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Results from the Hong Kong's 2018 report card on physical activity for children and youth

Wendy Y. Huang^a, Stephen H.S. Wong^{b,*}, Cindy H.P. Sit^b, Martin C.S. Wong^c, Raymond K.W. Sum^b, Sam W.S. Wong^d, Jane J. Yu^b^a Department of Sport and Physical Education, Hong Kong Baptist University, Hong Kong, China^b Department of Sports Science and Physical Education, The Chinese University of Hong Kong, Hong Kong, China^c The Jockey Club School of Public Health and Primary Care, The Chinese University of Hong Kong, Hong Kong, China^d Physical Fitness Association of Hong Kong, Hong Kong, China

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ABSTRACT

Background/objective: The Active Healthy Kids 2018 Hong Kong Report Card provides evidence-based assessment across 12 indicators of physical activity behaviors, sleep, and related community and government initiatives for children and youth.

Methods: The systematic development process provided by the Active Healthy Kids Global Alliance was used. The best available data from the past 10 years were reviewed by a panel of experts. According to predefined benchmarks, letter grades were assigned to 12 indicators (Overall Physical Activity, Organized Sport Participation, Active Play, Active Transportation, Sedentary Behaviors, Physical Fitness, Sleep, Family, School, Community and Environment, Government, and Obesity).

Results: Three of the five activity behaviors received C- or C grades: Overall Physical Activity (C-), Sedentary Behaviors (C-), and Organized Sport Participation (C). Active Transportation was graded B+. Same to the 2016 Hong Kong Report Card, Active Play could not be graded. School and Government were graded C. Family and Community and Environment was graded D- and B, respectively. Three new indicators were added after the 2016 Report Card and they were graded from C- (Sleep) to D (Physical Fitness) or D- (Obesity).

Conclusions: Children and youth in Hong Kong have low physical activity and physical fitness levels and high sedentary behaviors despite a generally favorable community environment. A high prevalence of obesity and low levels of family support warrant more public health action. Researchers should address the surveillance gap in active play and peer support.

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Background

Physical inactivity has been identified as one of the behavioral risk factors for non-communicable diseases (NCDs), which are major causes of premature mortality worldwide.¹ In Hong Kong, a recent population survey showed that over 90% of school-aged

Abbreviations: AHKGA, Active Healthy Kids Global Alliance; LCSD, Leisure and Cultural Services Department; MVPA, moderate-to-vigorous physical activity; NCD, non-communicable disease; NGO, non-governmental organization; PE, physical education; RWG, research work group.

* Corresponding author. Department of Sports Science and Physical Education, The Chinese University of Hong Kong, Hong Kong, China.

E-mail address: hsswong@cuhk.edu.hk (S.H.S. Wong).

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children and youth did not participate in sufficient physical activity.² Aligning with the World Health Organization's action plan 2018–2030,¹ the Hong Kong government recently launched *Towards 2025: Strategy and Action Plan to Prevent and Control NCD in Hong Kong*, a strategic framework to prevent and control NCDs.² Nine local targets have been identified, one of which is a 10% reduction in physical inactivity among local youth and adults by 2025.² In order to achieve the targets, co-operation across sectors that are responsible for wellbeing and education of school-aged children and youth is essential, e.g., Education Bureau (for policy-making and legislation in respect of education), Student Health Service of Department of Health (for safeguarding physical and psychological health of school children), and Leisure and Cultural Services Department (LCSD, for providing leisure facilities and

services to the community).

The Active Healthy Kids Hong Kong was established in 2015 to consolidate evidence-based evaluation of physical activity related indicators for children and youth in Hong Kong. It is part of the international knowledge transfer effort *Active Healthy Kids Global Alliance* (AHKGA, <https://www.activehealthykids.org>). Membership of AHKGA has grown from 15 participating countries in Global Matrix 1.0 in 2014³ to nearly 50 countries and regions in Global Matrix 3.0 in 2018.⁴ The Hong Kong's first Active Healthy Kids Report Card on Physical Activity was launched in 2016 and showed a high level of physical inactivity and sedentary behavior among local children and youth.⁵ The second (2018) Hong Kong Report Card provides an updated assessment of the best available evidence on physical activity in the last 10 years for children and adolescents aged 6–17 years in Hong Kong. The preliminary findings of the 10 core indicators of the 2018 Hong Kong Report Card have been reported in an extended abstract.⁶ The aim of the present paper is to summarize the process and full results of the 2018 Hong Kong Report Card which includes 12 indicators.

Methods

The Research Work Group (RWG) for the 2018 Hong Kong Report Card consists of the five researchers who led the development of the first Hong Kong Report Card and a new member from a non-governmental organization (NGO) with expertise in physical fitness. The leader of the RWG secured funding as principal investigator and has overseen the whole project. All members of the RWG have been working closely to discuss the literature search outcomes, assign grades, communicate with stakeholders, and disseminate the findings. Building upon the successful network established during the first Report Card, the stakeholder group was extensively expanded this time. It comprised 36 members from diverse sectors including higher education institutions (physical education, exercise science, pediatrics, and public health), professional organizations (medicine, nursing, nutrition, obesity, sports medicine, and physiotherapy), schools, government, NGOs, and the private physical fitness sector. The stakeholder group played an

important role in providing comments on the initial grades at a face-to-face meeting or via an online consultation (details are given below).

The systematic development process provided by the AHKGA was used.⁷ The 2018 Hong Kong Report Card had three new indicators (Physical Fitness, Sleep, and Obesity) in addition to the nine indicators used in the 2016 Hong Kong Report Card (Overall Physical Activity, Organized Sport Participation, Active Play, Active Transportation, Sedentary Behaviors, Family, School, Community and Environment, and Government). Physical Fitness is an integral part of the Global Matrix, while the other two new indicators are added based on the suggestions from the stakeholders of the first Hong Kong Report Card. The best available data over the past 10 years (from March 2008 to February 2018) were consolidated and reviewed by the RWG. Such search period was applied due to the limited number of available data. Finding from the newly added data source after 2016 and its influence on grade changes were highlighted in discussion. The search for data sources included published journal articles, government and non-government reports (including completion reports of funded grants), manual searches, and personal contacts. The inclusion criteria were the same as those used for the 2016 Hong Kong Report Card.⁵ An exception is that the 2018 Hong Kong Report Card focuses only on children and youth aged 6–17 years to be consistent with the Global Matrix 3.0.⁴ According to the predefined benchmarks (Table 1), letter grades were assigned to the 12 indicators using the grading scheme formulated by the AHKGA: A + = 94%–100%; A = 87%–93%; A- = 80% to 86%; B + = 74%–79%; B = 67%–73%; B- = 60% to 66%; C + = 54%–59%, C = 47%–53%; C- = 40% to 46%; D + = 34%–39%; D = 27%–33%; D- = 20% to 26%; F = < 20%; INC = incomplete data. The grading scheme is slightly different from what was applied for developing the Global Matrix 2.0 in two ways. Firstly, more clear-cut benchmarks for plus and minus grades are adopted this time, e.g. a proportion of 61%–80% was generally rated as B in Global Matrix 2.0, while it was split into 3 sub-categories in Global Matrix 3.0. Secondly, the existence of gender disparities results in an additional minus grade in Global Matrix 2.0, but it is no longer considered when assigning a grade. The data

Table 1
Benchmarks used to guide the grade assignment for indicators.

Indicator	Benchmark
Overall Physical Activity	% of children and youth who meet physical activity guidelines of 60 min of MVPA per day on average.
Organized Sport Participation	% of children and youth who participate in organized sport for at least once per week.
Active Play	% of children and youth who participate in non-organized sport (active play) for at least once per week.
Active Transportation	% of children and youth who use active transportation to school for at least once per week.
Sedentary Behaviors	% of children and youth who meet screen time guideline, i.e. <2 h of recreational screen time per day).
Physical Fitness	% of children and youth who meet the international criterion-referenced standards for cardiorespiratory fitness.
Sleep	% of children and youth who meet the sleep recommendations (9–11 h per night for 6- to 13-year-old children; 8–10 h per night for 14- to 17-year-old adolescents).
Family	% of parents who are physically active with their kids. % of family members who facilitate physical activity and sport opportunities for their children.
School	% of parents who meet the physical activity guidelines for adults. % of schools where the majority of students are offered at least 70 min of PE per week. % of schools that have active school policies. % of schools that offer physical activity opportunities to the majority of their students in addition to PE.
Community and Environment	% of schools with students who have regular access to facilities and equipment that support physical activity. % of children or parents who report living in a safe neighborhood where they can be physically active. % of children and youth who have used sport facilities in their community. % of children or parents who are satisfied with parks, playgrounds and sport facilities in their community.
Government	% of children or parents who report having sport facilities, parks and playgrounds available to them in their community. Evidence of leadership and commitment in providing physical activity opportunities for all children and youth. Allocated funds and resources for the implementation of physical activity promotion strategies and initiatives for all children and youth.
Obesity	This indicator is a health outcome instead of a health behavior. It is impossible to follow the same grading scheme as the other indicators. Grading is based on the similar situations of obesity reported from the other countries and the consensus from RWG members and stakeholders.

MVPA: moderate-to-vigorous physical activity; PE: physical education; RWG: research work group.

sources relied upon were most recent territory-wide surveys such as “Healthy Exercise for All Campaign – Physical Fitness Test for the Community” in 2012⁸ and “Surveys on Physical Fitness Status of Hong Kong School Pupils” in academic year of 2014–2015 and 2015–2016,⁹ and published journal articles and completion reports from representative samples. More details of these data sources in terms of sampling methods, characteristics of the participants, and major outcome measures are presented in the long form of the Report Card (available online at <http://activehealthykidshongkong.com.hk/>). The RWG met in March 2018 to review the evidence and assign initial grades. A face-to-face consultation meeting with the stakeholders was then held in April 2018. Comments from stakeholders who were not able to attend the meeting were collected via an online consultation survey. The stakeholders were asked whether they agree with the initial grades or not (providing reasons if disagree), and to suggest any data sources that they think are missed in assigning the grades. They also indicated their willingness to take part in the future report cards development as stakeholders. Agreement on the initial grades was eventually obtained from more than 80% of the stakeholder members, and seven indicators had agreement from over 90% of the members. Consequently, no revisions were made to the initial grades, and they were finalized after auditing by the AHKGA.

Results

The 2018 Hong Kong Report Card is the second report card for children and youth in Hong Kong. Grades for the 2018 Hong Kong Report Card are provided in Table 2 (the 2016 grades are also presented for comparison) and its cover page is shown in Fig. 1. The grades of four of the five behavior indicators had slightly changed since the 2016 Report Card. Active Play could not be graded due to a lack of data.

Similar to 2016, Family was assigned the lowest grade (D-) among the three settings and sources of influence indicators. Although new data sources had been found, there was no compelling evidence suggesting obvious changes in School (C) or Community and Environment (B). Since 2016, the Hong Kong government has made efforts in promoting sport culture in schools and increasing financial support for school sports programs. Consequently, the indicator Government was graded C in the 2018 Report Card. The three new indicators were graded C- (Sleep), D (Physical Fitness) and D- (Obesity).

Table 2
Grades according to physical activity indicator in the 2018 Hong Kong report card on physical activity for children and youth.

Indicator	2018 Grades	2016 Grades
Overall Physical Activity	C-	D
Organized Sport Participation	C	C-
Active Play	INC	INC
Active Transportation	B+	B
Sedentary Behaviors	C-	C
Physical Fitness*	D	–
Sleep*	C-	–
Family	D-	D
School	C	C
Community and Environment	B	B
Government	C	INC
Obesity*	D-	–

Note. The grade for each indicator is based on the percentage of children and youth meeting a defined benchmark (except for Obesity): A + is 94%–100%; A is 87%–93%; A- is 80%–86%; B + is 74%–79%; B is 67%–73%; B- is 60%–66%; C + is 54%–59%; C is 47%–53%; C- is 40%–46%; D + is 34%–39%; D is 27%–33%; D- is 20%–26%; F is <20%; INC is Incomplete data.

*New indicators in the 2018 Report Card.



Fig. 1. Front cover of the 2018 Hong Kong report card.

Discussion

Overall physical activity: C

The Hong Kong government adopts the global recommendations on physical activity for local children and youth, i.e. at least 60 min of moderate-to-vigorous physical activity (MVPA) a day.¹⁰ Three data sources were used to determine the 2018 grade for Overall Physical Activity. Two of them assessed physical activity using the accelerometer^{11,12} and the other one relied on self-reported data.⁸ A longitudinal study reported that half of the children aged 6–10 years met the physical activity recommendations, but the percentages decline to 30% and 22% one year and two years later, respectively.¹² Another study among 11- to 18-year-olds found that 90% of the youth met the recommendation.¹¹ However, the proportion meeting the recommendation was as low as less than 10% for self-reported data in a territory-wide survey from a randomly selected sample of primary and secondary school students.⁸ One new data source was added after the 2016 Report Card: it assessed the frequency of exercise for 30 min or above in the last week using one self-reported question.¹³ Since the outcome measures for physical activity in this study did not align with the benchmark, it could not be used for grading. Collectively, this indicator was graded C- by taking average of the adherence rates to the guidelines in the 3 studies mentioned above. It is noteworthy

that the difference between the 2016 grade (D) and the 2018 grade (C-) is due to revisions to the grading scheme for Global Matrix 3.0, that is, more clear-cut benchmarks for plus and minus grades.

Organized sport participation: C

A population-based study showed that 50.2% of secondary school students self-reported that they participated in exercise (of any type) for 30 min or more at least once a week in the 2007–2008 academic year.¹⁴ No new data source after 2016 was found. In fact, the data collection period of that study¹⁴ only partly fulfilled the searching timeframe criterion (i.e., after March 2008). More surveillance data are therefore needed for this indicator. National surveys may consider adding specific questions asking participation in organized sport. Stakeholders from the school sector noted during the consultation meeting that local schools had put much effort into providing opportunities for organized sport for their students. However, a lack of appropriate and continuous assessment may be an important issue to address in the future. The difference between the 2016 grade (C-) and the 2018 grade (C) is due to two reasons: (1) one study included in the 2016 Report Card grading was no longer eligible because it was out of the search timeframe; (2) the revision of the grading scheme for Global Matrix 3.0: gender disparities are no longer considered when assigning a plus or minus grade.

Active play: INC

As in 2016, Active Play was graded as *INC* due to a lack of consensus on a robust definition and relevant data source. Although the promotion of active play is believed to be important for increasing physical activity levels, especially for young children, appropriate definition and measurement remains challenging.¹⁵ However, a working description of active play has been recently proposed.¹⁵ The suggested key features of active play are that it is fun, unstructured, and freely chosen physical activity.¹⁵ Research on active play in the Hong Kong context is scarce, although a recent survey study conducted among 3177 children and youth aged 6–24 years provided some preliminary data.¹⁶ The average time spent in play at playgrounds and parks was 4.1 h per week for 6- to 12-year-olds and 1.7 h per week for 13- to 18-year-olds.¹⁶ Unfortunately, the representativeness of the sample and details of the questions asked pertaining to play are not available.

Active transportation: B +

Active Transportation was graded based on a city-wide study of young people, which showed that nearly 80% of boys and girls used active transportation (either walking or cycling) to get to school at least once per week.¹¹ Another recent study found that 52% of primary school children walked to school regularly, making at least one active travel trip per day for journeys between home and school.¹⁷ However, data on active travel to other places are limited in Hong Kong. Of further concern, although it is not required in the benchmark, no studies have considered the duration of active travel trips. This issue may be particularly relevant to Hong Kong because many of the districts are highly self-contained and schooling facilities are usually provided within the neighborhood.¹⁸ It is not surprising that children and youth walk to schools that are close to their homes. The distance they travel may affect the magnitude of the contribution of active travel to school to overall physical activity.

Sedentary behaviors: C-

Similar to other countries, the Hong Kong government provides a time limit recommendation for children of no more than 2 h of screen time per day for leisure-time screen-based sedentary pursuits.¹⁹ This indicator was graded based on 3 data sources^{20–22}; two of them were new since the 2016 Report Card.^{21,22} Using parent-reported questionnaire, screen time in an usual week was assessed among 1020 children aged 6–8 years and 52% of them adhered to the recommendations.²¹ A youth survey among a random sample of 825 adolescents aged 12–23 years found that half of them self-reported spending no more than 2 h using the Internet.²⁰ Another survey study using convenience sampling showed that only 35.5% of children and youth aged 10–19 years spent less than 2 h per day using smart devices.²² Consequently, the RWG reached the consensus that this indicator was graded C-, indicating an increasing excessive screen use in Hong Kong compared with a grade of C in 2016. In fact, excessive screen time, in particular the use of electronic screen products, is also reflected in a recent government census report.²³ The proportion of children aged 10–14 years who spent 3 or more hours per day using the Internet increased from 45.8% in 2015 to 50.6% in 2017.²³

Physical fitness: D

Health-related physical fitness, particularly cardiorespiratory fitness, has protective effects on cardiovascular health.²⁴ It has been suggested that cardiorespiratory fitness levels below 42 and 35 mL/kg/min for boys and girls, respectively, are associated with cardiovascular disease risk.²⁴ There are no standard norms or recommended levels of physical fitness in Hong Kong. International norms of relative peak oxygen uptake (VO_{2peak}) determined by a 20 m shuttle run were recently published based on data from 9 to 17-year-olds representing 24 countries including Hong Kong.²⁵ This indicator was graded based on the most recent territory-wide physical fitness surveys in local primary in academic year 2015–2016 and secondary schools in academic year 2014–2015. The results showed that the average percentiles achieved for VO_{2peak} were 25.4% for boys and 36.2% for girls.⁹ For boys, the average percentile achieved was lowest at age 10 (18.6%) and highest at age 13 (33.1%). For girls, it was lowest at age 12 (25.9%) and highest at age 14 (48.4%). The grade of D demonstrates the alarmingly low cardiorespiratory fitness levels of children and youth in Hong Kong even though good surveillance of fitness is undertaken in school settings.

Sleep: C

Sufficient sleep is essential for optimal health benefits for children and youth. The recent evidence-informed guidelines suggest that children aged between 5 and 13 years should have 9–11 h of uninterrupted sleep and youth aged 14–17 years should have 8–10 h per night.²⁶ Results from the 3 data sources upon which the indicator was graded indicated that compliance with these guidelines is low in Hong Kong. For example, only one third of primary school children had 9 or more hours of sleep according to the results of the territory-wide survey.⁸ Another study showed that 45% of 6- to 8-year-old children slept for 9 or more hours but very few of them slept for more than 11 h per nights.²¹ Weekend catch-up sleep has been found to be prevalent among school-aged children and youth in Hong Kong. For example, 86.4% of secondary school students who voluntarily participated in the 2007–2008 Hong Kong Student Obesity Surveillance study had sufficient sleep (≥ 8 h) on weekends and holidays, whereas only 27.4% of them complied with the recommendation on school nights.²⁷ The impact of

weekend oversleeping on physical health is not fully understood; however, it has been found to be associated with poor cognitive function in adolescents.²⁸

Family: D-

Family plays an important role in promoting a physically active lifestyle for children and youth. However, this indicator continues to be assigned a grade lower than the other two settings and sources of influence indicators, School and Community and Environment. Two data sources, including a new one from after 2016,²⁹ were used to determine the grade for the Family indicator. According to a territory-wide survey, 37% of 7- to 12-year-old children and 23% of 13- to 19-year-old youth reported that they participated in physical activity with family members at least once a week.⁸ Another study among youth found that 17% of their fathers and 15% of mothers had an exercise habit of at least three times a week.²⁹ Similar to the first report card, no data were found for peer support, and this indicator was therefore named Family rather than Family and Peers.

School – physical education (PE), physical activity-related policy, and programs: C

Although a new data source was found after the first Report Card,³⁰ there was no evidence of obvious changes in the grade for this indicator. A government report from over 400 primary schools showed that 77% of them allocated 70–120 min per week to PE lessons, which was in line with the requirement of the Education Bureau.³¹ However, only 28% of the schools had a documented policy on physical activity, although 42% of them claimed to have undocumented school policy. According to the Student Health Service survey in 2013–2014, local schools had on average 4.2 physical activity facilities (ranging from 0 to 16) and 4.6 physical activity programs per academic year (ranging from 0 to 20) in schools.³⁰ As a result, this indicator received the same grade as in 2016 based on the two data sources while taking reference to the new one.³⁰

Community and environment: B

This indicator was graded based on youth and parent perceptions of sport facilities and the neighborhood environment and received the same grade as in 2016 due to the same data sources. A household survey reported that the majority of people aged ≥ 12 years were satisfied with the sport facilities provided by the government, particularly the location and cleanliness of the facilities.³² A majority (60%–79%) of parents of youth aged 11–18 years felt that their neighborhood was safe in terms of traffic and crime rate.¹¹ There was one new reference reporting parental perceived sport facilities (e.g., parks and outdoor playgrounds) in the neighborhoods, however, this study did not provide specific percentages that are relevant to the benchmark.³³ Data are not available on objectively measured features of the built environment pertaining to physical activity for Hong Kong children and youth, although some evidence has been reported for adults.³⁴

Government: C

It is the policy in Hong Kong that at the primary and junior secondary levels schools should allocate 5%–8% of the total lesson time to general PE and at least 5% should be allocated at the senior secondary level.³⁵ Recently, the Hong Kong government has made efforts to promote a sporting culture in schools, as reflected in the Hong Kong Chief Executive's 2017 policy address: the Opening Up

School Facilities for Promotion of Sports Development Scheme was initiated to encourage public sector schools to open up their school facilities to sports associations by providing additional subsidies to the schools (https://www.policyaddress.gov.hk/2017/eng/policy_ch06.html). The LCSD has recently increased its annual budget for recreation and sports, including increasing the number of participants in school sport programs (<http://www.lcsd.gov.hk/en/aboutlcsd/ppr/statistics/leisure.html#fac>). Given the emerging evidence of commitment to providing physical activity opportunities and the resources for the implementation of physical activity promotion programs for children and youth, this indicator was graded C. However, continuous monitoring and evaluation of implementation is needed in the future.

Obesity (including overweight): D-

Using the international body mass index cut-offs for children and youth,³⁶ the prevalence of obesity (including overweight) is relatively consistent across studies in Hong Kong.^{8,12,30,37,38} For example, 22.4% of boys and 14.0% of girls were overweight or obese in 2014.³⁷ A cohort study indicated that the prevalence of overweight and obesity was stable across three annual assessment waves for primary school children.¹² Using a local definition of overweight and obesity (weight exceeding 120% of the median weight-for-height),³⁹ 17.6% of primary school children and 20% of secondary school children were overweight or obese in the 2016–2017 academic year.² As this indicator is a health outcome rather than a health behavior, it is impossible to follow the same grading scheme used for the other indicators. The grade of D- was assigned based on the similar levels of obesity reported from those countries that have provided grades for Obesity in Global Matrix 2.0, such as Belgium⁴⁰ and Sweden⁴¹ and consensus from RWG members and stakeholders. “Halting the rise in diabetes and obesity by 2025” has been identified as one of the targets for tackling NCDs by the Hong Kong government.² Attaining this target is closely related to goals such as reducing physical inactivity for children and youth in Hong Kong.

Strengths and limitations

Strengths of the Report Card include experienced core members and a stakeholder group representative of all sectors relevant to children's physical activity and health. Although there were a few new data sources available for some of the indicators in the 2018 Hong Kong Report Card, surveillance gaps remain, especially for active play and peer support. It is useful if the existing health related surveys in Hong Kong incorporate questions pertaining to active play in addition to overall physical activity or exercise participation. The results of the two Hong Kong Report Cards warrant further research into peer support for physical activity in pediatric population. For some of the indicators, such as Organized Sport Participation and Active Transportation, grades were based on one or two best available data sources only. Surveillance studies specifically designed to target the indicators and the predefined benchmarks would be helpful for future development of the Report Card.

Conclusions

Children and youth in Hong Kong have low physical activity and physical fitness levels and high sedentary behaviors despite a generally favorable community environment. Compared with the first Report Card, there is no obvious evidence of changes for most of the indicators, while the grades for Sedentary Behaviors and Family seem to be getting worse. The low levels of family support

warrant more public health action. There is a surveillance gap in active play and peer support that researchers should address.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jesf.2018.10.003>.

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