



# **EUFITMOS**

## **final report:**

### **Outputs and results from the EUFITMOS project**





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## Introduction

Physical activity (PA) is an important health behaviour for young people. Regular PA benefits cardiometabolic health (e.g., blood pressure, lipid profile, glucose control, and insulin sensitivity), bone health, and mental health (Bull et al., 2020; Chaput et al., 2020). PA also helps to prevent childhood obesity (Wyszynska et al., 2020). Several reasons contribute to the health benefits of PA; one of the reasons is that it improves physical fitness. Physical fitness is considered a powerful health marker in youth (Ortega et al., 2008).

European Union's (EU) guidelines on health-enhancing PA (HEPA) are clear in identifying monitoring as a key area for promoting and supporting the development of EU and member states level policies to promote HEPA (Andersen et al., 2008; Expert Group on HEPA, 2015). These guidelines reinforce the value of developing common monitoring tools for comparable cross-country data and improving data collection on HEPA with objective measurements at the school level. EU guidelines on monitoring HEPA include fitness levels as an outcome of interest. However, at the European level, cross-country comparison information is scarce. Schools and physical education provide fitness assessment information that is underused. Capitalising on the opportunity that school and physical education provides to gather information on physical fitness is an efficient strategy for reaching European guidelines for HEPA.

With this in mind, the European Fitness Monitoring System (EUFITMOS) project was developed. The EUFITMOS project is a consortium of seven institutions from six European countries (Germany, Greece, Montenegro, Portugal, Slovenia, and Spain) funded by the Erasmus+ program (grant number 613324-EPP-1-2019-1-PT-SPOSCP). This text aims to explain the background and motives behind the development of the EUFITMOS project, its design, the criteria used to develop the EUFITMOS battery, and its resources.

## Project design

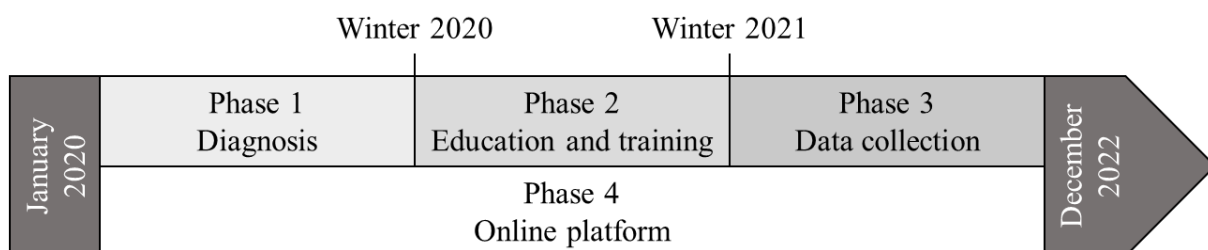
The EUFITMOS was a funded project with a three-year life span from 2020 to 2022. The project was developed in four phases.

The first phase was the diagnosis. The idea was to identify existing fitness batteries, fitness tests, monitoring systems, and good practices and better understand youth fitness levels' trends.

The second phase, supported by the knowledge obtained in the first phase, was focused on creating the EUFITMOS education and training resources, including a text manual, a toolkit, and a training module, culminating in the creation of the EUFITMOS fitness battery. This phase supports the project's sustainability, as these resources will be available for years.

The third phase corresponds to the data collection, where physical fitness data from young people living in the project partners' countries was collected. Simultaneously during the first, second, and third phases, the fourth phase was conducted.

The fourth phase sought to organise an online structure, the EUFITMOS online platform, able to be populated with fitness data and generate reports, to promote the availability of young people's fitness data as an indicator of HEPA at the EU level. An overview of the EUFITMOS project timeline is shown in figure 1.



**Figure 1.** Overview of the EUFITMOS project timeline.

## Main outputs

To achieve the project aim, the development of the objectives resulted in three main project outputs: 1) the EUFITMOS fitness battery, 2) the teacher training module and toolkit, and 3) the EUFITMOS online platform.

### **EUFITMOS fitness battery**

One of the first tasks of the EUFITMOS project was to review the evidence (what we called diagnosis) to better understand the status of young people's fitness testing and fitness levels. This was achieved by performing systematic reviews on these topics. A first systematic review of fitness level trends was conducted, concluding that most research shows a declining trend in strength and endurance over the past years (Masanovic et al., 2020). These results highlighted the need to invest in strategies to monitor and promote youth's physical fitness



**Figure 2.** Systematic review to identify trends in adolescent fitness levels.

Exploring what existing fitness batteries can be completed in school became logical in this context. Then, a systematic review was performed to identify and summarise the existing field-based health-related fitness batteries for young people (Marques et al., 2021). This review identified 24 fitness batteries with those characteristics and 81 tests assessing the different physical fitness components. Such a high number of fitness batteries and tests

have advantages and drawbacks. On the one hand, this variety allows choosing a fitness battery or test that better fits the specific purpose and setting of the assessment. On the other hand, the lack of fitness assessment standards hinders the comparability of collected data from different contexts, countries, or regions. To have physical fitness as an indicator of HEPA at the EU level, comparability is important. Also, feasibility is important to be applicable in the school setting in different countries with different resources available. With these needs in mind, the EUFITMOS fitness battery was created.



**Figure 3.** Systematic review to identify fitness test batteries.

The EUFITMOS fitness battery includes a set of complementary and alternative tests assessing health-related fitness in youth. Developing the EUFITMOS fitness battery sought to capitalise on the knowledge of existing fitness batteries and tests to produce a feasible (simple to execute in the school setting and low cost on resources) yet complete (encompass the most important health-related fitness components) fitness battery. Thus, existing fitness tests were analysed and selected to compose the EUFITMOS fitness battery. The criteria used to select the fitness test integrating the EUFITMOS fitness battery were: 1) having a spread use, being well-known, and previously validated, 2) needing the minimum resources possible, and 3) being associated with health.



The components of physical fitness assessed by the EUFITMOS fitness battery are cardiorespiratory fitness, muscle strength, endurance and power, flexibility, speed, and body composition. Cardiorespiratory fitness is one of physical fitness' most studied health-related components (Marques et al., 2021). Thus, two alternative tests were selected, the Progressive Aerobic Cardiovascular Endurance Run (PACER) and the 1-mile run. Both are widely used fitness tests with simple execution. Having the two in the fitness battery allows for flexibility when assessing this important fitness component, which can be context and resource-dependent. Muscle strength, endurance, and power can be assessed by the handgrip test, push-up test, and standing broad jump, considering the assessment of both the upper and lower body. Among these, the handgrip test requires specific equipment (a dynamometer) that may not be commonly found in schools and is therefore considered an optional assessment. The back-saver sit and reach were selected to assess flexibility. Although this test requires specific equipment (box and ruler), it is well-known and commonly used in fitness batteries. For speed, the 20m run (or 20m dash) was selected mainly because of having less space requirement. Lastly, the body mass index (by measuring height and weight) and waist circumference are alternative tests to estimate body composition, depending on available resources. Both tests are widely used.

### **Teacher training module and toolkit**

An online toolkit was elaborated to support the implementation of the EUFITMOS fitness battery. The toolkit includes the EUFITMOS fitness testing protocol, support videos, and audio for performing the fitness tests. Additionally, a training module for physical education teachers was created. These resources are available on the EUFITMOS website at <https://eufitmos.eu/>.

The EUFITMOS fitness testing protocol is a plain language text manual explaining each fitness test with reference values for health. It is available in English, German, Greek, Montenegrin, Portuguese, Slovenian and Spanish. The purpose of this manual is to support the teachers' practice and field implementation of the EUFITMOS fitness battery. For each fitness test, it is possible to learn about its purpose, the equipment required, the procedure to perform the test, the scoring system, and its validity and reliability. Also, the sex- and age-specific health-related reference values are shown for each fitness test. Along with the text





manual, short tutorial videos are available for each fitness test. Audio is available for fitness tests requiring specific cadences (PACER and push-up test).

The training module is another online resource to support the field implementation of the EUFITMOS fitness battery, also available in English, German, Greek, Montenegrin, Portuguese, Slovenian and Spanish. The purpose was to teach teachers how to implement the EUFITMOS fitness battery in their physical education classes. The training was composed of theoretical asynchronous non-video lessons. Teachers could do the course on their rhythm, divided into nine units. The nine units correspond to the fitness tests and are the following: 1) PACER, 2) 1-mile run, 3) push-up test, 4) handgrip test, 5) standing broad jump, 6) 20m run, 7) back-saver sit and reach, 8) body mass index, and 9) waist circumference. Within each unit, the following content is available: 1) what the test is, 2) how to prepare for the test, 3) how to apply the test, 4) how to interpret the results, 5) quiz (self-assessment). Thus, teachers could find information on how to and the requirements to perform the fitness tests on a more interactive approach than the text manual (e.g. quizzes). Also, a direct messaging system was incorporated in case questions or doubts occurred.

### **EUFITMOS online platform**

Creating a framework for monitoring fitness in youth would not be complete without a place where data collected using the EUFITMOS fitness battery could be stored and analysed. Therefore, the EUFITMOS online platform was built. This online platform aimed to have an important role in promoting physical fitness data as an indicator of HEPA by making available comparable fitness data and generating periodic reports on European youth's fitness levels. Users can access the platform at <http://eufitmosdb.csd.auth.gr/>.

The EUFITMOS online platform was a user-based platform containing the EUFITMOS physical fitness database and analysis and visualisation resources that inform young people's fitness levels. The platform users are divided into four categories. The categories of users were: i) system administrators, ii) country administrators, iii) teachers, iv) students. Every category had a different level of permissions and actions they could take. A summary of actions available on the platform by user category is presented in table 1.

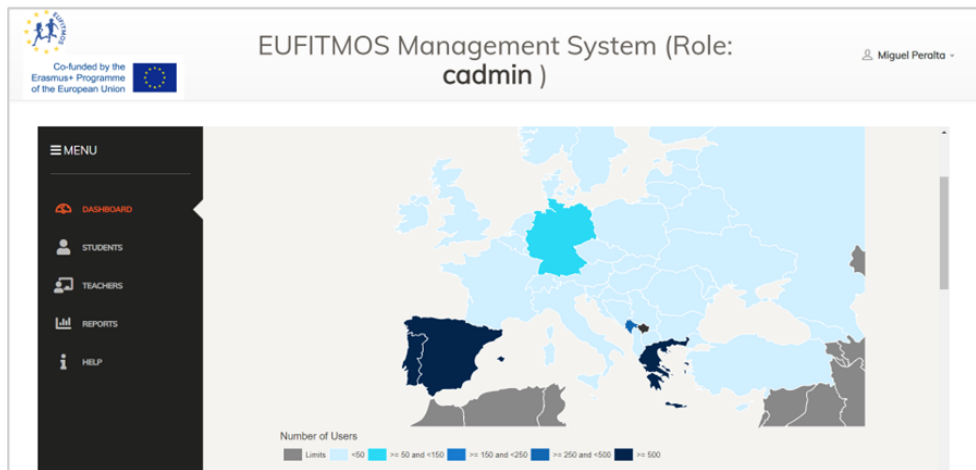
**Table 1.** Actions available on the platform by user category.

<b>User category</b>	<b>Actions</b>
Administrator	Administrators can perform any action as they are responsible for system monitoring, support, and maintenance. However, their main action is defining country administrators or modifying existing ones.
Country administrator	Country administrators are the way to connect teachers with the platform by adding/editing them. They can add/edit students, too. However, these users do not have access to the database or any other system's functionality. Summary of actions available: <ul style="list-style-type: none"> <li>– Add/edit teachers and their data;</li> <li>– Add/edit students and their data;</li> <li>– Visualise reports.</li> </ul>
Teacher	Teachers have one of the most important tasks as they insert students' data. Thus, they are also able to add/edit students. Regarding these data, the platform allows exporting and reviewing statistics and reports. Summary of actions available: <ul style="list-style-type: none"> <li>– Add/edit students and their data;</li> </ul> Visualise reports.
Student	Students can review their data. Comparing their results and indexes to the mean values of a specific country, even their own country, allows them to understand their fitness level. Summary of actions available: <ul style="list-style-type: none"> <li>– Visualise reports.</li> </ul>

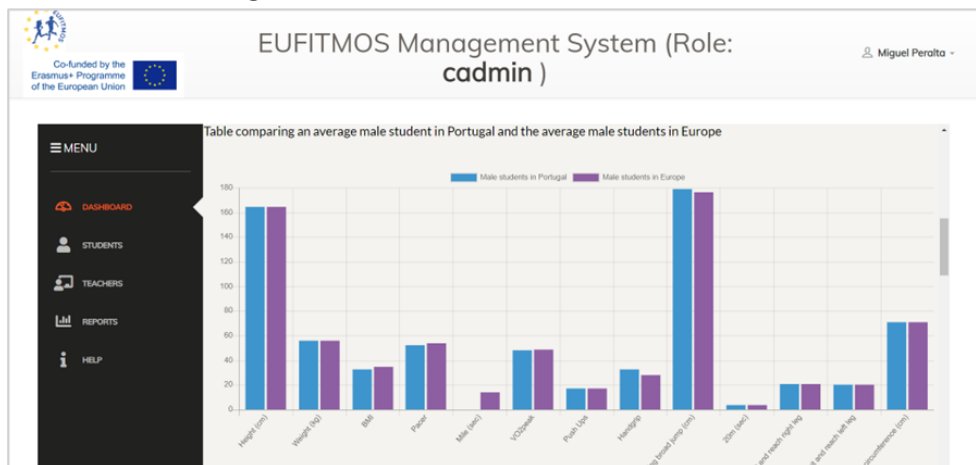
Teachers had one of the major roles, as they could access the online platform through their user accounts and input students' fitness data in specific fields. The platform makes a set of reports available, including individual and country reports. These reports were composed of charts and tables summarising the student's or country's (depending on the report) fitness data that can be visualised against age- and sex-specific health standards and other students' fitness data in the class, country, and European (average of all countries' data) level. The data presented in these reports were descriptive. Some mock examples of data visualisation options on the EUFITMOS platform are presented in figure 4.

The online platform complied with the General Data Protection Regulation regarding data management and confidentiality. The data collected were safe as they were protected by the Aristotle University of Thessaloniki's IT infrastructure. All of them which were exported, and the reports were anonymous. They did not include users' personal information. Data quality control was performed upon data entry with a series of limitations (e.g. PACER must vary between 1 and 247) and warnings by country administrators when the dataset was completed.

Panel A. In platform visualization of interactive European map.



Panel B. In platform visualization of bar chart comparing average of male Portuguese students to the average of all male students in the database.



Panel B. In platform visualization of bar chart comparing the average of female Portuguese students to the average of female Greek.

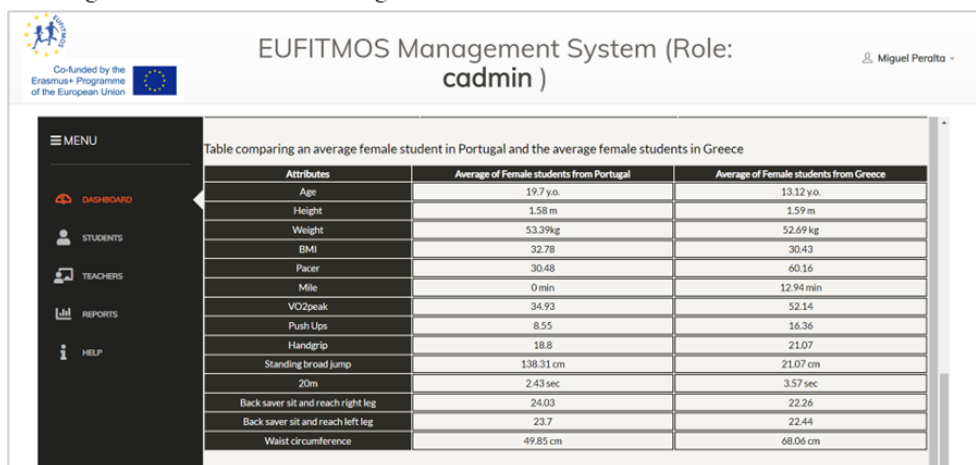


Figure 4. Mock example of data visualisation options on the EUFITMOS platform.

## Data analysis

Raw data from the fitness tests were used to calculate the prevalence and 95% confidence intervals (CI) of participants in the HFZ (health-related criterion-referenced standard indicating whether each participant was in or out of the HFZ) for each country and fitness test. Also, the prevalence and 95% CI of participants in the HFZ for fitness tests simultaneously were calculated for each country. Sex- and age-specific z-scores were calculated for each fitness test, and z-score deviation from the criterion-referenced standard of the HFZ for each sex and age were plotted against the HFZ established at 0 standard deviations (SD). All analyses were stratified by sex, and statistical analysis was performed using IBM SPSS Statistics version 28. The significance level was set at  $p < 0.05$ .

### Results from the EUFITMOS platform

In total, 4965 (51.4% boys) children and adolescents aged 9 to 18 from seven European countries participated in the study. Countries that implemented the EUFITMOS fitness battery and with data from the 2022 year were Albania (n=855), Germany (n=672), Greece (n=421), Montenegro (n=405), Portugal (n=1445), Slovenia (n=532) and Spain (n=635). Because within-country valid data differed from fitness test to fitness test, sub-samples for each fitness test and country were used (table 2).

**Table 2.** The number of participants per country and fitness test.

	n (% of boys)							
	All countries (n=4965)	Albania (n=855)	Germany* (n=672)	Greece (n=421)	Montenegro (n=405)	Portugal (n=1445)	Slovenia (n=532)	Spain* (n=635)
PACER	4312 (51.5)	218 (46.3)	672 (51.2)	420 (53.1)	404 (54.2)	1431 (50.2)	532 (52.1)	635 (50.8)
Push-ups	4562 (52.1)	833 (50.1)	622 (49.8)	418 (55.2)	356 (58.4)	1183 (51.7)	532 (52.1)	618 (51.8)
Handgrip	3137 (51.1)	850 (49.4)	0	418 (55.2)	368 (55.7)	969 (48.4)	532 (52.1)	0
SBJ	4868 (51.3)	849 (49.7)	667 (50.8)	419 (55.7)	405 (54.1)	1361 (50.5)	532 (52.1)	635 (50.8)
20m run	4286 (51.3)	811 (49.9)	666 (51.1)	419 (55.7)	405 (54.1)	818 (49.0)	532 (52.1)	635 (50.8)
SR	4808 (51.2)	853 (49.6)	628 (49.8)	418 (55.2)	400 (53.5)	1344 (50.7)	532 (52.1)	633 (50.9)
BMI	4965 (51.4)	855(49.6)	672 (51.2)	421 (53.1)	405 (54.1)	1445 (50.6)	532 (52.1)	635 (50.8)

Abbreviations: BMI, body mass index; PACER, progressive aerobic cardiovascular endurance run; SBJ, standing broad jump; SR, sit and reach; WC, waist circumference.

\*Without data for the handgrip.

The percentage of boys and girls in the HFZ for each fitness test by country is presented in table 3. Considering all countries, the test with the greatest prevalence (>70%) of boys and girls in the HFZ was the SBJ (boys: 83.5, 95% CI=82.0, 84.9; girls: 85.1, 95% CI=83.7, 86.5) followed by the handgrip (boys: 81.7, 95% CI=79.8, 83.6; girls: 76.8, 95% CI=74.8, 78.9) and the BMI (boys: 72.4, 95% CI=70.7, 74.2; girls: 77.9, 95% CI=76.3, 79.6); the push-up test (boys: 60.8, 95% CI=58.8, 62.7; girls: 58.3, 95% CI=56.2, 60.4) and the 20m run (boys: 53.9, 95% CI=51.3, 55.5; girls: 56.7, 95% CI=54.6, 58.8) in boys and girls. The sit and reach (64.2, 95% CI: 62.3, 66.1) and VO<sub>2</sub>peak (62.8, 95% CI: 60.8, 64.9) in boys had a prevalence >50%. Prevalences of <50% were found for the sit and reach (45.8, 95% CI=43.8, 47.8) and VO<sub>2</sub>peak (48.1, 95% CI=46.0, 50.3) in girls. However, the prevalence of participants in the HFZ greatly varies among countries and fitness tests. Generally, Albania and Montenegro present the lowest percentage of boys and girls in the HFZ; on the other hand, Portugal and Spain show the greatest.

**Table 3.** Percentage of boys and girls in the healthy fitness zone for each fitness test by country.

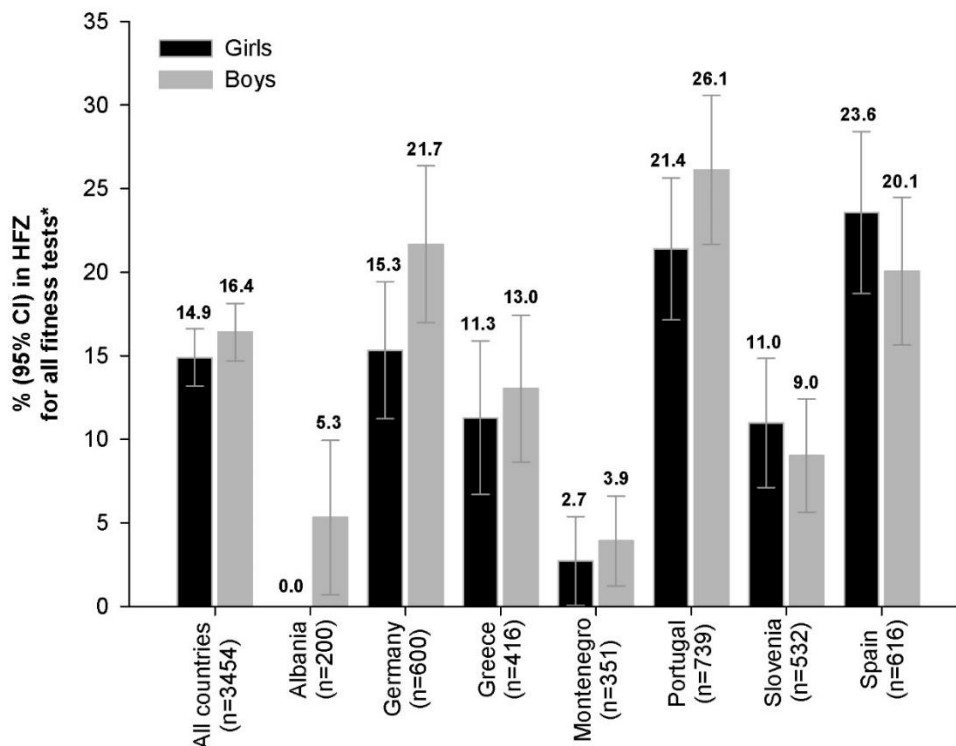
	% (95% confidence interval) in healthy fitness zone						
	VO <sub>2</sub> peak	Push-ups	Handgrip*	SBJ	20m run	Sit and reach	BMI
<b>Boys</b>							
All countries	62.8 (60.8, 64.9)	60.8 (58.8, 62.7)	81.7 (79.8, 83.6)	83.5 (82.0, 84.9)	53.9 (51.3, 55.5)	64.2 (62.3, 66.1)	72.4 (70.7, 74.2)
Albania	12.9 (6.2, 19.5)	49.4 (44.6, 54.2)	67.9 (63.4, 72.3)	74.6 (70.5, 78.8)	46.2 (41.3, 51.1)	72.3 (68.1, 76.6)	68.4 (63.9, 72.8)
Germany	67.2 (62.2, 72.1)	69.0 (63.9, 74.2)	---	85.6 (81.8, 89.3)	40.6 (35.3, 45.8)	65.8 (60.5, 71.1)	83.7 (79.8, 87.6)
Greece	54.9 (48.5, 61.4)	87.0 (82.3, 91.4)	75.3 (69.7, 80.9)	85.3 (80.0, 89.9)	80.2 (75.0, 85.3)	64.1 (57.8, 70.3)	56.6 (50.2, 63.0)
Montenegro	21.5 (16.0, 26.9)	42.8 (36.0, 49.6)	34.2 (27.6, 40.7)	80.4 (75.1, 85.7)	42.9 (36.3, 49.5)	49.5 (42.8, 56.3)	69.4 (63.2, 75.5)
Portugal	82.5 (79.7, 85.3)	67.2 (63.4, 70.9)	90.8 (88.2, 93.5)	82.1 (79.2, 85.0)	70.3 (65.8, 74.8)	59.2 (55.5, 62.9)	73.6 (70.3, 76.8)
Slovenia	28.5 (23.2, 33.9)	45.9 (39.9, 51.8)	99.6 (99.2, 99.9)	92.4 (89.3, 95.6)	28.9 (23.5, 34.3)	88.1 (84.3, 91.9)	67.8 (62.3, 73.4)
Spain	92.9 (90.0, 95.7)	60.9 (55.6, 66.3)	---	88.9 (85.4, 92.3)	63.8 (58.5, 69.1)	51.9 (46.4, 57.4)	80.5 (76.1, 84.8)
<b>Girls</b>							
All countries	48.1 (46.0, 50.3)	58.3 (56.2, 60.4)	76.8 (74.8, 78.9)	85.1 (83.7, 86.5)	56.7 (54.6, 58.8)	45.8 (43.8, 47.8)	77.9 (76.3, 79.6)
Albania	10.2 (4.6, 15.7)	22.4 (18.3, 26.4)	85.4 (82.0, 88.7)	61.4 (56.7, 66.0)	35.5 (30.8, 40.1)	35.4 (30.8, 39.9)	76.3 (72.3, 80.3)
Germany	38.1 (32.8, 43.4)	52.2 (46.7, 57.8)	---	90.9 (87.7, 94.0)	76.5 (70.3, 82.6)	51.4 (45.9, 57.0)	88.7 (85.2, 92.1)
Greece	58.8 (51.7, 65.9)	88.8 (84.2, 93.3)	69.0 (62.3, 75.7)	85.0 (79.9, 90.2)	65.6 (60.5, 70.8)	26.7 (20.3, 33.1)	63.8 (56.9, 70.7)
Montenegro	10.3 (5.8, 14.7)	30.4 (22.9, 37.9)	24.5 (17.9, 31.2)	88.7 (84.1, 93.3)	42.5 (35.3, 49.6)	40.3 (33.2, 47.4)	81.7 (76.1, 87.3)
Portugal	57.2 (53.5, 60.8)	71.1 (67.4, 74.8)	92.8 (90.5, 95.1)	85.6 (83.0, 88.3)	65.5 (60.9, 70.1)	53.8 (50.0, 54.2)	71.4 (68.1, 74.7)
Slovenia	26.7 (21.2, 32.1)	77.7 (72.5, 82.8)	99.6 (99.2, 99.9)	99.6 (99.2, 99.9)	40.0 (34.0, 46.1)	46.3 (40.1, 52.4)	82.7 (78.0, 87.4)
Spain	86.2 (82.4, 90.1)	68.5 (63.2, 73.8)	---	96.5 (94.4, 98.5)	73.4 (68.5, 78.3)	51.8 (46.2, 57.4)	86.2 (82.3, 90.0)

Abbreviations: BMI, body mass index; SBJ, standing broad jump; WC, waist circumference.

\*Without data for the handgrip.

Overall, 14.9% (95% CI=13.2, 16.6) of girls and 16.6% (95% CI=14.7, 18.1) of boys were in the HFZ in all fitness tests (figure 4). Once again, this prevalence widely varied among countries. Spain (boys: 20.1%, 95% CI=15.6, 24.5; girls: 23.6%, 95% CI=18.7, 28.4)

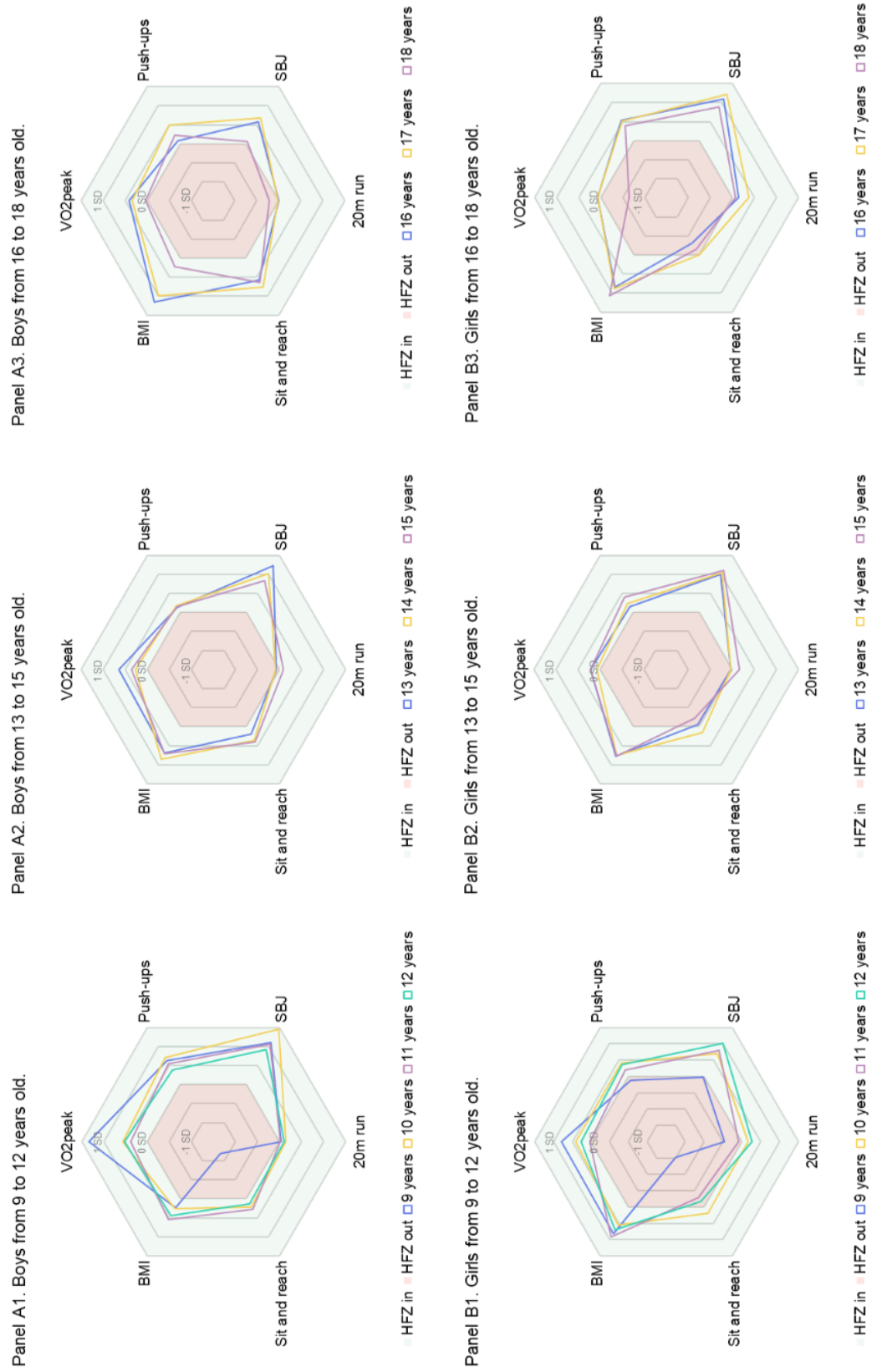
and Portugal (boys: 26.1%, 95% CI=21.7, 30.8; girls: 21.4%, 95% CI=17.1, 25.6) presented the best results, while Albania (boys: 5.3%, 95% CI=0.7, 9.9; girls: 0%) and Montenegro (boys: 3.9%, 95% CI=1.2, 6.6; 2.7% girls: 95% CI=0.1, 5.4) showed the worst (figure 5).



\*Fitness test considered were  $VO_2$ peak, push-ups, standing broad jump, 20m run, sit and reach, and body mas index. HFZ, healthy fitness zone.

**Figure 5.** Percentage of boys and girls in the HFZ for all fitness tests simultaneously by country.

Figure 6 shows the z-score age-specific fitness profile (z-score difference from the HFZ) for boys and girls from all countries. Boys have a mainly HFZ profile, except for the 9-year-olds in the sit and reach (z-score difference=-1.20) and the 20m run for boys 13–18-year-olds (z-score difference range: -0.09 to -0.01). Girls have a worse HFZ profile than boys, being out of the HFZ in the push-up test and the SBJ at 9-year-old, the 20m run at 9- and 11–14-year-olds, the sit and reach at 9-, 11–13-, 15–16-, and 18-year-olds, and the  $VO_2$ peak at 18-year-old. The BMI is the only test that is in the HFZ for every age group in girls. Furthermore, a decreasing trend in z-score difference from the HFZ with age was observed in  $VO_2$ peak for boys and girls and sit and reach for girls.



Each line represents 1 SD of the z-score. The 0 SD mark represents the HFZ reference value, thus being above (green zone) or below (red zone) that line means being in or out of the HFZ, respectively. Abbreviations: BMI, body mass index; HFZ, healthy fitness zone; SBJ, standing broad jump; SD, standard deviation.

**Figure 6.** Z-score difference from the healthy fitness zone for each fitness test by sex and age.

The final results, in general, and per country, which allow a better characterisation of European adolescents' physical fitness levels, can be seen in the figures below.

# EUFITMOS countries

## Fitness report



**4965 participants**

48.6% | 51.4%

**9 to 18 years old**

**Methods**

Data was collected by physical education (PE) teachers during PE classes in Albania, Germany, Greece, Montenegro, Portugal, Slovenia and Spain.

Fitness tests in the EUFITMOS battery are: the Progressive Aerobic Cardiovascular Endurance Run (PACER), push-up test, standing broad jump (SBJ), 20m run, sit and reach and body mass index (BMI).

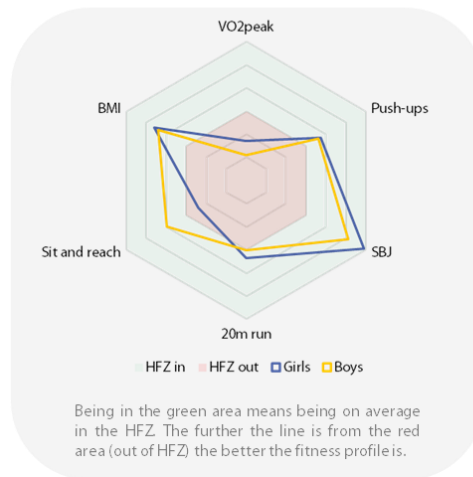


Figure 1. Fitness profile of EUFITMOS countries' boys and girls.

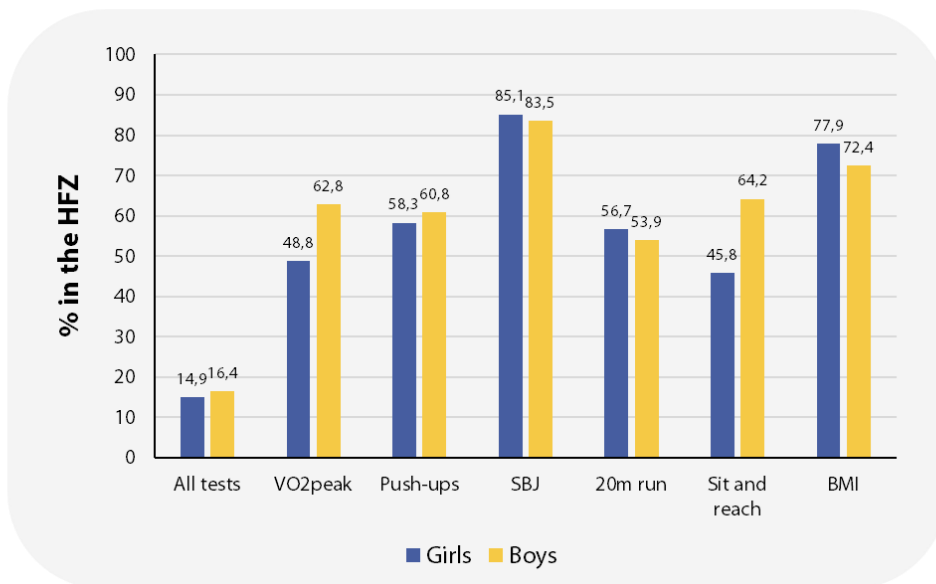


Figure 2. Prevalence of boys and girls in the healthy fitness zone (HFZ) for each fitness test and all tests simultaneously.

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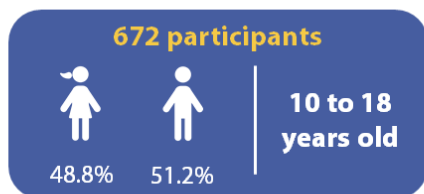
Figure 7. All countries' general report.





# Germany

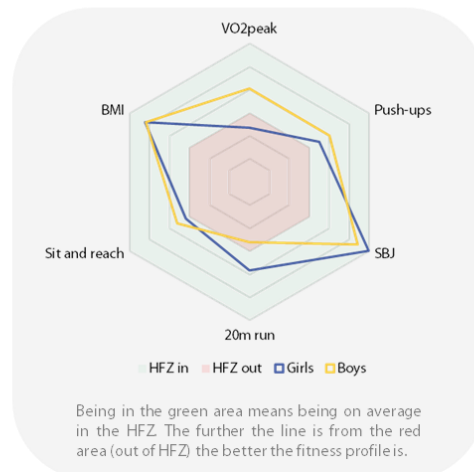
## Country fitness report



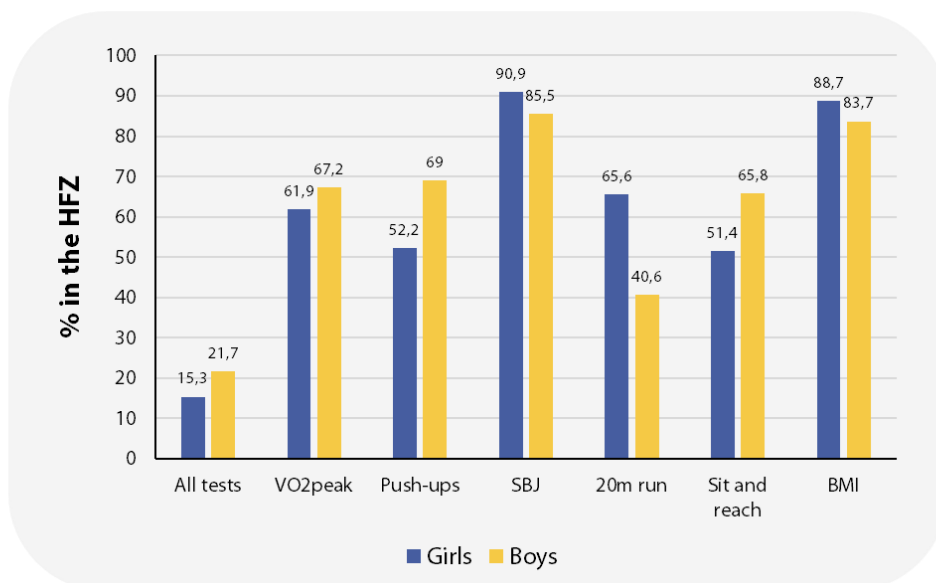
**Methods**

Data was collected by physical education (PE) teachers during PE classes.

Fitness tests in the EUFITMOS battery are: the Progressive Aerobic Cardiovascular Endurance Run (PACER), push-up test, standing broad jump (SBJ), 20m run, sit and reach and body mass index (BMI).



**Figure 1.** Fitness profile of German boys and girls.



**Figure 2.** Prevalence of boys and girls in the healthy fitness zone (HFZ) for each fitness test and all tests simultaneously.

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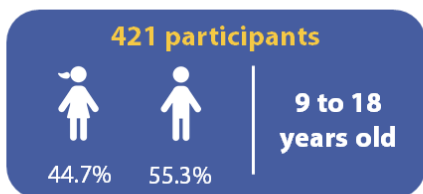
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**Figure 8.** Germany general report.



# Greece

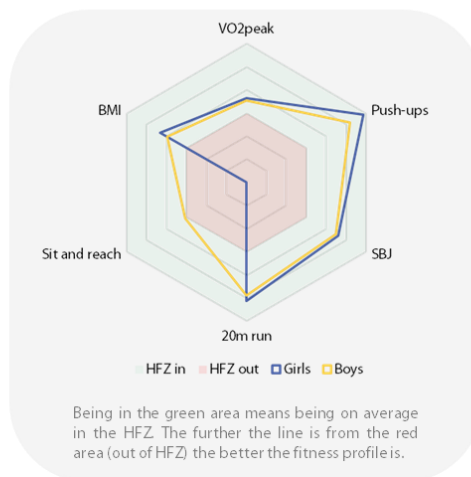
## Country fitness report



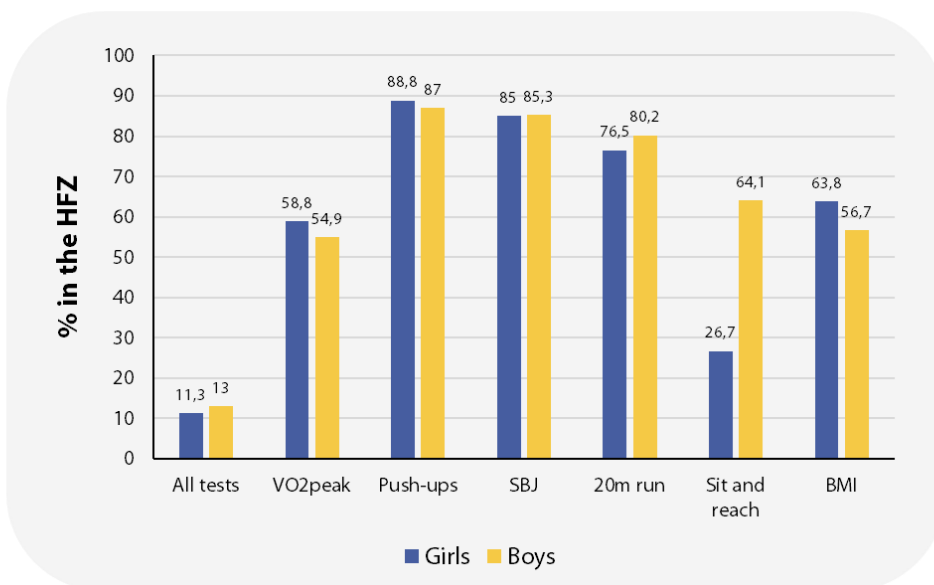
**Methods**

Data was collected by physical education (PE) teachers during PE classes.

Fitness tests in the EUFITMOS battery are: the Progressive Aerobic Cardiovascular Endurance Run (PACER), push-up test, standing broad jump (SBJ), 20m run, sit and reach and body mass index (BMI).



**Figure 1.** Fitness profile of Greek boys and girls.



**Figure 2.** Prevalence of boys and girls in the healthy fitness zone (HFZ) for each fitness test and all tests simultaneously.

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**Figure 9.** Greece general report.



# MONTENEGRO

## Country fitness report



**405 participants**

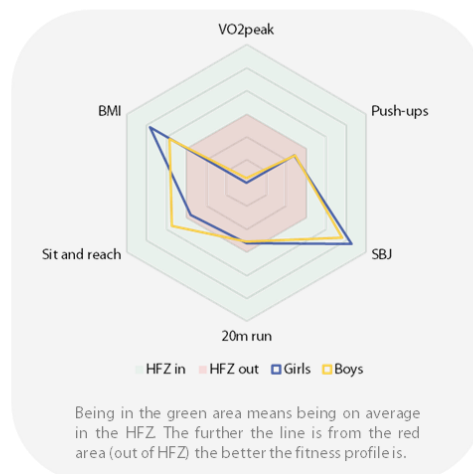
43.9% | 54.1%

**10 to 15 years old**

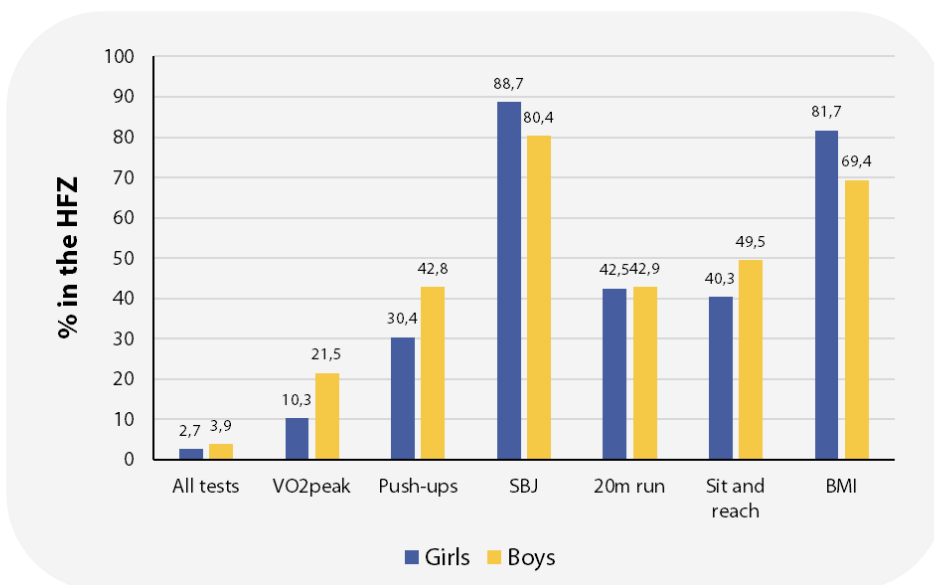
**Methods**

Data was collected by physical education (PE) teachers during PE classes.

Fitness tests in the EUFITMOS battery are: the Progressive Aerobic Cardiovascular Endurance Run (PACER), push-up test, standing broad jump (SBJ), 20m run, sit and reach and body mass index (BMI).



**Figure 1.** Fitness profile of Montenegrin boys and girls.



**Figure 2.** Prevalence of boys and girls in the healthy fitness zone (HFZ) for each fitness test and all tests simultaneously.

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**Figura 10.** Montenegro general report.



# PORTUGAL

## Country fitness report



**1445 participants**

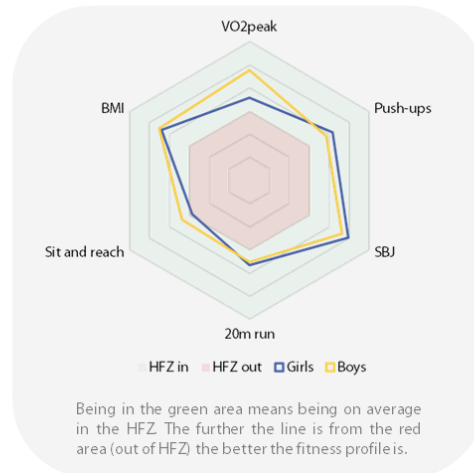
49.4%
 50.6%

**10 to 18 years old**

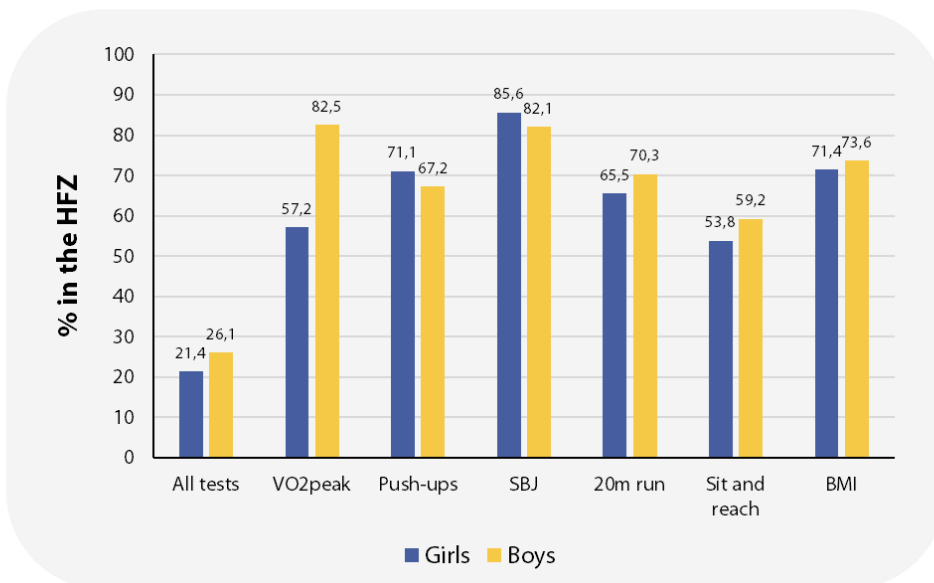
**Methods**

Data was collected by physical education (PE) teachers during PE classes.

Fitness tests in the EUFITMOS battery are: the Progressive Aerobic Cardiovascular Endurance Run (PACER), push-up test, standing broad jump (SBJ), 20m run, sit and reach and body mass index (BMI).



**Figure 1.** Fitness profile of Portuguese boys and girls.



**Figure 2.** Prevalence of boys and girls in the healthy fitness zone (HFZ) for each fitness test and all tests simultaneously.

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**Figure 11.** Portugal general report.



# Slovenia

## Country fitness report



**532 participants**

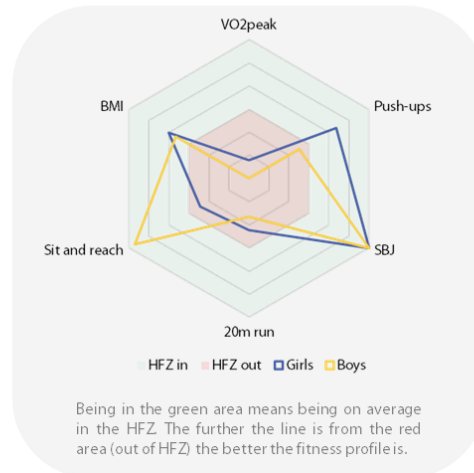
47.9%
 52.1%

**10 to 18 years old**

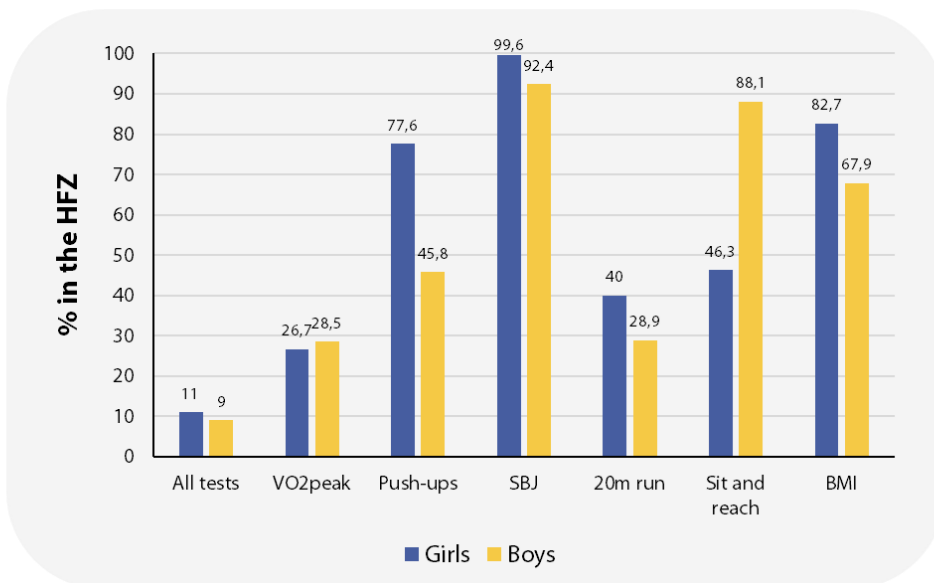
**Methods**

Data was collected by physical education (PE) teachers during PE classes.

Fitness tests in the EUFITMOS battery are: the Progressive Aerobic Cardiovascular Endurance Run (PACER), push-up test, standing broad jump (SBJ), 20m run, sit and reach and body mass index (BMI).



**Figure 1.** Fitness profile of Slovenian boys and girls.



**Figure 2.** Prevalence of boys and girls in the healthy fitness zone (HFZ) for each fitness test and all tests simultaneously.

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**Figure 12.** Slovenia general report.



# SPAIN

## Country fitness report

**635 participants**

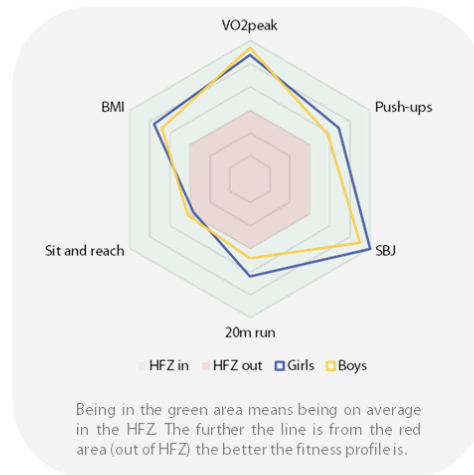
49.1% | 50.9%

**12 to 18 years old**

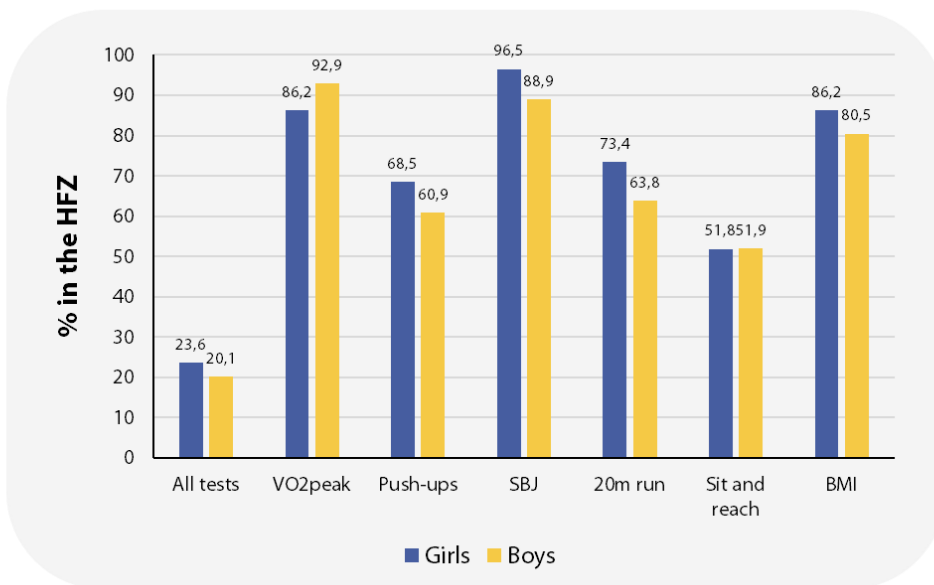
**Methods**

Data was collected by physical education (PE) teachers during PE classes.

Fitness tests in the EUFITMOS battery are: the Progressive Aerobic Cardiovascular Endurance Run (PACER), push-up test, standing broad jump (SBJ), 20m run, sit and reach and body mass index (BMI).



**Figure 1.** Fitness profile of Spanish boys and girls.



**Figure 2.** Prevalence of boys and girls in the healthy fitness zone (HFZ) for each fitness test and all tests simultaneously.

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**Figure 13.** Spain general report.





## **Future perspectives**

The grounding for the project's sustainability is set (based on its existing resources). However, strong communication and dissemination are needed to have a real and lasting impact, especially among main stakeholders such as physical education teachers and central and regional education and health authorities. With a wide and consistent implementation of the EUFITMOS fitness battery, the goal of having comparable, valid, and reliable physical fitness data available as an indicator of HEPA at the European level can be achieved. Future perspectives are that the EUFITMOS fitness battery will continue to grow within the project partner countries and expand to new countries (outside the project partner countries). Also, in the immediate future, youth's physical fitness reports at the country and European levels will be available to disseminate the EUFITMOS fitness battery and support decision-making and HEPA policy planning.

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