Acta Gymnica, vol. 49, no. 2, 2019, 92–102
doi: 10.5507/ag.2019.007

Executive summary of the Czech Republic's 2018 Report Card on Physical Activity for Children and Youth

Aleš Gába[1,*], Lukáš Rubín[1,2], Erik Sigmund[1], Petr Badura[1], Jan Dygrýn[1], Michal Kudláček[1], Dagmar Sigmundová[1], Eliška Materová[1], Zdenek Hamrik[1], Aleš Jakubec[1], and Aleš Suchomel[2]

[1]Faculty of Physical Culture, Palacký University Olomouc, Olomouc, Czech Republic; and [2]Faculty of Science, Humanities and Education, Technical University of Liberec, Liberec, Czech Republic

Background: Regular physical activity (PA) is associated with numerous health benefits. However, the decreasing level of PA and increasing screen-time among Czech children and youth has been well documented in the last two decades. To build effective intervention and prevention programs, it is necessary to review all available sources of evidence. **Objective:** The aim is to summarize the results of the first Czech Report Card on Physical Activity for Children and Youth based on a synthesis of the most recently available evidence. **Methods:** The Report Card included 10 indicators. To inform the indicator grades, a multi-level search strategy was used to find all relevant sources that provide published/unpublished data collected from 2013 through 2018. The data were synthesised, and a set of standardized benchmarks was used to assign grades. Final grades were assigned upon consensus of all members of the national research work group. **Results:** We retrieved 724 records from database searches and 81 records identified through other sources. A total of 40 records were identified as eligible for data extraction. Overall PA in Czech children and youth was observed to be insufficient to support fitness and health, with high rates of excessive screen-time and low numbers of children and youth spending time in unstructured/unorganized play. On the other hand, some grades indicated promising foundations to build on in future. They are represented, for instance, by a relatively high number of children and youth participating in organized sports and/or PA programs, or generally PA-friendly setting (e.g., family and peers, school, and built environment). **Conclusions:** There is ample evidence that Czech children and youth are insufficiently active, and the prevalence of physical inactivity and excessive screen-time has increased in both sexes during the last two decades. Thus, PA in childhood and adolescence should be promoted intensively and effective intervention and prevention programs are needed.

Keywords: active play, organized sport, active transportation, sedentary behaviours, physical fitness, school

Introduction

Scientific evidence clearly confirms a positive effect of regular physical activity (PA) on the health of children and youth (Janssen & Leblanc, 2010). Unfortunately, 81% of individuals aged 11 to 17 years are physically inactive because they perform less than 60 minutes of the recommended PA per day (World Health Organization [WHO], 2014). The insufficient engagement in regular PA among children and youth is particularly caused by low participation in leisure time PA (e.g., organized sport and PA, active free play) and decrease use of active modes of transportation (e.g., active commuting to school). Likewise, excessive sedentary behaviours (SB), specifically watching TV, watching media content or playing games on computers or mobile devices (i.e., screen time), negatively influence overall PA levels and may have a negative impact on human health (Cliff et al., 2016).

According to the WHO, physical inactivity is one of the top risk factors of non-communicable diseases, such as high blood pressure, overweight and obesity, or diabetes mellitus (WHO, 2009). Moreover, physical inactivity seriously increases the risk of premature death. Each year, physical inactivity causes more than 5.3 million deaths across the globe and brings considerable economic burden not only in the area of healthcare

* Address for correspondence: Aleš Gába, Department of Natural Sciences in Kinanthropology, Faculty of Physical Culture, Palacký University Olomouc, třída Míru 117, 711 11 Olomouc, Czech Republic. E-mail: ales.gaba@upol.cz

(Ding et al., 2016; Lee et al., 2012). It is clear that physical inactivity is rightly considered one of the greatest health challenges of the 21st century (Blair, 2009).

In response to this alarming situation, several organizations, professional societies and initiatives have recently been established in the area of public health in order to identify problems associated with physical inactivity and to contribute to decreasing its prevalence. One of the major global calls to action is surely the "Toronto Charter for Physical Activity" established in 2010 under the auspices of the "Global Advocacy for Physical Activity" which calls for universal PA support in order to ensure healthy growth and social development of children and youth, reduce the risk of non-communicable diseases, and promote mental health (Bull et al., 2010). Following this initiative, the WHO called for a 10% reduction in global prevalence of physical inactivity until 2025 (WHO, 2013). In 2016 the members of the "International Society of Physical Activity and Health" adopted the "Bangkok Declaration on Physical Activity for Global Health and Sustainable Development" (International Society for Physical Activity and Health, 2017) which includes an updated statement on the significance of PA and which has become an important impulse for the development of the "Action Plan on Physical Activity for 2018–2030" calling for a reduction in physical inactivity by 15% until 2030 (WHO, 2018). However, long-term development of the prevalence of physical inactivity suggests that achieving this goal will be very difficult (Guthold, Stevens, Riley, & Bull, 2018).

Another concurrent effort in 2014 was a global initiative "Active Healthy Kids Global Alliance". This is an international network of more than five hundred researchers and experts from 49 countries of the world who cooperate in promoting PA of children and adolescents through a project called the "Global Matrix on Physical Activity for Children and Youth". The project fully corresponds with the basic principles of the "Toronto Charter" and regularly publishes a national Report Cards on PA of children and youth. The Report Card is designed as knowledge synthesis, translation, and mobilization instrument serving as an advocacy mechanism to drive social action by stimulating debate, motivating policy, practice and inspiring actions to get kids moving. It is prepared according to a harmonized methodology by professionals in the area of movement science research and professionals in public health, and presents the latest scientific evidence on the current state of PA among children and youth. The Report Card is updated on a regular basis and has become a key resource for public awareness campaigns and for the preparation or adjustment of governmental strategies aimed at PA promotion in children and youth (Aubert, Barnes, Abdeta, et al., 2018; Colley, Brownrigg, & Tremblay, 2012; Tremblay, Barnes, & Bonne, 2014; Tremblay et al., 2016). The Czech Republic became a new member of the "Active Healthy Kids Global Alliance" in 2016 and the first Czech Report Card on Physical Activity for Children and Youth was published in 2019 (Gába et al., 2019). The purpose of this paper is to summarize the process of development and provide an executive summary of the results of the Czech Report Card based on a synthesis of the most recently available evidence published between 2013 and 2018.

Methods

The Report Card was prepared according to a harmonized methodology used by all 49 countries participating in the Global Matrix 3.0 project (Aubert, Barnes, Abdeta, et al., 2018; Colley et al., 2012). The national research work group comprised 11 members – experts in movement science research from Palacký University Olomouc (coordination centre) and Technical University of Liberec. The main objective of the research work group was to conduct a comprehensive analysis of all available published, semi-published ("grey literature") and non-published resources between 2013 and 2018 that focused on PA and its main determinants in children and youth (6–17 years old). Following the analysis, the research work group agreed on and proposed the final evaluation of 10 indicators (Table 1), which include six behavioural indicators (Overall PA, Organized Sport and PA, Active Play, Active Transportation, SB, Physical Fitness) and four sources of influence indicators (Family and Peers, School, Community and Environment, Government).

In order to identify all available information resources, a multilevel search strategy was used involving (1) searching in the Medline (via Ovid) and Medvik databases (www.medvik.cz); (2) searching for grey literature (NUSL and Theses database – www.nusl.cz); (3) manual searching in key journals; (4) published and unpublished data proposed by selected professionals in the area of movement science research and public health; and (5) searching in relevant web-based resources and public information databases. The analysis also used the yet unpublished data from the Health Behaviour in School-aged Children (HBSC) study (Inchley, Currie, Jewell, Breda, & Barnekow, 2017), International Physical Activity and the Environment Network (IPEN) Adolescent study (Mitáš, Dygrýn, et al., 2018) and several projects supported by the Czech Science Foundation. The search process was terminated in January 2018.

Table 1
Set of indicators and benchmarks used to guide the grade assignment process

Indicator	Benchmark	Available data
Overall Physical Activity	The percentage of children and youth who meet physical activity guidelines of 60 min of MVPA per day on average.	Yes
Organized Sport and PA	The percentage of children and youth who participate in organized sport and/or PA programs.	Yes
Active Play	The percentage of children and youth who engage in unstructured/unorganized active play at any intensity for more than 2 hours a day.	Yes
	Percentage of children and youth who report being outdoors for more than 2 hours a day.	No
Active Transportation	The percentage of children and youth who use active transportation to get to and from places (e.g., school, park, mall, friend's house).	Yes
Sedentary Behaviours	The percentage of children and youth who meet screen time guideline, i.e. < 2 hours of recreational screen time per day.	Yes
Physical Fitness	Average percentile achieved on certain physical fitness indicators based on the normative values published by Tomkinson et al. (2018).	Yes
Family and Peers	The percentage of family members (e.g., parents, guardians) who facilitate PA and sport opportunities for their children (e.g., volunteering, coaching, driving, paying for membership fees and equipment).	No
	The percentage of parents who meet the PA guidelines for adults (≥ 150 min/week of MPA or ≥ 75 min/week of VPA or an equivalent combination of PA of both intensities.	No
	The percentage of family members (e.g., parents, guardians) who are physically active with their kids.	Yes
	The percentage of children and youth with friends and peers who encourage and support them to be physically active.	Yes
	The percentage of children and youth who encourage and support their friends and peers to be physically active.	No
School	The percentage of schools with active school policies (e.g., daily PE, daily PA, active recess).	Yes
	The percentage of schools where the majority (≥ 80%) of students are taught by a PE specialist.	Yes
	The percentage of schools where the majority (≥ 80%) of students are offered the mandated amount of PE.	Yes
	The percentage of schools that offer PA opportunities (excluding PE) to the majority (≥ 80%) of their students.	Yes
	The percentage of parents who report their children and youth have access to PA opportunities at school in addition to PE classes.	No
	The percentage of schools with students who have regular access to facilities and equipment that support PA (e.g., gymnasium, outdoor playgrounds, sporting fields).	Yes
Community and the Built Environment	The percentage of children or parents who perceive their community/municipality is doing a good job at promoting PA.	No
	The percentage of communities/municipalities that report they have policies promoting PA.	No
	The percentage of communities/municipalities that report they have infrastructure (e.g., sidewalks, trails, paths, bike lanes) specifically geared toward promoting PA.	No
	The percentage of children or parents who report having facilities, programs, parks and playgrounds available to them in their community.	Yes
	The percentage of children or parents who report living in a safe neighbourhood where they can be physically active.	Yes
	The percentage of children or parents who report having well-maintained facilities, parks and playgrounds in their community that are safe to use.	No
Government	Evidence of leadership and commitment in providing PA opportunities for all children and youth.	Yes
	Allocated funds and resources for the implementation of PA promotion strategies and initiatives for all children and youth.	Yes
	Demonstrated progress through the key stages of public policy making (i.e., policy agenda, policy formation, policy implementation, policy evaluation and decisions about the future).	Yes

Note. MVPA = moderate to vigorous physical activity; PA = physical activity; MPA = moderate physical activity; VPA = vigorous physical activity; PE = physical education.

For the purposes of evaluating the compiled information to assign a grade to each indicator, data extraction from published resources and additional calculations from unpublished datasets were performed to provide a body of relevant data for the evaluation of at least one benchmark assigned to each indicator (Table 1). Subsequently, all members of the research work group agreed on the final evaluation using the following classification scale: A+ (94–100%), A (87–93%), A– (80–86%), B+ (74–79%), B (67–73%), B– (60–66%), C+ (54–59%), C (47–53%), C– (40–46%), D+ (34–39%), D (27–33%), D– (20–26%) and F (< 20%). In the absence of relevant data for the evaluation of at least one benchmark, the indicator was graded with an "INC" (incomplete data). If data were available for multiple benchmarks, the final evaluation of indicator used a weighted mean (adjusted for sample size). If necessary, the evaluation was additionally increased (+) or decreased (–), for example due to lower primary data quality (e.g., a high risk of selection bias) or a limited size of the research samples of primary studies.

The drafting of the Report Card started at the first meeting of the research work group in October 2017, the grade assignment for all indicators was determined on 19 April 2018, and finally the whole process was completed on 17 November 2018 by publishing the Report Card and global reports (Aubert, Barnes, Abdeta, et al., 2018; Aubert, Barnes, Aguilar-Farias, et al., 2018; Gába et al., 2018; Gába et al., 2019). The cover page of the Report Card is shown in Figure 1. To summarize the main findings of the Report Card, the short version was also published. The electronic version of the Report Card and its short version is available at www.activehealthykids.cz.

Figure 1. Cover page of the Czech Republic's 2018 Report Card on Physical Activity for Children and Youth.

Results

Using the multilevel search strategy, a total of 805 potentially relevant resources were identified, of which 724 were records from database searches and 81 were records identified through other sources. After elimination of 130 duplicates, an analysis of titles and abstracts of the remaining search outcomes was performed. Based on the assessment of their content and quality, a final sample of 40 relevant resources were obtained and used for the evaluation of the indicators (Figure 2). The analysis also used the yet unpublished data from the HBSC study, IPEN Adolescent study, and several completed or ongoing projects supported by the Czech Science Foundation.

Generally, in comparison with source of influence indicators (Family and Peers C+, School B+, Community and Environment B and Government C+), behavioural indicators received a relatively low grade. As far as behavioural indicators are concerned, Overall PA (D), Active play (D–) and SB (D–) received the lowest grades. On the contrary, the best grades were given to Organized Sport and PA (B–) and Active Transportation (C+; Table 2).

Discussion

Overall Physical Activity (D)

In the monitored period, studies using objective assessments of PA were sporadic (Gába, Dygrýn, Mitáš, Jakubec, & Frömel, 2016; Gába, Mitáš, & Jakubec, 2017; Rubín et al., 2018). Although the pooled sample size of these studies is relatively high (N = 973), it should be mentioned that this is not a representative sample as it includes individuals mostly from several Moravian towns. An analysis of objectively measured data suggests that only 35% of children youth perform the recommended amount of PA, i.e., 60 minutes of moderate to vigorous PA per day.

The results of the HBSC study provide information on the prevalence of physical inactivity in a representative sample of youth. The results of a HBSC questionnaire survey suggest that a sufficient amount of moderate to vigorous PA is performed by only 27% of boys and

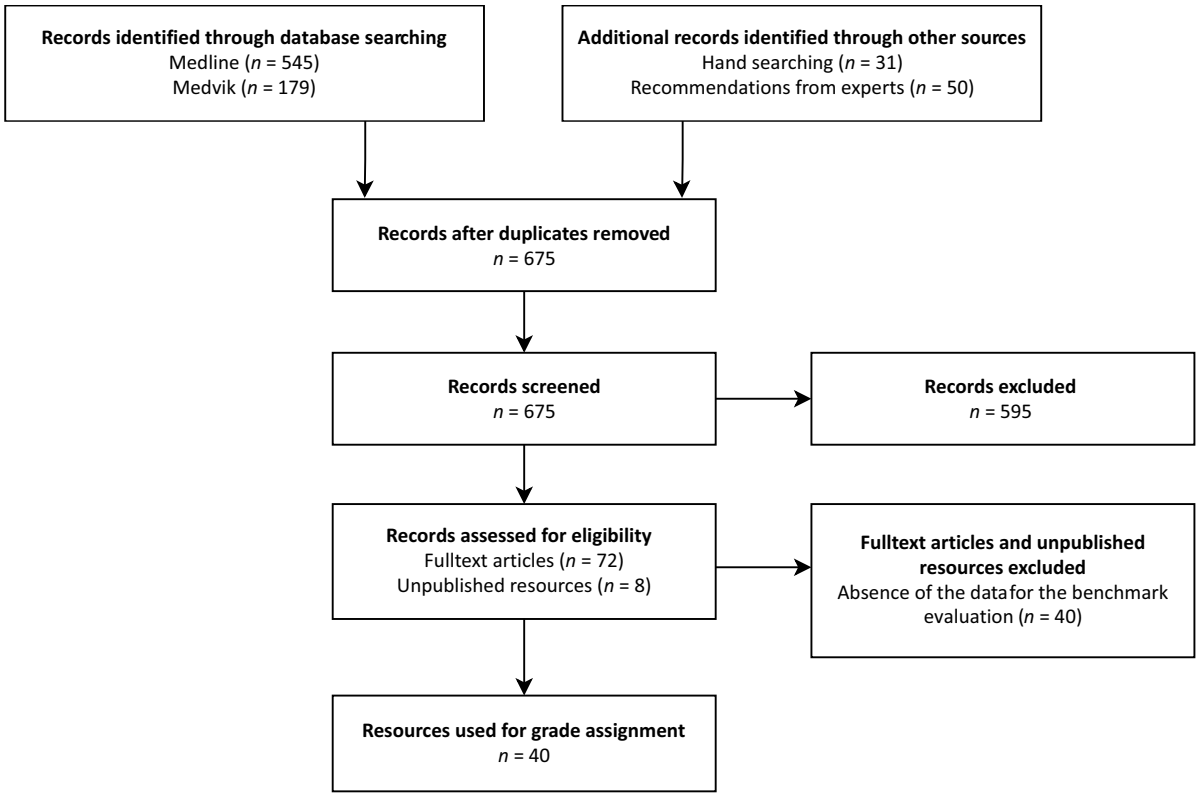

Figure 2. Flow diagram of search strategy for identifying all available resources.

Table 2

Grades by physical activity indicators in the 2018 Report Card for Czech Republic and comparisons with average grades from a group of high Human Development Index (HDI) countries and global averages

Indicator	Czech Republic	Very high HDI	Global results
Overall Physical Activity	D	D-	D
Organized Sport and Physical Activity	B-	C+	C
Active Play	D-	D+	D+
Active Transportation	C+	C-	C
Sedentary Behaviours	D-	D+	D+
Physical Fitness	C+	C-	C-
Family and Peers	C+	C-	D+
School	B+	C+	C
Community and Environment	B	B-	C
Government	C+	C+	C

Note. The grade for each indicator is based on the percentage of children and youth meeting a defined benchmark(s): A+ (94–100%), A (87–93%), A- (80–86%), B+ (74–79%), B (67–73%), B- (60–66%), C+ (54–59%), C (47–53%), C- (40–46%), D+ (34–39%), D (27–33%), D- (20–26%), F (< 20%). Grades for very high HDI countries (n = 30) and all countries of the Global Matrix 3.0 (N = 49) were adopted from global reports (Aubert, Barnes, Abdeta, et al., 2018; Aubert, Barnes, Aguilar-Farias, et al., 2018). The HDI is a composite index, ranging from 0 to 1, calculated using education, life expectancy, and per capita income.

19% of girls (weighted mean 22%). Moreover, the trend analyses of the HBSC study emphasise an increase in the number of physically inactive youth between 2002 and 2014 (Sigmund et al., 2018). For youth, representative self-reported data are also available (N = 4,561) based primarily on the International Physical Activity Questionnaire. According to the data, the number of youth meeting the recommended amount of PA ranges from 47 to 74% (Frömel et al., 2017; Mitáš, Sas-Nowosielski, Groffik, & Frömel, 2018). However,

it should be noted that the evaluation of this indicator reflected the fact that the International Physical Activity Questionnaire significantly overestimates PA (Cerin et al., 2016).

Organized Sport and Physical Activity (B–)

Due to a lack of information in the registers of sports associations and other sports organizations, it was impossible to perform a systematic and thorough analysis of the indicator. The main source of information for the evaluation was a study using the national data from the HBSC surveys focusing on adolescents' participation in organized leisure activities in the context of team and individual sports. Organized PA and sport is pursued by 55% of girls and 70% of boys (weighted mean 62%) at least once a week (Badura, Geckova, Sigmundova, van Dijk, & Reijneveld, 2015; Kokko et al., 2018). The final grade of the indicator is also based on the results of a study by Steffl, Chrudimsky, and Tufano (2017) and on unpublished data from a project supported by the Czech Science Foundation (No. 18-09188S). Both resources are fully consistent with the findings of the national HBSC survey and revealed that 71–77% of children and youth (pooled sample size 868) participate in organized sport and PA.

Active Play (D–)

The final grade of the indicator is based solely on unpublished data from a project funded by the Czech Science Foundation (No. 18-09188S). These data suggest that only 27% of boys and girls aged 9 to 17 years pursued spontaneous unorganized PA in their free time for at least two hours a day. The reason for decreasing the grade (from D to D–) was especially the fact that the analysed data sample included only a small number of respondents (N = 175) and that the data collection procedure was carried out in winter months, which need not reflect the real condition regarding the seasonal variability of this type of PA (Brockman, Fox, & Jago, 2011).

Active Transportation (C+)

The analysis of all available resources (3 published studies and 2 unpublished results) presents that 59% of children and youth use active forms of transport. All resources included in the analysis focused only on active transport between the place of residence and the school. Information on the use of active transport to reach other destinations (park, shopping centre, sports hall, etc.) was not available. Moreover, there is available evidence that 70% of Czech youth use active forms of transport almost every school day (unpublished results of a project supported by the Czech Science Foundation, No. 17-24378S), and most of them consider the walking distance of up to 20 minutes acceptable for choosing an active form of transport from the place of residence to the school (Vorlíček, Rubín, Dygrýn, & Mitáš, 2017). The HBSC study suggests a higher prevalence of active transport in the youngest monitored group of youth (11-year olds) irrespective of gender (Pavelka et al., 2017). In determining the final grade of the indicator the research work group, in addition to the above, took into account the existing negative trend in the prevalence of active transport among Czech children and youth (Dygrýn, Mitáš, Gába, Rubín, & Frömel, 2015; Pavelka et al., 2017).

Sedentary Behaviours (D–)

According to the results of the HBSC study, 21% of youth reported less than two hours of screen time on school-days and 12% at the weekend (Sigmund et al., 2018; Sigmundová et al., 2017). However, it is important to note that the trend analyses of the HBSC study between 2002 and 2014 confirmed an increase in the number of youth who spend more than two hours per day watching TV, computer, or various types of mobile devices. The high prevalence (> 77%) of excessive screen time was also confirmed by one published study (Brindova et al., 2014) and yet unpublished results of a project supported by the Czech Science Foundation (No. 18-09188S). In these studies, screen time was also assessed by means of questions based on the HBSC questionnaire. Another major source of information was the IPEN Adolescent study, according to which 29% of youth spent less than two hours of screen time per day (Rubín et al., 2018).

Physical Fitness (C+)

The main sources for the determination of the final grade were studies with a representative research sample including various regions of the Czech Republic, and regional studies with a relatively large sample size (Balaban & Bešič, 2017; Bešič & Balaban, 2016; Cihlář, 2017; Rubín et al., 2018; Rychtecký & Tilinger, 2017; Steffl et al., 2017). By combining the samples of the studies mentioned above, the research work group obtained a representative sample of more than 12 thousand children and youth aged 9 to 17 years. Overall physical fitness and its sub-components were diagnosed objectively by means of institutional testing (the results of self-assessment of physical fitness were not used). When compared with international standards for aerobic fitness (Tomkinson et al., 2017), boys achieved the 49th percentile, while girls achieved the 59th percentile. The level of aerobic fitness was represented by maximum oxygen consumption predicted on the basis of the outcome of a 20-m endurance shuttle run (Léger,

Mercier, Gadoury, & Lambert, 1988). Czech youth also did well in other components of overall physical fitness. In comparison with international standards, the youth achieved above-average results in standing broad jump (boys: 62nd percentile, girls: 72nd percentile), handgrip (boys: 57th percentile, girls: 60th percentile), and bent arm hang test (80th percentile, available only for girls).

Family and Peers (C+)

The HBSC study provides information concerning the proportion of parents (guardians) who are physically active together with their children (Badura et al., 2017; Vokacova, Badura, Pavelka, Kalman, & Hanus, 2016). Joint walks at least once a week were reported by 50% of girls and 49% of boys. Joint sports activities with the family at least once a week were confirmed only by 34% of girls and 37% of boys. At least one of the mentioned activities was declared by 59% of girls and 59% of boys (unpublished results of the HBSC study). Similar results were confirmed by a pilot study that preceded the main data collection for the HBSC study. In the pilot study, joint walks with the family were declared by almost half of the respondents (49%) and joint sports activities by 39% of adolescents (Brindova et al., 2014). More positive results were brought by the international IPEN Adolescent study, according to which joint PA with parents (or an adult living in the same household) was reported by 77% of boys and 82% of girls. Joint PA with siblings or friends was confirmed by 84% of boys and 90% of girls. 75% of boys and 83% of girls were supported in joint active transport (Rubín et al., 2018).

School (B+)

The main sources for the assessment of the indicator were the Thematic Report issued by the Czech School Inspectorate (Czech School Inspectorate, 2014, 2016), unpublished data from the HBSC study (school management questionnaire), and the IPEN Adolescent study. All data were collected by means of a questionnaire survey and covered a representative sample of more than 1,500 elementary and secondary schools. The results suggest that all schools offer the mandatory amount of physical education (at least 90 min per week) for the vast majority of their students. Approximately one fifth of elementary and secondary schools have more physical education classes than the mandatory amount. The vast majority of schools (83%) declared active school policy, particularly in the form of active transport to school and supporting PA during school recess, in classes, and after classes. In addition to physical education, 89% of schools offer other PA opportunities, especially in the form of swimming, skiing, cycling and canoeing courses. Most schools confirm a favourable environment to promote PA of their students, as 84% of elementary schools and 79% of secondary schools make their facilities and equipment available for PA outside physical education classes. These include especially outdoor grass fields and sports grounds, gyms and fitness centres. The present analysis also confirms that physical education is taught by qualified teachers in 63% elementary and 81% secondary schools. Although the percentage of qualified physical education teachers is relatively high, in the past few years there has been a decrease in overall teacher qualification. The absence of qualified teachers is evident particularly in higher grades of elementary schools (49%), which is a clearly negative trend.

Community and Environment (B)

The main sources of data for the assessment of the indicator were the unpublished data of the HBSC and IPEN Adolescent studies (Rubín et al., 2018). The overall grade of the indicator reflected the results of both subjective and objective research methods. Generally, the majority of Czech girls and boys have a pitch, park or a playing field in the vicinity of their home where they feel safe. Of the evaluated benchmarks, the lowest values were achieved in the measurement of objective accessibility of parks in the vicinity of the place of residence (distance of up to 500 m); a park was available only for 57% of girls and 47% of boys (unpublished data from IPEN Adolescent). This benchmark was evaluated objectively using geographic information systems, but only for 146 youth from one regional city (Olomouc). In a national research study, a total of 71% of youth reported that there was a playing area or park where they could play in the vicinity of their home (unpublished HBSC data). The benchmarks that relate to security in the place of residence achieved an average score of 77% (interval of 55–89%). A relatively low percentage of girls (57%) as well as boys (55%) believe that there are pedestrian crossings and pedestrian warning lights for crossing roads with heavy traffic in the vicinity of their place of residence. On the contrary, most girls (86%) and boys (89%) do not consider crime a barrier to active transport to school.

Government (C+)

The evaluation was based on existing policy documents, especially documents issued by the Ministry of Health of the Czech Republic and the Ministry of Education, Youth and Sports of the Czech Republic, legislative provisions, documents issued by non-governmental non-profit organizations and the Czech Olympic Committee, political and economic resources at all public administration levels, including interviews with key actors in this area. Generally, there has been solid

progress over the past 10 years in the Czech Republic in terms of the development of public policy in PA promotion. Currently, the Czech Republic has two national strategies aimed at PA promotion (Ministry of Education, Youth and Sports of the Czech Republic, 2016; Ministry of Health of the Czech Republic, 2014). However, the problematic part of public policy aimed at promoting PA of the citizens of the Czech Republic is the implementation stage and strategy evaluation. The main barriers to the implementation of strategies are especially insufficient funding and insufficient political support. At the same time, the Czech Republic has no serious scientific studies evaluating PA promotion strategies. Moreover, the vast majority of strategic documents lack appropriate evaluation and any existing evaluations are of a formal nature.

International comparison

Compared with other very high Human Development Index countries (n = 29), the Czech Republic received a worse grade only in the case of the Active Play (D–) and SB indicators (D–), see Table 2 (Aubert, Barnes, Aguilar-Farias, et al., 2018). Similar outcomes were achieved by comparing the results of all countries involved in Global Matrix 3.0 (N = 48). On the other hand, all sources of influence indicators had a better grade. It should be mentioned however that the differences in the final grades did not exceed one-degree deviations (equals a maximum of 20% difference). Among all countries participating in the Global Matrix 3.0 project, the Czech Republic ranked in top 10 countries for Physical Fitness (5th out of 22 countries with complete grade), Family and Peer (9th out of 27 countries), School (9th out of 41 countries) and Community and Environment indicator (10th out of 36 countries) (Aubert, Barnes, Abdeta, et al., 2018).

Strengths and limitations

The Report Card is the first document of its kind that comprehensively summarizes the current knowledge about PA and its main determinants in Czech children and youth. It contains several evidence-based findings and recommendations for professionals, but also endeavours to encourage parents, teachers, headteachers, coaches, and various stakeholders by providing a variety of inspiring ideas and recommendations to decrease the prevalence of physical inactivity and related health risks. The Report Card is a crucial document for determining research priorities, is an appropriate instrument for identifying research gaps, and can be used as an essential document for developing a national PA promotion strategy that would correspond with the WHO objectives, i.e. decreasing the level of physical inactivity by 15% by 2030 (WHO, 2018).

The main limitation is the absence of national research studies based on objective measured PA and its main determinants. Currently, representative data are only available based on questionnaire surveys aimed at the youth population. The area of objective monitoring could be affected especially by the non-systematic nature of data collection. Although a relatively large sample covering the whole age range is available, the data are not fully representative because they cover only a part of the Czech Republic and they are based on different testing systems. For example, several (un)standardized test batteries (i.e., Eurofit, Fitnessgram, INDARES) are currently used for assessment of physical fitness in Czech children and youth and the results of these tests are not fully comparable (Rubín, Suchomel, & Kupr, 2014). Similarly, there is an absence of longitudinal studies that would identify any changes in movement behaviour in childhood and adolescence and analyse the impact of these changes on individuals' health.

In the area of public policy, the major weakness is the absence of policy evaluation, particularly in terms of continuous evaluation of the impact of specific policies and interventions. The literary search performed by the research work group did not identify any studies on the real impacts of specific policies (interventions) across all sectors involved in PA promotion (education, healthcare, transport, etc.). This is despite the fact that in the Czech Republic these were often expensive, nationwide and structural projects (e.g., "Hodina pohybu navíc"), the sustainability of which is not possible to objectively evaluate without sufficient evidence-based evaluation. Therefore, in the current environment it is very difficult to evaluate effective policies and interventions, and to provide high-quality feedback or recommendations for future decision-making. The key actors can make decisions based on their own experience or using relevant international resources.

Conclusions

Following the results of the Report Card, it can be stated that despite the PA-friendly setting (e.g., family and peers, school, and built environment) overall PA in Czech children and youth is insufficient. Moreover, the high rates of excessive screen-time and low numbers of children and youth spending time in unstructured/unorganized play was observed. In compliance with the results and taking into consideration the several limitations and research gaps, the research work group believes that it is essential: (1) to develop a national surveillance system to track the levels of all movement behaviours, (2) to enhance scientific evidence on health risks of

physical inactivity and SB, (3) to initiate discussion about the development of national 24-hour movement guidelines for children and youth, and (4) to implement policy audit tool(s) to evaluate the real effects of government strategies and investment in PA promotion.

Acknowledgments

The Report Card was supported by Palacký University Olomouc (project IGA_FTK_2018_007) and the Czech Science Foundation (project 17-12579S and 18-09188S).

Conflict of interest

There were no conflicts of interest.

References

Aubert, S., Barnes, J., Abdeta, C., Nader, P., Adeniyi, A., Aguilar-Farias, N., ... Tremblay, M. (2018). Global Matrix 3.0 Physical Activity Report Card grades for children and youth: Results and analysis from 49 countries. *Journal of Physical Activity and Health, 15*(S2), S251–S273.

Aubert, S., Barnes, J., Aguilar-Farias, N., Cardon, G., Chang, C., Delisle Nyström, C., ... Tremblay, M. S. (2018). Report Card grades on the physical activity of children and youth comparing 30 very high Human Development Index countries. *Journal of Physical Activity and Health, 15*(S2), S298–S314.

Badura, P., Geckova, A. M., Sigmundova, D., van Dijk, J. P., & Reijneveld, S. A. (2015). When children play, they feel better: Organized activity participation and health in adolescents. *BMC Public Health, 15,* 1090.

Badura, P., Madarasova Geckova, A., Sigmundova, D., Sigmund, E., van Dijk, J. P., & Reijneveld, S. A. (2017). Do family environment factors play a role in adolescents' involvement in organized activities? *Journal of Adolescence, 59,* 59–66.

Balaban, V., & Bešič, D. (2017). Vztah mezi tělesnou zdatností a pohybovými dovednostmi u dětí středního školního věku [The relationship between physical fitness and motor skills in middle childhood children]. *Studia Sportiva, 11,* 135–143.

Bešič, D., & Balaban, V. (2016). Vztah mezi pohybovou aktivitou a komponentami zdravotně orientované zdatnosti u dětí ve věku 9–11 let [The relationship between physical activity and health-related physical fitness components in 9–11-years-old children]. *Studia Kinanthropologica, 17,* 203–212.

Blair, S. N. (2009). Physical inactivity: The biggest public health problem of the 21st century. *British Journal of Sports Medicine, 43,* 1–2.

Brindova, D., Pavelka, J., Ševčikova, A., Žežula, I., van Dijk, J. P., Reijneveld, S. A., & Madarasova Geckova, A. (2014). How parents can affect excessive spending of time on screen-based activities. *BMC Public Health, 14,* 1261.

Brockman, R., Fox, K. R., & Jago, R. (2011). What is the meaning and nature of active play for today's children in the UK? *International Journal of Behavioral Nutrition and Physical Activity, 8,* 15.

Bull, F., Gauvin, L., Bauman, A., Shilton, T., Kohl, H. W., 3rd, & Salmon, A. (2010). The Toronto Charter for Physical Activity: A global call for action. *Journal of Physical Activity and Health, 7,* 421–422.

Cerin, E., Cain, K. L., Oyeyemi, A. L., Owen, N., Conway, T. L., Cochrane, T., ... Sallis, J. F. (2016). Correlates of agreement between accelerometry and self-reported physical activity. *Medicine & Science in Sports & Exercise, 48,* 1075–1084.

Cihlář, D. (2017). *Hodnocení žáků 2. stupně základních škol v Ústeckém kraji a jejich postoj ke školní tělesné výchově* [Assessment of the 2nd grade elementary school pupils in Ústí nad Labem region and their attitude towards physical education] (Unpublished doctoral dissertation). Charles University, Prague, Czech Republic.

Cliff, D. P., Hesketh, K. D., Vella, S. A., Hinkley, T., Tsiros, M. D., Ridgers, N. D., ... Lubans, D. R. (2016). Objectively measured sedentary behaviour and health and development in children and adolescents: Systematic review and meta-analysis. *Obesity Reviews, 17,* 330–344.

Colley, R. C., Brownrigg, M., & Tremblay, M. S. (2012). A model of knowledge translation in health. *Health Promotion Practice, 13,* 320–330.

Czech School Inspectorate. (2014). *Tematická zpráva – výsledky zjišťování podpory výchovy ke zdraví v mateřských, základních a středních školách* [Thematic report – results of the survey of health education in preschool, primary and secondary education] (ČŠIG-410/14-G2). Retrieved from https://www.csicr.cz/Csicr/media/Prilohy/PDF_el._publikace/Tematick%c3%a9%20zpr%c3%a1vy/2014_TZ_vychova_ke-zdravi.pdf

Czech School Inspectorate. (2016). *Tematická zpráva – vzdělávání v tělesné výchově, podpora rozvoje tělesné zdatnosti a pohybových dovedností* [Thematic report – physical education, promoting the development of physical fitness and physical skills] (ČŠIG-2038/16-G2). Retrieved from http://www.csicr.cz/Csicr/media/Prilohy/PDF_el._publikace/Tematick%c3%a9%20zpr%c3%a1vy/2016_TZ_vzdelavani_v_telesne_vychove.pdf

Ding, D., Lawson, K. D., Kolbe-Alexander, T. L., Finkelstein, E. A., Katzmarzyk, P. T., van Mechelen, W., & Pratt, M. (2016). The economic burden of physical inactivity: A global analysis of major non-communicable diseases. *Lancet, 388,* 1311–1324.

Dygrýn, J., Mitáš, J., Gába, A., Rubín, L., & Frömel, K. (2015). Changes in active commuting to school in Czech adolescents in different types of built environment across a 10-year period. *International Journal of Environmental Research and Public Health, 12,* 12988.

Frömel, K., Kudláček, M., Groffik, D., Svozil, Z., Šimůnek, A., & Garbaciak, W. (2017). Promoting healthy lifestyle and well-being in adolescents through outdoor physical activity. *International Journal of Environmental Research and Public Health, 14,* 533.

Gába, A., Dygrýn, J., Mitáš, J., Jakubec, L., & Frömel, K. (2016). Effect of accelerometer cut-off points on the

recommended level of physical activity for obesity prevention in children. *PLOS ONE, 11,* e0164282.

Gába, A., Mitáš, J., & Jakubec, L. (2017). Associations between accelerometer-measured physical activity and body fatness in school-aged children. *Environmental Health and Preventive Medicine, 22,* 43.

Gába, A., Rubín, L., Badura, P., Roubalová, E., Sigmund, E., Kudláček, M., ... Hamrik, Z. (2018). Results from the Czech Republic's 2018 Report Card on Physical Activity for Children and Youth. *Journal of Physical Activity and Health, 15*(S2), S338–S340.

Gába, A., Rubín, L., Sigmund, E., Badura, P., Dygrýn, J., Kudláček, M., ... Suchomel, A. (2019). *Národní zpráva o pohybové aktivitě českých dětí a mládeže* [Czech Republic's 2018 report card on physical activity for children and youth]. Olomouc, Czech Republic: Palacký University Olomouc.

Guthold, R., Stevens, G. A., Riley, L. M., & Bull, F. C. (2018). Worldwide trends in insufficient physical activity from 2001 to 2016: A pooled analysis of 358 population-based surveys with 1.9 million participants. *Lancet Global Health, 6,* e1077–e1086.

Inchley, J., Currie, D., Jewell, J., Breda, J., & Barnekow, V. (2017). *Adolescent obesity and related behaviours: Trends and inequalities in the WHO European Region, 2002–2014*. Retrieved from http://www.euro.who.int/__data/assets/pdf_file/0019/339211/WHO_ObesityReport_2017_v3.pdf?ua=1

International Society for Physical Activity and Health. (2017). The Bangkok Declaration on Physical Activity for Global Health and Sustainable Development. *British Journal of Sports Medicine, 51,* 1389–1391.

Janssen, I., & Leblanc, A. G. (2010). Systematic review of the health benefits of physical activity and fitness in school-aged children and youth. *International Journal of Behavioral Nutrition and Physical Activity, 7,* 40.

Kokko, S., Martin, L., Geidne, S., Van Hoye, A., Lane, A., Meganck, J., ... Koski, P. (2018). Does sports club participation contribute to physical activity among children and adolescents? A comparison across six European countries. *Scandinavian Journal of Public Health*. Advance online publication. doi:10.1177/1403494818786110

Lee, I.-M., Shiroma, E. J., Lobelo, F., Puska, P., Blair, S. N., & Katzmarzyk, P. T. (2012). Effect of physical inactivity on major non-communicable diseases worldwide: An analysis of burden of disease and life expectancy. *Lancet, 380,* 219–229.

Léger, L. A., Mercier, D., Gadoury, C., & Lambert, J. (1988). The multistage 20 metre shuttle run test for aerobic fitness. *Journal of Sports Sciences, 6,* 93–101.

Ministry of Education, Youth and Sports of the Czech Republic. (2016). *Koncepce podpory sportu 2016–2025* [Conception of support for sport 2016–2025]. Retrieved from https://www.olympic.cz/upload/files/Koncepce-sportu-2016-2025.pdf

Ministry of Health of the Czech Republic. (2014). *Zdraví 2020 – národní strategie ochrany a podpory zdraví a prevence nemocí* [Health 2020 – national strategy for health protection and promotion and disease prevention]. Retrieved from https://www.mzcr.cz/Verejne/dokumenty/zdravi-2020-narodni-strategie-ochrany-a-podpory-zdravi-a-prevence-nemoci_8690_3016_5.html

Mitáš, J., Dygrýn, J., Rubín, L., Křen, F., Vorlíček, M., Nykodým, J., ... Frömel, K. (2018). Multifaktoriální výzkum zastavěného prostředí, aktivního životního stylu a tělesné kondice české mládeže: design a metodika projektu [Multifactorial research on built environment, active lifestyle and physical fitness in Czech adolescents: Design and methods of the study]. *Tělesná kultura, 41,* 17–24.

Mitáš, J., Sas-Nowosielski, K., Groffik, D., & Frömel, K. (2018). The safety of the neighborhood environment and physical activity in Czech and Polish adolescents. *International Journal of Environmental Research and Public Health, 15,* 126.

Pavelka, J., Sigmundová, D., Hamrik, Z., Kalman, M., Sigmund, E., & Mathisen, F. (2017). Trends in active commuting to school among Czech schoolchildren from 2006 to 2014. *Central European Journal of Public Health, 25*(Suppl. 1), S21–S25.

Rubín, L., Mitáš, J., Dygrýn, J., Vorlíček, M., Nykodým, J., Řepka, E., ... Frömel, K. (2018). *Asociace mezi pohybovou aktivitou, tělesnou zdatností a zastavěným prostředím u adolescentů* [Physical activity and physical fitness of Czech adolescents in the context of the built environment]. Olomouc, Czech Republic: Palacký University Olomouc.

Rubín, L., Suchomel, A., & Kupr, J. (2014). Aktuální možnosti hodnocení tělesné zdatnosti u jedinců školního věku [Current options of the physical fitness assessment in school-aged children]. *Česká kinantropologie, 18*(1), 11–22.

Rychtecký, A., & Tilinger, P. (2017). *Životní styl české mládeže: pohybová aktivita, standardy a normy motorické výkonnosti* [Lifestyle of Czech youth: Physical activity, standards of motor performance]. Prague, Czech Republic: Karolinum.

Sigmund, E., Badura, P., Sigmundová, D., Voráčová, J., Zacpal, J., Kalman, M., ... Hamrik, Z. (2018). Trends and correlates of overweight/obesity in Czech adolescents in relation to family socioeconomic status over a 12-year study period (2002–2014). *BMC Public Health, 18,* 122.

Sigmundová, D., Sigmund, E., Bucksch, J., Baďura, P., Kalman, M., & Hamřík, Z. (2017). Trends in screen time behaviours in Czech schoolchildren between 2002 and 2014: HBSC study. *Central European Journal of Public Health, 25*(Suppl. 1), S15–S20.

Steffl, M., Chrudimsky, J., & Tufano, J. J. (2017). Using relative handgrip strength to identify children at risk of sarcopenic obesity. *PLOS ONE, 12,* e0177006.

Tomkinson, G. R., Carver, K. D., Atkinson, F., Daniell, N. D., Lewis, L. K., Fitzgerald, J. S., ... Ortega, F. B. (2018). European normative values for physical fitness in children and adolescents aged 9–17 years: Results from 2 779 165 Eurofit performances representing 30 countries. *British Journal of Sports Medicine, 52,* 1445–1456.

Tomkinson, G. R., Lang, J. J., Tremblay, M. S., Dale, M., LeBlanc, A. G., Belanger, K., ... Léger, L. (2017). International normative 20 m shuttle run values from 1 142 026 children and youth representing 50 countries. *British Journal of Sports Medicine, 51,* 1545–1554.

Tremblay, M. S., Barnes, J. D., & Bonne, J. C. (2014). Impact of the Active Healthy Kids Canada Report Card: A 10-year

analysis. *Journal of Physical Activity and Health, 11*(Suppl. 1), S3–S20.

Tremblay, M. S., Barnes, J. D., González, S. A., Katzmarzyk, P. T., Onywera, V. O., Reilly, J. J., & Tomkinson, G. R. (2016). Global Matrix 2.0: Report card grades on the physical activity of children and youth comparing 38 countries. *Journal of Physical Activity and Health, 13*(11 Suppl. 2), S343–S366.

Vokacova, J., Badura, P., Pavelka, J., Kalman, M., & Hanus, R. (2016). Brief report: Changes in parent-adolescent joint activities between 2002 and 2014 in the Czech Republic, Health Behaviour in School-aged Children (HBSC) study. *Journal of Adolescence, 51*, 1–5.

Vorlíček, M., Rubín, L., Dygrýn, J., & Mitáš, J. (2017). Pomáhá aktivní docházka/dojíždka českým adolescentům plnit zdravotní doporučení pro pohybovou aktivitu? [Does active commuting help Czech adolescents meet health recommendations for physical activity?]. *Tělesná kultura, 40,* 112–116.

World Health Organization. (2009). *Global health risks: Mortality and burden of disease attributable to selected major risks*. Retrieved from http://www.who.int/iris/handle/10665/44203

World Health Organization. (2013). *Global action plan for the prevention and control of NCDs 2013–2020*. Retrieved from https://www.who.int/nmh/events/ncd_action_plan/en/

World Health Organization. (2014). *Global status report on noncommunicable diseases 2014*. Retrieved from https://www.who.int/nmh/publications/ncd-status-report-2014/en/

World Health Organization. (2018). *Global action plan on physical activity 2018–2030: More active people for a healthier world*. Retrieved from https://www.who.int/ncds/prevention/physical-activity/global-action-plan-2018-2030/en/