

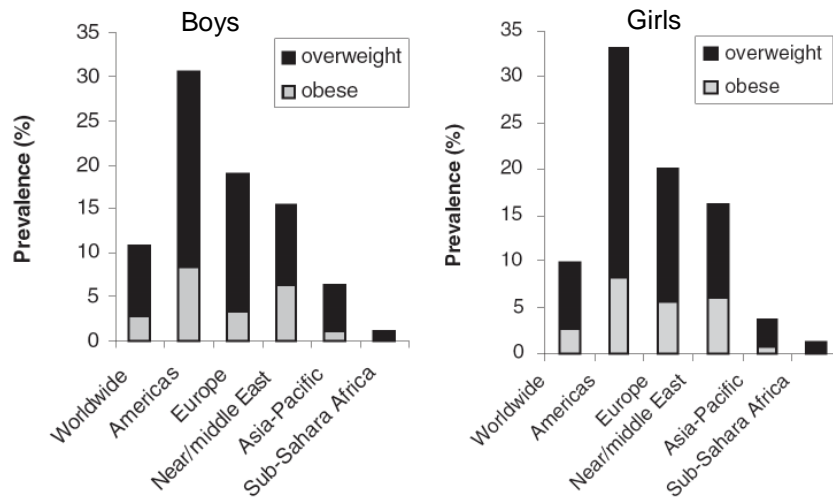
The Hong Kong Student Obesity Surveillance (HKSOS) Project – main findings, challenges and opportunities



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 School of Public Health
 HKU
 for HKSOS Project
 30 June 2008

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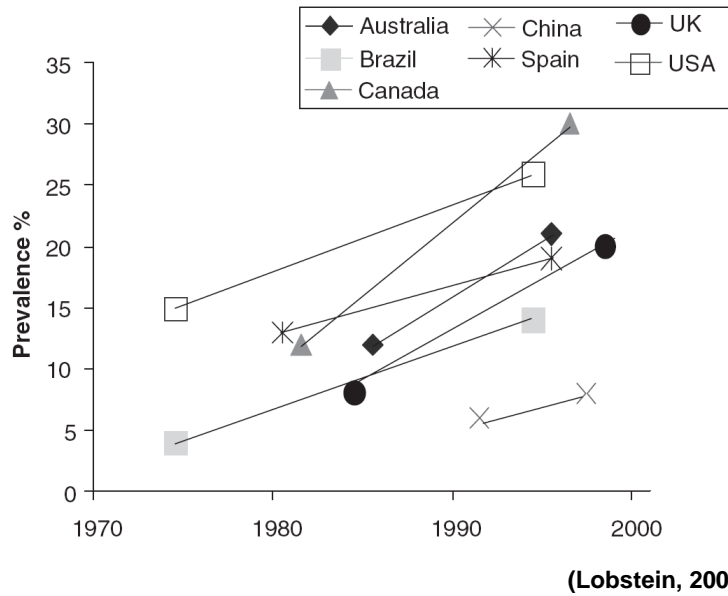
Childhood overweight/obesity worldwide



Age 5-17, IOTF criteria, post 1990 data (Lobstein, 2004)

2

Trends in childhood overweight 1970-2000

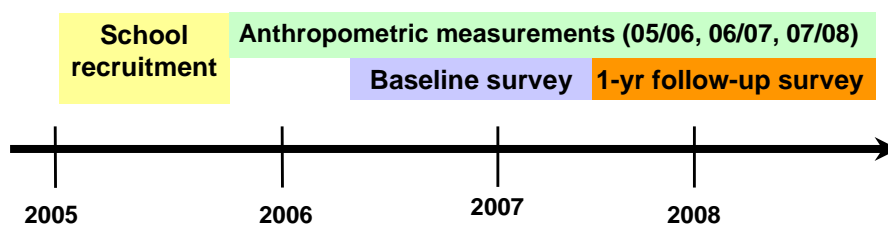


HKSOS

- Objectives

- Investigate the prevalence of obesity among HK adolescents
- Measure obesity related risk factors
- Develop a large and representative baseline sample for future prospective studies on adolescent obesity

- Timeline



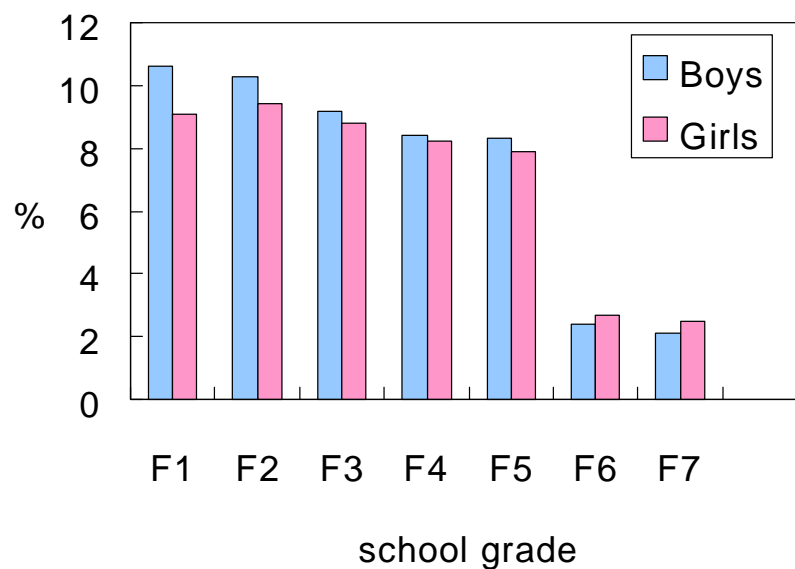
4

Sampling

- Chinese secondary 1 to 7 students
 - Baseline self-administered questionnaire
 - 2006/07: 34,369 students in 42 local secondary schools
 - Anthropometric data
 - measured by trained school teachers
 - 2005/06: 24,071
 - 2006/07: 22,720
- Stratified random sampling of schools
 - by district, funding, religion, Eng/Chi, co-ed schools
 - Sampled students and schools were representative of the reference population in Hong Kong
 - small effect size: 0.1 to 0.2

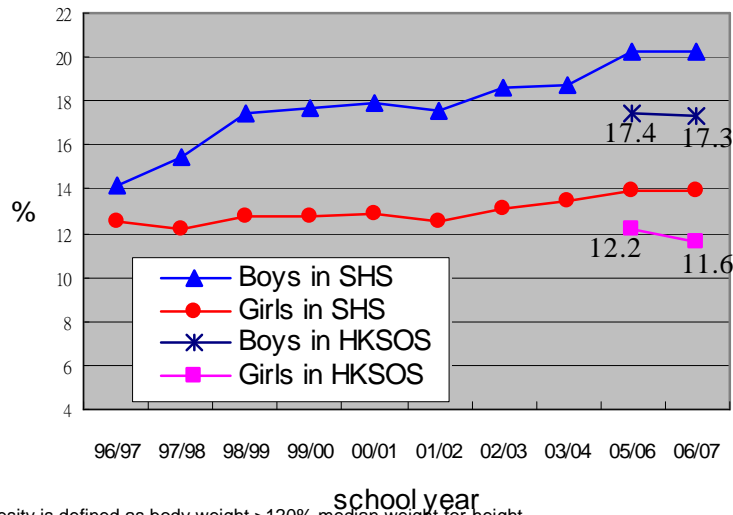
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School grade distribution



6

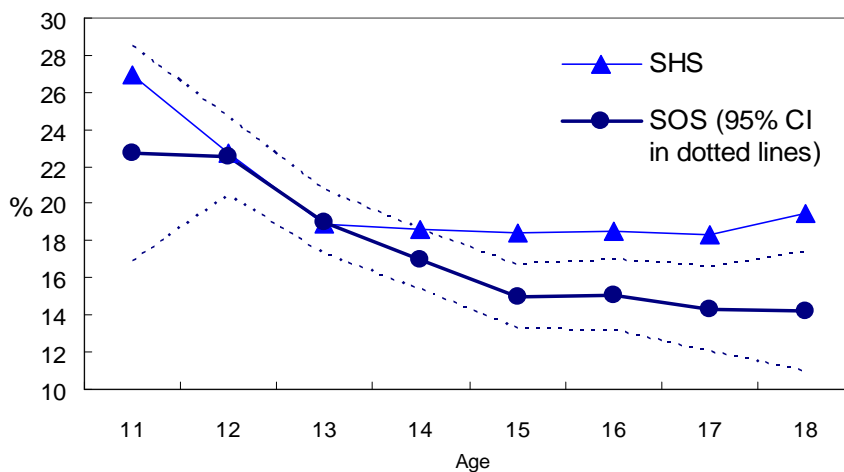
Obesity* prevalence detected by the Student Health Service# (SHS) and HKSOS



*Obesity is defined as body weight >120% median weight-for-height.
 # Data were from Department of Health.
 Note: Data for 05/06 and 06/07 were weighted by 05/06 bi-census age and sex distribution.

7

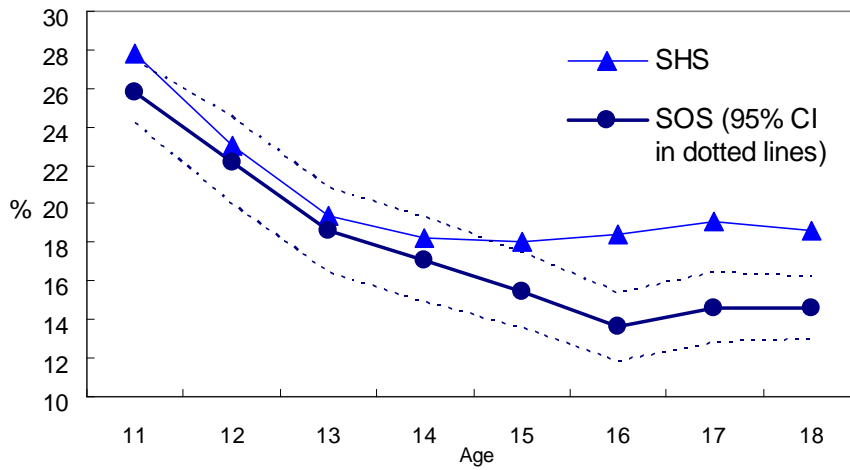
Obesity* prevalence by age in boys 2005-06, SHS# vs SOS



*Obesity is defined as body weight >120% median weight-for-height.
 # Data were from Department of Health.

8

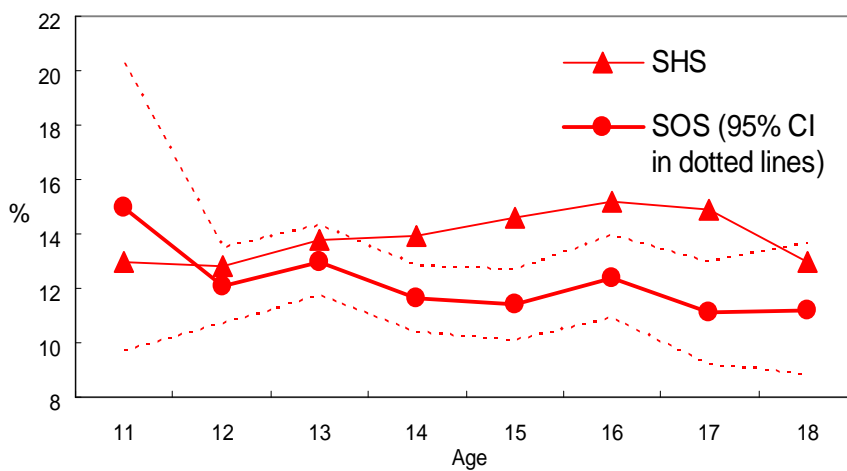
Obesity* prevalence by age in boys 2006-07, SHS# vs SOS



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9

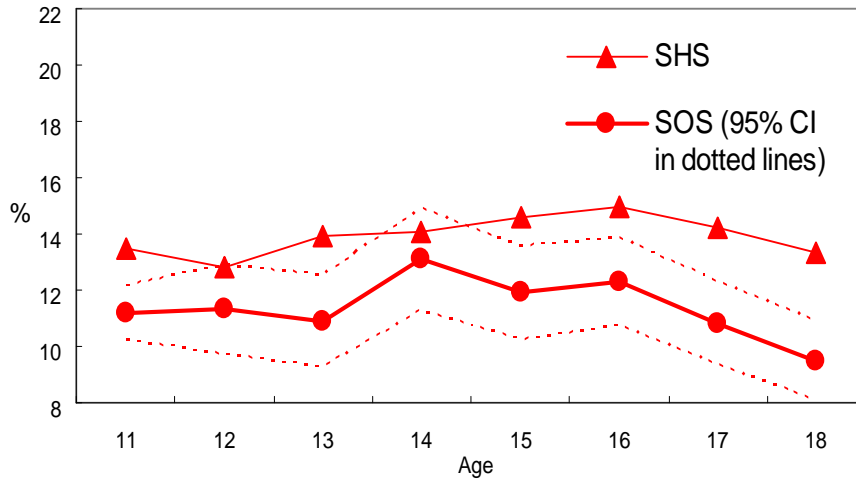
Obesity* prevalence by age in girls 2005-06, SHS# vs SOS



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 # Data were from Department of Health.

10

Obesity* prevalence by age in girls 2006-07, SHS# vs SOS:

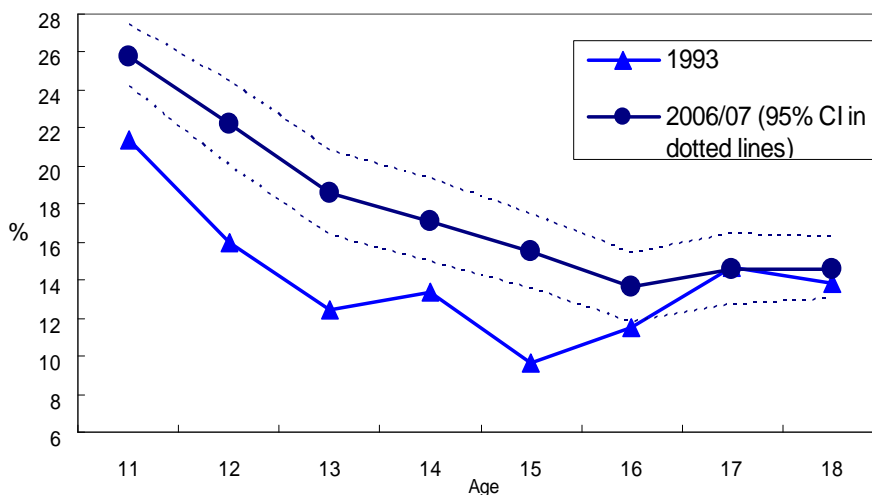


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Data were from Department of Health.

11

Obesity* prevalence by age in boys, 1993# vs 2006-07^



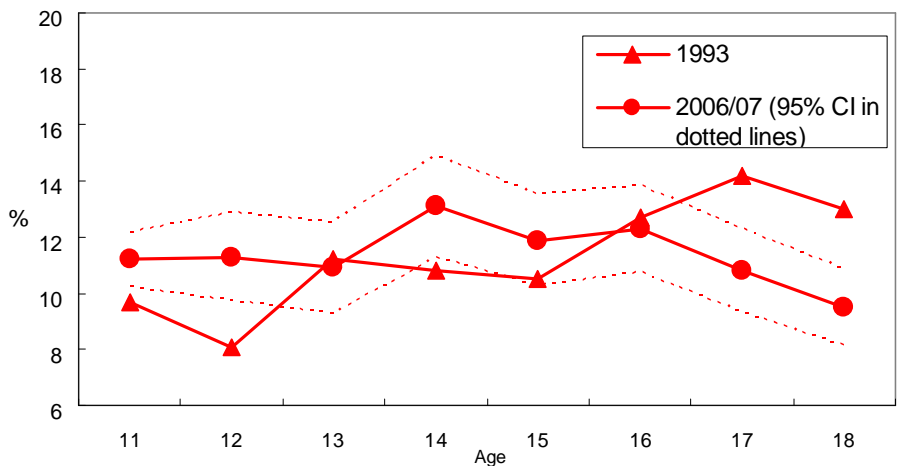
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#Data for year 1993 were adapted from Leung SSF et al.

^ Data for year 2006/07 were from HKSOS.

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Obesity* prevalence by age in girls, 1993# vs 2006-07^



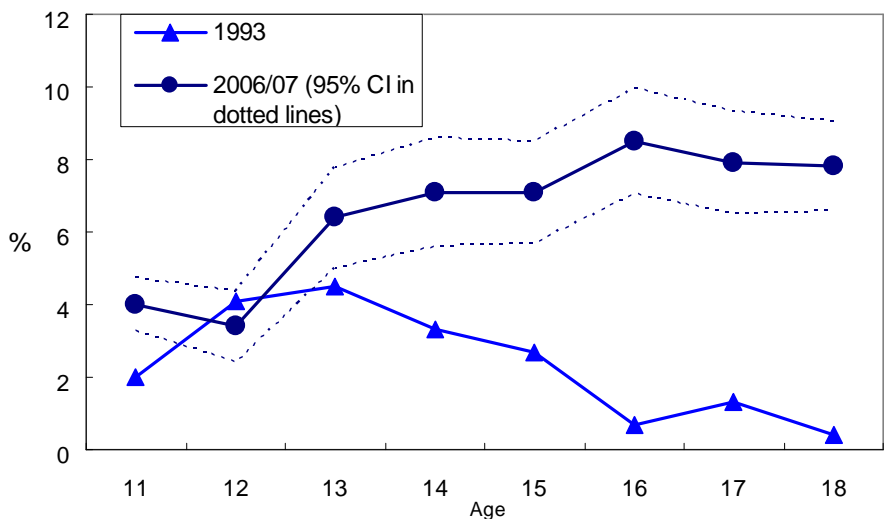
*Obesity is defined as body weight >120% median weight-for-height.

#Data for year 1993 were adapted from Leung SSF et al.

^ Data for year 2006/07 were from HKSOS.

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Underweight* prevalence by age in boys, 1993# vs 2006-07^



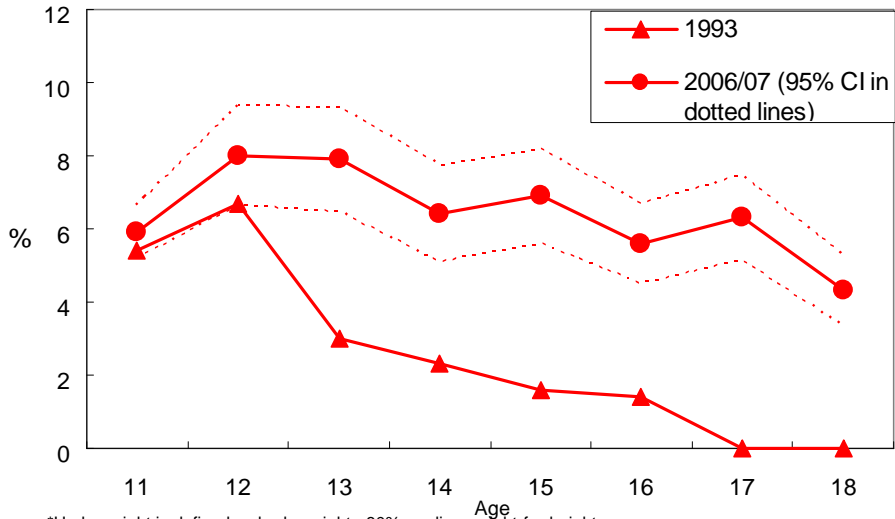
*Underweight is defined as body weight <80% median weight-for-height.

#Data for year 1993 were adapted from Leung SSF et al.

^ Data for year 2006/07 were from HKSOS.

14

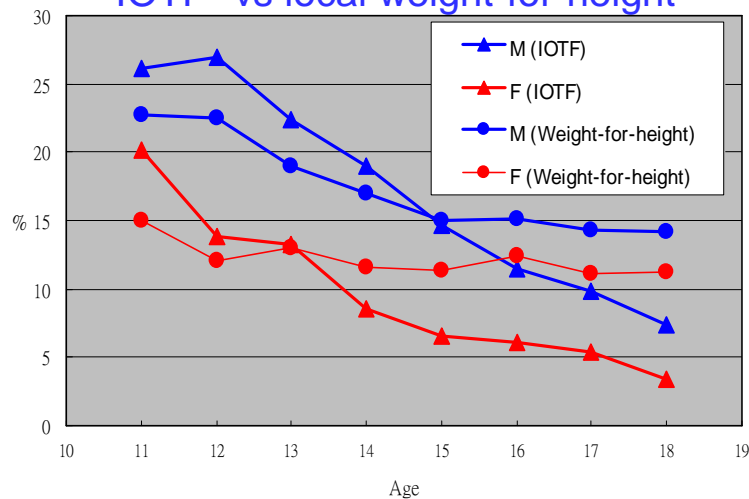
Underweight* prevalence by age in girls, 1993# vs 2006-07^



*Underweight is defined as body weight <80% median weight-for-height.
 #Data for year 1993 were adapted from Leung SSF et al.
 ^ Data for year 2006/07 were from HKSOS.

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Obesity prevalence by age in HK 2005-06, IOTF* vs local weight-for-height#

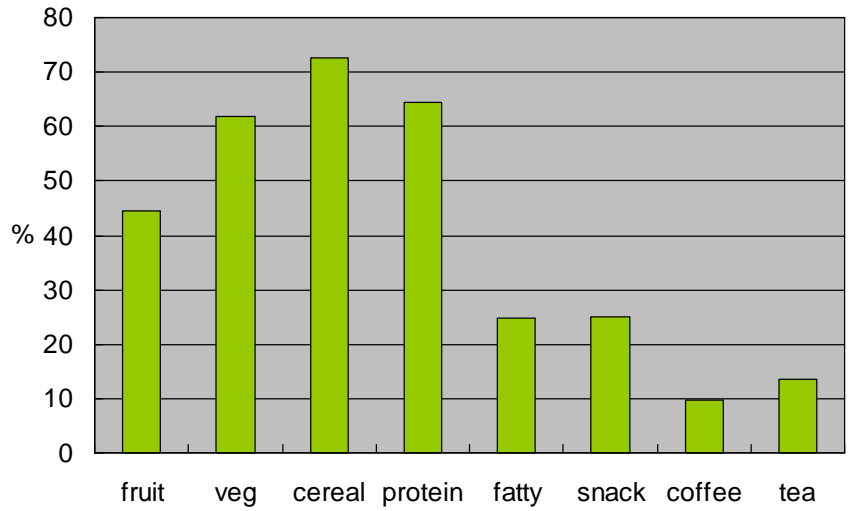


*IOTF=International Obesity Task Force. Overweight and obese are combined and are defined by BMI cutoffs corresponding to the adult cutoffs of 25 and 30 kg/m², respectively.

Obesity is defined as body weight >120% median weight-for-height.

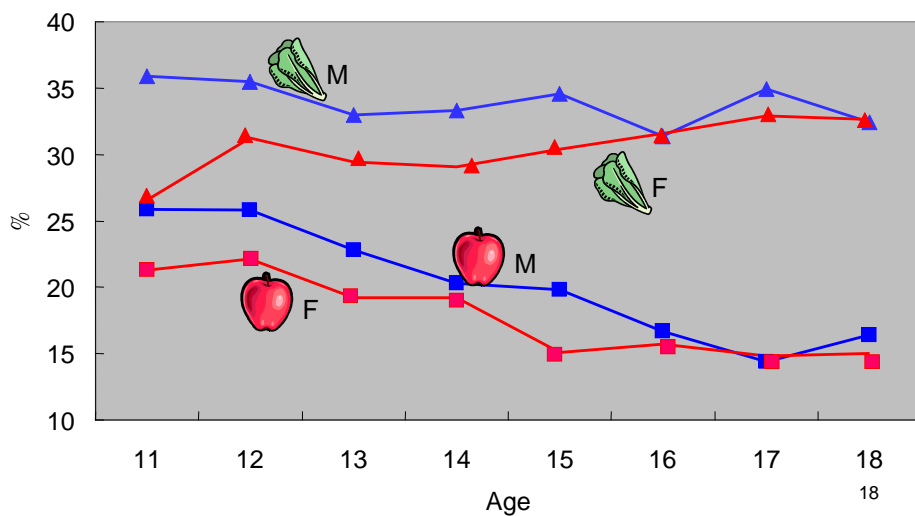
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Prevalence of daily (≥ 1 /day) food intake

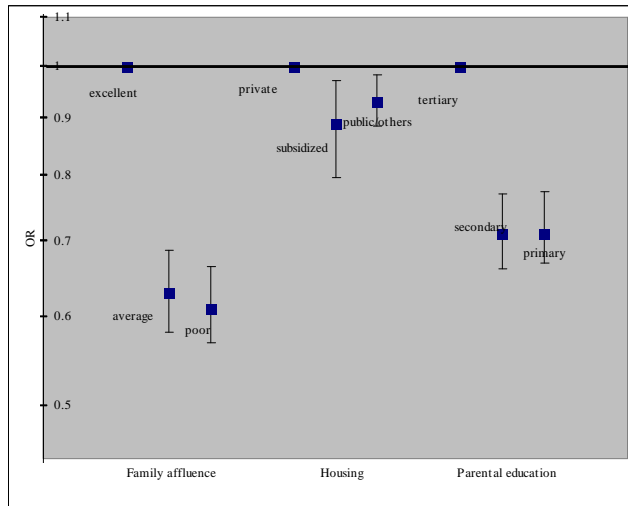


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Prevalence of meeting recommended daily intake of fruit (≥ 2 portions) and vegetables (≥ 3 portions)



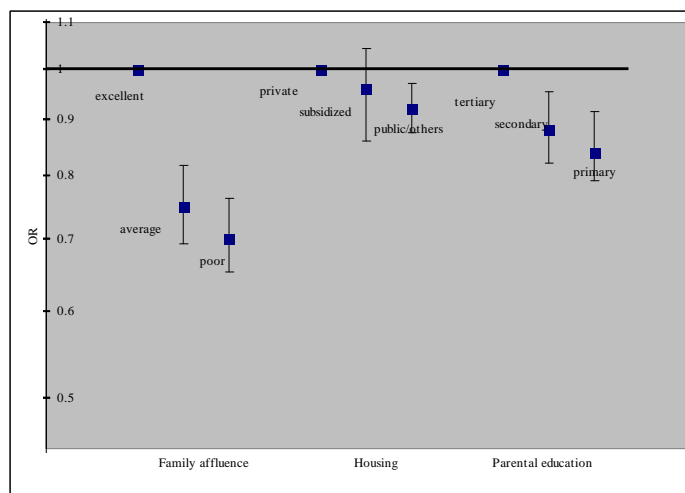
***Adjusted ORs for having ≥ 2 servings of fruits/day by SES**



#adjusted for sex and age

19

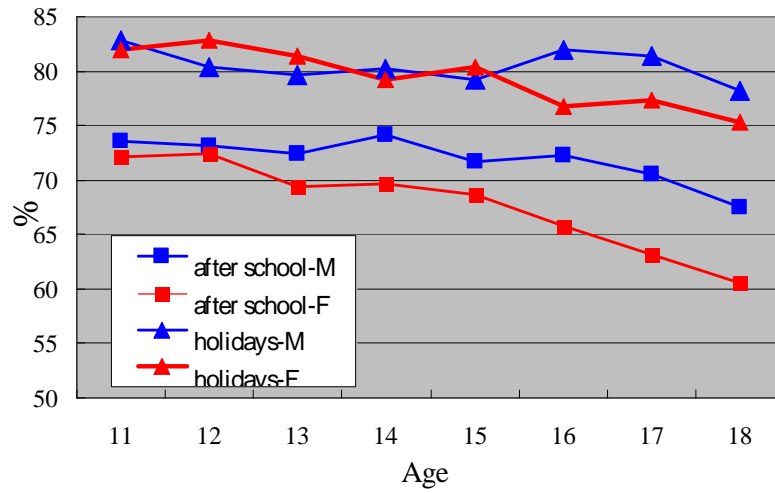
***Adjusted ORs for having ≥ 3 servings of vegetables/day by SES**



#adjusted for sex and age

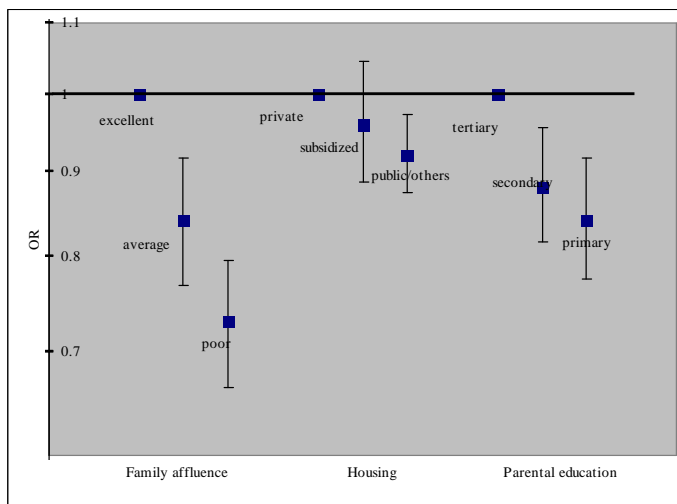
20

Non-Exercise Physical Activity (NEPA) for ≥ 1 hour a day



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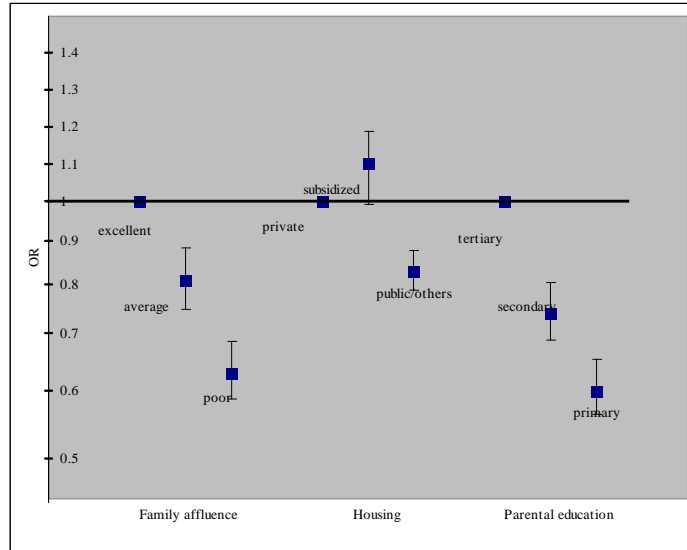
***Adjusted ORs for performing NEPA for ≥ 1 hr/day after school**



#adjusted for sex and age

22

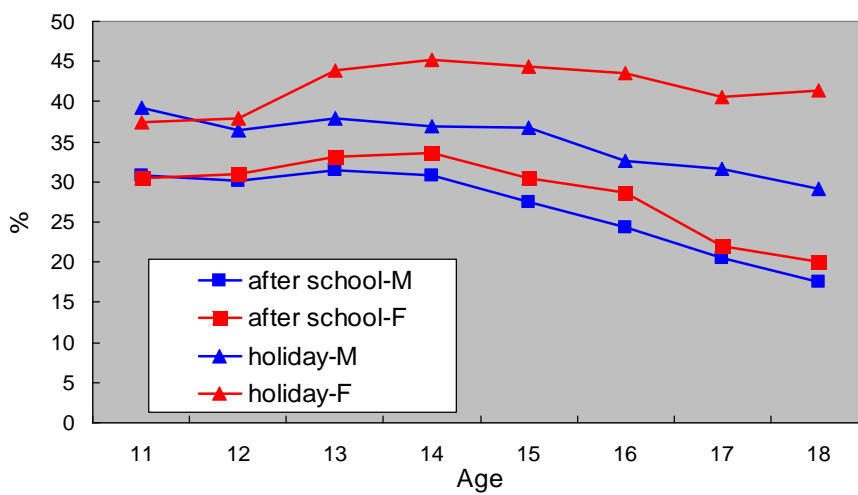
***Adjusted ORs of performing NEPA for ≥ 1 hr/day during holidays**



23

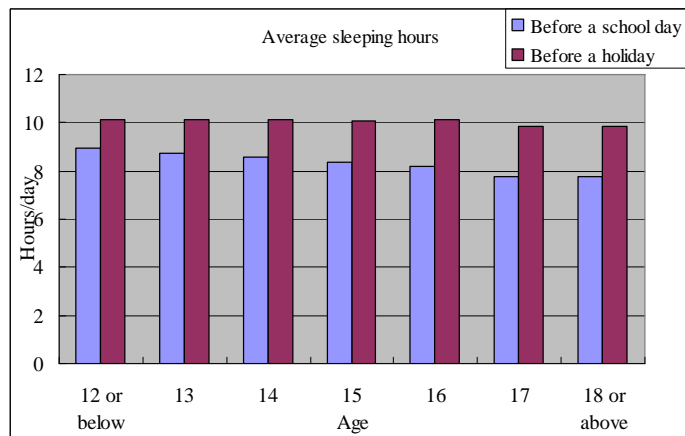
#adjusted for sex and age

Prevalence of watching TV/video for >2 hours/day



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Sleep habits and Problems



Sleeping problems in the past 30 days

Sleeping problems in the past 30 days	N (%)
Insomnia	10331 (35.1)
Snoring	2200 (7.5)
Sleep-disordered breathing (SDB)	1400 (4.8)

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Physical fitness by weight status in boys and girls

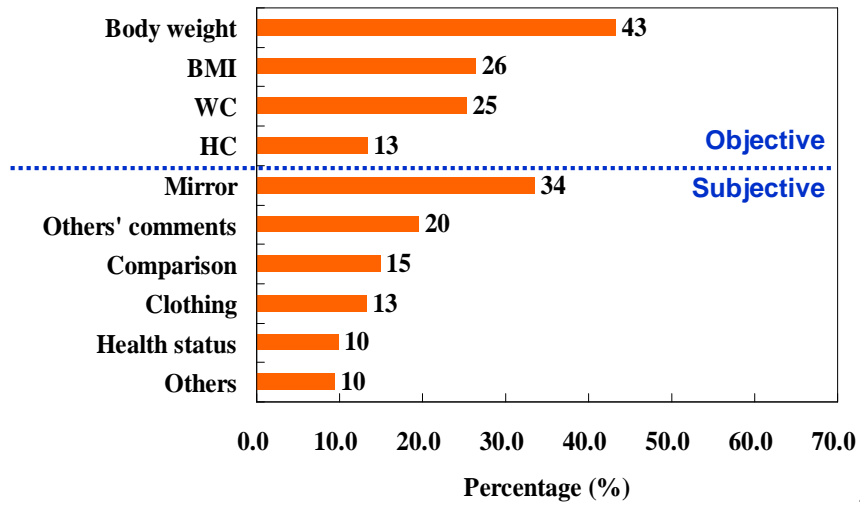
	Underweight		Normal	Overweight/Obese	
	# Mean	**P	# Mean	# Mean	**P
Boys					
Push-up (no. of time/min)	22.8	0.08	24.6	18.7	<0.001
Sit-up (no. of time/min)	37.2	<0.001	39.8	36.9	<0.001
Sit-and-reach (cm)	25.5	<0.001	27.8	27.9	0.87
9-min run (m)	1643	0.25	1665	1500	<0.001
Girls					
Push-up (no. of time/min)	29.7	0.08	27.9	23.5	0.003
Sit-up (no. of time/min)	31.3	0.19	31.9	29.5	<0.001
Sit-and-reach (cm)	31.5	0.04	32.5	32.5	0.96
9-min run (m)	1378	0.13	1359	1237	<0.001

Adjusted for age

**P-value of the LSD post-hoc test, in comparison with the normal group

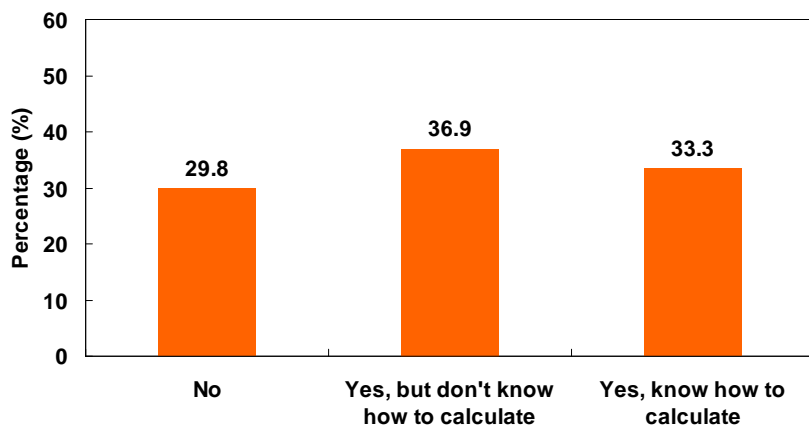
26

Ways to evaluate weight status



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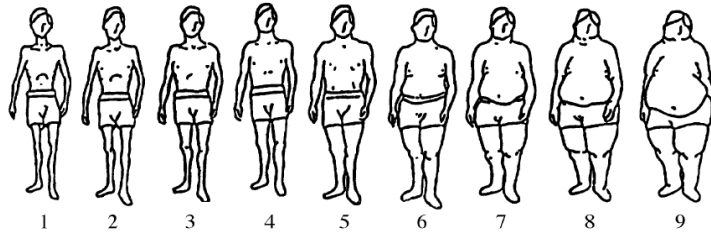
Have you ever heard of BMI?



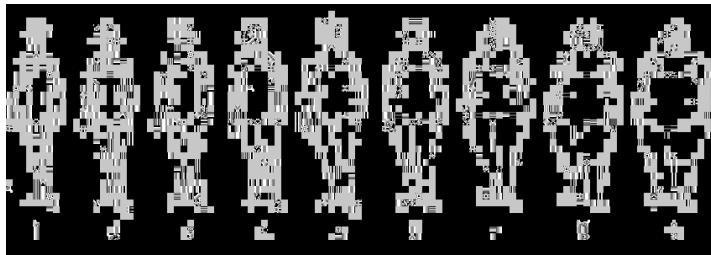
28

Standard figural stimuli. ©Dr A Stunkard

M

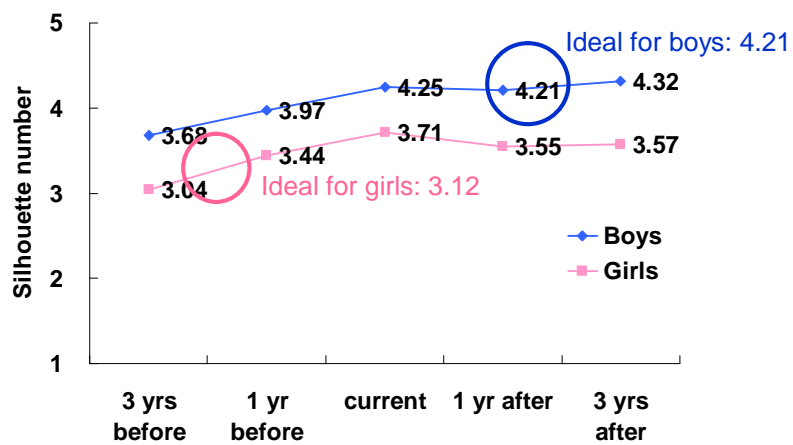


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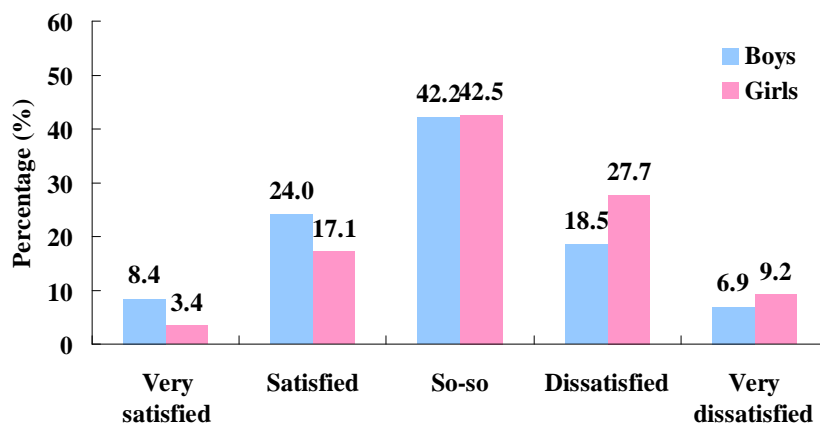
29

Perceived & predicted body shape



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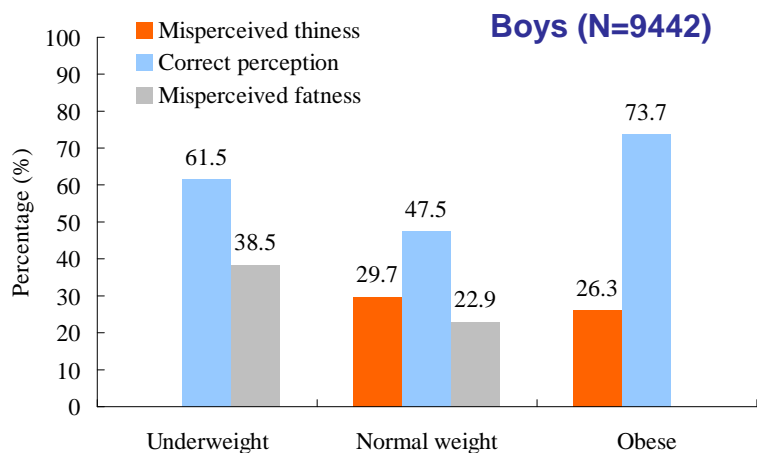
Body shape satisfaction by sex



p<0.001

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Weight perception in boys

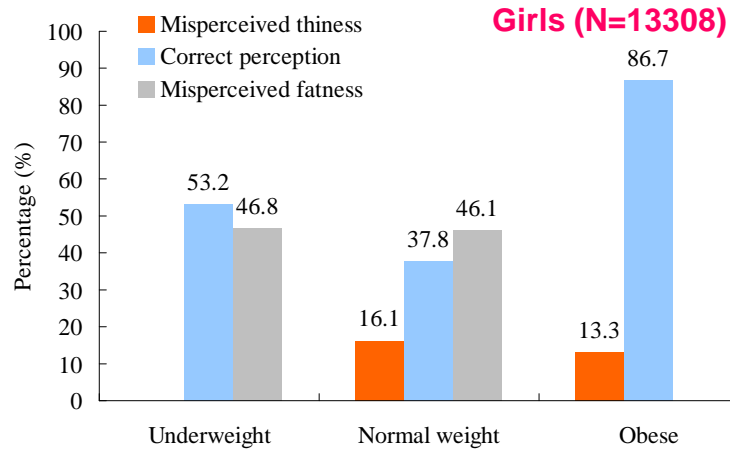


Boys (N=9442)

* based on the weight status defined by local reference

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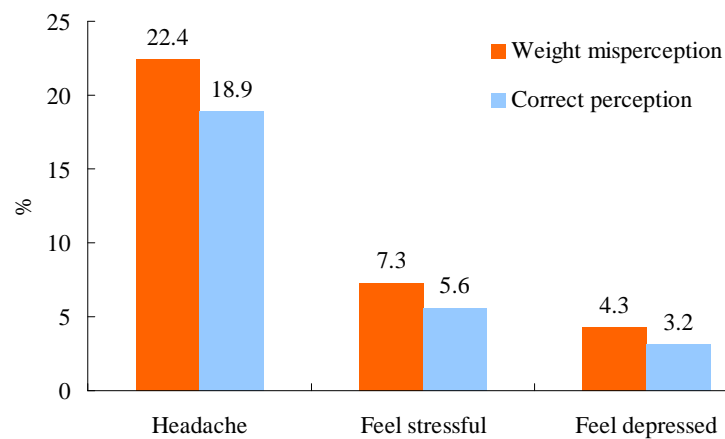
Weight perception in girls



* based on the weight status defined by local reference

33

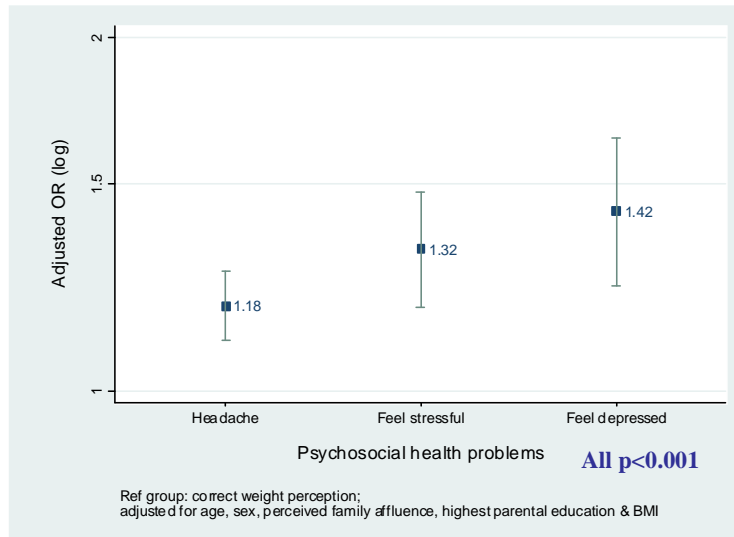
Prevalence of psychosocial health problems by weight perception



All $p < 0.001$

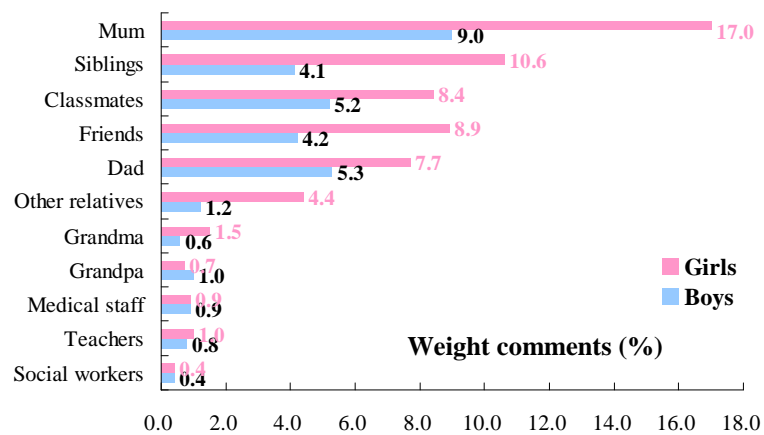
34

Adjusted ORs for psychosocial health problems due to weight misperception



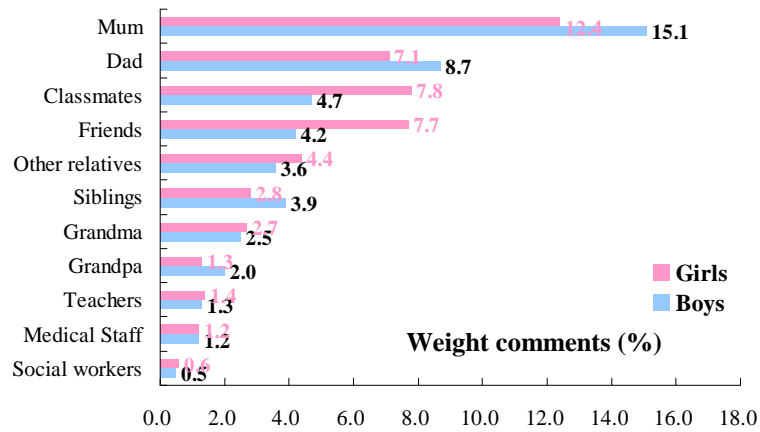
35

Prevalence of being told “too fat”



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Prevalence of being told “too thin”



37

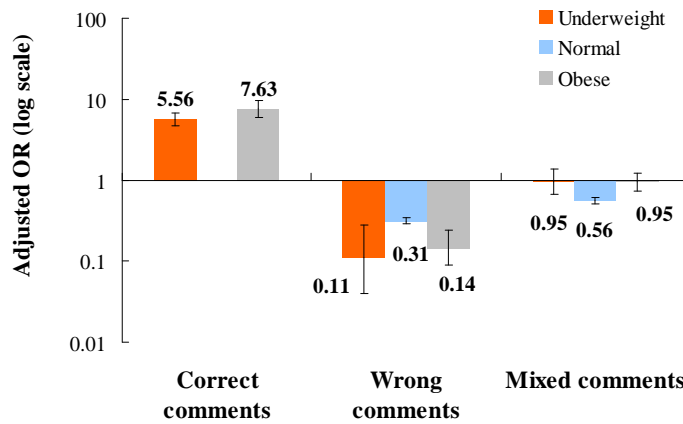
Accuracy* of weight comments



* based on the weight status defined by local reference

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Adjusted ORs for correct weight perception by types of weight comments

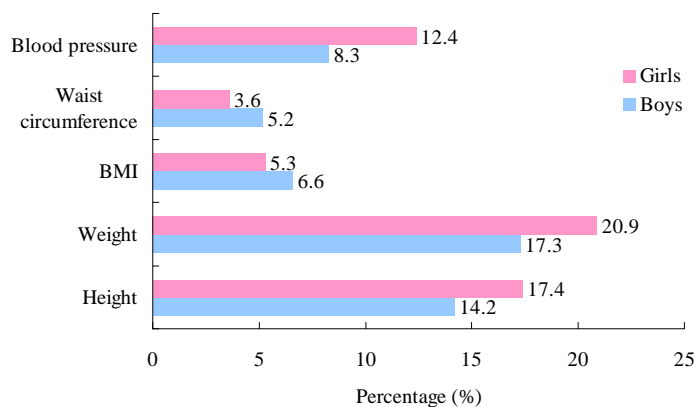


Ref group: no weight comments received; adjusted for age, sex, perceived family affluence, highest parental education, BMI & school effect

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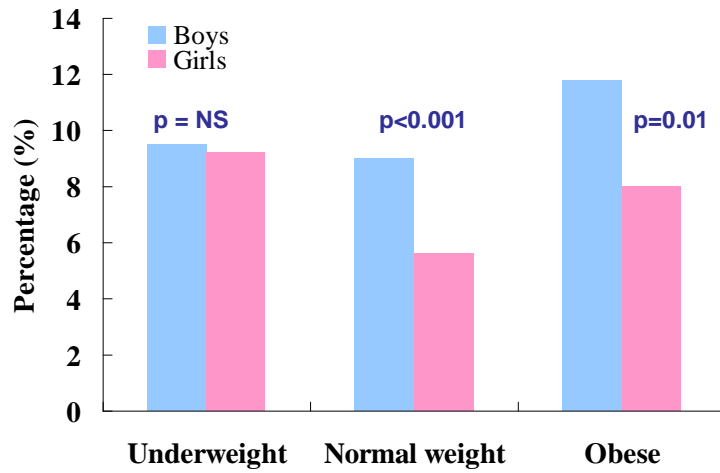
Prevalence of different advice given by doctors

- (exclude those who didn't see doctor and missing value, N=17483)



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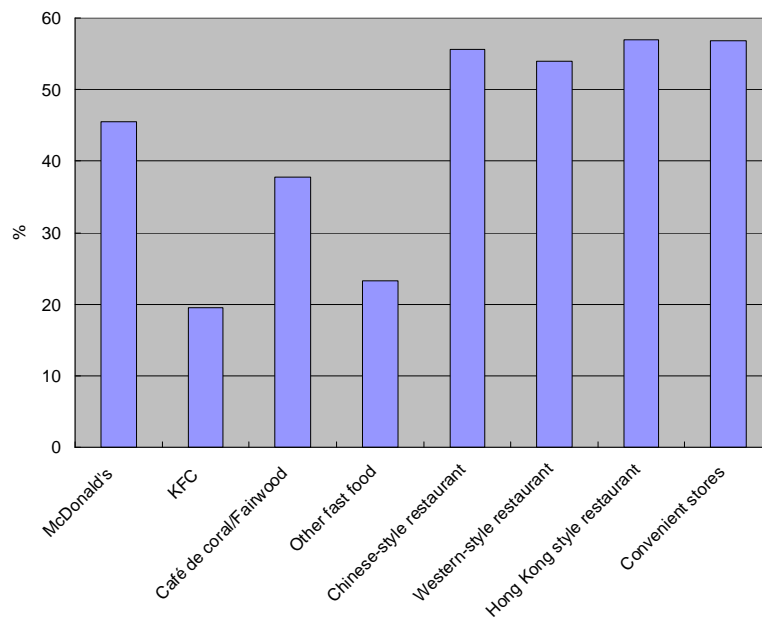
Asking for doctor's advice on weight status



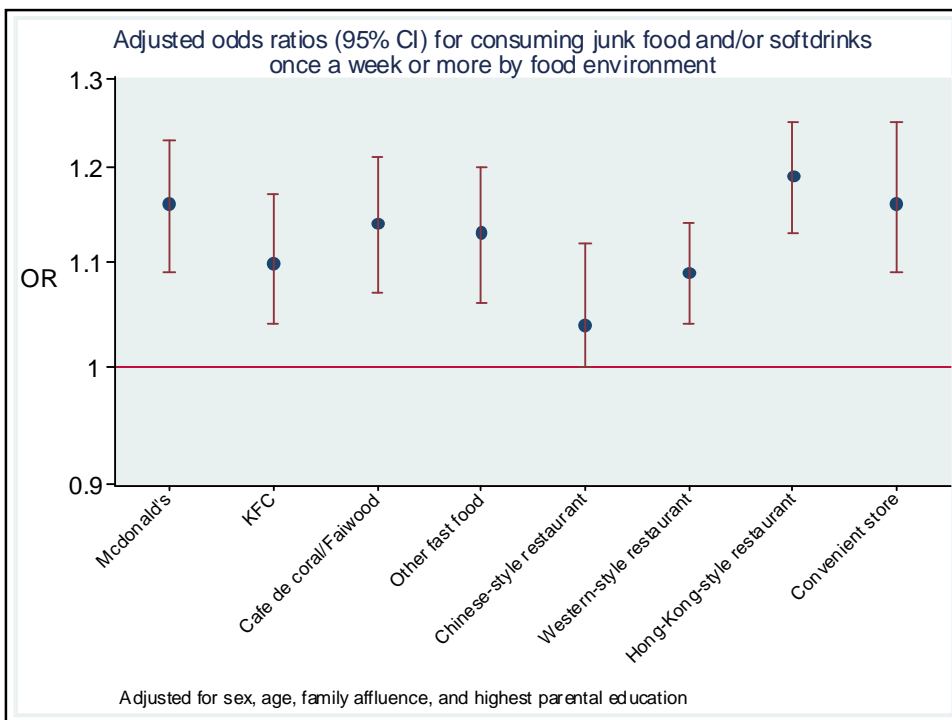
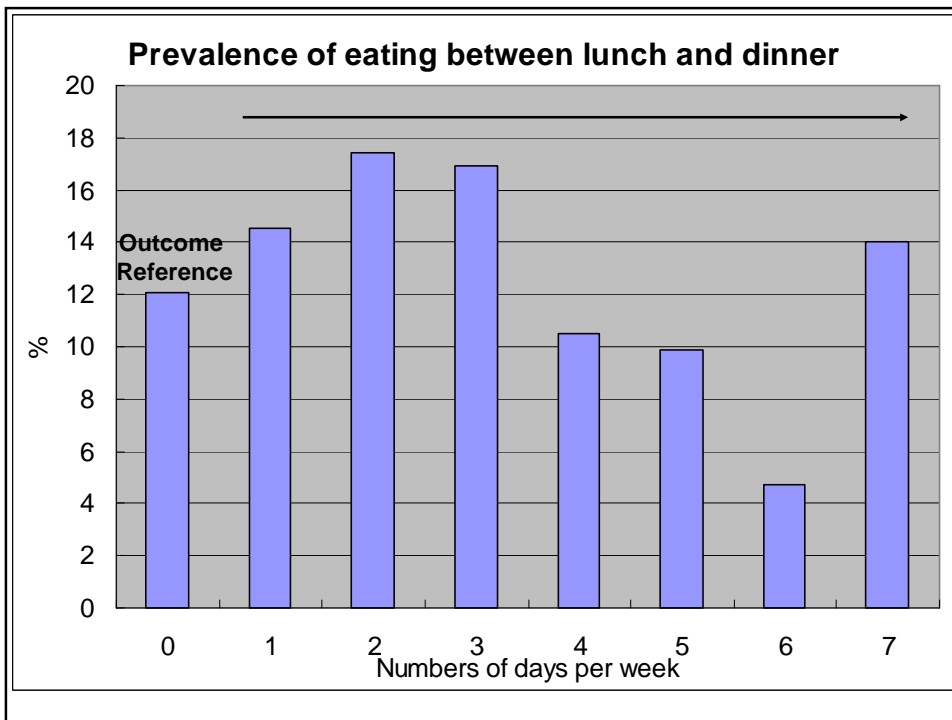
* based on the weight status defined by local reference

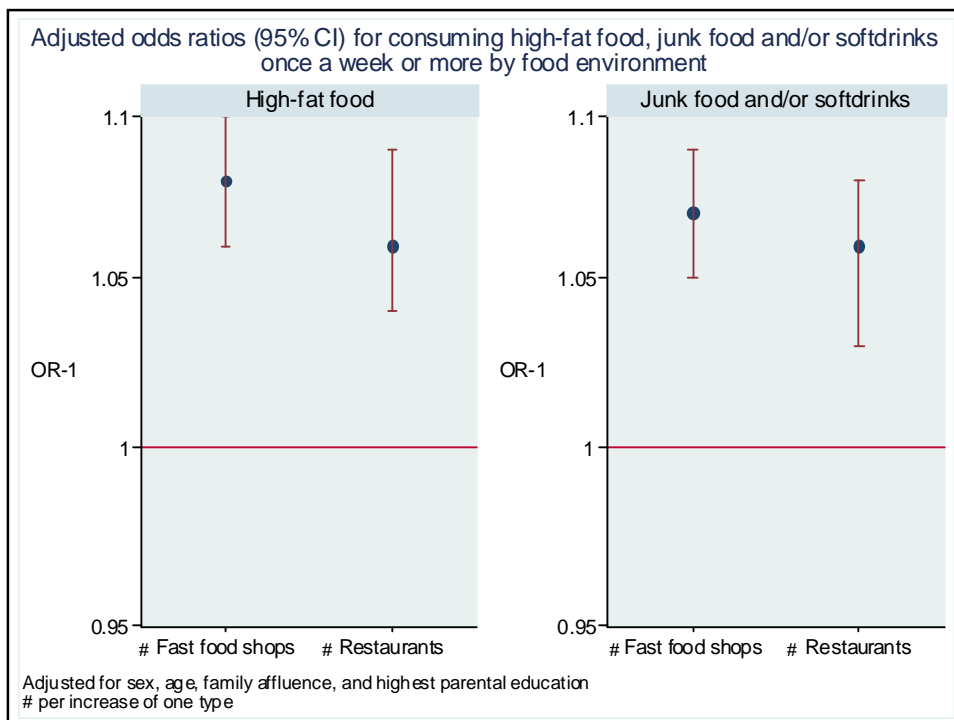
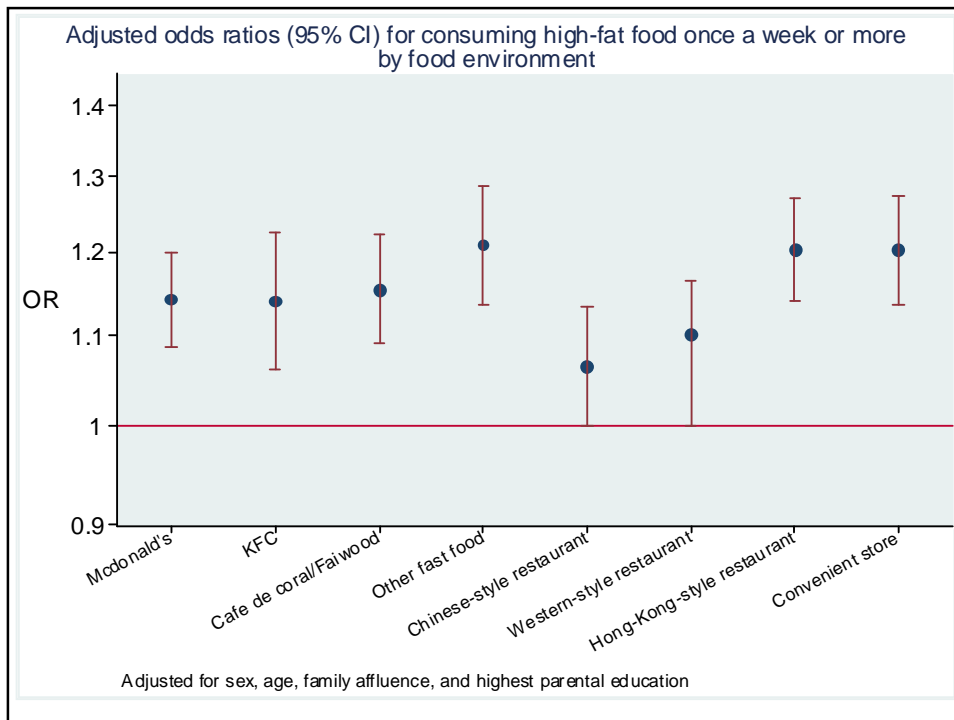
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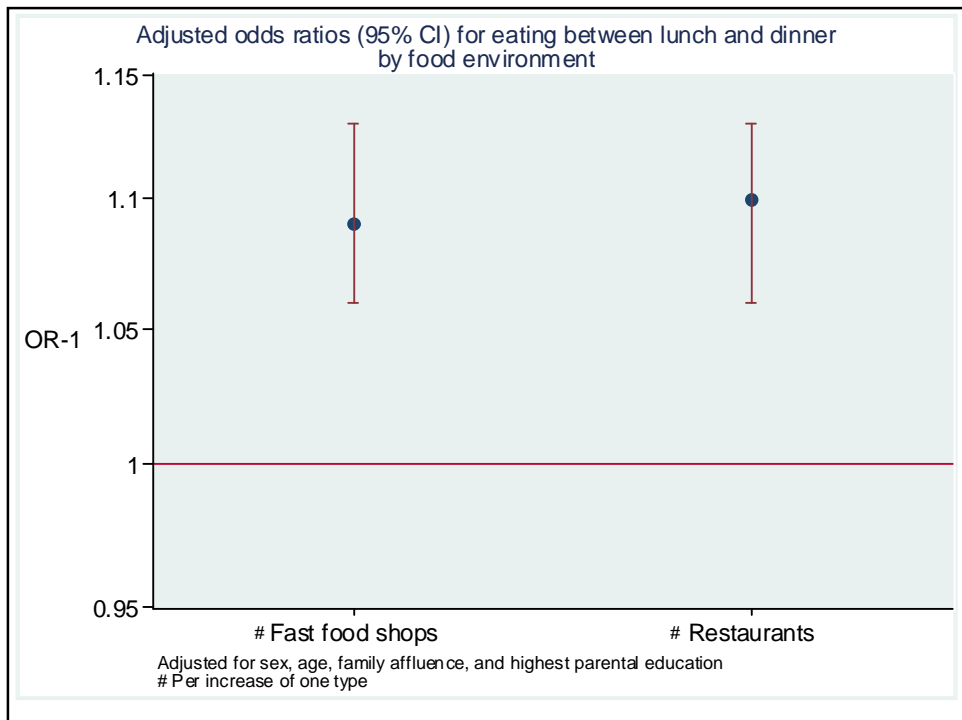
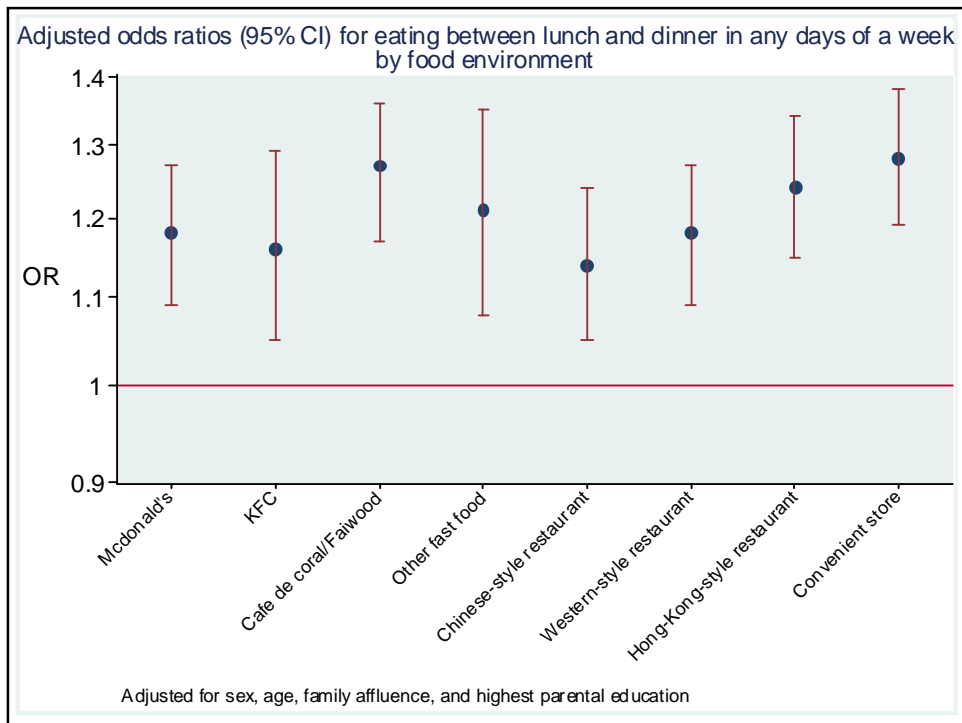
Prevalence of different eating places

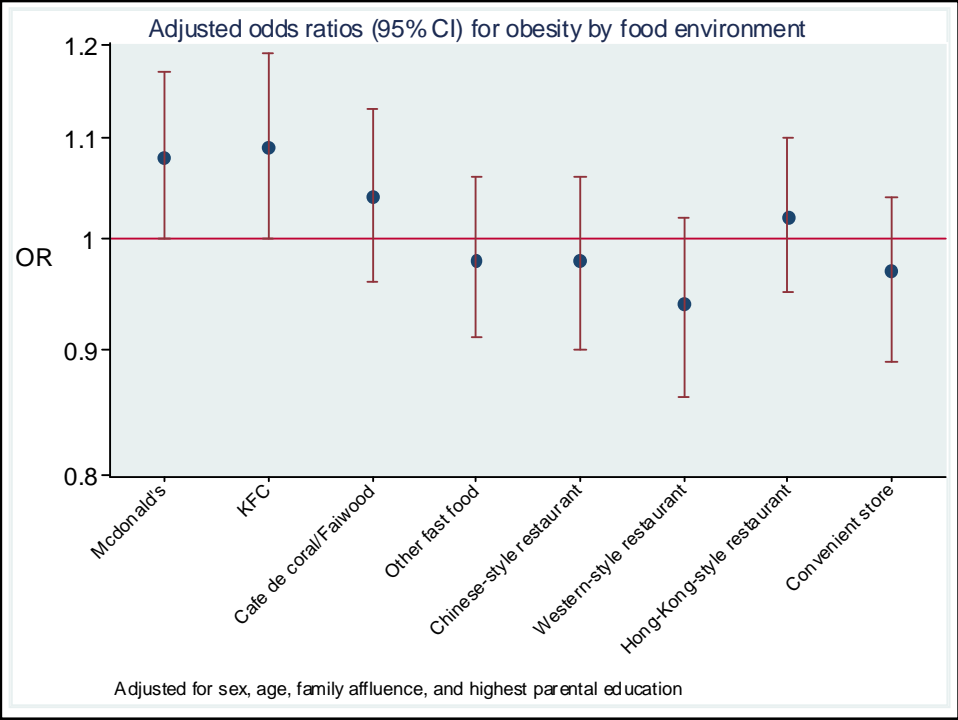


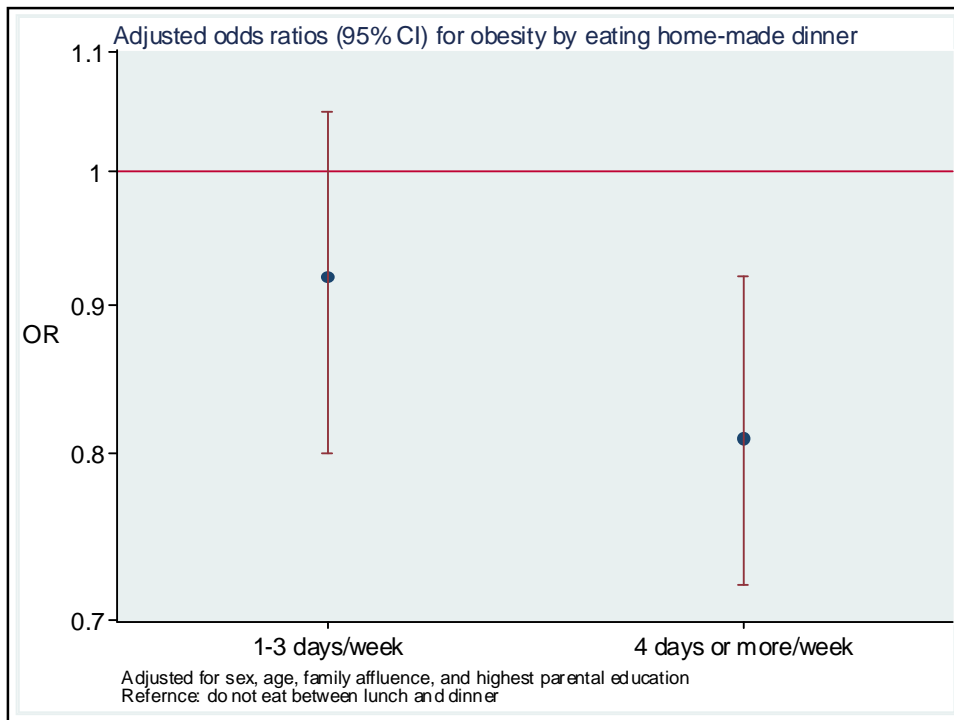
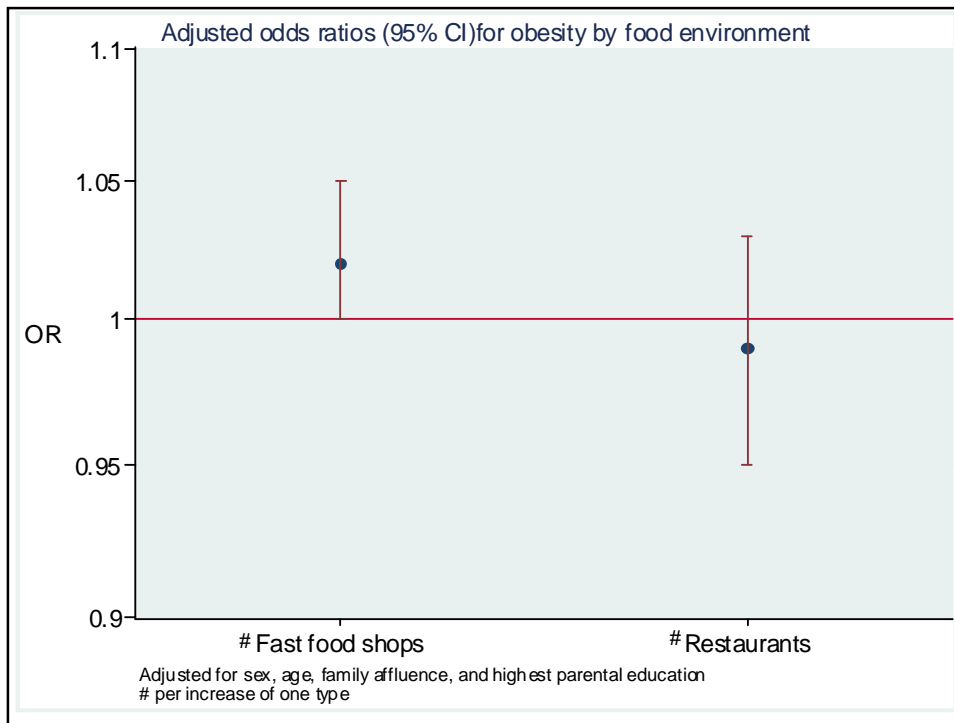
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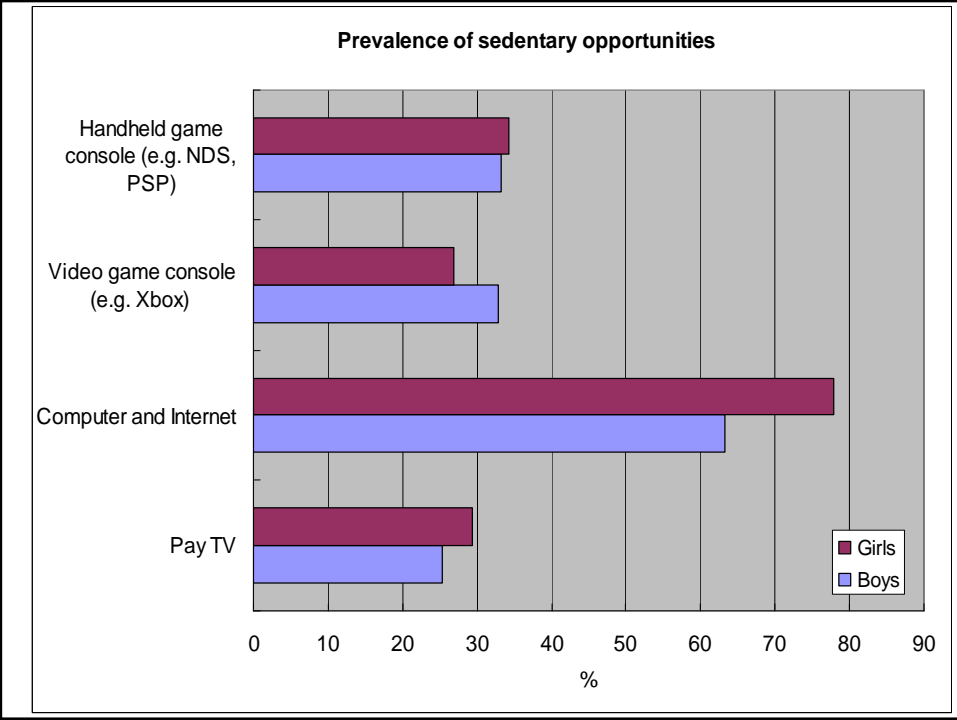
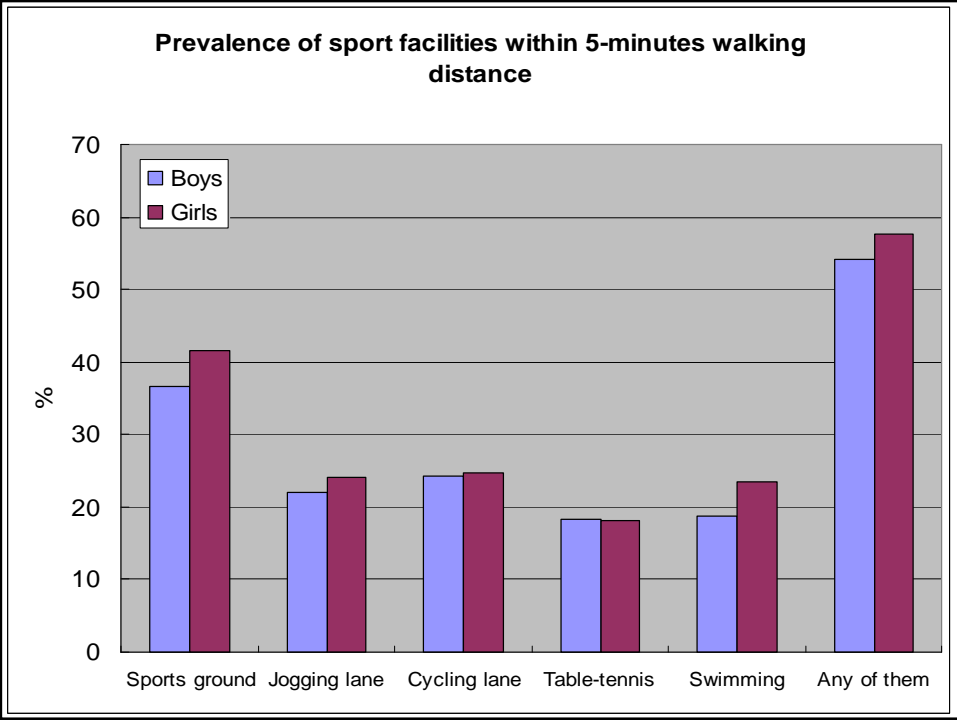


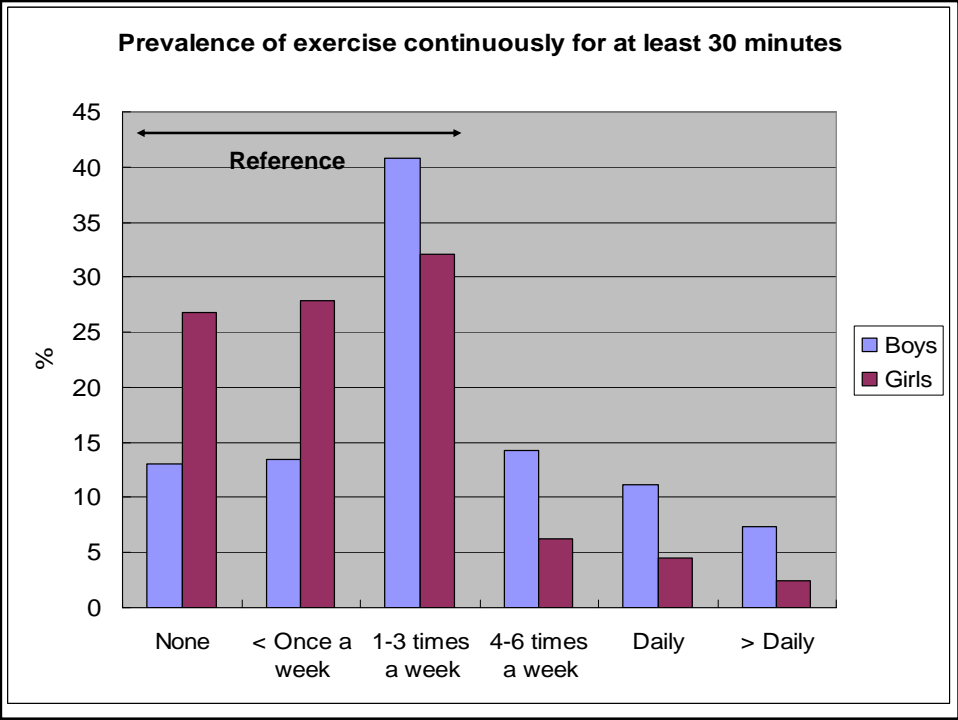
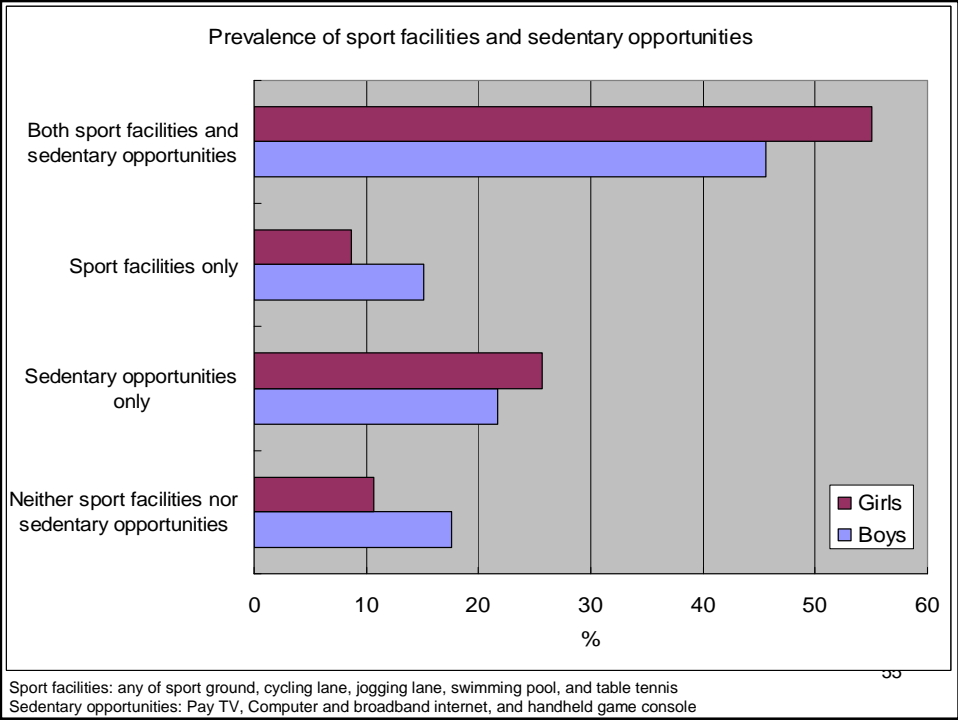


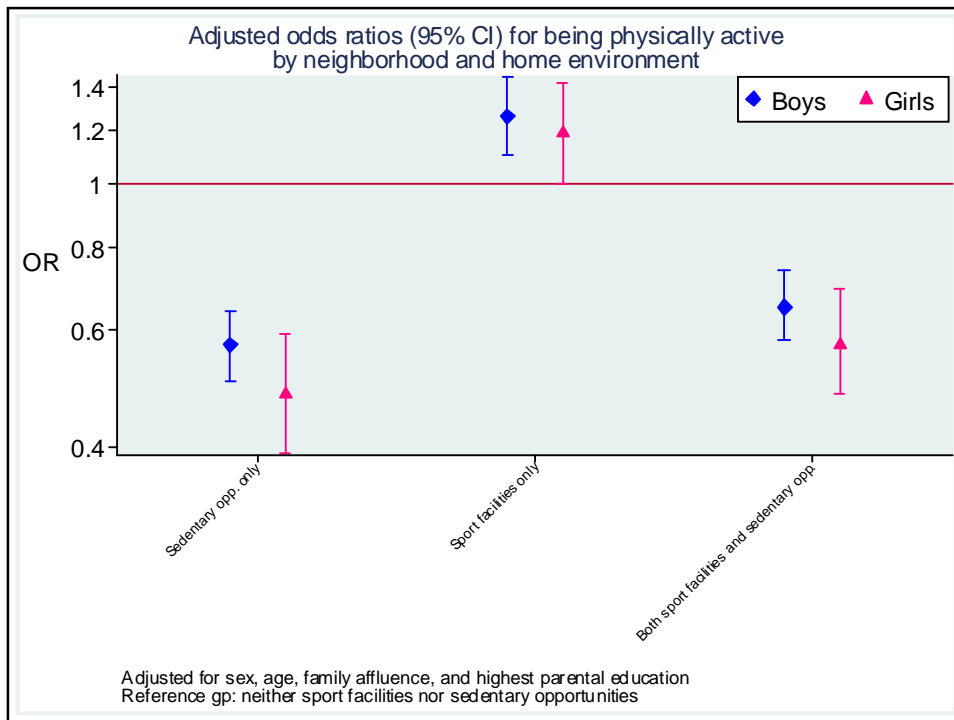
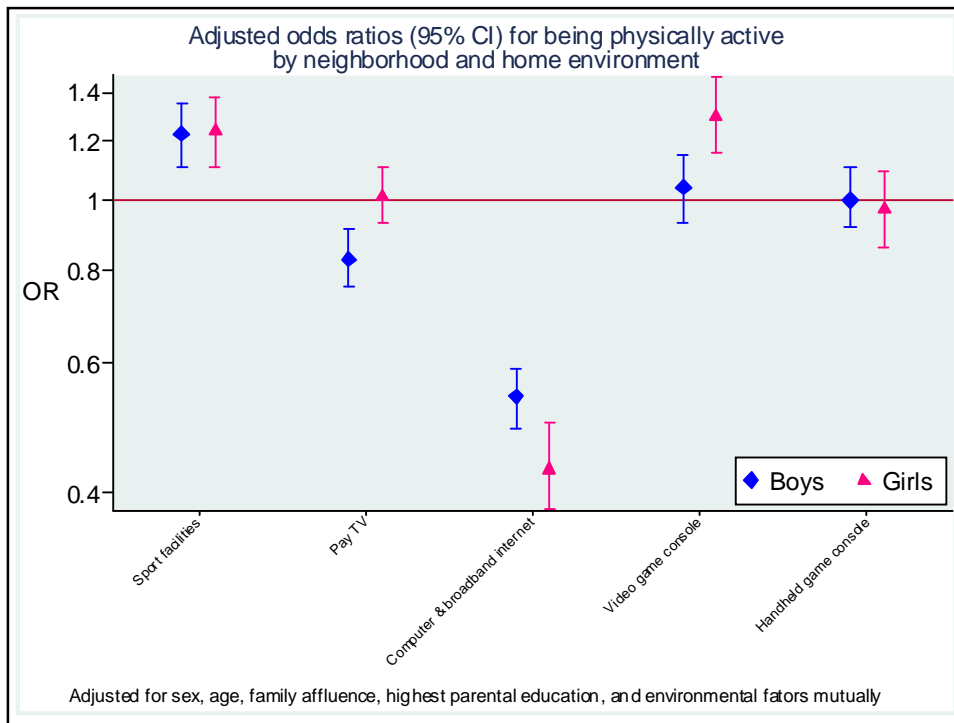


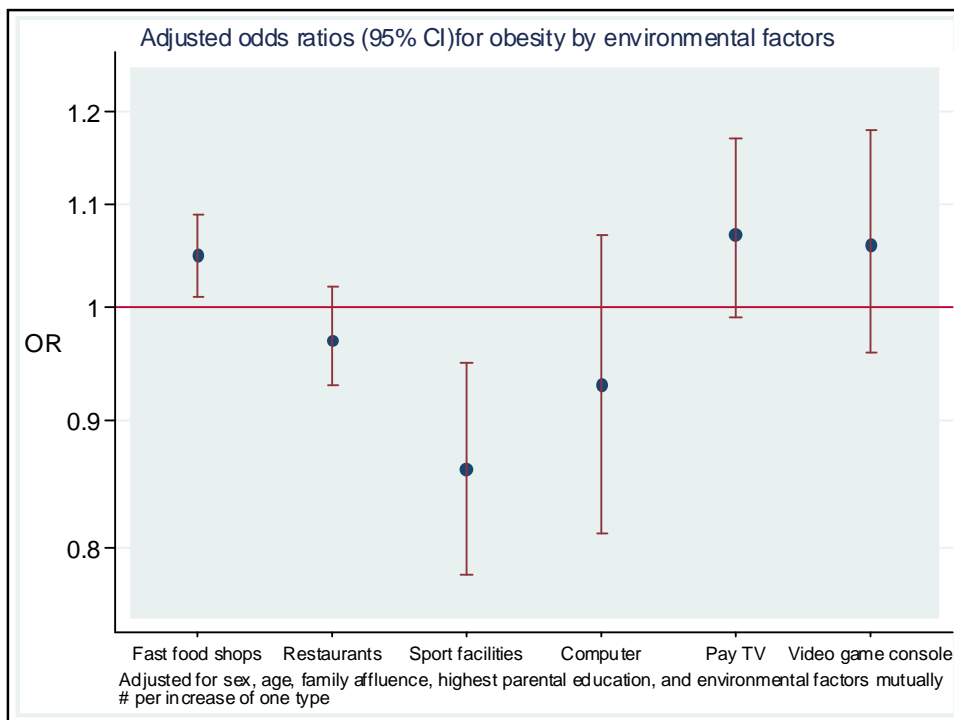
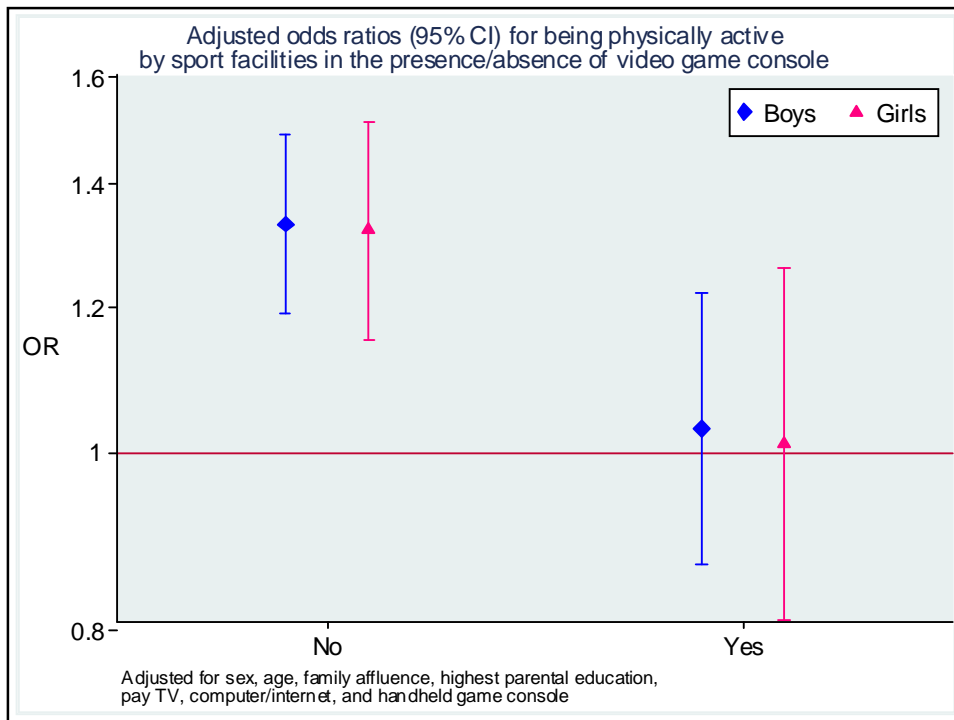












Challenges and opportunities

- **Obesity prevalence - trends and risk factors**

- Diet

- Lunch box, food labeling, TV commercials (HRP), home dinner, catering industry

- Physical activity

- 3+3+4 system more time to play?
- Promotion of walking, pedometer

- Sedentary activity

- TV, Internet, evolving games (Wii)

- Physical environment

- Urban living, mass transportation, petrol price, air pollution
- School environment

- Culture

- Traditional Chinese diet
- Individualism vs collectivism?

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Obesity prevalence - which standard?

- Weight for height

- Taller and fatter kids, update cutoffs?

- IOTF international standard for children

- For international comparisons based on adult BMI of 25, 30
- To establish cutoffs based on BMI 23, 25 as in Asian adults?

- Waist circumference

- Better than general obesity as predictor of CV outcomes

- Body shape figures

- Body shape figures based on local obesity index

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Underweight prevalence

- Large relative increases 2005 vs 1993
- Validity of cutoffs in children and adults?
- Lower BMI cutoff for Asians?
- Under-researched topic
 - Risk factors
 - Consequences
 - Genes

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Weight misperception

- Classification of wt status difficult for children
 - Continuous scale more useful
 - Need for health education
- To study prospective effects on psychosocial health
- Optimistic vs pessimistic misperception
- Regular self-weighing
 - To correct misperception
 - To motivate weight control
 - Potential harm?
 - RCT

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Fostering collaboration with school

- **Invitation letter**
 - Advanced invitation
 - Research objectives that make sense and relevant to schools
 - List out requirement clearly
 - When, where, how, who
 - Benefits to school
 - Report, talks, equipment, training, \$, (reputation)
 - Benefits to students
 - Health, incentive (\$/prize)
 - Enquiry person
 - Reply form

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Fostering collaboration with school

- **Fieldwork**
 - Establish rapport with teacher coordinator
 - Complete survey in one class session
 - Minimise teacher workload
 - Recognise teacher contribution
 - Allow flexible timing
 - Explore online survey

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Fostering collaboration with school

- **Post fieldwork**

- Letter of appreciation
- Individual school report with comparison of overall findings
- School talk on findings or research topic
- Maintain contact with school and students
 - Website
 - Newsletter

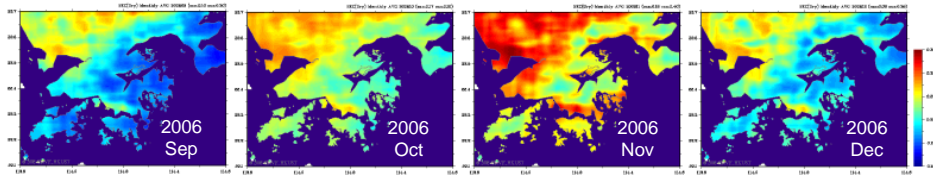
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Future plans

- 2-year follow-up in 2008-9
- Development of website for project
- Analysis of cross-sectional and prospective data
- Potential grant applications
- Studies on school environment and body shape figures
- Studies that build on project
 - Air pollution and health

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Air pollution level at individual locations in Hong Kong can be estimated now



- PM_{10} can be estimated based on surface extinction coefficients with control of cloudiness and humidity (mapped at 1 km^2 resolution) (Li et al 2005)
- Satellite information has been validated ($R=0.91$) with EPD's monitoring stations.
- Individual addresses could be geo-coded (into XY coordinates) to obtain the exposures to PM_{10} at individual locations.

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Pilot study of satellite-detected PM_{10} and the associated health outcomes

Subjects and dataset : Adolescents (age 11 to 20), HKSOS baseline data, $n=10k$

Outcome: Respiratory symptom (cough/sputum) in the past 30 days

Preliminary findings: Adjusted odds ratios of respiratory symptoms and other non-respiratory symptoms associated with $1 \mu\text{g m}^{-3}$ increase in PM_{10} .

	OR	LCL95	UCL95	p
Cough (or sputum)	1.007	1.000	1.013	0.042
low back pain	1.000	0.994	1.006	0.941
neck pain	1.002	0.996	1.009	0.512
upper limbs pain	0.998	0.991	1.006	0.624
lower limb pain	1.000	0.993	1.008	0.907
diarrhea	0.995	0.986	1.003	0.227
vomiting	0.992	0.983	1.002	0.117
toothache	1.012	0.999	1.025	0.069

- Adjusted for sex, age, smoking habit, SHS from parents, seasons, flu intensity, height, weight, school grade, home floor area, housing type, exercise, alcohol drinking.

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Acknowledgements

HKSOS team

Postgraduate students (Tracy Lo, KK Mak, Anita
Lai, Bonny Wong)

Participating schools and students

HKU University Research Committee, Strategic
Research Theme on Public Health for funding

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