



HAL
open science

2022 French Report Card on Physical Activity and Sedentary Behaviors in Children and Youth: From Continuous Alarming Conclusions to Encouraging Initiatives

Alicia Fillon, Jérémy Vanhelst, Pauline Genin, Benjamin Larras, Michèle Tardieu, Marion Porcherie, Maxime Luiggi, Salome Aubert, Charlotte Verdot, Olivier Rey, et al.

► **To cite this version:**

Alicia Fillon, Jérémy Vanhelst, Pauline Genin, Benjamin Larras, Michèle Tardieu, et al.. 2022 French Report Card on Physical Activity and Sedentary Behaviors in Children and Youth: From Continuous Alarming Conclusions to Encouraging Initiatives. *Journal of Physical Activity and Health*, 2023, 20 (7), pp.664-673. 10.1123/jpah.2022-0660 . hal-04164737

HAL Id: hal-04164737

<https://hal.science/hal-04164737>

Submitted on 19 Mar 2024

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

2022 French Report Card on Physical Activity and Sedentary Behaviors in Children and Youth: From Continuous Alarming Conclusions to Encouraging Initiatives

Alicia Fillon,^{1,2,3} Jeremy Vanhelst,⁴ Pauline Genin,^{1,2} Benjamin Larras,¹ Michèle Tardieu,¹ Marion Porcherie,⁵ Maxime Luiggi,⁶ Salomé Aubert,⁷ Charlotte Verdot,^{8,9} Olivier Rey,¹⁰ Lena Lhuisset,¹¹ Julien E. Bois,^{1,11} Guillaume Y. Millet,^{12,13} Martine Duclos,^{1,3,14,15,16} and David Thivel^{1,2,3}

¹National Observatory for Physical Activity and Sedentary behaviors (ONAPS), Clermont-Ferrand, France; ²Laboratory of the Metabolic Adaptations to Exercise under Physiological and Pathological Conditions (AME2P), Clermont Auvergne University, CRNH Auvergne, Clermont-Ferrand, France; ³International Research Chair "Health in Motion," University Clermont Auvergne Foundation, Clermont-Ferrand, France; ⁴Nutritional Epidemiology Research Team (EREN), Sorbonne Paris Nord University, Cnam, Center of Research in Epidemiology and Statistics—University of Paris Cité (CRESS), Bobigny, France; ⁵EHESP-French School of Public Health, Univ. Rennes, Arènes, UMR CNRS 6051, Rennes, France; ⁶Aix-Marseille University, ADEF, Marseille, France; ⁷Active Healthy Kids Global Alliance, Ottawa, ON, Canada; ⁸Équipe de surveillance et d'épidémiologie nutritionnelle (Esen), Direction des maladies non-transmissibles et traumatismes (DMNTT)—Santé publique France (French Public Health Agency), Sorbonne Paris Nord University, Centre of Research in Epidemiology and Statistics—University of Paris Cité (CRESS), Bobigny, France; ⁹Université Paris 13—Sorbonne Paris Nord, Centre de recherche en Épidémiologie et Statistiques (CRESS), Bobigny, France; ¹⁰CNRS, ISM, UMR 7287, Marseille, Structure Fédérative d'Études et de Recherches en Éducation de Provence, Aix-Marseille Université, Marseille, France; ¹¹Université de Pau & des Pays de l'Adour, e2s UPPA, MEPS, Tarbes, France; ¹²Laboratoire Interuniversitaire de Biologie de la Motricité, Université Jean Monnet Saint-Étienne, Saint-Étienne, France; ¹³Institut Universitaire de France (IUF), Paris, France; ¹⁴INRAE, Clermont-Ferrand, France; ¹⁵UFR Medicine, University Clermont 1, Clermont-Ferrand, France; ¹⁶Department of Sport Medicine and Functional Explorations, Clermont-Ferrand University Hospital, G. Montpied Hospital, Clermont-Ferrand, France

Background: Scientific evidence and public health reports keep highlighting the continuous and alarming worldwide progression of physical inactivity and sedentary behaviors in children and adolescents. The present paper summarizes findings from the 2022 French Report Card (RC) on physical activity for children and youth and compares them to the 2016, 2018, and 2020 RCs. **Methods:** The 2022 edition of the French RC follows the standardized methodology established by the Active Healthy Kids Global Matrix. Ten physical activity indicators have been evaluated and graded based on the best available evidence coming from national surveys, peer-reviewed literature, government and nongovernment reports, and online information. The evaluation was also performed in children and adolescents with disabilities. Indicators were graded from A (high level of evidence) to F (very low level of evidence) or INC for incomplete. **Results:** The evaluated indicators received the following grades: overall physical activity: D⁻; organized sport participation and physical activity: C; active play: F; active transportation: C; sedentary behaviors: D⁻; family and peers: D; physical fitness: C; school: C⁻; community and the built environment: F; government: B. **Conclusions:** While this 2022 French RC shows progression for 7 out of the 10 indicators considered, it also underlines the continuous need for actions at the local, regional, and national levels to develop better surveillance systems and favor a long-term improvement of youth movement behaviors.

Q4

Keywords: adolescents, active transportation, physical activity promotion

Whereas international scientific evidences and public health reports have been pointing constant alarming progressions of both physical inactivity and sedentary time in children, and adults, these trends have been unfortunately reinforced during the last 2 years by the COVID-19 pandemic consequences on our movement behaviors.¹ Such a deleterious and persistent evolution of our children and adolescents' healthy active lifestyle requires the identification of appropriate action plans and levers to build effective public health strategies.

Q2

Facing alarmingly low prevalence of physical activity (PA) levels and increasing sedentary time in both French adults and youth, the National French Minister of Sports initiated the creation of a National Observatory for Physical Activity and Sedentary Behaviors (ONAPS) in 2015. Quickly, the conclusions of the first reports from this observatory underlined the lack of national

Q3

Q4

Luiggi <https://orcid.org/0000-0001-6280-394X>

Aubert <https://orcid.org/0000-0002-6127-2398>

Q5

Thivel (david.thivel@uca.fr) is corresponding author.

surveillance systems and of multidimension evaluations that would help built and orientate future individual, local, and national initiatives, and strategies, especially in youth. This led the ONAPS in 2016 to join the international Global Matrix movement²⁻⁴ and to propose its first Report Card in 2016, published every 2 years since then.⁵⁻⁸ Although the worldwide COVID-19 pandemic led the international initiative to postpone the Global Matrix 4.0 from 2020 to 2022, some countries, including France, launched a 2020 version of their RC.⁸ This last edition of the French RC (2020) shows similar evaluation of the main indicators compared with the 2016 editions, with, however, a progression of national evidences for the active play, family and peers, and community and environment indicators, providing the opportunity to properly evaluate these indicators for the first time.⁸ Although stable as compared with 2018, the grades delivered in 2020 kept highlighting the alarmingly low level of PA and high time devoted to sedentary behaviors in French children and adolescents.⁸ Moreover, even though it was not considered in the general grading of the indicators, the French 2020 RC dedicated a specific analysis to the impact of the COVID-19 lockdowns on youth's movement behaviors, concluding, like in

most countries,¹ in the urgent need for public health strategies to break the deleterious effects of the successive lockdowns and avoid any persistence in the induced behaviors.^{8–10}

As part of the Global Matrix 4.0 international initiative, the aim of the present paper was to summarize the findings of the 2022 French RC performed by ONAPS and to compare them with the 2016, 2018, and 2020 editions. For that purpose, 10 PA indicators were considered: overall PA levels, organized sport and PA, active play, active transportation, sedentary behaviors, physical fitness, family and peers, school, community and environment, and governmental and institutional implication.

Methods

Q6 As since its first 2016 edition and following the classical and collective methodology established by the Global Alliance.¹¹ The 2022 French RC was conceived by an expert panel composed of members of ONAPS (www.onaps.fr), external and academic experts, and members from public health agencies (Santé Publique France). Briefly, the panel leader was responsible for integrating each expert's contribution and for writing the RC main document. All the authors contributed to identifying key data sources and synthesized the evidence from a range of national surveys, reviewed the entire document, and contributed to the grade for each indicator.

The 10 PA indicators selected at the international level by the Global Alliance were evaluated by the panel. The following behavioral and outcome indicators were considered: overall PA levels, organized sport and PA, active play, active transportation, sedentary behaviors, and physical fitness. In addition, sources of influence outcomes were also considered such as family and peers, school, community and environment, and governmental and institutional implication. Importantly, the 2022 French RC proposes a first evaluation of the 10 indicators in the specific context of children and adolescents with disabilities. Moreover, the present 2022 French RC proposes a new evaluation of the behavioral changes induced by the first COVID-19 lockdown in France in terms of PA and sedentary behaviors, deepening the preliminary one proposed in 2020.

The expert panel first connected in February 2020 and indicators were assigned according to their area of interest and expertise of each panel member. Each expert (or group of experts), supported by ONAPS operative agents, compiled the best available evidence for 5- to 17-year-old children and adolescents, performed an objective analysis, and wrote the RC section specific to their indicator. As detailed for each indicator in the "Result" section, peer-reviewed journal articles (indexed in MEDLINE, EMBASE, PubMed, and SportDiscus) were considered, as well as governmental reports, and report from nongovernmental organizations. To be considered, these sources had to be published after the closing date of the source search realized for the development of the 2020 Report Card (May 2020). As detailed in the "Results" section, some sources used in the 2020 RC may have been considered as well, when needed.

Based on each expert's report, grades were collectively discussed and assigned in June 2022. Each indicator evaluation with quantitative data was graded using the benchmarks and grading scheme provided by the Active Healthy Kids Global Alliance. Importantly, the Global Matrix 4.0 grading system was improved by the Active Healthy Kids Global Alliance, providing more details and precisions for the national team to better discriminate between grades (for instance between B and B+ or between B and B⁻). As in

2020, the French expert panel also used a grading system specifically developed for qualitative indicators. Briefly, grades were assigned based on the proportion of children and adolescents meeting the predefined benchmarks such as: A⁺ = 94% to 100%; A = 87% to 93%; A⁻ = 80% to 86%; B⁺ = 74% to 79%; B = 67% to 73%; B⁻ = 60% to 66%; C⁺ = 54% to 59%; C = 47% to 53%; C⁻ = 40% to 46%; D⁺ = 34% to 39%; D = 27% to 33%; D⁻ = 20% to 26%; F = <20%; and INC = incomplete data. The overall grading system used for this 2022 French RC is presented in Figure 1.

Results

Overall PA

As for the 2020 RC edition, most of the available evidence regarding French children and adolescents overall PA level come from national epidemiological surveys.^{12–15} About half (50.7%) of French boys and 33.3% of girls aged 6–17 years old achieved the PA guidelines, that is, 60 minutes of moderate to vigorous PA per day.¹⁶ These percentages decline with age and time (from one generation to another), particularly during puberty. Indeed, while about 70% of boys and 56% of girls aged 6–10 years old reach the PA recommendations, these proportions drop down to 34% and 20% between 11 and 14 years, and 40% and 16% between 15 and 17 years old, respectively.¹² Gender also appears to be an important determinant of French youth's PA decline since a greater decrease of the prevalence of meeting the PA recommendations was found in girls compared with boys from 11 years old.¹² Based on these evidences, the expert panel decided to slightly decrease the grade to "D⁻" compared with the "D" grade that was attributed in 2018 and 2020.

Organized Sport and PA

As for the last 2 reports, the participation in organized sports was evaluated based on the number of sports licenses delivered by French sports federations after registration in sports clubs for children and youth (excluding licenses delivered for school-based organized sports). Importantly, the number of licenses does not represent the exact number of children practicing sports. Indeed, some children might have several licenses and some of these licenses concern referees or staff for instance. In 2020, 8.6 million of licenses were registered by children and adolescents in sport federation, which corresponds to 53% of the total number of French youth ages 0–19 years old. This number of licensed children and adolescents decreased by 4% compared to 2019. Excluding school sports, 1,838,839 children aged 0–9 years were involved in a sport association in 2020, the number being 2,475,784 between 10 and 14 years and 1,459,033 between 15 and 19 years. Most of these licenses (60.4%) concerned single-sport federations, the rest (39.6%) being multisport ones (some sport federations are indeed not focused on one specific sport but propose multisport practices). In 2020, 59.3% of these licenses concerned boys. This higher number of licenses in boys especially concerned single-sport federations (64.2% for boys vs 35.8% for girls), whereas this gender difference was less marked in multisport federations (51.7% vs 48.4%, respectively). Interestingly, over-sea French regions showed the lowest (29% of the youth) number of licenses in children and adolescents, followed by Ile de France county (43%). The highest regional prevalence reached 61% and 64% in the Pays de Loire and Bretagne regions, respectively. These

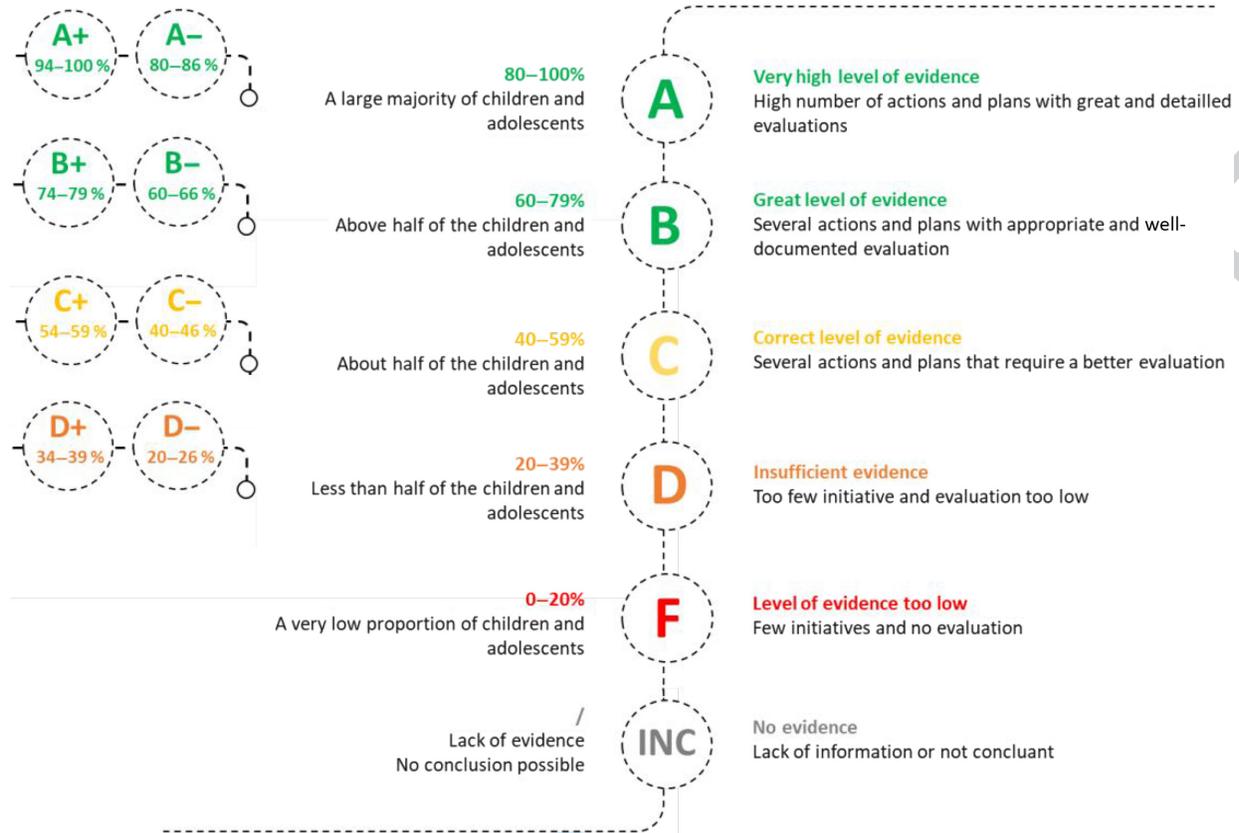


Figure 1 — 2022 grading system adapted from the Active Healthy Kids Global Alliance.

geographical disparities were accompanied by socioeconomic ones. Indeed, the number of licenses increased with the socioeconomic level of the population, the academic level of the parents, and their incomes. Among secondary school children, 67% of the preadolescents issued from families whose parents have executive professions or are company heads, owned a sport license against 39% among preadolescents with unemployed parents.¹⁷ These differences seemed associated with the parents' education level since 70% of children with parents who earned a diploma from a higher education institution were licensed versus 40% among those whose parents do not have any academic diploma. Similarly, 70% of the children whose parents have a monthly income above or equivalent to 4000 € were engaged in sport federations versus only 43% when their salary is below 1600 €. Furthermore, some license holders drop out from sport, but their licenses remain recorded in the statistics. Thus, the number of registered licenses is greater than the real number of practitioners in organized sport.¹⁸ The 2022 RC expert panel collectively decided to highlight a somehow positive improvement compared with the previous editions by attributing the grade of "C" to this indicator this year.

Active Play

The ESTEBAN 2014-2016 and INCA 3 national surveys are so far the only available data regarding active play. They indicated that only 38% of boys and 39.3% of girls aged 6–10 years old were engaged in outdoor active play every school day, and 32.2% of boys and 33.2% of girls on nonschool days.¹⁴ Interestingly, in 2021, ONAPS conducted a PA survey whose first results concern data from 507 children and adolescents aged 0–17 years old.

Parents of children (n = 217) aged 0–6 years old were questioned and reported that 59.9% of the children regularly engage in active play and only 2.3% declared complete absence of active play. The results of this survey also indicated that those who regularly engaged in active play were active for about 8 (5) hours per week, that is, there was a large interindividual variability. Importantly, 37.8% of the consulted parents did not answer the question about active play, indicating a lack of understanding of what active play or active gaming is. Although the sample size remained modest, these data are the only available ones to date regarding active play in France. The expert panel graded this indicator with a "C" this year (against "INC" in 2016, 2018, and 2020).

Active Transportation

Recent national surveys dedicated to human mobilities^{19,20} showed that whatever the type of travel, active transports were used by 37.2% of the overall French children and adolescents, more specifically 42.6% between 6 and 9 years old, 43.1% between 10 and 14 years old, and 29.7% between 15 and 18 years old. Available data indicated an increasing use of bicycles for transport with the children's age while the walking modality decreases. Most of the distance covered while walking or cycling remain short since 60% and 50% of the trips were shorter than 2 km for the 6–9 years and the 10–14 years old, respectively. When it comes to the travels between school and the home place, 40% of them were done using an active mode, 37.6% walking, and 2.4% cycling, the rest being made through motorized transportation (including 31.7% by car). A total of 54% of parents thought that public administration should improve the infrastructures to develop active transportation to and



Figure 2 — Evolution of the French Report Card grades from 2016 to 2022 for each physical activity indicator. NA indicates not assigned; INC, incomplete grade.

from school, instead of motorized modalities. A total of 97% of parents declared that safety is the main driver for them to choose their kids' transport mode to school, 91% combined safety with rapidity, and 84% mentioned the cost of transportation. The lack of security was pointed out by 55% of parents and 44% also pointed out un-adapted long-distance pathways. Interestingly, 76% of the parents declared that they are willing to get involved in local efforts with municipalities to improve the home-school active transportations modality. The 2022 RC expert panel attributed the grade of "C" to this indicator.

Sedentary Behaviors

Although no new national evidence is available since the last 2020 French RC with the INCA 3 and ESTEBAN survey remaining the main sources of data,^{14,15} a recent reanalysis of Health Behavior in School-aged Children survey provided some interesting new

insights.¹³ Similarly, the national center for the development PA and sedentary behaviors strategies (Centre National d'Appui au Déploiement en Activité Physique et lutte contre la Sédentarité, CNDAPS) recently showed that (1) French children and adolescents were found to spend between 3 and 4 hours per day in front of screens²¹ and (2) only 34.6%, 17%, and 8.4% of the 6–10, 11–14 and 15–17 years old, respectively, followed the recommendations of less than 2 hours daily. The proportion of both boys and girls spending more than 3 hours per day in front of a screen was inversely associated with their legal representative's academic highest degree. The highest sedentary time was also observed among adolescents from low socioeconomic status. The CNDAPS survey conducted among 283 adolescents showed a mean screen time of 4 hours and 27 minutes per day in secondary school youth. The Health Behavior in School-aged Children European and Canadian survey provided some new results regarding the use of screen-based social medias. According to their results, 28% and

25% of 11 years old girls and boys, respectively declared an intensive (almost all the time) use of electronic social medias. These percentages reached 44% and 32% in 13 years old girls and boys, 50% and 40% in those aged 15 years old. Importantly, 5% and 6% of 11 years old girls and boys reported a problematic usage (negative effect on their concentration; face-to-face social interactions or sleep or instance) of these screen-based social-media, reaching 10% and 5% at 13 years and 11% and 5% at 15 years old.¹³ The grade of “D” already assigned to this indicator in 2018 and 2020 was maintained this year.

Physical Fitness

According to some European studies, French 10–15 year old children and adolescents present a greater cardiorespiratory fitness than aged matched Spanish, Portuguese, and Belgium kids, but lower than Swiss children of same age group. Regarding flexibility, French children show similar performances as compared with Spanish, Portuguese, and Belgium kids, but lower than Swiss ones. French boys show similar muscular endurance compared with Portuguese ones, but lower than Spanish ones. Muscular endurance of French girls is higher than their Spanish counterparts. Finally, speed seems to be similar when compared with Spanish youth. According to recently published data obtained among 20,228 French adolescents aged 14–17 years old, a better overall fitness was observed among students of general schools as compared with professional and technical schools particularly among girls.²² Using the Diagnoform database evaluating physical fitness among about 15,000 5–10 years old children, Barbry et al²³ showed a greater overall physical fitness among both boys and girls engaged in sport federations, especially in sports such as track and field, swimming, triathlon, cycling, combat sports, team sports, and racket activities. The RC expert panel graded this indicator with a “C” for 2022.

Family and Peers

In this edition of the RC, this indicator has been mainly graded thanks to the 2021 ONAPS national survey questioning active gaming in children and the role played by parents. According to this survey, 6% of parents of children below 6 years, 17.7% of parents of kids aged 6–11, and 46.8% of parents of children older than 12 years, admit that they do not engage in any active games with their children. The grade of “B” has been attributed to this indicator in this 2022 edition of the RC.

School

Physical Education is compulsory in French schools and should represent a volume of 3 hours per week in primary and secondary schools, and 2 hours in high schools. As previously underlined in the 2018 RC, a permanent exemption has been observed in 8.5% of girls following a professional curriculum, rate that is twice as high as the percentage reported in boys.²⁴ Whereas the reasons leading to these exemptions must be better understood, ONAPS conducted a national online survey in 2021 that showed that 3.5% of the kids aged 6–11 years old and 17% of those aged 12–16 years found physical education classes boring and not attractive. A recent survey conducted in the academy of Aix-Marseille, that is, regionally representative, showed that 27.2% of secondary and high school students presented a low PA level (below 600 METs·min/wk or less than 2 h 30 min of total PA), 60% showed a moderate PA level (between 600 and 3000 METs·min/wk or

between 2 h 30 min and 12 h 30 min total PA), and 12.8% a high PA level (more than 3000 METs·min/wk or above 12 h 30 min of total PA).²⁵ According to this survey, students in disadvantaged schools showed significantly lower PA levels. Indeed, 40.9% of student in disadvantaged schools show a low level of PA against 20.9% in mixed schools and 19.5% in advantaged schools. Nearly 47% of kids showed a moderate PA level in disadvantage schools against 64.8% and 69% in mixed and advantages schools, respectively. This social gradient was also observed at the individual level, with student from lower socioeconomic status showing lower PA levels. Regarding the role played by the extracurricular sport associations proposed by the school institutions, the number of adherents decreased from 2019–2020 to 2020–2021 in both primary schools and secondary high schools. Indeed, primary school-related association (USEP) declined from 693,073 adherents to 430,590 and the secondary high school associations (UNSS) declined from 1,138,687 to 871,727 adherents. Among secondary high schools, this decrease equally concerned both boys and girls. The 2022 RC decided to attribute the grade “B” to this indicator this year.

Community and Environment

Some recent surveys have considered this indicator and have provided important new results related to cycling paths, showing in 2020 that 87% of 523 cities that participated, 99% of departments and 85% of the counties reported that they were currently developing specific actions to promote the use of cycles. According to a 2021 Barometer, 68% of the respondents below the age of 18 years old affirmed that they walked every day for their main travels, the most frequent one being the school–home trip (60% of them). This barometer also indicated that 80% of the walking transport were performed in urban areas but 34% of the participants mentioned that they did not feel fully secured while walking in their city. When it comes to the investment in outside sport structures by municipalities, 27% concern small side sport areas with permanent free accesses. An ONAPS survey conducted in 2021 showed that 55% of children below 6 years old use public playing areas for about 2.5 hours per week, which reaches 64% among 6–11 years ones. A total of 26% of the kids aged 12 years and above declare regularly using public free access playing areas and city stadiums. The 2022 RC expert panel collectively decided to grade this indicator with a “B.”

Government

The last 2 years have seen the development of new national actions. One of them, which is one of the actual French government priorities, is the action called “more sport at school.” The national strategy aims at enrolling all primary school teachers in order to increase school children’s PA during and in-between classes, and to reinforce the connection between the schools and sport associations. This is in line with the national initiative aiming at making children engaged in 30 minutes of PA per day. This program, already presented in the 2020 RC, has been deployed at the national level with 49,000 primary schools engaged in September 2022. Although targeting the population overall health indicators and levers, the National Prevention Priority Plan also includes the promotion of a healthy active living in kids, especially in its fifth axe targeting pediatric obesity. This fifth axe includes 3 priorities: (1) learning how to swim, (2) self-confidence in sport practice lessons, and (3) learning how to ride a bike. These priorities aim at increasing the possibilities for kids to engage safely in physical

activities. Similarly, the fourth National Nutrition and Health Plan launched in 2019 included the promotion of more active mobilities, reduced sedentary time, and greater level of PA in youth, as well as the reinforcement of school-related physical activities and classes. The 2019–2024 National Sport and Health Strategy also has the objectives to encourage the French population to increase its PA level by developing accessible and adapted PA facilities and opportunities, in both children and youth. Importantly, a new sport-related law has been established on March 2, 2022, aiming at democratizing the practice of sport and PA among French people. This law mainly officialized the instauration of daily physical activities in primary school as well as the inclusion of the “learning how to swim and ride a bike” in the school educational programs. The law also opens the possibilities for schools to use public sport facilities and infrastructures. Finally, the law makes it compulsory to include an independent access to the sports facilities of a new school from the early conception of its construction plans. The Pass’Sport initiative has been launched by the government providing families with a 50 € support for the inscription in any sport and PA associations or club. Initially planned to help youth under 18 years old, this financial help has been enlarged to 16–30 years old people with low incomes. To encourage the development of PA programs during and outside the school time, the CNDAPS has been created and is in charge of the development

Q13

in French territories of the ICAPS program. Finally, the “2024 Generation” Label has been reinforced during the last 2 years, trying to develop an educative continuity from primary school to university, in terms of PA promotion and healthy active living. This indicator has been upgraded to “B” in 2022.

Children and Adolescents With Disabilities

The details of this evaluation and the attributed grades can be found in Table 1.

Impact of the COVID-19-Related Lockdowns

A recent study questioned the effect of the successive 2020 and 2021 lockdowns on primary school children’s physical fitness and cognitive performance.¹⁰ It was found that kids’ muscle power (lower and upper limbs), overall motricity, and cardiorespiratory fitness were impaired. For instance, the level of cardiorespiratory fitness was reduced by 54.5% compared with before the lockdowns. On top of that, the results point out a decline of 20% of cognitive performances. Recently, a study was published comparing 2 independent sample of French adolescents before and after the first lockdown.³⁰ The authors showed a negative impact of COVID-19 pandemic lockdown on physical fitness, which was significantly lower both adolescent boys (−9.8%; $P < .01$) and girls (−16.2%; $P < .01$).³⁰

Table 1 Evaluation of the Main RC Indicators in Children and Adolescents With Disabilities

Indicator	Evidences	Grade
Physical activity	Sixteen percent of boys and 7.1% of girls with a disability reach at least 60 min of moderate to vigorous physical activity per day. These percentages reach respectively 22.4% and 12.7% among boys and girls suffering from a disability, affecting their presence at and participation to school. Thanks to their survey enrolling 1000 parents of kids with disabilities, Cacioppo et al ²⁶ showed that 73% of them declare that their kids regularly practice physical activity, percentage that dropped to 44% after the successive COVID-19-related lockdowns.	F
Sedentary behaviors	A secondary analysis of the 2014 HBSC survey suggests that most of the children and adolescents presenting a disability spend more than 2 h/d in front of screens ²⁷	F
School	Although disabled kids following a normal school curriculum are supposed to receive the same volume of PE classes than healthy ones and to get a similar access to school-related sport associations, more efforts are needed to avoid their classification as ill-fitted kids or to be condemned to the role of referee for instance. ²⁸ Importantly, PE and adapted physical activity must be part of the program proposed to kids with disability in French specialized institutions. ²⁹ Only 1% of the total kids with a license in a school-related sport association suffers from a disability; however, the national federation for these extracurricular school sports has developed the program “Le Sport Partagé” to include these kids into sports competitions and events by creating mixed teams (valid + disabled kids together).	B+
Organized sport and physical activity	In 2020, 4000 children and adolescents aged 1–19 years owned a license in the French Parasport Federation and more than 11,000 in the French Adapted Sport Federation (that concerns mental disabilities). Although these numbers of affiliated kids need to be improved, this shows an important dynamic from our national federations.	F
Community and environment	According to an online national survey addressed to municipalities, 68% of the sports infrastructures are accessible for people with disabilities. A total of 47% of the municipalities affirmed that they offer dedicated time slot to sport association that enroll people with disabilities. Fifty-five percent of the municipalities affirmed to dedicate specific time slot in their sport infrastructures to specialized institutions taking care of people with disabilities. Finally, 39% of them responded that they have specific strategies, projects, and policies to favor the physical activity of people with disabilities. Interestingly, 10 national parks have engaged renovations between 2008 and 2014 to improve their access to people with disabilities.	C+
Government	In 2013, the program called “Sport Santé Bien-être” launched by the French government had as an objective to develop the practice of physical activity in people with disabilities. About 44% of the original project has been developed with a total cost of 5 million euros. Similarly, the national plan Sport and Disability 2020–2024 includes specific objectives regarding the promotion of physical activity in this population, especially among children and youth. Some guidelines specifically developed to help people with disabilities to engage in physical activities have been developed such as the “Handiguide des Sports” published in 2020. These initiatives need to be further developed and similarly some initiative dedicated to sedentary behaviors in kids with disabilities are needed. The expert panel proposed the Grade “C+” to this indicator for 2022.	C+

Q14

Discussion

Overall PA: D–

Whereas only little more evidence is available since 2020 for this indicator, the 2022 French RC clearly underlines the need for better and more regular monitoring of PA at the national level. Most of data used to grade this indicator come from the main national surveys and their most recent updates.^{13,14} For the first edition of the French RC in 2016, the expert panel decided that it was not possible to grade this indicator due to the lack of available evidence.⁵ The grade D was attributed in 2018 and 2020, thanks mainly to the results obtained through national surveys.^{6–8} The still worrying overall PA level of children and adolescents in France, combined with the absence of new and updated evidences led the expert panel to slightly decrease the grade to “D–.” As already established in 2020, based on this evaluation, the expert panel call for the urgent development of a large-scale and efficient national surveillance system specifically assessing the level of PA in children and adolescents, as well as the related barriers and potential levers.

Organized Sport and PA: C

A grade of “D” was attributed to this indicator in 2016, it was upgraded to “C–” in 2018 and maintained at this level in 2020. The 2022 RC expert panel collectively decided to highlight a somehow positive improvement by attributing the grade of “C” to this indicator for is year. As already underlined in our previous RC, the available data do not provide any information concerning the dose, frequency, and intensity of activity during organized sports. This information should be evaluated to better understand the extent to which these practices in sport federations contribute to the overall PA level of our children and adolescents. Our expert committee calls again for the development of new sport federations (development of new practices and sports) that would attract more youth, especially for girls, as well as the development of multi-activity licenses by federations. The organization of the 2024 Olympic and Paralympic games in Paris is a unique occasion to promote federative sports (altogether with daily PA) in French children and adolescents.

Active Play: C

While the lack of evidence regarding this indicator since 2016 led the expert panel to classify the indicator as INC in the previous editions of the RC, the results proposed by the ONAPS 2021 survey provide some first evidence and led the expert panel to grade this indicator with a “C” this year. An international consensus on the definition of active play should be elaborated and disseminated to help a better evaluation of this indicator but also to increase the awareness of parents regarding the contribution of such active gaming for the children’s health and development. Future surveys and studies should include simple questions to parents to estimate the engagement of children in active play and its contribution to overall PA level. Methodological studies should be conducted to develop reliable and validated tools to properly assess active play in children.

Active Transportation: C

The grade attributed to the Active Transportation indicators slightly progressed from “D” to “C–” between the first 2016 French RC and its 2 following editions (2018 and 2020). Considering the recent

publication of new and more detailed data, the 2022 RC expert panel attributed the grade of “C.” As in most countries around the globe, the assessment of the use of active transportations among French children and adolescents is primarily assessed through the commuting from home to school, yet the full spectrum of active commuting opportunities should be considered (travels to parks, leisure activities, shopping, etc). The experts call for a reinforcement of such national surveys and for the development of urban and rural strategies to improve the possibilities of using active transportations for youth through the creation of new infrastructures, or improvement of existing ones, and importantly, the possibility to use them in complete safety.

Sedentary Behaviors: D–

Due to the lack of new or higher quality data since the 2018 RC expert panel downgraded this indicator from “D” in 2016 to “D–” 2018 and 2020, it was decided to maintain “D–” in 2022. Because the available evidence come mainly from 2 national surveys conducted 5 years ago from a European–Canadian survey not restricted to France, or from a small scaled survey involving 283 secondary school children only, it seems necessary to elaborate new national campaigns to update our knowledge regarding the sedentary behaviors of French children and adolescents. Some national sensitization campaigns should indeed be conducted to better inform parents and children of the deleterious effects of sedentary time, effects whose consequences cannot be compensated for by being physically active.³¹

Physical Fitness: C

Absent from the 2016 RC evaluation, the physical fitness indicator received a “B–” grade in 2018, indicating an overall moderate level of physical fitness in French children and adolescents, based on data collected among a large sample of children and youth aged 10–15 years old, between 2009 and 2013.³² In 2020, the RC expert panel graded this indicator with a “C,” considering the lack of available data, especially at the national level or collected among large enough sample size to be representative. Most of the evaluation conducted in the 2022 RC only relies on a reevaluation of existing data, still pointing a lower fitness among 6–11 years old girls compared with boys, and underlying the predominant role played by the children’s weight status and fitness.³³ Although physical fitness in children and adolescents is a determinant of physical and mental health and is strongly associated with long-term health outcomes as they age into adulthood, France is still lacking national data collection that could be representative of the population. Not only do we call for larger and better data collection, we also call for the development of national campaigns and educational strategies for children and families in combination with environmental approaches to promote PA, physical fitness, as already pointed out in 2020.

Family and Peers: B

With only 2 regional studies that examined the PA level of parents until 2018,^{34,35} the 2016 and 2018 editions of the RC concluded there was a clear lack of evidence and, therefore, we could not properly grade this indicator (“NC”). The evaluation of this indicator improved in 2020 thanks to the publication of studies showing that the PA level of French adolescents was positively associated with the perception of their parents’ activity levels,³⁶ or the positive role played by sport club coaches (study conducted among football players and coaches).³⁷ In 2021, in response to the lack of available evidence, the ONAPS decided to launch an online

national survey regarding active gaming in children and the role played by parents. Although there is a clear need for more evaluation of the role played by families and peers in French children and adolescents PA and sedentary behaviors, the expert panel of the 2022 RC decided to upgrade this indicator from “D” in 2018 to “B,” due to this new evidence. There is a need to conduct such surveys and studies, but also to urgently develop educative strategies in order to increase awareness among families and peers regarding the crucial role and responsibility they have regarding their kids’ movement behaviors.

School: B

Although the 2 first RC highlighted the central and crucial role played by the school setting on PA in youth, attributing to this indicator the grade “B,” the 2020 RC slightly degraded this indicator to “B-.” The 2022 RC decided to attribute the grade “B” to this indicator this year. School plays a major role in PA through the Physical Education classes and the sport activities proposed at school as extra-curricular activities. Although the Minister of National Education is encouraging schools to increase their students’ PA through some national programs such as the recently developed “30 minutes per day, there is a clear need for more educative approaches to have a significant long-term impact of the children’s behaviors. Moreover, school remains a place favoring sitting time in class and interventions and strategies should be developed to help reduce this sedentary time during school days. Six years and 4 editions after the first RC, we reinforce the recommendations to develop strategies to take advantage of the school setting to promote PA and reduce sedentary time. Indeed, the school environment appears as an ideal setting to promote overall PA and to create a culture of healthy movement behaviors beyond those that take place at school. We encourage the continued development of new school policies to increase PA opportunities and ensure that a greater proportion of youth would meet sedentary and PA guidelines.

Q16

Community and Environment: B

Although our 2022 RC analysis seems to indicate an increasing number of investments for securing public areas for children in some counties, this must remain a priority at the national level. Our analysis underlines the necessity to question the gender effect in the appropriation of the public area when it comes to PA. Better understanding these potential gender differences might help improve public health strategies. The new available evidence underline the need for more efforts in order to develop urban areas favoring active living in children and adolescents. The “active design” group created as part of the Legacy division of the organization committee of the 2024 Olympic and Paralympic games that will take place in Paris, will have to significantly improve these active areas, which will hopefully result in active behaviors. While the 2016 and 2018 RC had insufficient evidence to assign a letter grade to the Community and Environment indicator, the 2020 edition attributed the “F” grade to this indicator. Based on the performed analyses, the 2022 RC expert panel collectively decided to upgrade the grade to “B.”

Government: B

Since our first RC conducted in 2016, national plans and strategies have been developed to promote PA and reduce excessive sedentary behaviors from the youngest age. The improvement of the

French population’s PA level together with the decrease of its time dedicated to sedentary behaviors are indeed central objectives of the 2018–2022 National Health Strategy. This strategy is still on going and has been detailed in the previous RC.⁸ As noted in the previous 2018 and 2020 RC, there is still a lack of data to quantify the level of leadership and commitment from the French government in providing PA opportunities for all youth. Although several actions and plans have been initiated and launched, the evaluation of effectiveness and cost-benefit analysis is still to be determined. While graded with “INC” in 2016, “C” in 2018, and “C-” in 2020, this indicator has been upgraded to “B” in 2022.

What About Children and Adolescents With Disabilities?

The 2022 RC proposes for the first time a brief evaluation of the main indicators among children and adolescents suffering from a disability. The only data available so far come from a secondary analysis of the 2014 Health Behavior in School-aged Children survey where 822 children and adolescents were identified with a disability among which 236 have a disability affecting their mobility.²⁷ There is today a clear need to conduct further exploration and surveys dedicated to the PA level and sedentary time and behaviors of these children with disabilities in order to develop and propose specific and adapted public health strategies.

COVID-19-Related Lockdowns: What do We Know in 2022?

The previous edition of the French RC published in 2020 proposed a focus on the effect of the COVID-19-related lockdowns that occurred in 2020. Most of the available evidence came from the national online survey conducted by ONAPS, in the early days of the first lockdown (March 2020), exploring the changes induced by the lockdown on the population’s level of PA and sedentary behaviors (for details, see Genin et al³⁸). Data were collected for 1588 children (6–10 y), 4903 adolescents (11–18 y), and 348 children below 6 years old. Whereas the dramatic effects of the lockdown on French children and adolescents’ movements behaviors have been previously published^{9,10} and detailed in the French 2020 RC,⁸ some new studies conducted between 2020 and 2022 provided more evidence that enriched this 2022 edition, pointing the still dramatic effects of these successive lockdowns, months after. In addition to the transversal observation made during the first COVID-19 lockdown in 2020, both in France and at the international level, these results highlight the need to consider and handle the long-term effects of these past lockdowns as well as the necessity of behavioral education to prevent their dramatic impact in the future.

Conclusions

This 2022 French RC represents the fourth editions since 2016. While this 2022 edition underlines once more the need for additional data and evidence to empower the evaluation of the RC indicators, the expert panel was able to grade all of them for the first time. Importantly, although sometimes modest, the results of this new RC showed progression for 7 out of the 10 indicators considered (active transportation, active gaming, physical fitness, organized sport and PA, community and environment, family and peers, and governmental implication). Importantly, 3 main indicators remain somehow stable with the sedentary behavior part conserving its “D” grade, the school indicator being evaluated from “B-” to “B,” and the overall PA level indicator being grade “D-” while it was evaluated with a “D” in 2020. With an average

grade of “C” France ranked between the 11th and 24th countries when compared with the 57 countries enrolled in the Global Matrix 4.0 (10 countries present an average grade above C and 13 with a C). This position remains somehow stable compared with the Global Matrix 3.0 international comparison where France reached the 26th position (out of 49) and 19th one (out of 30) when considering the countries with a High Human Development Index only. At the national level, the 10 grades attributed keep calling for urgent actions at the local, regional, and national levels to not only develop better surveillance systems but, more importantly, develop effective and long-term strategies that can lead to significant improvement of the French kids’ movement behaviors.

Acknowledgments

The authors want to thank Assurance Prevention, main sponsor of the Health in Motion International Research Chair; as well as HealthWay and ONAPS for coordinating the France RC process. **Founding source:** The authors want to thank the Assurance Prevention insurance mutuality for its support as well as HealthWay for coordinating the France Report Card process.

References

1. Aubert S, Barnes JD, Demchenko I, et al. Global Matrix 4.0 physical activity report card grades for children and adolescents: results and analyses from 57 countries. *J Phys Act Health*. 2022;19(11):700–728. doi:10.1123/jpah.2022-0456
2. Colley RC, Brownrigg M, Tremblay MS. A model of knowledge translation in health: the active healthy kids Canada report card on physical activity for children and youth. *Health Promot Pract*. 2012;13(3):320–330. doi:10.1177/1524839911432929
3. Tremblay MS, Barnes JD, Cowie Bonne J. Impact of the active healthy kids Canada report card: a 10-year analysis. *J Phys Act Health*. 2014;11(suppl 1):S3–S20. doi:10.1123/jpah.2014-0167
4. Tremblay MS, Gray CE, Akinroye K, et al. Physical activity of children: a global matrix of grades comparing 15 countries. *J Phys Act Health*. 2014;11(suppl 1):S113–S125. doi:10.1123/jpah.2014-0177
5. Aucouturier J, Ganière C, Aubert S, et al. Results from the first French report card on physical activity for children and adolescents. *J Phys Act Health*. 2017;14(8):660–663. doi:10.1123/jpah.2017-0046
6. Aubert S, Aucouturier J, Ganière C, et al. Results from France’s 2018 report card on physical activity for children and youth. *J Phys Act Health*. 2018;15(suppl 2):S360–S362. doi:10.1123/jpah.2018-0511
7. Aubert S, Aucouturier J, Vanhelst J, et al. France’s 2018 report card on physical activity for children and youth: results and international comparisons. *J Phys Act Health*. 2020;17(3):270–277. doi:10.1123/jpah.2019-0241
8. Fillon A, Genin P, Larras B, et al. France’s 2020 report card on physical activity and sedentary behaviors in children and youth: results and progression. *J Phys Act Health*. 2021;18(7):811–817. doi:10.1123/jpah.2021-0025
9. Fillon A, Lambert C, Tardieu M, et al. Impact of the COVID-19 confinement on movement behaviors among French young children: The ONAPS national survey. *Minerva Pediatr*. Published online September 13, 2021. doi:10.23736/S2724-5276.21.06194-2
10. Chambonniere C, Lambert C, Fearnbach N, et al. Effect of the COVID-19 lockdown on physical activity and sedentary behaviors in French children and adolescents: new results from the ONAPS national survey. *Eur J Integr Med*. 2021;43:101308. doi:10.1016/j.eujim.2021.101308
11. Aubert S, Barnes JD, Abdeta C, et al. Global Matrix 3.0 physical activity report card grades for children and youth: results and analysis from 49 countries. *J Phys Act Health*. 2018;15(suppl 2):S251–S273. doi:10.1123/jpah.2018-0472
12. Verdot C, Salanave B, Deschamps V. Activité physique et sédentarité dans la population française. situation en 2014–2016 et évolution depuis 2006–2007. *Bull Epidemiol Hebd*. 2020;15:296–304.
13. Inchley J, Currie D, Budisavljevic S, et al. (Eds.). *Spotlight on Adolescent Health and Well-Being. Findings From the 2017/2018 Health Behaviour in School-Aged Children (HBSC) Survey in Europe and Canada. International Report. Volume 2. Key Data*. WHO Regional Office for Europe; 2020.
14. équipe de surveillance et d’épidémiologie nutritionnelle (Esen). *étude de Santé Sur l’environnement, La Biosurveillance, l’activité Physique et La Nutrition (Esteban), 2014–2016. Volet Nutrition. Chapitre Corpulence*. 2nd ed. Santé publique France; 2020:1–58. <https://www.santepubliquefrance.fr>
15. Anses. INCA 3 en image—Les Français, l’activité physique et la sédentarité | Anses—Agence nationale de sécurité sanitaire de l’alimentation, de l’environnement et du travail. 2021. <https://www.anses.fr/fr/content/inca-3-en-image-les-fran%C3%A7ais-lactivit%C3%A9-physique-et-la-s%C3%A9dentarit%C3%A9>
16. Chaput JP, Willumsen J, Bull F, et al. 2020 WHO guidelines on physical activity and sedentary behaviour for children and adolescents aged 5–17 years: summary of the evidence. *Int J Behav Nutr Phys Act*. 2020;17(1):141. doi:10.1186/s12966-020-01037-z
17. Caille JP. Les pratiques sportives des collégiens sont très liées au rapport au sport de leurs parents et à leurs vacances d’été. *Portrait Social: Insee Références*. 2020:109–128.
18. Lafabrière C. Qui construit les données du sociologue? Les problèmes posés par l’analyse secondaire des fichiers des licences fédérales. *Bulletin Sociol Methodol*. 2005;86(1):55–82. doi:10.1177/075910630508600105
19. Institut national de la statistique et des études économiques. Enquête mobilité des personnes. 2018–2019. 2020. <https://www.statistiques.developpement-durable.gouv.fr/resultats-detaillées-de-lenquete-mobilite-des-personnes-de-2019>
20. Institut d’études opinion et marketing en France et à l’international. EcoCO2: Les parents et les transports domicile - établissement scolaire. 2020. <https://www.ecoco2.com/blog/barometre-les-parents-et-les-transports-domicile-etablissement-scolaire-2021/>
21. Centre National d’appui au Déploiement en Activité Physique et lutte contre la Sédentarité. Données du CNDAPS sur le déploiement du dispositif ICAPS (2020–2021). 2021. <https://www.cndaps.fr/connaître-le-cndaps/connaître-le-cndaps-3-3.html>
22. Duclos M, Lacomme P, Lambert C, et al. Is physical fitness associated with the type of attended school? A cross-sectional analysis among adolescents. *J Sports Med Phys Fitness*. 2022;62(3):404–411. doi:10.23736/S0022-4707.21.12203-0
23. Barbry A, Carton A, Ovineur H, Coquart J. Relationships between sports club participation and physical fitness and body mass index in childhood. *J Sports Med Phys Fitness*. 2022;62(7):931–937. doi:10.23736/S0022-4707.21.12643-X
24. Eduscol. L’évaluation Aux Baccalauréats, CAP et BEP de l’enseignement Général, Technologique et Professionnel En Education Physique et Sportive. 2019. <https://eduscol.education.fr/eps/examens/ComNat/rapport-cne-2019>
25. Luiggi M, Rey O, Travert M, Griffet J. Overweight and obesity by school socioeconomic composition and adolescent socioeconomic status: a school-based study. *BMC Public Health*. 2021;21(1):1837. doi:10.1186/s12889-021-11752-2

26. Cacioppo M, Bouvier S, Bailly R, et al. Emerging health challenges for children with physical disabilities and their parents during the COVID-19 pandemic: The ECHO French survey. *Ann Phys Rehabil Med*. 2021;64(3):101429. doi:10.1016/j.rehab.2020.08.001
27. Ng K, Tynjälä J, Sigmundová D, et al. Physical activity among adolescents with long-term illnesses or disabilities in 15 European countries. *Adapt Phys Act Q*. 2017;34(4):456–465. doi:10.1123/apaq.2016-0138
28. Meynaud F. Éducation physique et sportive et situation de handicap. *Reliance*. 2007;24(2):32. doi:10.3917/reli.024.0032
29. Rigot. Les principes et finalités de l'EPS en milieu spécialisé [Internet]. 2020 [cited March 31, 2022]. https://apa.montpellier.free.fr/enseignements/tous_cours/enseignement/rigot_notes_eps_milieu_spe.pdf
30. Béghin L, Thivel D, Baudelet JB, Deschamps T, Ovigneur H, Vanhelst J. Change in physical fitness due to the COVID-19 pandemic lockdown in French adolescents: a comparison between two independent large samples from Diagnoform battery. *Eur J Pediatr*. 2022;181(11):3955–3963. doi:10.1007/s00431-022-04610-
31. Julian V, Bergsten P, Forslund A, et al. Sedentary time has a stronger impact on metabolic health than moderate to vigorous physical activity in adolescents with obesity: a cross-sectional analysis of the Beta-JUDO study. *Pediatr Obes*. 2022;17(7):12897. doi:10.1111/ijpo.12897
32. Vanhelst J, Labreuche J, Béghin L, et al. Physical fitness reference standards in French youth: The BOUGE program. *J Strength Cond Res*. 2017;31(6):1709–1718. doi:10.1519/JSC.0000000000001640
33. Vanhelst J, Ternynck C, Ovigneur H, Deschamps T. Normative health-related fitness values for French children: the Diagnoform Programme. *Scand J Med Sci Sports*. 2020;30(4):690–699. doi:10.1111/sms.13607
34. Thibault H, Contrand B, Saubusse E, Baine M, Maurice-Tison S. Risk factors for overweight and obesity in French adolescents: physical activity, sedentary behavior and parental characteristics. *Nutrition*. 2010;26(2):192–200. doi:10.1016/j.nut.2009.03.015
35. Wagner A, Klein-Platat C, Arveiler D, Haan MC, Schlienger JL, Simon C. Parent-child physical activity relationships in 12-year old French students do not depend on family socioeconomic status. *Diabetes Metab*. 2004;30(4):359–366. doi:10.1016/S1262-3636(07)70129-5
36. Langlois J, Omorou AY, Vuillemin A, Briançon S, Lecomte E. PRALIMAP Trial Group. Association of socioeconomic, school-related and family factors and physical activity and sedentary behaviour among adolescents: multilevel analysis of the PRALIMAP trial inclusion data. *BMC Public Health*. 2017;17(1):175. doi:10.1186/s12889-017-4070-9
37. Van Hoye A, Heuzé J-P, Van den Broucke S, Sarrazin P. Are coaches' health promotion activities beneficial for sport participants? A multilevel analysis. *J Sci Med Sport*. 2016;19(12):1028–1032. doi:10.1016/j.jsams.2016.03.002
38. Genin P, Dutheil F, Larras B, et al. Promoting physical activity and reducing sedentary time among tertiary workers: position stand from the French National Observatory for Physical Activity and Sedentary Behaviors (ONAPS). *J Phys Act Health*. 2020;16(9):677–678. doi:10.1123/jpah.2019-0154

Queries

- Q1. Author Affiliations are not in order. Hence numbering changed to " 13-3, 3-4, 12-5, 4-6, 5-7, 6-8, 7-9, 8-10, 14-11, 9-12, 10-13, 11-14." Please check and confirm.
- Q2. Originally, reference citations were not in sequential order. Hence, to maintain sequential order, references were renumbered both in text citations and in reference list. Please verify.
- Q3. In sentence beginning "Facing alarming" . . . please confirm edit maintains the intended meaning.
- Q4. As per journal style, repeats in article and journal title are not allowed in keywords. Hence, the keywords "sedentary behaviors" and "health" are deleted. Please check.
- Q4. Please ensure author information is listed correctly here and within the byline.
- Q5. Please provide ORCID for the authors "Alicia Fillon, Jeremy Vanhelst, Pauline Genin, Benjamin Larras, Michéle Tardieu, Marion Porcherie, Charlotte Verdout, Olivier Rey, Lena Lhuisset, Julien E. Bois, Guillaume Y. Millet, Martine Duclos, and David Thivel" if they available.
- Q6. The sentence "As since its first 2016 . . ." seems incomplete. Please check.
- Q7. In sentence beginning "As since it's" please check wording of sentence for clarity.
- Q8. As per journal style, "mean \pm SD" should be represented as "mean (SD)." Hence, the values are changed accordingly. Please check and confirm.
- Q9. Please provide in-text citation for "Figure 2".
- Q10. In sentence beginning "Interestingly, 76%" . . . please check edit maintains the intended meaning of the sentence.
- Q11. Please provide expansion for "USEP."
- Q12. Please provide expansion for "UNSS."
- Q13. In sentence beginning "This law mainly" please check highlighted word for correctness and clarity.
- Q14. Please note that "HSBC" has been changed to "HBSC" in Table 1. Please check and correct if necessary.
- Q15. In sentence beginning "With only 2" . . . Please check edit for clarity and that it maintains the intended meaning.
- Q16. The opening quotes does not have a corresponding closing quotes in the sentence "Although the Minister of . . ." Please insert the quotes in the appropriate position.
- Q17. Please provide volume and page range if available for "Ref. 9".
- Q18. Please provide volume if available for "Ref. 17".