

Results From Kenya's 2014 Report Card on the Physical Activity and Body Weight of Children and Youth

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Background: The report card presents available evidence on the physical activity (PA) and body weight status of Kenyan children and youth. It highlights areas where Kenya is succeeding and those in which more action is needed. **Methods:** Comprehensive review and analysis of available data on core indicators for Kenyan children and youth 5–17 years were conducted. The grading system used was based on a set of specific criteria and existing grading schemes from similar report cards in other countries. **Results:** Of the 10 core indicators discussed, body composition was favorable (grade B) while overall PA levels, organized sport participation, and active play were assigned grades of C. Active transportation and sedentary behaviors were also favorable (grade B). Family/peers, school, governmental and nongovernmental strategies were graded C. **Conclusions:** The majority of Kenyan children and youth have healthy body composition levels and acceptable sedentary time, but are not doing as well in attaining the World Health Organization (WHO) recommendation on PA. Although Kenya seems to be doing well in most indicators compared with some developed countries, there is a need for action to address existing trends toward unhealthy lifestyles. More robust and representative data for all indicators are required.

Keywords: body composition, sedentary behavior, sport

Populations worldwide are increasingly facing lifestyle-related health risks associated with increasing prevalence of overweight/obesity, physical inactivity, and sedentary behaviors.¹ Of major concern is the potential for lifelong health consequences in children and youth. It is, therefore, our responsibility to act to preserve healthy active lifestyle behaviors for the promotion and maintenance of health and wellness, among children and youth.^{2,3}

Healthy Active Kids Kenya (HAKK) and the Kenyan International Development Study—Canadian Activity Needs (KIDS-CAN) Research Alliance have been working jointly toward the establishment of relevant research, effective dissemination of findings, and interventions for Kenyan child and youth populations. These groups, in partnership with Active Healthy Kids Canada (AHKC), prepared and produced an evidence-informed, knowledge synthesis 'Report Card' in short and long form as part of a knowledge translation and dissemination strategy.

The 2014 Kenya Report Card is the second report card completed in Kenya, after the first Report Card released in 2011, designed to synthesize the best available evidence and provide increased awareness on issues concerning physical activity (PA) among children and youth. The Report Card highlights areas where Kenya is succeeding as a nation and those in which more action is needed to realize healthy active lifestyle goals for children and youth. This Report Card was modeled after similar report cards done in Canada, Mexico, the United States of America, and South

Africa. This manuscript summarizes the methodology and results of the 2014 Kenya Report Card.

Methods

Relevant data sources on the core indicators for school-age Kenyan children and youth 5 to 17 years of age were searched and analyzed. The report card was informed by two systematic reviews of published literature: the first on trends in overweight/obesity⁴ and the second on PA, sedentary behaviors, and fitness levels.⁵ In these reviews, studies were identified by searching the MEDLINE, Embase, Africa Index Medicus, Global Health, Geobase, and EPPI-Centre electronic databases. All published, peer-reviewed studies were included if they reported use of subjective or objective measures in apparently healthy or population-based samples of children and youth 5–17 years. Intervention studies were excluded unless they conducted baseline measurements. Study quality was assessed using a modified Downs and Black instrument.⁶ Due to heterogeneity in study methodology and cut-points used to categorize samples meta-analysis was not possible. However, quantitative syntheses were conducted and complemented with narrative syntheses of the included studies.

Other sources included data from governmental organizations and practitioner communities, graduate student theses and the recently concluded International Study of Childhood Obesity, Lifestyle and Environment (ISCOLE-Kenya). ISCOLE-Kenya was carried out to investigate the influence of behavioral settings and the physical, social and policy environments on the observed relationship between lifestyle characteristics and weight status in school-aged children recruited from schools in Nairobi.⁷

Data on child and youth weight status, PA, sedentary behaviors, school infrastructure, family and peers, community and the built environment, governmental and nongovernmental strategies and policies, were collected, collated, and synthesized. Thereafter, a stakeholder and reviewer group rigorously discussed and critiqued the evidence, and consultatively assigned grades based on a set of

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specific criteria and existing grading schemes from similar report cards in other countries. The grading system used is presented in Table 1. Consensus was achieved on final grade assignments for each indicator. More information on development and grading is available in the long form, accessible from the HAKK website (<http://www.hakkenya.org/>).⁸

Results

While no nationally representative surveys were used to inform the 2014 Kenya Report Card (front cover illustrated in Figure 1), results from studies conducted countrywide were used where possible for most of the core indicators. A summary of the indicators and final grades assigned is presented in Table 2.

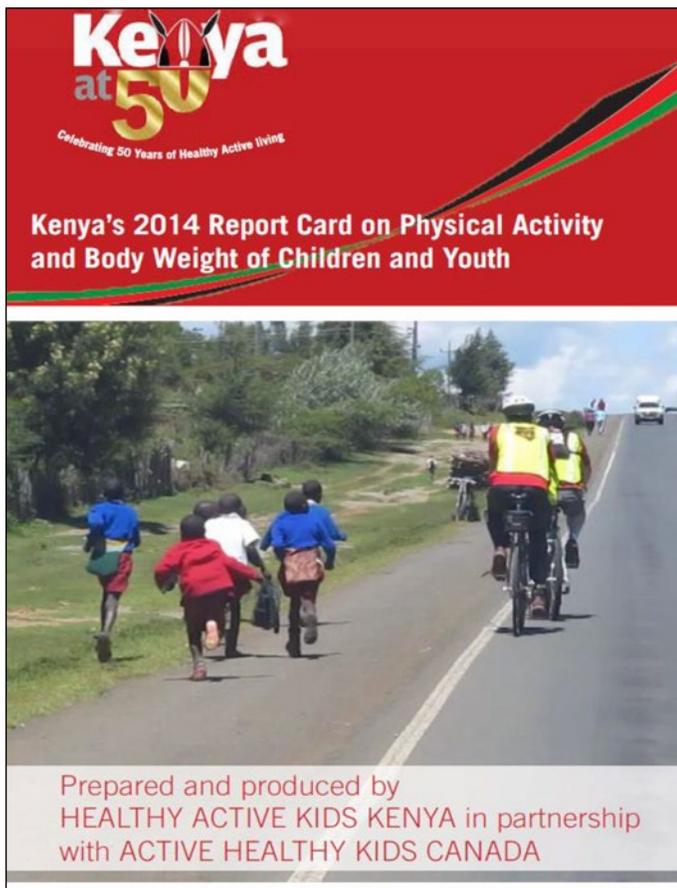


Figure 1 — Front cover of the 2014 Kenyan Report Card.

Weight Status

The findings generally showed an age difference (a higher percentage of older children were underweight compared with younger children), a sex difference (girls had a higher prevalence of overweight/obesity and lower prevalence of underweight compared with boys), and a positive socioeconomic (SES) relationship with weight status. The results also showed a contrast between urban or town and rural or village children and youth. Based on WHO cut-points,⁹ up to 4% of rural and 21% of urban children were overweight/obese, and up to 9% of rural and 4% of urban children were underweight. A grade of B was assigned to this indicator as over one-half of the children and youth sampled had appropriate body weights.

Overall Physical Activity Levels

Data for PA were sufficient to inform the grading process; however, grades varied among components of the indicator. The evidence-base to inform the grades also included results of a systematic review⁵ and those from the ISCOLE-Kenya research,⁷ but a majority of studies were based on nonrepresentative samples. For overall PA levels, the evidence consistently showed that children from rural Kenya were more physically active than their urban peers. In one study, 72% of rural children were classified as physically active relative to WHO guidelines which recommend that children and youth accumulate at least 60 minutes of daily moderate-to-vigorous physical activity (MVPA).¹⁰ In another study, the proportion of children meeting the WHO guideline was only 35% in a combined sample of urban and rural children.¹¹ In yet another study of urban children, only 13% met the guidelines.⁷ Given the seemingly mixed results, this indicator was graded C, implying that only about one-half of Kenyan children and adolescents were engaging in sufficient levels of PA.

Organized Sport

Organized sport participation was also graded C since about one-half of participating schools in the ISCOLE-Kenya study offered organized soccer, volleyball, track and field, and swimming.⁷

Active Play

Active play was also graded C. Self-reported average time spent in outdoor play, either before/after school or on weekend days, was 6.0 hours in urban children, while studies in rural children reported engagement in active play combined with other leisure time activities and not quantified as a separate entity. Given the limited data, the research work group reached consensus on the assigned grade for this indicator.

Table 1 Grading System

| Grade | Interpretation |
|-------|--|
| A | We are succeeding with a large majority of Kenyan children and youth (81–100%) |
| B | We are succeeding with well over half of Kenyan children and youth (61%–80%) |
| C | We are succeeding with about half of Kenyan children and youth (41%–60%) |
| D | We are succeeding with less than half of Kenyan children and youth (21%–40%) |
| F | We are succeeding with very few Kenyan children and youth (0%–20%) |
| INC | Denotes there is insufficient data for grading |

Table 2 Categories and Indicators of Kenya's 2014 Report Card on the Physical Activity and Body Weights of Children and Youth

| Categories | Indicators | Grade |
|-------------------------------------|--|-------|
| Body Composition | Body weight status | B |
| Physical Activity | Overall physical activity levels | C |
| | Organized sport participation | C |
| | Active play | C |
| | Active transportation | B |
| Sedentary Behavior | Screen-based and nonscreen based behaviors | B |
| School | Infrastructure, policy, and programs | C |
| Family and Peers | Support and behavior | C |
| Community and the Built Environment | Infrastructure, policy, programs, and safety | INC |
| Government and Non-Governmental | Strategies, policies, and investments | C |

Active Transportation

Active transportation was graded B because well over one-half of children and adolescents used active transport rather than motorized transport. The evidence supports a large rural-urban contrast: between 87% and 100% of rural and 42% and 50% of urban children and adolescents used active transport to/from school.

Sedentary Behavior

The sedentary behavior indicator included both screen-based and nonscreen-based sedentary pursuits. The evidence for this grade included results of a systematic review⁵ and those of the ISCOLE-Kenya study.⁷ Directly measured daily sedentary time was 398 minutes (6.6 hours), including time spent in sedentary behaviors while at school. Based on self-report, urban children spent an average of 1.75 hours in screen-based sedentary activities during the school day and 4.25 hours on weekend days. The evidence also showed that rural children accumulated less time in sedentary behavior time than their urban peers. A grade of B was assigned since more than one-half of Kenyan children and adolescents had acceptable sedentary time.

Family and Peers

The family and peers indicator was graded C based on evidence of parental perception, education attainment, and household SES. ISCOLE-Kenya data show a decreasing trend in the number of children who met the guidelines for PA with increasing maternal and paternal educational attainment. Children of mothers with a high school education (compared with primary school or less) were 65% less likely to meet the PA guidelines, while children of mothers with a diploma, higher diploma or degree (compared with primary school or less), were 75% less likely to meet the guidelines. Further, the proportion of children meeting the PA guidelines decreased with increasing household SES.

Schools

The school infrastructure, policies, and programs indicator was also graded C based on the evidence for physical education (PE) and opportunities for sports and PA in the school environment. Public schools were mandated by Kenyan education policy to allocate 35

minutes of PE 3 times per week. ISCOLE-Kenya data reported that only 14% of private and 13% of public school children reported not having participated in any PE classes during the past week. All sampled schools had access to an outdoor sports field where children could participate in formal or informal sports or PA. The data also showed that 69% of the sampled schools reported having existing written policies and/or practices concerning PA.⁷ However, supporting evidence for this indicator was not available for rural areas.

Government

The governmental and nongovernmental strategies, policies, and investments indicator was graded C based on the evidence that Kenya had several national policies which targeted several of the core indicators of PA. However, lack of implementation and follow-through of some key policies was evident to a large extent.

Community and the Built Environment

Although rural versus urban residence significantly influenced total PA volume and percentage of time spent in MVPA, satisfactory data were not available to grade the community and the built environment indicator, highlighting a significant research gap.

Discussion

The primary purpose of this manuscript was to present a summary of the procedures and results of the 2014 Kenya Report Card using the best available evidence for Kenyan children and adolescents. While the grades from Kenya compare favorably to those from high income countries,¹² there is room for improvement considering the concern for the transition from PA toward more sedentary behaviors in more developed countries.^{13,14} Further, it is clear that more robust and representative surveillance measures are needed to fully understand and monitor healthy lifestyle behaviors of Kenyan children and adolescents.

Indicators of body weight status showed age, sex, rural-urban, and SES variation. The observations on the prevalence of overweight/obesity as well as underweight indicate that Kenya faces to some extent a double-burden of under- and over-nutrition, although the latter includes a physical inactivity component.

In view of the heterogeneity in measurement devices, methods and cut-off points in studies of PA, it is difficult to offer meaningful comparisons across studies. Only 3 studies estimated proportions of children meeting global PA guidelines.^{11,13,15} Based on a weighting of these findings, it was estimated that about one-half of Kenyan children and adolescents met the global PA guideline. Accelerometry data also show that urban children and adolescents had significantly lower MVPA than rural peers. Representative national-level surveillance estimates of PA are essential to evaluate overall PA patterns among Kenyan children and adolescents. However, it is also important to partition the overall pattern into the key sources of PA such as active play, active transportation, sports, and PE, and perhaps household chores and subsistence activities in rural areas of the country.

The grade for sedentary behaviors was based on self-reported time spent on screen based sedentary activities and directly measured daily sedentary time. Rural Kenyan children were engaged in fewer minutes of sedentary behavior.¹³ Canadian sedentary behavior guidelines recommended that children and adolescents should limit their recreational sedentary screen time to no more than 2 hours per day.¹⁶ The Kenyan results revealed that urban children spent more than the recommendation for screen activities on weekend-days. There are apparently no studies that have evaluated screen-based versus nonscreen based sedentary behaviors among Kenyan children and youth. Sedentary behaviors among Kenya children appear comparatively low,¹² but with the emerging transition in PA^{13,14} this indicator should be watched closely.

Family and peers significantly influence PA behaviors of children and adolescents, although data addressing the direct influence of each for Kenya are lacking. ISCOLE-Kenya showed that maternal and paternal education level and total annual household income were associated with meeting recommended PA guidelines,¹⁵ with a decreasing trend in the number of children who met the guidelines with increasing maternal/paternal educational attainment and increasing household SES. A study on a pastoralist community¹⁷ noted gender differences in the encouragement and acceptability of, or participation in PA. Certain sociocultural beliefs do exist in some Kenyan communities whereby female children are discouraged from being physically active—a trait deemed unfeminine.¹⁸ The grade assigned to this indicator was based on the evidence for the influence of parental education and SES on meeting PA guidelines, because there were no studies available for the influence of peer influence. Parents in Kenya need to be educated about the negative effects of sedentary lifestyles, the importance of maintaining a healthy body weight, and the importance of encouraging their children and adolescents to lead physically active lifestyles.

School infrastructure, policies, and programs that promote PA seemingly had an average role in encouraging and supporting PA among children and youth as evident in the C grade. The quality of school infrastructure and programs were dependent on the type of school (private versus public) and the level of socioeconomic development of the location. Kenya needs to improve both infrastructure and programs, especially in the rural areas and low income urban settings as school environments that encourage PA and healthy eating are strongly associated with improved health, PA and fitness outcomes in students.^{19,20}

There were insufficient data on proximity and availability of infrastructure; use of facilities, programs, parks, and playgrounds; community programming, policies, and regulations; perceptions of safety and maintenance; and nature and the outdoors as factors that promote PA at the community level. There was a critical absence of governmental and/or nongovernmental strategies to address the built

environment and its impact on PA. This indicator requires earnest investment of time and resources for future research.

The potential role of governmental and nongovernmental strategies, policies and investments in encouraging and supporting healthy lifestyles was average. Kenya has several national policies and recommendations such as a policy on the rights of children to play and health sector policies that advocate for healthy nutritional status and control of lifestyle-related diseases. The Kenyan education policy also advocates for provision of school facilities that support PA and mandatory teaching of PE. However, more must be done to implement these policies and recommendations and to ensure compliance by the relevant stakeholders. Prevention strategies are of paramount importance to reduce the predicted detrimental impact of physical inactivity.¹⁸

The major strength of this report lies in its comprehensive and systematic review of the most recent available data for the evaluation of core indicators. Although the grades were assigned based on the best available data, there were several research and data gaps. Future studies are needed on larger and more representative samples throughout the country, including both rural and urban populations. The samples should also be extended from preschool through adolescence. Such information will be vital to informing future report cards.

To improve report card grades, Kenyan children and youth need to be supported in making PA choices that are convenient, sustainable and compatible with their needs and interests. There is also a need to enhance the development of social and physical environments that support the integration of PA into daily life. Kenya should also work at increasing the knowledge on healthy active living to cultivate correct attitudes and behaviors among its children and youth.

Conclusions

The 2014 Kenya Report Card shows that the majority of the children and youth were of healthy body weight and had acceptable levels of sedentary behavior, but were falling short in maintaining optimal PA levels. While Kenya seems to be doing comparatively well compared with several developed countries, it is necessary to address the emerging trends toward unhealthy lifestyles resulting from urbanization and the emerging PA transition.¹³

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References

1. World Health Organization. Global health risks: mortality and burden of disease attributable to selected major risks. Geneva, Switzerland; 2009.
2. Tremblay MS, Onywera V, Adamo KB. A child's right to healthy, active living—building capacity in Sub-Saharan Africa to curb the impending

- physical activity transition: the KIDS-CAN Research Alliance. In: Bennett S, Pare M, editors. *20th Anniversary of the Convention on the Rights of the Child*. Ottawa, ON: University of Ottawa Press. pp. 97–110; 2010.
3. United Nations Convention on the Rights of the Child. *United Nations Treaty Series*. Geneva, Switzerland. 1989.
 4. Muthuri SK, Francis CE, Wachira LM, LeBlanc AG, Sampson M, Onywera VO, Tremblay MS. Evidence of an overweight/obesity transition among school-aged children and youth in sub-saharan Africa: a systematic review. *PLoS ONE*. 2014;9(3):e92846. doi:10.1371/journal.pone.0092846.
 5. Muthuri SK, Wachira LM, LeBlanc AG, Francis CE, Sampson M, Onywera VO, Tremblay MS. Temporal trends and correlates of physical activity, sedentary behaviour, and physical fitness among school-aged children in sub-saharan Africa: a systematic review. *Int J Environ Res Public Health*. 2014;11:3327–3359; doi:10.3390/ijerph110303327
 6. Downs SH, Black N. The feasibility of creating a checklist for the assessment of the methodological quality both of randomised and non-randomised studies of health care interventions. *J Epidemiol Community Health*. 1998;52:377–384. [PubMed doi:10.1136/jech.52.6.377](#)
 7. Katzmarzyk PT, Barreira TV, Broyles ST, et al. The International Study of Childhood Obesity, Lifestyle and the Environment (ISCOLE): design and methods. *BMC Public Health*. 2013;13:900. [PubMed doi:10.1186/1471-2458-13-900](#)
 8. Healthy Active Kids Kenya. Kenya 2014 Report Card: long form. 2014. Available: (<http://www.hakkenya.org/>).
 9. deOnis M, Onyango AW, Borghi E, Siyam A, Nishida C, Siekmann J. Development of a WHO growth reference for school-aged children and adolescents. *Bull World Health Organ*. 2007;85:660–667.
 10. World Health Organization. *Global recommendations on physical activity for health*. Geneva, Switzerland. 2010.
 11. Ojiambo RM, Easton C, Casajus JA, Konstabel K, Reilly JJ, Pitsiladis Y. Effect of urbanization on objectively measured physical activity levels, sedentary time, and indices of adiposity in Kenyan adolescents. *J Phys Act Health*. 2012;9:115–123. [PubMed](#)
 12. Tremblay MS, Gray CE, Akinroye K, Harrington D, Katzmarzyk PT, Lambert EV, Liukkonen J, Maddison R, Ocansey RT, Onywera VO, Prista A, Reilly JJ, Rodriguez P, Sarmiento Duenas OL, Standage M, Stratton G, Tomkinson G. Physical activity of children: a global matrix of grades comparing 15 countries. *J Phys Act Health*. 2014;11(suppl.1):S113–S125.
 13. Onywera VO, Adamo KB, Sheel AW, Waudou JN, Boit MK, Tremblay M. Emerging evidence of the physical activity transition in Kenya. *J Phys Act Health*. 2012;9:554–562. [PubMed](#)
 14. Onywera VO, Heroux M, Jaureguiulloa E, et al. Adiposity and physical activity among children in countries at different stages of the physical activity transition: Canada, Mexico and Kenya. *AJPHERD*. 2013;19:132–142.
 15. Muthuri SK, Wachira LM, Onywera VO, Tremblay MS. Correlates of objectively measured overweight/obesity and physical activity in Kenyan school children: results from ISCOLE-Kenya. *BMC Public Health*. 2014;14:436. doi:10.1186/1471-2458-14-436
 16. Canadian Society for Exercise Physiology. Canadian physical activity guidelines. 2011 Available: www.csep.ca/guidelines. Accessed 19 September 2013.
 17. Little MA, Galvin K, Mugambi M. Cross-sectional growth of nomadic Turkana pastoralists. *Hum Biol*. 1983;55:811–830. [PubMed](#)
 18. Adamo KB, Sheel AW, Onywera V, Waudou J, Boit M, Tremblay MS. Child obesity and fitness levels among Kenyan and Canadian children from urban and rural environments: a KIDS-CAN Research Alliance Study. *Int J Pediatr Obes*. 2011;6:e225–e232. [PubMed doi:10.3109/17477166.2010.543683](#)
 19. Nettlefold L, McKay H, Warburton D, McGuire K, Bredin S, Naylor P. The challenge of low physical activity during the school day: at recess, lunch and in physical education. *Br J Sports Med*. 2010;45:813–819. [PubMed doi:10.1136/bjism.2009.068072](#)
 20. Story M, Nannery M, Schwartz M. Schools and obesity prevention: creating school environments and policies to promote healthy eating and physical activity. *Milbank Q*. 2009;87:71–100. [PubMed doi:10.1111/j.1468-0009.2009.00548.x](#)