

# **WHO European Childhood Obesity Surveillance Initiative (COSI) Report on the fourth round of data collection, 2015–2017**

# Abstract

The WHO Regional Office for Europe established the WHO European Childhood Obesity Surveillance Initiative (COSI) in 2007 in response to the need for standardized surveillance data on the prevalence of overweight and obesity among school-aged children. The availability of such information is essential to develop effective policies and strategies to tackle childhood obesity in the WHO European Region.

Since its first round of data collection, which involved 13 countries, COSI has grown dramatically: 38 countries participated in the fourth round that took place during the 2015–2016 and 2016–2017 school years, involving more than 250 000 primary school-aged children in anthropometric measurements (36 of the 38 participating countries collected data). In addition, 34 of the countries collected further data on the school environment, and 23 countries collected data on children's diet and physical activity.

The systematic collection and analyses of these data allow intercountry comparisons and a better understanding of the progression of childhood overweight and obesity in Europe. Together, they clearly show that childhood obesity remains a major public health problem in the WHO European Region.

## Keywords:

Child nutritional sciences; Obesity prevention and control; Public health surveillance; Body height; Body weight; Nutrition policy; Schools – education; Cross-sectional studies; Health plan implementation

WHO/EURO:2021-2495-42251-58349

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**Suggested citation:** WHO European Childhood Obesity Surveillance Initiative (COSI): report on the fourth round of data collection, 2015–2017. Copenhagen: WHO Regional Office for Europe; 2021. Licence: CC BY-NC-SA 3.0 IGO.

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# Acknowledgements

This report is made possible through the support, leadership and commitments of Member States participating in the fourth round of data collection in the WHO European Childhood Obesity Surveillance Initiative (COSI), most notably their principal investigators, data collectors, school officials, parents and children participating in the survey.

Overall technical oversight, management and supervision for this initiative was provided by João Breda, former Head of the WHO European Office for Prevention and Control of Noncommunicable Diseases. The main authors of this report are Angela Spinelli, Marta Buoncristiano, Paola Nardone, and Silvia Andreozzi (National Centre for Disease Prevention and Health Promotion, Italian National Institute of Health [Istituto Superiore di Sanità]; WHO Collaborating Centre on Childhood Obesity). WHO European Office for Prevention and Control of Noncommunicable Diseases acknowledges the contribution of the COSI Principal Investigators, who shared data, extensive knowledge, text and comments on the document. All of the Principal Investigators are also co-authors of this document. The WHO European Office for Prevention and Control of Noncommunicable Diseases also sincerely thanks Harry Rutter (University of Bath, United Kingdom) and Wolfgang Ahrens (Leibniz Institute for Prevention Research and Epidemiology, WHO Collaborating Centre, Germany) for overall advice on the design of COSI and its protocol.

Data collection in participating countries was carried out with financial support from the following institutions and organisations: **Albania:** WHO through the Joint Programme on Children, Food Security and Nutrition “Reducing Malnutrition in Children”, funded by the Millennium Development Goals Achievement Fund, and the Institute of Public Health; **Austria:** Federal Ministry of Social Affairs, Health, Care and Consumer Protection, Republic of Austria; **Bulgaria:** Ministry of Health, National Center of Public Health and Analyses, WHO Regional Office for Europe; **Croatia:** Ministry of Health, Croatian Institute of Public Health and WHO Regional Office for Europe; **Cyprus:** Ministry Of Health Cyprus (Health Visitors); **Czechia:** grants AZV MZČR 17-31670 A and MZČR – RVO EÚ 00023761; **Denmark:** Danish Ministry of Health; **Estonia:** Ministry of Social Affairs, Ministry of Education and Research (IUT 42-2), WHO Country Office, and National Institute for Health Development; **Finland:** Finnish Institute for Health and Welfare; **France:** Santé publique France, the French Agency for Public Health; **Georgia:** National Center for Disease Control and Public Health of Georgia and WHO; **Greece:** not available; **Hungary:** WHO Country Office in Hungary; **Ireland:** Health Service Executive; **Italy:** Ministry of Health and Italian National Institute of Health; **Kazakhstan:** Ministry of Health of the Republic of Kazakhstan and WHO Country Office; **Kyrgyzstan:** WHO; **Latvia:** Ministry of Health, Centre for Disease Prevention and Control; **Lithuania:** Science Foundation of Lithuanian University of Health Sciences and Lithuanian Science Council and WHO; **Malta:** Ministry of Health; **Montenegro:** WHO and Institute of Public Health of Montenegro; **North Macedonia:** COSI in North Macedonia is funded by the Government of North Macedonia through National Annual Program of Public Health and implemented by the Institute of Public Health and Centers of Public Health in the country; the WHO Country Office provided support for training and data management; **Norway:** Ministry of Health and Care Services and Norwegian Institute of Public Health; **Poland:** National Health Programme, Ministry of Health; **Portugal:** Ministry of Health Institutions, the National Institute of Health, Directorate General of Health, Regional Health Directorates and the kind technical support of the Centre for Studies and Research in Social Dynamics and Health (CEIDSS); **Romania:** Ministry of Health; **Russian Federation:** WHO; **San Marino:** Health Ministry, Educational Ministry, Social Security Institute and Health Authority; **Serbia:** WHO (Ref. File 2015-540940); **Slovakia:** Biennial Collaborative Agreement between WHO Regional Office for Europe and Ministry of Health SR; **Slovenia:** Ministry of Education, Science and Sport of the Republic of Slovenia within the SLOfit surveillance system; **Spain:** Spanish Agency for Food Safety and Nutrition (AESAN); **Sweden:** Public Health Agency of Sweden; **Tajikistan:** WHO Country Office for Tajikistan and Ministry of Health and Social Protection of Population; **Turkmenistan:** WHO Country Office in Turkmenistan and Ministry of Health and medical industry of Turkmenistan; **Turkey:** Turkish Ministry of Health and World Bank.

In addition, the report was produced with financial support from a grant from the Russian Government in the context of the WHO European Office for the Prevention and Control of Noncommunicable Diseases, and the Ministries of Health of Austria, Croatia, Greece, Malta, Norway and the Russian Federation for financial support for the meetings at which data collection procedures and analyses were discussed.

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Kremlin Wickramasinghe, technical oversight, management and supervision, reviewing the report

Mirjam Heinen: technical support, coordination, reviewing the report

Julianne Williams: technical support, coordination, contribution drafting and reviewing the report

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Jelena Jakovljevic: project coordination, training, support with Round 4 data collection

Liza Jane Villas: administrative support and coordination of country contribution

Gerben Rienk: data management



# Abbreviations

<b>BMI</b>	Body Mass Index
<b>COSI</b>	Childhood Obesity Surveillance Initiative
<b>IOTF</b>	International Obesity Task Force
<b>NA</b>	Not Available
<b>NCD</b>	Noncommunicable Disease
<b>PSU</b>	Primary Sampling Unit
<b>QSU</b>	Quaternary Sampling Unit
<b>SSU</b>	Secondary Sampling Unit
<b>SU</b>	Sampling Unit
<b>TSU</b>	Tertiary Sampling Unit

## Three-digit ISO (International Organization for Standardization) codes for countries included in the report

Country Code	Country Name	Country Code	Country Name
<b>ALB</b>	Albania	<b>LVA</b>	Latvia
<b>AUT</b>	Austria	<b>MAT</b>	Malta
<b>BUL</b>	Bulgaria	<b>MKD</b>	North Macedonia
<b>CRO</b>	Croatia	<b>MNE</b>	Montenegro
<b>CYP</b>	Cyprus	<b>NOR</b>	Norway
<b>CZH</b>	Czechia	<b>POL</b>	Poland
<b>DEN</b>	Denmark	<b>POR</b>	Portugal
<b>EST</b>	Estonia	<b>ROM</b>	Romania
<b>FIN</b>	Finland	<b>RUS</b>	Russian Federation
<b>FRA</b>	France	<b>SMR</b>	San Marino
<b>GEO</b>	Georgia	<b>SPA</b>	Spain
<b>GRE</b>	Greece	<b>SRB</b>	Serbia
<b>HUN</b>	Hungary	<b>SVK</b>	Slovakia
<b>IRE</b>	Ireland	<b>SVN</b>	Slovenia
<b>ITA</b>	Italy	<b>SWE</b>	Sweden
<b>KAZ</b>	Kazakhstan	<b>TJK</b>	Tajikistan
<b>KGZ</b>	Kyrgyzstan	<b>TKM</b>	Turkmenistan
<b>LTU</b>	Lithuania	<b>TUR</b>	Turkey

# Executive summary

The WHO European Childhood Obesity Surveillance Initiative (COSI), established in 2007, has continued to grow not only as a source of reliable and valid data on childhood overweight and obesity, but also in its membership: from 13 Member States of the WHO European Region that participated in the first round of COSI (12 collected data) in 2007–2008 to 38 countries (36 collected data) in the fourth round in 2015–2017, measuring around 250 000 primary school-aged children.

Children's participation in the study was high in almost all countries: it was at least 90% of selected children in 13 countries and between 80% and 89% in 11 countries. Only in three countries did less than 70% of children take part in the study. In addition to anthropometric measurements, information about dietary intake, children's physical activity and inactivity, and the school environment was also collected in several countries.

## **Overweight and obesity prevalence**

Overall, the prevalence of overweight (including obesity) was 29% in boys and 27% in girls aged 7–9 years; the prevalence of obesity 13% in boys and 9% in girls (based on WHO definitions). These overall figures hide a wide variation between countries: overweight prevalence ranged from 9% to 43% in boys and from 5% to 43% in girls, while obesity prevalence ranged from 2% to 22% in boys and from 1% to 19% in girls. As in previous rounds, the data suggest an increasing north–south gradient, with the highest prevalence of overweight and obesity observed in countries of the Mediterranean area, such as Cyprus, Greece, Malta, Italy and Spain. Central Asian countries, such as Kyrgyzstan, Tajikistan and Turkmenistan, had the lowest prevalence.

Round 4 data confirm the gender differences that were observed in previous COSI editions, with overweight or obesity (according to WHO definitions) more prevalent in boys than girls in most countries. Moreover, in those countries that collected data for more than one age group – namely, Estonia, Finland, France, Greece, Italy, Kyrgyzstan, Latvia, Slovenia, Spain and Sweden – there was a tendency for an increase in the prevalence of overweight and obesity by age in both boys and girls.

A decreasing trend in overweight and obesity was observed in five of the 13 countries for which it was possible to compare round 4 figures with those of the first or second round. The reduction in prevalence of overweight in Greece, Italy, Portugal, Spain – all countries with the highest baseline figures – and Slovenia ranged from 4 to 12 percentage points for boys and from 3 to 7 percentage points for girls. Obesity prevalence rates showed a similar trend. In other countries – Bulgaria, Czechia, Hungary, Ireland, Latvia, Lithuania, North Macedonia and Norway – there was a less clear pattern of change over time.

## **Healthy dietary habits**

On average, almost 80% of children had breakfast every day, around 45% ate fruit daily, and around 25% consumed vegetables daily. These overall figures were the result of quite different situations at country level: daily consumption ranged from 49% to 96% for breakfast, from 18% to 81% for fruit, and from 9% to 74% for vegetables. No important gender difference was observed in most countries, though girls were generally slightly keener on healthy food consumption than boys. Parental education appeared to be strongly associated with daily consumption of breakfast, fruit and vegetables, with children of more educated parents more likely to have these eating habits.

## **Unhealthy dietary habits**

Frequent consumption of sweet snacks, found in 27% of children overall, was more widespread than consumption of savoury snacks (14%). The percentage of children eating these unhealthy foods more than 3 days a week varied greatly between countries – from 5% to 62% for sweet snacks and from less than 1% to 35% for savoury snacks. The proportion of children consuming soft drinks on more than 3 days a week also varied widely from country to country, from 1% and 44%.

In almost all countries, no gender difference was observed in the frequency of consumption of unhealthy food, whereas girls tended to be less likely to drink unhealthy beverages than boys. As was observed for healthy food, children of less educated parents were less well placed compared to children whose parents attained a higher level of education, with higher percentages of frequent consumption of sweet/savoury snacks and soft drinks in most countries.

### **Physical activity**

On average, one in two children used active transport (walking or cycling) to and from school, with country-specific figures varying from 18% to 94%. In all countries, most children spent at least an hour daily playing outside (from 62% to 98%). On the other hand, practising sports or dancing for at least 2 hours a week was much less common: on average, only one in three children spent this much time doing these activities, with great differences between countries (the proportion of children ranged between 10% and 75%).

Boys were more likely to play outside and, especially, to practise sports, whereas no important gender difference was observed with respect to active transport to and from school. Children with more educated parents were more likely to engage in sports/dancing in most countries than children of less educated parents – the difference exceeded 20 percentage points in seven countries. On the other hand, children of less educated parents were more likely to walk or cycle to and from school. In this respect, parental education may be a proxy for family wealth, with richer families better able to afford sports-related costs and more likely to drive their children to school. The relationship between playing outside and parental education was more mixed.

### **Screen time**

Around 40% of children spent at least 2 hours a day watching TV or using electronic devices, with marked differences between countries – the range of variation was 23–68%. In general, children were more engaged in these kinds of activity at the weekend, with figures ranging between 52% and 86% in all countries. Screen time showed a gendered pattern, with boys watching TV or using electronic devices more than girls in almost all countries. Screen-time behaviour was also associated with parental education, and children whose parents attained lower levels of education tended to have higher levels of screen exposure in many countries.

### **Sleep time**

In all countries, more than 80% of children slept at least 9 hours per night. If the threshold was set at 10 hours, figures dropped dramatically: in 13 out of 23 countries less than half of children slept at least 10 hours, and in five countries only one in four children did so. No important differences relating to gender or parental education were observed in most countries.

### **Nutrition environment in schools**

Most schools in nearly all countries had nutritional education as part of their curriculum, though figures varied widely (between 47% and 100%). The availability of fresh fruit on the school premises was quite common, in 13 of the 29 countries that gathered this information, with at least 70% of schools offering fresh fruit free of charge or for sale. By contrast, soft drinks were not available in most schools in most countries. Also, sweet and savoury snacks were not common at school in many countries, even though there were a few countries where half their schools offered this unhealthy food for sale. Finally, in the majority of countries, over half of schools were free from advertising and marketing of any energy-dense and nutrient-poor foods – figures ranged from 4% to 100%.

### **Physical activity environment in schools**

Generally, schools had an outdoor playground area within their premises, while the availability of an indoor gym was less common and varied more widely between countries – country-specific figures ranged between 19% and 100%. Again, the situation appeared to be extremely wide-ranging when it came to duration of physical education classes per week: it varied between 60 and 225 minutes per week, with 14 countries having a median duration of at least 2 hours of physical education weekly.

### **Initiatives to promote a healthy lifestyle**

In addition to providing physical activities and creating a healthy nutrition environment, schools can do more to promote a healthy lifestyle by participating in targeted initiatives and/or projects. In nearly all countries, most schools organized initiatives to promote physical activity or healthy eating habits, and in 19 of 32 countries where data were available, the proportion of actively engaged schools exceeded 80%.

# 1. Introduction

Childhood obesity is one of the most serious public health problems of the 21st century (1). Although the rates seem to be plateauing in some European countries (2), obesity in children – which is unequally distributed within and between countries and population groups (3, 4) – remains an important public health problem in the WHO European Region. Obesity and overweight are important risk factors for noncommunicable diseases (NCDs), and prevention and control of NCDs have been identified in the United Nations Sustainable Development Goals as one of the key global priorities for the next decade (5). In this context, the WHO Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013–2025 calls for a halt in the rise of obesity and overweight among young people (6), and the WHO Comprehensive Implementation Plan on Maternal, Infant and Young Child Nutrition sets targets to achieve no increase in childhood overweight and obesity by 2025 (7). Within the European context, the WHO European Action Plan for the Prevention and Control of NCDs also recognizes the importance of prevention as the most feasible option for curbing the epidemic of overweight and obesity (3).

Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health. The cause of obesity and overweight is an energy imbalance between calories consumed and calories expended (1). The reasons for this imbalance are complex and multifactorial (8); a widely accepted model of a child's weight status is the ecological model: the child's personal characteristics and individual risk factors are nested within the family context, incorporating parenting style and other family characteristics, which in turn is nested within the community and wider social context (9, 10).

Hereditary, environmental, metabolic, behavioural, mental, cultural and socioeconomic factors (along with having a family history of obesity) all together play a role in the development of obesity (11). Furthermore, many studies have demonstrated a socioeconomic gradient of childhood obesity in modern industrialized countries, with rates tending to decrease progressively as socioeconomic status increases (12). Interventions to reduce overweight and obesity and promote a healthy lifestyle need to be expanded and sustained, with greater effort focused on low social classes. Prevention is recognized as the most feasible option for curbing the epidemic, and nutritional surveillance data are essential to effectively design, implement and evaluate policies and strategies to counteract obesity (13).

Following the recommendations of the WHO European Ministerial Conference on Counteracting Obesity, held in Istanbul, Turkey, in 2006 (14), the WHO Regional Office for Europe and 13 Member States established the WHO European Childhood Obesity Surveillance Initiative (COSI) (15); this initiative aims to collect information on nutritional status, by routine and standardized measurement of body weight, height and related lifestyle behaviour in nationally representative samples of primary school-aged children living in the WHO European Region. The children are measured by trained staff with standardized high-quality equipment and studied on the basis of a common protocol and approach. Since its launch in 2007, COSI has made a difference by informing policy initiatives and the public health response to the obesity epidemic in the Region.

Thirteen Member States (Belgium, Bulgaria, Cyprus, Czechia, Ireland, Italy, Latvia, Lithuania, Malta, Norway, Portugal, Slovenia and Sweden) participated in the first wave of COSI in 2007–2008 (16). A further four countries joined the second round of COSI in 2009–2010 (17). Other five countries participated in the third round of COSI which took place in 19 countries during the 2012–2013 school year (18) (Table 1).

**Table 1. WHO-European Region countries that joined COSI<sup>a</sup>**

Round 1 (2007–2008)	Round 2 (2009–2010)	Round 3 (2012–2013)	Round 4 (2015–2017)
<ol style="list-style-type: none"> <li>1. Belgium</li> <li>2. Bulgaria</li> <li>3. Cyprus</li> <li>4. Czechia</li> <li>5. Ireland</li> <li>6. Italy</li> <li>7. Latvia</li> <li>8. Lithuania</li> <li>9. Malta</li> <li>10. Norway</li> <li>11. Portugal</li> <li>12. Slovenia</li> <li>13. Sweden</li> </ol>	<ol style="list-style-type: none"> <li>1. Belgium</li> <li>2. Bulgaria</li> <li>3. Cyprus</li> <li>4. Czechia</li> <li>5. Ireland</li> <li>6. Italy</li> <li>7. Latvia</li> <li>8. Lithuania</li> <li>9. Malta</li> <li>10. Norway</li> <li>11. Portugal</li> <li>12. Slovenia</li> <li>13. Sweden</li> </ol>	<ol style="list-style-type: none"> <li>1. Belgium</li> <li>2. Bulgaria</li> <li>3. Cyprus</li> <li>4. Czechia</li> <li>5. Greece</li> <li>6. Hungary</li> <li>7. Ireland</li> <li>8. Italy</li> <li>9. Latvia</li> <li>10. Lithuania</li> <li>11. Malta</li> <li>12. North Macedonia</li> <li>13. Norway</li> <li>14. Portugal</li> <li>15. Slovenia</li> <li>16. Spain</li> <li>17. Sweden</li> </ol>	<ol style="list-style-type: none"> <li>1. Albania</li> <li>2. Belgium</li> <li>3. Bulgaria</li> <li>4. Cyprus</li> <li>5. Czechia</li> <li>6. Greece</li> <li>7. Hungary</li> <li>8. Ireland</li> <li>9. Italy</li> <li>10. Latvia</li> <li>11. Lithuania</li> <li>12. Malta</li> <li>13. North Macedonia</li> <li>14. Norway</li> <li>15. Portugal</li> <li>16. Republic of Moldova</li> <li>17. Romania</li> <li>18. San Marino</li> <li>19. Slovenia</li> <li>20. Spain</li> <li>21. Sweden</li> <li>22. Turkey</li> </ol>
	<ol style="list-style-type: none"> <li>14. Greece</li> <li>15. Hungary</li> <li>16. North Macedonia</li> <li>17. Spain</li> </ol>	<ol style="list-style-type: none"> <li>18. Albania</li> <li>19. Republic of Moldova</li> <li>20. Romania</li> <li>21. San Marino</li> <li>22. Turkey</li> </ol>	<ol style="list-style-type: none"> <li>23. Austria</li> <li>24. Croatia</li> <li>25. Denmark</li> <li>26. Estonia</li> <li>27. Finland</li> <li>28. France</li> <li>29. Georgia</li> <li>30. Kazakhstan</li> <li>31. Kyrgyzstan</li> <li>32. Montenegro</li> <li>33. Poland</li> <li>34. Russian Federation</li> <li>35. Serbia</li> <li>36. Slovakia</li> <li>37. Tajikistan</li> <li>38. Turkmenistan</li> </ol>

<sup>a</sup>The following countries participated in COSI but did not collect data: Cyprus in round 1; Bulgaria, Cyprus and Sweden in round 2; Cyprus, Hungary and Sweden in round 3; and Belgium and Republic of Moldova in round 4. The countries which joined for the first time COSI are indicated in red.

In the third round, the prevalence of overweight (including obesity) ranged from 18% to 52% in boys and from 13% to 43% in girls; the prevalence of obesity from 6% to 28% in boys and from 4% to 20% in girls (18). Also, the data suggested an increasing north–south gradient, with overweight and obesity more prevalent in southern European countries. In countries that collected data for more than one age group, the prevalence of overweight and obesity tended to increase with age. Based on the 2007 WHO-recommended growth reference for school-aged children and adolescents (19), overweight or obesity were more prevalent in boys than girls in most age groups, particularly at older ages.

The fourth round witnessed the biggest increase in numbers of participating countries. Sixteen new countries joined the initiative, bringing the total of countries across the WHO European Region participating in COSI to 38 (two countries – Belgium and the Republic of Moldova – participated in COSI round 4 but did not collect data). This document is the official WHO report of round 4 of COSI data collection. It describes the methods used and presents the main results, including trends in overweight and obesity in relation to previous data collection rounds and comparisons by child's gender and by parental education.



## 2. Methods

### 2.1 Study design and sampling strategy

Round 4 of COSI data collection was conducted in 36 countries in the 2015–2016 and 2016–2017 school years. This round was conducted for the first time in 17 countries: Austria, Croatia, Cyprus, Denmark, Estonia, Finland, France, Georgia, Kazakhstan, Kyrgyzstan, Montenegro, Poland, Russian Federation (Moscow only), Serbia, Slovakia, Tajikistan and Turkmenistan (see Table 1 above). The other 19 countries had participated in at least one of the three previous rounds.

Data were collected according to a common protocol devised in 2007 by the WHO Regional Office for Europe and Member States (20). The protocol was amended slightly for COSI rounds 2, 3 and 4 (21–23).

Table 2 provides an overview of the main characteristics of the study design in each country that participated in COSI round 4. Children were enrolled at primary schools in all countries except Czechia, where they were selected in paediatric clinics because COSI had been integrated into the mandatory health checks performed by paediatricians and Finland, where data collection is through the health system. Integration of COSI into existing monitored measurement systems also took place in Denmark, France, North Macedonia, Slovenia and Sweden. Participating countries could select one or more of the following four age groups: 6.0–6.9, 7.0–7.9, 8.0–8.9 and 9.0–9.9 years. Seventeen countries targeted only 7-year-olds (Bulgaria, Czechia, Denmark, Georgia, Hungary, Ireland, Lithuania, Malta, Montenegro, North Macedonia, Portugal, Russian Federation – Moscow city, Serbia, Slovakia, Tajikistan, Turkey and Turkmenistan); seven targeted only 8-year-olds (Albania, Austria, Croatia, Norway, Poland, Romania and San Marino); two targeted only 9-year-olds (Cyprus and Kazakhstan); and 10 targeted more than one age group (6.0–6.9 and 8.0–8.9 in Sweden; 7.0–7.9 and 8.0–8.9 in Estonia, France and Kyrgyzstan; 7.0–7.9 and 9.0–9.9 in Greece and Latvia; 8.0–8.9 and 9.0–9.9 in Italy; 7.0–7.9, 8.0–8.9 and 9.0–9.9 in Finland; and all age groups in Slovenia and Spain).

Estonia, Malta and San Marino included the entire population of interest (all children in first-grade primary school classes in Estonia and all children in third-grade primary school classes in Malta and San Marino); all other countries selected a nationally representative sample. Of these latter countries, 17 had participated in at least one of the previous rounds of data collection; and of these, six adopted a sentinel approach (Bulgaria, Ireland, Lithuania, Norway, North Macedonia and Turkey) – that is, they involved the same schools that had been selected in a previous round.

**Table 2. Main characteristics of study design in each country collecting data in COSI round 4**

Country	Targeted age group(s)	Participation in previous COSI rounds of data collection <sup>a</sup>	Sentinel approach <sup>b</sup>	Data collection period
ALB	8	Round 3	No	03/2016–05/2016
AUT	8	No	–	10/2016–02/2017
BUL	7	Rounds 1 and 3	Yes	03/2016–05/2016
CRO	8	No	–	10/2015–12/2015
CYP	9	No	–	01/2016–12/2016
CZH	7	Rounds 1, 2 and 3	No	01/2016–12/2016
DEN	7	No	–	08/2016–09/2016
EST	7, 8	No	–	04/2016–05/2016
FIN	7, 8, 9	No	–	09/2017–10/2017
FRA	7, 8	No	–	06/2016 and 10/2016
GEO	7	No	–	10/2017–11/2017
GRE	7, 9	Rounds 2 and 3	No	10/2016–02/2017
HUN	7	Round 2	No	10/2016–11/2016
IRE	7	Rounds 1, 2 and 3	Yes	11/2015–02/2016
ITA	8, 9	Rounds 1, 2 and 3	No	03/2016–06/2016
KAZ	9	No	–	09/2015–12/2015
KGZ	7, 8	No	–	04/2018–05/2018
LTU	7	Rounds 1, 2 and 3	Yes	04/2016–05/2016
LVA	7, 9	Rounds 1, 2 and 3	No	10/2015–12/2015

contd

contd

Country	Targeted age group(s)	Participation in previous COSI rounds of data collection <sup>a</sup>	Sentinel approach <sup>b</sup>	Data collection period
MAT	7	Rounds 1, 2 and 3	–	04/2016–06/2016
MKD	7	Rounds 2 and 3	Yes	04/2016–06/2016
MNE	7	No	–	05/2016–06/2016
NOR	8	Rounds 1, 2 and 3	Yes	09/2015–11/2015
POL	8	No	–	11/2016–12/2016
POR	7	Rounds 1, 2 and 3	No	04/2016–06/2016
ROM	8	Round 3	–	03/2016–06/2016
RUS	7	No	–	09/2017–11/2017
SMR	8	Round 3	No	04/2016
SPA	6, 7, 8, 9	Rounds 2 and 3	No	11/2015–03/2016
SRB	7	No	–	09/2015–11/2015
SVK	7	No	–	11/2015–02/2016
SVN	6, 7, 8, 9	Rounds 1, 2 and 3	No	04/2016
SWE	6, 8	Round 1	No	not available
TJK	7	No	–	11/2016–02/2017
TKM	7	No	–	03/2017
TUR	7	Round 3	Yes	12/2016–01/2017

<sup>a</sup>COSI rounds 1, 2 and 3 took place in 2007–2008, 2009–2010 and 2012–2013, respectively.

<sup>b</sup>Countries that participated in a previous round of data collection could choose to select a new sample of schools or follow a sentinel site approach—that is, involve the same schools that were selected previously.

Table 3 shows the main features of the sampling design adopted by countries that did not include the whole population of targeted children. Most of the countries adopted a two-stage cluster sampling design with schools as the primary sampling unit (PSU) and classes as the secondary sampling unit (SSU). Norway also adopted a two-stage cluster sampling design, but with counties as the PSU and schools as the SSU. Eight countries adopted a cluster design with classes (Croatia and Italy), schools (Denmark, Greece, Latvia and Slovakia), municipalities (Sweden) and paediatric units (Czechia) as the sampling unit (SU). A cluster design with more than two stages was adopted in Austria (three stages), Bulgaria (three stages) and Poland (four stages). In Finland, all measurements of targeted children that had been taken in September and October 2017 were extracted from the national register for primary health care and included in COSI round 4. Stratification was applied in 21 countries, and in many cases a geographical or administrative division of the national territory and the degree of urbanization of the child's place of residence or school location were considered.

**Table 3. Main features of sampling design used in COSI round 4, by country<sup>a,b</sup>**

Country	Sampling design	Sampling unit definition	Stratification variable
ALB	Two-stage cluster sampling design	PSU: primary schools SSU: 2 <sup>nd</sup> and 3 <sup>rd</sup> grades	–
AUT	Three-stage cluster sampling design	PSU: districts SSU: municipalities TSU: primary schools	–
BUL	Three-stage sampling design	PSU: primary schools SSU: 1 <sup>st</sup> grades TSU: 7-year-old pupils	–
CRO	Cluster sampling design	SU: 2 <sup>nd</sup> and 3 <sup>rd</sup> grades of primary school	–
CYP	NA	NA	NA
CZH	Stratified cluster sampling design	SU: paediatric clinics	Region and degree of urbanization

contd



contd

Country	Sampling design	Sampling unit definition	Stratification variables
DEN	Stratified cluster sampling design	SU: primary schools	Region
FRA	Two-stage stratified cluster sampling design	PSU: primary schools SSU: 2 <sup>nd</sup> and 3 <sup>rd</sup> grades	Education authority and priority areas
GEO	Two-stage stratified cluster sampling design	PSU: primary schools SSU: 2 <sup>nd</sup> grade	Region and degree of urbanization
GRE	Cluster sampling design	SU: primary schools	–
HUN	Two-stage stratified cluster sampling design	PSU: primary schools SSU: 1 <sup>st</sup> and 2 <sup>nd</sup> grades	County
IRE	Two-stage stratified cluster sampling design	PSU: primary schools SSU: 1 <sup>st</sup> and 4 <sup>th</sup> grades	School size
ITA	Stratified cluster sampling design	SU: 3 <sup>rd</sup> grades of primary school	Region
KAZ	Two-stage stratified cluster sampling design	PSU: primary schools SSU: 3 <sup>rd</sup> and 4 <sup>th</sup> grades	Region and degree of urbanization
KGZ	Two-stage stratified cluster sampling design	PSU: primary schools SSU: 1 <sup>st</sup> and 2 <sup>nd</sup> grades	Region and degree of urbanization
LTU	NA	NA	NA
LVA	Stratified cluster sampling design	SU: primary schools	Degree of urbanization and language of instruction
MKD	Two-stage stratified cluster sampling design	PSU: primary schools SSU: 2 <sup>nd</sup> grade	Public Health Authority
MNE	Two-stage stratified cluster sampling design	PSU: primary schools SSU: 1 <sup>st</sup> and 2 <sup>nd</sup> grades	Macro-region and degree of urbanization
NOR	Two-stage stratified cluster sampling design	PSU: counties SSU: primary schools	Region
POL	Four-stage cluster sampling design	PSU: regions SSU: subregions TSU: schools QSU: 3 <sup>rd</sup> grade	–
POR	Two-stage stratified cluster sampling design	PSU: primary schools SSU: 1 <sup>st</sup> and 2 <sup>nd</sup> grades	Region and school size
ROM	Two-stage stratified cluster sampling design	PSU: primary schools SSU: 1 <sup>st</sup> and 2 <sup>nd</sup> grades	County and degree of urbanization
RUS	Two-stage cluster sampling design	PSU: primary schools SSU: 1 <sup>st</sup> grade	–
SPA	Two-stage stratified cluster sampling design	PSU: primary schools SSU: 1 <sup>st</sup> , 2 <sup>nd</sup> , 3 <sup>rd</sup> and 4 <sup>th</sup> grades	Region and degree of urbanization
SRB	Two-stage cluster sampling design	PSU: school districts SSU: primary schools	–
SVK	Stratified cluster sampling design	SU: primary schools	Public Health Authority
SVN	Two-stage cluster sampling design	PSU: primary schools SSU: 1 <sup>st</sup> , 2 <sup>nd</sup> and 3 <sup>rd</sup> grades	–
SWE	Stratified cluster sampling design	SU: municipalities	Number of preschool students
TJK	Two-stage stratified cluster sampling design	PSU: primary schools SSU: 1 <sup>st</sup> grade	Region and degree of urbanization
TKM	Two-stage stratified cluster sampling design	PSU: primary schools SSU: 2 <sup>nd</sup> grade	Region
TUR	Two-stage stratified cluster sampling design	PSU: primary schools SSU: 2 <sup>nd</sup> grade	Macro-region

<sup>a</sup> Dash (–) = not applicable; NA = not available; SU = sampling unit; PSU = primary sampling unit; SSU = secondary sampling unit; TSU = tertiary sampling unit; QSU = quaternary sampling unit.

<sup>b</sup> In Finland, all measurements of targeted children that had been taken in September and October 2017 were extracted from the national register for primary health care.

Table 4 shows, for each country, the number of children who were invited to participate in COSI round 4; the proportion who took part in measurements and the proportion whose parents completed the family form; and the numbers of measured children in the targeted age groups.

According to the COSI protocol, the minimum final effective sample size should be 2800 children per target age group (1400 girls and 1400 boys). In order to compensate for the number of children who may not be willing to participate in the study and/or may not belong to target age groups, the overall number of children to be sampled should be higher. The sample size should be considerably increased in countries wishing to obtain estimates at subnational levels. Among countries that used a sampling approach, the number of children selected to participate in COSI round 4 varied because of differences in study design and sampling strategy: from over 50 000 in Italy – where a subregional representativeness of the estimates was chosen – to less than 2000 in Cyprus. Likewise, the effective sample size differed widely between countries. In Cyprus, Czechia and Ireland, the sample size (between 600 and 1000) was much lower than that recommended in the COSI protocol; while in Austria, Denmark, Greece and Montenegro the number of measured children for each target age group was between around 1500 and 2000. Nine countries measured a higher number of children per target age group but without quite reaching the recommended effective sample size: Croatia (about 2700), France (about 2300), Hungary (about 2600), Latvia (about 2600), Lithuania (about 2500), North Macedonia (about 2300), Norway (about 2700), Russian Federation – Moscow only (about 2100) and Serbia (about 2300). Finally, the highest sample sizes were recorded in Turkey and Slovenia (around 9000 each) and Italy, where almost 30 000 children aged 8 years were measured.

Children’s participation in the study was high in almost all countries: it was at least 90% of selected children in 13 countries and between 80% and 89% in 11 countries. Only in three countries did less than 70% of children take part in the study, with the lowest level recorded in Austria (49.3%).

Twenty-four countries used the family form in the fourth round of COSI: Albania, Bulgaria, Croatia, Czechia, Denmark, France, Georgia, Ireland, Italy, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Malta, Montenegro, Poland, Portugal, Romania, Russian Federation (Moscow only), San Marino, Spain, Tajikistan, Turkey and Turkmenistan. Parents’ participation in the initiative was particularly high in Italy, San Marino, Tajikistan and Turkmenistan, where 93–95% of the parents of selected children filled out and returned the family form. Percentages between 80% and 90% were recorded in five countries, while in eight countries parent participation was between 70% and 80%. Participation of parents was particularly low in Albania, Denmark and Ireland, where only around one in three parents took part in the survey.

**Table 4. Participation of children and parents in COSI round 4 by country<sup>a</sup>**

Country	Number of children invited to participate			Number of measured children with complete information in each target age group <sup>b</sup>			
	Total	Proportion who participated in measurements (%)	Proportion whose family form was filled in (%)	6-year-olds	7-year-olds	8-year-olds	9-year-olds
ALB	7113	91.8	36.2	–	–	3381	–
AUT	5135	49.3	–	–	–	1475	–
BUL	4090	83.7	83.1	–	3386	–	–
CRO	7220	78.6	76.0	–	–	2724	–
CYP	1819	85.7	–	–	–	–	653
CZH	NA	NA	NA	–	1002	–	–
DEN	3202	84.6	29.9	–	1882	–	–
EST	14 038	91.9	–	–	6281	6397	–
FIN	NA	NA	–	–	4536	4511	3914
FRA	7094	76.8	75.6	–	1966	2333	–
GEO	4143	80.7	78.4	–	2814	–	–
GRE	6920	63.5	–	–	1898	–	1874

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Country	Number of children invited to participate			Number of measured children with complete information in each target age group <sup>b</sup>			
	Total	Proportion who participated in measurements (%)	Proportion whose family form was filled in (%)	6-year-olds	7-year-olds	8-year-olds	9-year-olds
HUN	5978	91.2	–	–	2638	–	–
IRE	2704	56.6	32.4	–	882	–	–
ITA	50 902	90.2	95.2	–	–	29 633	14 494
KAZ	6026	92.7	82.3	–	–	–	2910
KGZ	8773	91.6	86.6	–	3248	3318	–
LTU	5527	70.8	69.8	–	2540	–	–
LVA	8143	80.4	71.5	–	2737	–	2613
MAT	4329	91.8	73.4	–	2784	–	–
MKD	3824	94.0	–	–	2343	–	–
MNE	4094	84.1	66.8	–	1683	–	–
NOR	4030	83.2	–	–	–	2734	–
POL	3828	89.0	76.9	–	–	3338	–
POR	7475	92.1	85.6	–	3325	–	–
ROM	9094	83.7	73.6	–	–	3510	–
RUS	3900	77.7	52.6	–	2162	–	–
SMR	329	95.1	93.6	–	–	202	–
SPA	14 908	73.1	70.1	2635	2815	2789	2635
SRB	5605	86.7	–	–	2347	–	–
SVK	NA	NA	–	–	2761	–	–
SVN	29 187	96.7	–	6115	9661	9259	3050
SWE	NA	NA	–	3153	–	2683	–
TJK	3502	94.7	93.5	–	2894	–	–
TKM	4085	96.7	95.3	–	3124	–	–
TUR	14 164	81.7	81.7	–	9281	–	–

<sup>a</sup> Dash (–) = age group not targeted; NA = not available.

<sup>b</sup> The reported values include only those children with complete information on sex, age, body weight and height and who belonged to the targeted age group(s). These values are therefore lower than the total number of children who were measured in each country.

## 2.2 Types of indicator and data analysis

The report presents findings from COSI round 4 across 36 countries. Data were drawn from the three COSI record forms: the child record form, the school record form and the family record form. The child record form was compiled by the examiner to register a child's age in months, sex, date and time of measurement, clothes worn when measured, and anthropometric measurements. The family form was filled in by parents or caregivers and gathered data on simple indicators of a child's dietary intake and physical activity or inactivity patterns, the family's socioeconomic characteristics and comorbid conditions associated with obesity. The school form was completed by the school principal (head teacher), by the teachers in the sampled classes, or by someone else who could document and report the information required. It allowed information to be collected on the number of children registered and measured (examined) per sampled class, those whose parents refused to allow their child to be measured, and children who were absent on the measuring day. Furthermore, a few school (environmental) characteristics were included, such as the frequency of physical education lessons, the availability of school playgrounds, the possibility of purchasing a number of listed food items and beverages on the school premises, and current organized school initiatives to promote a healthy lifestyle (healthy eating, physical activity). Data were gathered following standardized procedures (24) and in accordance with the agreed common protocol of the WHO Regional Office for Europe and Member States for the fourth round (23).

A child's weight and height were measured in a private room at school by a trained examiner using standardized procedures. Countries were required to use the same highly accurate and precise anthropometric instruments. To measure weight, portable electronic (digital) scales calibrated to 0.1 kg (100 g) and measuring up to 150 kg were used. Height was measured in centimetres and the reading taken to the last completed millimetre (0.1 cm); a height board mounted at a right angle between a level floor and a straight, vertical surface (if possible, with a digital counter) was used.

More details about COSI record forms, measurement and data collection procedures are provided elsewhere (24).

The report describes COSI round 4 findings under the following headings:

- \* overweight and obesity among children aged 6–9 years
- \* eating habits among children aged 6–9 years
- \* physical activity among children aged 6–9 years
- \* screen time and sleep duration among children aged 6–9 years
- \* school environment

All cleaned country datasets were sent to the WHO Regional Office for Europe, where they were reviewed for inconsistencies and completeness in a standardized manner and then merged for intercountry analyses. Post-stratification weights to adjust for sampling design, oversampling and nonresponse were available for all countries that applied a sampling approach in round 4 except for Lithuania and Cyprus. These weights were used in all analyses to infer results from sample to population. For Lithuania and Cyprus, the analysis was unweighted.

In addition to presenting individual country prevalence for a range of indicators, overall values were estimated by pooling all countries with available data. Because of the heterogeneity in the number and type of age group(s) targeted by each country, the overall analysis included only one target age group per country in order to balance the contribution of each country to the pooled estimates and to limit, as much as possible, the differences in children's age. For the pooled analysis, 7-year-olds were selected if they were targeted; otherwise, the nearest target age group was chosen. In the pooled analysis, an adjusting factor was applied to the post-stratification weights to take account of differences in population size of the countries involved. The adjusting factor was calculated based on the number of children belonging to the targeted age group according to Eurostat figures or national official statistics for 2016.

Prevalence in children of overweight, obesity, eating habits, duration of physical activity, screen time and sleep duration were estimated by child's sex and by parental education.

Levels of educational attainment were categorized in two groups: (1) both parents with a low level of education; and (2) at least one parent with a high level of education. "Low level" was defined by grouping together the following answer options: "primary school or less", "secondary or high school" and "vocational school". "High level" included "undergraduate or bachelor's degree" and "master's degree or higher".

## 2.2.1 Overweight and obesity among children aged 6–9 years

The classification of children’s weight status was based on the 2007 WHO-recommended growth reference for school-aged children and adolescents (19, 25). According to WHO definitions, overweight and obesity are defined as a BMI-for-age value  $>+1$  Z-score and  $>+2$  Z-scores, respectively (19). The estimated prevalence of overweight includes children with obesity (26). Children for which a biologically implausible (or extreme) BMI-for-age value was estimated were excluded from the analysis (values below  $-5$  or above  $+5$  Z-scores relative to the 2007 WHO growth reference median) (25). As International Obesity Task Force (IOTF) cut-off points (27) are widely used in the WHO European Region, prevalences were also calculated using these cut-offs and are presented in Annex 1. Body mass index (BMI) was calculated using the formula: weight (kg) divided by height squared ( $m^2$ ).

The prevalence of overweight and obesity among boys and girls was calculated by age group by country and by pooling data from all countries together. Children who were not in the defined target age groups were excluded from the analysis. The report also describes country-specific values of overweight and obesity prevalence rates by parental education. To estimate these values, only one age group per country (the same age group used for pooled analysis) was included.

## 2.2.2 Eating habits among children aged 6–9 years

COSI collected information on a relatively small set of eating-related behaviours of children through a questionnaire filled out by parents. Of these behaviours, the report focuses on the frequency of breakfast consumption and the frequency of consumption of food and beverage items that are generally considered to be healthy (fresh fruit and vegetables) or less healthy (including foods rich in salt, sugar, fat and trans-fat, such as savoury snacks – potato crisps, corn chips, popcorn, peanuts, etc. – sweet treats and soft drinks containing sugar).

For each of the above dietary components, an indicator of “healthy” or “less healthy” behaviour was defined to facilitate comparisons between countries and according to child’s sex and parents’ educational attainment. The indicators were calculated by aggregating answer options as reported in Table 5. Country-specific estimates were calculated including all children aged 6–9 years. Pooled values were estimated including only one age group for each country, as described in section 2.2 above. In three countries (France, Italy and San Marino), data on some of the indicators were collected in a different way or not at all and were not included in the analysis.

**Table 5. Questions and answer options included in the COSI family record form on children’s eating habits and indicators of healthy behaviour**

Family record form items and related questions	Answer options	Indicator	Countries with no data
<b>Breakfast consumption frequency</b>			
“Over a typical or usual week, how often does your child have breakfast?”	“every day”; “most days (4–6 days)”; “some days (1–3 days)”; “never”	“healthy” behaviour: 7 days= “every day”	France, Italy, San Marino
<b>Food and beverage consumption frequency</b>			
“Over a typical or usual week, how often does your child eat or drink the following kinds of foods or beverages?”	“every day”; “most days (4–6 days)”; “some days (1–3 days)”; “never”	“healthy” behaviour for food items (i) and (ii): 7 days= “every day”	France
(i) “fresh fruit”; (ii) “vegetables (excluding potatoes)”; (iii) “savoury snacks such as potato crisps, corn chips, popcorn or peanuts”; (iv) “sweet treats such as candy bars or chocolate”; (v) “soft drinks containing sugar”		“less healthy” behaviour for food items (iii) to (v): >3 days/week = “every day” or “most days (4–6 days)”	France, Italy, San Marino

## 2.2.3 Physical activity, screen time and sleep duration among children aged 6–9 years

COSI round 4 collected data on physical activity patterns of children, screen time and sleep duration through a questionnaire filled in by parents. Of these behaviours, the report focuses on the following: transport to and from school; time spent practising sports and actively/vigorously playing; time spent watching TV or using electronic devices; and hours of sleep per night. For each of these, an indicator of “healthy” or “less healthy”



behaviour was defined to facilitate comparisons between countries and according to child's sex and parents' educational attainment. The indicators were calculated by aggregating answer options as reported in Table 6. Country-specific estimates were calculated including all children aged 6–9 years. Pooled values were estimated including only one age group for each country, as described in section 2.2 above. In four countries (France, Ireland, Italy and San Marino), data on some of the indicators were collected in a different way or not at all and were not included in the analysis. As Estonia did not use the family form but collected data on physical activity behaviours by asking children directly, these data are included in the report.

**Table 6. Questions and answer options included in the COSI family record form on children's physical activity patterns, screen time and sleep duration and indicators of healthy behaviour**

Family record form items and related questions	Answer options	Indicator	Countries with no data
<b>Physical activity</b>			
"How does your child usually get to and from school?"	"walking or cycling"; "motorized vehicles"; "combination of walking and cycling and motorized vehicles"	"healthy" behaviour: "walking or cycling"	Italy, San Marino
"Is your child a member of one or more sports clubs or dancing courses (e.g. football, running, hockey, swimming, tennis, basketball, gymnastics, ballet, fitness, ballroom dancing, etc.)?"	"yes"; "no"	"healthy" behaviour: ≥2 hours/week = "2 hours a week", "3 hours a week"; "4 hours a week"; "5 hours a week"; "6 hours a week"; "7 hours a week"; "8 hours a week"; "9 hours a week"; "10 hours a week"; "11 hours a week"	France, Ireland, Italy, San Marino
"Over a typical or usual week (including weekends), how many hours does your child spend on sports and physical activities with these sports clubs or dancing courses?"	"none"; "1 hour a week"; "2 hours a week"; "3 hours a week"; "4 hours a week"; "5 hours a week"; "6 hours a week"; "7 hours a week"; "8 hours a week"; "9 hours a week"; "10 hours a week"; "11 hours a week"		
"In his/her free time, approximately how many hours per day does your child usually spend playing actively/vigorously (e.g. running or jumping outside or fitness games involving movement inside)?" "Please tick one box for weekdays and one box for weekends."	"never"; "less than 1 hour per day"; "about 1 hour per day"; "about 2 hours per day"; "about 3 or more hours per day"	"healthy" behaviour: ≥1 hours/day <sup>a</sup>	France, Italy, San Marino
<b>Screen time</b>			
"Outside school lessons, how much time does your child usually spend watching TV or using electronic devices such as a computer, tablet, smartphone or other device (not including moving or fitness games), either at home or outside home (e.g. internet cafés, game centres, etc.)?" "Please tick one box for weekdays and one box for weekends."	Number of hours per day	"less healthy" behaviour: ≥2 hours/day <sup>b</sup>	Ireland
<b>Sleep duration</b>			
"At what time does your child usually go to bed on school days?" "At what time does your child usually wake up on school days?"	___ hours/___ minutes	"healthy" behaviour: ≥9 hours/day	France

<sup>a</sup>Numerical values are assigned to the items "playing actively/vigorously on a weekday" and "playing actively/vigorously on a weekend day", allowing conversion of this item to a numerical scale ("never" = 0; "less than 1 hour per day" = 0.5; "about 1 hour per day" = 1; "about 2 hours per day" = 2; "about 3 or more hours per day" = 3). Usual play time per day is calculated weighting weekday hours (5/7) and weekend hours (2/7) accordingly.

<sup>b</sup>Number of hours per day is calculated weighting weekday hours (5/7) and weekend hours (2/7) accordingly.

## 2.2.4 School environment

COSI gathered data on the school environment with respect to nutrition and physical activity through a dedicated form which had been filled in by the school principal or another relevant school representative. The report includes findings about the following characteristics: inclusion of nutritional education in the school curriculum; availability on the school premises of fresh fruit, savoury snacks, sweet snacks and soft drinks; presence, within the school premises, of vending machines where children are allowed to purchase foods or beverages other than water; presence, within the school premises, of advertising and marketing of any energy-dense and nutrient-poor foods; availability of an indoor gym and an outside playground area; mean duration of physical education classes per week; and implementation of initiatives or projects to promote a healthy lifestyle.

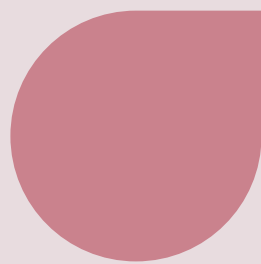
Table 7 lists the questions and answer options on the COSI school record form that were used to collect data on the above-mentioned school environment features. All countries, except Finland and Sweden, collected information about the school environment. One country that collected data is not presented here because there were many missing responses. In eight countries (Denmark, Estonia, France, Norway, Serbia, Italy, San Marino and Spain) data on some of the school environment features were not gathered.

**Table 7. Questions and answer options included in the COSI school record form on school environment with respect to nutrition and physical activity<sup>a</sup>**

School record form questions	Answer options	Countries with no data
“Does your school curriculum include nutrition education, either given as a separate lesson or integrated into other lessons?”	“yes”; “no”	Denmark, Estonia, France, Norway, Serbia
“Which of the following kinds of foods or beverages can pupils obtain on the school premises?” “fresh fruit”; “sweet snacks (e.g. chocolate, sugar confectionery, cakes, breakfast and/or cereal bars, sweet biscuits and/or pastries)”; “savoury snacks (e.g. potato crisps, salted popcorn, salted nuts, savoury biscuits and/or pretzels)”; “carbonated (soft) drinks containing added sugar”	“free”; “paid”; “not available”	France, Italy, Norway, San Marino, Serbia
“Does your school have vending machines where children are allowed to purchase foods or beverages (other than water, fruit and vegetables)?”	“yes”; “no”	Norway, Serbia, Spain
“Is your school free from advertising and marketing (e.g. posters, billboards or banners with food company names or products featured, food company imagery or names on vending machines, and/or branded school materials such as books and sports equipment) of any energy-dense and nutrient-poor foods (e.g. cakes, pastries, sweets) and beverages that could undermine promotion of a healthy, balanced diet?”	“yes”; “no”	France, Norway, Serbia
“Does your school have an indoor gym?”	“yes”; “no”	Norway, Serbia
“Does your school have an outdoor playground area(s)?”	“yes”; “no”	Norway, Serbia
“In the current school year, how much time each week does your school provide for physical education lessons for pupils of each class participating in this project?”	“__ minutes/week”	France
“In the current school year, have any initiatives/projects been organized (or will be organized) in each participating class to promote a healthy lifestyle (e.g. to promote physical activity and/or healthy eating)?”	“yes”; “no”	France

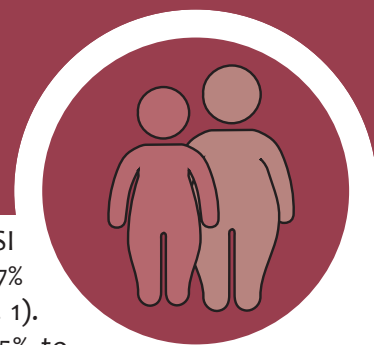
<sup>a</sup>Finland and Sweden did not collect any information on the school environment. In total, 34 countries collected data on the school environment, but one of the countries that collected data is not shown in the tables because of the high level of missing data.





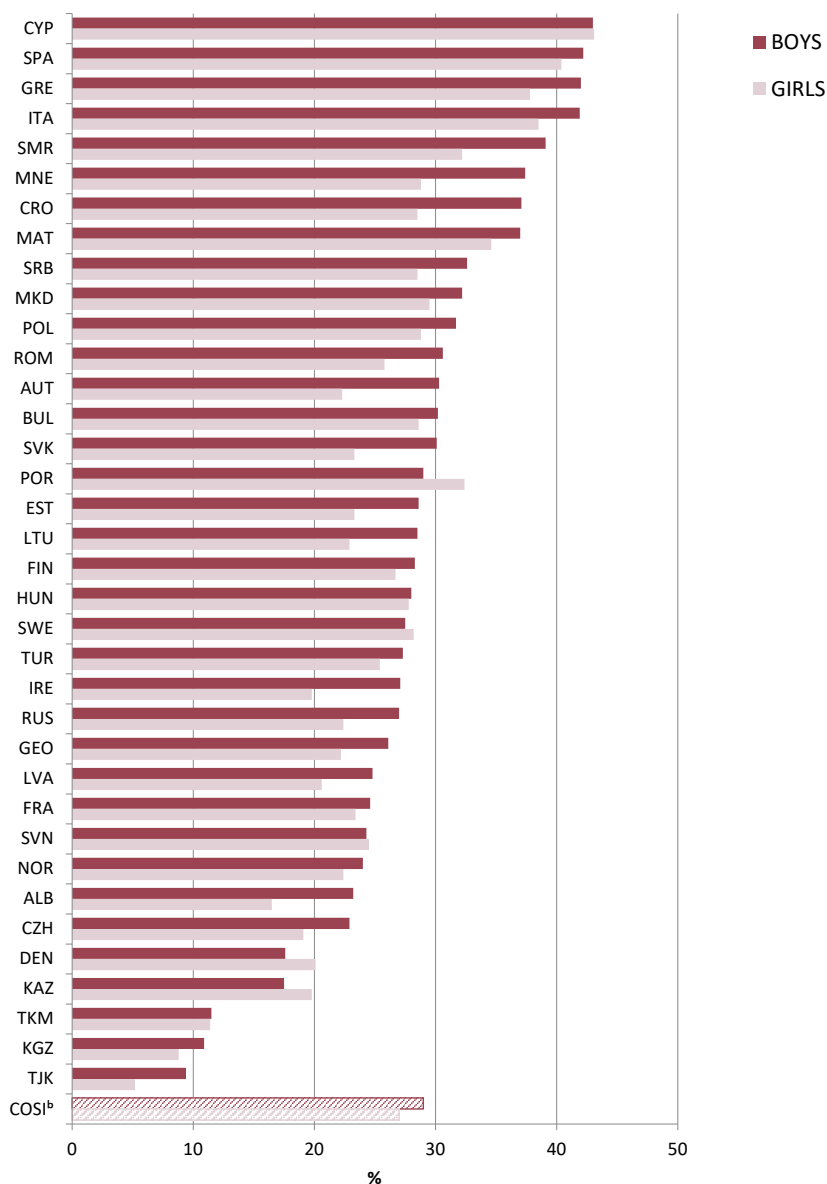
# Overweight and obesity

### 3. Overweight and obesity



Overall, in the 36 countries of the WHO European Region that collected data in COSI round 4, the prevalence of overweight (including obesity) was 29% for boys and 27% for girls aged 7–9 years. Large differences between countries were observed (Fig. 1). Country-specific prevalence of overweight ranged from 9% to 43% in boys and from 5% to 43% in girls (Table A1.1 in Annex 1). The highest prevalence of overweight for both genders (between 38% and 43%) was observed in Mediterranean countries such as Cyprus, Spain, Greece and Italy; conversely, central Asian countries such as Tajikistan, Kyrgyzstan and Turkmenistan had the lowest prevalence (between 5% and 11%). Gender differences were observed in most countries, with boys recording a higher prevalence than girls. However, prevalence of overweight was similar for both genders in Cyprus, Hungary, France, Slovenia, Sweden and Turkmenistan.

**Fig. 1. Prevalence of overweight (including obesity – WHO definition) in boys and girls aged 7–9 years (%)<sup>a</sup>**

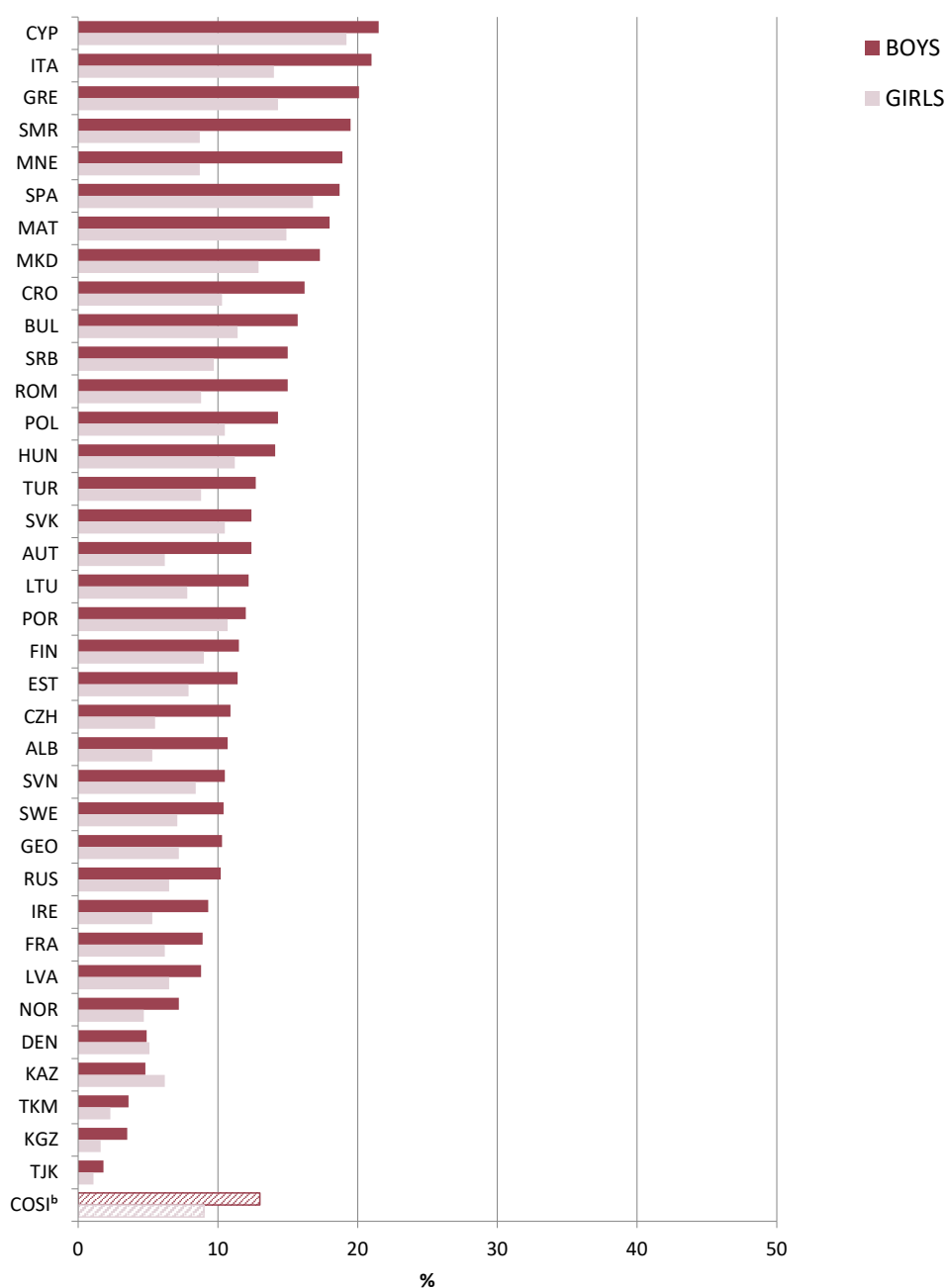


<sup>a</sup>Data relate to: (i) 7-year-olds in Bulgaria, Czechia, Denmark, Estonia, Finland, Georgia, Greece, Hungary, Ireland, Kyrgyzstan, Lithuania, Latvia, Malta, Montenegro, Portugal, North Macedonia, Russian Federation (Moscow only), Serbia, Slovakia, Slovenia, Spain, Tajikistan, Turkmenistan and Turkey; (ii) 8-year-olds in Albania, Austria, Croatia, France, Italy, Norway, Poland, Romania, San Marino and Sweden; and (iii) 9-year-olds in Cyprus and Kazakhstan.

<sup>b</sup>The columns labelled "COSI" represents the average value across the countries that provided relevant information.

Overall, around one in 10 children had obesity in the 36 countries of the WHO European Region that collected data in COSI round 4: 13% of boys and 9% of girls aged 7–9 years. The prevalence of obesity varied between 2% to 22% in boys and between 1% and 19% in girls, with the highest values in Mediterranean countries such as Cyprus, Spain, Greece, Malta and Italy, and the lowest values in central Asian countries such as Tajikistan, Kyrgyzstan and Turkmenistan (Fig. 2). Most Balkan countries, such as Montenegro, North Macedonia, Croatia and Bulgaria, had high levels of obesity among boys (between 16% and 19%). As for overweight, obesity was more prevalent in boys than girls in most countries.

**Fig. 2. Prevalence of obesity (WHO definition) in boys and girls aged 7–9 years (%)<sup>a</sup>**

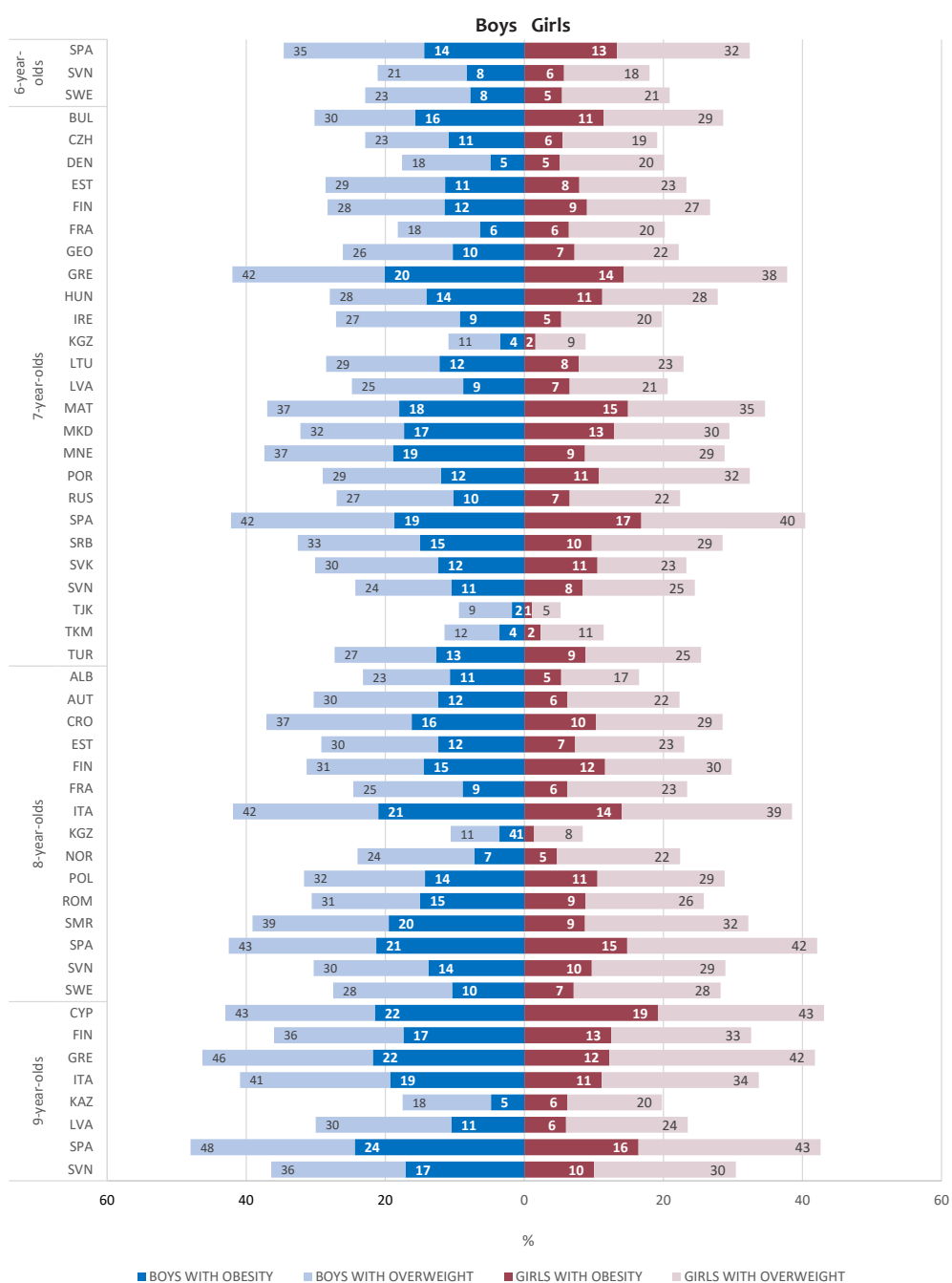


<sup>a</sup>Data relate to: (i) 7-year-olds in Bulgaria, Czechia, Denmark, Estonia, Finland, Georgia, Greece, Hungary, Ireland, Kyrgyzstan, Lithuania, Latvia, Malta, Montenegro, Portugal, North Macedonia, Russian Federation (Moscow only), Serbia, Slovakia, Slovenia, Spain, Tajikistan, Turkmenistan and Turkey; (ii) 8-year-olds in Albania, Austria, Croatia, France, Italy, Norway, Poland, Romania, San Marino and Sweden; and (iii) 9-year-olds in Cyprus and Kazakhstan.

<sup>b</sup>The columns labelled "COSI" represents the average value across the countries that provided relevant information.

Fig. 3 shows the prevalence of overweight (including obesity) and obesity among boys and girls by age and country. Gender differences were observed in all age groups, with overweight or obesity more prevalent in boys than girls in most countries. In those countries that collected data for more than one age group (Estonia, Greece, Finland, France, Kyrgyzstan, Italy, Latvia, Slovenia, Spain and Sweden), there was a tendency for the prevalence of overweight and obesity to increase by age in both boys and girls.

**Fig. 3. Prevalence of overweight (including obesity) and obesity (WHO definitions) in boys and girls aged 6–9 years, by age and country (%)**



A low level of parental education was associated with higher overweight prevalence in 12 of the 23 countries that used the family form, and higher obesity prevalence in 14 of the 23 countries (Fig. 4). The greatest differences were observed in France and Czechia – around 10 percentage points for overweight and 8 percentage points for obesity – followed by Italy, Malta, Portugal and Ireland, with differences ranging between 5 and 8 percentage points. A reverse relationship, in which a high level of parental education was associated with higher prevalence of overweight and/or obesity, was found in some countries in eastern Europe and western and central Asia, such as Montenegro, Bulgaria, Romania, Turkey, Albania, Georgia, Turkmenistan, Kazakhstan, Kyrgyzstan and Tajikistan.

**Fig. 4. Prevalence of overweight (including obesity) (A) and obesity (B) (WHO definitions) in children aged 7–9 years, by parental education and country<sup>a</sup>**

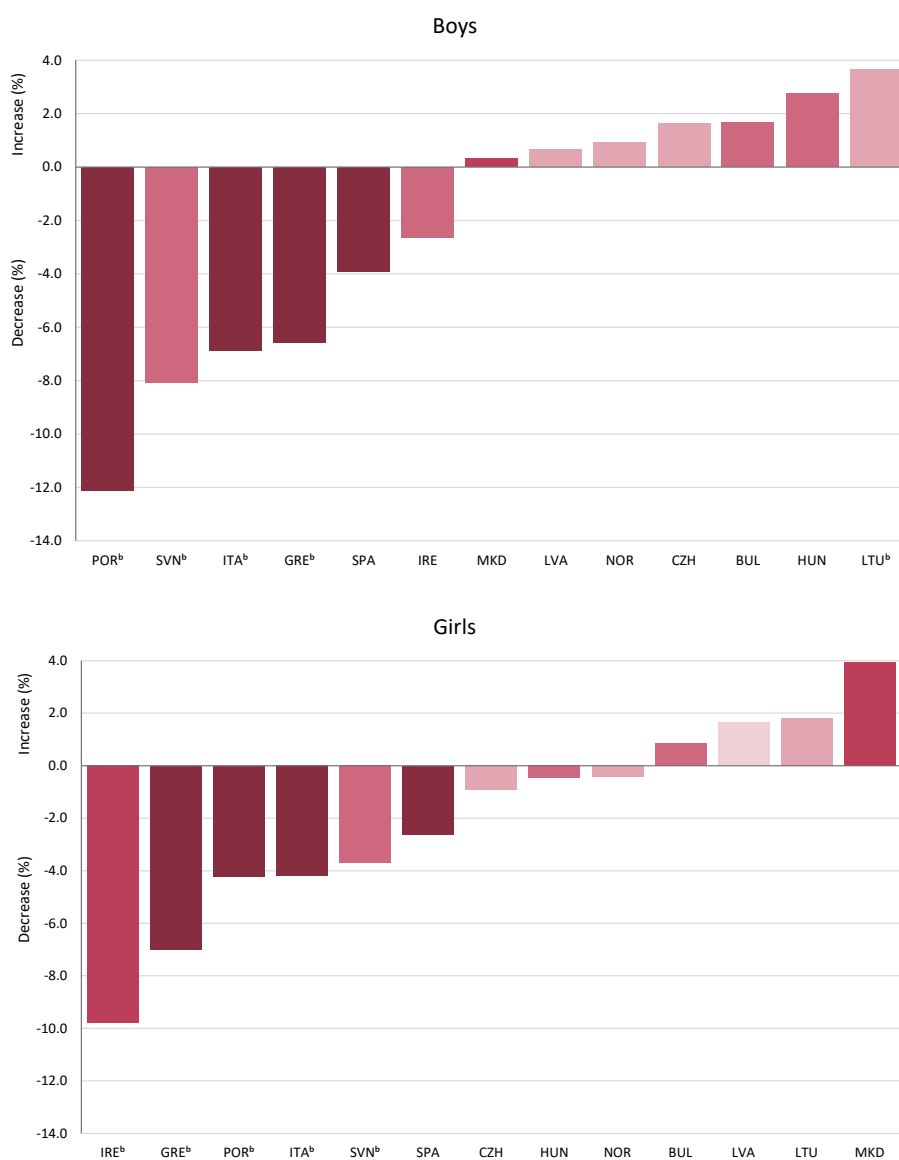


<sup>a</sup>Data relate to: (i) 7-year-olds in Bulgaria, Czechia, Denmark, Georgia, Ireland, Kyrgyzstan, Lithuania, Latvia, Malta, Montenegro, Portugal, Spain, Tajikistan, Turkmenistan and Turkey; (ii) 8-year-olds in Albania, Croatia, France, Italy, Poland, Romania and San Marino; and (iii) 9-year-olds in Kazakhstan.

Fig. 5 shows the change in overweight prevalence that occurred during a six- or eight-year timeframe in 13 countries that joined COSI at its very beginning (nine countries) or two years later (four countries); Fig. 6 shows the parallel change in obesity prevalence in these countries over the same timeframes. The prevalence of overweight decreased in countries with the highest baseline figures, such as Greece, Italy, Portugal and Spain, where the reduction ranged from 4 to 12 percentage points for boys and from 3 to 7 percentage points for girls. Important decreasing trends were also recorded in Slovenia. In these five countries, obesity prevalence showed a similar pattern. Irish data indicated a decrease mainly among girls for both overweight and obesity, whereas a rising trend was observed among girls in North Macedonia and boys in Lithuania. Czechia and Norway have stable figures, while the picture is less clear in Bulgaria and Latvia. A rising trend in obesity was observed among Latvian girls and Bulgarian boys.

**Fig. 5. Absolute difference in the prevalence of overweight (including obesity – WHO definition) between COSI round 1 (2007–2008) or round 2 (2009–2010) and COSI round 4 (2015–2017)<sup>a</sup>**

Baseline prevalence category: ■ < 20.0% ■ 20.0–24.9% ■ 25.0–29.9% ■ 30.0–34.9% ■ ≥35.0%

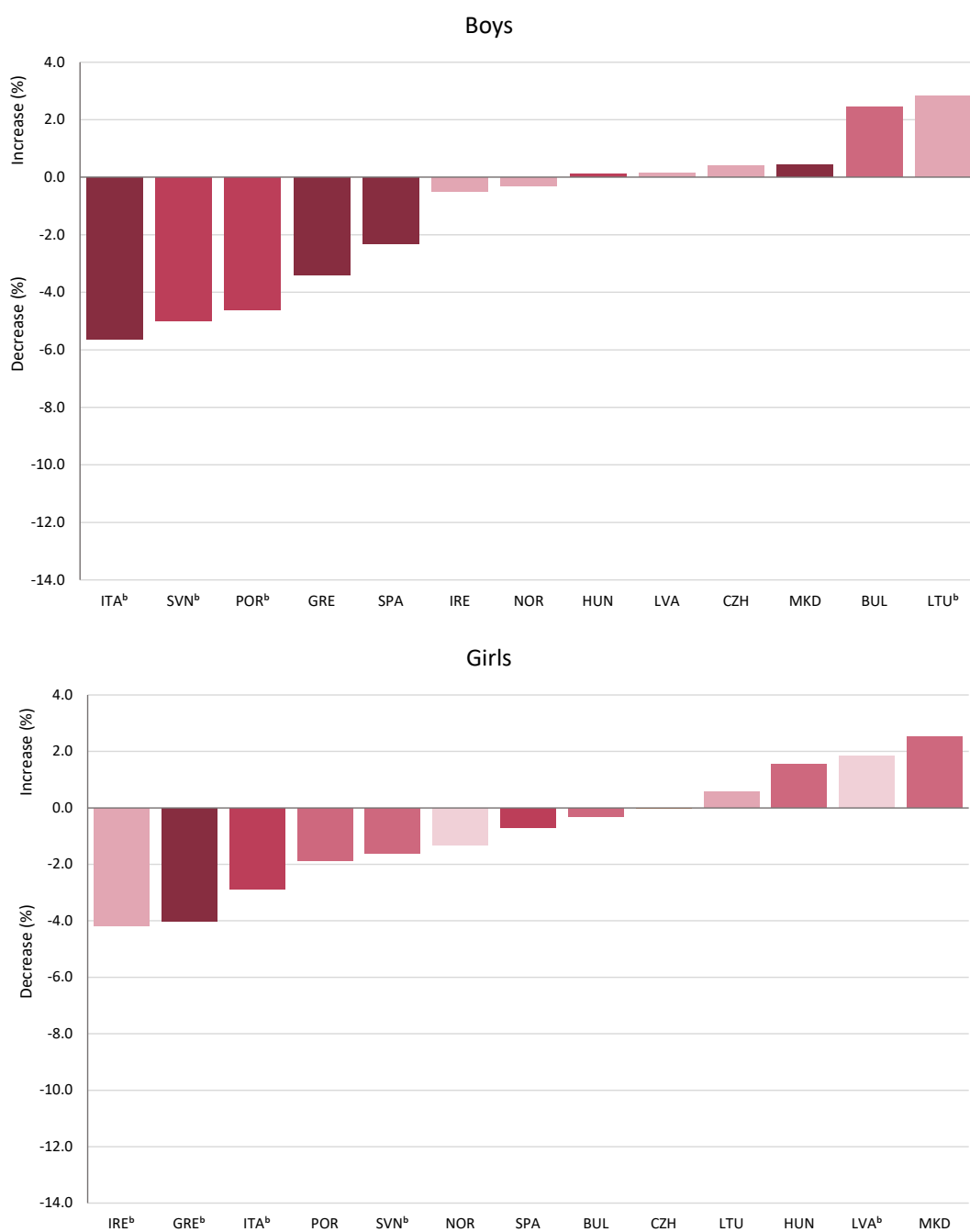


<sup>a</sup>Data from COSI round 2 (2009–2010) are used as the baseline for countries that did not participate in COSI round 1 (Greece, Hungary, North Macedonia, Spain). Figures refer to 7-year-olds in all countries except Italy and Norway (8-year-olds).

<sup>b</sup>Pearson design-based  $\chi^2$  test used for assessing homogeneity of prevalence estimates across the two rounds of data collection – p-value < 0.05.

**Fig. 6. Absolute difference in obesity prevalence between COSI round 1 (2007–2008) or round 2 (2009–2010) and COSI round 4 (2015–2017)<sup>a</sup>**

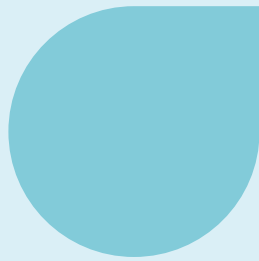
Baseline prevalence category:  < 6.0%  6.0–9.9%  10.0–13.9%  14.0–17.9%  ≥18.0%



<sup>a</sup>Data from COSI round 2 (2009–2010) are used as the baseline for countries that did not participate in COSI round 1 (Greece, Hungary, North Macedonia, Spain). Figures refer to 7-year-olds in all countries except Italy and Norway (8-year-olds).

<sup>b</sup>Pearson design-based  $\chi^2$  test used for assessing homogeneity of prevalence estimates across the two rounds of data collection – p-value < 0.05.





## **Eating habits**

**Breakfast consumption**

**Fresh fruit consumption**

**Vegetable consumption**

**Savoury snacks consumption**

**Sweet snacks consumption**

**Soft drinks consumption**

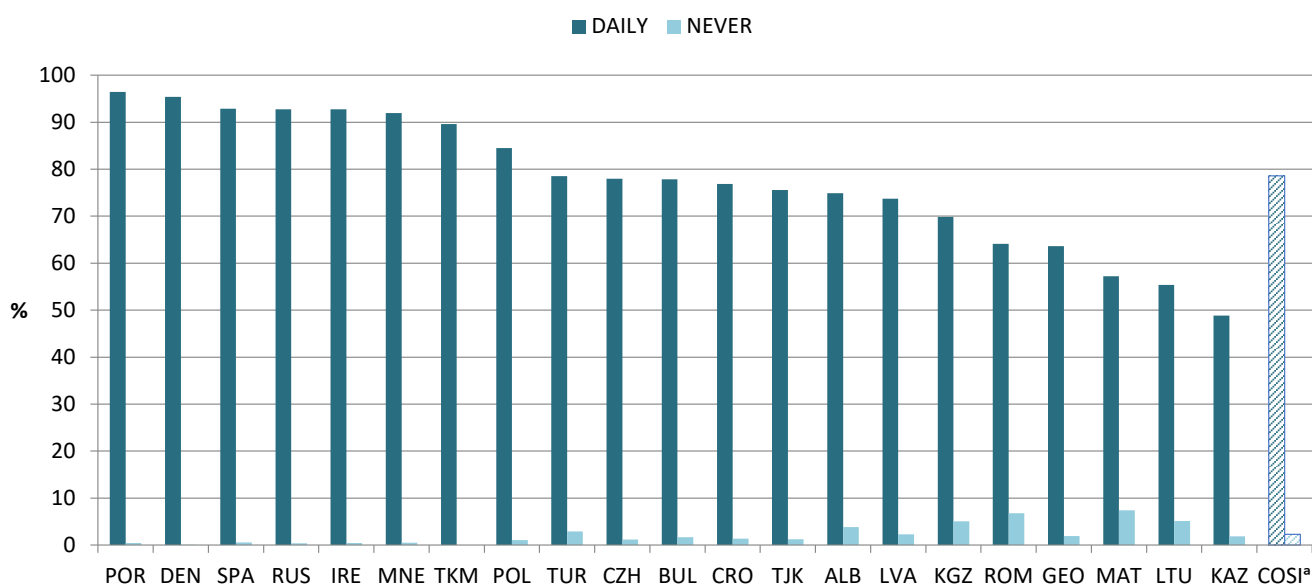
# 4. Eating habits

## 4.1 Breakfast consumption



Breakfast is recommended as an important means to provide children with nutrient-rich foods to start the day and to give them energy after a long night fast. Several studies show that breakfast consumption is associated with maintaining a healthy weight in children. Fig. 7 shows the percentage of children who had, respectively, the healthiest habit (having breakfast every day) and the unhealthiest habit (never having breakfast) in the 21 countries participating in COSI round 4 where relevant information was gathered. Except for Kazakhstan (49%), a majority of children in all countries had breakfast daily, with figures ranging from 55% in Lithuania to 96% in Portugal. Nearly all children (over 90%) had breakfast every day in Denmark, Portugal, Spain, Russian Federation (Moscow only), Ireland and Montenegro. The percentage of children never having breakfast did not exceed 7% in any country, with the highest values recorded in Malta, Romania, Lithuania and Kyrgyzstan (between 5% and 7% of children).

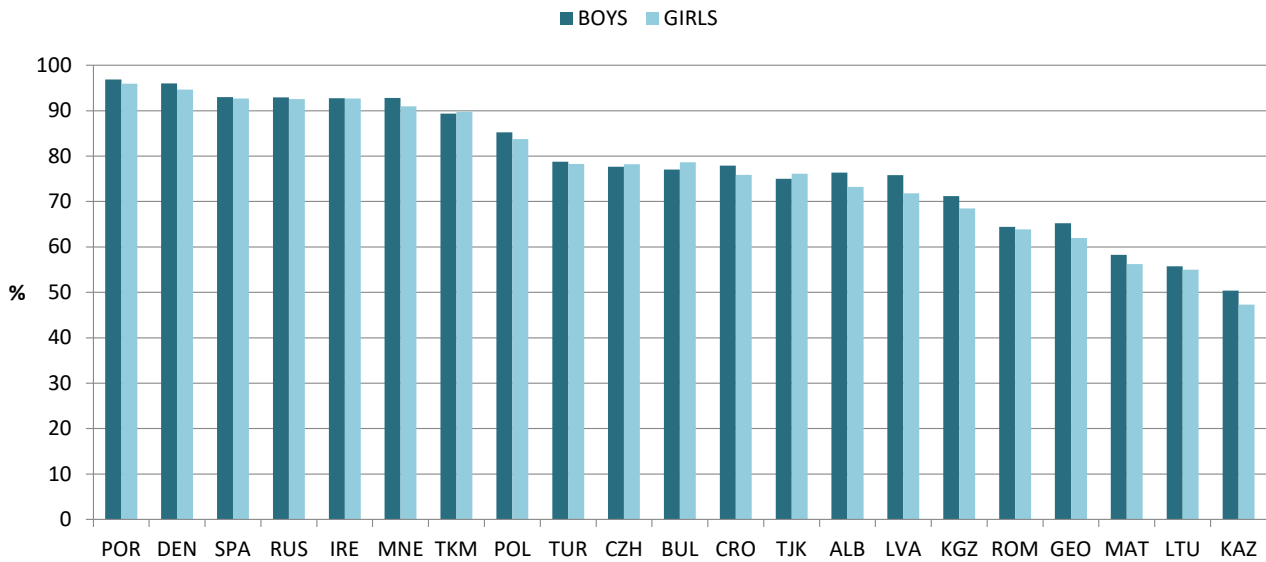
**Fig. 7. Frequency of breakfast consumption among 6–9-year-olds: consumed daily or never consumed (%)**



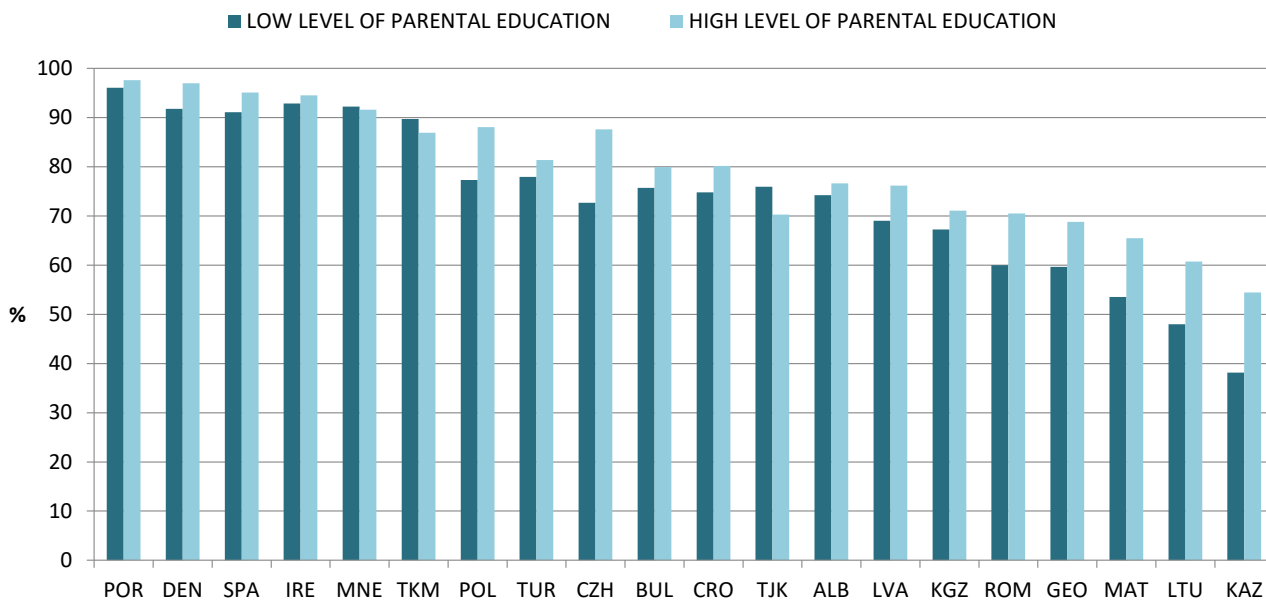
<sup>a</sup>The columns labelled "COSI" represents the average value across the countries that provided relevant information.

There was no important difference in daily consumption of breakfast between girls and boys (Fig. 8). The largest gaps were found in Latvia (76% of boys versus 72% of girls), Albania (76% versus 73%), Georgia (65% versus 62%) and Kazakhstan (50% versus 47%). Compared to gender, parental education appeared to have a more consistent impact in nearly all countries, with children of highly educated parents more likely to have breakfast every day than children whose parents had a lower level of education (Fig. 9). The greatest differences were observed in Poland, Czechia, Romania, Malta, Lithuania and Kazakhstan, where intervals of over 10 percentage points were recorded. Only in Tajikistan, Turkmenistan and Montenegro was the relation reversed, with higher parental education associated with lower breakfast consumption.

**Fig. 8. Daily consumption of breakfast among 6–9-year-old boys and girls (%)**



**Fig. 9. Daily consumption of breakfast among 6–9-year-olds, by parental education (%)<sup>a</sup>**



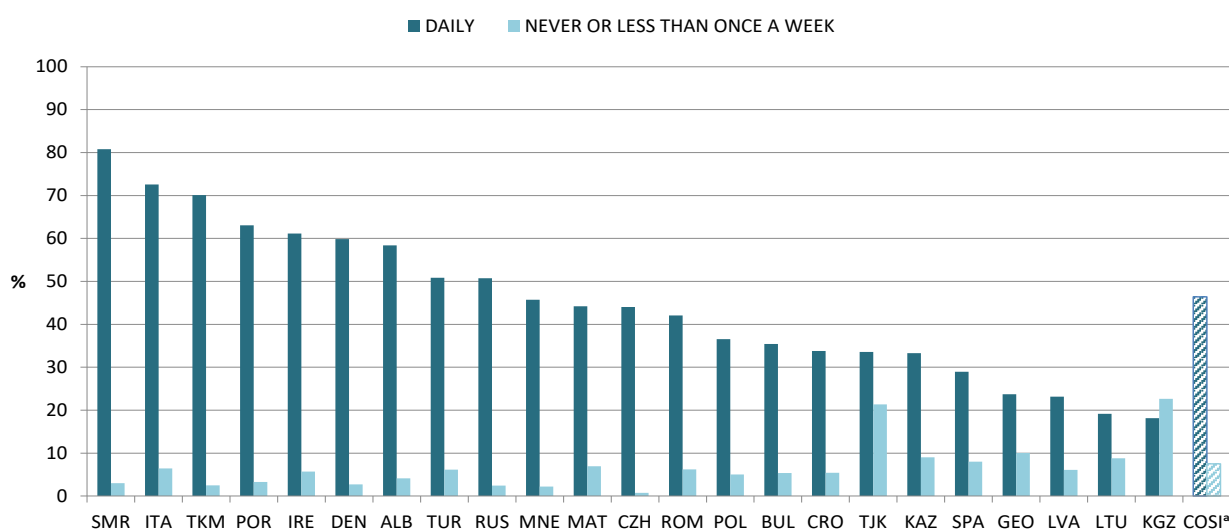
<sup>a</sup>The Russian Federation (Moscow only) is not included in the figure because of the high level of missing data on parental education.

## 4.2 Fresh fruit consumption



Fruit consumption is in the category of habits linked to positive health in the short and long term. Recommendations on consumption vary between countries, the usual advice being to eat five or more portions of fruit and/or vegetables daily. Fig. 10 shows the percentage of children who reported, respectively, the healthiest habit (eating fresh fruit every day) and the unhealthiest habit (eating fresh fruit less than once a week or never in the 23 countries participating in COSI round 4 where relevant information was gathered. Daily fruit consumption ranged widely across countries, with a difference of over 60 percentage points between the highest value (81%) and the lowest (18%). Overall, in only nine countries out of 23 – San Marino, Italy, Turkmenistan, Portugal, Ireland, Denmark, Albania, Turkey and Russian Federation (Moscow only) – did a majority of children eat fresh fruit every day. However, most children had fresh fruit more than once a week, as the percentage of children who ate it less than once a week or not at all did not exceed 10% in any countries except Kyrgyzstan and Tajikistan, where the percentage was just over 20%.

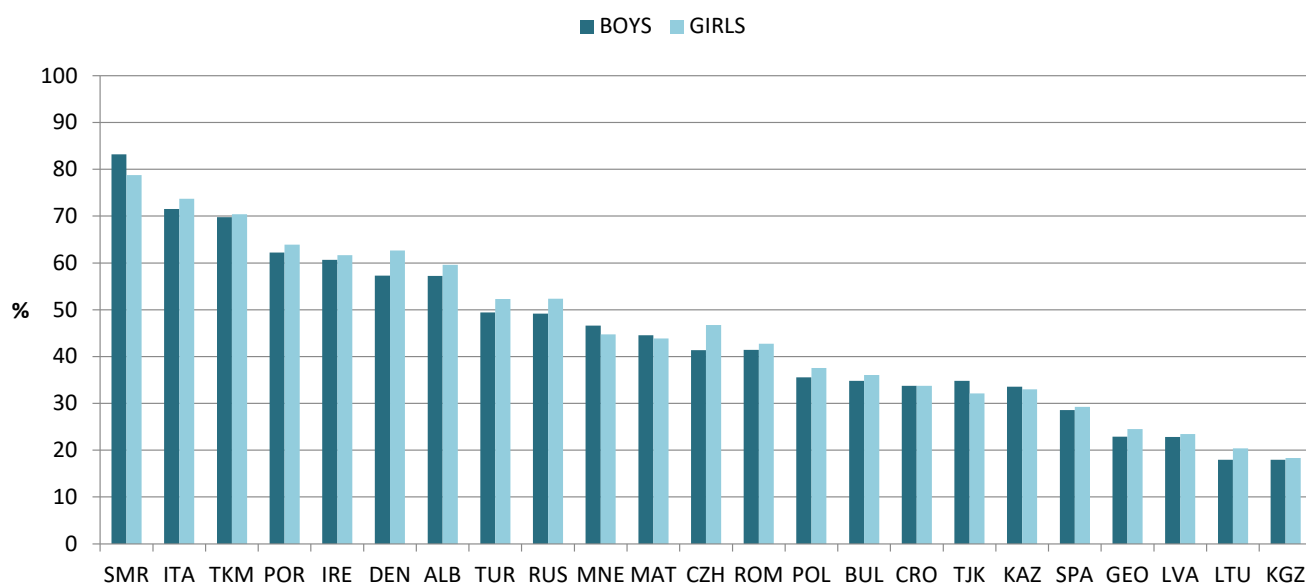
**Fig. 10. Frequency of fresh fruit consumption among 6–9-year-olds: consumed daily versus never or sporadically consumed (%)**



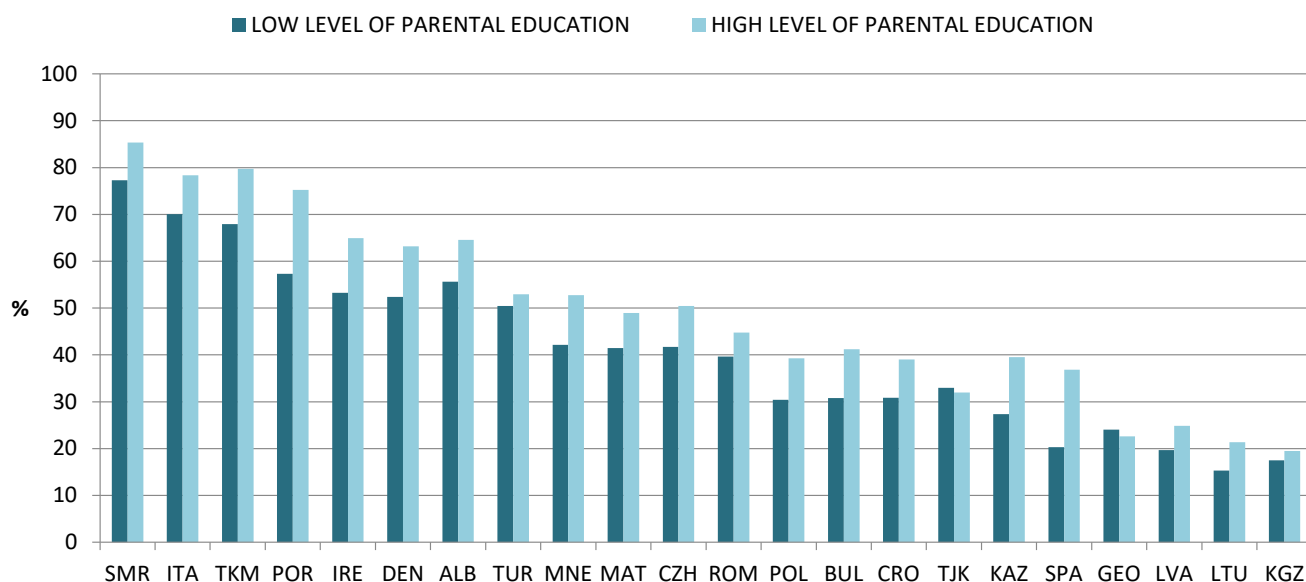
<sup>a</sup>The columns labelled “COSI” represents the average value across the countries that provided relevant information.

In most countries, girls consumed fresh fruit daily slightly more frequently than boys (Fig. 11). The largest differences were observed in Denmark (63% girls, 57% boys) and Czechia (47% girls, 41% boys). As with breakfast, a higher level of parental education appeared to be associated more strongly with consumption of fresh fruit (Fig. 12). The greatest difference in this respect was observed in Portugal and Spain, where a gap of nearly 20 percentage points was recorded in the daily consumption of fresh fruit between children of more educated parents and children of less educated parents. Differences of over 10 percentage points were also recorded in Turkmenistan, Ireland, Denmark, Montenegro and Kazakhstan.

**Fig. 11. Daily consumption of fresh fruit among 6–9-year-old boys and girls (%)**



**Fig. 12. Daily consumption of fresh fruit among 6–9-year-olds, by parental education (%)<sup>a</sup>**



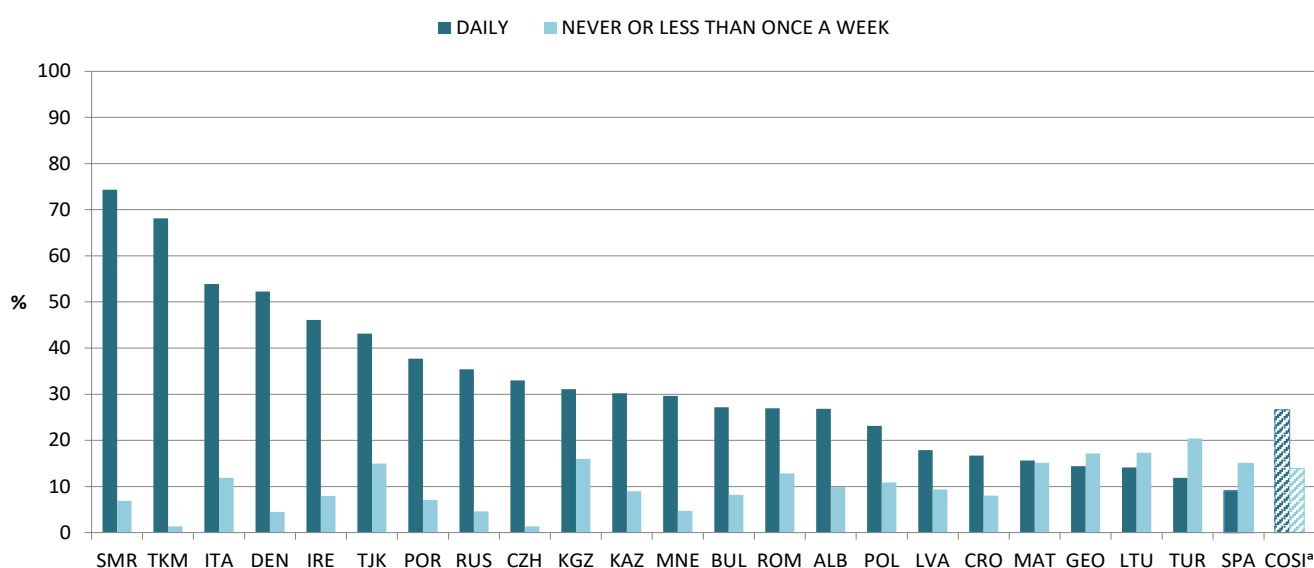
<sup>a</sup>The Russian Federation (Moscow only) is not included in the figure because of the high level of missing data on parental education.

## 4.3 Vegetable consumption



Vegetables are also important components of a healthy diet. Fruit and vegetables are rich sources of essential nutrients and their consumption helps to ensure adequate growth. Fig. 13 shows the percentage of children who reported, respectively, the healthiest habit (eating vegetables every day) and the unhealthiest habit (eating vegetables less than once a week or never). Like daily fruit intake, vegetable consumption ranged widely between countries, reaching 74% in San Marino and falling to just 9% in Spain. Overall, in only four of the 23 countries participating in COSI round 4 and where relevant information was gathered – San Marino, Italy, Turkmenistan and Denmark – did more than 50% of children eat vegetables every day. However, nearly all children ate vegetables at least once a week, as in most countries the percentage of those never eating vegetables or eating them less than once a week was around 10% or below (the figures varied between 1% in Czechia and Turkmenistan and 20% in Turkey).

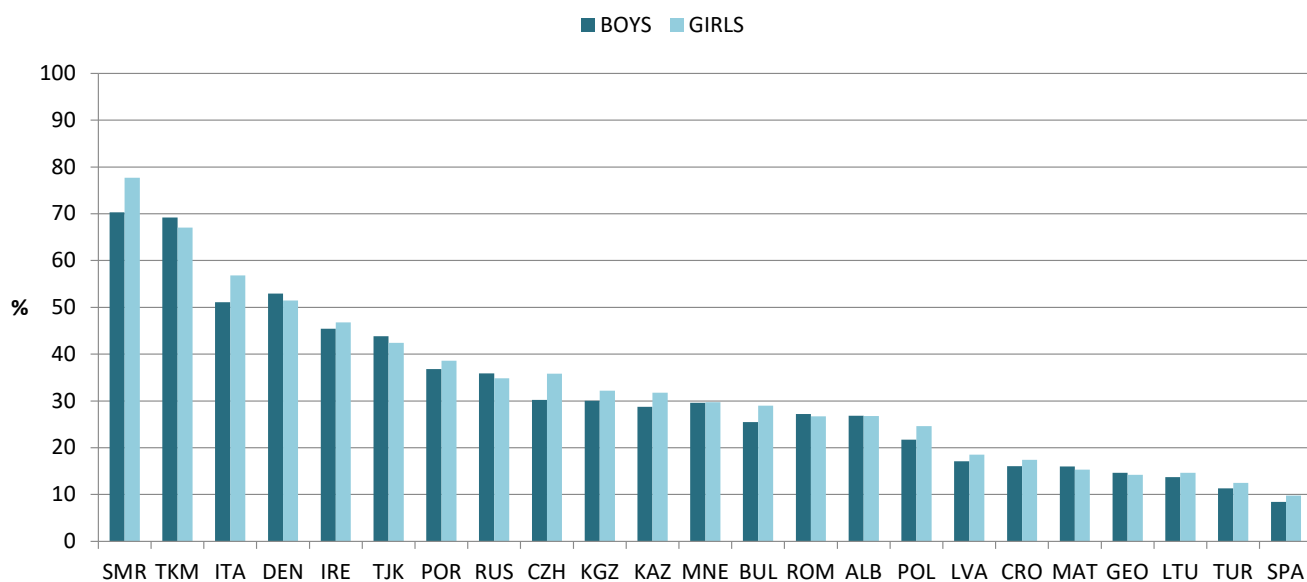
**Fig. 13. Frequency of vegetable consumption among 6–9-year-olds: consumed daily versus never or sporadically consumed (%)**



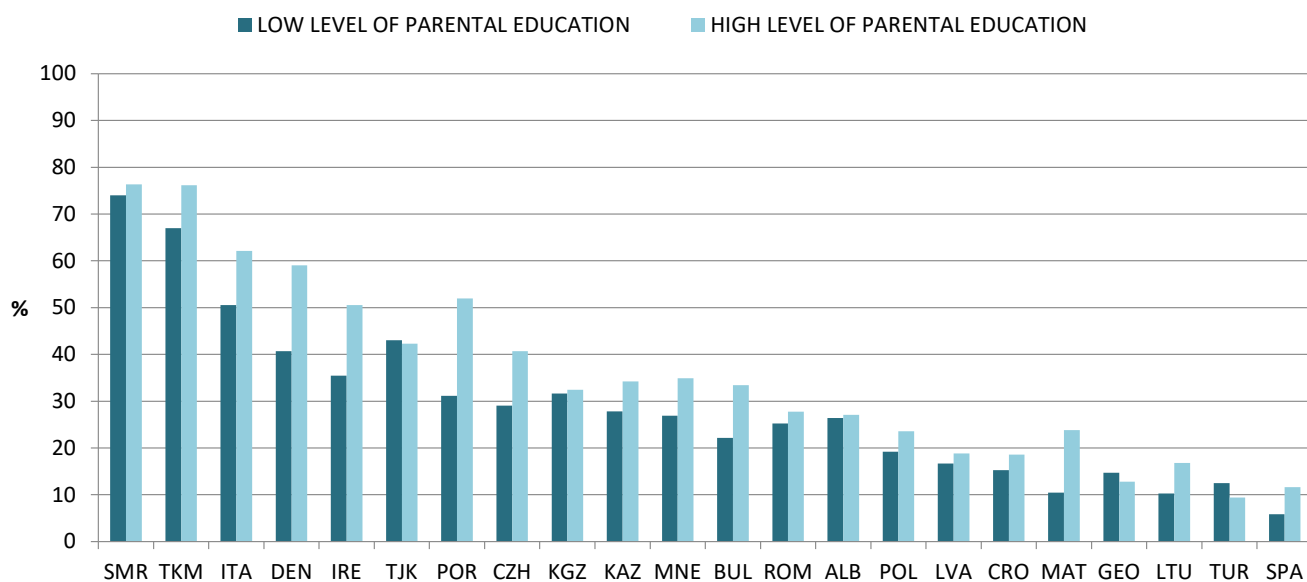
<sup>a</sup>The columns labelled "COSI" represent the average values across the countries that provided relevant information.

In most countries, little gender difference was observed in vegetable consumption (Fig. 14). Girls were generally slightly more frequent daily consumers of vegetables, with the largest difference observed in San Marino (78% girls, 70% boys), Italy (57% girls, 51% boys) and Czechia (36% girls, 30% boys). Children of more highly educated parents consumed vegetables daily more frequently than children whose parents attained a lower level of education, with a difference of around 20 percentage points observed in Portugal and Denmark. Differences of over 10 percentage points were also recorded in Italy, Ireland, Czechia, Bulgaria and Malta. Only in Turkey and, to a lesser extent, in Georgia and Tajikistan was a higher level of parental education associated with less frequent vegetable consumption (Fig. 15).

**Fig. 14. Daily consumption of vegetables among 6–9-year-old boys and girls (%)**



**Fig. 15. Daily consumption of vegetables among 6–9-year-olds, by parental education (%)<sup>a</sup>**



<sup>a</sup>The Russian Federation (Moscow only) is not included in the figure because of the high level of missing data on parental education.



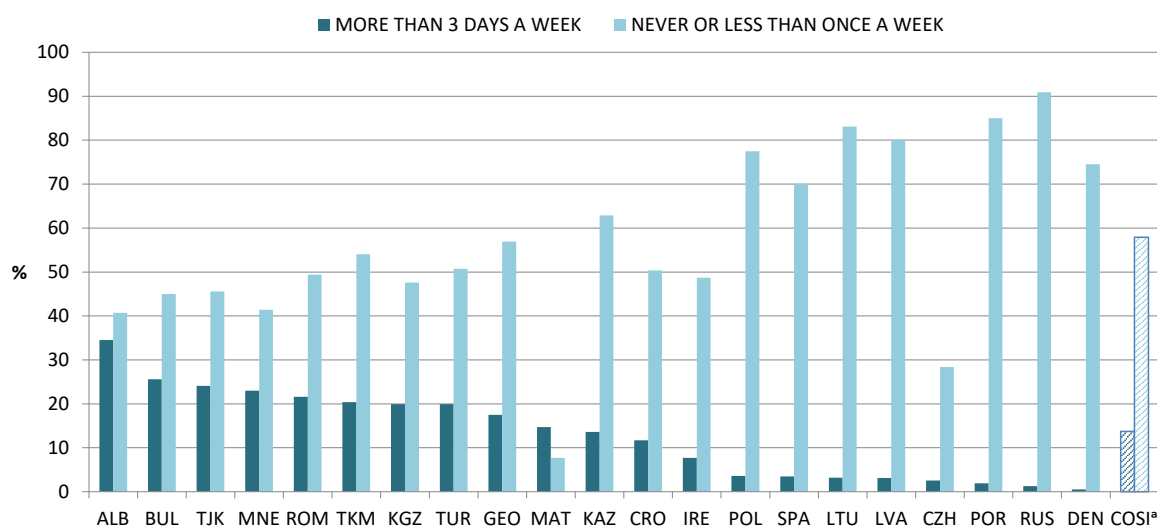
## 4.4 Savoury snacks consumption



Snacking is influenced by multiple factors, including taste preference, which determines the choice between salty and sweet snacks. Some snacks belong to the category of unhealthy habits that can have a direct impact on overweight and obesity.

Fig. 16 shows the consumption of savoury snacks as the percentage of children eating them, respectively, more than 3 days per week and less than once a week or never in the 21 countries participating in COSI round 4 where relevant information was gathered. The highest level of consumption was recorded in Albania, where 35% of children consumed savoury snacks more than 3 days per week; the lowest level was in Denmark, where all children consumed such snacks less than 4 days a week. The habit appeared to be quite widespread in central Asian countries (Tajikistan, Turkmenistan and Kyrgyzstan), where around 20–25% of children frequently consumed salty snacks. By contrast, consuming salty snack less than once a week or not at all was common (over 70% of children) in seven of the 21 countries where information was collected: Poland, Spain, Lithuania, Latvia, Portugal, Russian Federation (Moscow only) and Denmark.

**Fig. 16. Frequency of savoury snacks consumption among 6–9-year-olds: frequent (more than 3 days per week) versus never or sporadically consumed (%)**

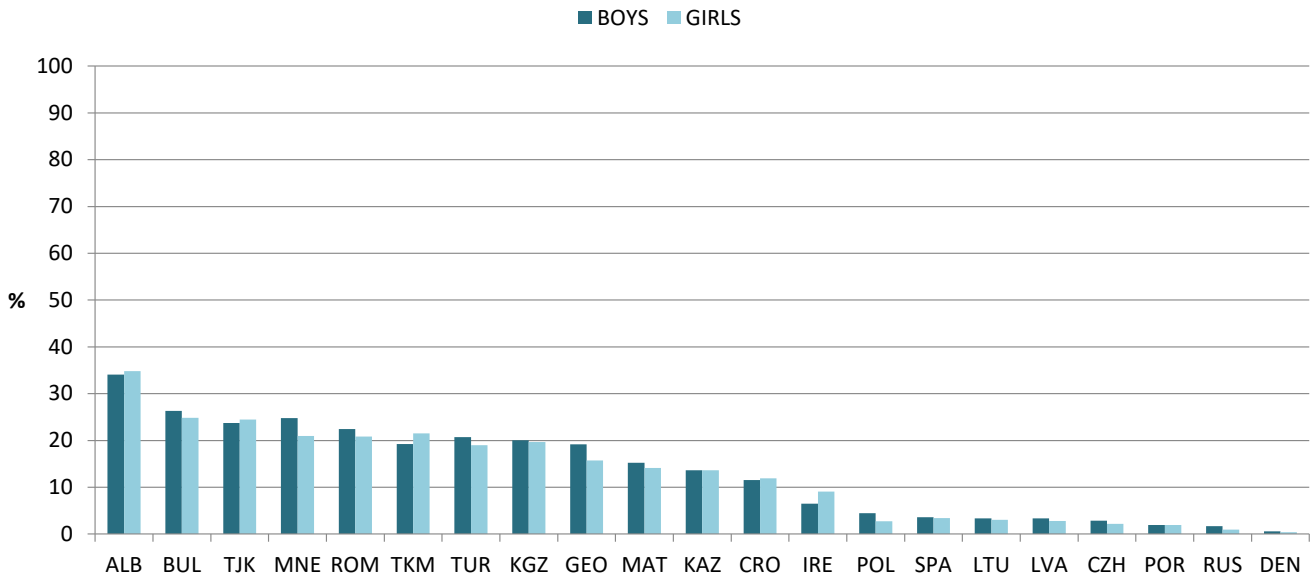


\*The columns labelled "COSI" represent the average values across the countries that provided relevant information.

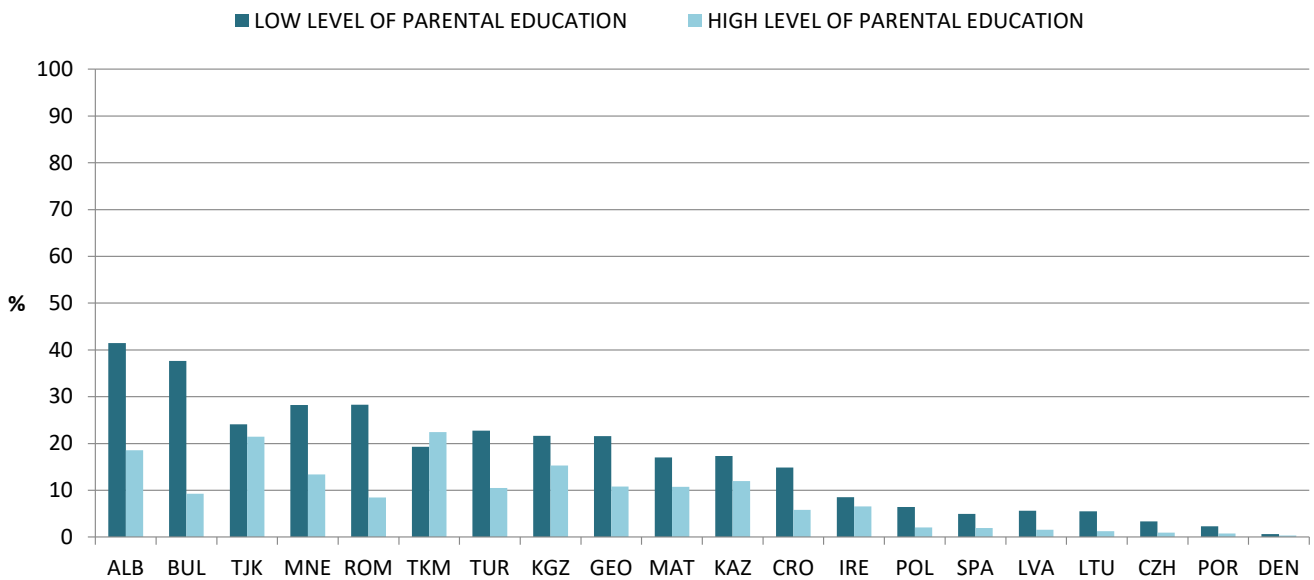
In almost all countries, no important gender difference (less than 2%) was observed in children consuming savoury snacks more than 3 days per week (Fig. 17). The largest gender differences were observed in Montenegro (21% for girls, 25% for boys) and Georgia (16% for girls, 19% for boys).

A lower level of parental education was associated with a higher level of consumption of savoury snacks in almost all countries (Fig. 18). The largest gaps were recorded in Albania, Bulgaria and Romania, where a difference of 20 percentage points or more was recorded between children of less educated parents and children whose parents attained a higher level of education. In Georgia, Montenegro and Turkey, the differences were above 10%. Parental education appeared to be inversely related to consumption of savoury snacks only in Turkmenistan.

**Fig. 17. Frequent (more than 3 days per week) consumption of savoury snacks among 6–9-year-old boys and girls (%)**



**Fig. 18. Frequent (more than 3 days per week) consumption of savoury snacks among 6–9-year-olds, by parental education (%)<sup>a</sup>**



<sup>a</sup>The Russian Federation (Moscow only) is not included in the figure because of the high level of missing data on parental education.

## 4.5 Sweet snacks consumption

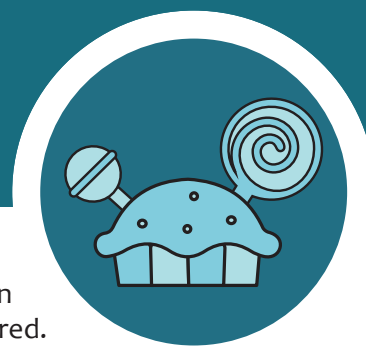
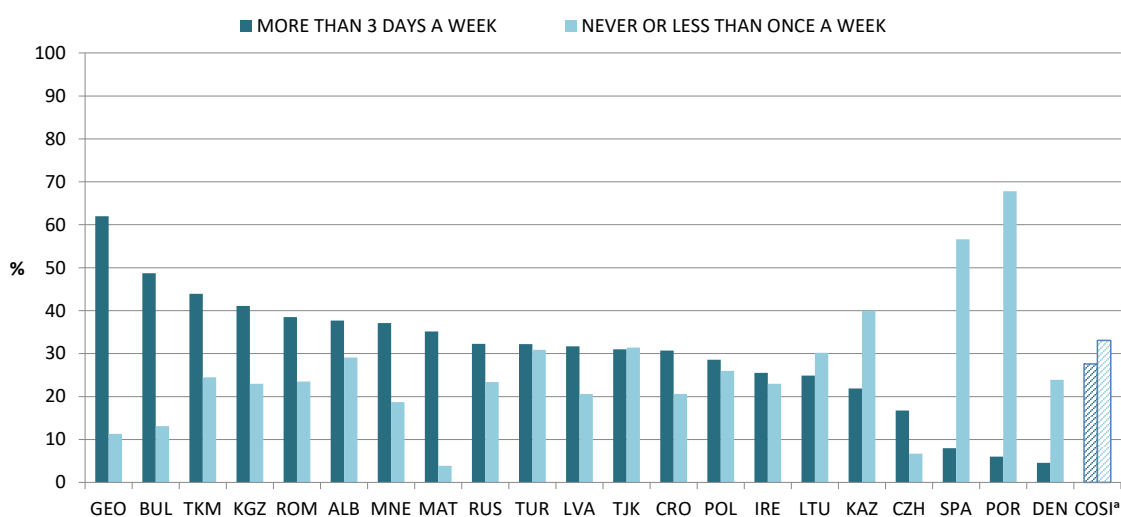


Fig. 19 shows the consumption of sweet snacks as the percentage of children eating them, respectively, more than 3 days per week and less than once a week or never in the 21 countries participating in COSI round 4 where relevant information was gathered. Frequent consumption (more than 3 days per week) ranged from 5% in Denmark to 62% in Georgia, while consumption less than once a week or not at all ranged from 4%, observed in Malta, to 68% in Portugal. In general, consumption of sweet snacks was more evenly spread than that of savoury snacks. Frequent consumption was very common in some eastern European and central Asian countries – in particular, Georgia (62%), Bulgaria (49%), Turkmenistan (44%), Kyrgyzstan (41%), Romania (38%) and Albania (38%). At least one in five children ate sweet snacks more than 3 days a week in 17 of 21 countries where data were available. Only in two countries – Portugal and Spain – a majority of children ate sweet snacks less than once a week or not at all.

**Fig. 19. Frequency of sweet snacks consumption among 6–9-year-olds: frequent (more than 3 days per week) versus never or sporadically consumed (%)**

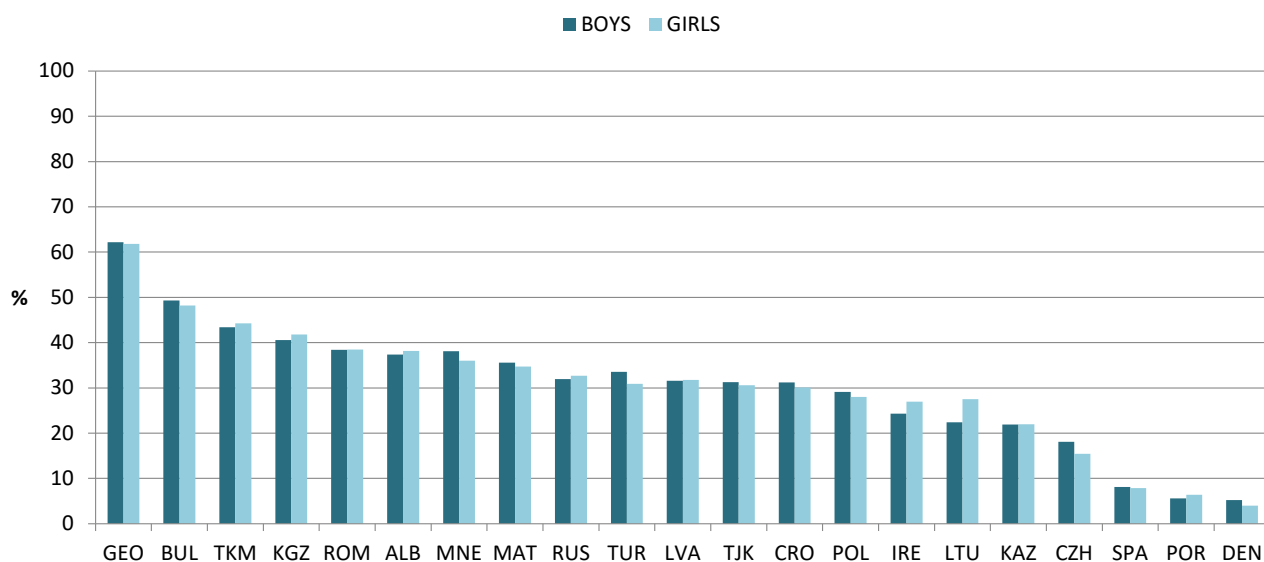


<sup>a</sup>The columns labelled “COSI” represent the average values across the countries that provided relevant information.

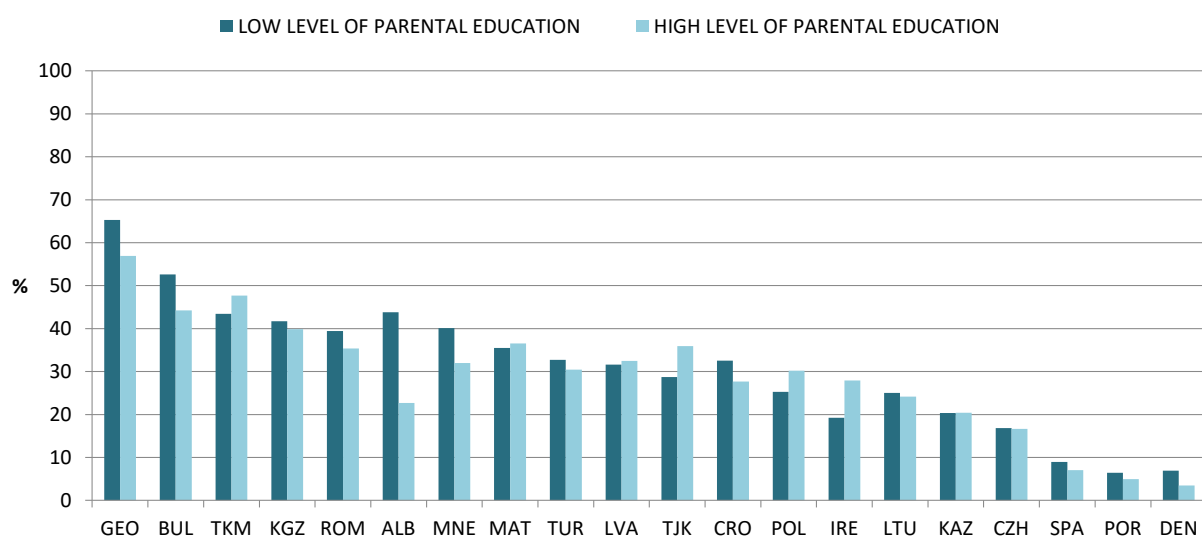
In almost all countries, no important gender difference was observed in the percentage of children who frequently consumed sweet snacks (Fig. 20). The largest gender difference was observed in Lithuania (28% for girls, 22% for boys).

The relationship between sweet snacks consumption and parental education is shown in Fig. 21. In most countries, children of more educated parents were less likely to be frequent consumers of sweet snacks. The largest gap was observed in Albania, where 44% of children of less educated parents frequently consumed sweet snacks, as against 23% of children of more educated parents. In Georgia, Bulgaria and Montenegro there was also a large difference of around 8 percentage points between children whose parents had a higher or lower level of education. The relation between parental education and frequent consumption of sweet snacks was reversed in Turkmenistan, Malta, Latvia, Tajikistan, Poland and, particularly, Ireland, where 28% of children of more educated parents ate sweet snacks more than 3 days per week as against 19% of those whose parents had lower levels of education.

**Fig. 20. Frequent (more than 3 days per week) consumption of sweet snacks among 6–9-year-old boys and girls (%)**



**Fig. 21. Frequent (more than 3 days per week) consumption of sweet snacks among 6–9-year-olds, by parental education (%)<sup>a</sup>**



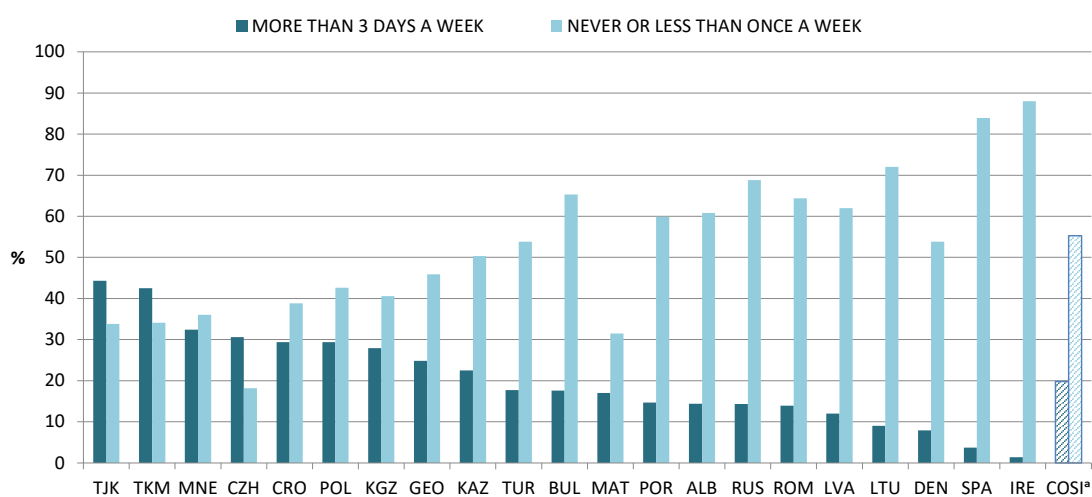
<sup>a</sup>The Russian Federation (Moscow only) is not included in the figure because of the high level of missing data on parental education.

## 4.6 Soft drinks consumption



Several studies show that soft drinks are associated with a greater risk of weight gain and obesity, while the excessive amounts of sugars they provide directly affect dental health. Fig. 22 shows the consumption of soft drinks as the percentage of children consuming them, respectively, more than 3 days per week and less than once a week or never in the 21 countries participating in COSI round 4 where relevant information was gathered. The percentage of children frequently consuming soft drinks (more than 3 days per week) ranged from 1% in Ireland to 44% in Tajikistan; the figures for children who consumed soft drinks less than once a week or not at all from less than 18% in Czechia to 88% in Ireland. The habit appeared to be quite widespread in central Asian countries, where between 22% and 44% of children consumed soft drinks more than 3 times a week. In twelve out of 21 countries with available data the majority of children drank soft drinks less than once a week or not at all.

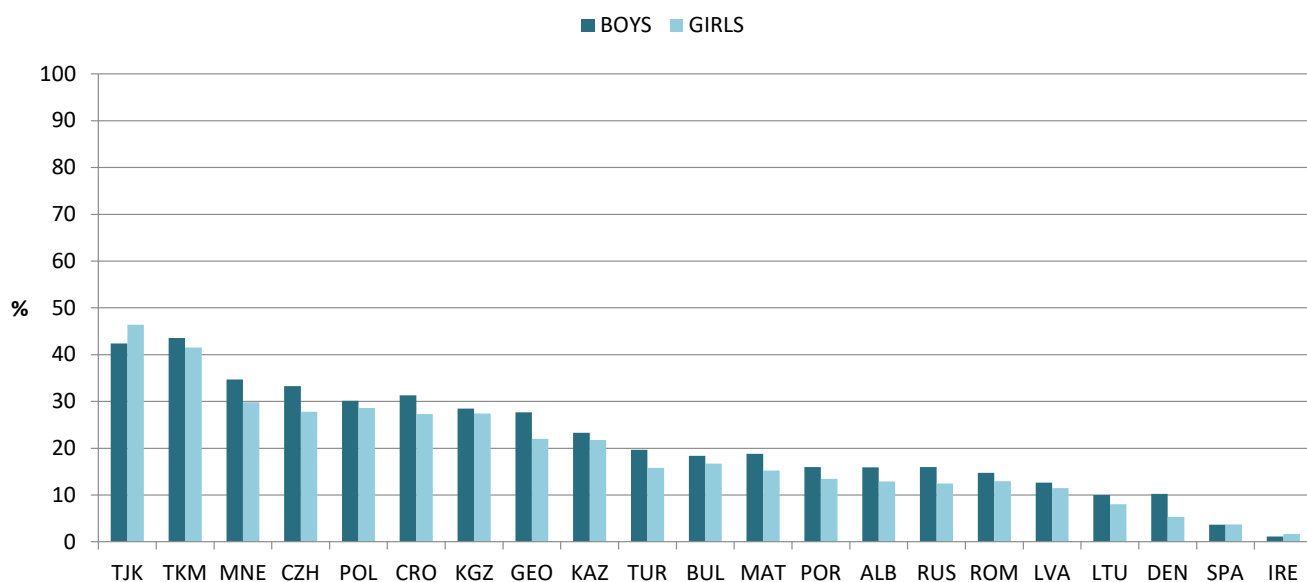
**Fig. 22. Frequency of soft drinks consumption among 6–9-year-olds: frequent (more than 3 days per week) versus never or sporadically consumed (%)**



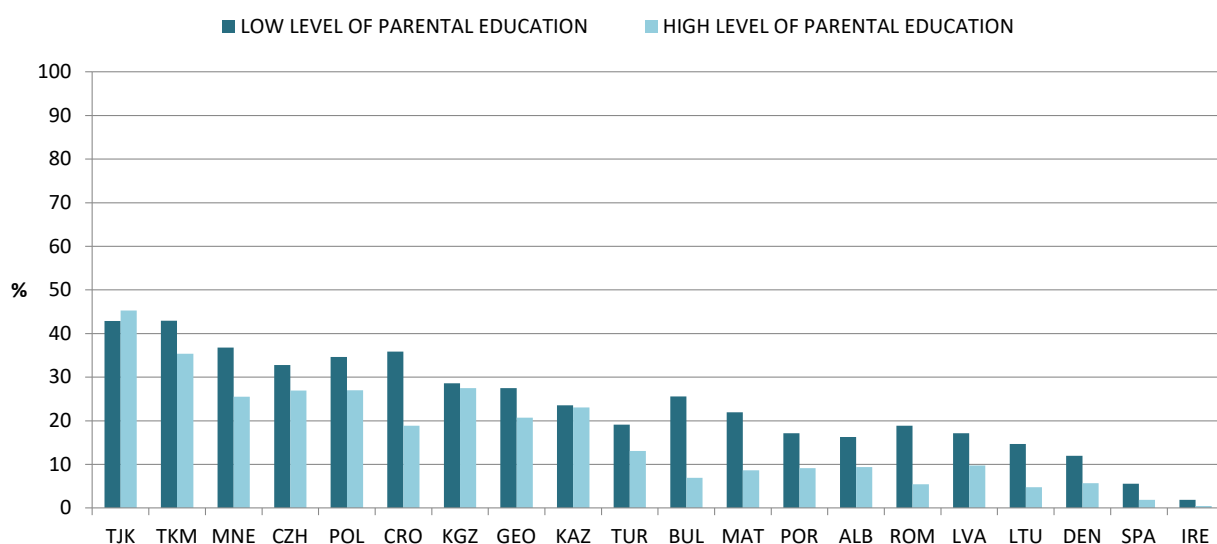
<sup>a</sup>The columns labelled "COSI" represent the average values across the countries that provided relevant information.

In almost all countries, frequent consumption of soft drinks (more than 3 days per week) was lower among girls (Fig. 23), and particularly among children whose parents had a higher level of education (Fig. 24). The largest gender differences were observed in Montenegro (30% for girls, 35% for boys), Czechia (28% and 33%), Georgia (22% and 28%) and Denmark (10% and 5%). With respect to parental education, the differences were more marked, with the largest gaps in Montenegro (25% for children of more educated parents, 37% for children of less educated parents), Croatia (19% and 36%), Bulgaria (7% and 26%), Malta (9% and 22%) and Romania (5% and 19%). Tajikistan was the only country where a significant reverse relationship was found between soft drink consumption and both gender and parental education: 46% of girls consumed soft drinks more than 3 times a week (versus 42% of boys), and 45% of children of more educated parents drank them more than 3 times a week (versus 43% of children with less educated parents).

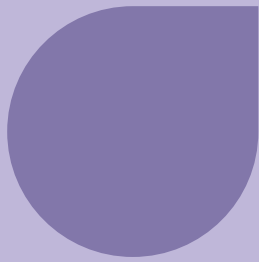
**Fig. 23. Frequent (more than 3 days per week) consumption of soft drinks among 6–9-year-old boys and girls (%)**



**Fig. 24. Frequent (more than 3 days per week) consumption of soft drinks among 6–9-year-olds, by parental education (%)<sup>a</sup>**



<sup>a</sup>The Russian Federation (Moscow only) is not included in the figure because of the high level of missing data on parental education.



## **Physical activity**

**Transport to and from school**

**Time spent practising sports/dancing**

**Time spent actively/vigorously playing**



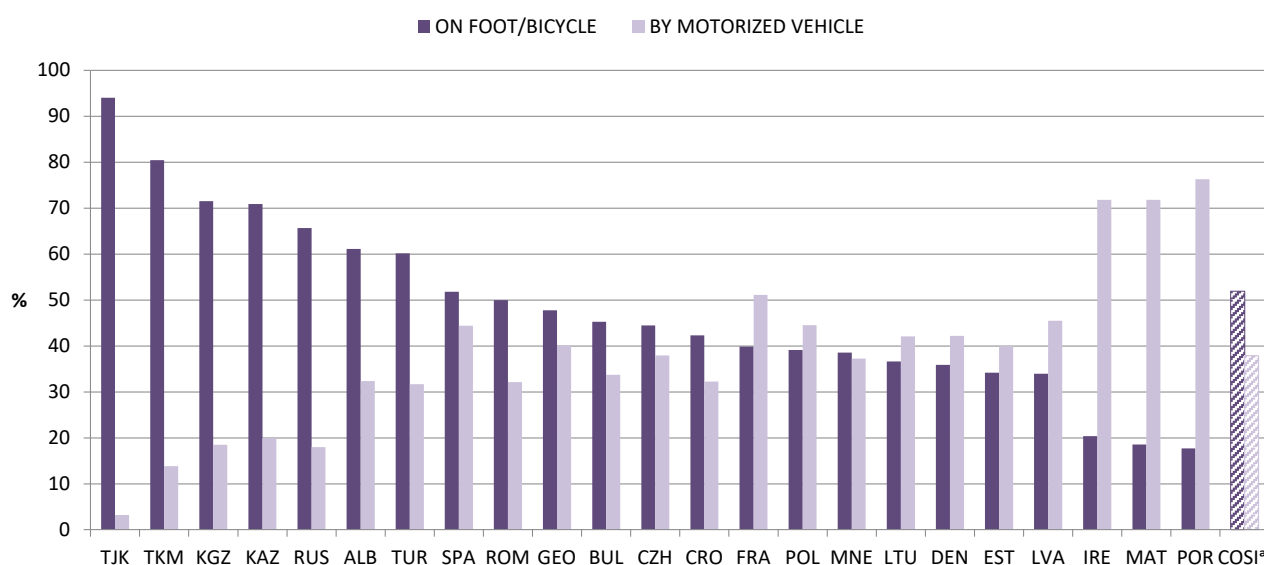
# 5. Physical activity

## 5.1 Transport to and from school



The benefits of moderate to vigorous physical activity for health and overweight and obesity are well documented. Going to and from school on foot/bicycle contributes to children’s physical activity. Fig. 25 shows the percentage of children who reported, respectively, the healthiest habit (going to and from school on foot/bicycle) and the unhealthiest habit (going to and from school using a motorized vehicle) in the 23 countries participating in COSI round 4 where relevant information was gathered. While a wide variability in behaviours across countries was observed, some regional patterns emerged. Children were very likely to go to and from school on foot/bicycle in all central Asian countries and the Russian Federation (Moscow only), where figures ranged between 66% and 94%. Conversely, in southern and northern Europe going to school by car or bus was more common. In Portugal, Malta and Ireland around three quarters of children went to and from school by motorized vehicle.

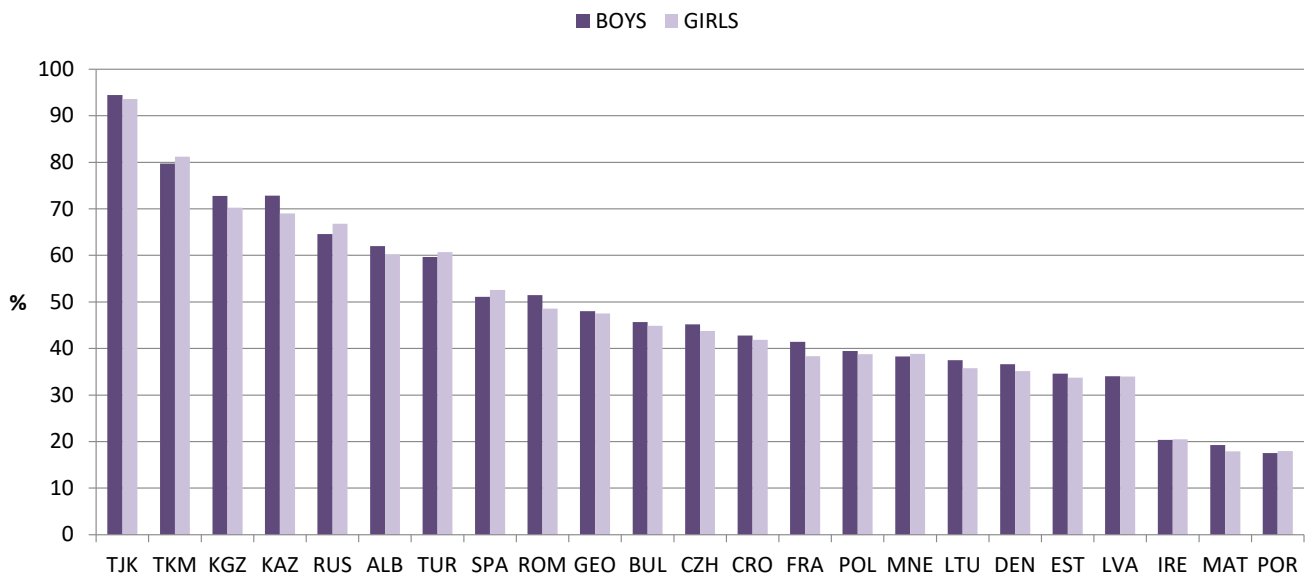
**Fig. 25. Transport to and from school: 6–9-year-olds going on foot/bicycle versus those going by motorized vehicle (%)**



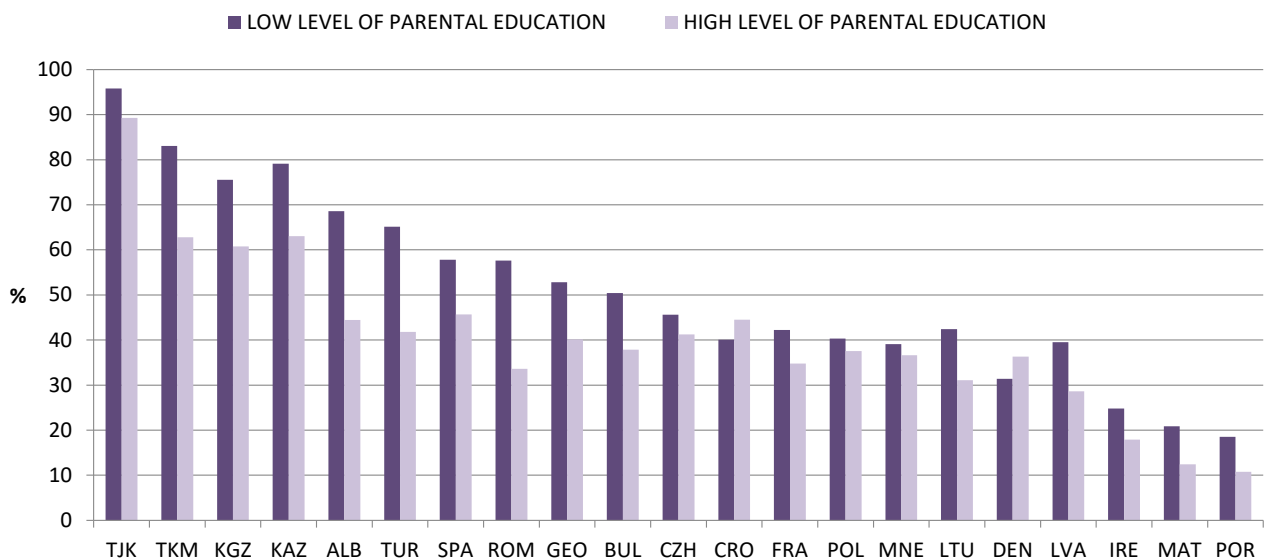
\*The columns labelled “COSI” represent the average values across the countries that provided relevant information.

In most countries no significant gender difference in going to and from school on foot/bicycle was observed (Fig. 26). The largest gender difference was in Kazakhstan (69% of girls versus 73% of boys). Boys were slightly more likely to go to and from school on foot/bicycle in Romania, France and Kyrgyzstan. The relationship between walking or cycling to and from school and parental education was more straightforward: the less educated the parents, the more likely were the children to walk or cycle to and from school (Fig. 27). In fact, this may also be an indication of family wealth, as it is probable that boys and girls from more affluent families would be driven to school by their parents. The greatest differences were observed in Albania, Turkmenistan, Turkey and Romania, where there were gaps of between 20 and 24 percentage points. Only in Croatia and Denmark was a higher level of parental education associated with a higher incidence of walking or cycling to and from school; the difference in these countries was around 5 percentage points.

**Fig. 26. Percentage of 6–9-year-old boys and girls going to and from school on foot/bicycle (%)**



**Fig. 27. Transport to and from school on foot/bicycle among 6–9-year-olds, by parental education (%)<sup>a</sup>**



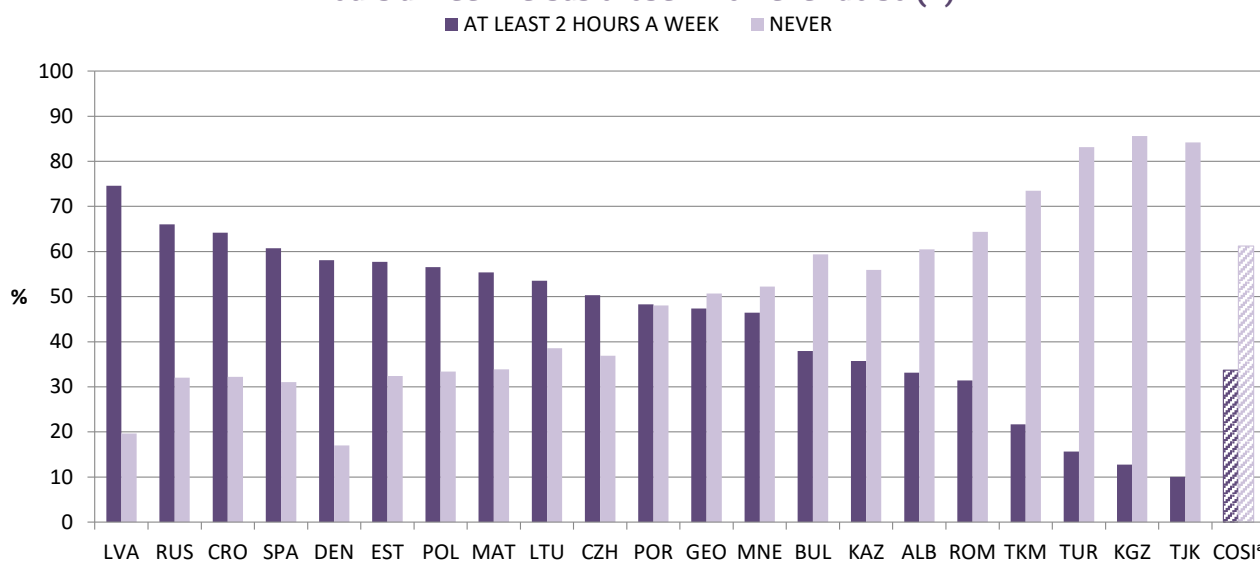
<sup>a</sup>The Russian Federation (Moscow only) is not included in the figure because of the high level of missing data on parental education. Information on parental education was not gathered in Estonia.

## 5.2 Time spent practising sports/dancing



Fig. 28 shows the percentage of children who spent at least 2 hours a week practising sports/dancing and the percentage who did not spend any time doing so in the 21 countries participating in COSI round 4 where relevant information was gathered. The time dedicated to practising sports/dancing for at least 2 hours a week ranged widely across countries, with a difference of 65 percentage points between the highest (Latvia at 75%) and the lowest (Tajikistan at 10%). Overall, only in nine countries out of 21 – Latvia, Russian Federation (Moscow only), Croatia, Spain, Denmark, Estonia, Poland, Malta and Lithuania – did a majority of children spend this amount of time a week doing sports/dancing. Conversely, the percentage who never did any sports/dancing was very high in Kyrgyzstan, Tajikistan, Turkey and Turkmenistan, where it ranged between 73% and 86%. Even in Latvia, the country with the best record in this respect, one out of five children never practised any sports/dancing.

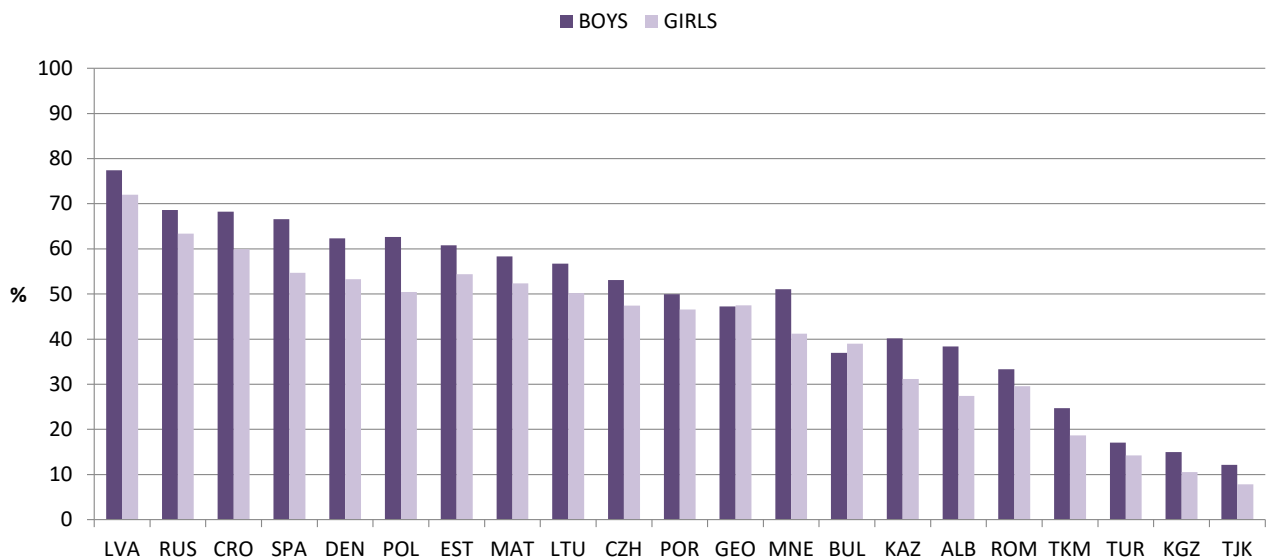
**Fig. 28. Time spent practising sports/dancing: 6–9-year-olds doing sports/dancing for at least 2 hours a week versus those who never do so (%)**



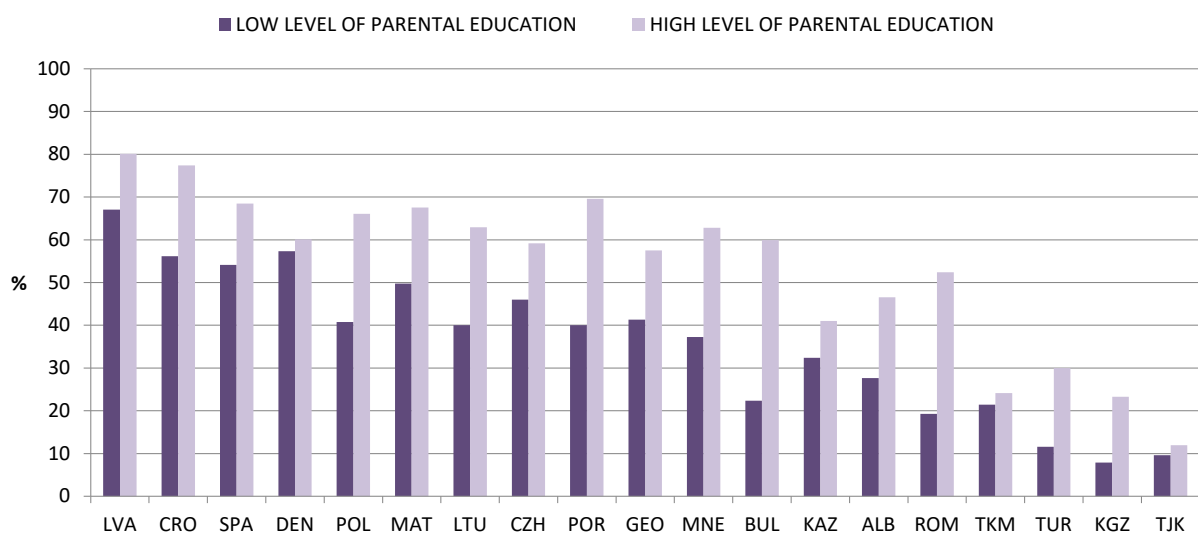
<sup>a</sup>The columns labelled “COSI” represent the average values across the countries that provided relevant information.

Gender differences were recorded in nearly all countries, with the largest occurring in Spain, Poland, Montenegro and Albania, where around 10% more boys engaged in 2 hours a week of sports/dancing compared to girls (Fig. 29). Differences related to parental education were even more marked (Fig. 30). Children whose parents attained a high level of education were more likely to engage in sports/dancing in all countries, and the difference between children with more or less educated parents ranged between 2–3 percentage points (observed in Denmark, Tajikistan and Turkmenistan) and 38 percentage points (in Bulgaria). Very large differences (over 20%) were also found in Croatia, Poland, Lithuania, Portugal, Montenegro and Romania. In this area, parental education may be linked to family wealth, with affluent parents better able to sustain the costs related to their children participating in sports/dancing.

**Fig. 29. Percentage of 6–9-year-old boys and girls spending at least 2 hours a week practising sports/dancing (%)**



**Fig. 30. Percentage of 6–9-year-olds spending at least 2 hours a week practising sports/dancing, by parental education (%)<sup>a</sup>**



<sup>a</sup>The Russian Federation (Moscow only) is not included in the figure because of the high level of missing data on parental education. Information on parental education was not gathered in Estonia.

## 5.3 Time spent actively/vigorously playing



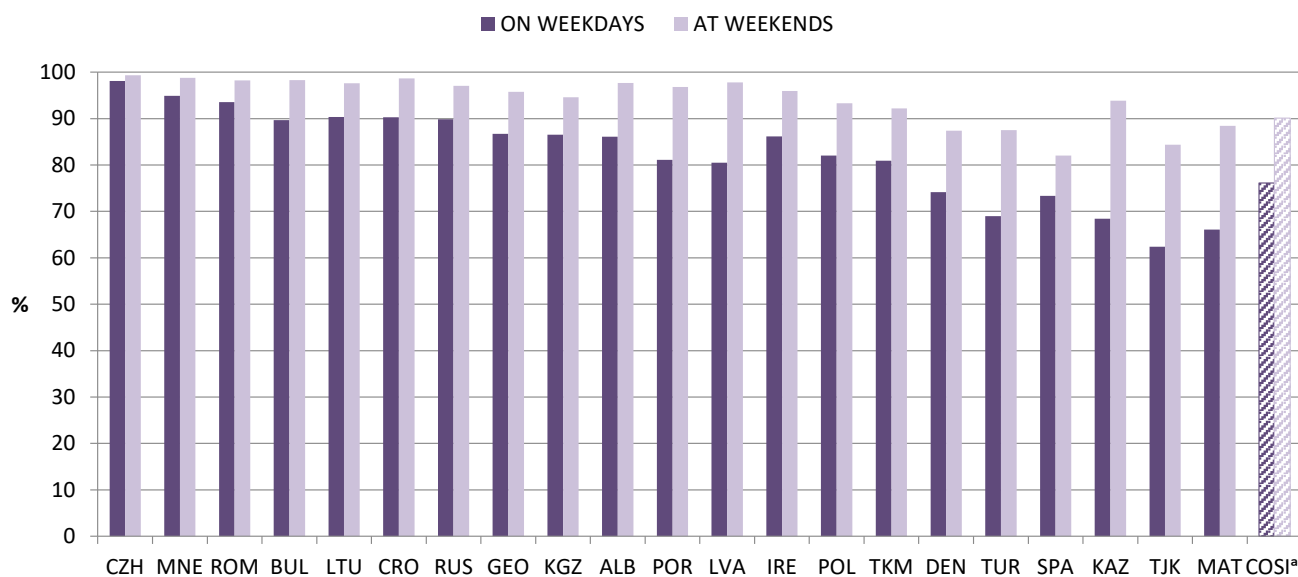
The habit of actively/vigorously playing was reviewed across 21 countries where this information was gathered. Fig. 31 shows the percentage of children in these countries playing actively/vigorously for at least 1 hour per day; Fig. 32 shows how this percentage is split between weekdays and weekends. In general, children tended to play actively/vigorously more frequently at weekends, when figures were above 90% in most countries. The spectrum was wider on weekdays: at the top was Czechia, followed by Montenegro, Romania, Bulgaria, Lithuania, Croatia and the Russian Federation (Moscow only), where 90% or more of children played outside for at least an hour daily. By contrast, in Turkey, Kazakhstan, Tajikistan and Malta, less than 70% of children spent at least an hour actively/vigorously playing on weekdays.

**Fig. 31. Percentage of 6–9-year-olds spending at least 1 hour a day actively/vigorously playing in 21 countries participating in COSI round 4 (%)**



<sup>a</sup>The columns labelled "COSI" represent the average values across the countries that provided relevant information.

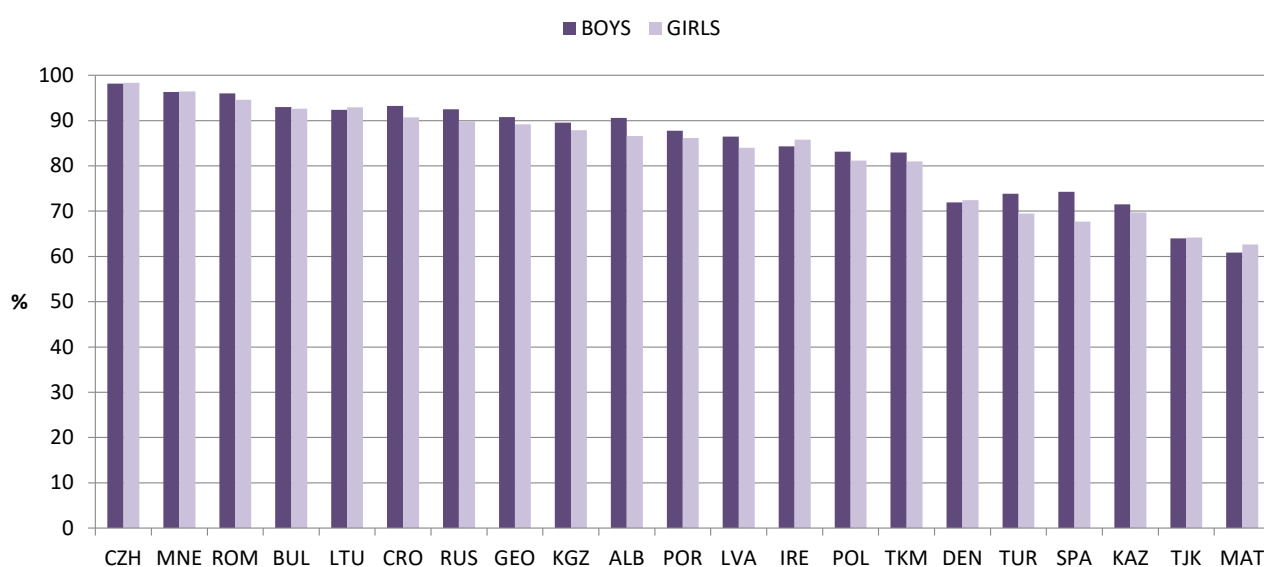
**Fig. 32. Percentage of 6–9-year-olds spending at least 1 hour a day actively/vigorously playing on weekdays and at the weekend (%)**



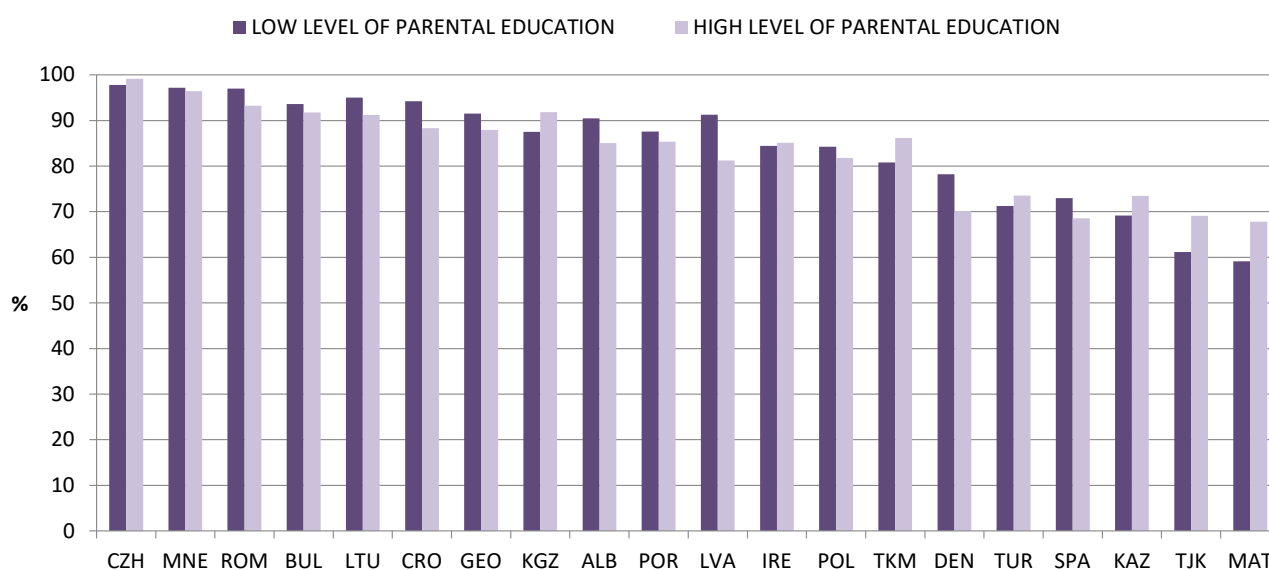
<sup>a</sup>The columns labelled "COSI" represent the average values across the countries that provided relevant information.

In most countries, boys were more likely to play actively/vigorously for at least an hour per day than girls (Fig. 33), with the biggest differences observed in Spain (74% of boys versus 68% of girls), Turkey (74% versus 70%) and Albania (91% versus 87%). No important gender difference was observed in Bulgaria, Denmark, Czechia, Ireland, Lithuania, Montenegro, Romania and Tajikistan. The relationship between playing actively/vigorously and parental education was more mixed (Fig. 34). Children of less educated parents seemed more likely to spend time playing actively/vigorously in 11 out of 20 countries, notably in Latvia (91% versus 81%) and Denmark (78% versus 70%). In Czechia, Montenegro and Ireland no important difference was apparent, while in the remaining eight countries the situation was reversed. In Malta and Tajikistan, in particular, nearly 70% of children of more educated parents spent at least an hour per day playing actively/vigorously, compared to around 60% of children of less educated parents.

**Fig. 33. Percentage of 6–9-year-old boys and girls spending at least 1 hour a day actively/vigorously playing (%)**



**Fig. 34. Percentage of 6–9-year-olds spending at least 1 hour a day actively/vigorously playing, by parental education (%)<sup>a</sup>**



<sup>a</sup>The Russian Federation (Moscow only) is not included in the figure because of the high level of missing data on parental education.



# Screen time and sleep duration

Screen time  
Sleep duration



# 6. Screen time and sleep duration

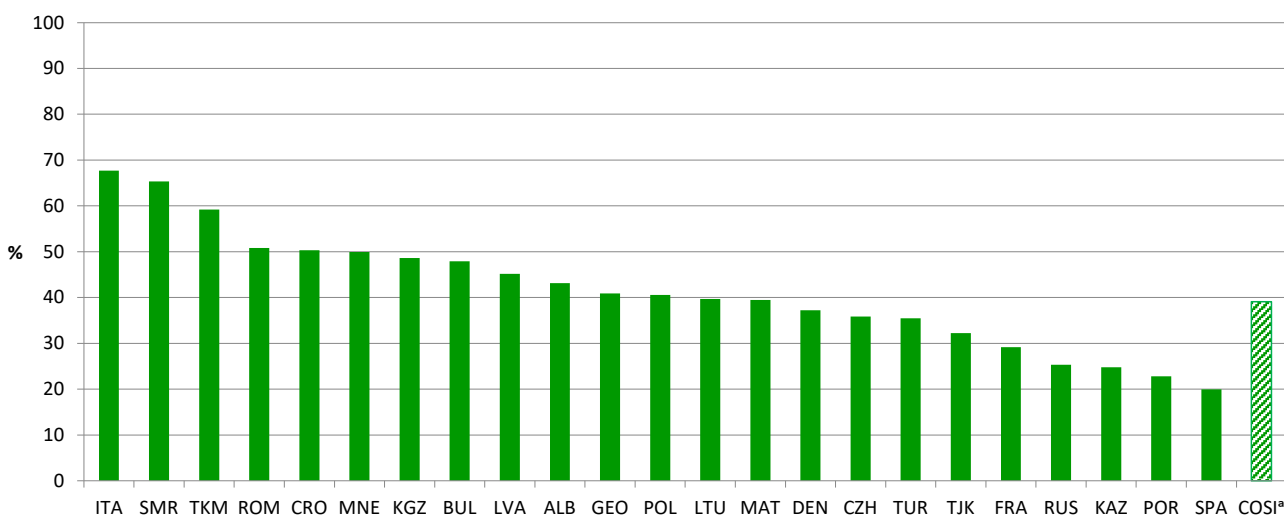
## 6.1 Screen time



Time spent in front of a screen (TV or electronic device) is often associated with a range of adverse health outcomes, both psychosocial (depression and poor academic performance) and physical (lower physical fitness, more musculoskeletal pain, obesity).

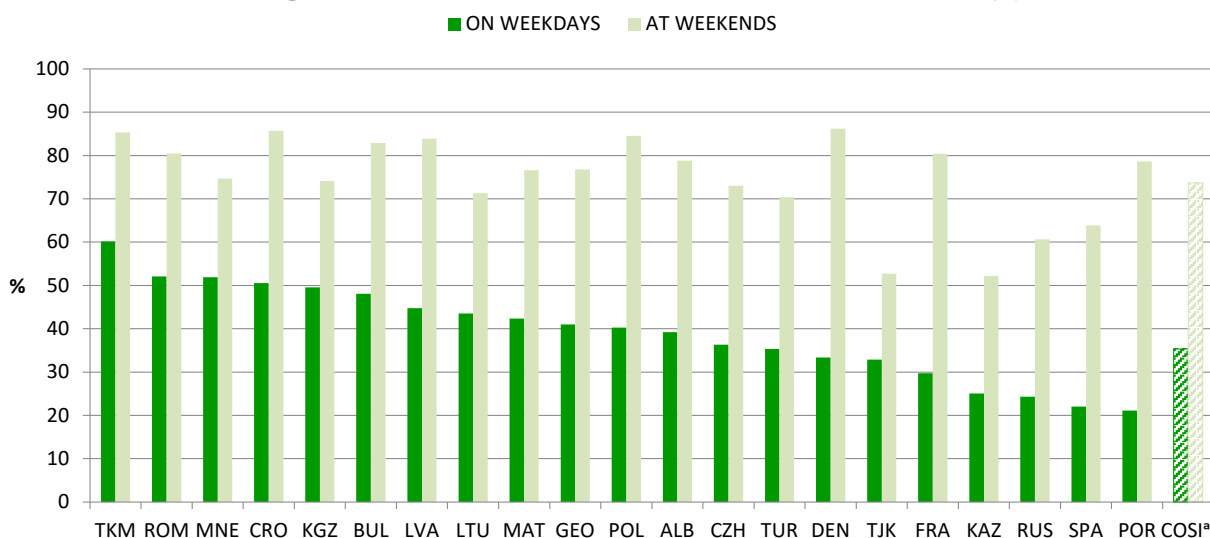
Fig. 35 shows the percentage of children watching TV or using electronic devices for at least 2 hours per day in the 23 countries that gathered this information; Fig. 36 shows how this percentage is split between weekdays and weekends. If we consider an average day (i.e. including both weekdays and weekends), the percentage was highest in Italy (68%) and San Marino (65%) and lowest in Spain (20%) and Portugal (23%). In general, children spent more time watching TV/using electronic devices at weekends, when figures ranged between 52% (in Tajikistan and Kazakhstan) and 86% (in Croatia and Denmark). On weekdays, this percentage ranged from 21% in Portugal to 60% in Turkmenistan.

**Fig. 35. Percentage of 6–9-year-olds spending at least 2 hours a day watching TV or using electronic devices (%)**



<sup>a</sup>The columns labelled “COSI” represent the average values across the countries that provided relevant information.

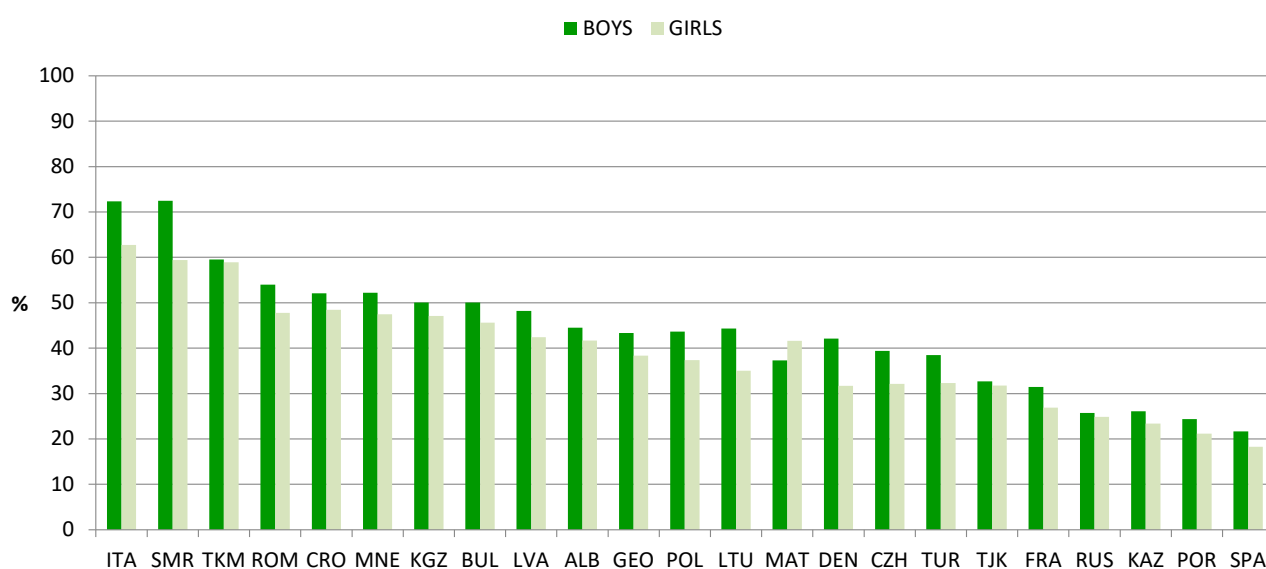
**Fig. 36. Percentage of 6–9-year-olds spending at least 2 hours a day watching TV or using electronic devices on weekdays and at weekends (%)**



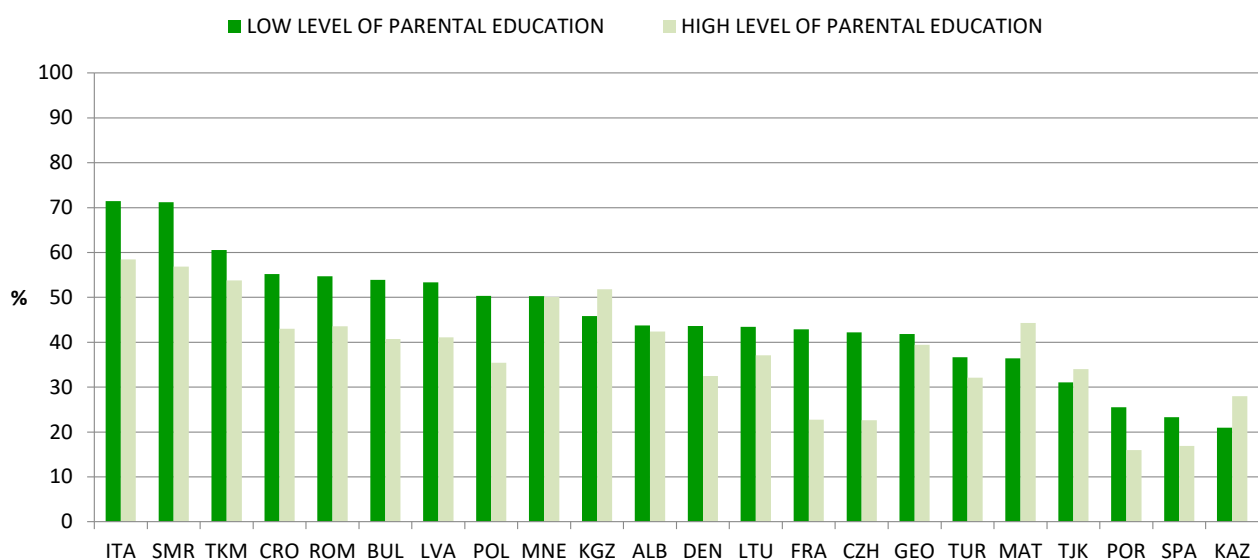
<sup>a</sup>The columns labelled “COSI” represent the average values across the countries that provided relevant information. Italy and San Marino are not included in the figure because in these countries information about the number of hours spent in front of a screen was not gathered separately for weekdays and weekends.

Overall, screen time showed a gendered pattern, with boys tending to watch TV/use electronic devices slightly more than girls in all countries except Malta, where 42% of girls had at least 2 hours of screen time per day as against 37% of boys (Fig. 37). Gender differences were usually less than 10 percentage points across all countries. Only in Denmark, San Marino and Italy did boys' screen time exceed that of girls by 10 percentage points or more. There was also a link between the amount of time spent in front of a screen and parental education, with children whose parents attained lower levels of education tending to have more screen time in most countries (Fig. 38). The difference was over 10 percentage points in 10 out of 22 countries: Bulgaria, Croatia, Czechia, Denmark, France, Italy, Latvia, Poland, Romania and San Marino. In a reversal of the trend, children of more educated parents tended to spend more time in front of a screen than children of less educated parents in Kazakhstan (28% versus 21%), Kyrgyzstan (52% versus 46%), Malta (44% versus 36%) and Tajikistan (34% versus 31%).

**Fig. 37. Percentage of 6–9-year-old boys and girls spending at least 2 hours a day watching TV or using electronic devices (%)**



**Fig. 38. Percentage of 6–9-year-olds spending at least 2 hours a day watching TV or using electronic devices, by parental education (%)<sup>a</sup>**



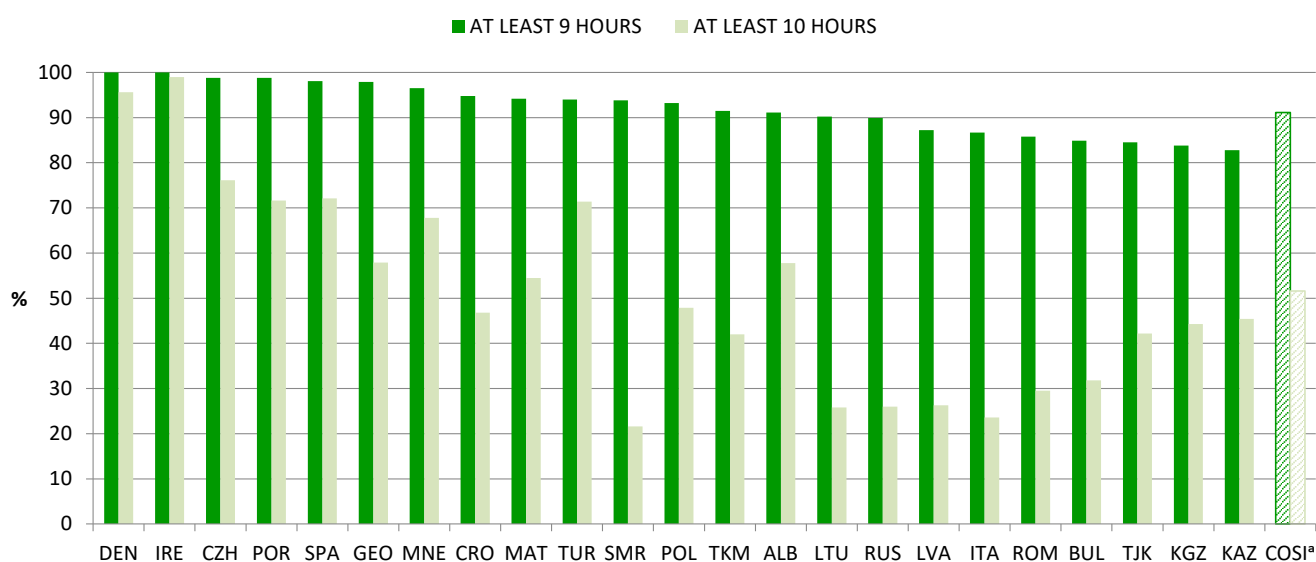
<sup>a</sup>The Russian Federation (Moscow only) is not included in the figure because of the high level of missing data on parental education.

## 6.2 Sleep duration



Data on the sleeping habits of children were collected in 23 countries. A substantial body of research suggests that there is a positive relationship between adequate sleep time and healthy bodyweight. Fig. 39 shows the percentage of children getting at least 9 hours of sleep per night and compares this percentage with the percentage of children getting at least 10 hours of sleep per night. In all countries, more than 80% of children slept at least 9 hours. However, while in Denmark, Ireland, Czechia, Portugal, Spain and Georgia nearly all children got at least 9 hours of sleep per night, in Bulgaria, Kazakhstan, Kyrgyzstan and Tajikistan, figures did not exceed 85%. If the threshold was set at 10 hours, figures dropped dramatically: in 13 out of 23 countries less than half of children slept at least 10 hours, and in Italy, Lithuania, Latvia, the Russian Federation (Moscow only) and San Marino only one in four children (or less) did so.

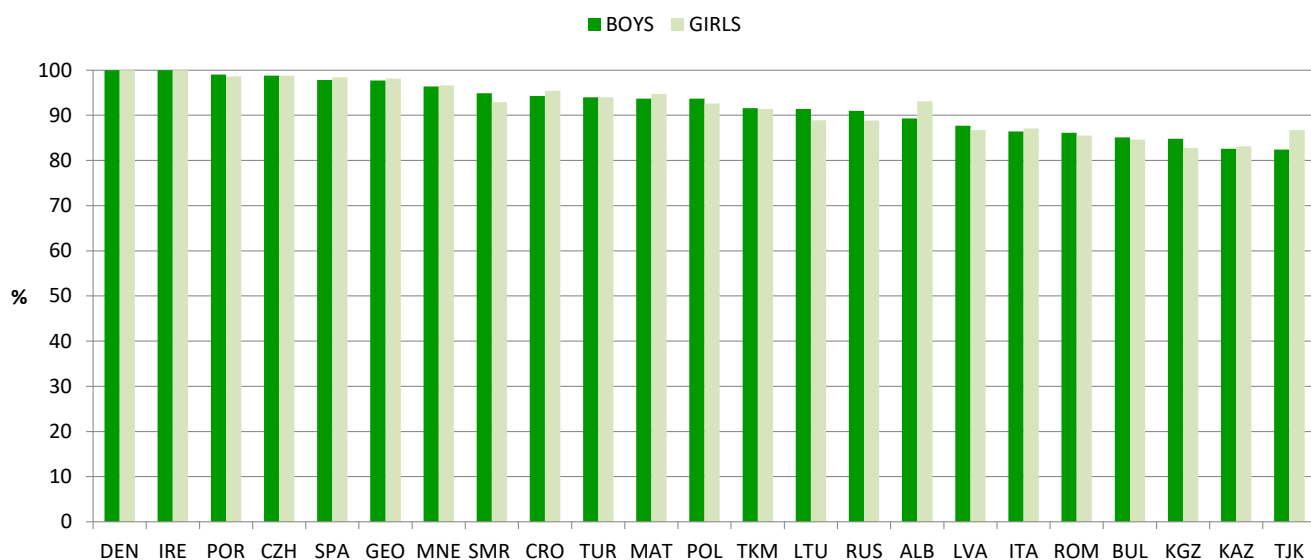
**Fig. 39. Percentage of 6–9-year-olds sleeping at least 9 or at least 10 hours per night (%)**



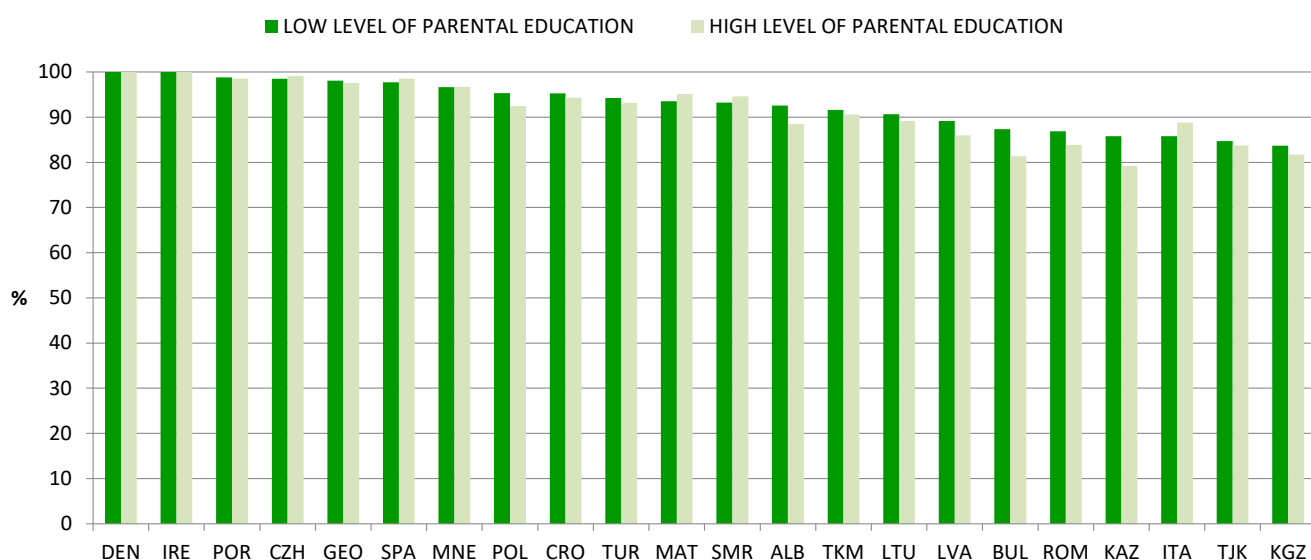
<sup>a</sup>The columns labelled “COSI” represent the average values across the countries that provided relevant information.

No important gender difference was observed in 21 out of 23 countries. Gender differences of around 4 percentage points were present only in Tajikistan and Albania; in both cases, girls tended to have healthier sleeping habits than boys (Fig. 40). A similar result was observed with respect to the relationship between the amount of sleep and parental education, with most countries not recording important differences (Fig. 41). In 13 out of 22 countries, children of less educated parents had (slightly) more healthy sleeping habits than children whose parents attained higher levels of education. Particularly notable differences were observed in Kazakhstan and Bulgaria; in both cases, children of less educated parents tended to have healthier sleeping habits than children of more educated parents, with differences of 6 and 7 percentage points respectively.

**Fig. 40. Percentage of 6–9-year-old boys and girls sleeping at least 9 hours per night (%)**



**Fig. 41. Percentage of 6–9-year-olds sleeping at least 9 hours per night, by parental education (%)<sup>a</sup>**



<sup>a</sup>The Russian Federation (Moscow only) is not included in the figure because of the high level of missing data on parental education.



# School environment

Nutrition

Physical activity

Promotion of a healthy lifestyle

# 7. School environment

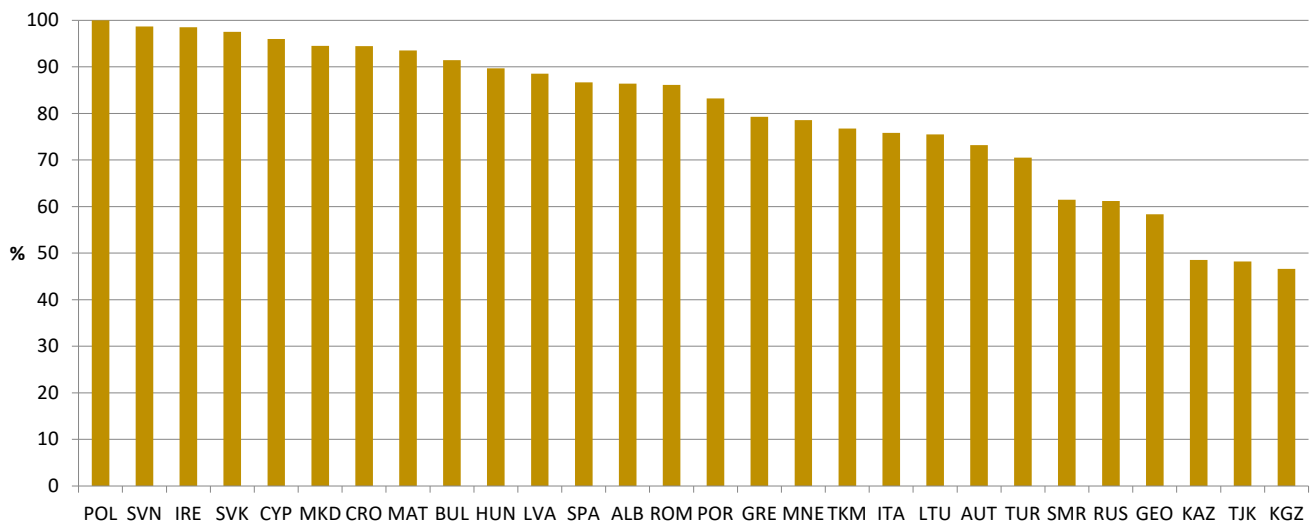
## 7.1 Nutrition



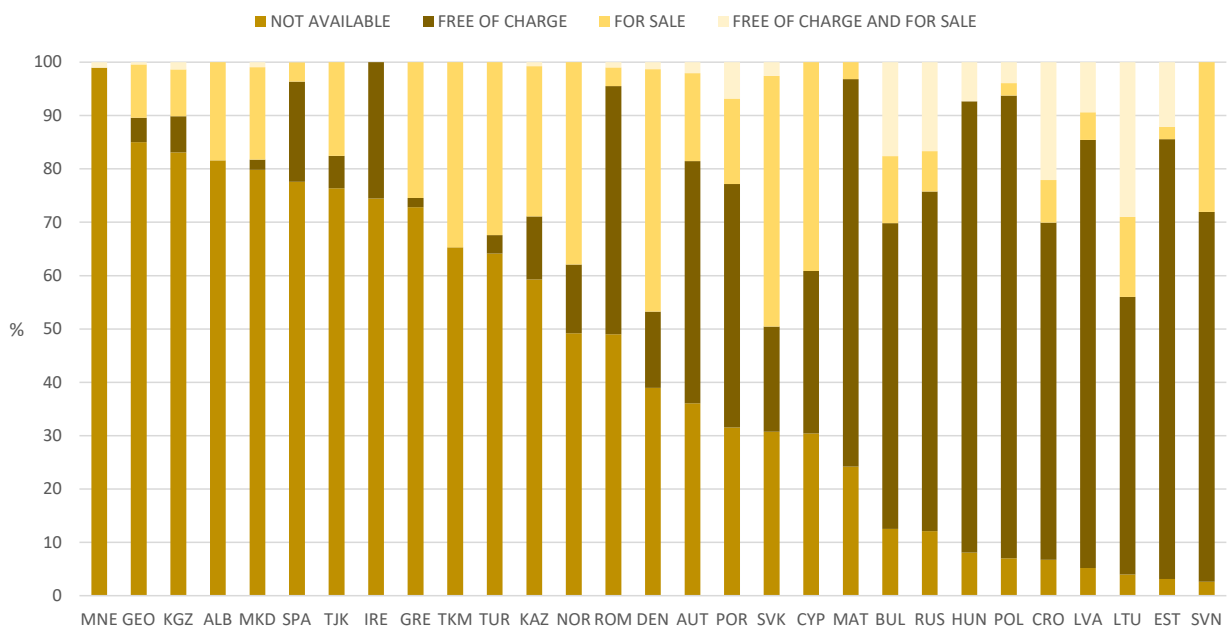
Children spend a substantial amount of time at school. School can therefore play an important role in promoting healthy behaviour. This section is dedicated to analysis of the school setting as a promoter of healthy nutrition. Fig. 42 shows the percentage of schools that included nutritional education in their curriculum. Overall, figures ranged from just under 50% to 100%. Central Asian countries were positioned at the lower end (46–48%).

Availability of fresh fruit free of charge on school premises was very common in Poland, Hungary, Latvia and Estonia (over 80% of schools), whereas in nearly half of Danish and Slovakian schools fruit was available but not free of charge (Fig. 43). In over three quarter of schools in Montenegro, Georgia, Kyrgyzstan, Albania, North Macedonia, Spain and Tajikistan, fresh fruit was not available on school premises, either free of charge or for sale.

**Fig. 42. Percentage of schools including nutritional education in their curriculum (%)**

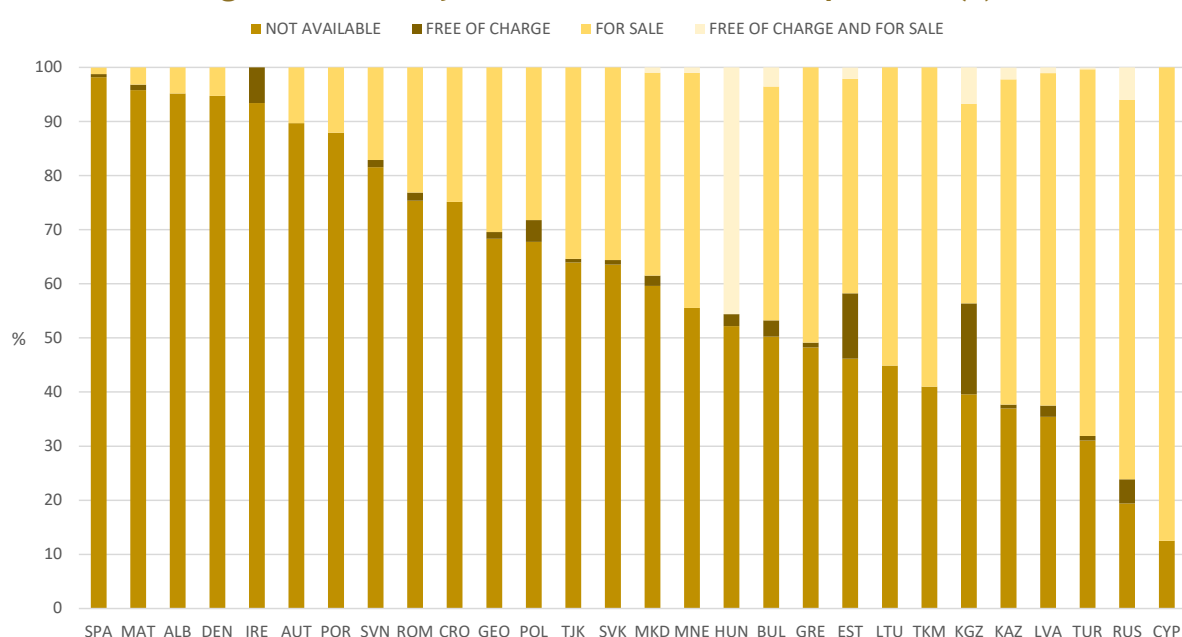


**Fig. 43. Availability of fresh fruit, free of charge or for sale, on school premises (%)**

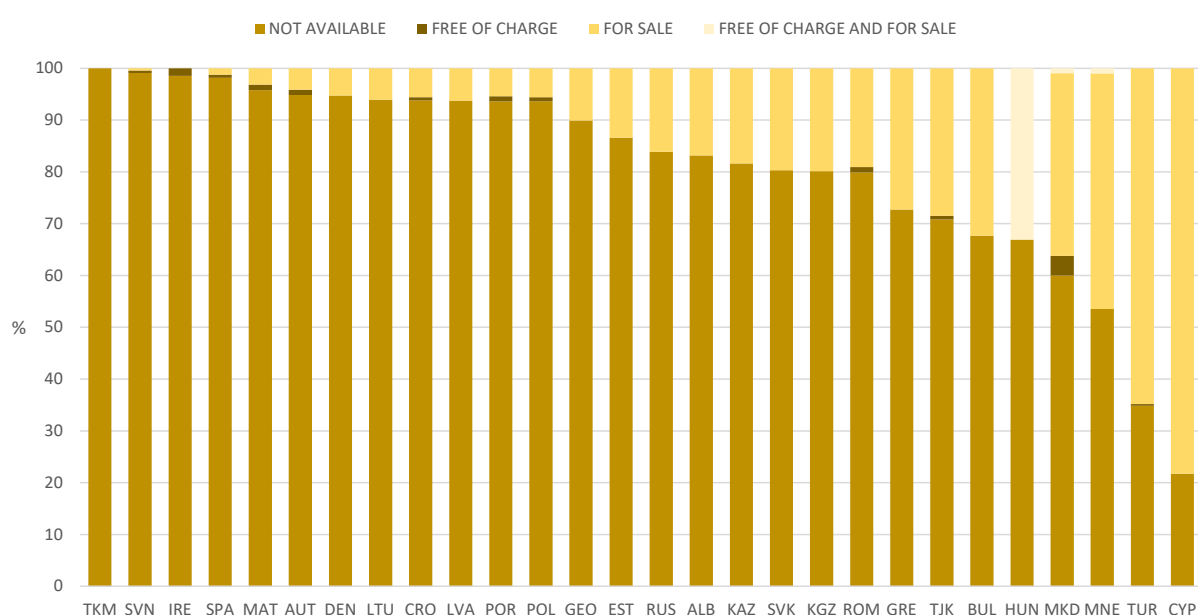


Snacks other than fresh fruit were not usually available on school premises in most countries, and – where they were available – sweet snacks tended to be slightly more common than savoury ones. More specifically, sweet snacks were available in a majority of schools in 10 of the 28 countries where data were gathered: Cyprus, Russian Federation (Moscow only), Turkey, Latvia, Kazakhstan, Kyrgyzstan, Turkmenistan, Lithuania, Estonia and Greece (Fig. 44). Savoury snacks were available in a majority of schools in just two countries – Turkey and Cyprus (Fig. 45). Where available, snacks were generally for sale and not provided free of charge (with the exception of Estonia and Kyrgyzstan, where sweet snacks were available free of charge in around 15% of schools). It is worth noting that sweet snacks were available, either for sale or free of charge, in around half of Hungarian schools; and the same was true of savoury snacks in around one third of schools. By contrast, in over 90% of schools in Spain, Malta, Denmark and Ireland, neither savoury nor sweet snacks were available on school premises.

**Fig. 44. Availability of sweet snacks on school premises (%)**

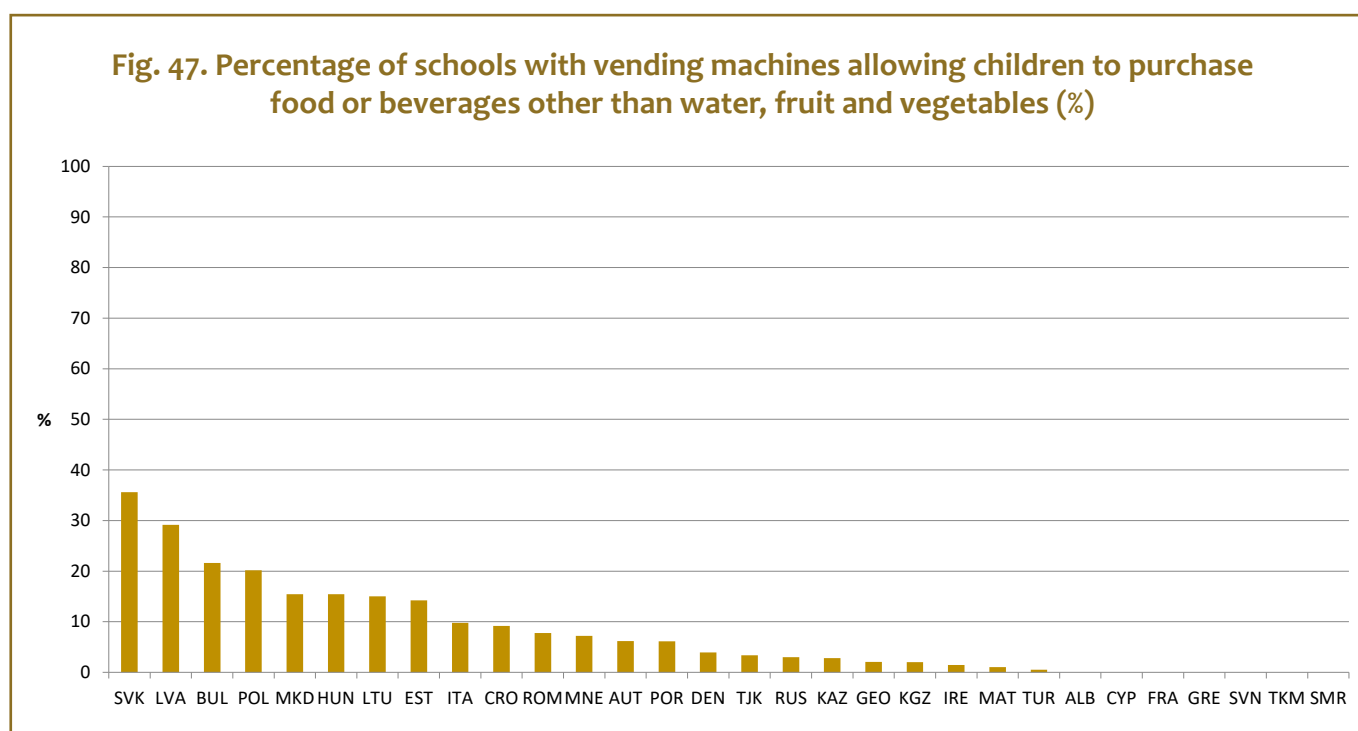
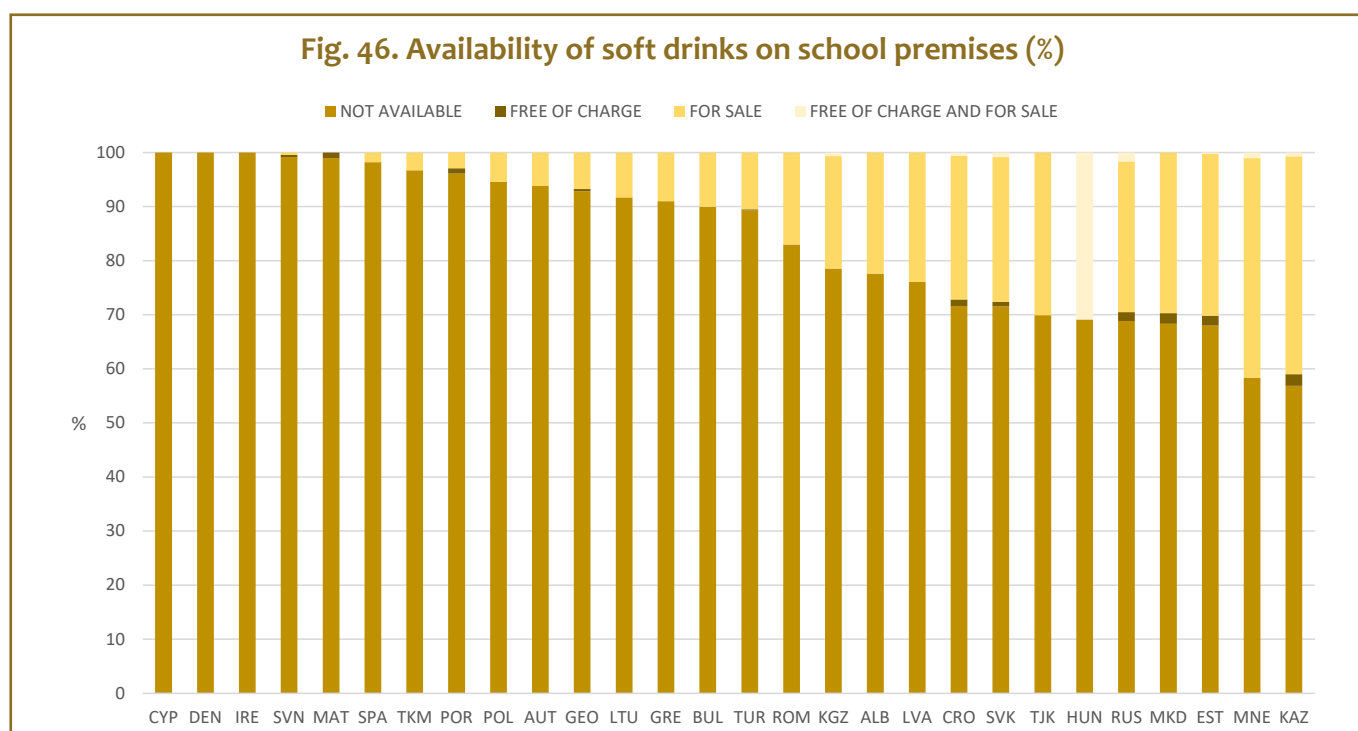


**Fig. 45. Availability of savoury snacks on school premises (%)**



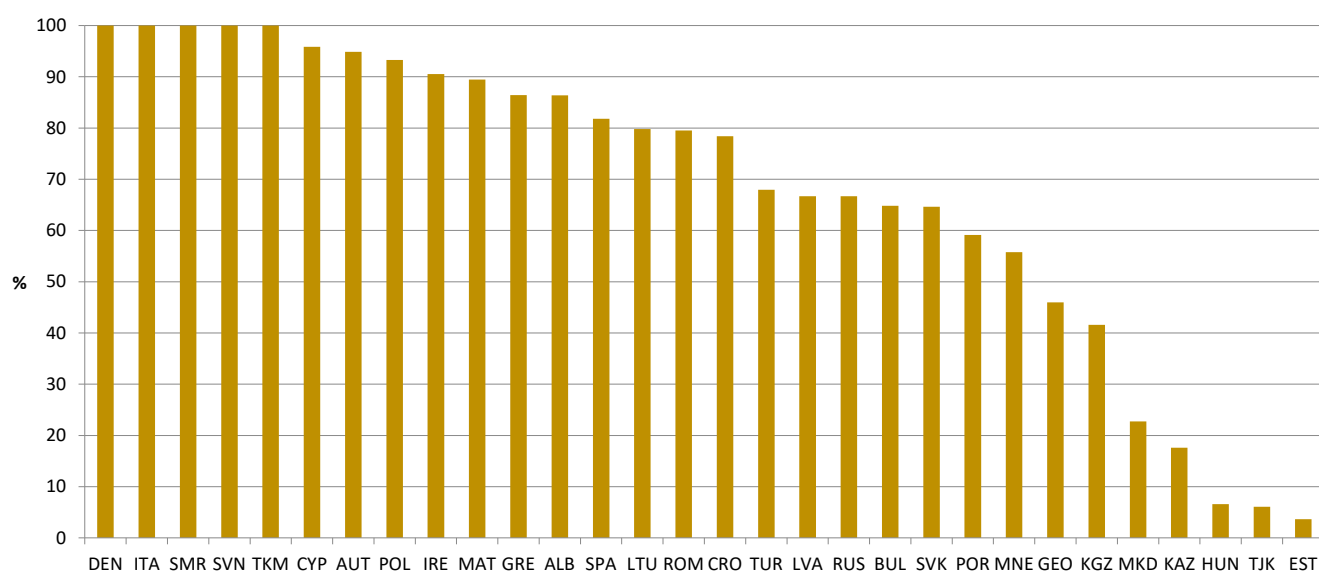


Although no clear geographical trend could be observed, it appeared that the availability of soft drinks on school premises was very similar, though slightly less common, to that of sweet snacks (Fig. 46). Soft drinks could be found on school premises in roughly 20–40% of schools in Kazakhstan, Montenegro, Estonia, North Macedonia, Russian Federation (Moscow only), Hungary, Tajikistan, Slovakia, Croatia, Latvia, Albania and Kyrgyzstan. In all these countries, soft drinks were available only for sale, with the exception of Hungary, where they were available both for sale and free of charge. Vending machines where children were allowed to purchase food and beverages (other than water and fresh fruit and vegetables) were generally quite uncommon in all countries (Fig. 47). Figures ranged from 0% of schools in Turkmenistan, San Marino, Slovenia, Greece, France, Cyprus and Albania, to 36% in Slovakia. More specifically, in 22 countries out of 30, the percentage of schools with vending machines was below 10%, and in 16 of these countries the figure was below 5%.



Both advertising and marketing of energy-dense and nutrient-poor foods on school premises appeared to be uncommon in most countries. In 22 out of 30 countries, the percentage of schools free from advertising and marketing was above 55%; and in nine of these countries – Denmark, Italy, San Marino, Slovenia, Turkmenistan, Cyprus, Austria, Poland and Ireland – the figure was over 90% (Fig. 48). No clear geographical pattern could be observed, and allowing unhealthy foods to be advertised and marketed within schools did not seem to be related to the availability of vending machines. The countries with the worst record in this regard were Estonia, Tajikistan and Hungary, where advertising and marketing of energy-dense and nutrient-poor foods were observed in over 90% of schools; these were followed by Kazakhstan, North Macedonia, Kyrgyzstan and Georgia, where figures were approximately 50–80%.

**Fig. 48. Percentage of schools free from advertising and marketing of energy-dense and nutrient-poor foods (%)**

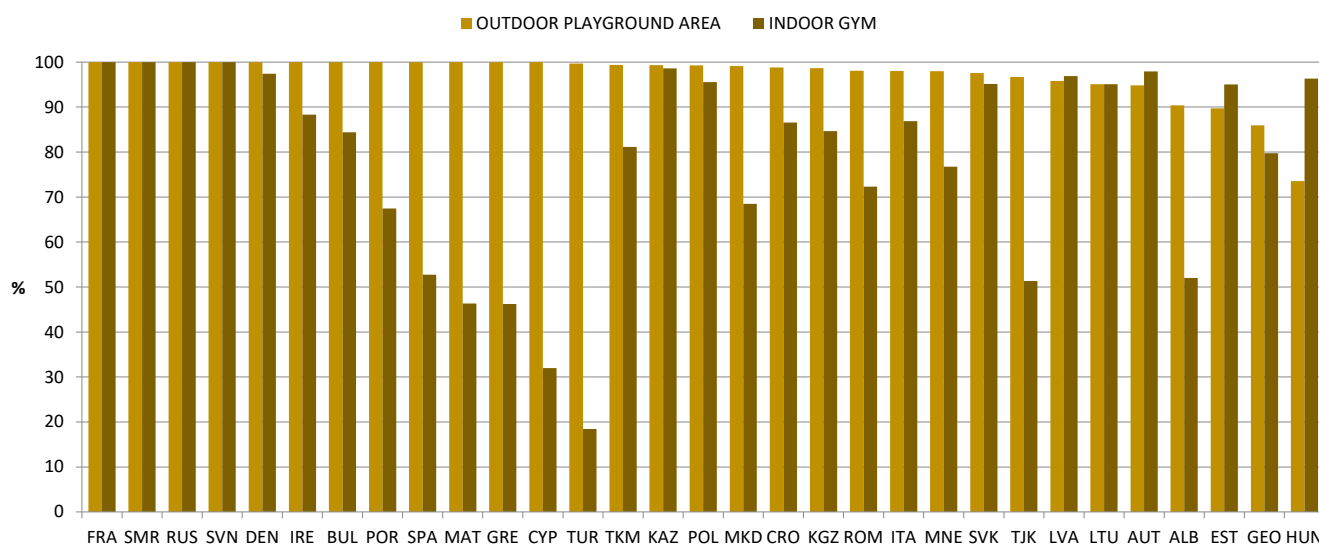


## 7.2 Physical activity

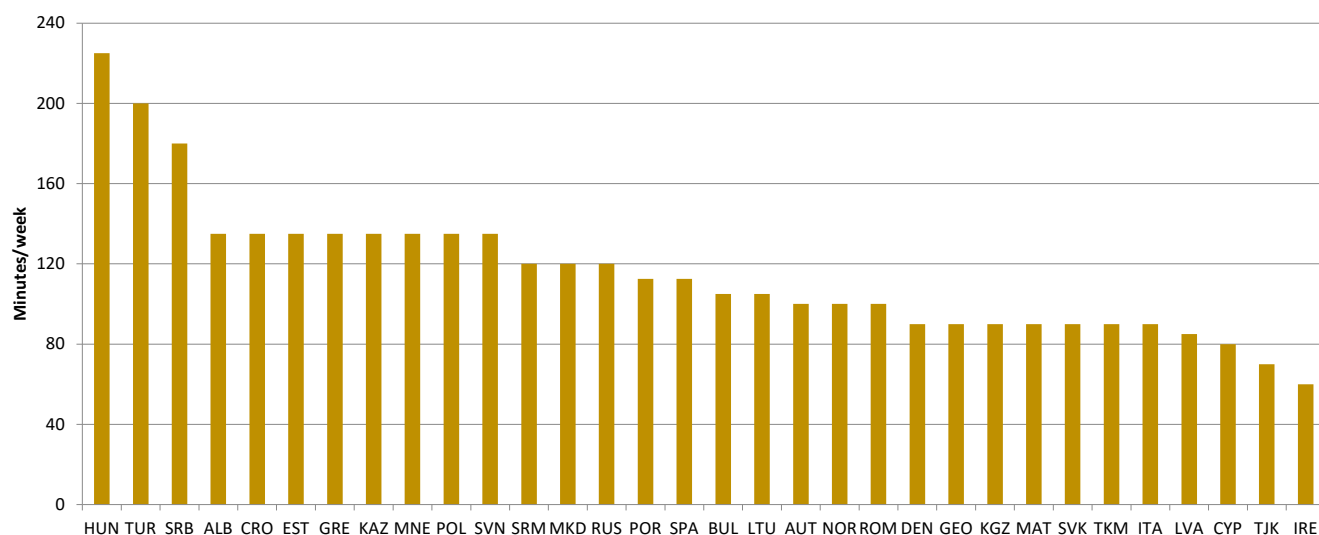


Most schools in most countries had an outdoor playground area within their premises (Fig. 49). Figures across countries showed little variation, ranging from three quarters of schools in Hungary to all schools in Bulgaria, Cyprus, Denmark, France, Greece, Ireland, Malta, Portugal, Russian Federation (Moscow only), San Marino, Spain and Slovenia. Having an indoor gym was less common and more variable across countries, ranging from one third of schools in Cyprus to all schools in France, Russian Federation (Moscow only), San Marino and Slovenia (Fig. 49). Looking at the median duration of physical education classes per week, the situation again appeared to vary widely (Fig. 50). Italian and Irish children spent the least time each week doing physical education classes, the median duration of which was only 60 minutes. At the opposite end of the scale, Turkish and Hungarian children had over 3 hours of physical education each week.

**Fig. 49. Percentage of schools with an indoor gym and outdoor playground area (%)**



**Fig. 50. Median duration of physical education classes per week (minutes)**

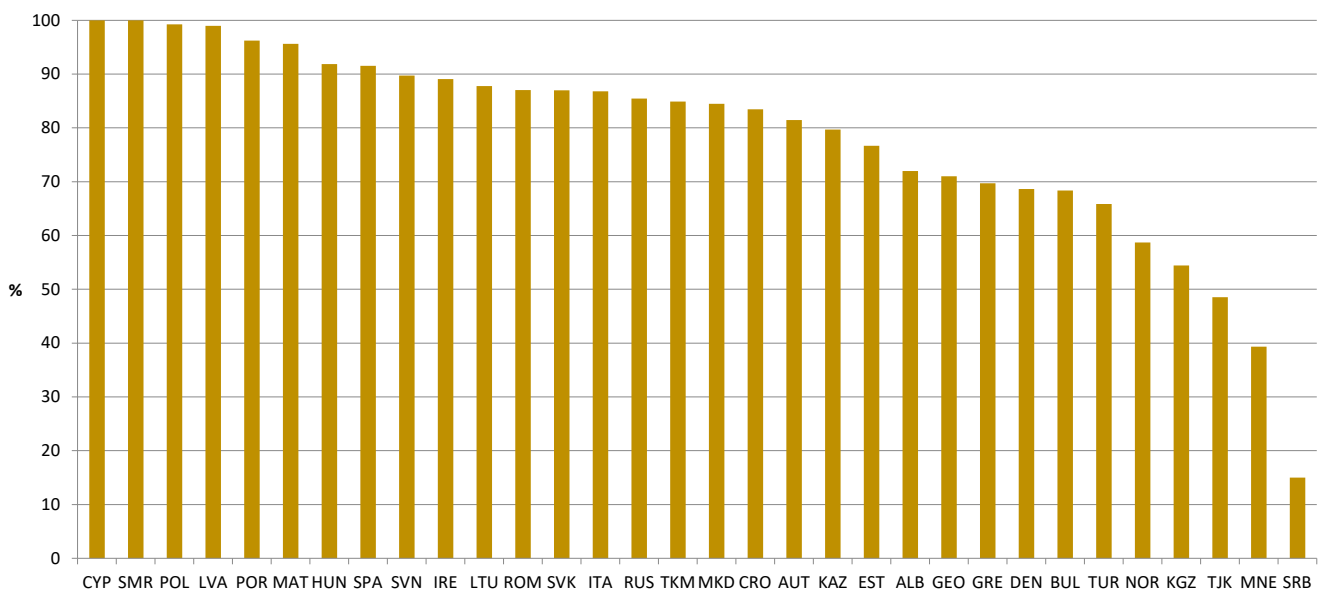


## 7.3 Promotion of a healthy lifestyle



Schools play an important role in supporting children’s well-being and healthy habits. In addition to providing physical activities, schools can strengthen their engagement by actively supporting and promoting targeted initiatives and/or projects (Fig. 51). With the exception of Serbia, Montenegro and Tajikistan, a majority of schools actively promoted a healthy lifestyle among their students. This was the case in 29 out of 32 countries, and in 19 of these countries the proportion of actively engaged schools exceeded 80%. The countries with the best record in this respect were Cyprus, San Marino, Poland and Latvia (around 99–100% of schools), followed by Portugal, Malta, Hungary and Spain (all over 90%). By contrast, in Montenegro only 39% of schools were engaged in initiatives or projects to promote a healthy lifestyle, and in Serbia only 15%. Tajikistan, Kyrgyzstan and Norway performed slightly better, with around 50–60% of their schools actively supporting children’s healthy habits.

**Fig. 51. Percentage of schools with initiatives or projects to promote a healthy lifestyle (%)**



## 8. Conclusions

This report summarizes results from 36 countries of the WHO European Region that collected data in the fourth round of COSI. Surveying around 250 000 primary school-aged children, this is the largest surveillance initiative of its kind globally. It uses highly standardized methods to ensure the validity of the data collected and to produce results that are nationally representative.

The results showed that overweight and obesity were widespread among European children: the prevalence of overweight (including obesity) was around 29% in boys and 27% in girls aged 7–9 years, while the prevalence of obesity was about 13% in boys and 9% in girls. However, there were large differences between countries: the highest levels of overweight and obesity were observed in countries in the Mediterranean area, while the lowest levels were found in central Asian countries.

Of 13 countries where it was possible to examine trends over time, the results indicated that the prevalence of overweight had fallen in five. The WHO Global Monitoring Framework for NCDs calls for a halt in the rise of obesity (Target 7), so it will be important to continue this surveillance initiative in order to track progress towards this target over time (28).

Results from COSI Round 4 indicated that there were large differences between countries in children's dietary habits, with around 80% of children eating breakfast every day, 45% eating fruit daily, and 25% eating vegetables daily. Most children in all countries spent at least an hour playing outside. Around 40% of children spent at least 2 hours a day watching TV or using electronic devices. Healthy habits with respect to diet, physical activity and screen time were more likely to be exhibited by children from families of higher socioeconomic status.

These results point to important opportunities to improve the health of primary school-aged children and future generations within the WHO European Region. The COVID-19 pandemic has caused many disruptions across the Region, including closure of schools, economic hardship and stress on families, which are likely to have a negative effect on children's health behaviours (such as diet, physical activity, screen time and sleep). In this context, it is particularly important that the COSI project continues into the future in order to monitor the situation with respect to childhood obesity and overweight, to track trends over time and to inform policy action.

From a policy perspective, there are several promising areas for action to help prevent obesity and overweight among children in the WHO European Region (29). School-based interventions to promote healthy diets and physical activity are promising because they can help ensure that children from all socioeconomic backgrounds have access to healthy foods and environments that encourage physical activity. Governments bear ultimate responsibility for ensuring that their children have a healthy start in life, and such work requires coordination between many sectors and institutions to implement comprehensive programmes that:

- promote the intake of healthy foods and reduce the intake of unhealthy foods and sugar-sweetened beverages by children and adolescents;
- promote physical activity and reduce sedentary behaviours in children and adolescents;
- strengthen guidance on NCD prevention and integrate it with current guidance on preconception and antenatal care;
- provide guidance on and support for healthy diet, sleep and physical activity in early childhood;
- promote healthy school environments, health and nutrition literacy, and physical activity among school-age children; and
- provide family-based multicomponent services on lifestyle and weight management for children and young people who are living with obesity.

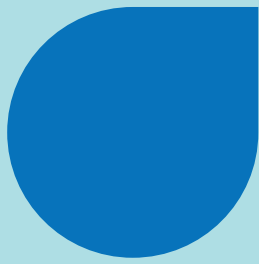
Future work to be published in an upcoming special supplement to *Obesity reviews* will examine more closely data from COSI Round 4. Planned topics include analysis of waist circumference and waist-to-height ratios in 7-year-old children; a more detailed examination of changes in overweight and obesity over time (2007–2017); socioeconomic inequalities in overweight and obesity (24 countries) and in physical activity, sedentary behaviour and sleep patterns (24 countries); socioeconomic differences in food habits (23 countries); and urban and rural differences in dietary habits (19 countries). There will also be further reflections on measures needed to mobilize governments and society to combat childhood obesity.

# References

1. Obesity and overweight: key facts. Geneva: World Health Organization; 2020 (<https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight>, accessed 29 December 2020).
2. NCD Risk Factor Collaboration (NCD-RisC). Worldwide trends in body-mass index, underweight, overweight, and obesity from 1975 to 2016: a pooled analysis of 2416 population-based measurement studies in 128.9 million children, adolescents, and adults. *Lancet*. 2017;390(10113):2627–42. doi:10.1016/S0140-6736(17)32129-3.
3. Action Plan for the Prevention and Control of Noncommunicable Diseases in the WHO European Region 2016–2025. Copenhagen: WHO Regional Office for Europe; 2016 ([http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0008/346328/NCD-ActionPlan-GB.pdf](http://www.euro.who.int/__data/assets/pdf_file/0008/346328/NCD-ActionPlan-GB.pdf), accessed 29 December 2020).
4. Report of the Commission on Ending Childhood Obesity. Geneva: World Health Organization; 2016 ([http://apps.who.int/iris/bitstream/10665/204176/1/9789241510066\\_eng.pdf](http://apps.who.int/iris/bitstream/10665/204176/1/9789241510066_eng.pdf), accessed 29 December 2020).
5. Sustainable Development Goals: the 17 goals. New York (NY): United Nations Department of Economic and Social Affairs (<https://sdgs.un.org/goals>, accessed 29 December 2020).
6. Resolution WHA 66.10. Follow-up to the Political Declaration of the High-level Meeting of the General Assembly on the prevention and control of non-communicable diseases. In: Sixty-sixth World Health Assembly, Geneva, 27 May 2013. Geneva: World Health Organization; 2013 ([https://apps.who.int/gb/ebwha/pdf\\_files/WHA66/A66\\_R10-en.pdf](https://apps.who.int/gb/ebwha/pdf_files/WHA66/A66_R10-en.pdf), accessed 29 December 2020).
7. Comprehensive Implementation Plan on Maternal, Infant and Young Child Nutrition. Geneva: World Health Organization; 2014 ([https://apps.who.int/iris/bitstream/handle/10665/113048/WHO\\_NMH\\_NHD\\_14.1\\_eng.pdf](https://apps.who.int/iris/bitstream/handle/10665/113048/WHO_NMH_NHD_14.1_eng.pdf), accessed 29 December 2020).
8. Han JC, Lawlor DA, Kimm SY. Childhood obesity. *Lancet*. 2010;375(9727):1737–48. doi:10.1016/S0140-6736(10)60171-7.
9. Birch LL, Ventura AK. Preventing childhood obesity: what works? *Int J Obes (Lond)*. 2009;33 Suppl 1:S74–S81. doi:10.1038/ijo.2009.22.
10. van der Zwaard BC, Schalkwijk AAH, Elders PJM, Platt L, Nijpels G. Does environment influence childhood BMI? A longitudinal analysis of children aged 3–11. *J Epidemiol Community Health*. 2018;72(12):1110–16. doi:10.1136/jech-2018-210701.
11. Kumar S, Kelly AS. Review of childhood obesity: from epidemiology, etiology, and comorbidities to clinical assessment and treatment. *Mayo Clin Proc*. 2017;92(2):251–65. doi:10.1016/j.mayocp.2016.09.017.
12. Murphy M, Johnson R, Parsons NR, Robertson W. Understanding local ethnic inequalities in childhood BMI through cross-sectional analysis of routinely collected local data. *BMC Public Health*. 2019;19(1):1585. doi:10.1186/s12889-019-7870-2.
13. EU Action Plan on Childhood Obesity 2014–2020. Brussels: European Commission; 2014 ([https://ec.europa.eu/health/sites/health/files/nutrition\\_physical\\_activity/docs/childhoodobesity\\_actionplan\\_2014\\_2020\\_en.pdf](https://ec.europa.eu/health/sites/health/files/nutrition_physical_activity/docs/childhoodobesity_actionplan_2014_2020_en.pdf), accessed 29 December 2020).
14. European Charter on Counteracting Obesity. WHO Ministerial Conference on Counteracting Obesity. Istanbul, Turkey, 15–17 November 2006. Copenhagen: WHO Regional Office for Europe; 2006 ([http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0009/87462/E89567.pdf](http://www.euro.who.int/__data/assets/pdf_file/0009/87462/E89567.pdf), accessed 29 December 2020).
15. Branca F, Nikogosian H, Lobstein T, editors. The challenge of obesity in the WHO European Region and the strategies for response. Copenhagen: WHO Regional Office for Europe; 2007 ([https://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0010/74746/E90711.pdf](https://www.euro.who.int/__data/assets/pdf_file/0010/74746/E90711.pdf), accessed 29 December 2020).
16. Wijnhoven TM, van Raaij JM, Spinelli A, Rito AI, Hovengen R, Kunesova M et al. WHO European Childhood Obesity Surveillance Initiative 2008: weight, height and body mass index in 6–9-year-old children. *Pediatr Obes*. 2013;8(2):79–97. doi:10.1111/j.2047-6310.2012.00090.x.

17. Wijnhoven T, van Raaij J, Breda J, editors. WHO European Childhood Obesity Surveillance Initiative: implementation of round 1 (2007/2008) and round 2 (2009/2010). Copenhagen: WHO Regional Office for Europe; 2014 ([https://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0004/258781/COSI-report-round-1-and-2\\_final-for-web.pdf](https://www.euro.who.int/__data/assets/pdf_file/0004/258781/COSI-report-round-1-and-2_final-for-web.pdf), accessed 29 December 2020).
18. WHO European Childhood Obesity Surveillance Initiative: overweight and obesity among 6–9-year-old children. Report of the third round of data collection 2012–2013. Copenhagen: WHO Regional Office for Europe; 2018 ([http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0010/378865/COSI-3.pdf](http://www.euro.who.int/__data/assets/pdf_file/0010/378865/COSI-3.pdf), accessed 29 December 2020).
19. de Onis M, Onyango AW, Borghi E, Siyam A, Nishida C, Siekmann J. Development of a WHO growth reference for school-aged children and adolescents. *Bull World Health Organ.* 2007;85:660–7. doi:10.2471/blt.07.043497.
20. Wijnhoven T, Branca F. WHO European Childhood Obesity Surveillance Initiative: protocol (version January 2008). Copenhagen: WHO Regional Office for Europe; 2008.
21. WHO European Childhood Obesity Surveillance Initiative: protocol (version August 2010). Copenhagen: WHO Regional Office for Europe; 2010.
22. WHO European Childhood Obesity Surveillance Initiative: protocol (version October 2012). Copenhagen: WHO Regional Office for Europe; 2012.
23. WHO European Childhood Obesity Surveillance Initiative: protocol (2016). Copenhagen: WHO Regional Office for Europe; 2016.
24. WHO European Childhood Obesity Surveillance Initiative: data collection procedures (2016). Copenhagen: WHO Regional Office for Europe; 2016.
25. WHO AnthroPlus for personal computers manual: software for assessing growth of the world’s children and adolescents. Geneva: World Health Organization; 2009 ([https://www.who.int/growthref/tools/who\\_anthroplus\\_manual.pdf](https://www.who.int/growthref/tools/who_anthroplus_manual.pdf), accessed 29 December 2020).
26. Physical status: the use and interpretation of anthropometry. Report of a WHO Expert Committee. WHO Technical Report Series No. 854. Geneva: World Health Organization; 1995 ([http://whqlibdoc.who.int/trs/WHO\\_TRS\\_854.pdf](http://whqlibdoc.who.int/trs/WHO_TRS_854.pdf), accessed 29 December 2020).
27. Cole TJ, Lobstein T. Extended international (IOTF) body mass index cut-offs for thinness, overweight and obesity. *Pediatr Obes.* 2012;7(4):284–94. doi:10.1111/j.2047-6310.2012.00064.x.
28. Commission on Ending Childhood Obesity [online information hub]. Geneva: World Health Organization; 2021 (<https://www.who.int/end-childhood-obesity/en>, accessed 26 April 2021).
29. Report of the Commission on Ending Childhood Obesity. Implementation plan: executive summary. Geneva: World Health Organization; 2017 (<https://apps.who.int/iris/bitstream/handle/10665/259349/WHO-NMH-PND-ECHO-17.1-eng.pdf>, accessed 27 April 2021).





# Annex 1

Supplementary data tables  
COSI round 4 (2015–2017)

**Table A1.1 Country-specific prevalence of overweight (including obesity) according to WHO definition among boys and girls, by age (%)<sup>a</sup>**

Country	6-year-olds		7-year-olds		8-year-olds		9-year-olds	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
ALB					23.2	16.5		
AUT					30.3	22.3		
BUL			30.2	28.6				
CRO					37.1	28.5		
CYP							43.0	43.1
CZH			22.9	19.1				
DEN			17.6	20.1				
EST			28.6	23.3	29.7	23.0		
FIN			28.3	26.7	31.3	29.8	36.0	32.6
FRA			18.2	20.2	24.6	23.4		
GEO			26.1	22.2				
GRE			42.0	37.8			46.3	41.8
HUN			28.0	27.8				
IRE			27.1	19.8				
ITA					41.9	38.5	40.9	33.7
KAZ							17.5	19.8
KZG			10.9	8.8	10.6	8.4		
LTU			28.5	22.9				
LVA			24.8	20.6			30.5	23.5
MAT			37.0	34.6				
MKD			32.2	29.5				
MNE			37.4	28.8				
NOR					24.0	22.4		
POL					31.7	28.8		
POR			29.0	32.4				
ROM					30.6	25.8		
RUS			27.0	22.4				
SMR					39.1	32.2		
SPA	34.9	32.4	42.2	40.4	42.5	42.1	48.0	42.6
SRB			32.6	28.5				
SVK			30.1	23.3				
SVN	21.1	18.0	24.3	24.5	30.3	28.9	36.4	30.4
SWE	22.9	21.3			27.5	28.2		
TJK			9.4	5.2				
TKM			11.5	11.4				
TUR			27.3	25.4				

<sup>a</sup>Calculated only for the targeted age groups.

**Table A1.2. Country-specific prevalence of obesity according to WHO definition among boys and girls, by age (%)<sup>a</sup>**

Country	6-year-olds		7-year-olds		8-year-olds		9-year-olds	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
ALB					10.7	5.3		
AUT					12.4	6.2		
BUL			15.7	11.4				
CRO					16.2	10.3		
CYP							21.5	19.2
CZH			10.9	5.5				
DEN			4.9	5.1				
EST			11.4	7.9	12.4	7.3		
FIN			11.5	9.0	14.5	11.6	17.4	12.5
FRA			6.4	6.4	8.9	6.2		
GEO			10.3	7.2				
GRE			20.1	14.3			21.8	12.2
HUN			14.1	11.2				
IRE			9.3	5.3				
ITA					21.0	14.0	19.3	11.1
KAZ							4.8	6.2
KZG			3.5	1.6	3.6	1.4		
LTU			12.2	7.8				
LVA			8.8	6.5			10.5	6.0
MAT			18.0	14.9				
MKD			17.3	12.9				
MNE			18.9	8.7				
NOR					7.2	4.7		
POL					14.3	10.5		
POR			12.0	10.7				
ROM					15.0	8.8		
RUS			10.2	6.5				
SMR					19.5	8.7		
SPA	14.4	13.3	18.7	16.8	21.3	14.8	24.4	16.4
SRB			15.0	9.7				
SVK			12.4	10.5				
SVN	8.3	5.7	10.5	8.4	13.8	9.7	17.1	10.0
SWE	7.8	5.4			10.4	7.1		
TJK			1.8	1.1				
TKM			3.6	2.3				
TUR			12.7	8.8				

<sup>a</sup>Calculated only for the targeted age groups.

**Table A1.3. Country-specific prevalence of overweight (including obesity) according to IOTF cut-offs among boys and girls, by age (%)<sup>a</sup>**

Country	6-year-olds		7-year-olds		8-year-olds		9-year-olds	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
ALB					16.8	13.8		
AUT					19.3	18.4		
BUL			22.8	23.4				
CRO					25.6	24.5		
CYP							33.1	38.7
CZH			17.1	16.8				
DEN			10.8	16.5				
EST			19.5	19.5	20.6	18.8		
FIN			19.3	22.1	22.1	24.6	25.8	27.7
FRA			12.4	14.4	15.8	18.9		
GEO			17.9	18.2				
GRE			31.9	32.4			35.3	34.8
HUN			21.2	23.3				
IRE			17.6	16.6				
ITA					31.2	32.0	29.8	27.7
KAZ							10.4	16.0
KZG			6.0	6.9	5.9	5.5		
LTU			19.2	19.6				
LVA			15.4	17.3			19.5	18.3
MAT			27.2	30.8				
MKD			25.8	25.5				
MNE			28.4	25.0				
NOR					14.3	17.2		
POL					22.3	23.7		
POR			19.4	26.5				
ROM					22.7	21.8		
RUS			19.4	19.4				
SMR					28.7	28.7		
SPA	24.4	27.7	28.9	35.0	31.6	34.0	36.6	36.4
SRB			23.5	24.0				
SVK			22.0	19.9				
SVN	14.3	15.1	17.0	20.5	21.3	23.4	26.4	24.9
SWE	14.5	17.4			17.0	22.2		
TJK			4.5	3.6				
TKM			6.3	8.2				
TUR			19.7	21.4				

<sup>a</sup>Calculated only for the targeted age groups.

**Table A1.4. Country-specific prevalence of obesity according to IOTF cut-offs among boys and girls, by age (%)<sup>a</sup>**

Country	6-year-olds		7-year-olds		8-year-olds		9-year-olds	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
ALB					5.1	3.5		
AUT					6.4	4.7		
BUL			8.8	8.2				
CRO					7.6	6.8		
CYP							9.0	12.0
CZH			5.5	4.9				
DEN			1.3	3.2				
EST			5.9	5.7	6.0	4.7		
FIN			5.9	6.5	7.6	7.7	10.0	9.0
FRA			3.0	4.5	4.3	4.0		
GEO			5.9	5.5				
GRE			10.4	10.5			8.7	6.9
HUN			8.4	9.3				
IRE			4.6	4.2				
ITA					10.3	9.8	8.4	6.9
KAZ							2.2	2.5
KZG			1.7	1.2	1.6	0.8		
LTU			7.0	5.7				
LVA			4.3	4.8			4.2	3.1
MAT			10.9	11.5				
MKD			10.7	9.8				
MNE			9.0	6.5				
NOR					2.1	3.1		
POL					7.6	5.3		
POR			6.3	8.8				
ROM					7.8	6.4		
RUS			4.9	4.9				
SMR					9.2	5.2		
SPA	7.4	11.5	9.6	12.9	9.9	10.6	9.6	10.0
SRB			7.3	7.2				
SVK			7.9	8.1				
SVN	4.8	4.6	5.4	6.3	6.5	6.5	8.5	7.2
SWE	3.3	3.8			4.1	4.3		
TJK			0.9	0.8				
TKM			1.5	1.6				
TUR			6.3	6.8				

<sup>a</sup>Calculated only for the targeted age groups.

**Table A1.5. Children included in the analysis of eating habits and physical activity and sedentary behaviour, by country, age group and sex**

Country	Number of children with family data	Boys (%)	Age (%)			
			6-year-olds	7-year-olds	8-year-olds	9-year-olds
ALB	2527	52.5	0.1	24.2	52.0	23.7
BUL	3400	51.5	0.0	100.0	0.0	0.0
CRO	2651	51.1	0.0	0.0	100.0	0.0
CZH	1406	50.7	49.5	50.5	0.0	0.0
DEN	957	52.7	27.4	70.2	2.4	0.0
FRA	5318	50.0	5.5	36.6	43.7	14.1
GEO	3246	51.2	1.6	85.1	13.0	0.3
IRE	874	52.6	38.2	60.2	1.6	0.0
ITA	43 696	51.5	0.0	0.6	66.3	33.1
KAZ	4311	50.6	0.0	0.4	51.0	48.6
KGZ	7567	50.7	10.5	43.5	39.5	6.5
LTU	3812	50.6	0.4	66.4	33.0	0.2
LVA	5707	48.2	7.9	43.8	9.1	39.3
MAT	3179	50.0	0.1	69.7	30.1	0.1
MNE	2736	52.8	31.2	48.5	20.1	0.2
POL	2945	50.2	0.0	0.0	100.0	0.0
POR	6391	50.7	25.2	49.0	24.0	1.7
ROM	6610	49.1	0.4	28.4	47.5	23.8
RUS	2052	50.2	18.8	72.8	8.3	0.1
SMR	306	45.1	0.0	0.0	64.7	35.3
SPA	10 453	50.9	25.4	25.2	24.9	24.6
TJK	3270	51.6	7.7	90.8	1.4	0.2
TKM	3891	49.9	0.0	79.9	20.1	0.0
TUR	10 502	50.9	11.4	82.3	6.0	0.3

**Table A1.6. Frequency of consumption of breakfast among 6–9-year-old boys and girls (%)**

Country	Boys				Girls				Total			
	Never	Some days (1–3 days)	Most days (4–6 days)	Every day	Never	Some days (1–3 days)	Most days (4–6 days)	Every day	Never	Some days (1–3 days)	Most days (4–6 days)	Every day
ALB	3.7	11.4	8.5	76.4	3.9	12.5	10.3	73.2	3.8	11.9	9.4	74.9
BUL	1.5	11.4	10.0	77.1	1.8	9.9	9.7	78.7	1.7	10.7	9.8	77.8
CRO	1.1	9.7	11.4	77.9	1.6	8.9	13.6	75.8	1.4	9.3	12.5	76.9
CZH	1.2	8.7	12.5	77.7	1.3	10.5	10.0	78.2	1.2	9.5	11.3	77.9
DEN	0.0	0.9	3.0	96.0	0.2	2.2	3.0	94.7	0.1	1.5	3.0	95.4
GEO	1.7	19.6	13.5	65.2	2.3	22.4	13.4	61.9	2.0	21.0	13.4	63.6
IRE	0.6	2.6	4.1	92.8	0.3	1.9	5.2	92.7	0.4	2.2	4.6	92.7
KAZ	2.0	12.9	34.8	50.4	1.8	15.0	35.9	47.3	1.9	14.0	35.3	48.9
KGZ	5.3	14.3	9.2	71.2	4.7	15.4	11.4	68.5	5.0	14.8	10.3	69.9
LTU	5.1	28.3	10.8	55.8	5.2	28.3	11.5	55.0	5.1	28.3	11.2	55.4
LVA	1.9	11.1	11.2	75.8	2.7	13.3	12.2	71.8	2.3	12.2	11.7	73.7
MAT	7.1	20.4	14.3	58.2	7.7	21.7	14.4	56.2	7.4	21.0	14.3	57.2
MNE	0.4	2.0	4.9	92.8	0.6	3.6	4.8	91.0	0.5	2.7	4.8	92.0
POL	1.2	6.5	7.0	85.3	0.8	6.8	8.7	83.7	1.0	6.6	7.8	84.5
POR	0.4	1.4	1.4	96.9	0.6	1.5	2.0	96.0	0.5	1.4	1.7	96.4
ROM	7.1	19.1	9.4	64.4	6.5	20.6	9.0	63.8	6.8	19.8	9.2	64.1
RUS	0.3	2.8	3.9	92.9	0.5	2.2	4.7	92.6	0.4	2.5	4.3	92.8
SPA	0.7	3.1	3.1	93.0	0.4	2.7	4.2	92.7	0.6	2.9	3.7	92.8
TJK	1.4	14.5	9.1	75.0	1.1	13.0	9.7	76.1	1.3	13.8	9.4	75.5
TKM	0.0	3.7	7.0	89.4	0.0	3.0	7.2	89.8	0.0	3.3	7.1	89.6
TUR	3.0	6.7	11.5	78.8	2.8	7.5	11.4	78.3	2.9	7.1	11.5	78.5

Table A1.7. Frequency of consumption of fresh fruit among 6–9-year-old boys and girls (%)

Country	Boys					Girls					Total				
	Never	Less than once a week	Some days (1–3 days)	Most days (4–6 days)	Every day	Never	Less than once a week	Some days (1–3 days)	Most days (4–6 days)	Every day	Never	Less than once a week	Some days (1–3 days)	Most days (4–6 days)	Every day
ALB	1.5	3.1	17.1	21.0	57.2	1.2	2.3	17.2	19.6	59.6	1.4	2.7	17.2	20.4	58.4
BUL	1.8	3.4	31.2	28.8	34.8	1.0	4.5	28.1	30.3	36.1	1.4	4.0	29.7	29.5	35.4
CRO	2.3	4.8	30.0	29.1	33.8	1.0	2.6	28.6	34.0	33.7	1.7	3.7	29.3	31.5	33.8
CZH <sup>a</sup>	0.9		19.9	37.9	41.4	0.6		16.8	35.8	46.7	0.7		18.4	36.9	44.0
DEN	0.3	2.3	12.3	27.7	57.3	1.4	1.4	8.2	26.3	62.7	0.8	1.9	10.4	27.1	59.8
GEO	1.9	8.0	28.1	39.0	22.9	1.7	8.4	27.4	38.0	24.5	1.8	8.2	27.8	38.5	23.7
IRE	3.4	3.3	13.7	18.9	60.7	3.7	0.8	11.4	22.5	61.6	3.6	2.1	12.6	20.6	61.1
ITA <sup>b</sup>	3.9	3.2			71.5	2.9	2.6			73.7	3.4	2.6			72.6
KAZ	1.4	8.1	35.0	21.9	33.5	1.1	7.4	30.8	27.8	33.0	1.3	7.7	32.9	24.8	33.3
KGZ	3.4	19.5	42.0	17.2	18.0	4.4	17.9	41.3	18.0	18.3	3.9	18.7	41.7	17.6	18.1
LTU	2.1	8.0	37.3	34.7	18.0	1.1	6.3	33.2	39.0	20.4	1.6	7.2	35.3	36.8	19.2
LVA	0.7	6.5	36.4	33.6	22.8	0.6	4.5	35.0	36.5	23.5	0.7	5.5	35.7	35.1	23.2
MAT <sup>a</sup>	8.7		26.6	20.1	44.5	5.1		28.1	23.3	43.9	6.9		27.4	21.2	44.2
MNE	0.5	2.4	17.9	32.5	46.6	0.7	0.6	16.4	37.5	44.7	0.6	1.6	17.2	34.9	45.7
POL	2.0	4.2	26.9	31.4	35.5	0.4	3.4	27.2	31.5	37.6	1.2	3.8	27.0	31.4	36.6
POR	1.4	2.4	14.7	19.3	62.2	1.1	1.7	14.0	19.3	63.9	1.3	2.0	14.3	19.3	63.1
ROM	1.4	6.1	27.7	23.4	41.4	0.8	4.2	26.8	25.5	42.7	1.1	5.1	27.3	24.5	42.1
RUS	0.9	2.0	15.7	32.2	49.2	0.5	1.5	14.5	31.2	52.3	0.7	1.8	15.1	31.7	50.7
SMR <sup>b</sup>	2.2	0.0			83.2	0.6	3.0			78.8	1.3	1.7			80.8
SPA	4.0	4.5	30.0	32.9	28.6	2.8	4.6	29.4	33.9	29.3	3.5	4.6	29.7	33.4	28.9
TJK	1.6	19.3	30.5	13.8	34.8	1.5	20.4	30.9	15.1	32.2	1.5	19.8	30.7	14.4	33.5
TKM	0.0	2.7	5.1	22.5	69.7	0.0	2.3	6.0	21.2	70.4	0.0	2.5	5.6	21.9	70.1
TUR	2.0	4.8	19.4	24.4	49.4	1.6	3.9	17.8	24.4	52.3	1.8	4.4	18.6	24.4	50.8

<sup>a</sup> Only data on “Never”, “Some days (1–3 days)”, “Most days (4–6 days)” and “Every day” were available for Czechia and Malta.

<sup>b</sup> Only data on “Never”, “Less than once a week” and “Every day” consumption were available for Italy and San Marino.



Table A1.8. Frequency of consumption of vegetables among 6–9-year-old boys and girls (%)

Country	Boys					Girls					Total				
	Never	Less than once a week	Some days (1–3 days)	Most days (4–6 days)	Every day	Never	Less than once a week	Some days (1–3 days)	Most days (4–6 days)	Every day	Never	Less than once a week	Some days (1–3 days)	Most days (4–6 days)	Every day
ALB	2.6	8.3	33.7	28.5	26.9	1.9	6.8	31.9	32.6	26.8	2.3	7.6	32.9	30.5	26.8
BUL	2.3	6.4	32.3	33.4	25.5	1.4	6.2	30.2	33.3	29.0	1.9	6.3	31.3	33.4	27.2
CRO	2.2	6.9	41.3	33.5	16.1	1.3	5.6	42.1	33.6	17.4	1.8	6.3	41.7	33.6	16.7
CZH <sup>a</sup>	1.3		32.2	36.2	30.2	1.4		24.6	38.1	35.8	1.3		28.5	37.2	33.0
DEN	0.7	3.3	16.0	27.1	52.9	1.2	3.9	15.8	27.7	51.5	1.0	3.6	15.9	27.4	52.2
GEO	3.6	14.0	33.1	34.8	14.6	3.7	13.1	33.4	35.7	14.2	3.6	13.5	33.2	35.2	14.4
IRE	6.2	3.1	14.5	30.8	45.5	3.5	3.0	19.0	27.7	46.8	4.9	3.1	16.6	29.3	46.1
ITA <sup>b</sup>	7.1	6.2			51.1	5.3	4.7			56.8	6.2	5.5			53.9
KAZ	1.2	7.7	26.8	35.5	28.7	1.3	7.7	24.2	35.1	31.7	1.3	7.7	25.5	35.3	30.2
KGZ	4.6	11.9	31.1	22.3	30.0	3.7	11.7	30.8	21.6	32.2	4.1	11.8	31.0	22.0	31.1
LTU	4.6	14.0	37.3	30.4	13.7	3.7	12.2	36.9	32.6	14.6	4.2	13.1	37.1	31.5	14.1
LVA	1.1	8.5	39.5	33.8	17.1	0.8	8.4	38.5	33.7	18.5	0.9	8.4	39.0	33.7	17.8
MAT <sup>a</sup>	16.3		48.0	19.8	16.0	14.0		48.1	22.6	15.3	15.1		48.0	21.2	15.6
MNE	1.3	4.6	26.6	37.9	29.6	0.7	2.6	28.0	39.0	29.7	1.0	3.7	27.3	38.4	29.7
POL	2.6	8.9	36.6	30.2	21.7	1.6	8.7	33.8	31.3	24.6	2.1	8.8	35.2	30.7	23.1
POR	2.6	5.1	26.5	29.1	36.8	1.6	4.8	25.0	30.0	38.6	2.1	5.0	25.7	29.5	37.7
ROM	3.0	11.1	36.0	22.8	27.2	2.1	9.5	35.0	26.7	26.7	2.6	10.2	35.5	24.7	26.9
RUS	1.0	4.0	22.5	36.5	35.9	0.8	3.3	22.2	38.8	34.9	0.9	3.7	22.4	37.7	35.4
SMR <sup>b</sup>	2.2	5.8			70.3	3.0	1.2			77.7	2.6	3.3			74.3
SPA	6.2	8.6	49.3	27.5	8.4	6.3	8.9	50.0	25.1	9.8	6.2	8.7	49.6	26.3	9.1
TJK	3.8	11.2	23.5	17.6	43.8	3.6	11.3	25.2	17.6	42.4	3.7	11.2	24.3	17.6	43.1
TKM	0.0	1.0	7.9	21.9	69.2	0.1	1.6	8.1	23.2	67.0	0.0	1.3	8.0	22.5	68.1
TUR	8.8	14.9	41.6	23.4	11.3	5.4	11.6	43.1	27.5	12.5	7.1	13.3	42.3	25.4	11.9

<sup>a</sup> Only data on “Never”, “Some days (1–3 days)”, “Most days (4–6 days)” and “Every day” were available for Czechia and Malta.

<sup>b</sup> Only data on “Never”, “Less than once a week” and “Every day” consumption were available for Italy and San Marino.

Table A1.9. Frequency of consumption of savoury snacks among 6–9-year-old boys and girls (%)

Country	Boys					Girls					Total				
	Never	Less than once a week	Some days (1–3 days)	Most days (4–6 days)	Every day	Never	Less than once a week	Some days (1–3 days)	Most days (4–6 days)	Every day	Never	Less than once a week	Some days (1–3 days)	Most days (4–6 days)	Every day
ALB	7.4	33.5	25.0	12.7	21.4	7.9	32.3	24.9	13.4	21.5	7.7	33.0	24.9	13.0	21.5
BUL	8.6	35.6	29.4	12.5	13.8	7.7	38.3	29.2	12.9	11.9	8.1	36.9	29.3	12.7	12.9
CRO	4.7	45.2	38.5	7.2	4.3	6.9	43.9	37.3	8.8	3.1	5.8	44.6	37.9	8.0	3.7
CZH <sup>a</sup>	26.7		70.5	2.6	0.3	30.2		67.6	1.7	0.5	28.4		69.1	2.1	0.4
DEN	5.0	68.5	25.9	0.6	0.0	5.7	70.1	23.8	0.4	0.0	5.3	69.2	24.9	0.5	0.0
GEO	16.4	40.0	24.5	16.2	3.0	16.0	41.4	26.9	12.8	2.9	16.2	40.7	25.6	14.5	3.0
IRE	5.9	48.7	38.9	5.4	1.1	4.1	38.0	48.8	7.2	1.9	5.1	43.6	43.5	6.2	1.5
KAZ	18.2	43.1	25.2	7.0	6.6	20.2	44.3	21.8	7.8	5.8	19.2	43.7	23.5	7.4	6.2
KGZ	15.8	31.7	32.4	11.7	8.3	16.4	31.3	32.7	11.8	7.9	16.1	31.5	32.5	11.8	8.1
LTU	11.3	70.9	14.4	2.8	0.6	13.6	70.3	13.0	2.5	0.6	12.5	70.6	13.7	2.6	0.6
LVA	11.1	67.2	18.4	2.7	0.7	12.0	70.0	15.3	2.3	0.5	11.5	68.6	16.8	2.5	0.6
MAT <sup>a</sup>	8.3		76.4	14.7	3.3	7.1		78.8	9.9	4.3	7.7		77.6	10.3	4.4
MNE	5.7	34.4	35.2	15.2	9.6	6.0	36.9	36.2	12.6	8.4	5.8	35.6	35.6	14.0	9.0
POL	9.0	67.5	19.1	3.0	1.5	12.6	66.0	18.7	2.1	0.7	10.8	66.7	18.9	2.5	1.1
POR	15.2	69.6	13.2	1.6	0.3	14.2	70.8	13.0	1.6	0.4	14.8	70.2	13.1	1.6	0.3
ROM	7.9	39.1	30.5	10.9	11.5	9.6	42.1	27.5	11.0	9.8	8.8	40.6	29.0	11.0	10.6
RUS	29.8	60.2	8.3	1.4	0.3	36.0	55.7	7.4	0.9	0.0	32.9	58.0	7.9	1.2	0.1
SPA	10.9	58.5	27.0	2.7	0.9	10.1	60.5	26.1	2.6	0.7	10.5	59.5	26.5	2.7	0.8
TJK	15.8	30.2	30.2	12.4	11.4	15.5	29.6	30.4	13.2	11.2	15.7	29.9	30.3	12.8	11.3
TKM	11.1	43.9	25.8	11.1	8.1	11.0	42.1	25.3	11.7	9.8	11.0	43.0	25.6	11.4	9.0
TUR	13.6	36.0	29.6	12.9	7.8	15.4	36.4	29.2	12.7	6.3	14.5	36.2	29.4	12.8	7.1

<sup>a</sup> Only data on “Never”, “Some days (1–3 days)”, “Most days (4–6 days)” and “Every day” were available for Czechia and Malta.

Table A1.10. Frequency of consumption of sweet snacks among 6–9-year-old boys and girls (%)

Country	Boys					Girls					Total				
	Never	Less than once a week	Some days (1–3 days)	Most days (4–6 days)	Every day	Never	Less than once a week	Some days (1–3 days)	Most days (4–6 days)	Every day	Never	Less than once a week	Some days (1–3 days)	Most days (4–6 days)	Every day
ALB	3.3	25.7	33.6	17.8	19.6	3.2	25.8	32.8	18.0	20.1	3.3	25.8	33.2	17.9	19.8
BUL	0.6	11.2	39.0	25.3	24.0	1.0	13.5	37.3	26.6	21.6	0.8	12.3	38.2	25.9	22.8
CRO	1.2	19.1	48.5	18.5	12.7	0.9	19.9	49.1	18.6	11.6	1.1	19.5	48.8	18.5	12.2
CZH <sup>a</sup>	5.8		76.1	14.7	3.3	7.5		77.0	12.9	2.5	6.7		76.5	13.8	2.9
DEN	0.9	20.4	73.5	4.7	0.6	0.2	26.5	69.3	3.8	0.2	0.6	23.3	71.5	4.2	0.4
GEO	1.0	10.1	26.7	42.9	19.3	1.1	10.3	26.8	43.7	18.1	1.1	10.2	26.7	43.3	18.7
IRE	0.7	24.6	50.4	17.0	7.3	0.4	19.9	52.8	19.8	7.1	0.6	22.4	51.5	18.3	7.2
KAZ	6.9	34.8	36.4	14.1	7.8	5.5	32.8	39.7	14.7	7.2	6.2	33.8	38.0	14.4	7.5
KGZ	4.3	19.4	35.7	21.5	19.1	4.3	18.0	35.9	22.8	19.0	4.3	18.7	35.8	22.1	19.0
LTU	0.8	30.8	46.0	16.8	5.7	0.6	28.2	43.6	20.3	7.2	0.7	29.5	44.8	18.5	6.4
LVA	0.8	20.6	47.0	20.8	10.8	0.4	19.4	48.5	20.6	11.1	0.6	20.0	47.8	20.7	11.0
MAT <sup>a</sup>	4.6		59.8	20.4	15.2	3.3		62.0	19.9	14.8	3.9		60.9	20.1	15.0
MNE	1.0	17.9	43.0	24.7	13.4	0.8	17.7	45.5	21.0	15.0	0.9	17.8	44.2	23.0	14.1
POL	1.5	23.0	46.4	19.9	9.2	1.9	25.6	44.5	19.0	9.0	1.7	24.3	45.5	19.5	9.1
POR	7.7	60.7	26.0	4.2	1.3	6.6	60.6	26.4	4.3	2.1	7.2	60.6	26.2	4.3	1.7
ROM	2.1	21.5	38.0	19.5	18.9	1.6	21.6	38.3	18.9	19.6	1.9	21.6	38.2	19.2	19.3
RUS	2.3	21.0	44.7	23.1	8.9	2.1	21.5	43.7	24.5	8.2	2.2	21.2	44.2	23.8	8.5
SPA	10.6	47.5	33.7	6.1	2.0	9.0	46.2	36.9	6.4	1.4	9.8	46.8	35.3	6.3	1.7
TJK	7.5	24.7	36.6	16.1	15.2	5.4	25.1	38.9	15.4	15.1	6.5	24.9	37.7	15.8	15.2
TKM	2.5	22.3	31.8	21.9	21.5	1.6	22.8	31.4	23.7	20.6	2.0	22.5	31.6	22.8	21.1
TUR	5.8	25.4	35.3	20.5	13.0	5.7	25.0	38.4	19.7	11.2	5.7	25.2	36.8	20.1	12.1

<sup>a</sup> Only data on “Never”, “Some days (1–3 days)”, “Most days (4–6 days)” and “Every day” were available for Czechia and Malta.

Table A1.11. Frequency of consumption of soft drinks among 6–9-year-old boys and girls (%)

Country	Boys					Girls					Total				
	Never	Less than once a week	Some days (1–3 days)	Most days (4–6 days)	Every day	Never	Less than once a week	Some days (1–3 days)	Most days (4–6 days)	Every day	Never	Less than once a week	Some days (1–3 days)	Most days (4–6 days)	Every day
ALB	18.7	39.4	26.0	7.6	8.3	22.7	41.1	23.3	7.4	5.5	20.6	40.2	24.7	7.5	6.9
BUL	34.1	29.7	17.8	7.8	10.6	37.7	29.3	16.3	7.7	9.1	35.8	29.5	17.1	7.7	9.9
CRO	11.7	25.9	31.1	15.0	16.3	11.0	29.0	32.6	14.5	12.8	11.4	27.4	31.9	14.8	14.6
CZH <sup>a</sup>	17.9		48.9	19.0	14.3	18.6		53.6	15.8	12.0	18.2		51.2	17.4	13.2
DEN	9.1	41.8	38.8	7.1	3.1	13.4	43.7	37.6	4.3	1.1	11.1	42.7	38.3	5.8	2.1
GEO	11.4	31.5	29.4	21.0	6.7	13.5	35.6	28.9	16.4	5.6	12.4	33.5	29.2	18.7	6.1
IRE	46.9	41.1	10.8	0.5	0.6	53.5	34.4	10.3	1.5	0.2	50.1	37.9	10.6	1.0	0.4
KAZ	22.7	27.1	26.9	12.7	10.6	22.3	28.5	27.4	10.5	11.3	22.5	27.8	27.2	11.6	10.9
KGZ	17.6	23.1	30.8	13.6	14.9	18.3	22.0	32.3	12.6	14.8	18.0	22.6	31.5	13.1	14.8
LTU	18.5	50.5	21.0	7.7	2.3	23.1	51.9	16.9	6.4	1.6	20.8	51.2	19.0	7.0	2.0
LVA	12.2	47.8	27.4	8.5	4.2	13.0	50.9	24.6	7.4	4.1	12.6	49.4	26.0	7.9	4.1
MAT <sup>a</sup>	29.0		52.2	8.6	10.2	33.9		50.8	7.0	8.3	31.5		51.5	7.8	9.3
MNE	11.6	23.4	30.3	17.3	17.4	12.6	24.6	33.0	17.1	12.7	12.0	24.0	31.6	17.2	15.2
POL	9.1	32.2	28.6	16.4	13.8	9.1	34.7	27.6	16.0	12.6	9.1	33.5	28.1	16.2	13.2
POR	19.2	39.3	25.5	8.0	8.0	20.5	40.9	25.2	7.7	5.8	19.8	40.1	25.4	7.8	6.9
ROM	21.1	41.5	22.7	7.4	7.3	20.8	45.3	20.9	7.1	5.9	20.9	43.5	21.8	7.3	6.6
RUS	35.5	31.5	16.9	7.3	8.7	38.8	31.7	17.1	5.5	7.0	37.2	31.6	17.0	6.4	7.9
SPA	50.9	32.2	13.3	2.5	1.1	54.9	30.0	11.4	2.7	1.1	52.8	31.1	12.4	2.6	1.1
TJK	18.5	16.3	22.8	10.5	31.9	16.8	15.9	20.9	12.5	33.8	17.7	16.1	21.9	11.5	32.8
TKM	8.0	26.3	22.1	16.2	27.3	8.8	25.1	24.5	17.2	24.3	8.4	25.7	23.3	16.7	25.8
TUR	23.7	27.7	28.9	11.5	8.1	27.0	29.1	28.0	8.9	6.9	25.4	28.4	28.5	10.2	7.5

<sup>a</sup> Only data on “Never”, “Some days (1–3 days)”, “Most days (4–6 days)” and “Every day” were available for Czechia and Malta.

**Table A1.12. Transport to and from school among 6–9-year-old boys and girls (%)**

Country	Boys			Girls			Total		
	Walking/ cycling	Motorized vehicles	Combination	Walking/ cycling	Motorized vehicles	Combination	Walking/ cycling	Motorized vehicles	Combination
ALB	62.0	31.0	7.0	60.2	33.9	5.9	61.1	32.4	6.5
BUL	45.7	34.1	20.3	44.9	33.4	21.7	45.3	33.7	21.0
CRO	42.8	31.6	25.6	41.9	32.9	25.2	42.3	32.3	25.4
CZH	45.2	38.8	16.0	43.7	37.1	19.2	44.5	38.0	17.6
DEN	36.6	41.7	21.6	35.1	42.8	22.1	35.9	42.2	21.8
EST	34.6	39.7	25.7	33.7	40.3	26.0	34.2	40.0	25.8
FRA	41.4	49.8	8.8	38.4	52.4	9.2	39.9	51.1	9.0
GEO	48.0	40.6	11.4	47.5	39.7	12.8	47.8	40.2	12.1
IRE	20.3	72.8	6.9	20.5	70.7	8.8	20.4	71.8	7.8
KAZ	72.8	18.6	8.6	69.0	21.4	9.6	70.9	20.0	9.1
KGZ	72.8	17.9	9.4	70.2	19.2	10.6	71.5	18.5	10.0
LTU	37.5	41.6	20.9	35.7	42.6	21.7	36.6	42.1	21.3
LVA	34.0	45.2	20.8	34.0	45.8	20.2	34.0	45.5	20.5
MAT	19.2	71.4	9.4	17.9	72.3	9.8	18.6	71.8	9.6
MNE	38.3	38.7	23.0	38.9	35.7	25.4	38.6	37.3	24.2
POL	39.4	44.2	16.3	38.8	44.9	16.3	39.1	44.6	16.3
POR	17.5	76.6	5.9	18.0	76.1	6.0	17.7	76.3	6.0
ROM	51.5	31.1	17.4	48.6	33.1	18.3	50.0	32.1	17.9
RUS	64.6	18.0	17.5	66.8	18.1	15.2	65.7	18.0	16.3
SPA	51.1	45.2	3.7	52.6	43.6	3.8	51.8	44.4	3.8
TJK	94.5	3.3	2.3	93.6	3.1	3.3	94.0	3.2	2.8
TKM	79.7	14.2	6.0	81.2	13.4	5.4	80.5	13.8	5.7
TUR	59.7	32.0	8.3	60.7	31.4	7.9	60.2	31.7	8.1

**Table A1.13. Hours per week spent by 6–9-year-old boys and girls on sports (%)**

Country	Boys					Girls					Total				
	0 hours/week	1 hour/week	2 hours/week	3 hours/week	4 hours/week or more	0 hours/week	1 hour/week	2 hours/week	3 hours/week	4 hours/week or more	0 hours/week	1 hour/week	2 hours/week	3 hours/week	4 hours/week or more
ALB	55.6	6.0	9.1	7.8	21.5	65.7	6.8	9.7	6.7	11.0	60.5	6.4	9.4	7.2	16.5
BUL	60.5	2.5	10.6	7.6	18.8	58.1	2.9	14.7	9.0	15.3	59.4	2.7	12.6	8.3	17.1
CRO	29.8	2.0	11.3	15.7	41.2	34.8	5.3	20.0	14.8	25.2	32.2	3.6	15.6	15.2	33.4
CZH	38.0	8.9	21.3	10.4	21.4	35.7	16.9	21.8	12.2	13.5	36.9	12.8	21.5	11.3	17.5
DEN	16.6	21.1	28.1	17.1	17.2	17.5	29.2	32.1	14.4	6.9	17.0	24.9	30.0	15.8	12.3
EST	31.3	7.9	25.2	21.9	13.7	33.6	12.0	28.0	14.7	11.7	32.4	9.9	26.6	18.4	12.7
GEO	51.1	1.7	6.9	13.1	27.1	50.2	2.3	6.2	15.5	25.8	50.7	2.0	6.6	14.3	26.5
KAZ	50.8	9.1	11.4	12.0	16.8	61.2	7.6	8.3	11.4	11.4	56.0	8.3	9.9	11.7	14.2
KGZ	83.4	1.7	3.0	3.0	8.9	87.9	1.6	2.5	3.1	4.9	85.6	1.6	2.8	3.1	6.9
LTU	36.8	6.4	12.5	14.2	30.0	40.4	9.4	21.0	12.2	17.0	38.6	7.9	16.7	13.3	23.6
LVA	18.2	4.3	13.7	15.7	48.1	20.9	7.1	21.1	16.2	34.7	19.6	5.8	17.5	15.9	41.1
MAT	33.0	8.7	14.4	15.8	28.1	34.8	12.9	21.5	15.0	15.8	33.9	10.8	18.0	15.4	22.0
MNE	47.6	1.4	4.8	15.9	30.4	57.5	1.3	11.5	9.7	20.0	52.2	1.3	7.9	13.0	25.5
POL	30.2	7.2	11.7	16.3	34.7	36.7	12.9	18.3	13.1	19.0	33.4	10.0	15.0	14.7	26.9
POR	46.7	3.3	10.7	15.1	24.2	49.4	4.0	13.6	16.4	16.7	48.0	3.7	12.1	15.7	20.5
ROM	63.4	3.3	9.9	7.9	15.6	65.3	5.1	14.9	5.3	9.4	64.4	4.2	12.4	6.6	12.4
RUS	29.0	2.4	15.7	15.3	37.6	35.0	1.6	15.1	13.7	34.5	32.0	2.0	15.4	14.5	36.1
SPA	27.3	6.1	19.9	17.5	29.2	34.9	10.4	28.0	12.5	14.2	31.0	8.2	23.9	15.0	21.8
TJK	81.9	5.9	6.5	2.3	3.4	86.6	5.6	4.2	2.4	1.3	84.2	5.7	5.4	2.4	2.3
TKM	70.2	5.1	9.2	4.8	10.7	76.7	4.6	8.9	3.8	6.0	73.5	4.9	9.0	4.3	8.4
TUR	81.7	1.2	3.0	7.3	6.7	84.6	1.1	3.7	5.8	4.8	83.1	1.2	3.3	6.6	5.8

**Table A1.14. Hours per day spent by 6–9-year-old boys and girls playing actively/vigorously (%)**

Country	Boys				Girls				Total			
	0 hours/day	Less than 1 hour/day	1-2 hours/day	More than 2 hours/day	0 hours/day	Less than 1 hour/day	1-2 hours/day	More than 2 hours/day	0 hours/day	Less than 1 hour/day	1-2 hours/day	More than 2 hours/day
ALB	0.5	9.0	45.8	44.7	0.4	13.0	50.3	36.2	0.4	10.9	48.0	40.7
BUL	0.3	6.7	32.7	60.3	0.0	7.3	35.5	57.1	0.2	7.0	34.0	58.8
CRO	0.0	6.8	41.9	51.3	0.1	9.2	42.4	48.4	0.0	8.0	42.1	49.9
CZH	0.0	1.8	24.8	73.3	0.1	1.6	24.6	73.7	0.0	1.7	24.7	73.5
DEN	0.5	27.5	54.0	17.9	0.6	26.9	53.5	18.9	0.6	27.2	53.8	18.4
GEO	0.3	8.9	33.7	57.1	0.4	10.5	36.6	52.5	0.3	9.7	35.1	54.9
IRE	0.4	15.3	48.3	36.0	0.0	14.2	53.7	32.1	0.2	14.8	50.9	34.1
KAZ	0.4	28.1	43.9	27.6	1.0	29.3	46.1	23.6	0.7	28.7	45.0	25.6
KGZ	0.6	9.8	24.8	64.8	0.8	11.3	28.9	59.0	0.7	10.6	26.8	61.9
LTU	0.3	7.3	30.6	61.8	0.1	7.0	34.0	58.9	0.2	7.1	32.3	60.4
LVA	0.0	13.5	40.9	45.6	0.1	15.9	40.5	43.5	0.0	14.8	40.7	44.5
MAT	0.8	38.4	30.3	30.6	1.3	36.1	42.9	19.7	1.0	37.3	36.6	25.1
MNE	0.3	3.4	26.5	69.8	0.1	3.5	30.0	66.4	0.2	3.4	28.1	68.2
POL	0.1	16.7	55.1	28.1	0.6	18.3	56.5	24.6	0.3	17.5	55.8	26.4
POR	0.1	12.2	47.3	40.4	0.1	13.8	46.3	39.8	0.1	13.0	46.8	40.1
ROM	0.4	3.6	26.3	69.8	0.2	5.2	29.1	65.5	0.3	4.4	27.7	67.6
RUS	0.1	7.4	45.7	46.8	0.0	10.1	45.0	44.9	0.1	8.7	45.3	45.9
SPA	2.1	23.7	46.1	28.1	2.8	29.5	43.9	23.8	2.4	26.5	45.1	26.0
TJK	3.3	32.7	39.1	24.9	3.2	32.6	41.3	22.9	3.3	32.7	40.2	23.9
TKM	0.5	16.5	44.3	38.6	1.3	17.7	46.9	34.1	0.9	17.1	45.6	36.4
TUR	2.0	24.1	36.8	37.0	2.7	27.8	40.5	28.9	2.3	26.0	38.6	33.1

**Table A1.15. Hours per day spent by 6–9-year-old boys and girls watching TV or using electronic devices (%)**

Country	Boys				Girls				Total			
	Never or less than 1 hour/day	About 1 hour/day	About 2 hours/day	About 3 hours/day or more	Never or less than 1 hour/day	About 1 hour/day	About 2 hours/day	About 3 hours/day or more	Never or less than 1 hour/day	About 1 hour/day	About 2 hours/day	About 3 hours/day or more
ALB	16.4	39.1	29.4	15.1	14.4	43.9	30.8	10.8	15.5	41.4	30.1	13.1
BUL	8.7	41.3	34.5	15.6	10.8	43.6	32.4	13.2	9.7	42.4	33.5	14.4
CRO	3.5	44.4	38.7	13.4	4.5	47.0	36.4	12.1	4.0	45.7	37.6	12.8
CZH	13.8	46.8	31.3	8.1	14.8	53.1	24.7	7.4	14.3	49.9	28.1	7.8
DEN	8.9	49.0	32.0	10.2	13.8	54.4	26.2	5.5	11.2	51.5	29.2	8.0
FRA	24.4	44.1	20.9	10.6	30.0	43.1	18.1	8.8	27.2	43.6	19.5	9.7
GEO	16.5	40.2	29.8	13.5	18.9	42.7	28.0	10.3	17.7	41.4	28.9	12.0
ITA	2.7	25.0	25.1	47.3	5.0	32.3	28.7	34.0	3.8	28.5	26.8	40.9
KAZ	34.5	39.3	18.4	7.7	37.3	39.3	17.3	6.0	35.9	39.3	17.9	6.9
KGZ	16.7	33.2	32.9	17.2	16.4	36.5	33.0	14.2	16.6	34.8	32.9	15.7
LTU	21.0	34.6	34.9	9.4	28.3	36.7	30.3	4.7	24.6	35.6	32.6	7.1
LVA	9.5	42.4	33.3	14.8	11.3	46.3	30.2	12.2	10.4	44.4	31.7	13.5
MAT	11.9	50.8	27.8	9.6	12.7	45.7	32.9	8.7	12.3	48.2	30.3	9.1
MNE	4.4	43.5	38.2	14.0	4.3	48.2	36.1	11.4	4.3	45.7	37.2	12.7
POL	11.5	44.8	31.9	11.8	11.9	50.8	26.6	10.8	11.7	47.8	29.2	11.3
POR	17.8	57.8	18.2	6.1	18.9	59.9	15.3	5.9	18.3	58.9	16.8	6.0
ROM	9.8	36.3	38.1	15.9	9.3	42.9	34.4	13.4	9.5	39.6	36.2	14.7
RUS	27.3	47.0	20.1	5.6	29.2	45.9	20.5	4.4	28.2	46.5	20.3	5.0
SMR	1.4	26.1	31.2	41.3	7.3	33.3	29.1	30.3	4.6	30.0	30.0	35.3
SPA	41.2	37.2	18.5	3.2	47.1	34.6	16.1	2.1	44.1	35.9	17.3	2.7
TJK	41.5	25.8	21.3	11.4	41.0	27.3	20.5	11.2	41.3	26.5	20.9	11.3
TKM	2.2	38.3	41.6	17.9	1.8	39.3	41.6	17.3	2.0	38.8	41.6	17.6
TUR	19.0	42.5	25.1	13.4	22.5	45.2	21.7	10.7	20.7	43.8	23.4	12.1



**Table A1.16. Hours per night spent sleeping by 6–9-year-old boys and girls (%)**

Country	Boys			Girls			Total		
	At least 9 hours/night	At least 10 hours/night	At least 11 hours/night	At least 9 hours/night	At least 10 hours/night	At least 11 hours/night	At least 9 hours/night	At least 10 hours/night	At least 11 hours/night
ALB	89.3	54.3	19.0	93.1	61.6	22.9	91.1	57.8	20.8
BUL	85.1	32.6	3.5	84.6	30.9	4.8	84.9	31.8	4.1
CRO	94.3	45.2	8.3	95.4	48.5	9.9	94.8	46.8	9.0
CZH	98.8	75.3	16.0	98.8	77.0	12.1	98.8	76.1	14.0
DEN	100.0	95.4	38.0	100.0	95.7	40.5	100.0	95.6	39.2
GEO	97.7	57.8	16.4	98.1	57.9	17.9	97.9	57.9	17.1
IRE	100.0	99.1	71.5	100.0	98.9	75.8	100.0	99.0	73.5
ITA	86.4	23.1	0.7	87.1	24.1	1.0	86.7	23.6	0.8
KAZ	82.6	44.9	19.1	83.1	45.9	22.0	82.8	45.4	20.5
KGZ	84.8	44.2	14.3	82.8	44.5	15.4	83.8	44.3	14.8
LTU	91.4	26.0	1.0	88.9	25.6	0.9	90.2	25.8	0.9
LVA	87.7	27.0	1.2	86.7	25.6	1.4	87.2	26.3	1.3
MAT	93.7	52.6	6.4	94.7	56.5	10.0	94.2	54.5	8.2
MNE	96.4	66.9	22.8	96.6	68.8	26.4	96.5	67.8	24.5
POL	93.7	48.5	5.3	92.6	47.3	6.4	93.2	47.9	5.9
POR	99.0	72.3	9.2	98.6	70.7	10.8	98.8	71.6	10.0
ROM	86.1	29.8	4.0	85.5	29.2	3.5	85.8	29.5	3.8
RUS	91.0	27.1	1.7	88.8	25.0	0.7	89.9	26.0	1.2
SMR	94.9	22.5	0.7	92.9	20.8	0.6	93.8	21.6	0.7
SPA	97.8	71.9	10.0	98.4	72.2	11.6	98.1	72.1	10.8
TJK	82.4	42.3	10.6	86.7	42.1	11.1	84.5	42.2	10.8
TKM	91.6	41.8	0.2	91.4	42.2	0.1	91.5	42.0	0.2
TUR	94.0	71.3	39.3	94.0	71.6	37.8	94.0	71.4	38.6

**Table A1.17. Number of schools that participated in COSI round 4 and nutrition environment indicators<sup>a</sup>**

Country	Number of schools that participated in survey	Schools that included nutritional education in school curriculum (%)	Schools that had vending machines (%) <sup>b</sup>	Schools free from advertising and marketing of energy-dense and nutrient-poor foods (%)	Availability on the school premises of fresh fruit (%)			
					Not available	Free	For sale	Free and for sale
ALB	125	86.4	0.0	86.4	81.6	0.0	18.4	0.0
AUT	97	73.2	6.2	94.9	36.1	45.4	16.5	2.1
BUL	199	91.5	21.6	64.8	12.6	57.3	12.6	17.6
CRO	164	94.5	9.2	78.4	6.8	63.2	8.0	22.1
CYP	25	96.0	0.0	95.8	30.4	30.4	39.1	0.0
DEN	77	–	4.0	100.0	39.0	14.3	45.5	1.3
EST	381	–	14.2	3.7	3.2	82.4	2.4	12.1
FRA	197	–	0.0	–	–	–	–	–
GEO	242	58.3	2.1	46.0	85.0	4.6	10.0	0.4
GRE	120	79.3	0.0	86.4	72.8	1.8	25.4	0.0
HUN	136	89.7	15.4	6.6	8.1	84.6	0.0	7.4
IRE	138	98.5	1.5	90.5	74.5	25.6	0.0	0.0
ITA	2375	75.8	9.8	100.0	–	–	–	–
KAZ	142	48.6	2.8	17.6	59.3	11.9	28.2	0.7
KGZ	150	46.6	2.0	41.6	83.1	6.8	8.8	1.4
LTU	102	75.5	15.0	79.8	4.0	52.0	15.0	29.0
LVA	96	88.5	29.2	66.7	5.2	80.2	5.2	9.4
MAT	95	93.6	1.1	89.5	24.2	72.6	3.2	0.0
MKD	112	94.5	15.5	22.7	79.8	1.9	17.3	1.0
MNE	100	78.6	7.2	55.8	99.0	0.0	0.0	1.0
NOR	124	–	–	–	49.2	12.9	37.9	0.0
POL	135	100.0	20.2	93.3	7.0	86.7	2.3	3.9
POR	212	83.3	6.1	59.1	31.6	45.6	16.0	6.8
ROM	207	86.1	7.8	79.5	49.0	46.5	3.5	1.0
RUS	68	61.2	3.0	66.7	12.1	63.6	7.6	16.7
SMR	14	61.5	0.0	100.0	–	–	–	–
SPA	165	86.7	–	81.8	77.6	18.8	3.6	0.0
SRB	40	–	–	–	–	–	–	–
SVK	123	97.6	35.6	64.7	30.8	19.7	47.0	2.6
SVN	228	98.7	0.0	100.0	2.6	69.3	28.1	0.0
TJK	153	48.2	3.4	6.1	76.4	6.1	17.6	0.0
TKM	159	76.8	0.0	100.0	65.3	0.0	34.7	0.0
TUR	580	70.5	0.5	67.9	64.1	3.5	32.4	0.0

<sup>a</sup>A dash (–) indicates that no data were collected.

<sup>b</sup>Includes only vending machines where children were allowed to purchase food or beverages other than water, fruit and vegetables.

**Table A1.18. Availability of sweet, savoury snacks and soft drinks on school premises (%)<sup>a</sup>**

Country	Sweet snacks				Savoury snacks				Soft drinks			
	Not available	Free	For sale	Free and for sale	Not available	Free	For sale	Free and for sale	Not available	Free	For sale	Free and for sale
ALB	95.2	0.0	4.8	0.0	83.2	0.0	16.8	0.0	77.6	0.0	22.4	0.0
AUT	89.7	0.0	10.3	0.0	94.9	1.0	4.1	0.0	93.8	0.0	6.2	0.0
BUL	50.3	3.0	43.2	3.5	67.7	0.0	32.3	0.0	90.0	0.0	10.1	0.0
CRO	75.2	0.0	24.8	0.0	93.8	0.6	5.6	0.0	71.6	1.2	26.5	0.6
CYP	12.5	0.0	87.5	0.0	21.7	0.0	78.3	0.0	100.0	0.0	0.0	0.0
DEN	94.7	0.0	5.3	0.0	94.7	0.0	5.3	0.0	100.0	0.0	0.0	0.0
EST	46.2	12.1	39.6	2.1	86.6	0.0	13.4	0.0	68.0	1.8	29.9	0.3
FRA	–	–	–	–	–	–	–	–	–	–	–	–
GEO	68.3	1.3	30.4	0.0	89.9	0.0	10.1	0.0	92.8	0.4	6.8	0.0
GRE	48.3	0.9	50.9	0.0	72.7	0.0	27.3	0.0	91.0	0.0	9.0	0.0
HUN	52.2	2.2	0.0	45.6	66.9	0.0	0.0	33.1	69.1	0.0	0.0	30.9
IRE	93.4	6.6	0.0	0.0	98.5	1.5	0.0	0.0	100.0	0.0	0.0	0.0
ITA	–	–	–	–	–	–	–	–	–	–	–	–
KAZ	37.0	0.7	60.1	2.2	81.6	0.0	18.4	0.0	56.8	2.2	40.3	0.7
KGZ	39.6	16.8	36.9	6.7	80.1	0.0	19.9	0.0	78.5	0.0	20.8	0.7
LTU	44.9	0.0	55.1	0.0	93.9	0.0	6.1	0.0	91.7	0.0	8.3	0.0
LVA	35.4	2.1	61.5	1.0	93.8	0.0	6.3	0.0	76.0	0.0	24.0	0.0
MAT	95.8	1.1	3.2	0.0	95.8	1.1	3.2	0.0	99.0	1.1	0.0	0.0
MKD	59.6	1.9	37.5	1.0	60.0	3.8	35.2	1.0	68.3	2.0	29.7	0.0
MNE	55.6	0.0	43.4	1.0	53.5	0.0	45.5	1.0	58.3	0.0	40.6	1.0
NOR	–	–	–	–	–	–	–	–	–	–	–	–
POL	67.7	4.0	28.2	0.0	93.6	0.8	5.6	0.0	94.5	0.0	5.5	0.0
POR	87.9	0.0	12.1	0.0	93.6	1.0	5.4	0.0	96.1	1.0	2.9	0.0
ROM	75.4	1.5	23.1	0.0	79.9	1.0	19.1	0.0	83.0	0.0	17.0	0.0
RUS	19.4	4.5	70.2	6.0	83.9	0.0	16.1	0.0	68.9	1.6	27.9	1.6
SMR	–	–	–	–	–	–	–	–	–	–	–	–
SPA	98.2	0.6	1.2	0.0	98.2	0.6	1.2	0.0	98.2	0.0	1.8	0.0
SRB	–	–	–	–	–	–	–	–	–	–	–	–
SVK	63.6	0.9	35.6	0.0	80.3	0.0	19.7	0.0	71.6	0.9	26.7	0.9
SVN	81.6	1.3	17.1	0.0	99.1	0.4	0.4	0.0	99.1	0.4	0.4	0.0
TJK	64.0	0.7	35.4	0.0	70.8	0.7	28.5	0.0	69.9	0.0	30.1	0.0
TKM	41.0	0.0	59.0	0.0	100.0	0.0	0.0	0.0	96.7	0.0	3.3	0.0
TUR	31.0	0.9	67.8	0.3	34.8	0.3	64.8	0.0	89.3	0.2	10.5	0.0

<sup>a</sup>A dash (–) indicates that no data were collected.

**Table A1.19. School environment indicators regarding physical activity and initiatives/projects to promote healthy lifestyle<sup>a</sup>**

Country	Schools that had outside playground areas (%)	Schools that had indoor gym (%)	Median duration of physical education classes (minutes/week)	Schools with initiatives or projects to promote healthy lifestyle (%)
ALB	90.4	52.0	135	72.0
AUT	94.9	97.9	100	81.4
BUL	100.0	84.4	105	68.3
CRO	98.8	86.6	135	83.5
CYP	100.0	32.0	80	100.0
DEN	100.0	97.4	90	68.7
EST	89.7	95.0	135	76.7
FRA	100.0	100.0	–	–
GEO	86.0	79.8	90	71.0
GRE	100.0	46.2	135	69.7
HUN	73.5	96.3	225	91.9
IRE	100.0	88.3	60	89.1
ITA	98.0	86.9	90	86.8
KAZ	99.3	98.6	135	79.7
KGZ	98.7	84.7	90	54.4
LTU	95.1	95.1	105	87.8
LVA	95.8	96.9	85	99.0
MAT	100.0	46.3	90	95.6
MKD	99.1	68.5	120	84.5
MNE	98.0	76.8	135	39.4
NOR	–	–	100	58.7
POL	99.3	95.6	135	99.2
POR	100.0	67.5	113	96.2
ROM	98.1	72.3	100	87.1
RUS	100.0	100.0	120	85.5
SMR	100.0	100.0	120	100.0
SPA	100.0	52.7	113	91.5
SRB	–	–	180	15.0
SVK	97.6	95.1	90	87.0
SVN	100.0	100.0	135	89.7
TJK	96.7	51.3	70	48.6
TKM	99.4	81.1	90	84.9
TUR	99.7	18.5	200	65.8

<sup>a</sup>A dash (–) indicates that no data were collected.

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WHO/EURO:2021-2495-42251-58349

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