Non-Communicable Diseases Watch

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衞生防護中心 Centre for Health Protection

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Healthy Weight Healthy Kids

Key Points

- In Hong Kong, the detection rate of overweight and obesity among primary school students increased from 16.1% in 1995/96 to 22.2% in 2008/09, but then decreased gradually to 20.0% in 2013/14. For secondary school students, the corresponding detection rate increased from 13.2% in 1996/97 to 19.5% in 2013/14.
- Every aspect of the environment in which children are conceived, born and raised can contribute to their risk of becoming overweight or obese. Obesity can lead to both short and long term consequences in terms of children's physical and psychosocial health.
- Prevention of childhood obesity should start before birth and continue through childhood and adolescence with healthy feeding practices and eating patterns along with the promotion of adequate physical activity.

Tips for Parents in Helping Children and Adolescents Achieve a Healthy Weight

Promotion of Healthy Eating

- Consider exclusively breastfeeding your baby for the first six months, then with the introduction of complementary foods to continue breastfeed until two years or above
- Offer children and adolescents three regular meals every day. Serve food in the portion size appropriate for their age and development
- Teach and encourage children and adolescents a variety of healthy foods and in the proportions as the Healthy Eating Food Pyramid recommends
- Serve children and adolescents healthy snacks and plain water. Limit snacks that are high in fat, salt and sugar, soft drinks or other sugary beverages. Do not use food as reward for children
- Eat at home with children and adolescents as often as possible. When eating out, choose healthy dishes with less fat, salt and sugar

Promotion of Physical Activity

- Make physical activity part of the family's daily routine
- Engage children and adolescents in more outdoor activities
- Support children and adolescents in sports or other active recreational activities
- Offer children and adolescents incentives or rewards that promote physical activity
- Limit non-active screen time, such as television watching, use of computer and other electronic screen products

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Healthy Weight Healthy Kids

Childhood overweight and obesity is a looming crisis to public health. Over the past few decades, the global prevalence of overweight and obesity in children and adolescents has markedly increased. The fundamental cause of overweight and obesity is an energy imbalance between energy intake and energy expended, which can be attributed by one or more factors. Being overweight or obese is not just an issue about external appearance. Many medical, social and psychological problems are related to childhood overweight or obesity. Overweight and obesity, as well as their related diseases, are largely preventable. In view of this, vigorous and effective preventive measures should be adopted as early as pre-conception to prevent and control the childhood obesity epidemic, and to halt or even reverse the rising trend.

Global Perspective of Overweight and Obesity in Children and Adolescents

Magnitude of the Problem

Many different measurements and criteria are used to determine weight status in children and adolescents, such as the World Health Organization (WHO) Child Growth Standards for children aged 0-5 years and Growth Reference Data for children and adolescents aged 5-19 years. Regardless of what measurements or criteria are used, rates of overweight and obesity in children and adolescents have increased in many countries.[1, 2]

Globally, the number of overweight or obese infants and young children aged 0 to 5 years increased from 32 million in 1990 to 42 million in 2013. If current trends continue, it is anticipated that the number of overweight and obese infants and young children under 5 years of age will increase to 70 million by 2025.[1] Likewise, the Global Burden of Disease Study 2013 reported that the age-standardised prevalence of overweight and obesity in children and adolescents aged 2 to 19 years for both developed and developing countries increased between 1980 and 2013 (Table 1).[2]

Determinants and Contributing Factors

Every aspect of the environment in which children are conceived, born and raised contributes to their risk of becoming overweight or obese.[1] While genetic factors (such as family history of obesity[3]) can play a certain role in susceptible children, significant non-genetic individual factors contributing to childhood overweight and obesity include perinatal risk factors (such as intrauterine exposure to gestational diabetes, maternal smoking during pregnancy and high birth weight); early-life influences (such as no breastfeeding and rapid weight gain in the first year of life); lifestyles and behavioural factors (such as lack of physical activity, television viewing, excess energy intake and short sleep duration).[4-6] Drivers in the rapid increase of childhood obesity also include some social reasons (such as parenting practice at home), economic reasons (such as lack of access to affordable healthy food), and other environmental influences (such as inaccessibility to healthy food choices in schools; lack of facilities for physical activity in the community; overwhelming marketing of energy-dense foods and beverages to children and families).[7, 8]

Table 1: Age-standardised prevalence of overweight and obesity in children and adolescents aged 2 to 19 for developed and developing countries by sex, 1980 and 2013

Level of development	Sex	Year	
		1980	2013
Developed countries	Boys	16.9%	23.8%
	Girls	16.2%	22.6%
Developing countries	Boys	8.1%	12.9%
	Girls	8.4%	13.4%

Source: Global Burden of Disease Study 2013.

Health Risks and Consequences

Being overweight or obese is not just an issue about external appearance. Many health problems are related to childhood obesity. Compared to children with a healthy weight, obese children have more metabolic risk factors (including enlarged waist circumference, raised blood pressure, impaired glucose tolerance, elevated blood glucose and suboptimal levels of blood lipids), and at increased risk of diabetes, fatty liver disease, sleep apnoea, asthma and musculoskeletal disorders.[9-13] In addition, obese children are more likely to experience psycho-social problems.[10]A cross-sectional study of over 43 000 children aged 10 to 17 in the United States found that obese children had 59% increased risk of internalising problems (such as low self-esteem, sad/depressed mood and social withdrawal); 33% increased risk of externalising problems (such as disobedience, aggression and irritability) than their non-obese peers.[14] Another population-based study of 4 364 children (with a mean age of 6.2 years) in the Netherlands observed that obese children were about 2.3 times as likely to be bully-victims as their normal weight counterparts.[15]

Obese children tend to become obese adults. The adverse health consequences are not restricted to childhood, but can extend into adulthood. Estimates based on cohort studies suggested that around 40% to 70% of obese pre-pubertal children would become obese adults.[11] In later life, the most significant health consequences of childhood overweight and obesity include increased risk of cardiovascular diseases (mainly coronary heart disease and stroke), diabetes, musculoskeletal disorders, especially osteo-arthritis and certain cancers (such as cancers of the colon, breast and endometrium).[16] A pooled analysis of four prospective cohort studies with a mean length of follow-up of 23 years reported that persons who were overweight or obese in childhood and obese as adults were 5.4 times as likely to have type 2 diabetes, 3.0 times as likely to have elevated triglyceride levels, 2.7 times as likely to have hypertension, 2.1 times as likely to have reduced high-density lipoprotein (HDL) cholesterol levels, 1.8 times as likely to have elevated low-density lipoprotein (LDL) cholesterol levels and 1.7 times as likely to have carotid-artery atherosclerosis (hardening of arteries which supply blood to the head), as compared with persons who had a normal body mass index (BMI) in childhood and were non-obese as adults.[17] Furthermore, a large cohort study followed-up 227 000 Norwegian adolescents for an average of 34.9 years and observed that adolescents aged 14 to 19 years in the highest BMI category had an increased risk of death from coronary heart disease, respiratory system diseases, colon cancer and sudden death in middle age.[18]

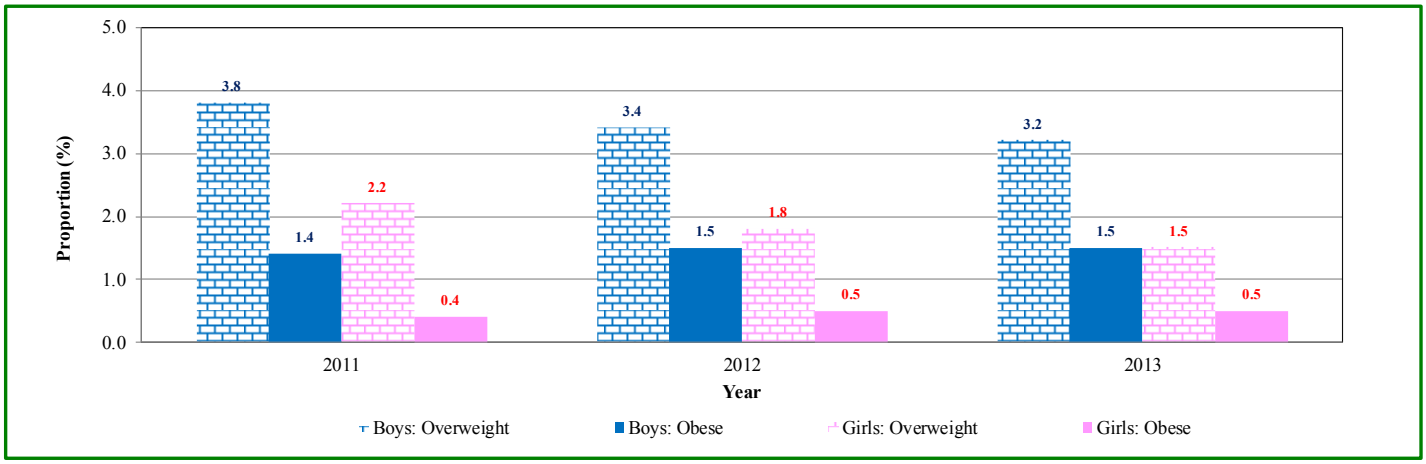
Overweight and Obesity in Children and Adolescents in Hong Kong

Magnitude of the Problem

For preschool children, data from the Family Health Service (FHS) of Department of Health (DH) showed that the proportion of overweight among 4-year-old children who attended Maternal and Child Health Centres (MCHCs) decreased from 3.0% in 2011, to 2.6% in 2012 and further down to 2.4% in 2013. The proportion of obesity remained at 1% over the same period. By sex, overweight and obesity was more prevalent among boys than girls (Figure 1).[19]

Among school-age children and adolescents, data from the Student Health Service (SHS) of DH recorded the detection rate of overweight and obesity among primary school students increased from 16.1% in 1995/96 to 22.2% in 2008/09, but then decreased gradually to 20.0% in 2013/14 (Figure 2a). For secondary school students, the corresponding detection rate increased from 13.2% in 1996/97 to 19.5% in 2013/14 (Figure 2b).[20]

Figure 1: Proportion of 4-year-old children being classified as overweight and obese by sex, 2011 – 2013



Note: Classification of being overweight or obese is in accordance with the WHO Child Growth Standards (0-5 years): Overweight if 2 < BMI z score ≤ 3; Obese if BMI z score > 3.

Source: Family Health Service, Department of Health.

Figure 2a: Detection rate of overweight and obesity among primary school students by sex, 1995/96 – 2013/14

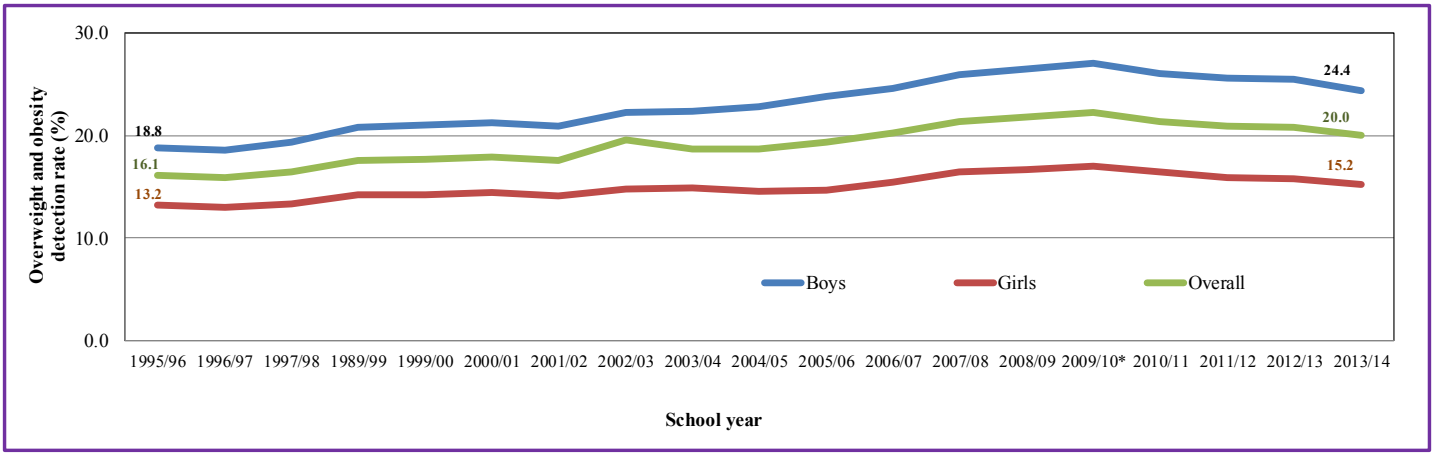
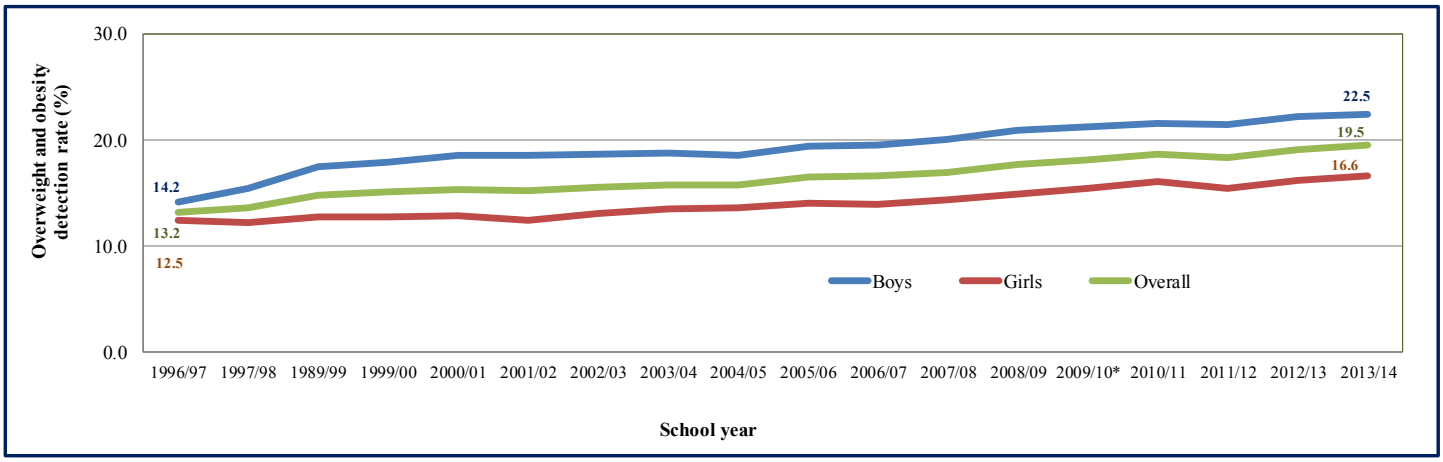


Figure 2b: Detection rate of overweight and obesity among secondary school students by sex, 1996/97 – 2013/14



Notes: Based on anthropometric measurement of students attending Student Health Service Centres of DH. Overweight (including obesity) is defined as: weight exceeding 120% of the median weight-for-height for male students with height between 55 and 175 cm and for female students with height between 55 and 165 cm; and BMI ≥25 for male students with height >175cm and for female students with height >165cm.

*In school year 2009/10, Student Health Service had to take part in the Human Swine Influenza Vaccination Programme, and therefore annual appointments were only provided to Primary 1 to Secondary 1 students. As such, the detection rate for school year 2009/10 was used the average of the school year 2008/09 and school year 2010/11.

Source: Student Health Service, Department of Health.

Risk Factors

An earlier study on 343 Hong Kong Chinese children aged 6 to 7 showed that children with obese mothers and obese fathers were about 5.1 times and 2.7 times as likely to be overweight as their peers whose mothers and fathers were not obese respectively. After adjusting for parental obesity, children having a current smoking father were about twice as likely to be overweight as children whose father was not a current smoker. The risk of being overweight also increased by higher birth weight and energy intake, but decreased by longer duration of sleep. While children with birth weight ≥3.5 kg were about 4.9 times as likely to be overweight as children with a birth weight <3.0 kg, children with a mean intake of ≥1 600 kcal/day were about 2.6 times as likely to be overweight as those with a mean energy intake of <1 200 kcal/day. Compared to children who slept <9 hours/day, children who slept ≥11 hours/day had 69% decreased risk of being overweight.[21]

Similarly, a study of 5 159 primary school children (with a mean age of 9.25 years) found that shorter sleep duration was associated with higher BMI. However, sleep compensation might partly modify the risk of childhood overweight and obesity. Compared to children who slept <8 hours/day during weekdays and had sleep compensation (sleep duration >8 hours/day) during weekends, children who slept <8 hours/day during weekdays but did not compensate for their sleep deficit during weekends would have 159% increased risk of being overweight and obese.[22] Another study involved 18 obese children aged 6 to 17 years and 18 age- and sex-matched non-obese children also found that obese children spent 12% less time asleep, 51% more time in sedentary activity, and 30% less time in physical activity than non-obese children.[23]

Studies also linked pattern of breakfast eating to higher BMI in children and adolescents. A study of 11 570 Hong Kong Chinese students aged 9 to 18 years showed that breakfast skippers (ate 0-2 times/week) had a higher BMI and larger percentage of body fat than their non-skipping peers (ate 5-7 times/week).[24] Another cohort study followed-up over 113 000 primary 4 students for 2 years also observed that children who skipped breakfast or ate breakfast away from home had greater BMI increase over 2 years than children who ate breakfast at home.[25]

Health Consequences

Local studies also implicated overweight and obesity in a number of health consequences among children and adolescents.[26] A study in 2003 explored the association between overweight or obesity and metabolic responses in a cohort of 2 102 Chinese adolescents (with a median age of 16 years) in Hong Kong. Results showed that overweight and obese adolescent boys and girls were about 21 times and 10 times as likely to have insulin resistance as their peers with a normal weight respectively. Overweight and obesity was also associated with an increased risk of raised systolic blood pressure and low HDL cholesterol levels, all of which were known important risk factors of future cardiovascular events.[27] Another study of 46 obese children (with a mean age of 10.8 years) and 44 sex- and age-matched children with a normal weight found that obese children had 20% increased risk of obstructive sleep apnoea.[28]

Prevention and Control of Childhood Obesity

The promotion of healthy diets and adequate physical activity are major elements in controlling the childhood obesity epidemic. Over the years, DH has collaborated with other government bureaux and departments (such as the Education Bureau, the Leisure and Cultural Services Department, and the Food and Environmental Hygiene Department), community partners and academia and initiated various public health programmes to prevent and control childhood obesity in Hong Kong. For example, breastfeeding has a protective effect against childhood obesity, as well as subsequent obesity-related comorbidities (such as type 2 diabetes).[29] Recently in April 2014, the Committee on Promotion of Breastfeeding was set up under Food and Health Bureau to advise the government on strategies and actions on protecting, promoting and supporting breastfeeding, oversee the implementation of the initiatives, and monitor their progress. The Committee has developed a three-year work plan to strengthen the community support on breastfeeding, which will be implemented by phases by DH in collaboration with relevant sectors.

As children and adolescents spend a significant amount of time in schools, the Central Health Education Unit (CHEU) uses a setting-approach and has launched the 'StartSmart@school.hk' Campaign (in 2012) and the 'EatSmart@school.hk' Campaign (since 2006) to promote healthy eating and physical activity participation among pre-schoolers and school students. Besides, the SHS monitors the weight status among school students and provides counselling for primary and secondary students with suboptimal weight status.

Parents and carers also have a significant role to play in prevention and control of childhood obesity. They should be clear about the recommended weight ranges for their children. Balancing the energy that children and adolescents eat and drink with the energy they expend through physical activity and normal growth is the key in achieving and maintaining a healthy weight. Healthy eating and physically active lifestyle should be established in early childhood. Parents and carers should act as positive role models, and build a supportive environment that would enable children achieving a healthy weight.

Promotion of healthy eating

As children and adolescents are at an important stage of development, it is important for them to eat well for getting sufficient nutrients for healthy growth and development. Eating well is not only about what and how much children and adolescents eat, but also about when and how they eat. Here are some tips that can help children and adolescents eat well:

- Breastfeed infants and young children as much as possible. As recommended, breastfeed infants exclusively from birth to about 6 months of age. With introduction of complementary foods, continue breastfeeding up to 2 years or above [30];
- Offer children and adolescents three regular meals every day. Always start the day with a nutritious breakfast at home and include all food groups in the daily diet. Serve food in the portion size appropriate for their age and development. Accept the child's ability to regulate energy intake rather than feed until the plate is empty[30];
- Teach and encourage children and adolescents to eat a variety of healthy foods and in the proportions as the Healthy Eating Food Pyramid recommends;
- Serve children and adolescents healthy snacks, such as fresh fruits, boiled eggs or green sandwiches. Limit the intake of nutrient-poor pre-packaged snacks or snacks that are high in fat, salt and sugar, such as prawn crackers, potato chips, confectionary, chocolate, cookies, cakes or ice-cream. Do not use food as reward for children;
- Offer plain water which is the best drink for all including children and adolescents. Limit consumption of soft drinks or other sugary beverages. For pure fruit juices, they need to be offered sparingly as excessive consumption can also increase energy and sugar intake that will lead to overweight and even obesity;
- Eat at home with children and adolescents as often as possible. When eating out, choose healthy dishes with less fat, sugar and salt. Patronise EatSmart Restaurants and choose EatSmart Dishes of "More Fruit and Vegetables" and "3 Less".

Promotion of physical activity

Preschool children aged 2 to 6 years is recommended to accumulate at least 180 minutes (3 hours) of physical activities of various intensities per day.[31] For school children, they should accumulate at least 60 minutes (1 hour) of moderate to vigorous-intensity physical activity daily. Physical activity of amounts greater than 60 minutes daily will provide additional health benefits.[32] Here are some tips that can help children and adolescents to be more physically active:

- Make physical activity part of the family's daily routine, such as designating time for active games or after-dinner walks together;
- Engage children and adolescents in more outdoor activities, such as bringing children and adolescents to city parks or playgrounds and playing with them; going to beaches or swimming pools and swiming with them; visiting nature parks or outlying islands for hiking or other outdoor activities;

- Support children and adolescents in sports or other active recreational activities that may interest them;
- Offer children and adolescents incentives or rewards gifts that promote physical activity, such as balls or tricycles for preschool children; scooters, bicycles and skipping ropes for school-age children; running shoes, squash or tennis rackets for adolescents. Ensure these items are appropriate for their development and provide protective equipment (such as helmets, knee pads and wrist pads) if indicated;
- Limit non-active screen time, such as television watching, use of computer and other electronic screen products. Toddlers under 2 years of age should avoid screen time as far as possible. Children aged 2-6 years should limit screen time to no more than 2 hours a day with parental or teachers' supervision, if electronic screen products have to be used. Students aged 6-12 years should limit recreational screen time to no more than 2 hours a day, whereas those aged 12-18 years should avoid prolonged screen time.

More information about child and adolescent health can also be found at the websites of relevant DH services (Box 1).

The SHS has also developed an App for iPhone/ iPad and Android platform (Bilingual) as a tool for students to check their body weight for height. The App also provides health tips on diet and physical activities. To access and download the App, please visit: http://www.studenthealth.gov.hk/english/mobile_app/mobile_app.html.

Box 1: Websites of DH services with information about child and adolescent health

Family Health Service (for infants and young children from birth to 5 years): http://www.fhs.gov.hk/english/
'StartSmart@school.hk' Campaign of CHEU (for preschool children aged 2 to 6 years): http://www.startsmart.gov.hk/en/index.asp
Student Health Service (for school-age children and adolescents): http://www.studenthealth.gov.hk/eindex.html
'EatSmart@school.hk' Campaign of CHEU (for school-age children): http://school.eatsmart.gov.hk/en/template/home.asp

Commission on Ending Childhood Obesity

In an effort to better inform a comprehensive response to childhood obesity, Dr Margaret Chan, WHO Director-General established a high-level Commission on Ending Childhood Obesity in July 2014. The Commission comprises 15 accomplished and eminent individuals from a variety of relevant backgrounds, including Dr Constance Chan Hon Yee, Director of Health of the Hong Kong Special Administrative Region Government.

The Commission is tasked with producing a report specifying which approaches and combinations of interventions are likely to be most effective in tackling childhood and adolescent obesity in different contexts around the world. The Commission is supported by two ad hoc working groups: the Ad hoc Working Group on Science and Evidence and the Ad hoc Working Group on Implementation, Monitoring and Accountability.

To know more about the work of the Commission on Ending Childhood Obesity, please visit http://www.who.int/end-childhood-obesity/en/.

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Data Brief

Pre-primary institutions (PPIs) should provide an environment in which young children are offered nutritious food and regular physical activity so that they learn these healthful lifestyle behaviours at an early age. However, findings from the Diet and Physical Activity Survey of PPI students revealed that certain unhealthy dietary practices are prevalent among PPIs in Hong Kong.

The survey was conducted by the DH between March and June 2013. A total of 350 PPIs completed the self-administered questionnaires. Results showed that less than one-tenth (9%) of the PPIs had established a written school healthy eating policy. Although PPIs claimed that they generally followed DH's nutritional guidelines when preparing food for students (such as removing visible fat and skin of poultry meat before cooking; providing fruits during birthday parties), some 'unhealthy' practices were identified (see Table). Regarding promotion of physical activity, 13% of the PPIs established written school physical activity policy. During a normal school day, full-day lower class students spent on average 120 minutes on physical activity (or 67% of recommended daily physical activity), while half-day lower class students spent on average 73 minutes on physical activity (or 41% of recommended daily physical activity).

'Unhealthy' practices		Findings
Cooking practices and choices of ingredients when preparing food for students (Base: All PPIs which provided food to their students excluding missing data)	Cooked with MSG, chicken powder, salty seasonings or other ready-made sauces	28%
	Prepared meal with processed or canned meat	33%
	Used dairy products with full cream or added sugar	54%
Food and drinks supplied at the birthday parties (Base: PPIs which had held birthday parties excluding missing data)	Cream cakes	42%
	Juices with added sugar	14%
	Sausages/ham/fish balls	10%
Using food as a reward for students (Base: All PPIs excluding missing data)	No relevant guidelines	69%
	Staff ever used food (including biscuits, candies or chocolates) as a reward for students	64%

Source: Department of Health 2014.

In 2012, the DH launched the 'StartSmart@school.hk' Campaign to encourage PPIs to proactively formulate and implement healthy eating and physical activity policies in order to promote an environment and a culture of healthy eating and regular physical activity both in school and at home to help young children establish healthy lifestyle. To know more about the Campaign, access nutritional and physical activity guidelines and educational resources, or download EatSmart recipes and sample menus, please visit http://www.startsmart.gov.hk/en/index.asp.

Non-Communicable Diseases (NCD) WATCH *is dedicated to promote public's awareness of and disseminate health information about non-communicable diseases and related issues, and the importance of their prevention and control. It is also an indication of our commitments in responsive risk communication and to address the growing non-communicable disease threats to the health of our community. The Editorial Board welcomes your views and comments. Please send all comments and/or questions to so_dp3@dh.gov.hk.*