



# MALAYSIA 2022 PHYSICAL ACTIVITY REPORT CARD FOR CHILDREN AND ADOLESCENTS

Active Healthy Kids Malaysia  
Kuala Lumpur • 2023  
<http://activehealthykids.org.my>

# MALAYSIA 2022

## PHYSICAL ACTIVITY REPORT CARD FOR CHILDREN AND ADOLESCENTS

This report card was produced in partnership with the Active Healthy Kids Global Alliance and Universiti Kebangsaan Malaysia (UKM) with support from Sun Life Malaysia as part of its purpose of helping people live healthier lives.



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**First Printing, 2023**  
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Published in Malaysia by  
Active Healthy Kids Malaysia  
Faculty of Health Sciences, Universiti Kebangsaan Malaysia,  
Jalan Raja Muda Abd Aziz, 50300 Kuala Lumpur, Malaysia

<http://activehealthykids.org.my>

Printed in Malaysia by

Awal Hijrah Enterprise  
No. 18, Jalan 3/69, Seksyen 3, 43650  
Bandar Baru Bangi  
Selangor DE.

**Please use the following citation:**

Active Healthy Kids Malaysia. 2023. Malaysia 2022 Physical Activity Report Card for Children and Adolescents. Kuala Lumpur: Universiti Kebangsaan Malaysia.

# ACKNOWLEDGEMENTS

This report card was produced in partnership with the Active Healthy Kids Global Alliance and Universiti Kebangsaan Malaysia (UKM) with support from Sun Life Malaysia as part of its purpose of helping people live healthier lives.



The Research Committee of the Active Healthy Kids Malaysia thanks all representatives of the Steering Committee and the Stakeholders for their substantial contribution to the report card. This Report Card is a collaborative work involving the following partners:





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## ABOUT MALAYSIA 2022 PHYSICAL ACTIVITY REPORT CARD FOR CHILDREN AND ADOLESCENTS

Malaysia 2022 Physical Activity Report Card for Children and Adolescents is a comprehensive, evidence-based assessment of physical activity behaviour among Malaysian children and adolescents aged 5 to 17 years published by the Active Healthy Kids Malaysia. The Report Card synthesises available data from multiple sources to assign evidence-informed grades across 12 physical activity indicators, to provide a scenario of the trends and current levels of physical activity among children and adolescents in Malaysia. The publication of the Report Card is part of the international collaboration between Active Healthy Kids Malaysia and Active Healthy Kids Global Alliance which has successfully collated the Report Cards from 60 countries for the Global Matrix 4.0 initiative.

The primary goal of developing the Report Cards is to advocate active living among children and adolescents in Malaysia. It is hoped that this Report Card will serve as the vehicle to drive advocacy towards active living. As with the previous Report Card released in 2016, current data indicate no change in children's overall physical activity levels, with Malaysia maintaining a poor grade of D-. Immediate actions are needed to get our children and adolescents to move more every day. The Active Healthy Kids Malaysia strongly recommend for a coordinated national response through the collaboration involving the government, non-government organisations, municipalities, communities, sport organisations, schools, teachers, parents, friends, families, and most importantly, children and adolescents. A coherent effort by all stakeholders is vital to ensure future improvement of our children's physical activity levels, as well as their health and wellbeing across the lifespan.

# PHYSICAL ACTIVITY AND SEDENTARY BEHAVIOUR RECOMMENDATIONS FOR CHILDREN AND ADOLESCENTS

Malaysian Physical Activity Guideline (2017), and Malaysian Dietary Guidelines for Children and Adolescents (2013) have outlined several recommendations for promoting physical activity and limiting sedentary activity among children and adolescents based on the Physical Activity Pyramid (Figure 1). A summary of these physical activity recommendations is shown in Table 1.



Figure 1. Physical Activity Pyramid for Malaysian Children and Adolescents  
Adapted from NCCFN (2013)<sup>2</sup>



**Table 1. Summary of the physical activity and sedentary behaviour recommendations for Malaysian children and adolescents aged 5 to 17 years.**

Recommendations	Physical Activity	Sedentary Behaviour
General	Children and adolescents should be physically active every day in as many ways as they can. <sup>2,3</sup>	Children and adolescents should limit physical inactivity and sedentary habits. <sup>2</sup>
Specific	Toddlers (aged 1-3 years) should accumulate at least 30 minutes a day, while pre-schoolers (aged 4-6 years) should accumulate 60 minutes a day of structured <sup>†</sup> physical activity. <sup>4</sup>	Children and adolescents should be discouraged from extended periods of inactivity and should not be sedentary for more than 60 minutes at a time. <sup>2</sup>
	Toddlers (aged 1-3 years) and pre-schoolers (aged 4-6 years) should engage in a minimum of 60 minutes to several hours per day of unstructured <sup>‡</sup> physical activity. <sup>4</sup>	Children and adolescents should limit screen time <sup>  </sup> to not more than two hours a day. <sup>2</sup>
	Children and adolescents (aged 5 to 17 years) should accumulate at least 60 minutes of moderate or vigorous intensity <sup>§</sup> physical activity daily. <sup>3</sup>	
	Children and adolescents should include muscle and bone strengthening activities as part of their 60 minutes or more daily physical activity for at least three times per week. <sup>2</sup>	

<sup>†</sup>Structured physical activity refers to physical activity done in a structured or organised environment (such as dancing, football, swimming).

<sup>‡</sup>Unstructured physical activity refers to physical activity done in free play (e.g., playing on school playground, walking, taking the stairs, bike riding).

<sup>§</sup>Moderate-intensity activity refers to physical activity carried out at 3.0 to 6.0 METs while Vigorous-intensity activity refers to physical activity carried out at greater than 6.0 METs. (METs is defined as multiples of the resting rates of oxygen consumption during physical activity).

<sup>||</sup>Screen time refers to time spent on watching television, playing video games, and using the computer or surfing the internet.

# METHODS AND DATA SOURCES

## STAGES OF WORK

The Malaysia 2022 Physical Activity Report Card for Children and Adolescents was developed and produced by the Research Committee (RC), whose responsibilities involved in determining the benchmarks to be used to grade the report card indicators, identifying, and assessing the key data sources, gathering, and evaluating the available evidence and assigning grades to each indicator. As shown in Table 2, a total of 12 indicators (10 core indicators endorsed by the AHKGA and two additional indicators Diet\* and Weight Status\* (Table 2)) were being evaluated.

**Table 2. Physical Activity Indicators and Its Definition**

1	Overall Physical Activity	Any bodily movement produced by skeletal muscles that require energy expenditure.
2	Organised Sport and Physical Activity Participation	A subset of physical activity that is structured, goal-oriented, competitive, and contest-based.
3	Active Play	Active play may involve symbolic activity or games with or without clearly defined rules; the activity may be unstructured/unorganised, social, or solitary, but the distinguishing features are a playful context, combined with activity that is significantly above resting metabolic rate.
4	Active Transportation	Active transportation refers to any form of human-powered transportation – walking, cycling, using a wheelchair, in-line skating or skateboarding.
5	Sedentary Behaviours	Any waking behaviour characterised by an energy expenditure $\leq 1.5$ metabolic equivalents, while in a sitting, reclining, or lying posture.
6	Physical Fitness	Characteristics that permit a good performance of a given physical task in a specified physical, social, and psychological environment.
7	Family and Peers	Any member within the family who can control or influence the physical activity opportunities and participation of children and youth in this environment.
8	School	Any policies, organisational factors (e.g., infrastructure, accountability for policy implementation) or student factors (e.g., physical activity options based on age, gender, or ethnicity) in the school environment that can influence the physical activity opportunities and participation of children and youth in this environment.
9	Community and Environment	Any policies or organisational factors (e.g., infrastructure, accountability for policy implementation) in the municipal environment that can influence the physical activity opportunities and participation of children and youth in this environment.

10	Government	Any governmental body with authority to influence physical activity opportunities or participation of children and youth through policy, legislation, or regulation.
11	Diet*	Amounts of foods and drinks consumed, dietary behaviour and habitual food intake of children and adolescents that are balanced and nutritious to support growth and daily activities.
12	Weight Status*	Children's body mass index (BMI) that is age- and sex-specific, often referred to as BMI-for-age.

Figure 2 summarises key stages of work in the development of the Report Card 2022. The proposed grades and supporting evidence by the RC were advised by a Steering Committee (SC) consisting of multidisciplinary local experts and government officials related to physical activity and health of children and adolescents. Following inputs by the SC, the proposed grades were presented, discussed, and agreed upon in a Consensus meeting held with Stakeholders from the government agencies, non-governmental organisations and academia who are actively involved in physical activity promotion and research. After the consensus meeting, the grades were then audited by experts from the Active Healthy Kids Global Alliance.

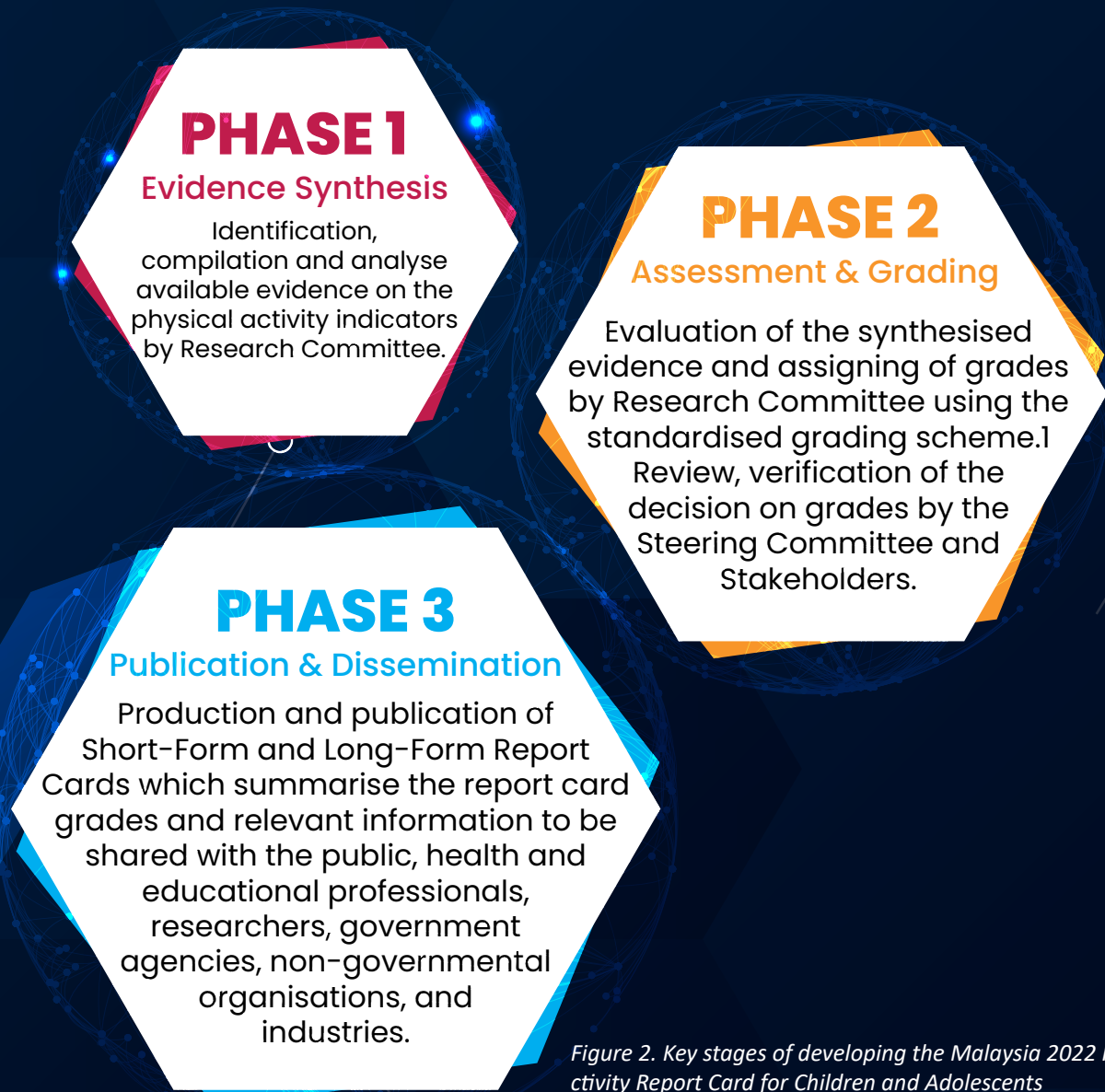


Figure 2. Key stages of developing the Malaysia 2022 Physical activity Report Card for Children and Adolescents



## KEY DATA SOURCES

The Malaysia 2022 Physical Activity Report Card for Children and Adolescents was developed based on the best available evidence synthesised from national surveys and health reports where physical activity and related health behaviours and settings were part of the outcome measures. While all available data were sourced, only studies and reports that fulfilled the following criteria were used to grade the 12 indicators:

- 01** The data source must be nationally based, representing Malaysian children and adolescents aged 5 to 17 years.
- 02** The data should be analysed or published from the year 2016 to 2021.
- 03** The sample size obtained must be of at least 500 subjects.

In addition, data obtained during the Covid-19 pandemic or data involving children or adolescents with disease (such as asthma/epilepsy etc) were not included as key data sources for grading PA indicators. Studies and data that do not meet the criteria above are included as supplementary data sources in this report card to provide some evidence on the PA indicators, but are not used to grade the indicators. Table 3 summarises the details of key data sources that are used to determine the grades of the indicators.



**Table 3. Data sources used to determine the Malaysia 2022 Physical Activity Report Card for Children and Adolescents grades**

Data source	Ages/matrix reported on (self-report (SR) or objective (O) measure)	Contribution to indicators (1-12)*
National Health and Morbidity Survey (NHMS): Adolescent Health Survey 2017 <sup>5</sup>	13 to 17 years (SR)	1, 4, 7
NHMS: Adolescent Nutrition Survey 2017 <sup>6</sup>	10 to 17 years (SR)	5
National Physical Fitness Standard for Malaysian School Student (SEGAK) 2019 <sup>7</sup>	10 to 17 years (O)	6
NHMS 2019: Non-Communicable Diseases <sup>8</sup>	5 to 17 years (O)	8
Report on School Sports Infrastructure and Programmes Survey 2021 (i-KePS Report) <sup>9</sup>	Primary and secondary schools nationwide	10
Report on School Sports Infrastructure and Programmes Survey 2021 (i-KePS Report) <sup>9</sup>	Primary and secondary schools nationwide	10
1 Student 1 Sports Policy 2011 <sup>10</sup>	Nationwide policies including strategies, action plans, legislation and guidelines geared towards promoting physical activity among children and adolescents in Malaysia.	12
Policy for the Implementation of Co-curricular Activities 1997 <sup>11</sup>		
National Sports Policy 2009 <sup>12</sup>		
National Community Policy 2018 <sup>13</sup>		
National Landscape Policy 2011 <sup>14</sup>		
Policy Options to Combat Obesity in Malaysia 2016 <sup>15</sup>		
National Strategic Plan for Active Living (NASPAL) 2019-2025 <sup>16</sup>		
Malaysia Education Blueprint 2013-2025 <sup>17</sup>		
Ministry of Health (MOH) Malaysia Strategic Plan 2016-2025 <sup>18</sup>		
Malaysian Dietary Guideline for Children & Adolescent 2013 <sup>2</sup>		
Malaysia Physical Activity Guidelines 2017 <sup>3</sup>		
Strategic Plan for Health Promotion 2018-2020, MOH <sup>19</sup>		
Tax Reliefs for Lifestyle Expenses 2019 (Sports Equipment/Sports) <sup>20</sup>		

Note: \*Indicators: 1) Overall Physical Activity; 2) Organised Sports and Physical Activity; 3) Active Play; 4) Active Transportation; 5) Sedentary Behaviour; 6) Physical Fitness; 7) Family and Peers; 8) School; 9) Community and the Built Environment; 10) Government 11) Diet ; 12) Weight Status.

## GRADING SCHEME

Using the AHKGA standardised grading framework, the grade for each indicator was assigned by comparing prevalence of the health behaviour or outcome, obtained from the best available evidence synthesised from the key data sources, against the predetermined grade benchmarks. For comparison purposes these benchmarks are consistent with those used by other countries participating in the Global Matrix 4.0. Following are the interpretation of the grades:

Table 4: Global Matrix 4.0 Grading Rubric

<b>A</b>	<b>A+ 94%-100%</b>	<b>A 87%-93%</b>	<b>A- 80%-86%</b>	
	<b>We are succeeding with a large majority of children and adolescents.</b>			
	<b>B</b>	<b>B+ 74%-79%</b>	<b>B 67%-73%</b>	<b>B- 60%-66%</b>
		<b>We are succeeding with well over half of children and adolescents.</b>		
<b>C</b>	<b>C+ 54%-59%</b>	<b>C 47%-53%</b>	<b>C- 40%-46%</b>	
	<b>We are succeeding with about half of children and adolescents.</b>			
<b>D</b>	<b>D+ 34%-39%</b>	<b>D 27%-33%</b>	<b>D- 20%-26%</b>	
	<b>We are succeeding with less than half but some children and adolescents.</b>			
<b>F</b>	<b>0%-20%</b>			
	<b>We are succeeding with very few children and adolescents.</b>			
<b>INC</b>	<b>Incomplete—insufficient or inadequate information to assign a grade.</b>			

# INDICATORS

## REPORT CARD INDICATORS

The 2022 MAHK Report Card assigned grades to a total of 12 indicators (10 core indicators endorsed by the AHKGA and two additional indicators [identified by the \* in Figure 3]). Indicators are grouped under the categories: Strategies and Investments, Settings and Sources of Influence and Behaviours/Traits that contribute to Overall Physical Activity.

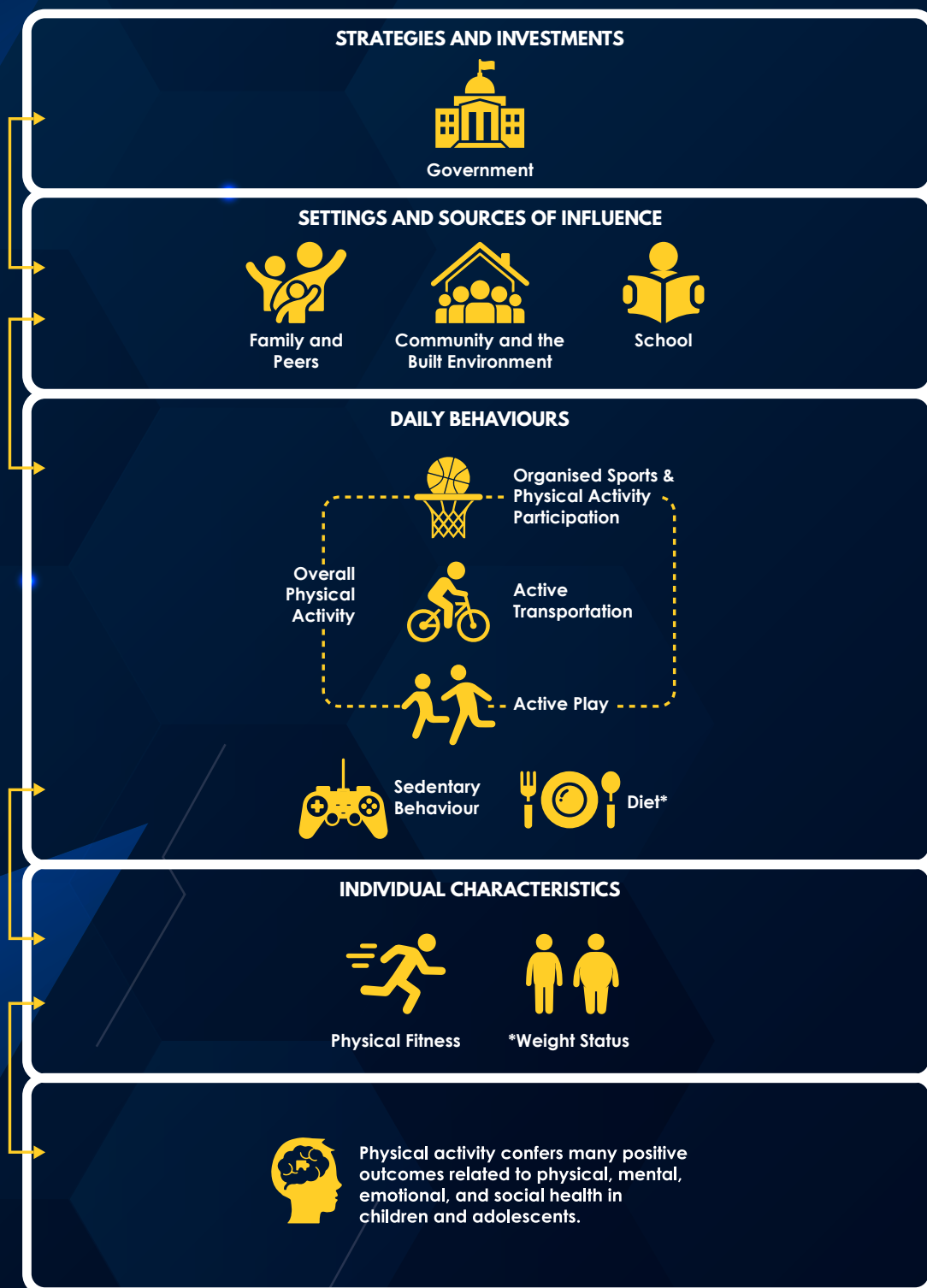



Figure 3. Summary of the Report Card indicator categories

## READING THE GRADE

The following sections describe each of the 12 indicators and the grades assigned to each. The following subsections will be used to examine each indicator within each section.

### GRADE ASSIGNMENT BOX:

Shows the grade allocated to each indicator, the grades assigned in previous Report Card, Age group represented by evidence used to grade the indicator and the benchmark lists used to assign the grade.



# OVERALL PHYSICAL ACTIVITY

YEAR	2016*	D-	2022	D-
GRADE				
AGE GROUP	13-17 years		13-17 years	
BENCHMARK USED FOR GRADING	Percentage of Malaysian children and adolescents who meet the Global Recommendations on Physical Activity (PA) for Health21, which recommend that children and youth accumulate at least 60 minutes of moderate-to vigorous physical activity (MVPA) per day on average.			

\*Note: 2016 grade was updated according to the Global Matrix 4.0 Grading Rubric.

**RATIONALE:** Describes how and why the grade was assigned based on the available evidence

#### RATIONALE

National data from the National Health Morbidity Survey (NHMS), Adolescent Health Survey (AHS) 2017 indicate that only one-fifth of Malaysian adolescents (20.3%) aged 13 to 17 years old were reported to be physically active for a total of at least 60 minutes per day on 5 or more days per week. It is important to note that the data used to grade this indicator was not specific with regards to the intensity of the activities as recommended by the Global Recommendations which is to accumulate at least 60 minutes of MVPA daily on average<sup>22</sup>. A national representative data was not available since 2016 for children aged 5 to 17 years old and data from only one source was available for 13 to 17 years old that met the guidelines. There was no clear evidence that physical activity levels in children and adolescents have changed, hence the grade remains the same as 2016.

#### KEY FINDINGS

**National**

- Self-reported data showed that about 20% of 13 to 17 years olds perform physical activity for at least 60 minutes daily for 5 days or more weekly. In terms of gender, it was higher in males (25.0%) than females (14.7%) while based on the school's location, it was higher in urban (23.7%) as compared to rural (18.6%) areas<sup>23</sup>.

**Supplementary**

- Self-reported data showed that 18-20% of 7-12-year-olds had moderate PA level while 3-5% had high PA level<sup>24</sup>.
- Self-reported data showed that 33-57% of 12-18-year-olds had moderate PA level while 3-54% had high PA level<sup>25</sup>.
- Self-reported data showed that 16-17-year-olds were physically active on 28 days per week<sup>26</sup>.
- Self-reported data for adolescents showed lack of PA during COVID-19 pandemic due to separation of home and school and moderate exposure to outdoors. In addition, the emotional toll of boredom led them to occupy their time with increasing use of electronic devices<sup>27</sup>.
- Objective data showed that 40% of 4-6-year-olds<sup>28</sup> and 14% of 12-17-year-olds<sup>29</sup> spent at least 60 minutes daily on MVPA.
- Parent-reported data showed that 46-57% of 4-6-year-olds performed at least 60 minutes of moderate PA daily<sup>30</sup> and 68% participated in vigorous PA weekly<sup>31</sup>.
- Self-reported data showed that 17-24% of 11-18-year-olds performed at least 60 minutes of MVPA on 5-7 days per week<sup>32</sup>.
- Self-reported data on physical activity patterns among adolescents at the age of 13, 16, and 17 showed that on average, boys had a higher pattern score compared to girls, where higher frequencies of jogging/hunting, being very active in the evening, at recess in the weekend, and cross-country were associated with a higher pattern score in boys. In girls, bicycling, tag, being active in the evening, after school, and at PE class were most associated with a higher pattern score<sup>33</sup>.

### KEY FINDINGS:

Highlights key findings that represent the grade. Key findings are characterised as National or Supplementary data, where:

#### National:

Include data/studies that are nationally representative and primary source used to assign grades where possible.

#### Supplementary:

Comprise data/studies to provide additional information but not used to assign grades. These include: 1) Data/studies collected or conducted at the state/territory level but not nationally representative; 2) Published research findings from local studies that are relevant to the benchmarks of an indicator; 3) Data collected nationwide but does not meet the benchmark of the indicator; 4) Studies that analysed nationwide data that were conducted before the year 2016. It is included as supplementary findings as data may be used for grading in the previous Report Card.

### RECOMMENDATIONS TO IMPROVE THE GRADE:

Provides recommendations based on discussions among the Research Committee, Steering Committee and Stakeholders on how to improve the grade in the future.

#### RECOMMENDATIONS TO IMPROVE THE GRADE

- Widely promote the national physical activity guidelines and increase physical activity programmes in schools and at the community level.
- Increase opportunities for children and adolescents to experience a broad range of physical activities, both structured and unstructured, among all population groups and target population groups (e.g. children with disabilities, girls, specific ethnic groups, low household income families).
- Boost efforts to promote physical activity participation among children as early as possible by parents as physical activity patterns in early childhood continue into late childhood and potentially in adolescence.
- Incorporate key physical activity indicators benchmarks in national surveys and include analysis of data by gender, location, and socioeconomic status and make the data available wherever possible.

### RESEARCH GAPS:

Lists of research gaps highlighted by the Report Card finding and in current literatures that need to be addressed to better inform the grade in the future.

#### RESEARCH GAPS

- Nationally representative data on daily MVPA of at least an average of 60 minutes across the week are limited, preventing a clear understanding on proportion of children and adolescents meeting the new WHO Guideline on Physical Activity and Sedentary Behaviour.<sup>22</sup> National-level descriptive data based on adherence to the new guideline are needed.
- National data for children aged 5 to 9 years on overall physical activity are limited thus we are unable to comment on the proportion of children meeting physical activity guidelines for pre-schools and primary school children. Commitment from the Government is needed to establish periodical national surveys that capture physical activity data covering both children and adolescent groups, aged 5 to 17 years.
- Given the limitations of self-reported data, objective measures and device-assessed physical activity should be incorporated into national surveys to provide a more objective picture of children and adolescents' physical activity levels and patterns.
- More research is needed to determine which interventions are most effective and sustainable, and the motivation and barriers for Malaysian children and adolescents to engage in physical activities are needed to be explored.

**WHAT DO WE NEED FOR GRADING?**  
As physical activity participation is complex, standardised methodologies for both objective and subjective measures should be considered as suggested in Table 5. This may be adapted to make comparisons between studies easier.

Method type	Details	Age Group	Metrics Measured
Various wearable devices/ Objective	Method: For pre-schoolers, children and adolescents, time derived from wearable devices should be collected on the duration they are engaged in MVPA. <sup>44</sup>	5-17 years	Percentage of children and adolescents who accumulate at least 60 minutes of MVPA per day.
Self and parent/proxy report	Question: In the past 7 days, on how many days were you/your child engaged in moderate to vigorous physical activity (activity that increases heart rate and gets you/your child out of breath some of the time) for at least 60 minutes? Physical activity can be spread out throughout the day (e.g. in short bouts that add up to 60 minutes across the day). <sup>44</sup>	5-17 years	Percentage of children who had at least 60 minutes of accumulated MVPA per day.

### WHAT DO WE NEED FOR GRADING?:

Suggests objective and self/proxy-report methods and how to collect the data for each indicator. Future data collection that considers these suggestions will help to ensure that more benchmarks can be evaluated for the future.



# OVERALL PHYSICAL ACTIVITY

YEAR	2016*	D-	2022	D-
GRADE				
AGE GROUP	13-17 years		13-17 years	
BENCHMARK USED FOR GRADING	Percentage of Malaysian children and adolescents who meet the Global Recommendations on Physical Activity (PA) for Health <sup>21</sup> , which recommend that children and youth accumulate at least 60 minutes of moderate-to vigorous physical activity (MVPA) per day on average.			

\*Note: 2016 grade was updated according to the Global Matrix 4.0 Grading Rubric.

## RATIONALE

National data from the National Health Morbidity Survey (NHMS): Adolescent Health Survey (AHS) 2017 indicate that only one-fifth of Malaysian adolescents (19.8%) aged 13 to 17 years old were reported to be physically active for a total of at least 60 minutes per day on 5 or more days per week<sup>5</sup>. It is important to note that the data used to grade this indicator was not specific with regards to the intensity of the activities as recommended by the Global recommendations which is to accumulate at least 60 minutes of MVPA daily on average<sup>21</sup>. A national representative data was not available since 2016 for children aged 5 to 12 years and data from only one source was available for 13 to 17 years old that met the guidelines. There was no clear evidence that physical activity levels in children and adolescents have changed, hence the grade remains the same as 2016.

## RECOMMENDATIONS TO IMPROVE THE GRADE

- Widely promote the national physical activity guidelines and increase physical activity programmes in schools and at the community level.
- Increase opportunities for children and adolescents to experience a broad range of physical activities, both structured and unstructured, among all population groups and target population groups (e.g., children with disabilities, girls, specific ethnic groups, low household income families).
- Boost efforts to promote physical activity participation among children as early as possible by parents as physical activity patterns in early childhood continue into late childhood and potentially in adolescence.
- Incorporate key physical activity indicators benchmarks in national surveys and include analysis of data by gender, location, and socioeconomic status and make the data available wherever possible.

## KEY FINDINGS

### National

- Self-reported data showed that about 20% of 13 to 17 years olds perform physical activity for at least 60 minutes daily for 5 days or more weekly. In terms of gender, it was higher in males (25.0%) than females (14.7%) while based on the school's location, it was higher in urban (20.7%) as compared to rural (18.6%) areas.<sup>5</sup>

### Supplementary

- Self-reported data showed that 51-62% of 7-12-year-olds had moderate PA level while 3-9% had high PA level.<sup>22-24</sup>
- Self-reported data showed that 33-57% of 12-19-year-olds had moderate PA level while 3-54% had high PA level.<sup>24-33</sup>
- Self-reported data showed that 16-17-year-olds were physically active on 2.8 days per week.<sup>34</sup>
- Self-reported data for adolescents showed lack of PA during COVID-19 pandemic due to separation of home and school and inadequate exposure to outdoors. In addition, the emotional toll of boredom led them to occupy their time with increasing use of electronic devices.<sup>35</sup>
- Objective data showed that 49% of 4-6-year-olds<sup>36</sup> and 14% of 12-17-year-olds<sup>37</sup> spent at least 60 minutes daily on MVPA.
- Parent-reported data showed that 46-57% of 4-6-year-olds performed at least 60 minutes of moderate PA daily<sup>38, 39</sup> and 68% participated in vigorous PA weekly.<sup>40</sup>
- Self-reported data showed that 17-24% of 11-18-year-olds performed at least 60 minutes of MVPA on 5-7 days per week.<sup>41, 42</sup>
- Self-reported data on physical activity patterns among adolescents at the age of 13, 15, and 17 showed that on average, boys had a higher pattern score compared to girls, where higher frequencies of jogging/running, being very active in the evening, at recess, in the weekend, and cross-country were associated with a higher pattern score in boys. In girls, bicycling, tag, being active in the evening, after school, and at PE class were most associated with a higher pattern score.<sup>43</sup>

## RESEARCH GAPS

- Nationally representative data on daily MVPA of at least an average of 60 minutes across the week are limited, preventing a clear understanding on proportion of children and adolescents meeting the new WHO Guideline on Physical Activity and Sedentary Behaviour. <sup>21</sup> National-level descriptive data based on adherence to the new guideline are needed.
- National data for children aged 5 to 9 years on overall physical activity are limited thus we are unable to comment on the proportion of children meeting physical activity guidelines for pre-schoolers and primary school children. Commitment from the Government is needed to establish periodical national surveys that capture physical activity data covering both children and adolescent groups, aged 5 to 17 years.
- Given the limitations of self-reported data, objective measures and device-assessed physical activity should be incorporated into national surveys to provide a more objective picture of children and adolescents' physical activity levels and patterns.
- More research is needed to determine which interventions are most effective and sustainable, and the motivation and barriers for Malaysian children and adolescents to engage in physical activities are needed to be explored.

## WHAT DO WE NEED FOR GRADING?

As physical activity participation is complex, standardised methodologies for both objective and subjective measures should be considered as suggested in Table 4. This may be adopted to make comparisons between studies easier.

**Table 5: Recommended objective and self/proxy report methods and how to measure the metrics for Overall Physical Activity.**

Method type	Details	Age Group	Metrics Measured
Various wearable devices/ Objective	Method: For pre-schoolers, children and adolescents, time derived from wearable devices should be collected on the duration they are engaged in MVPA. <sup>44</sup>	5-17 years	Percentage of children and adolescents who accumulate at least 60 minutes of MVPA per day.
Self and parent/proxy report	Question: In the past 7 days, on how many days were you/your child engaged in moderate to vigorous physical activity (activity that increases heart rate and gets you/your child out of breath some of the time) for at least 60 minutes? Physical activity can be spread out throughout the day (e.g., in short bouts that add up to 60 minutes across the day). <sup>44</sup>	5-17 years	Percentage of children who had at least 60 minutes of accumulated MVPA per day.

Note: Method/questions are adapted from Active Healthy Kids Australia 2022 Physical Activity Report Card<sup>44</sup>

# ORGANISED SPORT AND PHYSICAL ACTIVITY PARTICIPATION

YEAR	2016	INC	2022	INC
GRADE				
AGE GROUP	N/A		N/A	
BENCHMARK USED FOR GRADING	No consensus on a primary metric to be graded could be reached.			

## RATIONALE

Incomplete (INC) has again been assigned to this indicator, similar to the previous 2016 Report Card, given the limited evidence on how the nation is performing on organised sports and organised physical activity participation for both children and adolescents.

## RECOMMENDATIONS TO IMPROVE THE GRADE

- Ensure easy and fair access of opportunities across all age groups (pre-school, primary and secondary school), location (urban and rural) and socio-economic status levels for both individual and team sports.
- Increase exposure of young children to a variety of different sports for continued sport and/or leisure activity participation.
- Ensure adequate resources are provided in schools through close monitoring by relevant authorities to support organised sports participation among students across all age groups.
- Encourage school administrators to develop and implement strategies to reduce dropout rates in organised sports and physical activities among children and adolescents in school.

## KEY FINDINGS

### Supplementary

- Teacher-reported nationwide data from the Assessment of Physical, Sports, and Co-Curriculum Activity (Pentaksiran Aktiviti Jasmani, Sukan, dan Kokurikulum - PJASK) evaluated the attendance of school-going students for sports activities in the year 2021. Data showed that about 40% of primary students (10-12 year-olds) and about 38% of secondary students (13-17 year-olds) attended at least 6 out of 12 sports sessions.<sup>45</sup> It is important to note that this data was collected during the COVID-19 pandemic where the sessions were conducted online. Hence participation may not represent the actual situation of students' attendance during pre-COVID period.
- Based on the Malaysia Sports Culture Index (MCSI) 2019, Participation domain which include two indicators namely Involvement (refers to the scores of involvement in performing sports, exercise, or active recreational activities at least once a month for three consecutive months) and Activeness (refers to the activeness score in performing sports, exercise, or active recreational activities) among Malaysian youth aged 13 to 19 years are at high levels with scores 74.9 and 80.7 respectively.
- Self-reported data from 9-11-year-olds found that most male students participated in moderate to vigorous sports activities with high ground reaction force such as running, hockey and handball. While girls were generally involved in shorter duration and lower intensity sports activities such as aerobics exercise, and dancing during PE classes.<sup>46</sup>
- Self-report data from 10-11-year-olds showed that most of them were involved in football (37.8%), badminton (29.6%), netball (12.2%), cycling (4.3%), handball (3.9%), gymnastics (3.0%), and volleyball (2.6%).<sup>47</sup>
- Self-reported data showed that 13-17-year-olds' main physical and leisure activities were jogging, cycling, badminton, basketball, taekwondo, netball, and wushu. Males reported a larger number of PA sessions per week than females (2.88 sessions verses 2.10 sessions), and their sessions were longer than those of females (65.26 minutes verses 48.55 minutes).<sup>48</sup>



## RESEARCH GAPS

- More effective monitoring of sport participation, across all levels of performance is needed in children and youth. Information on the frequency, duration, and intensity of the organised sports and physical activity programmes sessions, as well as teaching/coaching practices is needed to properly assess the quality of both training and competition.
- To gain a better understanding of children and adolescents' access to sport, it is important to keep track of known factors that influence participation such as gender, disability status, income level or location, and examine participation rates that considers all these factors.
- Research on exploring reasons children and adolescents who stop participating in sports in school are needed to improve participation levels.

## WHAT DO WE NEED FOR GRADING?

To understand the amount of activity completed and what are the participation rates among Malaysian children and adolescents, we recommended the objective and self/ proxy-report techniques as illustrated in Table 6.

**Table 6: Recommended objective and self/proxy report methods and how to measure the metrics for Organised Sport and Physical Activity.**

Method type	Details	Age Group	Metrics Measured
Various wearable devices/ Objective	Method: Time derived from wearable devices should be collected on the duration of children and adolescents who are active (e.g., time spent in MVPA or light physical activity from both objective data collected and/or observations made) in minutes per session or as a percentage of the total session duration for training and competitive games. Make raw data available wherever possible. <sup>44</sup>	5-17 years	To be used as descriptive data only.
Self and parent/proxy report	<p>Questions:</p> <ul style="list-style-type: none"> <li>• Have you/has your child participated in organised team sports and/or physical activity programmes (e.g., football, futsal, badminton, netball, basketball) on a regular basis outside of school hours* (at least once a week for at least 1 school term) over the past year?<sup>44</sup></li> <li>• Have you/has your child participated in organised individual sports and/or physical activity (e.g., martial arts, swimming) on a regular basis outside of school hours* (at least once a week for at least 1 school term) over the past year?<sup>44</sup></li> </ul>	<p>PR: 5 – 9 years</p> <p>SR: 10 – 17 years</p>	Percentage of Malaysian children and adolescents regularly participating (at least once per week for at least 1 school term) in organised team/ individual sports and physical activity programmes in the past 12-months.

Note: PR = Parent/proxy-report; SR = Self-report; \*Any organised sport or physical activity that takes place outside of school hours, including any sport or activity in which they represent their school as long as it takes place outside of school start and finish times; Note: Method/questions are adapted from Active Healthy Kids Australia 2022 Physical Activity Report Card<sup>44</sup>





# ACTIVE PLAY

<b>YEAR</b>	<b>2016</b>	<b>INC</b>	<b>2022</b>	<b>INC</b>
<b>GRADE</b>				
<b>AGE GROUP</b>	<b>N/A</b>		<b>N/A</b>	
<b>BENCHMARK USED FOR GRADING</b>	<b>No consensus on a primary metric to be graded could be reached</b>			

## RATIONALE

Incomplete (INC) has again been assigned to this indicator, similar to the previous 2016 Report Card, given there is lack of evidence on how the nation is performing for both children and adolescents.

## KEY FINDINGS

### Supplementary

- Parent-reported data showed that 40.2% of pre-school children participated in active play for more than 2 hours a day with an average time of 2.2 hours spent daily.<sup>49</sup>
- A study conducted among children aged 9 to 11 years quantified the level of intensity for common Malaysian traditional games (i.e., Galah Panjang, Bola Beracun, Polis Senti, Belalang Belatuk, Ayam Musang, and Baling Tin). They found that three traditional Malaysian games (i.e., Bola Beracun, Galah Panjang and Baling Tin) satisfied the requirement as MVPA in terms of step count, heart rate and vector magnitude in all axes. Hence, 20 minutes of playing traditional games may be a way to increase PA among primary school students.<sup>50</sup>
- A study conducted in a low-cost high rise housing community among children aged 4 to 12 years showed that children preferred playing in outdoor spaces due to restrictive indoor environments. While the play of certain games is often tied to specific physical spaces within the community, the children have demonstrated an ability to transcend the inadequacies and restrictions of physical space by recreating or reimagining physical space thus, offering multiple play opportunities.<sup>51</sup>

## RESEARCH GAPS

- National data on active play among children aged 5 to 9 years and unstructured physical activity engagement among adolescents aged 10 to 17 years are limited.
- There is no universally accepted definition of active play, but 'freely chosen, fun, and unstructured manner' have been identified as the key characteristics of active play<sup>52</sup>. Operational definition of active play should be clearly defined in all studies.
- There is a need to establish standardised and valid tools to assess the type and location of active play, and motivation behind young children's active play.
- Qualitative and observational studies are needed to explore the behavioural context of children's active play, including understanding what children do in their active play, where and with whom they engage in active play.
- Questionnaires coupled with an objective measure of activity, such as accelerometer, is needed to capture total volume (duration and intensity) of activities accurately, given the sporadic nature of active play particularly among young children, and unstructured physical activity among adolescents.

## RECOMMENDATIONS TO IMPROVE THE GRADE

- Increase participation among children and adolescents in active play/unstructured physical activity by encouraging and offering them a variety of options to play indoors (example: hide and seek, hula hoops, and jump ropes) and outdoors (example: playing at the playground and tag-and-run).
- Increase awareness among parents and caregivers on the physical and social benefits associated with active play or unstructured physical activity versus the risks of outdoor play and the types of activities that are related to it.
- Ensure parents, caregivers, and school authorities focus on providing adequate opportunities for indoor and outdoor active play to children. Games and activities are offered to develop habits of active play or unstructured physical activity every day among children and adolescents.
- Involve children and adolescents in decorating and taking care of natural spaces for recreation, education, inspiration, and health, to give them ownership and pride in their local communities, schools, and parks.

## WHAT DO WE NEED FOR GRADING?

To understand the amount of active play/unstructured physical activity engaged among children and adolescents, we recommend the objective and self/ proxy-report techniques as illustrated in Table 7.

**Table 7: Recommended objective and self/proxy report methods and how to measure the metrics for Active Play.**

Method type	Details	Age Group	Metrics Measured
Various wearable devices/ Objective	<p>Method:</p> <ul style="list-style-type: none"> <li>For pre-schoolers, children, and adolescents, time derived from wearable devices should be collected on the duration they are engaged in active play (e.g., time spent in MVPA or light physical activity) based on objective data and/or observations). Make raw data available wherever possible.<sup>44</sup></li> </ul>	5-17 years	
Parent/Proxy Report	<p>Questions:</p> <ul style="list-style-type: none"> <li>For the past 7 days, how much time on average did your child engaged in active play per day?<sup>44</sup></li> <li>For the past 7 days, how much time on average did your child spend being outdoors to play per day?<sup>44</sup></li> </ul> <p>(Active play is any physical activity that is NOT part of organised sport, physical activity done at school, or active transportation, and is NOT restricted by rules usually set and governed by adults – examples include kicking a ball against a wall, playing tag with friends, or playing on fixed equipment at a park).</p>	5 – 9 years	<p>Percentage of Malaysian children and adolescents who engage in unstructured or unorganised active play at any intensity for more than 2 hours a day.</p> <p>Percentage of Malaysian children and adolescents who report being outdoors for more than 2 hours a day.</p>
Self-report	<p>Questions:</p> <ul style="list-style-type: none"> <li>For the past 7 days, how much time on average did you spend engaged in unorganised physical activity per day?<sup>44</sup></li> <li>For the past 7 days, how much time on average did you spend being outdoors engaging in unorganised physical activity per day?<sup>44</sup></li> </ul> <p>(Unorganised/unstructured physical activity include any physical activity that is NOT part of organised sport, physical activity done at school, or active transportation and is NOT restricted by rules usually set and governed by adults – some examples of active play include kicking a ball against a wall or running around with your dog at the park).</p>	10-17 years	

Note: Method/questions are adapted from Active Healthy Kids Australia 2022 Physical Activity Report Card<sup>44</sup>



# ACTIVE TRANSPORTATION

YEAR	2016*	D-	2022	D-
GRADE				
AGE GROUP	7-12 years		13-17 years	
BENCHMARK USED FOR GRADING	Percentage of Malaysian children and adolescents who regularly use active transportation (any form of human powered transportation e.g., walking, cycling, using a wheelchair, skateboarding) to get to and from places regularly (e.g., school, park, mall, friend's house).			

\*Note: 2016 grade was updated according to the Global Matrix 4.0 Grading Rubric.

## RATIONALE

The available national data represents the adolescents age group which indicates about one-fourth of Malaysian adolescents aged 13 to 17 commuted actively (walking or cycling) to or from school regularly (at least five times per week).<sup>5</sup> The results are similar to the previous 2016 Report Card which represented the children's age group. No recent data were available for children aged 5 to 12 years. Thus, the grade remains consistent with 2016.

## RESEARCH GAPS

- National data for preschool and primary school students on their use of active transport to and from school are limited. This data may be collected at the school-level and reported to MOE on a yearly basis.
- Data on active transportation to a broader range of destinations (e.g., parks, sports facilities, shops, friends' homes) among children and adolescents are limited. This data can be included in national surveys for future data collections.
- Research on how mode of transportation affects Malaysian children and adolescents' overall physical activity is limited and should be explored.
- More research is needed to uncover aspects of the built environment (e.g., walkability assessment especially in urban areas) that facilitate or motivate the population to engage more in active transportation.
- Need of research on how far caregivers or families, and children and adolescents independently, are willing (and allowed) to travel using active transportation so that appropriate policies can be implemented to help those who have concerns on far distances.

## KEY FINDINGS

### National

- A total of 25% of Malaysian adolescents aged 13 to 17 years self-reported using active modes of transportation (walking or cycling) at least five times per week to or from school.<sup>53</sup>

### Supplementary

- Self-reported data showed that 18% of primary students (7 to 12-year-olds) walk to or from school and 6% cycled at least once per week. Participation in transport-related physical activity was low (mean 1.8 out of score of 5) across all levels of physical activity.<sup>54</sup>
- Parental perception of neighbourhood environment and safety are linked with physical activity of children aged 9 to 12 years. The study found that more land-use mix (access) such as allocation of stores, places and transit stops within walking distance was positively correlated with higher levels of physical activity.<sup>23</sup>
- Parents of children aged 4 to 6 years showed that 50% were physically active among those residing in a high score of walkability environment at their neighbourhood.<sup>38</sup>

## RECOMMENDATIONS TO IMPROVE THE GRADE

- Monitor and improve on-going policies and strategies on creating a safe and supportive built environment, such as greater provision of sidewalks and bike lanes, pedestrian and bicycle infrastructure, lower speed limits, and placing crossing guards near schools to promote active transportation among children and adolescents.
- Create a culture of active transportation, continuous discussions regarding the value, safety, and societal expectations of independent mobility in school. Schools need to be supported in implementing active travel best practice focusing on structured programs (e.g., walking, school bus) and education strategies (e.g., bicycle training, using safe routes to schools).
- Establish consistent national surveys that capture active transportation data for both children and adolescent groups.



## WHAT DO WE NEED FOR GRADING?

Table 8 shows the suggested self/proxy-report methodologies and how to obtain the data to improve the current data collected and widen the scope of active transportation to varied destinations for nationwide surveys to better understand the behaviour of active transport among Malaysian children and adolescents.

**Table 8: Recommended objective and self/proxy report methods and how to measure the metrics for Active Transportation**

Method type	Details	Age Group	Metrics Measured
Self- or Parent/Proxy report	<p><b>Method:</b></p> <ul style="list-style-type: none"> <li><b>To School<sup>44</sup></b> <ol style="list-style-type: none"> <li>On how many of the past 5 school days did you/your child travel to (or part of the way to) school by walking, cycling or some other form of active transport?</li> <li>What is the usual form of active transport? Answer: walking; cycling; other, please specify</li> </ol> </li> <li><b>From School<sup>44</sup></b> <ol style="list-style-type: none"> <li>On how many of the past 5 school days did you/your child travel from (or part of the way from) school by walking, cycling or some other form of active transport?</li> <li>What is the usual form of active transport?<sup>44</sup> Answer: walking; cycling; other, please specify  (* Active transport refers to any form of human-powered transportation such as walking, cycling, or using a wheelchair).</li> </ol> </li> </ul>	PR: 5–9 years SR: 10–17 years	Percentage of Malaysian children and adolescents who use active transportation to get to and from school in the past five schooling days.
Self- or Parent/Proxy report	<p><b>Questions:</b></p> <ul style="list-style-type: none"> <li>In the past 7 days, how often did you/your child travel from place to place (apart from school) all or part of the way by walking, cycling or some other form of active transport?<sup>44</sup> Answer: Every day; Most days (5–6); Some days (3–4); Not many days (1–2); Never</li> <li>What is the usual form of active transport?<sup>44</sup> Answer: walking; cycling; other, please specify</li> </ul>	PR: 5–9 years SR: 10–17 years	Percentage of Malaysian children and adolescents who use active transportation to get to and from other destinations (e.g., parks, sports facilities, shops, friends' homes).

Note: PR = Parent/proxy-report; SR = Self-report; Method/questions are adapted from Active Healthy Kids Australia 2022 Physical Activity Report Card<sup>44</sup>



# SEDENTARY BEHAVIOURS

YEAR	2016*	D	2022	C
GRADE				
AGE GROUP	7-12 years		10-17 years	
BENCHMARK USED FOR GRADING	Percentage of Malaysian children and adolescents who meet the Canadian Sedentary Behaviour Guidelines (5- to 17-yr-olds: no more than 2 hours of recreational screen time per day). <sup>55</sup>			

\*Note: 2016 grade was updated according to the Global Matrix 4.0 Grading Rubric.

## RATIONALE

National data indicates that 48.2% of Malaysian school-going adolescents aged 10 to 17 years watched television, used computer, and played video games in no more than 2 hours per day.<sup>6</sup> It is worth noting that the recent Canadian Sedentary Behaviour Guidelines<sup>55</sup> recommends no more than 2 hours of recreational screen time daily for 5- to 17-year-olds. However, the definition of recreational screen time may differ in the nationwide survey conducted in 2017, where screen time referred to the time spent on screen-based behaviours such as watching television, playing video games, and using the computer or surfing the internet without specifying recreational or non-recreational computer or surfing internet usage. However, consensus was reached where the usage of computer or surfing the internet for non-recreational purposes in 2017 may be limited as previously all educational activities were more focused on paper-based activities as compared to the year 2020 till 2022, non-recreational screen-time will be maximised due to the COVID-19 pandemic. In addition, no screen time data was available for children aged 5 to 9 years.

## RECOMMENDATIONS TO IMPROVE THE GRADE

- Increase awareness among parents, children, and adolescents on the recreational screen-time recommendation to not more than 2 hours daily and inform them about the negative effects of excessive screen-based activities, which may contribute to high levels of sedentary behaviours among children and adolescents.
- Provide physical activity opportunities in schools to break prolonged sedentary hours during school time, for example by incorporating physical activity breaks into existing classroom activities.
- Improve compliance with the current screen time guidelines through collective efforts from teachers and parents.
- Consider collaborating between relevant government authorities and non-governmental organisations in developing a family screen and activity programme that details household screen time rule, where, when, and how screens may and may not be used to assist parents and caregivers in limiting screen activities to their children/adolescents. This can include screen-free times such as during mealtime and before bed.
- Consider adopting international recommendations for school-related sedentary behaviours to reduce school-related sedentary behaviours. Recommendations include 1) introducing breaks at frequent intervals, 2) incorporating different types of movement into homework whenever possible, 3) making school-related screen time meaningful, mentally, or physically active, 4) replacing sedentary learning activities with movement-based learning activities, and 5) replacing screen-based learning activities with non-screen-based learning activities.<sup>51, 62</sup>

## KEY FINDINGS

### National

- A total of 48.2% of school-going adolescents aged 10 to 17 years met the screen time recommendation that is, not more than two hours daily.<sup>9</sup>

### Supplementary

- Parent-reported data showed that 10-54% pre-schoolers aged 3 to 6-years met the daily screen time recommendations (≤1 hour for 4-year-olds; ≤2 hours for 5 to 6-year-olds).<sup>36, 38-40</sup>
- Parent-reported data showed that 41% of 4 to 6-year-olds engaged in high quiet play, i.e., doing activities during leisure time such as reading books, playing blocks, playing dolls, and painting.<sup>38</sup>
- Objective data showed that pre-schoolers aged 5 to 6 years who engaged with touch-screen technology for ≥2 hours per day have less adequate hand skills as compared to those who use touch-screen technology for less than 2 hours per day (M: 2.702 versus 0.956).<sup>56</sup>
- Objective data showed that 9 to 11-year old obese children spent an average of 69.6% of their day sitting/lying, 19.1% standing and 11.3% stepping.<sup>57</sup>
- Self-reported data showed that 50-57% of adolescents aged 10 to 17 years engaged in no more than 3 hours of sedentary behaviours daily (i.e., sitting and watching television, playing computer games, talking with friends).<sup>5, 58, 59</sup>
- Self-reported data showed that adolescents aged 12 to 17 years spent an average of 5 hours on screen-based activities and 7 hours in sitting activities daily.<sup>32, 41</sup>
- Self-reported data showed 35% of adolescents aged 13 to 18 years engaged in gaming daily and 16.25% of them spend more than 3 hours each time.<sup>60</sup>

## RESEARCH GAPS

- National data on the amount of screen time spent for non-recreational purposes are limited. National surveys can differentiate non-recreational screen time in adherence to the Asia-Pacific 24-hour activity guidelines<sup>62</sup> and Canadian Sedentary Behaviour Guidelines<sup>65</sup>.
- With the advent of technological advances, Malaysians lead a sedentary lifestyle and consequently higher rates of obesity. There is a need for in depth understanding of the current situation and factors affecting physical inactivity and sedentary lifestyle (e.g.: survey of existing physical activity curriculum and co-curriculum programme in schools, assessment of physical activity and sedentary level using objective methods).
- More research is needed looking into the health effects of sedentary recreational screen time versus overall non-screen sedentary behaviour so that appropriate guidelines can be developed to address each separately.
- Further research on children and adolescents' interaction with different types of screen devices and the time spent, particularly mobile touch screen devices must be explored.
- Evidence-based facilitators and barriers to active living are key factors in engaging parents and educators to reduce the sedentary recreational screen time of children and adolescents.

## WHAT DO WE NEED FOR GRADING?

To better understand the screen related pursuits for recreational purposes, we propose the self/proxy-report methods as illustrated in Table 9 on how to obtain the data.

**Table 9: Recommended objective and self/proxy report methods and how to measure the metrics for Sedentary Behaviours.**

Method type	Details	Age Group	Metrics Measured
Objective	Method: Standardised data collection and analysis protocols should be used for various measurement tools (e.g., accelerometers), where children are monitored for at least three days but ideally, they would be monitored for seven days. <sup>63</sup>	5-17 years	Percentage of Malaysian children and adolescents who meet the Canadian Sedentary Behaviour Guidelines (5- to 17-yr-olds: no more than 2 hours of recreational screen time per day).
Self- and Parent/Proxy report	Question: On how many days, during the past 7 days, were you/has your child engaged in sedentary screen-based activities (e.g., watching television, using tablets, computers, or smartphones, or playing electronic games) for entertainment for less than 2 hours per day? <sup>44</sup>	5-17 years	

Note: Method/questions are adapted from Active Healthy Kids Australia 2022 Physical Activity Report Card<sup>44</sup>



# PHYSICAL FITNESS

YEAR	2016*	N/A	2022	B
GRADE				
AGE GROUP	N/A		10-17 years	
BENCHMARK USED FOR GRADING	Comparison of the current levels of extent flexibility of Malaysian children and adolescents against international norms.			

\*Note: Physical fitness indicator was not included in the 2016 Report Card.

## RATIONALE

National data obtained from the National Physical Fitness Standard for Malaysian School Students (SEGAK), for adolescents aged 10 to 17 years, allowed extent flexibility (test protocol: Sit-and-reach, measured in cm) to be graded. The flexibility levels of Malaysian adolescents are average relative to international norms resulting in grade B.<sup>7</sup> The other components of physical fitness (cardiovascular fitness, muscle strength and endurance) carried out in SEGAK differs with the protocols used internationally and were not comparable with international norms.<sup>64</sup> Hence, those data were not used for grading. There was also no available data for children aged 5 to 9 years.



## KEY FINDINGS

### National

- Objective data showed that Malaysian adolescents (aged 10-17 years) rank in the 67th percentile for extent flexibility. Ranking was calculated by comparing the extent flexibility of Malaysian adolescents to international norms for sit-and-reach (cm).<sup>7</sup>

### Supplementary

- Objective data of Malaysian primary school adolescents (aged 10-12 years) and secondary school adolescents (aged 13 to 17 years) showed 8-20% obtained score 5 for cardiovascular fitness (step-up test), 24-47% obtained score 5 for upper body strength (push-up/modified push-up test), and 56-59% obtained score 5 for abdominal muscular endurance (partial curl=ups).<sup>7</sup>
- Objective data of children aged 7 years showed that among boys, children living in urban areas had higher physical strength and/or flexibility compared with rural children<sup>65, 66</sup>. While among girls, children from rural areas have advantage in hand-eye coordination and speed.<sup>66</sup>
- Objective data of children with mean age of 10 years showed that hamstring flexibility (passive straight leg raise test) were average ( $M=77.9 \pm 7.7$ ) for the dominant side and  $76.7 \pm 7.9$  for non-dominant side.<sup>67</sup>
- Objective data showed that 16.5% of adolescents aged 12 to 15 years who met physical activity guidelines, were more likely to be in the Healthy Fitness Zone (HFZ) for aerobic capacity (13.3%) and muscular fitness (7.4%).<sup>41</sup>
- Objective data showed only 9% of adolescents aged 12 to 17 years had acceptable levels of aerobic fitness (Physical Fitness Scores  $\geq 65$ ) using modified Harvard Step Test.<sup>28</sup> In another study, it showed that the scores were higher among male compared to female (Scores: 103.32 verses 73.79).<sup>68</sup>
- Objective data conducted among adolescents at the age of 13,15 and 17 years showed significant changes in hand grip strength over the 5-year period for males and females. Males had a greater increment of hand grip strength over time (18-28 kg) as compared to females (15 kg).<sup>69</sup>
- Objective data conducted among adolescents at age 13,15, and 17 showed that yearly, on average, an increase in Cardiorespiratory Fitness (CRF) score were observed in both boys ( $7.6 \pm 8.0$ ) and girls ( $3.4 \pm 8.3$ ), however to a lesser extent than boys.<sup>43</sup>

## RECOMMENDATIONS TO IMPROVE THE GRADE

- Increase understanding among children, adolescents, parents, and teachers on the benefits of participating in muscle and bone strengthening activity, as well as the types of movements and activities that will develop muscle and bone strength.
- Provide opportunities for children and adolescents to perform moderate-to-vigorous intensity physical activity daily, muscle and bone strengthening activities at least 3 days per week, at the school and community level.
- Advocate for relevant authorities to employ more physical education (PE) qualified teachers in schools to be able to conduct effective PE lessons that will improve fitness.



## RESEARCH GAPS

- National data on fitness level for children aged 5 to 9 years are limited. National fitness surveys should consider including this age group in measuring fitness levels for a more comprehensive view of physical fitness level of children in Malaysia.
- National survey methods, reference values, scoring system and benchmarks may need to be reviewed and adjusted based on international standards to ensure comparability between Malaysian data with the international community.
- More research is needed to better understand the primary barriers that encourage aerobic and muscle and bone strengthening activities among children and adolescents across all levels, including individual, family, and institution to assist in the development and implementation of age-specific interventions.
- Further research needs to explore the duration and intensity required for meaningful health benefits to assist in the prescription of muscle and bone strengthening activities for children and adolescents.

## WHAT DO WE NEED FOR GRADING?

It is important to consider standardised, well-defined objective measures for both aerobic and muscular fitness to ensure that both components of the recommended Malaysian Physical Activity Guidelines are met (i.e., 60 minutes MVPA daily and engage in muscle and bone strengthening activities). The recommendations are shown in Table 10.

**Table 10: Recommended objective and self/proxy report methods and how to measure the metrics for Physical Fitness.**

Physical Fitness Domains	Physical Fitness Tests	Age Group	Reference Standards
Cardiorespiratory Fitness (CRF)	20-m shuttle run of aerobic fitness	9-17 years	European normative values published by Tomkinson et al. (2018). <sup>64</sup>
	Modified step test	5-10 years	Step Test of Aerobic Fitness among Elementary School Children published by Hayes et al. (2019). <sup>70</sup>
Upper body Strength and Endurance	90 degree push up test/modified push ups	5-17 years	FITNESSGRAM/ACTIVITYGRAM test administration manual published by Cooper Institute (2017) <sup>71</sup>
	Flexed arm hang	5-17 years	FITNESSGRAM/ACTIVITYGRAM test administration manual published by Cooper Institute (2017) <sup>71</sup>
	Bent arm hang	9-17 years	European normative values published by Tomkinson et al. (2018). <sup>64</sup>
Abdominal Muscular Endurance	Sit-ups test	9-17 years	European normative values published by Tomkinson et al. (2018). <sup>64</sup>
	Curl up test	5-17 years	FITNESSGRAM/ACTIVITYGRAM test administration manual published by Cooper Institute (2017) <sup>71</sup>
Flexibility	Back-saver Sit-and-reach test	5-17 years	FITNESSGRAM/ACTIVITYGRAM test administration manual published by Cooper Institute (2017) <sup>71</sup>
	Curl up test	5-17 years	European normative values published by Tomkinson et al. (2018). <sup>64</sup>

# DIET

YEAR	2016	F	2022	D-
GRADE				
AGE GROUP	7-12 years		13-17 years	
BENCHMARK USED FOR GRADING	<p><b>Percentage of Malaysian children and adolescents eating adequate amounts of fruits and vegetables every day. Children aged under 7 years are recommended to eat two servings of fruits and two servings of vegetables daily; children aged 7-18 years are recommended to eat two servings of fruits and three servings of vegetables daily based on Malaysia Dietary Guidelines (MDG) for Children and Adolescents.<sup>2</sup></b></p> <p>Fruits and vegetables intake was chosen as the benchmark to grade the Diet indicator as there is currently a lack of a single, summary measure of overall diet for the Malaysian population. Moreover, fruits and vegetables intake has been broadly used as an indicator of healthy eating globally and has been previously shown to be associated with physical activity and sedentary behaviour in children and adolescents.</p>			

## RATIONALE

Diet was assigned a grade of D- as less than one-fourth of school-going adolescents aged 13 to 17 years self-reported achieving the recommended daily intake of fruits and vegetables.<sup>5</sup> In addition, no national data were available for children aged 5 to 9 years.

## KEY FINDINGS

### National

Self-reported data from the NHMS Adolescent Health Survey 2017 showed 23.5% of adolescents (aged 13-17 years) consumed fruits and vegetables at least 5 times daily in the past 7 days.<sup>5</sup> However, it is noted that data only report overall consumption of fruits and vegetable as five servings without quantifying how many servings were met for each fruits and vegetables separately.

### Supplementary

#### Dietary intake/quality

- Self-reported/parent-reported data of urban children aged 8 to 12 years showed that majority had dietary below the national recommendation when comparing food group intake to the MDG 2013.<sup>72</sup>
- Self-reported nationwide data from adolescents aged 13 to 17 years found that the median intake for; energy was 1848 kcal, 52% from carbohydrate, 15% from protein and 34% from fat.<sup>6</sup>
- Self-reported data showed that adolescents aged 13 in rural schools consumed more energy and cholesterol as compared to adolescents in urban schools (1706 kcal/d vs 1612 kcal/d, 244 mg/d vs 202 mg/d. While adolescents aged 13 to 15 years had higher dietary fibre intake (7.8g) compared to urban adolescents (6.9g) however their dietary fibre intake was still lower than the recommendation of 20-30 g/day.<sup>73</sup>
- Self-reported data showed that the overall diet quality measured by Healthy Diet Index (HEI) of children aged 7 to 13 years were poor (Mean score: 49-50).<sup>74, 75</sup>

#### Meal Pattern

- Self-reported data showed 56% of children from age 2 to 12 years consumed 3 main meals daily, about 20% snacked 3 times per day, whereas 9% ate fast food on a weekly basis.<sup>76</sup>
- Self-reported data showed that daily breakfast, lunch, and dinner intake of adolescents aged 10 to 17 years were 30-76%, 48-56%, and 55-63%, respectively.<sup>6, 24, 77, 78</sup>
- Self-reported data showed that 10-53% of children aged 6 to 17 years skipped breakfast at least once a week.<sup>24, 77</sup>
- Parent-reported data showed that 45% had more than 5 times weekly snack intake, 61% consumed SSB in weekly basis and only 11% had at least 2 servings of fruit and vegetable daily.<sup>40</sup>
- Self-reported/parent-reported data showed 58% of adolescents aged 13 to 16 years used to eat out of home without family members<sup>78</sup> and the mean for frequency of eating outside of home was 1.9days/week.<sup>79</sup>
- Self-reported data from adolescents aged 15 to 19 years showed that urban students prioritised having a healthy/balanced diet (59.55% versus 48.50%) and ate daily breakfast (57.4% versus 10.2%) compared to rural.<sup>80</sup>

#### Habitual Food Intake

- Self-reported data showed that 61.6% of adolescents aged 10 to 17 years met the recommended intake for poultry, meat and eggs, followed by cereals and grains (53.2%), fruits (31.5%), legumes (23.2%), milk and dairy products (23.3%), vegetables (7.8%), and fish (2.2%).<sup>6</sup>
- Self-reported data showed that 9-33% of children aged 7 to 16 years achieved adequate intake of vegetables daily based on recommendation by MDG.<sup>81, 82</sup>
- Self-reported data showed that 41-56% of children aged 9 to 11 years consumed whole grain.<sup>83, 84</sup>
- Self-reported data found that a greater proportion of children aged 10 to 12 years have an inadequate intake of cereals/grains, meat/poultry, legumes, and milk/dairy products compared with children 7 to 9 years old.<sup>85</sup>
- Self-reported data from adolescents aged 10 to 12 years showed there was a high occurrence of unhealthy eating habits such as having deep-fried food and consuming foods high in sugar, salt, and saturated fat.<sup>86</sup>
- Self-reported data from adolescents aged 12 to 16 years showed that the average daily consumption of Sugar Sweetened Beverages (SSB) was 177-1038ml daily.<sup>87, 88</sup>

## RECOMMENDATIONS TO IMPROVE THE GRADE

- Establish a monitoring system to assess the implementation, effectiveness and impact of programmes/initiatives conducted by government authorities for continuous improvement of strategies.
- Adopt the Malaysian Healthy Eating Index (HEI) in national surveys to measure diet quality measures that assess the population's compliance towards dietary guidelines. With this information, it will provide better representation of the status of balanced and nutritious food and drinks consumption to support growth and daily activities.
- Conduct ongoing engagement between government and school authorities with school canteen operators and food vendors to create a positive and supportive environment for healthy meal consumption at schools.
- Strengthen collaborative efforts between parents, government, and relevant stakeholders (e.g., food industry, media) to change children and adolescents' eating habits. A healthy eating habit that supports children and adolescents' growth, development, and activity requires deliberate selection of quality food and drinks in appropriate quantities for the corresponding age.
- Increase advocacy on implementing Healthier Choice logo and MY Choice logo to assist children and adolescents in choosing healthier options.
- Intensify collaborations between food and beverages industries, food retailers, government, and non-governmental associations in producing new products low in energy density, improving the nutritional quality of existing products, and implanting responsible marketing and labelling.
- Improve strategic approaches on ensuring the accessibility and affordability of quality and healthy nutrition, particularly among low-income families and indigenous children are needed to promote balanced and healthy eating habits.
- Advocate for teachers and parents to encourage children to bring healthy lunchboxes to school to instil healthier eating habits.
- Advocate for parents to be good role models during mealtimes and exert positive influence on the quality of their children's diet by having regular healthy family eating habits and food availability.

## RESEARCH GAPS

- National data on overall diet quality measure, food pattern, and diet preferences among Malaysian children and adolescents are limited.
- Comprehensive national data on the trend of food and nutrition transition in Malaysia are limited.
- Information on evaluation of existing nutrition strategies/interventions/programmes aimed to address diet quantity and quality are limited.
- More studies on the effects of food intake and dietary practices on short-term and long-term nutrition and health status needs to be explored.
- More studies on the influence of personal, social, and environmental factors towards children and adolescents eating out, late night eating practices, fast/ convenient/ restaurants/ hawker food, food truck and food delivery needs to be explored.



## WHAT DO WE NEED FOR GRADING?

To better understand the overall diet quality of Malaysian children and adolescents, we recommend the self/proxy-report methods as shown in Table 11.

**Table 11: Recommended objective and self/proxy report methods and how to measure the metrics for Diet.**

Method Type	Details	Age Group	Metrics Measured
Self- and Parent/Proxy report	Overall diet quality measures assessed using the Malaysian Healthy Eating Index and validated dietary assessment tool.	5-17 years	Measure the overall diet quality of all Malaysian children and adolescents



# WEIGHT STATUS

YEAR	2016*	N/A	2022	B-
GRADE				
AGE GROUP	N/A		5-17 years	
BENCHMARK USED FOR GRADING	Percentage of Malaysian children and adolescents who have a normal weight status according to BMI for age z-score (BAZ) indices of WHO Growth Reference 2007.			

\*Note: Weight Status is not a Global Matrix 4.0 indicator and was not included in the 2016 Report Card.

## RATIONALE

National data indicates that more than half of Malaysian children and adolescents' nutritional status aged 5 to 17 years are normal, while about one third are overweight or obese.<sup>9</sup>

## KEY FINDINGS

### National

- Objective data showed that the BAZ of Malaysian children and adolescents aged 5 to 17 years are 10% are thin, 60.2% are normal, 15% are overweight and 14.8% are obese.<sup>9</sup>

### Supplementary

- Objective data showed that 46-76% of 3- to 6-year-olds<sup>40, 89</sup>, 40-69% of 7- to 11-year-olds<sup>22, 90-93</sup> had normal BAZ.
- Objective data showed that 51-76% of 10 to 17-year-olds had normal BAZ.<sup>25, 29, 78, 94-99</sup>
- A study re-analysed data from NHMS 2011 for children aged 5 to 18 years showed that the prevalence of overweight was 25% and revealed that the availability of fast-food outlets with close proximity in residential areas was significantly associated with being overweight among children.<sup>100</sup>
- Malaysia is facing a double burden of malnutrition with a secular increase in overweight and obesity and a gradual decrease in thinness among 6-17-year-olds from varying socio-demographic backgrounds.<sup>101</sup>

## RECOMMENDATIONS TO IMPROVE THE GRADE

- Strengthen current school-based nutrition programmes aimed at improving schoolchildren's nutritional status by creating a nutrition-friendly atmosphere in the classroom through nutrition education, nutritional assessment, school meals, and physical activity education and promotion.
- Empower and train teachers and parents on procedures to collect data in government and private schools to ensure data collected are accurate and replicable.
- Conduct ongoing engagements with relevant stakeholders to ensure national and local nutrition programmes and policies are being implemented.
- Monitor weight-management/intervention programmes implementation and effectiveness for children and adolescents who are overweight or obese starting at all school levels.
- Raise awareness among parents, and caregivers on regular monitoring of children and adolescents' growth by measuring weight and height and determining weight status using Body Mass Index (BMI)-for-Age monthly.
- Empower parents, caregivers, and children by educating them on the proper methods to monitor their weight and BMI according to their age using growth charts as a reference point (children below 5 years old using WHO (2006) chart and children 5 to 19 years use WHO (2007) growth chart reference)





## RESEARCH GAPS

- More research on association of nutritional status with physical activity participation in both urban and rural areas can be conducted for future comparison.
- Research exploring effective intervention for weight management can be conducted for future implementation of weight management programmes in schools to curb overweight and obesity in school settings.

## WHAT DO WE NEED FOR GRADING?

Objective measures as shown in Table 12 are recommended to be used to obtain data on nutritional status of children and adolescents.

**Table 12: Recommended objective and self/proxy report methods and how to measure the metrics for Weight Status.**

Method type	Details	Age Group	Metrics Measured
Objective	<ul style="list-style-type: none"> <li>• Anthropometric measurements conducted by trained personnel based on a standard protocol.</li> <li>• Weight status of children and adolescents identified based on the WHO 2007 Growth Reference (WHO 2007) using the BMI-for-Age z-score.</li> </ul>	5-17 years	Percentage of Malaysian children and adolescents within a normal BMI-for-Age z-score category.



# FAMILY AND PEERS

<b>YEAR</b>	<b>2016</b>	<b>INC</b>	<b>2022</b>	<b>INC</b>
<b>GRADE</b>				
<b>AGE GROUP</b>	<b>N/A</b>		<b>N/A</b>	
<b>BENCHMARK USED FOR GRADING</b>	<b>No consensus on a primary metric to be graded could be reached.</b>			

## RATIONALE

Incomplete (INC) has again been assigned to this indicator as in the previous 2016 Report Card, given there is lack of national data available for the relevant benchmarks. While data on physical activity of Malaysian adults are available; it was not possible to identify the proportion of parents who met the physical activity guidelines.

## KEY FINDINGS

### Supplementary

- Studies found that students who received greater levels of parental and peer support were found to be more among active.<sup>42, 102</sup>
- Objective data collected from parents of primary school children showed that overweight and obese parents had a larger number of high BMI children, with the number in urban areas larger than rural areas.<sup>103</sup>
- Parent-reported data showed about 50% of parents with normal BMI often enforce limits on media viewing to their children. Moreover, about 75% of parents reported to rarely participate in PA, and a decreasing trend was observed in the level of PA as family activity as the child's BMI category increased from overweight to severe obese.<sup>103</sup>
- Parent-reported data found that barriers most parents faced was the need to spend time on household chores, unpredictable weather, and lack of a safe neighbourhood that restricted outdoor play as barriers for them to limit screen time exposure for their children<sup>104</sup>

## RESEARCH GAPS

- Data on the percentage of parents who meet physical activity guidelines (as parental role-model), and the challenges parents encounter in keeping their children active at different phases of their lives are limited and hence, need to be collected continuously under national surveys.
- To understand the role-modelling behaviour, data on frequency of co-participation in physical activity among children and parents/caregivers in a week/month are needed.
- More evidence of the extent and influence of family support on physical activity participation among children and adolescents is needed through dyadic research on physical activity behaviours of both children and their family members.
- Peer-based strategies should be studied, evaluated, and incorporated in future physical activity programmes to enhance children's and adolescent's participation in physical activity.

## RECOMMENDATIONS TO IMPROVE THE GRADE

- Prioritise the provision of spaces, places and programs that encourage co-participation of children and parents in school and community settings (e.g., sports grounds with workout equipment or walking tracks).
- Develop interventions aimed at increasing physical activity and decreasing screen time by targeting the entire family to maximise impact.
- Widely promote the sports tax relief exemption for the purchase of sports equipment for any sports activity for parents own use, spouse, or child. This is important to encourage parents to purchase sports equipment and be active together with their children.
- Increase involvement of parents through the Parent Teacher Associations (PTA/PIBG) at school levels by encouraging co-participation events involving both parents and children (for example, competitions during sports day).
- Provide training on physical activity role models or leaders in schools to promote physical activity among children and adolescents.



## WHAT DO WE NEED FOR GRADING?

When considering family and peers as a context and source of influence for a child's involvement in physical activity, factors such as support and role modelling must be evaluated. Malaysia has relatively few data on the family and peer's role. Methodologies and how the data should be operationalised for self/proxy-report measurements are listed in Table 13 as recommendations.

**Table 13: Recommended objective and self/proxy report methods and how to measure the metrics for Family and Peers.**

Method type	Details	Age Group	Metrics Measured
Self- and Parent/ Proxy report	<p><b>Question:</b></p> <ul style="list-style-type: none"> <li>In the past 7 days, on how many days, did you/your child receive/give some form of encouragement or support from a parent or siblings /to your child to be physically active (e.g., volunteering, coaching, driving to sports facilities, paying for membership fees and purchasing sports equipment)<sup>44</sup></li> </ul> <p>Answer (circle one): 0 1 2 3 4 5 6 7 days</p>	<p>PR: 5 – 9 years</p> <p>SR: 10–17years</p>	Percentage of Malaysian family members (e.g., parents, guardians) who facilitate physical activity and sport opportunities for their children (e.g., volunteering, coaching, driving, paying for membership fees and equipment).
Parent/ Proxy report	<p><b>Questions:</b></p> <ul style="list-style-type: none"> <li>In the past 7 days, on how many days have you engaged in a moderate intensity physical activity for at least 30 minutes per session? (e.g.: carry light weights, brisk walking, normal rate of cycling).<sup>44</sup></li> </ul> <p>Answer (circle one): 0 1 2 3 4 5 6 7 days</p> <ul style="list-style-type: none"> <li>In the past 7 days, on how many days, did you engage in vigorous intensity physical activity for at least 10 minutes per session? (e.g.: muscle or bone strengthening physical activity (e.g., body weight exercises like push-ups or squats, running, dancing)?<sup>44</sup></li> </ul> <p>Answer (circle one): 0 1 2 3 4 5 6 7 days</p>	Parent of child aged 5–17 years	Percentage of Malaysian family members (e.g., parents, guardians) who facilitate physical activity and sport opportunities for their children (e.g., volunteering, coaching, driving, paying for membership fees and equipment).

Self- and Parent/ Proxy report

**Question:**

- In the past 7 days, on how many days, were you physically active with a parent or sibling /with your child?<sup>44</sup>

Answer (select one): 0 1 2 3 4 5 6 7 day

PR: 5 – 9 years  
SR: 10–17years

Percentage of family members (e.g., parents, siblings, guardians) who are physically active with their kids.

Self- and Parent/ Proxy report

**Questions:**

- In the past 7 days, on how many days, did you/your child receive some form of encouragement from their friends or peers to be physically active (e.g., "It's great that we are walking to school together from now on")?<sup>44</sup>

Answer (select one): 0 1 2 3 4 5 6 7 days

- In the past 7 days, on how many days, did you/your child give some form of encouragement to their friends or peers to be physically active (e.g., "It's great that we are walking to school together from now on")?<sup>44</sup>

Answer (select one): 0 1 2 3 4 5 6 7 days

PR: 5 – 9 years  
SR: 10–17 years

Percentage of Malaysian children and adolescents with friends or peers who encourage and support them to be physically active.

Percentage of Malaysian children and adolescents who encourage or support their friends and peers to be physically active.

Note: PR = Parent/proxy-report; SR = Self-report; Method/questions are adapted from Active Healthy Kids Australia 2022 Physical Activity Report Card<sup>44</sup>







# SCHOOL

YEAR	2016*	B+	2022	A-
GRADE				
BENCHMARK USED FOR GRADING	Percentage of schools with students who have regular access to facilities and equipment that support physical activity (e.g., gymnasium, outdoor playgrounds, sporting fields, multipurpose space for physical activity, equipment in good condition).			

\*Note: 2016 grade was updated according to the Global Matrix 4.0 Grading Rubric.

## RATIONALE

Out of the 6 benchmarks under the school indicator, only 1 benchmark was used to grade this indicator as the other benchmarks lack available national data. Percentage of schools with students who have regular access to facilities and equipment that support physical activity was the only benchmark used. Grade A- was assigned to the school indicator as more than half of the national primary and secondary schools in Malaysia have sports fields.<sup>9</sup>

## KEY FINDINGS

### National

- About 80% of national primary and secondary schools in Malaysia have sports fields that support physical activity for school children and adolescents. However, it is important to note that there is lack of data on the condition of the school fields.<sup>9</sup>

### Supplementary

- Teacher-reported data showed that the majority of schools had a playground/field (100%), indoor hall (81.3%), and sports equipment (100%). However, in terms of the school environment (i.e., physical, economic, political, and socio-cultural environment), it is still not satisfactory.<sup>105</sup>
- Parent-reported data on perspectives of the existing quality of early childhood care and education (ECCE) programmes found that some parents were not satisfied with the outdoor/indoor facilities provided (e.g., playground, classroom design) in their child's centre, indoor and outdoor activities, and diet provided.<sup>106</sup>
- Teacher-reported data found that the barriers in promoting PA at school includes limited budget allocation, lack of manpower to organise and monitor the programme and lack of involvement and cooperation from parents.<sup>105</sup>
- Teacher-reported data found that the three main challenges faced when implementing school based assessment (SBA) in PE were core knowledge of the subject (SBA training course were short and not continuously provided), assessment facilities and equipment (poor condition, limited space or area to implement PE assessments), and classroom management (large class size).<sup>107</sup>
- Teacher-reported data showed that only 6.2% of the teachers teaching PE were qualified PE teachers and almost 71% of PE teachers taught less than 5 periods of PE per week but more than 16 periods per week for other subjects. Majority of them had never attended PE courses (89%) and sport related courses (92%) since becoming a teacher. In addition, almost half of the PE teachers perceived that facilities (52.2%) and equipment (48.1%) for PE were inadequate.<sup>108</sup>
- A qualitative study found that PE teachers' low commitment towards their teaching was mainly due to limited skills, as many did not have a PE background and were employed as temporary staff. Principals and PE teachers felt that more training should be provided to the teachers to conduct PE classes appropriately.<sup>109</sup>
- A study conducted among trainee teachers showed that during COVID-19 period, majority of the teachers preferred to use face-to-face learning method (46.9%), followed by online method (29.4%) and mixed method (23.8%).<sup>110</sup>
- A qualitative study found that students often perceived PE classes to have a limited variety of activities. PE teachers perceived insufficient sports equipment and teaching materials as challenges for PA in schools.<sup>109</sup>
- Teacher-reported data suggest that learning with nature contributes to positive development of children where the approaches used to instil nature awareness include conducive landscape, environmental activities, outdoor class activities, outdoor free play, formal education and recreational programme outside a preschool.<sup>111</sup>



## RECOMMENDATIONS TO IMPROVE THE GRADE

- Increase collaboration between education, health, and sport sectors to implement physical activity programs and support relevant policies in schools.
- Provide children and adolescents with multiple opportunities to be active throughout the day in school, for example conducting quality PE lessons, active classrooms, active recess, provide sports related after school activities, and promote active transportation to school.
- Advocate for PE lessons to be conducted by PE specialists. Schools should consider retraining current PE teachers if they did not specialise in PE, and to send PE teachers to continuous professional development to stay updated on current knowledge and implementation of PE in school.
- Provide more opportunities for physical activity in childcare and preschool settings by incorporating outdoor play into the curriculum and make physical activity opportunities and PE fun and meaningful.

## RESEARCH GAPS

- National data on the percentage of schools with active school policies and percentage of schools taught by a PE specialist is required.
- Observational studies that determine the physical environment, facilities, and equipment available in schools and their use for PE lessons are needed.
- Quality of PE lessons, the implementation of active school policies, and the usability of the sport facilities in schools are needed to better understand school's readiness in implementing more PA related activities and programmes. Data can be collected as part of the national surveys.
- Studies on the effectiveness of existing PE curriculum and co-curriculum programmes in pre-school and school-going children are needed for continuous improvement.
- There is currently a lack of studies documenting facilities suitable for conducting physical activities and programmes in preschools settings.
- Research is needed to identify the factors that influence physical activity participation among children and the level of physical activity participation at schools.

## WHAT DO WE NEED FOR GRADING?

School is a setting and source of influence for a child's participation in physical activity. Due to the complexity of this indicator, standardised methodology and indicators, and how the data should be measured must be considered. Recommendations are listed in Table 14.

Table 14: Recommended objective and self/proxy report methods and how to measure the metrics for School.

Method type	Details	Age Group	Metrics Measured
Staff-report	<p><b>Question:</b></p> <ul style="list-style-type: none"> <li>• Does your school implement active school policies? (e.g., daily physical education (PE), daily physical activity, recess, "everyone plays" approach, bike racks at school, traffic calming on school property, outdoor time).<sup>44</sup></li> </ul> <p><i>Answer: Yes; No; Not sure.</i></p>	Primary & secondary schools	Percentage of schools with active school policies (e.g., daily physical education (PE), daily physical activity, recess, "everyone plays" approach, bike racks at school, traffic calming on school property, outdoor time).
Staff-report	<p><b>Question:</b></p> <ul style="list-style-type: none"> <li>• What proportion of PE classes in your school is taught by a specialist PE teacher?</li> </ul>	Primary & secondary schools	Percentage of schools where the majority (≥80%) of students are taught by a PE specialist.
Staff-report	<p><b>Question:</b></p> <ul style="list-style-type: none"> <li>• What is the proportion of scheduled PE lessons that were conducted on an average year?</li> </ul>	Primary & secondary schools	Percentage of schools where the majority (≥80%) of students are offered the mandated amount of PE.

<p>Staff-report</p>	<p><b>Question:</b></p> <ul style="list-style-type: none"> <li>Do you prepare/allow active play opportunities for the students before and/or after school hours (waiting for transport home)?</li> </ul> <p><i>Answer: Yes; No; Not sure.</i></p> <ul style="list-style-type: none"> <li>How many students do you estimate were able to participate in that opportunity?</li> </ul>	<p>Primary &amp; secondary schools</p>	<p>Percentage of schools where the majority (<math>\geq 80\%</math>) of students are taught by a PE specialist.</p>
<p>Parent/ Proxy report</p>	<p><b>Question:</b></p> <ul style="list-style-type: none"> <li>Do your child/children have opportunities to participate in physical activity/sports programmes at school apart from PE classes?<sup>44</sup></li> </ul> <p><i>Answer: Yes; No; Not sure.</i></p>	<p>Parent of child aged 5–17 years</p>	<p>Percentage of parents who report their children and adolescents have access to physical activity opportunities at school in addition to PE classes.</p>
<p>Staff-or student-report</p>	<p><b>Question:</b></p> <ul style="list-style-type: none"> <li>If available, do students/you have access to the following outside of school hours and PE classes?<sup>44</sup> <ul style="list-style-type: none"> <li>+ Field</li> <li>+ Indoor court</li> <li>+ Playground</li> <li>+ Physical activity or sports equipment.</li> </ul> </li> </ul> <p><i>Answer: Yes; No; Not sure, for each.</i></p> <ul style="list-style-type: none"> <li>How many fixed pieces of physical activity equipment are available for children to use indoors/outdoors?<sup>44</sup> (e.g.: swings, climbing equipment, slides)</li> <li>How many portable pieces of physical activity equipment are available for children to use indoors/outdoors? (e.g.: hoops, balls, floor mats, mini trampolines)<sup>44</sup></li> </ul>	<p>Primary &amp; secondary schools</p>	<p>Percentage of schools with students who have regular access to facilities and equipment that support physical activity (e.g., gymnasium, outdoor playgrounds, sporting fields, multipurpose space for physical activity, equipment in good condition)</p>

Note: Method/questions are adapted from Active Healthy Kids Australia 2022 Physical Activity Report Card<sup>44</sup>

# COMMUNITY AND ENVIRONMENT

YEAR

2016

INC

2022

INC

GRADE

BENCHMARK USED FOR GRADING

No consensus on a primary metric to be graded could be reached.

## RATIONALE

Incomplete (INC) grade has again been assigned to this indicator as in the previous 2016 Report Card, given there is lack of national data available to assess the relevant benchmarks for community and environment.

## RECOMMENDATIONS TO IMPROVE THE GRADE

- Increase collaborative work between government authorities, municipalities, community, neighbourhood, parents, and caregivers to create and promote safe home and neighbourhood environments that support physical activity in children and adolescents as the areas in and around the house is where they usually play actively.
- Strengthen health and wellbeing, economic, social, and environmental benefits of participating in physical activity in the outdoors and green spaces to the community through nationwide/state/community campaigns.
- Raise awareness by relevant professional bodies related to sports or recreation in promoting physical activity participation at community and neighbourhood level.
- Increase quality, safety, accessibility, and diverse play spaces for children and adolescents in both urban and rural areas. Municipalities need to ensure that suitable space and equipment are provided equitably across their communities.
- Improve the development of playgrounds in natural spaces to help engage children in outdoor play and to enhance their connection with nature.
- Include policies focusing specifically on improving neighbourhood safety for children and adolescents living in both urban and rural areas.

## KEY FINDINGS

### Supplementary

- Based on the Malaysia Sports Culture Index (MCSI) 2019, the Facilities domain (refers to the score of availability, accessibility, safety, suitability, and functionality of sports facilities provided) reported by Malaysian youth aged 13 to 19 years was at a moderate level with a score of 50.<sup>8</sup>
- Parent-reported data showed that 37% agreed that their neighbourhood is safe for their child to play outside<sup>104</sup> while some perceived it is not safe from crimes.<sup>38, 112</sup>
- Self-reported data from residents in public housing (flat) showed majority were dissatisfied with the quality, safety, and cleanliness of the facilities.<sup>113</sup>
- Parent-reported data on children aged 9 to 12 years showed that parents' perception of neighbourhood environment that includes land use mix (access), traffic hazard and safety, and constrained behaviours (defensive behaviours) were associated with the level of children's participation in physical activity.<sup>23</sup>
- Parent reported data showed that 15% of children aged 4 to 6 years have a playground in their neighbourhood<sup>38</sup>.
- Proximity to neighbourhood parks was found to be highly associated with its level of utilisation where the longer the distance of the park from home, the longer the time spent at the park and the shorter the distance of the park from home, the higher the utilisation of the park.<sup>114</sup>
- Self-reported data from park users showed that most were satisfied with provision of exercise equipment and overall safety features of the park.<sup>115</sup> In addition, the highest pattern of park utilisation were found to be performing physical activities and gathering outdoors to spend some time with friends or family.<sup>116</sup>
- Self-reported data showed that 98% of park users and residents in the neighbourhood of three selected parks in Kuala Lumpur perceived that the parks near them provided sufficient space for recreation and leisure facilities including jogging and walking as well as opportunities for children to take part in physical activities.<sup>117</sup>
- A study conducted among children aged 7 years found that place of residence has clear impact on motor fitness of boys and girls.<sup>66</sup>



## RESEARCH GAPS

- Nationally representative data on the perception of children, adolescents and parents related to the availability, accessibility and safety of play areas or recreational parks, adequacy of exercise facilities and equipment, and their levels of cleanliness and maintenance across the country are limited. Thus, these areas need to be explored through national surveys.
- Policies for creating communities and environments that engage people across the lifespan in physical activity needs to be included along with the methods to assess its effectiveness and impact on physical activity participation levels.
- Large-scale studies evaluating the influence of community and built environment on the physical activity behaviours of children and adolescents are needed to provide strong evidence for supporting strategic actions on creating healthier and more active living environments.
- More research is needed to explore built environment that can promote families to participate in physical exercise together. These areas must be accessible and appealing to people of all ages, abilities, and preferences.

## WHAT DO WE NEED FOR GRADING?

Considering community and built environment as a setting and source of influence for a child's participation in physical activity, aspects related to policies, infrastructures and safety need to be investigated. Due to the complexity of this indicator, standardised methodologies and how the data should be operationalised for objective and self/parent/proxy-report measures must be considered. Recommendations are included in Table 15.

*Table 15: Recommended objective and self/proxy report methods and how to measure the metrics for Community and Environment.*

Method type	Details	Age Group	Metrics Measured
Self- and Parent/ Proxy report	<p><b>Question:</b></p> <ul style="list-style-type: none"> <li>• Is your neighbourhood safe where you/your child are comfortable being physically active outdoors on your/their own or with friends?<sup>44</sup></li> </ul> <p><i>Answer: Yes; No; Not sure</i></p>	<p>PR:5-9 years</p> <p>SR: 10-17years</p>	<p>Percentage of Malaysian children or parents who report living in a safe neighbourhood where they can be physically active.</p>
Self- and Parent/ Proxy report	<p><b>Question:</b></p> <ul style="list-style-type: none"> <li>• Within walking distance of your home, is there?<sup>44</sup> <ul style="list-style-type: none"> <li>+ a playground;</li> <li>+ a park;</li> <li>+ a sports field or facilities;</li> <li>+ affordable and regular public transport</li> </ul> </li> </ul> <p><i>Answer: Yes; No; Not sure</i></p> <ul style="list-style-type: none"> <li>• Within my local neighbourhood there are good roads and sidewalks to support *active transport.<sup>44</sup> Answer: Disagree; Neutral; and Agree. (*Active transport refers to any form of human-powered transportation such as walking, cycling, using a wheelchair, or skateboarding).</li> <li>• Are the facilities that are available near your home or your local neighbourhood fit and safe to use?<sup>44</sup></li> </ul> <p><i>Answer: Yes; No; Not sure</i></p>	<p>PR:5-9 years</p> <p>SR: 10-17years</p>	<p>Percentage of Malaysian children or parents who report having facilities, parks, and playgrounds available to them in their community.</p> <p>Percentage of communities/ municipalities that report they have infrastructure (e.g., sidewalks, trails, paths, bike lanes) specifically geared toward promoting physical activity.</p> <p>Percentage of children or parents who report having well-maintained facilities, parks, and playgrounds in their community that are safe to use.</p>

Note: PR = Parent/proxy-report; SR = Self-report; Method/questions are adapted from Active Healthy Kids Australia 2022 Physical Activity Report Card<sup>44</sup>

# GOVERNMENT

YEAR

2016

B

2022

B

GRADE

## BENCHMARK USED FOR GRADING

Allocated resources for the implementation of physical activity promotion strategies and initiatives for all children and adolescents.

Evidence of leadership and commitment in providing physical activity opportunities for all children and adolescents. Allocated funds and resources for the implementation of physical activity promotion strategies and initiatives for all children and adolescents.

Demonstrated progress through the key stages of public policy making (i.e., policy agenda, policy formation, policy implementation, policy evaluation and decisions about the future) using the \*Health Enhancing Physical Activity Policy Audit Tool Version 2 (HEPA PAT v2) and the scoring rubric published by Ward et al. 2021.118

(\*The HEPA PAT v2 tool was initially developed by HEPA Europe and used by the Welsh Report Card team. The HEPA PAT v2 tool provides a framework for analysing physical activity policy instruments and when used together with the scoring rubric published by Ward et al (2021)118, it offers an opportunity to provide better consistency and potential for developing both comparative and trend data when assessing policy impact on physical activity in children and adolescents).



## RATIONALE

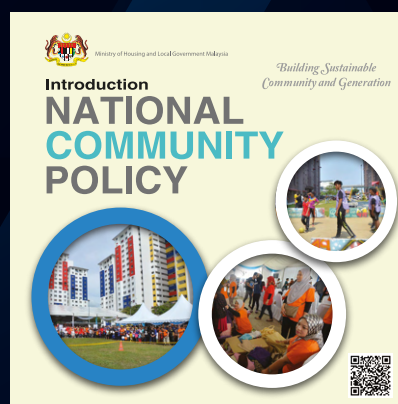
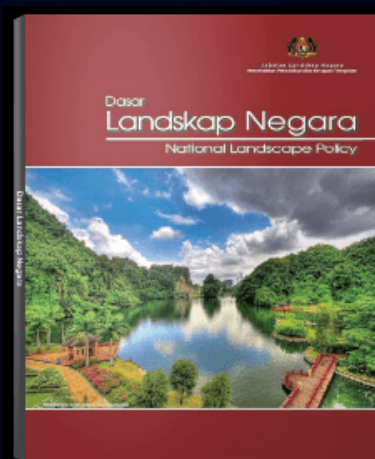
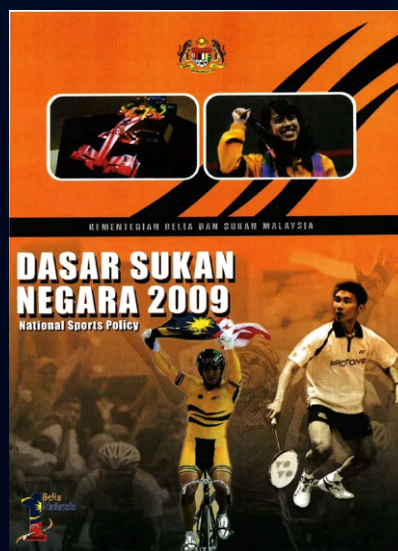
B grade was assigned to the government indicator assessing government policies/strategies/action plans and initiatives aiming at promoting active healthy lifestyle in children and adolescents that have been implemented in Malaysia using the HEPA PAT v2 tool and the Scoring Rubric published by Ward et al.<sup>118</sup> Although there are policies/strategies/action plans efforts in increasing physical activity, it is worth noting that the system for reporting, funding allocation for specific initiatives, and monitoring and evaluation plans needs to be more comprehensive and transparent to ensure that the initiatives will be effective and impact positively on child and adolescents physical activity. Overall, more information about impact is required and future policy documents will benefit by including clear and detailed information about reporting, funding, monitoring and evaluation.

## KEY FINDINGS

### National Policies

There are six policies that emerged in the education, environment and financial domains that promote physical activity as the main policy or were included in some of their thrust areas; for example: 1 Student 1 Sports Policy, Policy for the Implementation of Co-curricular Activities, National Sports Policy, National Landscape Policy, National Community Policy, Tax relief for lifestyle sports/sports equipment.

- **The “One Student One Sport” policy<sup>10</sup>** that was developed specifically to target school children and school-going adolescents was introduced to the Malaysian education system in 2011. This policy makes it compulsory for every student to participate in at least one type of sports conducted in a planned and systematic way at school. The short- and long-term objectives of this policy include: to improve physical fitness, to build self-esteem, to foster racial unity, to develop sports culture, to fulfil children’s natural affinity to be physically active, to provide a balance between academics and physical fitness, and to provide a platform for excellence in sports for all school-going children and adolescents.
- **Policy for the Implementation of Co-curricular Activities<sup>11</sup>** outlined the implementation of co-curriculum in school which highlights that Co-curriculum activity is part of the national curriculum and the implementation of co-curriculum in school is compulsory, thus refusal to carry out co-curricular activities is a mistake and can be punished with fines or imprisonment or both under general penalty. In addition, Co-curriculum activities implemented at schools should be in the form of any planned activities beyond the process of teaching and learning in the classroom for the purpose of providing the students with the opportunity to improve, strengthen, and practise the knowledge, skills, and values learned in the room.
- **The National Sports Policy<sup>12</sup>** was established in 2009 with the primary goal of creating a sports culture among Malaysians. This encompasses participation in sports and physical activities through Sports for All, High Performance Sports and Sports as an Industry. This policy outlines the objectives, strategies, roles and responsibilities of each government agency, non-governmental organisations, sports and fitness councils or associations, institutions of higher learning as well as bodies and individuals involved in sports.
- **The National Landscape Policy 2020<sup>14</sup>** includes strategies on the well-being of the citizen by providing adequate landscape spaces for recreation and social interaction among Malaysians. The strategic plan towards providing a clean and sustainable Malaysian environment include improving the provision of green areas in municipality, increasing quality of life and comfort in neighbourhood by upgrading Public Parks and implementing Landscape Cultivation Programme to improve the environment and the welfare of the community.
- **The National Community Policy 2018<sup>13</sup>** aims to empower the community in residential areas, particularly those in social housing (People’s Housing Programme), to be actively involved in the management and maintenance of public property. This policy also focuses on building an inclusive community towards the wellbeing of the people. The implementation of the National Community Policy focuses on 8 main areas or clusters which are the key factors in changing the mindset and attitude of the community in a housing area. The 8th cluster is Sports and Recreation where sporting and recreation culture among the community members should be nurtured so that it becomes part of their lifestyle. The 3 strategies outlined under Cluster 8 are 1) establish and maintain safe infrastructure for sports and recreational activities, 2) increase the number of appropriate sports and recreational activities and 3) enhance collaboration with strategic partners in promoting a healthy lifestyle.
- **Tax relief for lifestyle sports/sports equipment<sup>20</sup>** was established by the Ministry of Finance Malaysia on the purchase of sports equipment for any sports activity as defined under the Sports Development Act 1997 and gym memberships for the individuals own use, spouse, or child. This initiative may help to encourage an active lifestyle among family members.

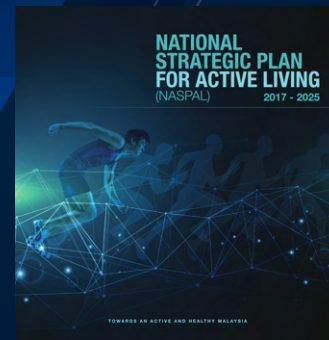




## Strategic Plans/ Blueprint

There are five national strategic plans/blueprint/prioritisation of policies to increase the promotion of physical activity across all ministries which include the National Strategic Plan for Active Living (NASPAL) 2019–2025, Strategic Plan of Ministry of Health 2016–2020, Policy Options to combat obesity (2016), Malaysia Education Blueprint 2013–2025, and Strategic Plan for Health Promotion 2018–2020.

- **National Strategic Plan for Active Living (NASPAL) 2017–2025<sup>16</sup>** that was developed specifically to target school children and school-going adolescents was introduced to the Malaysian education system in 2011. This policy makes it compulsory for every student to participate in at least one type of sports conducted in a planned and systematic way at school. The short- and long-term objectives of this policy include: to improve physical fitness, to build self-esteem, to foster racial unity, to develop sports culture, to fulfil children's natural affinity to be physically active, to provide a balance between academics and physical fitness, and to provide a platform for excellence in sports for all school-going children and adolescents.
- **Strategic Plan of Ministry of Health 2016–2020<sup>18</sup>** is a document that outlines the strategic planning of the MOH and emphasises on health promotive and preventive services, improvement in efficiency of the health system delivery as well as citizen involvement in care of their health. Among the strategic plans include empowering healthy individuals, family & community on health. Among the initiatives outlined in the plan is the development of National Action Plan for Active Living and Malaysian Physical Activity Guidelines and increase the number of advocators to promote physical activity at all levels.
- **Policy Options to Combat Obesity (2016)<sup>15</sup>** is a document that includes potential policy options to prioritise on food, physical activity, and environment to combat obesity in Malaysia. The policy options for physical activity were grouped into five policy areas, which include distribution, employment, education, infrastructure and planning and transport.
- **Malaysia Education Blueprint 2013–2025<sup>17</sup>** was developed to outline a comprehensive transformation programme for the system, including key changes to the Ministry. In terms of students' academic learning, the curriculum focuses on spirituality, along with artistic and sporting ability, to develop the child holistically. Programmes and initiatives to develop these components are present both during formal class time as well as through a variety of after-school sports and co-curricular activities. To enhance the sports and co-curricular experience and ensure that students are exposed to the full diversity of Malaysian society, the Ministry is expanding the Rancangan Integrasi Murid untuk Perpaduan (RIMUP) programme which will allow students from different school types, public and private, to mix during sports and co-curricular activities.
- **Strategic Plan for Health Promotion 2018–2020<sup>19</sup>** states the direction of the Health Promotion Program to instil care for health among Malaysians in line with the focus of the 11th Malaysia Plan and the Strategic Plan of the Ministry of Health Malaysia 2016–2020. This Strategic Plan set three objectives to be achieved, namely: i) improving health literacy, ii) improving access and equity of delivery of health promotion services, and iii) improvement of healthy lifestyle practices. Many programmes that aimed to instil active and healthy lifestyles among the population have been implemented and conducted by the Ministry of Health. These include the "10,000 steps a day" campaign introduced in 2009, Nak Sihat (Want to be Healthy) campaign launched in 2013, and Doktor Muda (Young Doctors) club, a school-based health promotion programme introduced in 2006 at schools as a collaborative effort between Ministry of Health and Ministry of Education.



## Supplementary

- Staff-reported data from a study among school administrators showed that majority (90%) were aware of the policy implementation related to obesity prevention for primary school students (1 Student 1 Sport, Guidelines in Weight Management of School Children, Guidelines for Food and Drinks Sold at the School Canteen, Banning the Sale of Food and Beverages by Mobile Vendors Outside of School Perimeters and School Health Promotion—Young Doctors Program). However, only 50% to 70% of schools had fully implemented the policies. The reported barriers were lack of equipment, inadequate training, and limited time to complete implementation. Commitment from the schools, staff members, students, and canteen operators were found to be facilitators of the policy implementation.<sup>119</sup>
- A study conducted among stakeholders and experts from Malaysia, representing the government, industry, academia, and non-governmental organisations to examine the status of policy interventions in addressing childhood obesity in Malaysia. Findings showed that all the domains measured in implementing policies related to childhood obesity were of low progress. Nine governance indicators were reported as 22.5% (low progress), four in the risk factors domain, and two in the surveillance.<sup>120</sup>

From the findings, there is evidence of leadership and commitment to increasing levels of physical activity and providing physical activity opportunities, although some are broader in nature and may not be specific to children and adolescents only. The allocation of funds and resources for the implementation of policy were also identified. Progress through the key stages of public policy making, such as policy agenda, policy formation, policy implementation, policy evaluation, and decisions about the future, is improved with some policy efforts that are in the process of implementation.



## RECOMMENDATIONS TO IMPROVE THE GRADE

- Develop a national physical activity participation plan and policy specifically for children and adolescents, with clear monitoring and evaluation framework, and a coordinated national research agenda.
- Increase the visibility and importance of physical activity through strong advocacy efforts on promotion of physical activity among children and adolescents.
- Establish strong collaboration and alignment across government institutions, non-governmental organisations, industries, and relevant stakeholders. Collaboration needs to be maintained to develop, support, and sustain physical activity initiatives, research efforts, and program implementation and evaluation. A whole systems approach should be adopted, where moving away from 'working in silos' to an approach that strengthens multisectoral collaboration is emphasised.
- Monitor and evaluate the effectiveness and sustainability of each planned strategy/programme conducted by the government and relevant implementing agencies to promote physical activity among children and adolescents, as well as gazette the results to the nation.
- Establish collaborations between government agencies and non-governmental organisations to conduct evaluation of policies via impact analysis.

## RESEARCH GAPS

- At the national level, as well as in each state and Federal territory, there is an urgent need to implement uniform tools and metrics for evaluating physical activity and sedentary behaviour.
- More evidence from large-scale, longitudinal studies examining the physiological, psychological, and sociological benefits/effects of physical activity participation and sedentary behaviour in children and adolescents are needed to provide a firm foundation for policy development and public health practices.
- Timely evaluation of all key government strategies and initiatives in promoting physical activity to children and adolescents are important and needed to ensure that resources and funds are allocated accordingly.
- Continuous national surveys on the reporting, funding, monitoring and evaluation of each policy, strategy, action plan and initiative implemented are needed, and data should be made available whenever possible.

## WHAT DO WE NEED FOR GRADING?

Given the complexity of this indicator there is no standardised method or recommendation proposed for how data should be operationalised for objective and/or self/parent/proxy-report measures.

# SUMMARY OF GRADES

INDICATOR	GRADE		BENCHMARK
	2016*	2022	
Overall Physical Activity	<b>D-</b>	<b>D-</b>	Percentage of Malaysian children and adolescents who meet the Global Recommendations on Physical Activity for Health, which recommend that children and youth accumulate at least 60 minutes of MVPA per day on average.
Organised Sports & Physical Activity	<b>INC</b>	<b>INC</b>	No consensus on a primary metric could be reached
Active Play	<b>INC</b>	<b>INC</b>	No consensus on a primary metric could be reached
Active Transportation	<b>D-</b>	<b>D-</b>	Percentage of Malaysian children and adolescents who regularly use active transportation (any form of human powered transportation e.g., walking, cycling, using a wheelchair, skateboarding) to get to and from places regularly (e.g., school, park, mall, friend's house).
Sedentary Behaviours	<b>D</b>	<b>C</b>	Percentage of Malaysian children and adolescents who meet the Canadian Sedentary Behaviour Guidelines (5- to 17-yr-olds: no more than 2 hours of recreational screen time per day).
Physical Fitness	<b>N/A</b>	<b>B</b>	Comparison of the current levels of extent flexibility of Malaysian children and adolescents against international norms.
Diet	<b>F</b>	<b>D-</b>	Percentage of Malaysian children and adolescents eating adequate amounts of fruits and vegetables every day meeting the Malaysian Dietary Guideline Recommendation.
Weight Status	<b>N/A</b>	<b>B-</b>	Percentage of Malaysian children and adolescents who have a normal weight status according to BMI for age indices of WHO Growth Reference 2007.
Family & Peers	<b>INC</b>	<b>INC</b>	No consensus on a primary metric could be reached
School	<b>B+</b>	<b>A-</b>	Percentage of schools with students who have regular access to facilities and equipment that support physical activity (e.g., gymnasium, outdoor playgrounds, sporting fields, multipurpose space for physical activity, equipment in good condition).
Community & Environment	<b>INC</b>	<b>INC</b>	No consensus on a primary metric could be reached
Government	<b>B</b>	<b>B</b>	Evidence of leadership and commitment in providing physical activity opportunities for all children and adolescents. Allocated funds and resources for the implementation of physical activity promotion strategies and initiatives for all children and adolescents. Demonstrated progress through the key stages of public policy making (i.e., policy agenda, policy formation, policy implementation, policy evaluation and decisions about the future) using the HEPA PAT v2 and the scoring rubric published by Ward et al., 2021. <sup>118</sup>

\*Note: 2016 grade was updated according to the Global Matrix 4.0 Grading Rubric.



# ABBREVIATIONS

<b>AHKGA</b>	Active Healthy Kids Global Alliance
<b>AHKM</b>	Active Healthy Kids Malaysia
<b>AHS</b>	Adolescent Health Survey
<b>ANS</b>	Adolescent Nutrition Survey
<b>GSHS</b>	Global School-based Student Health Survey
<b>HEPA PAT v2</b>	Health Enhancing Physical Activity Policy Audit Tool Version 2
<b>HFZ</b>	Healthy Fitness Zone
<b>M</b>	Mean
<b>MDG</b>	Malaysian Dietary Guideline
<b>MET</b>	Metabolic Equivalent Task
<b>MOE</b>	Ministry of Education Malaysia
<b>MOH</b>	Ministry of Health Malaysia
<b>MVPA</b>	Moderate to Vigorous Intensity Physical Activity
<b>MyAHRB</b>	Malaysian Adolescent Health Risk Behaviour
<b>MyHeARTs</b>	Malaysian Health and Adolescents Longitudinal Research Team study
<b>NHMS</b>	National Health Morbidity Survey
<b>O</b>	Objective measure
<b>PA</b>	Physical Activity
<b>PE</b>	Physical Education
<b>PR</b>	Parent/proxy report
<b>SR</b>	Self-Report

# REFERENCES

1. Active Healthy Kids Global Alliance (AHKGA). (2021). Global Matrix 4.0 Indicators and Benchmarks Active Healthy Kids Global Alliance. Retrieved from <https://www.activehealthykids.org/about/>
2. National Coordinating Committee for Food and Nutrition (NCCFN). (2013). Malaysian Dietary Guidelines for Children and Adolescents. Putrajaya: Ministry of Health Malaysia.
3. Ministry of Health Malaysia. (2017). Malaysia Physical Activity Guidelines. Putrajaya: Ministry of Health Malaysia.
4. National Coordinating Committee for Food and Nutrition (NCCFN). (2010). Malaysian Dietary Guidelines. Putrajaya: Ministry of Health Malaysia.
5. Institute for Public Health (IPH). (2017). National Health and Morbidity Survey (NHMS) 2017: Adolescent Health Survey 2017, Malaysia. Kuala Lumpur: Ministry of Health Malaysia.
6. Institute for Public Health (IPH). (2017). National Health and Morbidity Survey (NHMS) 2017: Adolescent Nutrition Survey 2017, Malaysia. Kuala Lumpur: Ministry of Health Malaysia.
7. Ministry of Education Malaysia. (2019). Data on National Physical Fitness Standard for Malaysian School Students (SEGAK) (Unpublished data).
8. Institute for Public Health (IPH). (2020). National Health and Morbidity Survey (NHMS) 2019: Vol. I: NCDs – Non-Communicable Diseases: Risk Factors and Other Health Problems. Kuala Lumpur: Ministry of Health Malaysia.
9. Ministry of Education Malaysia. (2021). Report on School Sports Infrastructure and Programmes Survey (i-KePS Report) (Unpublished data).
10. Ministry of Education Malaysia. (2011). One Student One Sport Policy Implementation Guide. Putrajaya: Ministry of Education Malaysia.
11. Ministry of Education Malaysia. (2000). Policy for the Implementation of Co-curricular Activities. Retrieved from <https://www.moe.gov.my>.
12. Ministry of Youth and Sports Malaysia. (2009). National Sports Policy 2009. Putrajaya: Ministry of Youth and Sports Malaysia.
13. Ministry of Housing and Local Government Malaysia. (2019). National Community Policy. Putrajaya: Ministry of Housing and Local Government Malaysia.
14. Ministry of Housing and Local Government Malaysia. (2011). National Landscape Policy. Putrajaya: Ministry of Housing and Local Government Malaysia.
15. Ministry of Health Malaysia. (2016). Policy Options to Combat Obesity in Malaysia. Putrajaya: Ministry of Health Malaysia.
16. Ministry of Health Malaysia. (2018). National Strategic Plan for Active Living 2017–2025. Putrajaya: Ministry of Health Malaysia.
17. Ministry of Education Malaysia. (2013). Malaysia Education Blueprint 2013–2025. Putrajaya: Ministry of Education Malaysia.
18. Ministry of Health Malaysia. (2016). Ministry of Health Malaysia Strategic Plan 2016–2020. Putrajaya: Ministry of Health Malaysia.
19. Ministry of Health Malaysia. (2018). Strategic Plan for Health Promotion 2018–2020. Putrajaya: Ministry of Health Malaysia.
20. Laws of Malaysia, Act 53, Income Tax Act 1967.
21. World Health Organization. (2020). WHO guidelines on physical activity and sedentary behaviour. Geneva: World Health Organization.
22. Teo, C. H., Chin, Y. S., Lim, P. Y., Masrom, S. A. H., & Shariff, Z. M. (2021). Impacts of a School-Based Intervention That Incorporates Nutrition Education and a Supportive Healthy School Canteen Environment among Primary School Children in Malaysia. *Nutrients*, 13(5).
23. Tung, S. E., Ng, X. H., Chin, Y. S., Mohd Taib, M. N., & Associates. (2016). Associations between parents' perception of neighbourhood environments and safety with physical activity of primary school children in Klang, Selangor, Malaysia. *Child Care Health Dev*, 42(4), 478–485.
24. Tee, E. S., Nurliyana, A. R., Karim Norimah, A., Jan Mohamed, H. J. B., Tan, S. Y., Appukutty, M., et al. (2018). Breakfast consumption among Malaysian primary and secondary school children and relationship with body weight status – Findings from the MyBreakfast Study. *Asia Pacific Journal of Clinical Nutrition*, 27(2), 421–432.
25. Al-Sadat, N., Majid, H. A., Sim, P. Y., Su, T. T., Dahlui, M., Abu Bakar, M. F., et al. (2016). Vitamin D deficiency in Malaysian adolescents aged 13 years: findings from the Malaysian Health and Adolescents Longitudinal Research Team study (MyHeARTs). *BMJ Open*, 6(8), e010689.
26. Ng, A. K., Hairi, N. N., Jalaludin, M. Y., & Majid, H. A. (2019). Dietary intake, physical activity and muscle strength among adolescents: The Malaysian Health and Adolescents Longitudinal Research Team (MyHeART) study. *BMJ Open*, 9(6), e026275.
27. Zaharan, N. L., Muhamad, N. H., Jalaludin, M. Y., Su, T. T., Mohamed, Z., Mohamed, M. N. A., et al. (2018). Non-synonymous single-nucleotide polymorphisms and physical activity interactions on adiposity parameters in Malaysian adolescents. *Frontiers in Endocrinology*, 9, 209.
28. Tee, J. Y. H., Gan, W. Y., Tan, K. A., & Chin, Y. S. (2018). Obesity and unhealthy lifestyle associated with poor executive function among Malaysian adolescents. *PLoS One*, 13(4), e0195934.
29. Mahaletchumy, A., Rampal, L., & Sharif, Z. M. (2019). Prevalence of overweight/obesity and its associated factors among secondary school students in semi-urban area in Malaysia. *Medical Journal of Malaysia*, 74(6), 513–520.
30. Che Hasan, M. K., Abdullah, F., Firdaus, M. K. Z. H., & Jamaludin, F. I. C. (2021). Does physical activity and body weight status determine musculoskeletal health among adolescents in Malaysia? *Enfermeria Clinica*, 31, S247–S251.
31. Jamani, N. A., Said, A. H., Aziz, K. H. A., & Rahman, M. A. A. (2019). Prevalence of physical activity and its association with body mass index among late adolescents in Kuantan, Malaysia. *Journal of International Dental and Medical Research*, 12(4), 1671–1675.
32. Chew, W. F., Yap, S. F., Yasmin, A. M., Choo, K. B., Low, G. K. K., & Boo, N. Y. (2018). Risk factors associated with abdominal obesity in suburban adolescents from a Malaysian district. *Singapore Medical Journal*, 59(2), 104–111.
33. Tyng, L., Mohd Zulkefli, N. A., & Md Said, S. (2020). Do psychological factors and sedentary activities influence physical activity level? Findings from Malaysian adolescents. *International Journal of Adolescence and Youth*, 25(1), 319–328.
34. Cheah, Y. K., Lim, H. K., Kee, C. C., & Ghazali, S. M. (2016). Factors associated with participation in physical activity among adolescents in Malaysia. *International Journal of Adolescence and Youth*, 28(4), 419–427.
35. Amran, M. S., & Jamaludin, K. A. (2021). The impact of unplanned school closures on adolescent behavioral health during the COVID-19 pandemic in Malaysia. *Frontiers in Public Health*, 9, 639041.
36. Lee, S. T., Wong, J. E., Chan, G. K. L., & Poh, B. K. (2021). Association between compliance with movement behavior guidelines and obesity among Malaysian preschoolers. *International Journal of Environmental Research and Public Health*, 18(9), 4611.
37. Cain, K. L., Salmon, J., Conway, T. L., Cerin, E., Hinckson, E., Mitás, J., et al. (2021). International physical activity and built environment study of adolescents: IPEN Adolescent design, protocol and measures. *BMJ Open*, 11(1), e046636.
38. Bin Saad, M. F., Lian, C. W., & Koon, P. B. (2020). Predictors and barriers to physical activity among rural preschool children in Kuching and Samarahan Division, Sarawak, Malaysia. *Sri Lanka Journal of Child Health*, 49(4), 353–360.
39. Mustafa, N., Rusali, R., Ramos, A. H. A., Ghazali, J., & Mohd Shukri, N. A. (2020). The Gadget Generation: Body Mass Index and Duration of Physical Activity and Screen-viewing among Preschoolers in Kuantan, Pahang. *Malaysian Journal of Public Health Medicine*, 20(2), 116–122.
40. Foo, L. H., Lee, Y. H., Suhaida, C. Y., & Hills, A. P. (2020). Correlates of sugar-sweetened beverage consumption of Malaysian preschoolers aged 3 to 6 years. *BMC Public Health*, 20(1), 552.
41. Hui, S. S., Zhang, R., Suzuki, K., Naito, H., Balasekaran, G., Song, J. K., et al. (2021). The associations between meeting 24-hour movement guidelines and adiposity in Asian Adolescents: The Asia-Fit Study. *Scandinavian Journal of Medicine & Science in Sports*, 31(3), 763–771.
42. Tan, A. K. G., Yen, S. T., Fang, X., & Chiang, F. S. (2019). Body weight and physical activity of adolescents in Malaysia. *International Health*, 11(2), 150–158.
43. Toumpakari, Z., Jago, R., Howe, L. D., Majid, H. A., Papadaki, A., Mohammadi, S., et al. (2019). Cardiometabolic risk factors and physical activity patterns maximizing fitness and minimizing fatness variation in Malaysian adolescents: A novel application of reduced rank regression. *International Journal of Environmental Research and Public Health*, 16(23), 4662.



44. Australia AHK. (2022). Reboot! Reimagining Physically Active Lives: 2022 Australian Report Card on Physical Activity for Children and Young People. Melbourne: Active Healthy Kids Australia.
45. Ministry of Education Malaysia. (2021). Assessment of Physical Activity, Sports, and Co-curriculum (Unpublished data).
46. Chang, C. Y., Arasu, K., Wong, S. Y., Ong, S. H., Yang, W. Y., Chong, M. H. Z., et al. (2021). Factors associated with bone health status of Malaysian pre-adolescent children in the PREBONE-Kids Study. *BMC Pediatrics*, 21(1), 382.
47. Kueh, Y. C., Abdullah, N., Chin, N. S., Morris, T., & Kuan, G. (2019). Motivation for physical activity among preadolescent Malay students in Kelantan, Malaysia. *Pertanika Journal of Social Sciences and Humanities*, 27(1), 675-683.
48. Kueh, Y. C., Abdullah, N., Kuan, G., Morris, T., & Naing, N. N. (2018). Testing measurement and factor structure invariance of the Physical Activity and Leisure Motivation scale for youth across gender. *Frontiers in Psychology*, 9, 1096.
49. Lee, S. T., Wong, J. E., Ong, W. W., Ismail, M. N., Deurenberg, P., & Poh, B. K. (2016). Physical activity pattern of Malaysian preschoolers: Environment, barriers, and motivators for active play. *Asia-Pacific Journal of Public Health*, 28, 21S-34S.
50. Adnan, M., Shahrudin, S., Abd Rahim, B. H., & Ismail, S. M. (2020). Quantification of physical activity of Malaysian traditional games for school-based intervention among primary school children. *Journal of Taibah University Medical Sciences*, 15(6), 486-494.
51. Agha, S. S., Thambiah, S., & Chakraborty, K. (2019). Children's agency in accessing for spaces of play in an urban high-rise community in Malaysia. *Children's Geographies*, 17(6), 691-704.
52. Truelove, S., Vanderloo, L. M., & Tucker, P. (2017). Defining and measuring active play among young children: A systematic review. *Journal of Physical Activity and Health*, 14(2), 155-166.
53. Institute for Public Health. (2017). National Health and Morbidity Survey (NHMS) 2017: Adolescent Health Survey 2017, Malaysia. Secondary School Student Active Transportation Data (Unpublished data).
54. Wong, J. E., Parikh, P., Poh, B. K., & Deurenberg, P. (2016). Physical activity of Malaysian primary school children: Comparison by sociodemographic variables and activity domains. *Asia-Pacific Journal of Public Health*, 28, 35S-46S.
55. Canadian Society for Exercise Physiology. (2016). Canadian 24-Hour Movement Guidelines for Children and Youth: An integration of physical activity, sedentary behaviour, and sleep. Ottawa: Canadian Society for Exercise Physiology.
56. Daud, A. Z. C., Aman, N. A., Chien, C. W., & Judd, J. (2020). The effects of touch-screen technology usage on hand skills among preschool children: A case-control study. *F1000Research*, 9, 1306.
57. Wafa, S. W., Aziz, N. N., Shahril, M. R., Halib, H., Rahim, M., & Janssen, X. (2017). Measuring the daily activity of lying down, sitting, standing and stepping of obese children using the ActivPAL™ activity monitor. *Journal of Tropical Pediatrics*, 63(2), 98-103.
58. Peltzer, K., & Pengpid, S. (2016). Leisure time physical inactivity and sedentary behaviour and lifestyle correlates among students aged 13-15 in the Association of Southeast Asian Nations (ASEAN) member states, 2007-2013. *International Journal of Environmental Research and Public Health*, 13(2), 217.
59. Said, N., Md Nor, N., Sharoni, S. K. A., Buhari, S. S., & Habidin, N. F. (2020). Weight management: Need assessment for health educational module development among primary school children. *Malaysian Journal of Public Health Medicine*, 20(Special Volume 1), 318-324.
60. Goh, Y. L., Goh, Y. H., Low, M. P., & Bin RLL. (2018). Usage behaviours of mobile phone among teenagers and its implications to teenagers in Kuala Lumpur, Malaysia. *Journal of Social Sciences Research*, 4(Special Issue 2), 332-336.
61. Saunders, T. J., Rollo, S., Kuzik, N., Demchenko, I., Bélanger, S., Brisson-Boivin, K., et al. (2022). International school-related sedentary behaviour recommendations for children and youth. *International Journal of Behavioral Nutrition and Physical Activity*, 19(1), 39.
62. Loo, B. K. G., Okely, A. D., Pulungan, A., & Jalaludin, M. Y. (2022). Asia-Pacific consensus statement on integrated 24-hour activity guidelines for children and adolescents. *British Journal of Sports Medicine*, 56(10), 539-545.
63. Atkin, A. J., Gorely, T., Clemes, S. A., Yates, T., Edwardson, C., Brage, S., Biddle, S. J. H. (2012). Methods of measurement in epidemiology: Sedentary behaviour. *International Journal of Epidemiology*, 41(5), 1460-1471.
64. Tomkinson, G. R., Carver, K. D., Atkinson, F., Daniell, N. D., Lewis, L. K., Fitzgerald, J. S., Olds, T. S. (2018). European normative values for physical fitness in children and adolescents aged 9-17 years: Results from 2,779,165 Eurofit performances representing 30 countries. *British Journal of Sports Medicine*, 52(22), 1445-1456.
65. Azahari, H., Abdullah, M. R., Husin Musawi Maliki, A. B., Eswaramoorthi, V., Juahir, H., Musa, R. M., Sulaiman, N. (2019). Physical fitness and anthropometric characteristics in school children: A comparison of urban and rural areas in the east coast of Peninsular Malaysia. *Indian Journal of Public Health Research and Development*, 10(3), 619-623.
66. Yusoff, N. I., Abdullah, M. R., Juahir, H., Lee, J. L. F., Mat-Rasid, S. M., Kosni, N. A., Sulaiman, N. (2019). The effect of residence area on motor skill development among children. *Indian Journal of Public Health Research and Development*, 10(3), 614-618.
67. Liyanage, E., Krasilshchikov, O., Hashim, H. A., & Jawis, N. M. (2020). Prevalence of hamstring tightness and hamstring flexibility of 9-11 years old children of different obesity and physical activity levels in Malaysia and Sri Lanka. *Journal of Physical Education and Sport*, 20, 338-343.
68. Thangiah, N., Su, T. T., Chinna, K., Jalaludin, M. Y., Mohamed, M. N. A., & Abdul Majid, H. (2021). Longitudinal assessment between lifestyle-related risk factors and a composite cardiovascular disease (CVD) risk index among adolescents in Malaysia. *Scientific Reports*, 11, 19135.
69. Ng, A. K., Hairi, N. N., Dahlui, M., Su, T. T., Jalaludin, M. Y., & Abdul Majid, H. (2020). The longitudinal relationship between dietary intake, physical activity, and muscle strength among adolescents. *British Journal of Nutrition*, 124(11), 1207-1218.
70. Hayes, R. M., Maldonado, D., Gossett, T., Shepherd, T., Mehta, S. P., & Flesher, S. L. (2019). Developing and validating a step test of aerobic fitness among elementary school children. *Physiotherapy Canada*, 71(2), 187-194.
71. Cooper Institute. (2017). FITNESSGRAM Administration Manual: The Journey to myhealthzone (5th ed.). Champaign, IL, USA: Human Kinetics.
72. Yang, W. Y., Burrows, T., MacDonal-Wicks, L., Williams, L. T., Collins, C. E., & Chee, W. S. S. (2018). Parent-child feeding practices in a developing country: Findings from the Family Diet Study. *Appetite*, 125, 90-97.
73. Daud, N. M., Fadzil, N. I., Yan, L. K., Makbul, I. A. A., Yahya, N. F. S., Teh, A. H., et al. (2018). Knowledge, attitude and practice regarding dietary fibre intake among Malaysian rural and urban adolescents. *Malaysian Journal of Nutrition*, 24(1), 77-88.
74. Appannah, G., Emi, N. A., Yusin, N. A. A., Gan, W. Y., Shariff, Z. M., Shamsuddin, N. H., et al. (2020). Evaluation of dietary quality using Malaysian healthy eating index and its relationships with cardiometabolic risk factors in Malaysian adolescents. *Malaysian Journal of Medicine and Health Sciences*, 16(6), 46-55.
75. Shan, C. H., Ali, A., Zakaria, N. S., & Yusof, H. M. (2018). Assessment of diet quality and its association with nutritional status among fishermen's children in Terengganu. *Malaysian Applied Biology*, 47(6), 137-144.
76. Chong, K. H., Wu, S. K., Noor Hafizah, Y., Bragt, M. C. E., & Poh, B. K. (2016). Eating habits of Malaysian children: Findings of the South East Asian Nutrition Surveys (SEANUTS). *Asia-Pacific Journal of Public Health*, 28, 59S-73S.
77. Mustafa, N., Majid, H. A., Toumpakari, Z., Carroll, H. A., Jalaludin, M. Y., Al Sadat, N., et al. (2019). The association of breakfast frequency and cardiovascular disease (CVD) risk factors among adolescents in Malaysia. *Nutrients*, 11(5), 973.
78. Tajik, E., Latiffah, A. L., Awang, H., Siti Nur'Asyura, A., Chin, Y. S., Azrin Shah, A. B., et al. (2016). Unhealthy diet practice and symptoms of stress and depression among adolescents in Pasir Gudang, Malaysia. *Obesity Research and Clinical Practice*, 10(2), 114-123.
79. Fen, H. S., Siew, C. Y., Shariff, A. R. B. M., & Ying, L. P. (2021). Associations of eating behaviours, fast food purchasing and availability with BMI-for-age z-score among adolescents in Labuan, Malaysia. *Malaysian Journal of Nutrition*, 27(1), 107-122.
80. Jeinie, M. H. B., Guad, R. M., Hetherington, M. M., Gan, S. H., Aung, Y. N., Seng, W. Y., et al. (2021). Comparison of nutritional knowledge, attitudes and practices between urban and rural secondary school students: A cross-sectional study in Sabah, East Malaysia. *Food*, 10(9), 2037.
81. Selamat, R., Raib, J., Abdul Aziz, N. A., Zulkafly, N., Ismail, A. N., W Mohamad, W. N. A., et al. (2020). Dietary practices and meal patterns among overweight and obese school children in Malaysia: Baseline data from a school-based intervention study. *Ecology of Food and Nutrition*, 59(3), 263-278.



82. Khalili Rohin, M. A., Abd Hadi, N., Sariff, S., Mohd Shariff, S. S., Ridzwan, N., & Jumli, M. N. (2021). Knowledge, attitude and practice on vegetables intake among adolescents in rural Terengganu, Malaysia. *Malaysian Journal of Medicine and Health Sciences*, 17(2), 98-105.
83. Koo, H. C., Lee, C. L., Nur Hidayah, A. S., & Nurain Hazwani, A. R. (2018). Knowledge, attitudes and practices of schoolchildren toward whole grains and nutritional outcomes in Malaysia. *Appetite*, 123, 256-263.
84. Koo, H. C., Kaur, S., Chan, K. Q., Soh, W. H., Ang, Y. L., Chow, W. S., et al. (2020). Whole-grain intake and its inverse relationships with fatty acids intake among multiethnic Malaysian schoolchildren. *Journal of Human Nutrition and Dietetics*, 33(5), 670-677.
85. Koo, H. C., Poh, B. K., Lee, S. T., Chong, K. H., Bragt, M. C. E., & Abd Talib, R. (2016). Are Malaysian children achieving dietary guideline recommendations? *Asia-Pacific Journal of Public Health*, 28, 8S-20S.
86. Hoque, K. E., Kamaluddin, M. A., Razak, A. Z. A., & Wahid, A. A. A. (2016). Building healthy eating habits in childhood: A study of the attitudes, knowledge and dietary habits of schoolchildren in Malaysia. *PeerJ*, 4, e2016.
87. Loh, D. A., Moy, F. M., Zaharan, N. L., Jalaludin, M. Y., & Mohamed, Z. (2017). Sugar-sweetened beverage intake and its associations with cardiometabolic risks among adolescents. *Pediatric Obesity*, 12(1), e1-e5.
88. Gan, W. Y., Mohamed, S. F., & Law, L. S. (2019). Unhealthy lifestyle associated with higher intake of sugar-sweetened beverages among Malaysian school-aged adolescents. *International Journal of Environmental Research and Public Health*, 16(15), 2785.
89. Aslan, A. A., & Sulaiman, N. (2020). Overweight and obesity among children: A relationship between maternal beliefs and feeding practices with children's body mass index-for-age in Bandar and Jugra Kuala Langat Selangor. *Malaysian Journal of Medicine and Health Sciences*, 16(6), 11-18.
90. Siew, C. Y., Siong, T. E., Hashim, Z., Raqi, R. A., & Karim, N. A. (2020). Effectiveness of a nutrition education intervention for primary school children: The healthy kids programme, Malaysia. *Malaysian Journal of Medicine and Health Sciences*, 16(6), 1-10.
91. Hashim, N. S., Ali, A., Kamarudin, K. S., Yusof, H. M., Zakaria, N. S., Sulaiman, N., et al. (2021). Association of Household Food Insecurity with Academic Performance and Nutritional Status of Fisherman's School Aged Children in Terengganu, Malaysia. *Malaysian Applied Biology*, 50(2 Special Issue), 61-9.
92. Teh, S. C., Asma' A., Hamid, J. J. M., & Yusof, H. M. (2020). Assessment of Food Security, Anthropometric and Cognitive Function among Orang Asli Children in Pahang, Malaysia. *IJUM Medical Journal Malaysia*, 19(3), 81-91.
93. Yee, S. K., Ali, A., Zakaria, N. S., & Yusof, H. M. (2021). Nutritional Status of Orang Asli Children in Sungai Berau, Terengganu. *Journal of Sustainability Science and Management*, 16(6), 180-90.
94. Tee, J. Y. H., Gan, W. Y., & Lim, P. Y. (2020). Comparisons of body mass index, waist circumference, waist-to-height ratio and a body shape index (ABSI) in predicting high blood pressure among Malaysian adolescents: A cross-sectional study. *BMJ Open*, 10(1), e032874.
95. Ahmad, A., Zulaili, N., Abdul Manan, N. S., Shahril, M. R., Syed Saadun Tarek Wafa, S. W. W., Mohd Amin, R., et al. (2017). Body weight status of school adolescents in Terengganu, Malaysia: a population baseline study. *BMC Public Health*, 17(1), 1-12.
96. Law, L. S., Gan, W. Y., & Mohd Taib, M. N. (2020). Sociodemographic and psychological factors as predictors of body mass index-for-age (BAZ) among adolescents in Sibul, Malaysia. *Malaysian Journal of Medicine and Health Sciences*, 16(6), 56-62.
97. Aainaa Syarfa, M. S., Zuriati, I., & Mohd Nasir, M. T. (2016). Associations between personality traits and body weight status with energy intake of adolescents in Hulu Langat District, Malaysia. *Malaysian Journal of Nutrition*, 22(3), 403-12.
98. Rahim, N. N. A., Chin, Y. S., & Sulaiman, N. (2019). Socio-demographic factors and body image perception are associated with BMI-for-age among children living in welfare homes in Selangor, Malaysia. *Nutrients*, 11(1), 142.
99. Lai, S. C., Siew, C. Y., Chan, Y. M., & Mohd Nasir, M. T. (2016). Prevalence of malnutrition and its association with socio-demographic characteristics among Malaysian adolescents living in day-school hostels. *Malaysian Journal of Nutrition*, 21(3), 321-34.
100. Cheong, K. C., Ling, C. Y., Hock, L. K., Ghazali, S. M., Huey, T. C., Ibrahim, M. K. C., et al. (2019). Association between availability of neighborhood fast food outlets and overweight among 5-18 year-old children in Peninsular Malaysia: A cross-sectional study. *International Journal of Environmental Research and Public Health*, 16(4), 593.
101. Mohamad, M. S., Mahadir Naidu, B., Kaltiala, R., Virtanen, S. M., & Lehtinen-Jacks, S. (2021). Thinness, overweight and obesity among 6- to 17-year-old Malaysians: Secular trends and sociodemographic determinants from 2006 to 2015. *Public Health Nutrition*, 24(18), 6309-22.
102. Khan, A., & Uddin, R. (2020). Parental and peer supports are associated with an active lifestyle of adolescents: evidence from a population-based survey. *Public Health*, 188, 1-3.
103. Mathialagan, A., Nallasamy, N., & Razali, S. N. (2018). Physical activity and media environment as antecedents of childhood obesity in Malaysia. *Asian Journal of Pharmaceutical and Clinical Research*, 11(9), 287-92.
104. Mansor, E., Ahmad, N., Raj, D., Mohd Zulkefli, N. A., & Mohd Shariff, Z. (2021). Predictors of Parental Barriers to Reduce Excessive Child Screen Time Among Parents of Under-Five Children in Selangor, Malaysia: Cross-sectional Study. *J Med Internet Res*, 23(4), e25219.
105. Rasyidah, G., & Wafa, S. W. (2020). A quantitative assessment of school environment as viewed by teachers. *Heliyon*, 6(6), e04059.
106. Tang, D. D., Dhamotharan, M., & Abdul Rahman, M. N. (2021). Unveiling Malaysian parents' perspectives on existing quality of early childhood care and education. *Perspektiv Nauki i Obrazovanja*, 49(1), 318-23.
107. Veloo, A., & Md-Ali, R. (2016). Physical education teachers' challenges in implementing school-based assessment. *International Review of Management and Marketing*, 6(S8), 48-53.
108. Wee, E. H. (2019). Implementation of physical education program in Malaysian primary schools. *Pertanika Journal of Social Sciences and Humanities*, 27(S3), 1-15.
109. Mohammadi, S., Su, T. T., Papadaki, A., Jalaludin, M. Y., Dahlui, M., Mohamed, M. N. A., et al. (2021). Perceptions of eating practices and physical activity among Malaysian adolescents in secondary schools: A qualitative study with multi-stakeholders. *Public Health Nutrition*, 24(8), 2273-85.
110. Chin, N. S., Teo, B. S., & Wee, E. H. (2021). Trainee Teachers' Situational Motivation and Motivational Climate towards Physical Education Lessons during COVID-19 Pandemic. *Collegium Antropologicum*, 45(3), 201-7.
111. Saleh, S. F., Latip, N. S. A., & Rahim, A. A. (2018). Assessment of learning with nature in preschool. *Planning Malaysia*, 16(3), 46-56.
112. Cerin, E., Conway, T. L., Barnett, A., Smith, M., Veitch, J., Cain, K. L., et al. (2019). Development and validation of the Neighborhood Environment Walkability Scale for Youth across six continents. *International Journal of Behavioral Nutrition and Physical Activity*, 16(1), 122.
113. Leh, O. L. H., Shaharom, N. H., Marzukhi, M. A., & Marzuki, S. Z. S. (2018). Healthy lifestyle of urban residents. Case study: Sri Pahang Public Housing, Bangsar, Kuala Lumpur, Malaysia. *Planning Malaysia*, 16(3), 1-12.
114. Malek, N. A., & Nashar, A. (2020). Do duration of stay and park visitation matter? An evaluation of park distance. *Planning Malaysia*, 18(1), 148-59.
115. Rosli, S., Leh, O. L. H., Adzmi, N. A. M., & Marzukhi, M. A. (2020). Relationship between quality of urban parks and physical activity: A case study in Changkat Public Park, Batu Gajah, Perak. *Planning Malaysia*, 18(4), 158-72.
116. Moulay, A., & Ujang, N. (2021). Functional needs and residents' motivation towards visiting a neighborhood park. *International Journal of Sustainable Society*, 13(1), 34-54.
117. Nath, T. K., Han, S. S. Z., & Lechner, A. M. (2018). Urban green space and well-being in Kuala Lumpur, Malaysia. *Urban Forestry and Urban Greening*, 36, 34-41.
118. Ward, M. R., Tyler, R., Edwards, L. C., Miller, M. C., Williams, S., & Stratton, G. (2021). The AHK-Wales Report Card 2018: Policy Measures - is it possible to 'score' qualitative data? *Health Promotion International*, 36(4), 1151-9.
119. Chan, C., Moy, F. M., Lim, J. N. W., & Dahlui, M. (2018). Awareness, facilitators, and barriers to policy implementation related to obesity prevention for primary school children in Malaysia. *American Journal of Health Promotion*, 32(3), 806-11.
120. Mok, W. K. H., Hairi, N. N., Chan, C. M. H., Mustapha, F. I., Saminathan, T. A., & Low, W. Y. (2021). The implementation of childhood obesity-related policy interventions in Malaysia—a non-communicable diseases scorecard project. *International Journal of Environmental Research and Public Health*, 18(11), 5950.



