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33 Abstract

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Background The Report Card on Physical Activity for Children and Youth aims to consolidate 34 existing evidence, encourage more evidence-informed physical activity, and improve surveillance 35 of physical activity. 36 37 Methods Application of Canada and Scotland Report Card methodology to Japan, adapted to Japanese circumstances and availability of data, and based on nationally representative surveys. 38 Results The 2016 Japan Report Card on Physical Activity for Children and Youth consists of 39 40 Health Behaviors and Outcomes (7 indicators); and Influences on Health Behaviors (4 indicators). Three Health Behaviors and Outcomes received C grades (Participation in Sport; Sedentary 41 42 Behavior; Recreational Screen Time; Physical Fitness), while two indicators could not be graded 43 (Overall Physical Activity, and Active Play). The indicators Active Transportation (B) and Weight Status were favorable (A). In the Influences domain, Family Influence and Community and the 44 45 Built Environment were graded as D, while the School & Childcare Settings and the Government 46 Strategies and Investments were favorable (B). 47 **Conclusions** The Japan report card illustrated some favorable health behaviors, health outcomes, 48 and influences. There is a need for more evidence especially on overall physical activity, active 49 play, and community and the built environment. 50 **Key words**: sports; sedentary behavior; environment; policy; physical fitness

52 **Introduction**

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Public health surveillance of physical fitness in children and youth in Japan using schoolmeasures of physical fitness has been based on the Physical fitness test of the Ministry of Education, Culture, Sports, Science and Technology (MEXT) since 1964, when the 18th Summer Olympic Games was held in Tokyo. This surveillance is performed to evaluate the physical fitness and exercise, life and eating habits across the life course, from Japanese children to the elderly, every year. In 2013 the MEXT issued a report comparing physical fitness in children and adolescents from 1964 to 2013. The results indicated that physical fitness and motor skill levels (Grip Strength, 50 Meter Run, Standing Long Jump, Softball Throw, Side Step, and Step Test or 20 Meter Shuttle Run) obtained in 2014 were lower than that at time of the previous Olympic Games. It was notable that, there has been a polarization in exercise habits in recent children and adolescents.² The latest surveillance of the Japan Sports Agency in 2015 reported that students with high exercise habits or exercise duration per week had superior physical fitness, liked exercise, participated in, watched or talked about sports or exercise with a guardian, and understood the importance of sleeping and eating habits.³ While there are several national representative surveys of exercise habits and related information on Japanese children and adolescents, they are somewhat limited. Thus, further comprehensive surveys should be performed. The Report Cards on Physical Activity for Children and Youth from Canada and 14 other countries published in 2014 presented a promising approach to achieving a more robust physical activity surveillance and evidence-informed physical activity promotion strategy in Japan.⁴⁻⁷ Japan is going to host the Tokyo 2020 Olympic and Paralympic Games. The Japan report card

has the possibility of showing any sporting legacy created by the Games, and may have a lasting

impact on the country and its residents not only children and adolescents in the near future. The purpose of this paper is to summarize the process and results of the 2016 Japan Report Card on Physical Activity for Children and Youth. This report card is based on recent nationally representative surveys of Japanese children and youth.

The 2016 Japan Report Card on Physical Activity for Children and Youth was produced by

79 Methods

a small Research Work Group, based on the Canadian and Scottish models^{4,5,7} which consisted of the six authors of the current paper. Members of the Stakeholder Group helped identify relevant data for the Japanese card. Funding for the 2016 Japan Report Card on Physical Activity for Children and Youth was provided by a grant from the project research of Japanese Society of Physical Fitness and Sports Medicine in 2015 (2015~2017)

(http://www.jspfsm.umin.ne.jp/en/index.htm),the J. F. Oberlin University, and the Institute of Health and Sports Science & Medicine, Juntendo University. The funding body had no role in the content or presentation of the report card, and no role in the current manuscript.

Since the 2016 Japan Report Card on Physical Activity for Children and Youth was modelled closely on the Canada and Scotland Report Cards, it was our intention to harmonize indicators (health behaviors and influences) with those Report Cards as much as possible, subject to the availability of suitable Japanese data. However, Japanese public health surveillance data were available for some health outcomes not included in the other countries cards, but which are

notably physical fitness and weight status. The final Japan Report Card therefore had a total of

related to physical activity, and hence we included these indicators in the Japanese report card,

from nationally representative surveys within Japan. Like the Active Healthy Kids Scotland Report Card, restricting the search to national surveys seems appropriate because several nationally representative surveys exist within Japan, and because of the dearth of large nationally representative research studies with high quality measures of the health behaviors and outcomes of interest. For the 11 indicators draft grades were assigned by the Research Work Group in February 2016, by comparison of the national survey data against a relevant evidence-based recommendation (e.g. two hours/day recreational screen time for school-age children and adolescents) where available, using the benchmark approach from the Canada and Scotland Report Card. 4,5,7 The grades used were as follows: grade A (we are succeeding with >80% of children and adolescents); grade B (succeeding with 60-79%); grade C (succeeding with 40-59%); grade D (succeeding with 20-39%); grade F (succeeding with <20%). The report card process, and the current manuscript also considered how each report card indicator measure might be improved in future (e.g. by inclusion of a better measure of that indicator); and a brief consideration of how the grade might be improved in the future. Decisions of this kind were made by the Research Work Group, using a combination of their expertise in the area, and the consultation process with stakeholders in Japan. Draft report card grades were considered at a feedback meeting attended by the Research

From July 2015 to February 2016 the Research Work Group searched for relevant evidence

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Work Group, and the Stakeholder Group who were members of Japan Society of Human Growth and Development (http://www.hatsuhatsu.com/english/), in March 2016. In the consultation stakeholders were asked to address the following questions: were any relevant Japanese data missed in the process of card development?; were any data misinterpreted by the Research Work Group? (e.g. were the draft grades justified?). This consultation process informed the final grades

in the short form report card published in May 2016. The long form (more detailed report card, with further information on data considered and rationale for the grades) will be published in October 2016.

123 Results

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The 2016 Japan Report Card on Physical Activity for Children and Youth is summarised in Table 1. The short-form and long-form Japanese report cards are accessible from the project website www.activekids.jp.

For the category of 'Health Behaviors and Outcomes' (Table 1), 5 of the 7 indicators could be graded with a degree of confidence with a combination of the availability of a recommendation and the benchmark of the proportion of children and youth meeting the guideline as noted above or the percentage of each indicator. The indicator 'Overall Physical Activity' could not be graded, because evidence-based data for the behavior were lacking in Japan. Table 1 shows that the key health behaviors and outcomes were generally assigned middle grades: C for Organized Sport Participation; C for Sedentary Behavior (recreational screen time); C for Physical Fitness, in particular. On the other hand, Weight Status and 'Active Transportation' were favorable (A and B grades respectively). For the category of 'Influences on Physical Activity and Health Behaviors and Outcomes' grade assignment was possible with a degree of confidence, but the indicator 'Active Play' could not be graded due to lack of evidence (Table 1). The indicator 'Family and Peer Influence on Physical Activity Behaviors and Outcomes' was graded D, informed by adult data that show Japan is characterised by low participation rate in organized sports among adults, and low participation in sport and physical activity of parents with their children; adherence to physical activity recommendations among adults is modest-low. The indicators 'School' and 'Government Strategies and Investments'

referred to national policy, and were graded B on the grounds that Japan has some a favorable national government school curriculum, policies, strategies, and investments which target most of the seven health behaviors and outcomes included in the report card. However, the indicator 'Community and the Built Environment' was graded D because many prefectures lack adequate facilities, programs, parks & playgrounds for exercise, and surveys of parents suggest that safety concerns in theirneighborhood reflect a perception of lowchild safety for outdoor active play, exercise or sports in preschool and primary school children. Moreover, there is little evidence on this indicator for school-aged children to help determine the grade.

151 Discussion

The cover of the Active Healthy Kids Report Card Japan 2016 shows students engaging in both physical activity and sedentary behaviour during a physical education (PE) class. The Japanese government sets national educational curriculum guidelines for PE classes in school aged students, and guidelines for active play in preschool children. All Japanese school aged students attend PE class about twice a week in the school term (almost 100 classes/year) and learn many sports skills and rules included in martial arts which are Japanese traditional sports (e.g., Kendo, Judo). A stated aim of these government guidelines is to improve physical fitness and to promote a positive attitude toward exercise as a lifelong physical activity. However, as the cover of the Japan 2016 Report Card suggests students don't move continuously during PE class, because they have to sit during their teacher's instruction and/or while waiting their turn. It is also worth noting that a recent systematic review of the moderate-vigorous physical activity (MVPA) content of school PE globally suggested that a minority of time in PE classes was spent in MVPA.

Overall physical activity levels

We have assigned INC for a grade of overall physical activity levels. There are no representative Japanese data for physical activity in under 15-year-olds, a major limitation of Japanese surveillance data. The National Health and Nutrition Examination Survey reported step counts for 15-19 year olds. 10 In males, the data showed a marked decrease over the past few years in 2010, mean values of 7458 steps/day for girls, 7872 steps/day for boys. On the other hand, trend data in females generally continues to be flat, with no obvious recent secular trends. However, step count data haven't been reported by the National Health and Nutrition Examination Survey since 2012. An additional problem is that in Japan an official national physical activity guideline does not exist for adolescents. The Japan Sports Association guideline (Active Child 60min) for preschool and primary school children is based on international physical activity guidelines. Similarly, for preschool children, the official national physical activity guideline was proposed by MEXT (2012). They address only duration not intensity. Some relevant regional (not nationally representative) physical activity data are available within Japan. The Tokyo Metropolitan Board and Education Survey collected pedometer data for 6-17 year olds in Tokyo in 2012 and found that only a small percentage of 11-15 year old youth met the adult recommendation of at least 10000 step counts per day. 11 Development of the Japan 2016 Report Card has also confirmed that there are currently no objectively or subjectively measured Japanese daily physical activity surveillance data for younger children, a major gap in public health surveillance in Japan.

Organized sport participation

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Two data sources were used to consider organised sport participation among Japanese children and adolescents: the first is the results of national physical fitness survey is reported by the Japan Sports Agency in 2015.³ This survey collected questionnaire data from a nationally

representative sample of 47 prefectures for 6-17 year-olds. The Sasagawa sports foundation (SSF) carries out a survey of exercise and sports participation among children every other year.¹² The survey uses a stratified two-step random sampling method. This survey currently includes only the small number of participants in each age group, and so is currently a less useful source for surveillance of organized sport participation than the national physical fitness survey by the Japan Sports Agency.

The Japanese government does not currently issue recommendations for organized sport participation in children and adolescents. The grade for this indicator was based on self-reported participation in sport. Participation in sport was reported by 27~92% of 6-to 17-year-olds by the national physical fitness survey of Japan Sports Agency.³ There were age and gender differences in participation in organized sports, with lower participation among younger children than older children and adolescents, and lower participation among girls than boys (4-5 years old; 27.7% in girls, 30.1% in boys, 6-11years old; 44.0% and 61.8%, 12-14 years old; 68.7% and 90.1%, 15-17 years old; 45.7% and 70.2%). Surveillance in Japan therefore suggests that strategies to increase the percentage of young children and girl's participation in organized sports will be necessary in the future.

Active Play

The present study found no representative Japanese data for active and outdoor play. In addition, there are no Japanese government recommendations for active and outdoor play. Thus, the grade INC. Future surveillance of active and outdoor play in Japan should be considered, and this domain of physical activity might be a neglected but potentially useful target of future strategies aimed at increasing physical activity. Janssen suggested that an importance of active play in reducing childhood obesity. ¹³ The Japanese national physical activity guideline in

preschool children also focuses on active play. However, Tanaka et al. suggested that in preschool children participation in a sports club and time in walking to school were not correlated with MVPA when adjusted for age, body height and log-body weight. ¹⁴ Moreover, parents' reported outdoor playing time was not significantly correlated with daily MVPA in preschool children. ¹⁴

Active Transportation

The SSF database was used to estimate prevalence of active transportation to school for the purposes of grading for this first Japanese report card, as it provided recent and nationally representative data. ¹² The SSF carries out an investigation to clarify the present state of active transportation for children and adolescents every other year. There are no Japanese government recommendations for active transportation and the grade was assigned according to the percentage of children who regularly commute actively to school (walking or cycling). The 2015 SSF National Sports-Life Survey of Children reported that 28% of Japanese preschool children (4-5 year olds) regularly commute actively (walking) to school. ¹² The 2015 SSF National Sports-Life Survey of Young People reported that 93% of Japanese elementary school children (6-11 year olds) regularly commute actively (walking or cycling) to school, and 88% of those at junior high school (12-14 year olds) and or 68% of high school students (15-18 year olds) regularly commute actively to school. ¹² The grade for Active Transportation is B, and is substantially higher than for most of the other high-income countries reported by the international Active Healthy Kids Report Card in 2015.⁶

Sedentary Behavior

We used both the national physical fitness survey of Japan Sports Agency (2015) and the SSF Survey (2015) as sources of evidence for grading of sedentary behaviour indicator.^{3,11} In

other countries, sedentary behavior guidelines are usually presented separately from physical activity guidelines, ¹⁶⁻¹⁸ and there is an international consensus that school-age children and adolescents should spend no more than 2 hours per day in recreational screen time. There are currently no Japanese government recommendations for sedentary behavior. Thus, the grade for the first Japanese report card was assigned with reference to the international guidelines.

Sedentary behaviour was graded C based on somewhat limited recreational screen-time data.

Moreover, no data were available for objective measures of sedentary behavior, or for types of sedentary behavior other than recreational screen time, including constructs of sedentary behavior now considered very important to later health, notably time spent sitting and breaks in sitting time.¹⁹

Physical fitness

We used the database by the national physical fitness survey of Japan Sports Agency (2015) to grade this indicator. There are no Japanese government recommendations for Physical fitness. However, the Japan Sports Agency (2015) comprehensively evaluates physical fitness and motor skills test (grip strength, sit-ups, sit & reach, side step, 20meter shuttle run: elective choice between 20 Meter Shuttle Run and endurance run in 12 to 19 year-old students, 50 meter 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 5 gender- and age-specific ranks (A~E).³ The percentage of A and B ranks among Japanese 6- to 17-year-olds was 42-67%. Thus, the grade for Physical fitness in the first Japanese report card was C. The physical fitness test data suggest that currently physical fitness level in children and adolescents is lower than that in the 1980s.¹

There are currently no nationally representative data on physical fitness for younger children, under the age of 6 years. For the present study Physical fitness and motor skills was

difficult to grade, because it concerns a health outcome rather than health behaviors, and so does not fit very easily into the A-F grading scheme described above.

Weight status

We used the database of the School Health Survey data (2015) of the MEXT to grade this indicator. ²⁰ The survey uses a two step stratified random sampling method and is assumed to produce representative data. The Survey reported that 2.24-11.34% of 5-17 years old Japanese boys and girls were obese The grade for this indicator was A. Obesity was defined as over 20% of standard weight which is gender- and age-specific. Although obesity levels decreased from 2006, they have been stable since 2011. Overall, however, levels are high compared the 1980s. On the other hand, the percentage of underweight is 0.40-4.33%. The underweight data maintains an upward trend in both genders. As a health outcome rather than a health behavior, like physical fitness as noted above, weight status was also difficult to grade.

Family and Peer Influence

We used three data sources when grading this indicator, the annual nationwide National Health and Nutrition Survey conducted by the Ministry of Health, Labour and Welfare²⁰, the Survey of SSF (2015)¹², and the report by Health Japan 21 (second term) of Ministry of Health Labour and Welfare.²¹ In all cases the data sources were effectively proxies for Family Influence, and provided little direct evidence on the influence which parents of peers have on physical activity among children and adolescents in Japan. The Japanese government does not currently issue recommendations for exercise or sport with their parents in children and adolescents.

Moreover, there are no representative Japanese Peer-Influence data. We considered that data on adult physical activity levels and exercise or sport with their parents in children and adolescents

would be appropriate as proxies for family influence in the absence of more direct data, as is the case in many other countries which have produced Report Cards to data (e.g. in Scotland). The original the National Health and Nutrition Survey was conducted in 1946. A total of 3648 households participated in the survey2014 of survey.²⁰ The SSF database was used to estimate participation in exercise or sport of Japanese preschool children (4-5 years old) with their parents. 12 Health Japan 21 (second term) is a national policy which focuses on extending healthy life expectancy, and minimizing the spread in health inequalities within the population.²¹ The National Health and Nutrition Survey in 2014 reported that daily step counts were 6794 steps/day for women aged 20 to 64 years old, and 7860 steps/day for men, respectively. 21 These results fail to meet the target of Japan 21 (second term) which are 8,500 steps/day for women and 9,000 steps/day for men. The physical activity surveillance data self-reported for adults in Japan shows that about one third of Japanese adults participate in sport more than 30min at least twice per week for more than 1 year. 20, 21 These data fall below the target of participation in sport as set by Health Japan 21 (second term).²¹ Surveillance data for adult obesity defined as BMI (body mass index) over 25 kg/m² suggest that adult obesity in 2014 was quite common at 31% of men and 25% of women. There are some limited Japanese data which are relevant to family/peer influence: in fifth grade Japanese primary school students and for those in second year in junior high school, the reported percentage of participation in sport or exercise with a guardian more than once per week ranged from 7-36% in the national physical fitness survey P of Japan Sports Agency (2015).³ The 2015 SSF National Sports-Life Survey of Young People reported that 72% of Japanese preschool children (4-5 years old) participated in exercise or sport with their parent "often" or "sometimes". 12 Grading of these limited influence data was difficult, but combined

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with the evidence of fairly low-moderate adult physical activity and relatively high prevalence of adult obesity the grade for Family and Peer Influence was D.

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Sources of evidence for grading of this indicator were the national educational curriculum, and school infrastructure and equipment guidelines for PE in school aged children and adolescence or active play in preschool children. The grade was assigned based on the curriculum content and presence of infrastructure and equipment such as environment in school e.g. safety; healthy cultural environment (e.g. a lot of sunshine and fresh air), neighborhood and school route, school building, indoor or outdoor exercise facilities in preschool to high school. The MEXT sets the curriculum in elementary school, junior high school and high school including the content of PE and the number of PE classes provided. The curriculum for kindergarten is also set by the MEXT. The curriculum for nursery schools is set by the Ministry of Health, Labour and Welfare. Both guidelines require physical activity during childcare for young children. However, PE in primary schools or active play in nursery schools or kindergarten isn't carried out by specialized course teachers who have studied PE. Also, in primary schools, only PE classes don't use textbooks. The MEXT produces guidelines for school infrastructure and equipment for PE or active play in kindergartens, primary schools, junior high schools, and high schools such as the area of the school playground, the existence of a gymnasium and relevant equipment according to the education guidelines, for example, sports mat, horizontal bars, hurdles etc. The nursery school facilities are also set by the same ministry. With a number of relevant guidelines for school and preschool settings, the grade for school and childcare settings was B.

Community and the Built Environment

The Health Japan 21 (second term) policy by the Ministry of Health, Labour and Welfare and the database of the SSF (2015) were used to grade this indicator. ^{12,21} The grade was assigned by the perceived availability of environments for exercise or outdoor play. Health Japan 21 (second term) reported that the number of local governments which were trying to provide environments where residents can easily access for exercise stood at 17 of the 47 prefectures (in 2012). ²¹ The 2015 SSF National Sports-Life Survey of Young People reported that 48.2% of Japanese parents of 4-9 year old children agreed they lived in neighborhoods that allowed children to engage in active and outdoor play, exercise, or to participate in organized sports. ¹² Thus, with evidence of modest accessibility to outdoor space to be physically active the grade for community and the built environment was D.

Government Strategies and Investments

In order to grade this indicator we searched for relevant national laws, ordinances, strategies, and policies in Japan. In Japan, there are many relevant laws and ordinances: The Basic Act on Sport, Health Promotion Law, the School Lunch Program Act, the Community Health Act, the Maternal and Child Health Act, the School Health and the Safety Act, Basic Act on Food Education. There are also multiple relevant strategies and policies like The Sport Basic Plan, Health Japan 21 (second term), Healthy parents and children 21 (second term). However, Physical activity guidelines for Japan at present are only available for preschool children, primary school children, adults, and the elderly: as noted above there are no national physical activity guidelines for adolescents, and this may have limited surveillance of physical activity and in turn policy, limited the strategy and investment for physical activity for school-age adolescents. Investment and implementation of national policy is the responsibility of the Japanese national budget for sports and the Sports Promotion Lottery, called "toto": this is used

as a subsidy for sport. Despite some limitations in the evidence available for this indicator, the presence of multiple policies and strategies, with some evidence of implementation of policy, meant that, the grade for national policy, strategy, and investment was B.

Strengths and Limitations

Although grades assigned in the Japan 2016 Report Card on Physical Activity for Children and Youth were based on the best available data, and on recent nationally representative surveys, the process of developing the Japanese Report Card highlighted a number of gaps in Japanese surveillance of health behaviors and outcomes. The three most glaring gaps were the lack of surveillance of physical activity, active play, and the absence of objective measures of sedentary behavior. For some indicators in the 'Health Behavior and Outcomes' category there were no or limited data for school-aged children. For other indicators difficulty in assigning a grade arose from a combination of limitations in the surveillance data and the absence of an evidence-based recommendation against which to assess adherence.

361 Conclusions

The first 2016 Japan Report Card on Physical Activity for Children and Youth shows that Japanese children and adolescents have moderate levels of organized sport participation and recreational screen time and they develop in an adult environment with low organized sport participation, moderate levels of physical activity, and relatively high prevalence of adult obesity. However, this first Japanese card suggests that Active Transportation to School in Japan is very high by international standards and environmental factors (School and Government strategies and investments) believed to influence physical activity are favorable. Future nationally representative surveys on overall physical activity, active play and, community and the built environment are needed. A combination of surveillance data for physical activity in

future, combined with future issues of the Japanese report card, will be useful in assessing whether the generally favorable policy environment in Japan is having the desired impact on physical activity and other important health behaviors and health outcomes included in the report card.

Institutions Where Work Originated

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Tables

Table 1. Grades According to Physical Activity Indicator in the 2016 Japan Report Card on

Physical Activity for Children and Youth

Indicator	Grades
Overall Physical Activity Levels	INC
Organized Sport Participation	C
Active Play	INC
Active Transportation	В
Sedentary Behaviours	C
Physical fitness	C
Weight status	A
Family and Peer Influence	D
School	В
Community and the Built Environment	D
Government strategies and investments	В

Note. The grade for each indicator is based on the percentage of children and youth meeting a defined benchmark: *A* is 81% to 100%; *B* is 61% to 80%; *C* is 41% to 60%, *D* is 21% to 40%; *F* is 0% to 20%; *INC* is Incomplete data.

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466	Figures
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468	Figure 1: Front Cover of the 2016 Japan Physical Activity Report Card
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470	Blank: We are going to submit that by July.