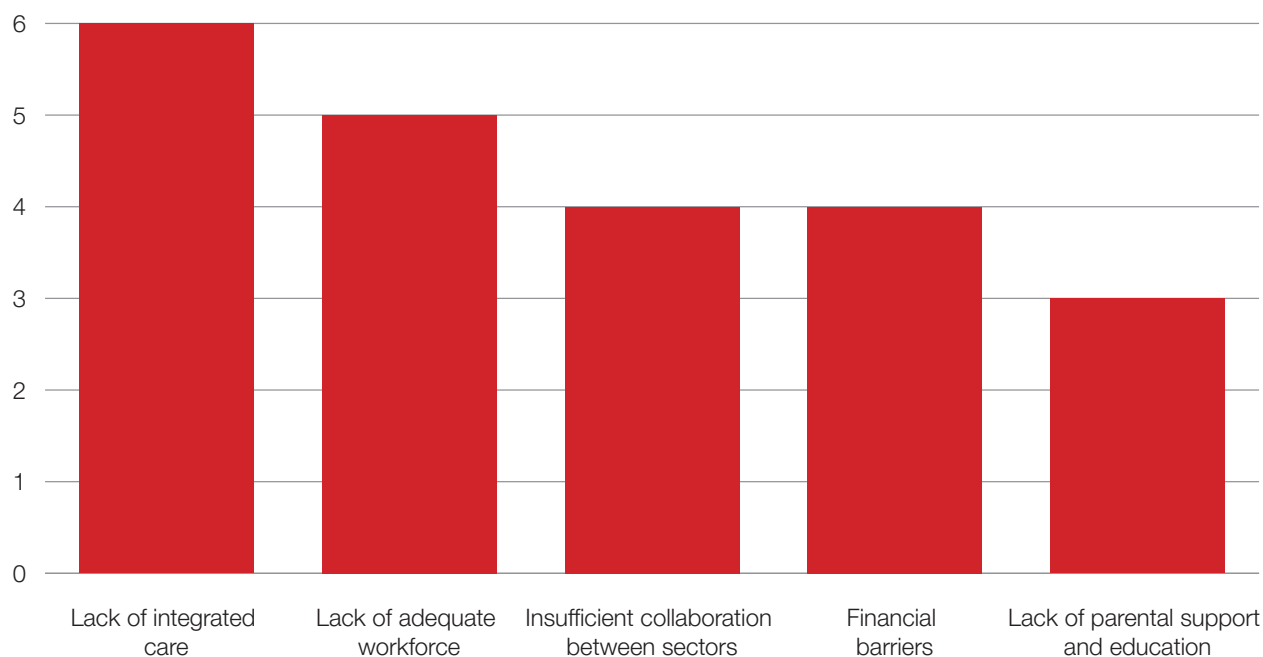
For this topic, we asked country teams in the survey and during the interviews to describe the main challenges, frequent barriers they encounter and potential facilitators of the current childhood obesity management system in their countries.

3.2.1 Challenges and barriers

The most frequent barriers mentioned were fragmentation of care, lack of a well-trained, adequately skilled workforce (both physicians and allied health professionals), lack of multidisciplinary teams, insufficient collaboration among sectors, inadequate reimbursement (in terms of both amount and regional differences in availability) and lack of parental support (Fig. 9).

Countries also cited inadequate recognition of childhood obesity as a disease by service providers, the complexity of childhood obesity and consequently the low rate of

Fig. 9. Most frequently mentioned barriers in current systems.



therapeutic success. *Norway* noted that treatment goals are difficult to achieve as there is no single solution or tool that appears to be effective. A systems approach to lifestyle changes in the family and living environment of the child requires substantial resources and long-term effort. The national guidelines reflect a high ambition, which is difficult to achieve in all regions and communities. Unequal distribution of services within countries was a major issue for some, with lack of proper coordination, which was identified as a significant barrier. Poor community involvement, lack of guidelines and lack of quality evaluation were also mentioned.

In the interviews, countries mentioned similar challenges and barriers. The main challenges identified by interviewees in *Sweden* were lack of centralized coordination and support and lack of standard recommendations and guidelines, such as a national action plan. They pointed out significant differences at every level of childhood obesity management throughout the country, because both prevention and interventions depend on regional bodies in Swedish counties.

In *England*, informants highlighted a number of challenges and barriers in the obesity management system, despite the obesity care pathway. The main one is lack of adequate funding for childhood obesity treatment, resulting in lack of service provision. Moreover, there is no agreement about who should fund which tiers of the obesity care pathway, and there are no targets, compounded by the absence of Government guidance. Informants agreed that, if the current system continues to operate as it does, health inequalities are likely to widen.

The main challenges and barriers in *Italy* are the low priority for childhood obesity on the political agenda and therefore lack of a national programme for prevention and management. Other challenges were cited as lack of collaboration between primary and secondary care specialists and between the health system and the school system, inadequate time for physical activity in and out of school, few facilities for physical activity for children and adolescents with obesity and few with reduced fees. Another important challenge is ensuring that adequate resources are allocated to regions where the prevalence of childhood obesity is high, as the geographical distribution of childhood obesity treatment is currently unequal due to haphazard regionalization of the health care system. Inequalities in childhood obesity and the special needs of low socioeconomic families are another challenge. The main barriers therefore are lack of financial resources, inadequate attention by health policy-makers and inadequate education and training of PCPs, especially in the regions.

Interviewees in *Hungary* said that, despite increased awareness, the situation of children with overweight or obesity is not solved. Children with overweight are considered to be in particular danger, as the current system pays more attention to children with obesity or severe obesity, whose treatment is more straightforward in specialized care settings. The interviewees emphasized that childhood obesity cannot be managed solely by the health care system, and an integrated social programme is required to halt the problem. Important steps have been taken in primary prevention in Hungary, such as introduction of daily physical education, a public catering act and a public health product tax, but secondary

prevention is more problematic. The system of childhood obesity management was considered unstructured, with weak progression and vertical integration of care. Coordination among different care settings is another challenge. Although most of the interviewees, in both primary and specialized care, were convinced that childhood overweight and obesity should be prevented and treated in the community with paramedical services, in practice, primary care and its gate-keeping function in childhood obesity management are insufficient. Consequently, children with obesity are evaluated and treated mainly at the level of specialized care, usually without sufficient pre-assessment. Interviewees pointed out the lack of defined patient pathways for children with overweight or obesity.

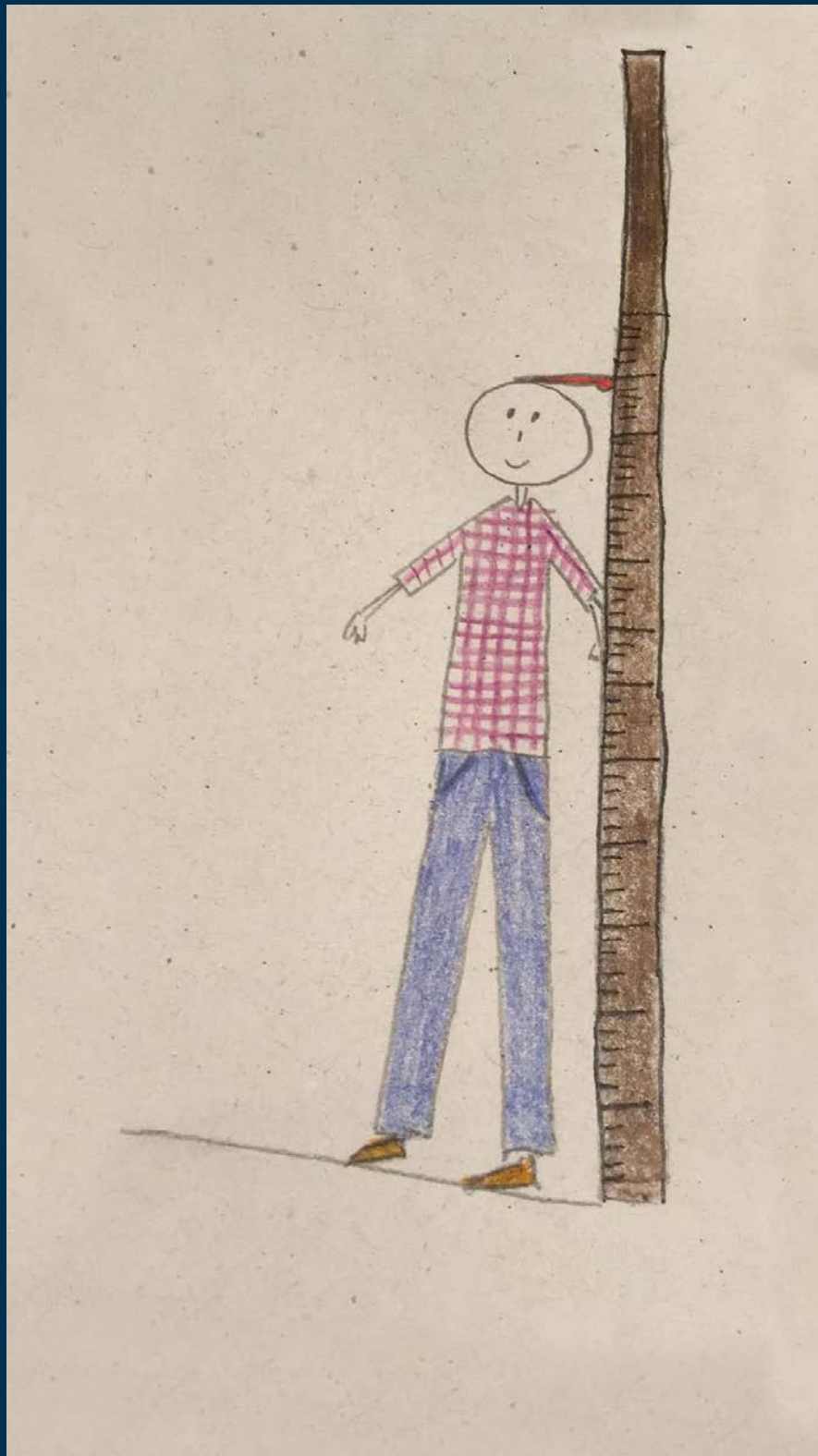
3.2.2 Facilitators

A few countries mentioned facilitating factors. *Estonia* for instance pointed out the engagement and will of professionals. *Israel* said that the nutrition departments of HMOs and training courses result in more efficient management. Some countries said that establishment of a surveillance system such as WHO COSI increased awareness in the population and among decision-makers about the problem of childhood obesity. In *Malta*, this has resulted in a growing number of actions. *Sweden* emphasized operation of the National Quality Registry for Childhood Obesity (67) (see country example on page 38).

Despite the different national contexts, similar challenges and barriers were reported by participating countries. The main challenges and barriers are in various aspects of governance, such as the lack of integrated prevention and care in national childhood obesity strategies, structural and organizational issues in childhood obesity management, weak vertical and horizontal integration of care providers, lack of clear care pathways and guidelines and weak communication and cooperation. Insufficient financial and human resources and insufficient training of medical and paramedical professionals involved in childhood obesity are seen as key challenges. Social and cultural barriers in the populations in greatest need of childhood obesity management are further issues.







4. Conclusions

Overall, the findings show that countries are tackling the problem; however, the health system response does not yet match the scale of the problem, and there are several constraints.

Recognition of childhood obesity as a chronic disease | In most countries, childhood obesity is recognized as a chronic disease by both the responsible authority and health professionals; however, the interviews indicated that, in practice, childhood obesity is not always considered and treated as a chronic disease, particularly in primary care.

Professionals and actors | Primary care services are provided mainly by nurses and physicians in the participating countries, and multidisciplinary care teams are rare.

Governance | Lack of good governance is reflected in the absence of strategic documents on the management of childhood obesity and the shortage of coordinated actions. Although awareness is growing among the general public, health professionals and governments, decision-makers focus more on prevention and less on the organization of disease management.

Guidelines | Most of the countries reported that they have guidelines on childhood obesity management; however, only a few have a single, nationally accepted, widely used, regularly updated document. As the aim is to improve the quality and consistency of care, use of multiple guidelines in one country may decrease the likelihood that all patients will receive treatment and care in the same manner and according to the latest evidence.

Screening and referral for care | All the participating countries reported some national or regional mechanism for evaluating the weight status of all children regularly. Some of the mechanisms, however, are considered to be monitoring or surveillance, and only a few are screening programmes. The pathways are often unclear and based on individual decisions (either personal or by a clinician) in most countries. Nevertheless, some good examples of clear referral criteria and well-described pathways were presented.

Diagnosis and assessment | Overweight or obesity in children is usually diagnosed in primary care or in specialized care by physicians or medical specialists. If risk stratification is performed, it is done by physicians to identify underlying causes and obesity-related comorbid conditions. The result of risk classification is used in the management plan in only half the surveyed countries.

Primary care | Unnecessary referrals were reported by some countries. Education of PCPs and GPs is essential.

There is insufficient communication among primary and specialized care providers.

Specialized care | Multidisciplinary teams are more frequent in specialized than in primary care. A challenge in specialized care appears to be the heterogeneity of service provision in terms of content and implementation (e.g. inpatient versus outpatient care, length of treatment, availability of multidisciplinary teams). Besides, several countries highlighted the importance of better communication between primary and specialized care providers as well as among specialists, as care is often fragmented. There are not enough specialized centres to accommodate the growing number of children with obesity and severe obesity.

Management of patients with severe obesity | Although the prevalence of severe obesity and of serious immediate and long-term physical and psychological consequences is increasing, current treatment options for children with severe obesity are limited in terms of both effectiveness and availability. This is particularly the case for younger children. The available services in the participating countries are characterized by short-term inpatient care with no defined after-care services. Structured management pathways are a priority.

Education | In most countries, medical students do not receive systematic curricular education on childhood obesity, and there are few post-graduate courses on childhood obesity management.

Inequalities | Although countries reported actions to reduce inequalities and ensure equal access to care, the characteristics of the childhood obesity management systems in many countries imply inequities for the population, including differential access to services both regionally and by urban–rural residence due to various aspects of health care systems and social and language barriers. One of the main challenges of childhood obesity management is ensuring access to high-quality services for all. The current systems are not adequate to avoid economic and social inequalities or to respond to the needs of families with the highest burden.

Challenges and barriers | Countries reported similar challenges and barriers, despite their different contexts. The main barriers originate from certain aspects of governance, including the lack of integrated prevention and care in national childhood obesity strategies, structural and organizational issues of the system, weak vertical and horizontal integration of care providers, lack of clear care pathways and guidelines and weak communication and cooperation. An important challenge is to ensure equal access to services and the capacity to respond adequately to the social and cultural needs of the populations most in need of childhood obesity management.



5. Considerations for Member States

On the basis of the country assessments, published literature and expert experience, Member States might consider the following suggestions for responding more effectively to the challenges posed by childhood obesity. A well-designed response could reduce within-country inequalities in access to care.

1. Strengthen governance to ensure coherent, connected actions at national, regional and local levels.
2. Establish well-resourced, adequately trained, multidisciplinary primary health care services.
3. Consider an increased contribution of school-based services to current obesity management systems.
4. Ensure proper financing.
5. Introduce incentives linked to service quality.

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Annex 1. Country questionnaire

Country:

Professions of respondents (*several may apply*): paediatrician / nurse / dietitian / exercise physiologist / public health specialist / psychologist / ministry representative / insurance company representative / other:

.....

In which part of the health system do respondents work: school health / community care / primary care / specialized care / other:

.....

Is childhood obesity recognized as a (chronic) disease in your country?

By the Ministry of Health: Yes No

By health professionals: Yes No

1. GUIDELINES

1.1 Are there any guidelines for childhood obesity screening, assessment or treatment in your country?

Yes, one nationally accepted and used guideline for childhood obesity.

Yes, several parallel childhood obesity guidelines are in place.

Yes, a joint guideline for adult and childhood obesity.

No

If yes, please give title(s) / year of issue / issuing organization / URL:

.....

1.2 If yes, what areas are covered? (*several answers allowed*)

diagnosis

long-term care

classification

organization of care

referral

prevention

treatment

others:

2.3 If yes, what principles are applied? (several answers allowed)

- | | |
|--|---|
| <input type="checkbox"/> integrated approach ⁷ | <input type="checkbox"/> family involvement |
| <input type="checkbox"/> community involvement | <input type="checkbox"/> universal access |
| <input type="checkbox"/> multi-disciplinarity ⁸ | <input type="checkbox"/> progressive care |
| <input type="checkbox"/> self-management support / | |

others:

.....

2.4 If yes, what professional disciplines were involved in the development process? (multiple answers allowed)

- | | | |
|---|--|--|
| <input type="checkbox"/> primary care pediatricians | <input type="checkbox"/> endocrinologists | <input type="checkbox"/> gastroenterologists |
| <input type="checkbox"/> obesity specialists | <input type="checkbox"/> nurses | <input type="checkbox"/> dietitians |
| <input type="checkbox"/> exercise physiologists | <input type="checkbox"/> public health specialists | <input type="checkbox"/> psychologists |
| <input type="checkbox"/> ministry representatives | <input type="checkbox"/> insurance company representatives | |

other:

.....

2. SCREENING AND REFERRAL FOR CARE

2.1 Is there a national or regional mechanism in your country for evaluating the weight status of all children on a regular basis with the purpose of screening⁹ for overweight and obese children?

- Yes No

2.2 If yes, what age groups are covered?

.....

2.3 If yes, what is the time¹⁰ and frequency of assessments¹¹?

.....

2.4 Please name and describe the designated organization(s) responsible for screening:

.....

.....
⁷ A stepwise algorithm for childhood obesity management

⁸ Including diet, physical activity and mental health as well as environmental change and parenting practices

⁹ Including systematic invitation, follow-up of identified individuals and access to treatment

¹⁰ For example, every April or at entry to primary school

¹¹ Annual; every 2–4 years; every 5 years; not routine

2.5 Which professionals are involved in the process of screening? *(multiple answers allowed)*

- school nurses community nurses
 primary care pediatricians dietitians

others:

.....

2.6 In which setting is the first screening implemented?

- school community primary care

other:

.....

2.7 Who is notified about any deviation from the reference curve (i.e. in case of underweight, overweight, obesity or severe obesity)? *(multiple answers allowed)*

- children parents or caregivers school health team
 primary care paediatrician clinical paediatrician

others:

.....

2.8 Please describe briefly how an overweight or obese child is referred to treatment services in your country?

.....

3. DIAGNOSIS, RISK STRATIFICATION

2.1 In which settings do actions related to the diagnosis¹² of childhood obesity and comorbid conditions take place? *(multiple answers allowed)*

- general or family practice health center other primary care
 school hospital out-patient clinic

.....

¹² The process of verifying the presence of overweight or obesity and comorbid conditions

3.2 Which professionals are involved in the diagnosis and risk stratification of childhood obesity and what is their respective role¹³?

Diagnosis:

.....

Risk stratification:

.....

4. TREATMENT OF PEDIATRIC OVERWEIGHT / OBESE PATIENTS

4.1 Who is/are responsible for the organization and coordination of care of overweight and obese children in your country¹⁴?

.....

4.2 Are these services run by the government / nongovernmental organization / private?

.....

4.3 Is childhood obesity care organized by taking into account risk classification of patients?

Yes No

4.4 If yes, please describe the stages of progressive care (incl. setting for each stage and referral criteria)

Stage	Brief description	Setting	Referral criteria
<i>Example: 1</i>	<i>Lifestyle weight management services</i>	<i>Community, school and primary care</i>	<i>Overweight children; either self-referred or identified by screening</i>
1			
2			
3			
4			

¹³ For example, assessment of weight status, evaluation of weight-related problems, laboratory testing, physical activity assessment, dietary behaviour assessment, psychological assessment

¹⁴ If there is a progressive care approach, please name the responsible organization for each stage.

4.5 What type of weight management services are available in the school setting? (multiple answers allowed)

- | | | |
|--|---|---|
| <input type="checkbox"/> basic healthy lifestyle | <input type="checkbox"/> counselling | <input type="checkbox"/> dietary therapy |
| <input type="checkbox"/> exercise therapy | <input type="checkbox"/> anti-obesity drugs | <input type="checkbox"/> other drug therapy
(e.g. anti-hypertension drugs) / |

others:

.....

Which professionals are available in the school setting?

- | | | |
|------------------------------------|--|--|
| <input type="checkbox"/> nurse | <input type="checkbox"/> pediatrician | <input type="checkbox"/> school health physician |
| <input type="checkbox"/> dietitian | <input type="checkbox"/> exercise physiologist | <input type="checkbox"/> psychologist / others: |
-

4.6 What type of weight management services are available in primary care (including community services)? (multiple answers allowed)

- | | | |
|--|---|---|
| <input type="checkbox"/> basic healthy lifestyle | <input type="checkbox"/> counselling | <input type="checkbox"/> dietary therapy |
| <input type="checkbox"/> exercise therapy | <input type="checkbox"/> anti-obesity drugs | <input type="checkbox"/> other drug therapy
(e.g. anti-hypertension drugs) |

others:

.....

Which professionals are available in the primary care (including community services)?

- | | | |
|------------------------------------|--|---|
| <input type="checkbox"/> nurse | <input type="checkbox"/> pediatrician | <input type="checkbox"/> childhood obesity specialist |
| <input type="checkbox"/> dietitian | <input type="checkbox"/> exercise physiologist | <input type="checkbox"/> psychologist |

others:

.....

What type of weight management services are available in specialized care? (multiple answers allowed)

- | | | |
|--|---|---|
| <input type="checkbox"/> basic healthy lifestyle | <input type="checkbox"/> counselling | <input type="checkbox"/> dietary therapy |
| <input type="checkbox"/> exercise therapy | <input type="checkbox"/> anti-obesity drugs | <input type="checkbox"/> other drug therapy
(e.g. anti-hypertension drugs) |

bariatric surgery

others:

.....

Which professionals are available at specialized care? (multiple answers allowed)

- | | | |
|------------------------------------|--|---|
| <input type="checkbox"/> nurse | <input type="checkbox"/> pediatrician | <input type="checkbox"/> childhood obesity specialist |
| <input type="checkbox"/> dietitian | <input type="checkbox"/> exercise physiologist | <input type="checkbox"/> psychologist |

others:

.....

4.7 Please briefly describe the care and health service infrastructure for the treatment of morbidly obese children in your country:

.....

4.8 How does the obesity care pathway integrate with other health and/or social care pathways¹⁵?

.....

4.9 How does the obesity care pathway integrate with prevention initiatives¹⁶?

.....

5. LONG-TERM CARE AND FOLLOW-UP

How are long-term care and follow-up organized in your country, and which professionals are involved?

(multiple answers allowed)

- | | | |
|--|--|--|
| <input type="checkbox"/> primary care pediatrician | <input type="checkbox"/> clinical pediatrician | <input type="checkbox"/> dietitian |
| <input type="checkbox"/> exercise physiologist | <input type="checkbox"/> health educator | <input type="checkbox"/> social worker |
| <input type="checkbox"/> psychologist | <input type="checkbox"/> school health team | <input type="checkbox"/> community health team |

others:

.....

Organization of care:

.....

What is the usual intensity of contact for long-term care?

- less than one contact per month
- monthly
- once every two weeks
- weekly

.....

¹⁵ Among professionals, facilities and/or support systems and also via systems for training, consultation and possible co-management

¹⁶ For example, at policy level or in the school setting

5.1 Is there a database / repository of community resources (e.g. sport clubs, running tracks, healthy eating clubs, etc.) that can be accessed either by the health care providers or by the patients themselves?

Yes No

If yes, please describe:

.....

.....

6. SERVICE COVERAGE, REIMBURSEMENT AND FUNDING

6.1 What basket of services is covered by publicly funded health care in your country¹⁷?

- | | |
|--|---|
| <input type="checkbox"/> assessment of weight status | <input type="checkbox"/> evaluation of weight-related comorbid conditions |
| <input type="checkbox"/> lifestyle and weight management counselling for child | <input type="checkbox"/> lifestyle and weight management support to parents |
| <input type="checkbox"/> physical activity | <input type="checkbox"/> anti-obesity drugs |
| <input type="checkbox"/> other outpatient services | <input type="checkbox"/> bariatric surgery |
| <input type="checkbox"/> pre- and post-operative services | <input type="checkbox"/> other inpatient treatment |
| <input type="checkbox"/> long-term care | <input type="checkbox"/> follow up |
| <input type="checkbox"/> no publicly-funded service for obesity management | |

6.2 What basket of services is covered only by private insurance for childhood obesity management in your country?

- | | |
|--|---|
| <input type="checkbox"/> assessment of weight status | <input type="checkbox"/> evaluation of weight related comorbid conditions |
| <input type="checkbox"/> lifestyle and weight management counselling for child | <input type="checkbox"/> lifestyle and weight management support to parents |
| <input type="checkbox"/> physical activity | <input type="checkbox"/> anti-obesity drugs |
| <input type="checkbox"/> other outpatient services | <input type="checkbox"/> bariatric surgery |
| <input type="checkbox"/> pre- and post-operative services | <input type="checkbox"/> other inpatient treatment |
| <input type="checkbox"/> long-term care | <input type="checkbox"/> follow-up |
| <input type="checkbox"/> no private health insurance in my country | |

¹⁷ Publicly funded services, from general government revenues (taxes) or through a social security system (social health insurance).

6.3 What basket of services is covered only by out of pocket payment in your country?

- | | |
|--|---|
| <input type="checkbox"/> assessment of weight status | <input type="checkbox"/> evaluate weight related comorbid conditions |
| <input type="checkbox"/> lifestyle and weight management counselling for child | <input type="checkbox"/> lifestyle and weight management support to parents |
| <input type="checkbox"/> physical activity | <input type="checkbox"/> anti-obesity drugs |
| <input type="checkbox"/> other outpatient services | <input type="checkbox"/> bariatric surgery |
| <input type="checkbox"/> pre- and post-operative services | <input type="checkbox"/> other inpatient treatment |
| <input type="checkbox"/> long-term care | <input type="checkbox"/> follow up |

6.4 Are there any incentives for preventive measures in primary care (e.g. pay for performance)?

.....

7. EDUCATION AND TRAINING

7.1 Is there any mandatory curricular education on childhood obesity for health professionals?

- yes, but only for physicians
- yes, it is mandatory for physicians, nurses, dietitians, exercise physiologists and psychologists *(if not mandatory for all, please underline the valid options)*
- no

7.2 Are there any national measures to provide post-graduate training to health professionals on the management of childhood obesity? Yes, but only for physicians / Yes, for physicians, nurses, dietitians, exercise physiologists and psychologists *(if not for all, please underline the valid options)*

- no
- if yes, please briefly describe:

.....

7.3 Is specific training in obesity management (including childhood obesity) available in your country?

- yes no

7.4 If yes, for which professionals:

.....

8. OVERALL MANAGEMENT

8.1 Which challenges do you identify concerning the current system?

.....

8.2 What are the main barriers in the current care management system?

.....

8.3 What are the facilitators?

.....

8.4 How does the current care management system address inequalities and the specific needs of low socioeconomic groups¹⁸?

.....

8.5 Is there a standard evaluation framework in place to assess the quality and effectiveness of national and local weight management services?

yes no

If yes, please specify what are the results?

.....

8.6 How would you describe communication and collaboration among different care providers?

.....

8.7 What suggestions do you have to improve the current practice of childhood obesity management?

.....

8.8 Does your country have a patient council?

yes no

8.9 Is the patient council involved in developing childhood obesity management strategies?

yes no

8.10 Is your patient council involved in evaluating your countries' services for childhood obesity?

yes no

8.11 How are weight management services promoted in your country (e.g. TV, radio, newspapers, professional publications)?

.....

8.12 Are there specific target audiences for these promotions? Health professionals, parents, family?

.....

¹⁸ For example, universal access, tailored services, organization of care and capacities are in line with local needs and take into account local prevalence.

9. POSSIBLE CASE STUDY

9.1 Can you identify a national or subnational health service management practice that could serve as an example for other countries?

.....

Country:

Region / City:

URL:

Contact person:

Annex 2. National guidelines

Denmark

Opsporing af overvægt og tidlig indsats for børn og unge i skolealderen. Vejledning til skolesundhedstjenesten / 2014 / Sundhedsstyrelsen (Danish Health Authority) / <https://www.sst.dk/da/udgivelser/2014/~~/media/F7C0D97FB5F840C69CE9388A0BAB4E1B.ashx>

Chapter 5 in this publication: Monitorering af vækst hos 0-5-årige børn. Vejledning til sundhedsplejersker og praktiserende læger / 2015 / Sundhedsstyrelsen (Danish Health Authority) / <https://www.sst.dk/da/udgivelser/2015/~~/media/A72D478EDC6F4298ACEE1E-9AE545BF83.ashx>

The same in short version for GPs, chapter 5: Monitorering af vækst hos 0-5-årige børn. Kort vejledning til praktiserende læger / 2015 / Sundhedsstyrelsen (Danish Health Authority) / <https://www.sst.dk/da/sundhed-og-livsstil/~~/media/C790FDC7890045618F7510DF62DD8D12.ashx>

"Svær overvægt, udredning og behandling hos børn og unge i pædiatrisk regi" / 2014 / Dansk Pædiatrisk Selskab (Danish Paediatric Society) / http://www.paediatri.dk/images/dokumenter/Vejledninger_2016/sv%C3%A6r_overv%C3%A6gt_udredning_og_behandling_hos_b%C3%B8rn_og_unge_i_p%C3%A6diatrisk_regi.pdf

On prevention, identification and early intervention: Forebyggelsespakke – Overvægt / 2018 (version 2013 updated in 2018) / Sundhedsstyrelsen (Danish Health Authority) / <https://www.sst.dk/da/udgivelser/2018/~~/media/92E34F6D5D94489F803C677FE757C3C2.ashx>

Estonia

Students' body weight and its psychological aspects, nutrition and physical activity counselling. A guideline for school health workers (*Õpilase kehakaal, selle psühholoogilised aspektid ning toitumis- ja liikumisnõustamine. Juhend koolitervishoiutöötajale*) / 2007 / Estonian Health Insurance Fund, Estonian Nurses Union, Health Promotion Union of Estonia / URL (in Estonian): http://www.ena.ee/images/KUTSE_ARENG/Opilase_kehakaal_selle_psyhholoogilised_aspektid_ning_toitumis-_ja_liikumisnoustamine.pdf

Remark: Improvements are being made to the "Guidelines for health checks among children up to 18 years of age". The new document will place more emphasis on childhood obesity and treatment.

Germany

Guidelines for the diagnosis, treatment and prevention of obesity in childhood and adolescence. From the Adiposity in Children and Young Adults Working Group Konsensbasierte (S2) Leitlinie zur Diagnostik, Therapie und Prävention von Übergewicht und Adipositas im Kindes- und Jugendalter (Consensus Conference of the Adiposity in Children and Young Adults Working Group at 15.10.2015) <http://www.aga.adipositas-gesellschaft.de/index.php?id=9>

Remark: This guideline is updated annually at a conference during the annual meetings of the German Obesity Society.

Israel

Clinical guideline by the Israel Pediatric Association 2015 https://www.ima.org.il/userfiles/image/clinical_77_hashmana.pdf

Netherlands

Multidisciplinary: National multidisciplinary guideline for adult and childhood obesity: CBO- richtlijn diagnostiek en behandeling van obesitas bij volwassenen en kinderen [Dutch multidisciplinary guideline diagnosis and treatment of obesity in adults and children] 2008 http://www.partnerschapovergewicht.nl/images/Organisatie/CBO_richtlijn_diagnostiek_behandeling_obesitas_08_1.pdf

National multidisciplinary health care standard for adult and childhood obesity: Zorgstandaard Obesitas [Integrated health care standard for obesity management] 2010. Partnerschap Overgewicht Nederland, VU University Amsterdam http://www.partnerschapovergewicht.nl/images/Organisatie/PON_Zorgstandaard_Obesitas_2011_A4_v1_04.pdf

National multidisciplinary model for integrated care for childhood overweight and obesity: Landelijk model ketenaanpak voor kinderen met overgewicht en obesitas [National model integrated care for children with overweight and obesity] 2018 (concept available, final draft expected December 2018) Care for Obesity, VU University Amsterdam https://www.c4o-proeftuinen.nl/images/Landelijk_model_digitaal.pdf

Remark: The health care standard (2010) is based on the guideline (2008). The model (2018) is based on the standard (2010) and the guideline (2008).

Monodisciplinary: Guideline for adult and child obesity for general practitioners: NHG-standaard obesitas [NHG standard obesity] 2010. Nederlands Huisartsen

Genootschap <https://www.nhg.org/standaarden/volledig/nhg-standaard-obesitas>

Guideline for severe adult and child obesity for bariatric surgeons: Richtlijn morbide obesitas [Guideline morbid obesity] 2011 Nederlandse Vereniging voor Heelkunde <https://www.mdl.nl/sites/www.mdl.nl/files/richtlijnen/Richtlijn-morbide-obesitas-final.pdf>

Guideline for childhood overweight for youth health care professionals: JGZ-richtlijn overgewicht [Youth health care guideline overweight] 2012 Nederlands Centrum Jeugdgezondheidszorg <https://www.ncj.nl/richtlijnen/alle-richtlijnen/richtlijn/overgewicht>

Remark: These guidelines are based on the multidisciplinary guideline (2008) and standard (2010).

North Macedonia

Cochrane guideline translated into North Macedonian and published at <http://zdravstvo.gov.mk/wp-content/uploads/2015/11/Prekumerna-telesna-tezhina-i-debelina-kaj-detsa.pdf>

Norway

National guideline for measuring height and weight at regular intervals from birth until 13 years. *The guideline is being revised.* Nasjonal faglig retningslinje for veiing og måling i helsestasjons og skolehelsetjenesten skolehelsetjenesten. Issued in 2010-10-01 by the Norwegian Directorate of Health. <https://helsedirektoratet.no/retningslinjer#k=veiing%20og%20m%C3%A5ling>

National guideline for prevention, investigation and treatment of overweight/obesity among children and youth. Nasjonal faglig retningslinje for forebygging, utredning og behandling av overvekt og fedme hos barn og unge. Issued 2010—07-01 by the Norwegian Directorate of Health. <https://helsedirektoratet.no/retningslinjer/nasjonalfaglig-retningslinje-for-forebygging-utredning-og-behandling-av-overvekt-og-fedme-hos-barn-og-unge>.

Romania

Protocol for diagnosis and treatment in childhood obesity, 2011, Ministry of Health and National Institute for

Maternal and Child Health. Available at: https://iomc.ro/uploads/files/Protocol_de_diagnostic_in_obezitate.pdf

Primary prevention guide, 2016, National Institute of Public Health. Available at: http://cnsmf.ro/ghidpreventie/GhidPreventie_Vol7.pdf

Intervention guide for healthy food and physical activity in kindergartens and schools has been reviewed and distributed in the 42 counties of the country <https://www.edu.ro/sites/default/files/afi%C8%99iere/Invatamant-Preuniversitar/2016/prescolar/ghiduri/Ghid%20pentru%20alimenta%C8%99Bie%20s%C4%83n%C4%83toas%C4%83%20%C8%99i%20activitate%20fizic%C4%83%20%C3%AE%20gr%C4%83dini%C8%99Be%20%C8%99i%20%C8%99coli.pdf> –

San Marino

Modello Regionale di Presa in Carico del Bambino Sovrapeso e Obeso / Year 2013/Regione Emilia Romagna Assessorata Politiche per la Salute (San Marino uses the guidelines of the Emilia Romagna region in Italy region.)

Serbia

National programme for tackling obesity in children and adults / 2018 / Serbian Government / <http://www.pravno-informacioni-sistem.rs/SIGlasnikPortal/reg/viewAct/fd4099d6-cd6c-4171-b0db-cda0cb34aa8f>

Slovakia

Expert guideline of the Ministry of Health of the Slovak Republic on the diagnosis and treatment of obesity in children. Vestník MZ SR - Čiastka 6-15, Dňa 31.marca 2012, Ročník 60 - Odborné usmernenie Ministerstva zdravotníctva Slovenskej republiky o diagnostike a liečbe obezity u detí

Official Journal of the Ministry of Health – Section: 6-15, On March 31, 2012, Vol. 60 www.health.gov.sk/Zdroje?/Sources/dokumenty/vestniky_mz_sr/.../vestnik2012-6...

Annex 3. Country reports

1. England

Prepared by James Nobles, Stuart W. Flint, Joanna Saunders and Paul Gately

Executive summary

Background: One in five children aged 4–5 years and one in three children aged 10–11 years have overweight or obesity. The prevalence is higher in areas of high deprivation, where twice as many children have overweight or obesity than in the least deprived areas. Childhood obesity is a priority for central and local government; the national Childhood Obesity Plan was published in 2016 and subsequently updated in 2018. Both versions of the Plan focused solely on prevention, with no reference to the treatment of childhood overweight and obesity.

Methods: The obesity management system in the context of this report comprises screening, diagnosis and treatment of childhood overweight and obesity. Nine senior informants were interviewed, and key policies were reviewed to create a case study of the English obesity management system. The informants ranged from Government advisors, to endocrinologists and academic experts in childhood obesity. Most held several posts related to obesity.

Results: Those involved in the obesity management system range from school nurses to counsellors, specialist dietitians and bariatric surgeons. In the National Child Measurement Programme, over 1 million children aged 4–5 and 10–11 years are weighed and measured annually, for surveillance rather than for screening. Many health care professionals can diagnose childhood overweight and obesity on the basis of their BMI standardized for age and gender.

England has a four-tiered approach to the prevention and treatment of child and adult obesity, referred to as the Obesity Care Pathway. The Pathway has been widely adopted in England to describe and commission various services for preventing and treating obesity. Tier 1 interventions are primarily for obesity prevention, while tiers 2–4 encompass obesity treatment, the level of support intensifying and becoming more clinical, in accordance with the complexity and severity of a child's obesity. Families can access support by self-referral (predominantly tier 2) or a health care professional referral (tiers 2–4). The four tiers are usually commissioned by local authorities (i.e. local government), CCGs and/or NHS England. Some services are funded by research funding bodies or charities.

Informants highlighted several challenges within the obesity management system, including a significant lack of adequate funding for childhood obesity treatment, which results in lack of services. Furthermore, there is no agreement on who should fund which tiers of the Obesity Care Pathway, and there are no targets, compounded by the absence of Government guidance. Informants agreed that health inequalities are likely to widen if the current system continues to operate as it does. They called for improvements throughout the system.

Study objectives and methods

The broad aim of this study, guided by the specifications of the WHO European Region, was to describe the approach taken in England to screen, diagnose and treat childhood obesity. More specifically, we sought to:

- determine which *professionals* are involved in childhood obesity management and their role in the system;
- understand the *coordination* of the childhood obesity management system in England in terms of provision, settings, funding, access (i.e. entry points) and pathways;
- identify the measures in place to facilitate implementation of the system;
- assess whether the access, uptake and processes of screening, diagnosis and treatment are the *same for all* children with obesity and the extent to which the system addresses health inequalities; and

- obtain stakeholders' views on the functioning of the childhood obesity management system.

The term “childhood obesity management system” as used in this report encapsulates screening, diagnosis and treatment of childhood obesity. To fulfil the study objectives, semi-structured interviews were conducted with senior staff in the system, as outlined below.

Data collection

The authors have extensive applied and theoretical experience of childhood obesity, which helped in initial identification of system leaders. The list evolved over time, as all those interviewed were encouraged to identify peers in a “snowball” sampling method. Nine interviews were conducted between May and June 2018, structured with a question guide proposed by WHO and subsequently adapted to the English context.

The interviewees were representatives of the National Obesity Observatory, Public Health England, the National Institute for Health and Care Excellence committee, the Royal College of Physicians, endocrinologists, central Government advisors on obesity, local government commissioners, weight management providers and higher education. Most had several roles in the obesity management system.

The interviews were not audio-recorded. Instead, a critical listening technique was used, and the research team made notes during the interview.

Data analysis

Once the interview notes were completed, they were re-organized in accordance with the study objectives, e.g. data related to *professionals involved in the obesity management system* were collated. A narrative synthesis approach was then used to use the collated data to answer the study objectives. Documents referred to by interviewees (e.g. guidance, commissioning guidelines) were located to verify and clarify the cited content appropriately. Additional policy documents were used to describe the English context of childhood obesity.

2. Italy

Prepared by Margherita Caroli and Angela Spinelli

Executive summary

The protocol of the survey was slightly changed. We sent the questionnaire for the semi-structured interviews with three extra questions by email to 24 experts, of whom 20 replied. Seven were also asked to fill in the WHO questionnaire. A total of 11 paediatricians, well-known experts in diagnosis and treatment of children with obesity and two public health experts, all working in Italian regions, completed the questionnaire, reporting their daily approach. Although obesity is not recognized as a chronic disease, it is on the National Health Ministry list of conditions requiring “essential levels of assistance”, as it is considered a lifestyle risk factor. Thus, every region is urged to conduct specific preventive activities.

Several national and regional guidelines on childhood obesity are available and used by health professionals. There is no mandatory national screening for childhood obesity, although PCPs generally check children's height and weight. Schools and communities are not involved in treating children with obesity. Instead, they are referred to treatment through PCPs or self-referred. Children with overweight or obesity, without complications, are often treated by PCPs with counselling, whereas obesity with complications is treated in second-level clinics in hospitals by multidisciplinary teams, both as in- and as outpatients. All treatment is covered by the National Health Care System but, due to the limited number of patients who can be followed in second- and third-level centres, visits and treatment at private paediatric and/or nutritionist clinics, paid by the families, are common. The frequency of follow-up visits depends on the severity of obesity and its complications.

Informants reported, however, that the way in which the system works is wasteful and disorganized. There is no mandatory curricular education or national post-graduate training in childhood obesity, and better education and training for health professionals is considered one of the main requirements, with greater financial support by the Government. The surveillance system OKkio alla Salute, the Italian arm of COSI, and the presence of PCPs are the two main means for raising awareness about childhood obesity, improving prevention and starting management of childhood obesity. Most of the respondents were optimistic about future developments in childhood obesity management and considered that, despite the high prevalence of childhood obesity and the difficult political and social situation in Italy, the prevalence of childhood obesity will decrease in the next 10 years.

Materials and methods

In May 2018, the WHO Region proposed that information be collected by interviewing 10–12 stakeholders in different fields of childhood obesity in each country, with a standard questionnaire. From the answers of the respondents, the coordinators were to write a report summarizing the key findings and new insights. A semi-structured questionnaire was also provided for interviews.

Stakeholder identification

MC and AS identified a number of well-known people at national or at least regional level involved in childhood obesity management and policy. The list included experts in public institutions, governmental and regional authorities, academic institutions, scientific societies, hospital paediatricians, family paediatricians, dietitians, psychologists and patients' associations. More experts were identified to cover potential refusals to participation in the survey. Two further names were suggested later by the experts and were included in the survey.

We proposed the semi-structured interview to 24 stakeholders: 1 representative of the National Institute of Health, 4 academic paediatricians actively involved in the field, 6 presidents or representatives of obesity or paediatric scientific societies, 1 psychologist, 1 PCP, the president of the Italian obese patient association, 2 public health experts, 1 paediatrician expert in public health, 2 representatives of regional political institutions, 1 representative of the Ministry of Health, 2 experts in health management, 1 representative of the Ministry of Education and 1 representative of the National Institute of Nutrition.

Data collection

The semi-structured questionnaire was sent by e-mail to each person, with a message that gave the mobile phone number of MC if clarifications were required. If a response was not received within 1 week, a reminder e-mail was sent, followed by a phone call if there was no answer. A third reminder was sent as a text message or phone call. After three reminders, the person was considered a “non-respondent”. The representative of the National Institute of Nutrition refused the invitation to participate because “Institute activities do not include any the clinical approach”. No answer was received to e-mails or phone calls from the president of the obese patient association; the representative of the Ministry of Education did not answer because of bureaucratic procedures; and the president of the Italian Society of Paediatrics did not answer any of the e-mails. Finally, there were 20 respondents.

To assess whether the answers given during the semi-structured interviews were consistent with those to the questionnaire, we sent both to 7 of the 24 stakeholders in different fields of childhood obesity and checked the answers. We found good consistency. Neither the interview nor the questionnaire was sent to nurses or midwives because, according Italian legislation, these professions have no decision-making power in childhood obesity management.

We added three questions to the semi-structured interview to record respondents' “feelings” about the perceived barriers and facilitators for childhood obesity management and their projections for the development of childhood obesity in their country in the next 10 years. The first two questions were used as “controls” to question 8, as the words “functioning” and “challenges” might have been perceived in different ways. We decided to use the words “obstacles” and “favouring factors” to encourage the experts to go into more detail in their replies. The questions, added at the end of the interview, were:

1. In your opinion, what are the obstacles to creating a functioning network to fight childhood obesity, from prevention to treatment?

2. In your opinion, what are the favouring factors for creating a functioning network to fight childhood obesity, from prevention to treatment?
3. How do you think the problem of paediatric obesity will evolve over the next 10 years?

To obtain a whole, clear picture of the real situation of the management of childhood obesity in the Italian regions, we asked a further 11 paediatricians, all personally known as experts working in diagnosis and treatment of obese children, and two public health experts working in different Italian regions to complete the questionnaire, reporting their own daily approach and behaviour.

3. Hungary

Prepared by Viktoria Anna Kovacs and Csilla Kaposvari

Executive summary

Childhood obesity is one of the most serious public health problems of our times. In Hungary and in many other countries, the obesity epidemic seems to have reached a plateau, with a substantial proportion of children overweight or obese. About every fourth child in Hungary is overweight or obese, and the prevalence of severe obesity (age and gender equivalent of BMI ≥ 35 kg/m²) is about 2.5%. Overweight (including obesity) affects about 460 000 children (22.5% of the population in the 2011 census), of whom 45 000 (2.5%) are estimated to be severely obese.

Childhood obesity does not affect every group in society equally, and it shows substantial regional variation. It is more frequent in families in which the parents are already overweight or obese and have a lower level of education or income. There are also regional differences in Hungary. In 2016, the prevalence of obesity among 7-year-old children was twice as high in the southern Trans-Danubia and northern regions than in central Hungary. Similar geographical patterns and inequalities are reflected in adult obesity trends.

Childhood obesity has serious social and health consequences in both childhood and adulthood. Overweight and obesity in childhood undermines physical, social and psychological well-being and is a known risk factor for adult obesity and for many chronic noncommunicable diseases. Obesity changes the structure and functioning of the cardiovascular system in childhood and adolescence. The most significant complications of obesity in childhood are type 2 diabetes, hypertension, depression and anxiety. All these conditions represent major public health challenges in our country.

Main findings

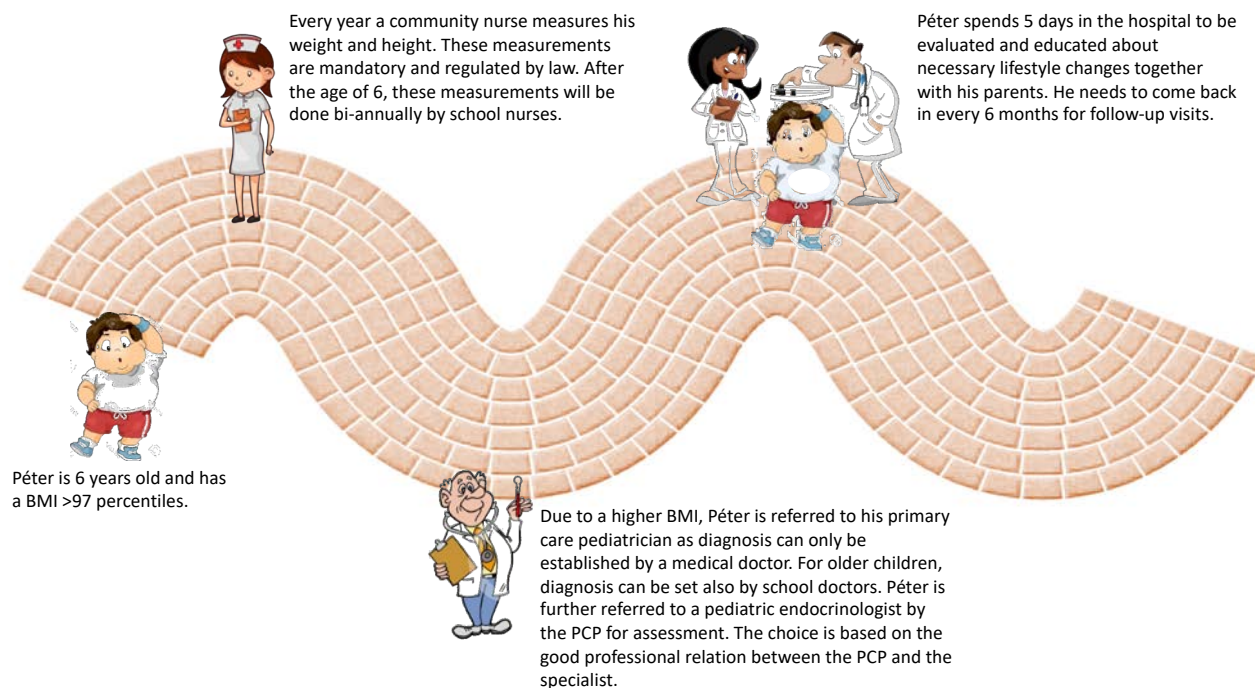
Context, governance and coordination

The Hungarian Society for the Study of Obesity was established in 1992, the first of its kind in eastern Europe. The first official position paper of the Society, endorsed by the Ministry of Health, recognized obesity as a chronic disease in 2002. The Hungarian Society of Obesitology and Movement Therapy was established in 2008. Although some health care and public health strategies mention obesity, the country lacks a coherent intersectoral strategy and action plans to coordinate the fight against childhood obesity in an integrated manner. There is no official professional guideline or directive for the organization of childhood obesity care services. Furthermore, the topic of obesity is underrepresented in medical education and continuing medical training. To overcome this problem, in 2014, the framework and conditions for obesitology education and license examination were established. There is one childhood obesity centre accredited by the European Association for the Study of Obesity in Hungary.

Screening

Screening by public health nurses has been in place for decades in Hungary. Coverage is national, and it is conducted in accordance with guidelines set out in relevant regulations. Screening below the age of schooling (0–7 years) is conducted by community nurses and screening at school age by school nurses. Data management in the school health system is predominantly paper-based, and the electronic systems are not uniform.

Fig. A3.1. Most common pathway for care a child with obesity in Hungary.



BMI, body mass index; PCP, primary care paediatrician.

Health care services

Children with obesity or severe obesity are more likely to enter the health care system than overweight children. There are no multidisciplinary teams in primary care, and other significant problems in primary care are a shortage of workforce, high average age of primary care physicians, and, in “mixed practices”, which are typical in disadvantaged areas, the health services are dominated by GPs without a paediatric specialization.

Assessment, treatment and follow-up of overweight and obese children are done mainly in specialized care. In specialized care, inpatient care services predominate, and this pattern is further encouraged by the present financing system. Patient pathways are not standardized but depend on doctors’ preferences and/or networks. Primary care and long-term care are insufficient, and there is no community care.

Financing

Childhood obesity care services are not financed by social security.

Prevention

A number of important measures have been introduced in the area of primary prevention, including daily physical education in schools and the Public Catering Act. The interviewees considered secondary and tertiary prevention much more problematic.

See Fig. 4 in the main text for the entry points, patient pathways and steps involved in screening, referral, diagnosis, assessment and treatment of childhood obesity in Hungary. Fig. A3.1 illustrates the most common pathway of care for a child with obesity, as ascertained from the semi-structured interviews.

Study objective and methods

The objective of our study was to describe how the Hungarian health system reacts to the childhood obesity problem and, more, specifically to identify and describe:

- the main professionals and their roles in childhood obesity management;
- possible entry points for overweight and obese children to the health system;
- the clinical pathways of childhood obesity management, through screening, diagnosis, treatment, follow-up and long-term care;
- financing and reimbursement schemes and the basket of services covered;
- how the informants perceive the functioning of the system and the challenges; and
- to what extent the management of childhood obesity addresses inequalities and the specific needs of low socioeconomic groups.

For the purposes of this study, we defined “management of childhood obesity” as the organized provision of screening, diagnosis, assessment, treatment and long-term care.

Stakeholder identification

During the initial phase, we mapped possible stakeholders, including professional organizations, institutions and authorities, and relevant legal regulations, guidelines and protocols. During the interviews we identified further stakeholders via the snowball method.

Data collection and analysis

We prepared an interview guideline in line with the study objectives and with topics and questions previously identified in an international narrative literature review. We conducted 15 face-to-face interviews with representatives of the following organizations: Hungarian Society for the Study of Obesity; National Health Care Service Centre; Hungarian Association of Primary Care Paediatricians; Hungarian Society of School Health; Hungarian Association of Public Health Nurses; Ministry of Human Capacities, State Secretariat of the Chief Medical Officer; Department of Public Health Nurses Inspectorate; Hungarian Dietetic Association; Paediatric Clinic Centre, Department of Paediatrics, Medical School, University of Pécs; Semmelweis University Paediatric clinics I and II; Heim Pal National Paediatric Hospital; and psychologists specialized in obesity treatment.

The interviews were recorded and transcribed after informed consent. The texts were analysed and reorganized according to topics relevant to the study objectives. In addition, we reviewed documents and websites for legal regulations, professional guidelines, recommendations, projects, organizations or institutes mentioned in the interviews.

The description of the childhood obesity management system in the report is based on the interviews and the desktop findings. An analysis of the strengths, weaknesses, opportunities and threats in the last section of the report reflects solely the view of the authors. A draft of the report was sent to the interviewees for comments before finalization of the summary report in English.

4. Sweden

Prepared by Ioannis Ioakeimidis

Executive summary

While the prevalence of obesity in certain parts of Sweden appears to be stabilizing (at least in certain age groups (1)), this does not appear to be the case throughout the country. The latest reports on children treated for obesity in Sweden (2) indicate an increase of two to three times in the past 10 years, demonstrating the importance of childhood obesity as a public health issue in the country.

In the preparation of this report, the framework for obesity management in Sweden was assessed in six interviews conducted according to the general guidelines provided by the WHO Regional Office for Europe. The semi-structured interviews addressed various aspects of prevention, screening, diagnosis and treatment of childhood overweight and

obesity as well as training of health professionals to address these tasks. The interviewed stakeholders had expertise ranging from medical advisors to public health authorities, to paediatricians, to specialized nurses and academic experts. The selected informants were or had been associated with several important national administrations for obesity management.

The main issue identified in the management of childhood obesity was lack of centralized coordination and support. Lack of homogeneous recommendations and guidelines (in the form of a national action plan) was identified by every participant. Action against childhood obesity, in both prevention and intervention, appeared to depend on regional actors and practices in the different Swedish counties. Thus, different counties commonly have different practices and dedicate widely different levels of resources to tackling the childhood obesity problem, creating significant differences across the country. Another common reflection was that the related Swedish public health agencies have functional relations with childhood obesity but no well-defined roles in its management. This creates a gap, and there is no dedicated organization with overall responsibility for work on childhood overweight and obesity. A surprising finding was lack of national or local coordination for use of the population surveillance data that are collected during regular health visits of students to school nurses. Stakeholders noted that this important resource is currently unexploited in the management of childhood obesity issues.

The stakeholders involved in obesity management cover a wide range of potentially important players, ranging from national agencies and public health authorities to medical and nursing associations, the association of primary care centres, specialist dietitians, scientific experts and bariatric surgeons, and a significant role of those who influence regional county councils. In general, although Sweden appears to have well-placed structures for population surveillance, especially for preschool children, there is no effective system for screening children and guiding them along the proper treatment pathway.

Methods

Semi-structured interviews with stakeholders

Stakeholders were identified from an initial list, and additional stakeholders were identified by snowballing through the initial interviews and contacts. The questionnaire was based on the interview guidelines used in the Hungarian study, translated into Swedish and adapted to Swedish conditions.

The interviews were recorded and transcribed (in Swedish), and the text was reorganized according to topics in line with the study objectives. An English summary of each interview was then prepared. We conducted six interviews with people who have active connections with the following organizations: Karolinska Institute, Department of Biosciences and Nutrition; Karolinska Institute, Division of Paediatrics; Uppsala University, Department of Food Studies, Nutrition and Dietetics; H2020 European Union project on science and technology in childhood obesity policy; Swedish Association for the Study of Obesity, Childhood Obesity Taskforce of the European Association for the Study of Obesity; European Childhood Obesity Group, National Food Agency, Group of Nutrition and Public Health; Astrid Lindgren Karolinska Paediatric Hospital, Centre for Childhood Obesity Treatment; Stockholm County Council; Academic Centre for Primary Care; Lund University, Department of Preventive Paediatrics; Swedish National Board of Health and Welfare; National Quality Registry for Childhood Obesity (BORIS); Östergötland County, Taskforce for Obese Child Health Care; Linköping University Hospital; Swedish Association of Clinical dietitians; and the Swedish Network for Health Promotion Health Care.

The stakeholders identified were responsible authorities in:

- the ministries of Health and Social Affairs and Education and Research;¹⁹
- the Swedish Association for the Study of Obesity;
- the Swedish Network for Health Promotion Health Care;
- the National Food Agency;

¹⁹ The relevance of the Ministry of Education and Research is surmised but not well defined. Their involvement is through management of the budget for student health; however, it was not possible to identify specific stakeholders responsible for childhood obesity management in this Ministry.

- the Public Health Agency;
- the National Board of Health and Welfare;
- the National Quality Registry for Childhood Obesity (BORIS);
- the Swedish Association of Local Authorities and Regions;
- the six directors of regional health care programmes;
- the National Health Programme Area for Endocrine Disorders;²⁰
- the 21 regional county councils;
- related professional associations: Swedish Association of Clinical Dietitians, Swedish Association for Childhood Obesity, Swedish Association for Obesity Research;
- primary care paediatricians working in health care centres and school health professionals (usually nurses);
- primary care paediatricians, dietitians, nutritionists, nurses, psychologists, counsellors and physiotherapists;
- specialized obesity clinics, mainly located in major population centres and usually associated with university hospitals;
- specialized bariatric surgery for children over 13 years; and
- PCPs, school health professionals and specialized treatment centre health professionals for long-term care and follow-up.²¹

References

1. Eriksson M, Lingfors H, Golsäter M (2018): Trends in prevalence of thinness, overweight and obesity among Swedish children and adolescents between 2004 and 2015. *Acta Paediatr.* 2018;107(10):1818–25.
2. Flodmark CE. Prevention models of childhood obesity in Sweden. *Obes Facts.* 2018;11:257–62.

²⁰ The precise place of childhood obesity in the Programme is not well-defined.

²¹ Practice varies considerably by region and centre.

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.

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