

Results from the Japan's 2018 Report Card on Physical Activity for Children and Youth

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Abstract

Background/Objective: The momentum to promote physical activity (PA) by various government agencies such as the Japan Sports Agency established in 2015, academic organizations, and companies is increasing towards the Tokyo Olympic and Paralympic Games. The goal of the 2018 Japan Report Card on Physical Activity for Children and Youth is to assess and track levels of health behaviors related to PA in Japanese children and youth, facilitators and barriers for PA, and related health outcomes.

Methods: Nationally representative data were used to score the indicators.

Results: The 2018 Japan Report Card on Physical Activity for Children and Youth consists of health behaviors and outcomes (7 indicators), and influences on health behaviors (4 indicators).

The key four health behaviors and outcomes (Organized Sport Participation: B-; Active Transportation: A-; Physical fitness: A, Weight status: A) were favorable. Sedentary Behavior received C- grade, while 2 indicators (Overall Physical Activity, and Active Play) could not be

graded. In the Influences domain, Family Influence and Community were graded as C-, while School (B+), Community and Environment (B-), and Government Strategies and Investments (B) were favorable.

Conclusions: The 2018 Japan Report Card on Physical Activity for Children and Youth shows that Japanese children and youth have favorable levels of organized sport participation, active transportation to and from school, and physical fitness and weight status. Future nationally representative surveys on overall PA and active play are needed.

Key words: environment; physical fitness; policy; sedentary behavior; sports

Abbreviations: physical activity: PA, Report Card on Physical Activity for Children and Youth: Report Card, Japan Sports Agency: JSA, physical education: PE, the Ministry of Education, Culture, Sports, Science and Technology: MEXT, research work group: RWG, The WHO Health Behaviour in School-aged Children: HBSC

Background/objective

Lack of physical activity (PA) in childhood and adolescence is associated with adverse health problems.^{1,2} Childhood PA patterns often extend into adulthood; insufficient PA during this developmental period is therefore a great public health threat.³ In 2016, 38 countries published Report Cards on Physical Activity for Children and Youth to consolidate existing evidence; identify research gaps; facilitate international comparisons; encourage more evidence-informed PA and health policies; and improve surveillance of PA of children and adolescents.⁴

The first Japan Report Card on Physical Activity for Children and Youth (Report Card) was developed and launched in 2016 by Active Healthy Kids Japan.^{5,6} It illustrated health behaviors such as favorable active transportation, health outcomes such as weight status, and positive influences on PA in children such as school environment and government strategies and investments. In 2015, the Japan Sports Agency (JSA) was established to advance policies such as promoting regional sports, school physical education (PE); promoting the Olympic and Paralympic movement, and so on.⁷ The momentum to promote PA by various government agencies including the JSA, academic organizations, companies, and other organizations, is increasing. A joint UK Government and Mayor of London report showed that as one of the legacies from the London 2012 Olympic and Paralympic Games, 1.4 million more people were playing sport once a week since London won the bid in 2005.⁸ Moreover, the first official national PA guidelines for 3-5 years olds were proposed by the Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT) in 2012.⁹ Since the guideline was set 6 years ago we hoped it might be reflected in improved PA trends in current primary school children. Health Japan 21 (second term) is a national policy which focuses on extending healthy life expectancy and minimizing the spread of health inequalities within the population.¹⁰

The primary goal of the 2018 Japan Report Card is to assess and track levels of health behavior related to PA in Japanese children and youth, facilitators and barriers for PA, and related health outcomes. This report card is based on recent nationally representative surveys of Japanese school-aged children and youth.

Methods

The 2018 Japan Report Card was produced by a small research work group (RWG) and based on the 2016 Japan Report Card⁵, developed by the 7 authors of the current article. The responsibilities of the groups were identifying nationally representative surveys and producing the final Report Card.

The target age was changed from preschool children to high school children in 2016 to only school aged children and adolescents in 2018 in line with Active Healthy Kids Global Alliance standards.⁵ We used 5 national surveys from all 47 prefectures which are divisions in a country governed by a prefect. for the 2018 Japan Report Card : 1) Annual Report of National Survey on Physical Fitness, Athletic Performance, and Exercise Habits of the JSA, using a questionnaire in two million students measurements among youth ages 10 years old (5th grade primary school students) and 13 years old (2nd grade of junior high school students); 2) Annual Report of Physical Fitness Survey of JSA objective measuring physical fitness in 2000 students in 6 to 17 years; 3) Annual School Health Survey of the MEXT objective measures of weight status in 695,600 students in 6 to 17 years; and 4) Annual National Health and Nutrition Survey using a questionnaire and objectively measured measuredstep counts in adults by a pedometer in 3,648 households and 5) Annual National Federation of Health Insurance Societies Survey using a questionnaire in 3,395,199 adults.¹¹⁻¹⁵

The RWG searched for relevant evidence from nationally representative surveys within Japan as noted above. Draft grades were assigned for the 11 indicators by the RWG in March 2018 following comparison of the national survey data against relevant evidence-based recommendations (e.g., 2 hours/day recreational screen time for school-aged children and adolescents, twenty-metre shuttle run (speed (km/h) at the last complete stage) centiles by age

and gender in children and youth aged 9 to 17 years where available, using the benchmark approach from the Active Healthy Kids Global Alliance.¹⁶⁻¹⁷ The grades used were as follows: A (We are succeeding with a large majority of children and youth: A⁺ 94% - 100%, A 87% - 93% and A⁻ 80% - 86%); B (We are succeeding with well over half of children and youth: B⁺ 74% - 79%, B 67% - 73% and B⁻ 60% - 66%); C (We are succeeding with about half of children and youth (C⁺ 54% - 59%, C 47% - 53%, C⁻ 40% - 46%); D (We are succeeding with less than half but some children and youth: D⁺ 34% - 39%, D 27% - 33%, D⁻ 20% - 26%); F (We are succeeding with very few children and youth: < 20%); and INC = Incomplete—insufficient or inadequate information to assign a grade. Decisions of this kind were made by the RWG using a combination of their expertise and comments arising from the consultation process with stakeholders in Japan. Draft report card grades were considered by the stakeholder group in April 2018, members of the Japanese Association of Exercise Epidemiology (<http://jaee.umin.jp/REE.html>). In the consultation stakeholders were asked to address the following questions: 1) Were any relevant Japanese data missed in the process of card development? and 2) Were any data misinterpreted by the RWG? (e.g., Were the draft grades justified?).

Results

The 2018 Japan Report Card is the second assessment of PA, health behaviours, outcomes and settings and influences on PA and health. Grades are summarized in include Table 1 (see below). Figure 1 shows the cover of the 2018 Japan Report Card.

Discussion

Overall Physical Activity Levels

The grade of Overall Physical Activity Levels was assigned INC. In the Global Matrix 2.0: Report Card Grades on the Physical Activity of Children and Youth Comparing 38 Countries, only Japan assigned an INC grade.⁴ Another previous international comparison study also reported data on the overall PA levels for Japanese children and adolescents were unavailable due to lack of evidence.¹⁸ Recently, a comparison study compared pedometer data between the Tokyo Metropolitan Board and Education Survey and the Canadian Physical Activity Levels among Youth survey.¹⁹ Daily steps were lower by approximately 1000 to 2000 steps per day for students living in Tokyo than in Canada (except for boys in primary school). It is noteworthy that the 2016 Canada Report Card assigned a low (D⁻) grade for overall PA, and this was graded D because of relatively high levels of PA among preschool children: for Canadian school-aged children and youth an F grade would have been justified.⁴ These concerning levels of step counts among Japanese children and adolescents make large-scale surveys of daily PA in Japanese children and adolescents even more necessary.

Our previous study summarized the global trends in the evaluation methodology of PA questionnaires for children and adolescents using literature from 38 countries that participated in the Report Card.²⁰ The WHO Health Behaviour in School-aged Children (HBSC) questionnaire was used most frequently among the 38 countries (12 countries, 31.6%). The above-mentioned international comparison study¹⁸ used data from the PA questionnaires of the HBSC survey in 38 European countries, the USA, and Canada. Thus, we made a Japanese version of HBSC questionnaire and then back-translated the questionnaire into English and validated it among 5th grade primary school students (10 to 11-year-olds).²¹ Most students in the very small sample

didn't fulfill the WHO international PA guidelines (only 10% of the 70 participants met the guideline for MVPA). In the near future, the validity of the HBSC questionnaire in its Japanese version should be examined among a wider range of age groups for large-scale surveys of daily PA in Japanese children and adolescents. There are official national guidelines for preschool children aged 3-to-5 years old by the MEXT and PA for adults and elderly by the Ministry of Health, Labour and Welfare.^{9,22} However, guidelines for school-aged children and adolescents in Japan, have yet to be drawn up. The guideline which is named 'Active Child 60 min' was intended only for preschool and primary school children and is based on international PA guidelines.²³

Organized Sport Participation

The Japanese government does not currently issue recommendations for levels or prevalence of organized sport participation in children and adolescents. Thus, the grade for this indicator, B-, was based on the prevalence of self-reported participation in sport as the percentage of indicator. In the 2016 Japan Report Card, the grade was C, reflecting the very low participation (33.4%) in organized sports by preschool children.⁵ Also, a gender gap still exists in organized sport participation in Japan. The Second Sport Basic Plan (the second term) by the JSA showed creating environments conducive to sport enabled participation in sport by female school-age students.²⁴ There were age and gender differences in participation in organized sports, with lower participation among primary school and high school students compared with junior high school students.

Active Play

The incomplete grades in the 2018 Japan Report Card as well as the 2016 Japan Report Card reflect a lack of nationally representative data assessing how much time children and youth in Japan spend engaging in active play.⁵ In addition, there are no Japanese government recommendations for active play. One opportunity for active play is school recess. According to the MEXT, all schools offer recess to students from primary school to high school; however, the school policy might affect how and how often students engaged in unstructured free play during the recess period. In the Global Matrix 2.0, 21 countries reported INC grades.⁴ The recent JSA survey of primary school students showed that the organized sport participation and physical fitness of students who played outside more when they were preschool children tended to be greater than that of students who spent less time playing outside.²⁵ Future surveillance of active and outdoor play in Japan should therefore be considered, and this domain of PA might be a neglected but potentially useful target of future strategies aimed at increasing PA.

Active Transportation

There are no Japanese government recommendations for active transportation. A grade of A⁻ was assigned according to the 86% of students who regularly commute actively to school (walking or cycling) for the 2018 Japan Report Card. The grade for Active Transportation is A⁻, which is substantially higher than that of the other high-income countries, except for the Netherlands (A) as reported in the international Active Healthy Kids Report Card in 2016.⁴ However, according to the grade in 47 prefectures, some variation among prefectures was observed.²⁶ For example, the B grades of some prefectures in the Tohoku district (Aomori, Iwate and Akita prefectures) and Okinawa prefecture were lower than those of other prefectures. Further research should be considered about other opportunities for active transportation, beyond

just active commuting to school, (e.g. going shopping, going to the park, sports clubs or cram schools). In the 2016 Japan Report Card, the grade of B was assigned.⁵ Except for preschool children, the percentage commuting actively to school slightly decreased with age in school-aged children and adolescents. Public schools in Japan are located in school districts. Japanese law determines school-commuting distances as around 4 kms for primary schools and around 6 kms for junior high schools as percentages of students attending private schools, which may be some distance away from students' homes, were only 1.0% in primary school, 7.0% in junior high school and 29.7% in high school, respectively.^{25,27} Thus, the grade of the 2018 Japan Report Card by data from 5th grade primary school students and 2nd grade high school students was higher than that of the 2016 Japan Report Card.

Sedentary behaviors

The national survey of the JSA reported that 43% of students spent less than 2 hours per day of screen time after school on weekdays and on weekends.¹¹ All 38countries in the global matrix 2.0 had an average of a D grade in 2016.⁴ In the 2016 Japan Report Card, the grade of C was assigned. The previous national survey of 2015 asked only about screen time on weekends for same age groups with the 2018 Japan Report Card.⁵ On the other hand, the most recent national survey of 2017 asked about screen time both on weekdays and weekend days. Moreover, the 2016 Japan Report Card included preschool children (4-5 years old), 31% of whom spent more than 2 hours per day watching TV, and using/watching PCs. Thus, the 2018 grade is lower than that of the previous the 2016 Japan Report Card.

Physical Fitness

The JSA survey comprehensively measures physical fitness and motor skills tests [grip strength, sit-ups, sit & reach, side step, 20-m shuttle run (elective choice between 20-m shuttle run and endurance run in 12- to 19-year-old students), 50-m run, standing long jump, and softball throw in 6- to 11-year-old students or handball throw in 12- to 19-year-old students] by gender in Japanese 6- to 19-year olds every year.¹² However, there are no Japanese government recommendations for physical fitness and criterion-referenced standards for aerobic power, muscular strength and flexibility. In the present study, we evaluated Japanese children and youth cardiorespiratory endurance according to twenty-metre shuttle run (speed (km/h) at the last complete stage) centiles by age and gender in children and youth aged 9–17 years according to the criterion-referenced data provided by Tomkinson et al.¹⁷ The mean values for the Japanese data were around the 90th centiles. The highest values were in junior high school students of both genders. One reason might be the higher percentage of organized sports participation in junior high school students. This indicator had previously received a grade of C on the 2016 Japan Report Card due to an evaluation based on nationally comprehensively evaluated physical fitness and motor skills tests by gender- and age-specific ranks (A–E, norm-referenced evaluation), because there were no Japanese government recommendations for physical fitness.¹² Despite the apparently high grade for physical fitness in Japan for the 2018 Japan Report Card, the continued surveillance of objective measurements of physical fitness of Japanese children and youth is a public health priority, particularly since the physical fitness level of Japanese children and adolescents are low compared to the 1980s in Japan.²⁸

Weight Status

Objectively measured weight Status was evaluated based on the prevalence of obesity and thinness in the database of the MEXT School Health Survey.¹³ Overall levels of obesity are high compared to the 1980s in Japan. A grade of A was assigned according to the 10% of Japanese students were overweight/obese or underweight. The prevalence in the 2018 Japan Report Card were similar with the 2016 Japan Report Card.

Family and peers

There are no Japanese government recommendations for exercise or sport with parents for children and adolescents. There is a lack of peer-influence evidence for Japan from nationally representative data. Health Japan 21 (second term) has many targets about health behavior and outcomes for adults. These percentages on PA in adults are similar to the 2016 Japan Report Card and the 2018 Japan Report Card percentages (36%), except for participation in sport by females (25% in the 2016 Japan Report Card).⁵ On the other hand, data on participation in sport or exercise with a guardian in the 2018 Japan Report Card uses the same survey year's data as the 2016 Japan Report Card because the question wasn't asked in the recent JSA survey.¹¹ The 2018 Japan Report Card also added a new question about parents encouraging children and adolescents to exercise and engage in sport as proxies for family influence in the absence of more direct data in the recent JSA survey.¹¹ The percentage from this the new question (44-63%) was higher than that of previous question in the 2016 Japan Report Card (7-36%). Thus, the 2018 Japan Report Card grade (C⁻) was higher than that of the 2016 Japan Report Card (D). Thus, parental support might affect a students' PA. Recently, our previous study found that there were associations between Japanese primary school children's MVPA and maternal support.²⁹

School

Although the percentage of full-time teachers of PE classes with specialized PE degrees in junior high school and high school was 100%, the percentage in primary schools was only 4.8%.¹¹ The MEXT in Japan sets the educational curriculum guidelines for all primary and secondary schools including the content of PE, the number of PE classes, and guidelines for school infrastructure and equipment ministry (eg, sports mat, horizontal bars, hurdles, etc).³⁰ As mentioned above, according to the MEXT, all schools from primary school to high school offer recess too. However, there are no data in Japan on the extent of regular access to facilities and equipment that support PA (e.g., gymnasium, outdoor playgrounds, sporting fields) and school policy and practice on these areas might affect how and how often students engaged in PA. In comparison with the previous the 2016 Japan Report Card,⁵ the target age was changed from preschool children through high school children in 2016 to only school-aged children and adolescents in 2018 in line with Active Healthy Kids Global Alliance standards. Active play in nursery schools and kindergartens isn't carried out by specialized course teachers who have studied PE. Also, in primary schools, PE classes are the only classes that don't use textbooks. Thus, the 2018 grade B⁺ changed to B of the 2016 Japan Report Card. The Second Sport Basic Plan showed the importance of PE in primary schools being carried out by PE specialist teachers.²⁴ Our previous study found that time spent in MVPA were only 27.3 ± 13.4% (45 min/lesson) during PE which were taught by class teachers who teach a range of courses in Japanese primary school children.³¹ Sallis et al. reported that results from a 2-year enhanced PE curriculum found PE specialist and trained teachers can provide students with more PA during PE lessons than generalist classroom teachers.³²

Community and the Built Environment

The grade for Community and the Built Environment in the 2018 Japan Report Card remains consistent with the 2016 Japan Report Card at a D. Health Japan 21 (second term) sets targets for the number of local governments trying to provide environments that were easily accessible for residents to exercise.¹⁰ Although the number of prefectures fulfilling the conditions increased from 17 prefectures in 2012, data that was used in the 2016 Japan Report Card, to 30 prefectures 5 years later (64%), used in the 2018 Japan Report Card, this is still well below Health Japan 21 (second term) target of all 47 prefectures.⁵ Even with evidence of modest increases in accessibility to outdoor space to be physically active, the grade for Community and the Built Environment remains D.

Government Strategies and Investments

The grade for Government Strategies and Investments remains unchanged from the 2016 Japan Report Card at a B given that no new data were available to inform a change to the previous grade. As in the 2018 Japan Report Card, the grade was also assigned based on relevant national laws, ordinances, and the “presence” of strategies, and policies in Japan like the 2016 Japan Report Card.⁵ Based on an analysis of assigned grades from 38 countries participating in the 2016 Report Card initiative, the grades ranged from F to A⁻ and that most countries are having both successes and challenges.⁴

Strengths and limitations

The major strength of the 2018 Japan Report Card was the use of nationally representative data to inform the assignment of the grades and the use of a quantitative grading rubric in both 2016 and 2018. The quality of the methods used, the recruitment procedure and representativeness of the surveys were adequate. However, there are large surveillance gaps in Japan, as 2 of the 11 indicators could not be graded, including the overall PA grade which is of fundamental importance, although we already have stated that data exist on other indicators and large surveys, conducted annually, already exist. There is also a lack of data on how much time children and youth spend in active play. For some indicators, there were limited data for 5th grade primary school students and 2nd grade junior high school students. Furthermore, some of the data used to derive grades in the 2018 Japan Report Card are several years old, making it difficult to make inferences about recent trends and current status. The data of Family Influence and Community and the Built Environment was limited. the 2018 Japan Report Card allowed the report to illustrate global gaps, and to detect problems particular to Japan.

Conclusion

The 2018 Japan Report Card shows that Japanese children and youth have favorable levels of organized sport participation, active transportation to and from school, physical fitness and weight status with moderate levels of recreational screen time. Findings were similar to those of the 2016 Japan Report Card Future nationally representative surveys on overall PA, active play, and community and the built environment are needed.

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References

- 1) Ekelund U, Brage S, Froberg K, et al. TV viewing and physical activity are independently associated with metabolic risk in children: the European youth heart study. *PLoS Med.* 2006;3:e488.
- 2) Janssen I, Katzmarzyk PT, Boyce WF, et al. Comparison of overweight and obesity prevalence in school-aged youth from 34 countries and their relationships with physical activity and dietary patterns. *Obes Rev.* 2005;6:123–132.
- 3) Trudeau F, Laurencelle L, Shephard RJ. Tracking of physical activity from childhood to adulthood. *Med Sci Sports Exerc.* 2004;36:1937–1943.
- 4) Tremblay MS, Barnes JD, González SA, et al. Report Card Grades on the Physical Activity of Children and Youth Comparing 38 Countries. *J Phys Act Health.* 2016;13(11 Suppl 2):S343-S366.
- 5) Tanaka C, Tanaka S, Inoue S, et al. Results From Japan's 2016 Report Card on Physical Activity for Children and Youth. *J Phys Act Health.* 2016;13(11 Suppl 2):S189-S194.
- 6) Active Healthy Kids Japan. <http://www.activekids.jp/>. Accessed May 25, 2018.
- 7) Japan Sports Agency. http://www.mext.go.jp/sports/en/about_us/background/index.htm Accessed March 19, 2018.
- 8) Government of the United Kingdom and Mayor of London. Inspired by 2012: The legacy from the London 2012 Olympic and Paralympic Games. 2013.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/224148/2901179_OlympicLegacy_acc.pdf. Accessed May 25, 2018.

- 9) Ministry of Education, Culture, Sports, Science and Technology: Youjiki Undou Shishin. 2012. http://www.mext.go.jp/a_menu/sports/undousisin/1319192.htm. Accessed 25th May 2018.
- 10) Ministry of Health Labour and Welfare: Health Japan 21 (second term). http://www.mhlw.go.jp/seisakunitsuite/bunya/kenkou_iryoku/kenkou/kenkounippon21/en/kenkounippon21/. Accessed May 16, 2018.
- 11) Japan Sports Agency: The Report of FY2017 National Survey on Physical Fitness, Athletic Performance and Exercise Habits. 2017. http://www.mext.go.jp/sports/b_menu/toukei/kodomo/zencyo/1401184.htm. Accessed May 15, 2018.
- 12) Japan Sports Agency. The Report of FY2016 Survey on Physical Strength and Athletic Performance. 2017.
- 13) Ministry of Education, Culture, Sports, Science and Technology. The School Health Survey data. 2015; <http://www.e-stat.go.jp/SG1/estat/List.do?bid=000001052600&cyclo=0>. Accessed May 16, 2016.
- 14) Ministry of Health, Labour and Welfare. Summary of results of the National Nutrition Survey, Japan. 2017. https://www.e-stat.go.jp/stat-search/files?page=1&layout=datalist&toukei=00450171&kikan=00450&tstat=000001041744&cycle=7&tclass1=000001111535&survey=%E5%81%A5%E5%BA%B7&result_page=1&second2=1. Accessed March 19, 2018.
- 15) National Federation of Health Insurance Societies. Results of the National Federation of Health Insurance Societies Survey, Japan. 2016.

- http://www.kenporen.com/study/toukei_data/pdf/chosa_h29_09_3.pdf. Accessed March 19, 2018.
- 16) Start active, stay active. A report on physical activity from the four home countries' Chief Medical Officers. https://www.sportengland.org/media/2928/dh_128210.pdf. Accessed May 16, 2018.
- 17) Tomkinson GR, Lang JJ, Tremblay MS, et al. International normative 20 m shuttle run values from 1 142 026 children and youth representing 50 countries. *Br J Sports Med*. 2017;51:1545-1554.
- 18) Hallal PC, Andersen LB, Bull FC, et al. Global physical activity levels: surveillance progress, pitfalls, and prospects. *Lancet*. 2012;380(9838):247-257.
- 19) Fukushima N, Inoue S, Hikihara Y, et al. Pedometer-determined physical activity among youth in the Tokyo Metropolitan area: a cross-sectional study. *BMC Public Health*. 2016;16:1104.
- 20) Kidokoro T, Tanaka C, Tanaka S, et al. Global Trends in Evaluation Methodology of Physical Activity Questionnaires for Children and Adolescents. *The Japanese Association of Exercise Epidemiology*. 2018;20:26-36. (in Japanese)
- 21) Tanaka C, Kyan A, Takakura M, et al. The Validity of the Japanese version of physical activity questions in the WHO Health Behaviour in School-aged Children (HBSC) survey. *The Japanese Association of Exercise Epidemiology*. 2018;19:93-101.
- 22) Ministry of Health, Labour and Welfare. Active guide. 2013, <http://www.nibiohn.go.jp/eiken/info/pdf/active2013-e.pdf>. Accessed May 16, 2018.
- 23) The Japan Sports Association : Active Child 60min. Takenaka K. (edit.), Sanraifukikaku, Tokyo, 2010. (in Japanese)

- 24) Ministry of Education. Culture, Sports, Science and Technology. The Sport Basic Plan (the second term). 2016. <http://www.mext.go.jp/en/>. Accessed March 19, 2018.
- 25) Japan Sports Agency. The Report of FY2016 National Survey on Physical Fitness, Athletic Performance and Exercise Habits. 2017.
http://www.mext.go.jp/sports/b_menu/toukei/chousa04/tairyoku/kekka/k_detail/1396900.htm. Accessed May 16, 2018.
- 26) Tanaka C, Abe T, Okada S, et al. Comparison of Indicators for Physical Activity in Primary School and Junior High School Students in 47 Prefectures —According to International Indicators Based on “REPORT CARD ON PHYSICAL ACTIVITY FOR CHILDREN AND YOUTH—”. *The Japanese Association of Exercise Epidemiology*. 2018;20:37-48. (in Japanese)
- 27) Mori N, Armada F, Willcox DC. Walking to school in Japan and childhood obesity prevention: new lessons from an old policy. *Am J Public Health* 2012;102:2068-2073.
- 28) Ministry of Education. Culture, Sports, Science and Technology: The Report of FY 2013 Survey on Physical Strength and Athletic Performance. 2014.
http://www.mext.go.jp/a_menu/sports/kodomo/zencyo/1342657.htm. Accessed May 16, 2018.
- 29) Tanaka C, Okuda M, Tanaka M, et al. Associations of physical activity and sedentary time in primary school children with their parental behaviors and supports. *Int J Environ Res Public Health*. in press.

- 30) Ministry of Education, Culture, Sports, Science and Technology: Commentary on the Course of Study for elementary school (Physical Education). 2008
http://www.mext.go.jp/component/a_menu/education/micro_detail/_icsFiles/afieldfile/2011/01/19/1234931_010.pdf
- 31) Tanaka C, Tanaka M, Tanaka S. Objectively evaluated physical activity and sedentary time in primary school children by gender, grade and types of physical education lessons. *BMC Public Health*. 2018;18:948.
- 32) Sallis JF, McKenzie TL, Alcaraz JE, et al. The effects of a 2-year physical education program (SPARK) on physical activity and fitness in elementary school students. *Am J Public Health*. 1997;87:1328–1334.
- 33)
- 34)