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Results From Denmark’s 2016 Report Card on Physical Activity for Children and Youth

Lisbeth Runge Larsen, Jens Troelsen, Kasper Lund Kirkegaard, Søren Riiskjær, Rikke Krølner, Lars Østergaard, Peter Lund Kristensen, Niels Christian Møller, Bjørn Friis Neerfeldt Christensen, Jens-Ole Jensen, Charlotte Østergård, and Thomas Skovgaard

Background: The first Danish Report Card on Physical Activity (PA) for Children and Youth describes Denmark’s efforts in promoting and facilitating PA and PA opportunities for children and youth. Methods: The report card relies primarily on a synthesis of the best available research and policy strategies identified by the Report Card Research Committee consisting of a wide presentation of researchers and experts within PA health behaviors and policy development. The work was coordinated by Research and Innovation Centre for Human Movement and Learning situated at the University of Southern Denmark and the University College Lillebaelt. Nine PA indicators were graded using the Active Healthy Kids Canada Report Card development process. Results: Grades from A (highest) to F (lowest) varied in Denmark as follows: 1) Overall Physical Activity (D+), 2) Organized Sport Participation (A), 3) Active Play (INC; incomplete), 4) Active Transportation (B), 5) Sedentary Behaviors (INC), 6) Family and Peers (INC), 7) School (B), 8) Community and the Built Environment (B+), and 9) Government strategies and investments (A-). Conclusion: A large proportion of children in Denmark do not meet the recommendations for PA despite the favorable investments and intensions from the government to create good facilities and promote PA.

Keywords: child health, health communication, knowledge translation

According to the latest version of the Health Behavior in School-aged Children study (HBSC) from the World Health Organization (WHO), only 9% of the Danish girls and 11% of the Danish boys at age 11 report at least 60 minutes of moderate-to-vigorous physical activity (MVPA) daily.1 Consequently Denmark ranks as number 41 of 42 comparing countries.1 Even though Danish children do substantially better when the compared factor is time in vigorous physical activity, the amount of physical activity (PA) in high intensity is not enough to compensate for the weekly lack of PA. Off hand, the low ranking is puzzling. Voluntary sport is of a high priority to both national and local governments. The Act on Nonformal Education and Democratic Voluntary Activity urges local governments to support voluntary sports clubs making sports participation available to all children. Furthermore, active transportation is promoted and very common in Denmark.5 Still, there are sizeable challenges in promoting PA among Danish children and youth. As PA is associated to several health benefits in children and tends to track from childhood to adulthood,3 a physically active childhood has great importance.

The Danish Health Authority’s recommendations for PA vary by age. In the age span 0 to 4 years, the recommendations of PA for children do not include a number of minutes of PA.4,5 From 5 to 17 years of age the recommendations advise children and youth to spend 60 minutes of MVPA per day including at least 3 sessions of 30 minutes of vigorous PA per week.6

Despite the recommendations for PA behavior and the growing body of evidence highlighting the adverse health outcomes of sedentary behaviors, these behaviors remain a challenge to address. There is a need to evaluate and translate the research on PA to guide future interventions, as well as policy and program development. One way to address this knowledge translation is to use the Report Card (RC) method, developed by Active Healthy Kids Canada (AHKC).7 The primary purposes of this article are to provide a “state of the nation” report presenting the first synthesis of the best available evidence on facilitators, barriers, and knowledge on how Denmark is performing in providing opportunities for PA for children and youth, and to evaluate their PA behaviors.

Methods

The work to develop and produce the Danish RC was initiated and coordinated by the Research and Innovation Centre for Human Movement and Learning, a joint-venture between the University...
of Southern Denmark and the University College Lillebaelt (http://fiibl.dk/inenglish/).

The RC was developed by a Report Card Research Committee (RCRC) comprised of 12 members. The RCRC had a wide presentation of researchers and experts in PA, health behaviors, and policy development and represented different scientific perspectives and methodological background. The RCRC represented 4 research units from University of Southern Denmark, 3 research departments from different university colleges, 3 professional organizations, and the region of Southern Denmark. The Danish Health Authority participated as observer in the committee and helped identify relevant data.

The RCRC was split into smaller groups (indicator groups) according to the fields of expertise of each member. The indicator group identified the existing key data sources on each indicator, presented the identified data for the RCRC, and made a draft of the indicator text. In case of incomplete data, the RCRC was used as an expert group to further guide the data identification process. The Research and Innovation Centre for Human Movement and Learning was responsible for writing up the final article text, as well as writing the full RC (Figure 1).

The RCRC met twice to plan the grading process and had 2 full-day seminars to present, discuss, and grade the indicators. Nine PA indicators were graded using the AHKC RC process, which included a synthesis of the best available evidence (large nationally representative surveys, peer reviewed papers, and gray literature such as government and nongovernment reports) and expert consensus. Grades were based on the proportion of children, adolescents, schools, or municipalities achieving the benchmark for each indicator.

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The majority of data to inform the Danish RC cover the period 2007–2016. The data sources used included population-based surveys and reports, primarily: “Sports Participation in Denmark” from The Danish Institute of Sports Studies (Idan), the HBSC 2014, the “Reform of Public Primary and Lower Secondary School” from the Danish National Centre for Social Research, the “Implementation of 45 minutes of Physical Activity on School days” from Danish School Sport (2015), the “Study of Transport Behaviour among School-children,” Ungdomsprofilen 2014 (the Danish National Youth study), the SPACE-study, and the SKOT cohort study.


The grades were given as follows: A, we are succeeding with 81% to 100%; B, we are succeeding with 61% to 80%; C, we are succeeding with 41% to 60%; D, we are succeeding with 21% to 40%; F, we are succeeding with 0% to 20%; and INC (incomplete data). If data were available, any disparities (eg, age, gender, disability, ethnicity, socioeconomic status, regional comparisons, etc.) and data trends also contributed to the decision of the assigned grades. When necessary, a “+” or “-” was included if any of the aforementioned disparities pushed the grade to the upper or lower limits of the benchmark.

Results and Discussion

Six of the nine indicators were assigned a grade, and 3 indicators were graded INC. The grades are presented in Table 1.

Overall Physical Activity: D+

Recent representative data are based on self-report of PA. In HBSC the PA recommendation is operationalized as the number of days within the latest week with at least 60 minutes of daily MVPA. The Danish part of the 2014 HBSC study (n = 4534) showed that on average 13% of Danish 11- to 15-year-olds met the national recommendation of at least 60 minutes MVPA per day. Fewer girls (10%) than boys (17%) met the recommendation.

Table 1 Grades According to Physical Activity Indicator in the 2016 Danish Report Card on Physical Activity for Children and Youth

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Grades</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Physical Activity Levels</td>
<td>D+</td>
</tr>
<tr>
<td>Organized Sport Participation</td>
<td>A</td>
</tr>
<tr>
<td>Active Play</td>
<td>INC</td>
</tr>
<tr>
<td>Active Transportation</td>
<td>B</td>
</tr>
<tr>
<td>Sedentary Behaviors</td>
<td>INC</td>
</tr>
<tr>
<td>Family and Peers</td>
<td>INC</td>
</tr>
<tr>
<td>School</td>
<td>B</td>
</tr>
<tr>
<td>Community and the Built Environment</td>
<td>B+</td>
</tr>
<tr>
<td>Government strategies and investments</td>
<td>A-</td>
</tr>
</tbody>
</table>

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.
Two recent studies have assessed PA habits for 15- to 20-year-olds. Both studies operationalized the PA recommendation as the mean number of weekly hours of MVPA during leisure time. Weekly hours ≥7 was interpreted as conformity to the PA recommendation. Separate analyses in one of the databases performed for the Danish RC, including only the 16- to 17-year-olds, showed that 55% met the PA recommendation (n = 955). The other study, including older participants (15- to 20-year-olds), reported that 18% met the PA recommendations. In both studies boys were more active than girls.

Data on objective measures of daily MVPA are available from 2 studies thought to be representative at a regional level, and additional analyses from the SKOT study (n = 386). The PA recommendations were operationalized as the average minutes of MVPA across all recorded days. For 5-year-olds, 78% met the recommendation of at least 60 minutes of daily MVPA (using accelerometer cut-point for MVPA ≥574 counts/15 sec). The SPACE study (n = 797) followed a sample of 11- to 15-year-old children for 2 years. In 11- to 13-year-olds, 41% complied with the recommendation of at least 60 minutes of daily MVPA, whereas the corresponding percentage at age 13 to 15 years was 24% (accelerometer cut-point ≥574 counts/15 sec). The choice of cut-point might influence the percentage of children complying with the recommendations for PA. In a study of preschool children (386 children, mean [SD] 5.8 ± 0.3 years), additional analyses were made (unpublished) presenting the proportion of children meeting the recommendations for PA depending on 2 different cut-point for MVPA. Based on the cut-point provided by Evenson (≥574 counts/15 sec), 78% of the children met the recommendation of at least 1 hour/day spent in MVPA. Based on the cut-point provided by Sirard (≥891 counts/15 sec), this was only the case for 3% of the children.

The grade for Overall PA is D+. The rating reflects the balance between one age group that is doing well (5-year-olds, rating B) and varying results for 11- to 17-year-olds (grade range C to F). Recommendations for PA for children below 5 years of age do not specify a number of minutes of PA per day.

Organized Sport Participation: A

The primary data source was 3 identical surveys all managed by Idan, the most recent being the largest. Preliminary results from the latest survey conclude that 83% of 7- to 15-year-olds in Denmark participate in organized sports. The proportion of children aged 7 to 15 years participating in organized sport has remained relatively stable in the surveys from 2007, 2011, and 2016 (84%, 86%, and 83%, respectively). Preliminary data showed that participation in organized sport was lower for the older age group (13 to 15 years) compared with the 2 other age groups (7 to 9 years and 10 to 12 years); the prevalence is almost equal across gender (Table 2). The grade for this indicator is A.

There has been a tendency for a slight decrease in the proportion of children who participate in organized sport at least 3 times a week from 2007 (65%) to 2011 (62%). In 2007, children were active in 3.9 sports per child. In 2011, the same estimate showed 3.2. Preliminary data from 2016 showed a decrease to 3.0 sport activities per child. However, children of today spend more time in fewer selected sport activities. The data indicate a specialization in sport participation over time. Whether this decrease in participation in a variety of sports influences physical literacy later in life remains an open question.

In a recent study, the mean frequency of participation in organized sport was 1.5 times per week, confirming the high level of sport participation among children.

Active Play: INC

Active Play is graded INC. The diversity of play is the essence of playing and for that reason it is a challenge to define, operationalize, and quantify this indicator in a meaningful way. There is no recommendation for the amount of active play in Denmark. If the purpose of the indicator is to estimate the time children spend in unorganized activity, we suggest a more appropriate term than ‘Active Play’ be developed.

From previous report cards, the indicator Active Play has been described as children’s PA in unorganized activities and / or time spent outside. Two studies from the Idan provide knowledge about children’s unstructured PA other than school and organized sport. In children, 46% of 7- to 15-year-olds reported that they were doing sport or exercise on their own; this was more popular among boys (52%) than girls (39%). Thirteen- to 15-year-olds were more likely (51%) to do unstructured and unorganized activities than 7- to 12-year-olds (43% to 44%). The most popular unstructured and unorganized activities were cycling, fitness training, running, hiking, skateboarding, and roller skating. The RCRC did not identify studies quantifying the time or the intensity of outdoor PA.

Active Transportation: B

Data from a school-based survey conducted in 2015 by The Danish Cancer Society was the primary data source for Active Transportation. As a result of personal communication between the RCRC and The Danish Cancer Society, additional analyses were performed to inform the Danish RC. The survey included 18,835 children from a voluntary sample including 4 of 98 municipalities. Thus, it is not a national survey. Virtually all public schools participated (1000 classes in total) and included 33.4% of all eligible pupils. Importantly, selection bias within municipalities is not considered a substantial issue because only 1 randomly selected class for each grade at each school was assessed. This approach was planned a priori.

The overall proportion of children and adolescents attending public schools that actively commuted (walking, cycling, skateboard, child scooter, or roller-skates) to and from school was 66% and 71%, respectively. The proportion that actively commuted to and from school was higher among 10- to 15-year-olds (76.4% and 82.1%, respectively) than among 6- to 9-year-olds (52.4% and 55.4%, respectively). Another study showed, that 57% of high school students and 45% of vocational students reported always to walk or bike to school. Based on a fact sheet from The Danish National Travel Survey (pooling 2010–2014 data) walking and cycling constituted approximately 64% of the school trips among 10- to 15-year-olds.
10- to 17-year-olds, walking and cycling trips to after-school care, sports club, and other leisure-time activities were approximately 78%, 43%, and 50%, respectively.2

The active transportation indicator was graded B because the majority of children and adolescents (averaging 68.5%) actively commuted to and from school.

The average distance to school increased during adolescence from approximately 3 km among 10- to 12-year-olds to 11 km among 16- to 17-year-olds. Since 85% of all cycle trips in Denmark are below a distance of 5 km it appears relevant to estimate the distance threshold for active school commuting.

**Sedentary Behaviors: INC**

The total amount of sedentary behavior among children and youth has been measured in nationally representative surveys and objectively by accelerometer in smaller, nonrepresentative intervention studies, respectively. All assessments showed the same tendency. During waking hours school-aged children (7- to 18-year-olds) spend an average of 8.2 hours per day being sedentary.1,11,25 According to the nationally representative HBSC 2014 data, 64% and 81% of Danish 11- to 15-year-olds spend more than 2 hours on TV viewing on weekdays and weekends, respectively.1 Among 11- to 15-year-olds, computers were used at least 2 hours per day by 56% and 61% on weekdays and weekends, respectively. There was a social gradient in 11- to 15-year-olds who exceeded this guideline on weekdays ranging from 54% in the high family occupation social class to 71% among children with parents outside the labor market.8 Computer use increased by age (41% of 11-year-olds and 69% of 15-year-olds).

New Zealand26 and Australia27 have specified that 5- to 17-year-olds should spend less than 2 hours on screen-time per day. Since there is no recommendation for sedentary behavior in Denmark the grade for this core indicator is INC.

**Family and Peers: INC**

Identified data on family and peer influence on children’s PA behavior were too limited to make a grading. However, it is possible to present indications based on data from 2 research projects28 and a report representing children aged 7 to 15 years.29 In addition, data from the Aarhus School Survey, including 2100 children at 11, 13, and 15 years of age, examined the importance of families and peers for children’s sports participation.30,31 Overall, the identified data indicated a close relationship between parents and their children’s participation in sports: if both parents take part in sport, 91% of their children also participate in sport. If none of the parents practices sport, 79% of the children participate in sport.29 It seems to especially matter to boys if their fathers participate in sports or not, resulting in 91% and 76% of the boys participating, respectively.29

**School: B**

Education is mandatory in Denmark and The Education Act, updated in 2014,32 makes it compulsory for public schools to offer an average of 45 minutes of PA per school day. In addition, Danish school children are ensured a minimum of 60 to 90 min of physical education (PE) every week, as PE lessons are compulsory from first to ninth grade (~7 years of age to ~15 years of age). In Denmark, 81% of PE teachers are PE specialists.33

The update of The Education Act is a major leap forward creating a political and organizational support structure to enhance children’s PA during school hours. However, a national survey among teachers in 2016 showed that only 27% stated the provision of 45 minutes of PA was fully implemented.9 In addition, data indicates that only 49% of girls and 63% of boys are physically active for a minimum of 45 minutes during a normal day of school.34 This lack of full implementation can be related to a general demand for pedagogical competence and information on how to implement 45 minutes of daily physical activities during school hours. The School indicator was assigned a B reflecting PE as a high priority of the field, but still inadequate implementation.

To support PA and meet the requirements of the learning objectives of PE, school children are by law ensured sports facilities and equipment in public schools.33 The majority (84%) of the teachers state that the indoor facilities support the requirements, while 27% of the teachers state that the outdoor facilities support the requirements.33 A whole-school approach for supporting PA is needed and school leaders must create a clear framework for implementing PA and acknowledging the benefits of more PA during the school day. The school provides an arena where it is possible to reach the majority of children and youth, including those who do not otherwise do regular PA.

**Community and the Built Environment: B+**

In general, Danish children have a very supportive activity-friendly environment. It includes access to sport facilities and urban green areas interconnected with pedestrian and cycling infrastructure with high perceived safety supporting children’s independent mobility from a young age.35 At the community level, children living in urban settings have access to many private and public playgrounds. In recent years, access to street movement facilities like parkour, skate and BMX parks also improved.36 For 7- to 15-year-olds, 88% assess their local community to have suitable facilities to do sport, and 91% assess the local community as a good setting to be active.22 However, children’s access to children’s facilities for sport, play, and leisure-time activities is unequally distributed geographically. Compared with more rural areas, children living in dense urban settings have lower accessibility to PA facilities per capita, though the absolute number of facilities is higher in the major Danish cities. In addition, the perceived safety in urban marginalized areas is lower,37 so for these reasons the community and the built environment indicator is graded B+.

A national study of outdoor life shows that the 2 most popular outdoor areas that children and youth prefer to spend their leisure time are “at sport facilities” (51%) and “in the garden” (40%).38 Obviously they do sports when they attend sport facilities (84%). This indicates that sport facilities should also be considered as important spaces for social networking among youngsters.

Limited knowledge was identified about children and youth’s movement patterns in relation to the characteristic of the Built Environment and the Community. The children’s landscape for PA is quite different from adults, mainly due to smaller radius of action and dependent mobility. More detailed knowledge about children’s movement patterns based on objective measurements using accelerometers and GPS could identify barriers and facilitators for PA in the built environment.

**Government Strategies and Investments: A-**

This indicator was assigned an A-. Denmark is among the most decentralized countries in Europe as assessed by the power to
make independent political decisions and the volume of resources spent at the local level. Thus, local governments in Denmark account for a very high degree of GDP and public expenditure. The fundamental rules for the division of competences and powers between the 3 nested governmental tiers in Denmark (National, Regional, and Local) build on a development through decades. The 98 Danish municipalities handle the greater part of welfare and societal affairs and have a strong local tax base. With regard to sport and leisure time, the municipalities are in charge of 85% of public expenditure.

Nationally The Danish Foundation for Culture and Sports facilities (LOA) was established in 1994 and substantially supports a number of leisure- and PA-related projects. LOA initiates and advises on capital investment for innovative building and design projects on stimulating new ways to be physically active.

Three laws are especially important for children’s PA from an early age. The Day-care Act specifies body and movement as 1 of 6 key learning themes. The Education Act requires schools to seek cooperation with local sports and leisure-time organizations and ideally ensures that all children are physically active at least 45 minutes each day in school. The Act on Nonformal Education and Democratic Volunteer Activity calls for municipalities to support voluntary associations for children and young people under 25 years of age. The latter legislation makes it mandatory to provide financial support for organized sport activities, to provide facilities, and to subsidize rent in privately owned facilities.

Municipalities spend annually around 890 DKR. per capita on sport purposes. Almost all municipalities have adopted a separate policy on sport-related issues. Furthermore, local authorities are obliged to provide a safe school route (eg, bicycle paths).

**Strengths and Limitations**

The Danish RC is a narrative review that constitutes the combined insights and knowledgebase of the RCRC. Thus, the grading is markedly influenced by the participant’s scientific knowledge and experience. The RC approach can be seen as a methodology that aims to extract the collective knowledge of a group of experts, in the study of a rather complex topic. Such a process certainly has its strengths and limitations. Major strengths are, at the same time, clear: emerging, mixed, and highly varied data are more easily processed using an open yet still structured discussion format.

A better understanding of determinants of PA behavior among the youngest children under the age of 6 is needed. For instance, it would be valuable to know more about when, how, and why children start in organized sport. As well as examining queries such as: Does sport participation facilitate the development of certain skills in the early years that condition participation in physical activity later on?

The RC points to possible methodological problems related to both self-reported and objective measures of PA. Self-reported measures are influenced by limited memory in children of the intensity and the amount of PA and in the interpretation of accelerometer measures, the choice of cut-point is crucial. Furthermore, time and intensity measured by quantitative methods is only one among several important variables to consider when addressing behavioral outcomes—especially when it comes to children and youth. Motivational drivers—both intrinsic and extrinsic—and the perceived quality of time spent engaging in PA are critical to include when aiming at fostering behavioral changes. Future report cards are encouraged also to represent qualitative measures influencing PA behavior.

**Conclusion**

Despite many strategies to promote PA, a large proportion of Danish children seem not to comply with the recommendations for PA. The first Danish RC shows that Denmark performs very well on the strategic and political level, but that the impact on the individual level is still sparse. This indicates an implementation gap between the governmental level and the individual level that needs to be bridged to increase PA and decrease sedentary behavior in children. Furthermore, to monitor childhood PA levels, including longitudinal and between countries comparisons, measurement and quantification of PA needs standardization.

**Acknowledgments**

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