



香港中文大學醫學院

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The Chinese University of Hong Kong



**HKU
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**School of Clinical Medicine
Department of Paediatrics
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香港大學兒童及青少年科學系

Hong Kong Growth Study 2020

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Background, Key Findings & Recommendations

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1. Background

HONG KONG GROWTH STUDY

Aim

To recommend and design a set of updated growth charts on weight, height, BMI and head circumference for contemporary Hong Kong children

A joint project conducted by

- Department of Paediatrics of the Chinese University of Hong Kong
- Department of Health of HKSAR Government;
- Department of Paediatrics and Adolescent Medicine of the University of Hong Kong

Supported by HMRF FHB HKSAR 2018

香港生長研究 2020
HONG KONG GROWTH STUDY 2020

一項大規模的全港研究
為香港兒童建造新的生長圖表
A large-scale territory-wide study
for constructing a set of new growth charts for Hong Kong children

關心兒童生長
Care about our children's growth

確保未來健康
together we ensure their future health

研究合辦單位
A Joint Project of

香港中文大學 兒科學系
Department of Paediatrics
The Chinese University of Hong Kong

香港大學 兒童及青少年科學系
Department of Paediatrics and Adolescent Medicine
The University of Hong Kong

香港特別行政區政府 衛生署
Department of Health, HKSAR Government

Study team

Prof Tony NELSON, Department of Paediatrics, CUHK
(Principal Investigator)

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Dr Lai Ling Connie HUI, Department of Food Science and Nutrition, PolyU



Expert advisory group

- Charlotte WRIGHT (University of Glasgow, Chair)
- Tim COLE (University College London, United Kingdom)
- David CHAO (Hong Kong College of Family Physician)
- Bill CHAN (Hospital Authority)
- Jacqueline CHOI (Hong Kong College of Community Medicine)
- Sophie LEUNG (Hong Kong College of Paediatricians)

Phase 1:
Review, analysis and
interpretation of existing
growth data

Phase 2:
Conduct a growth survey

Phase 3 :
Construct, design &
promulgate new growth
charts

Phase 1 -

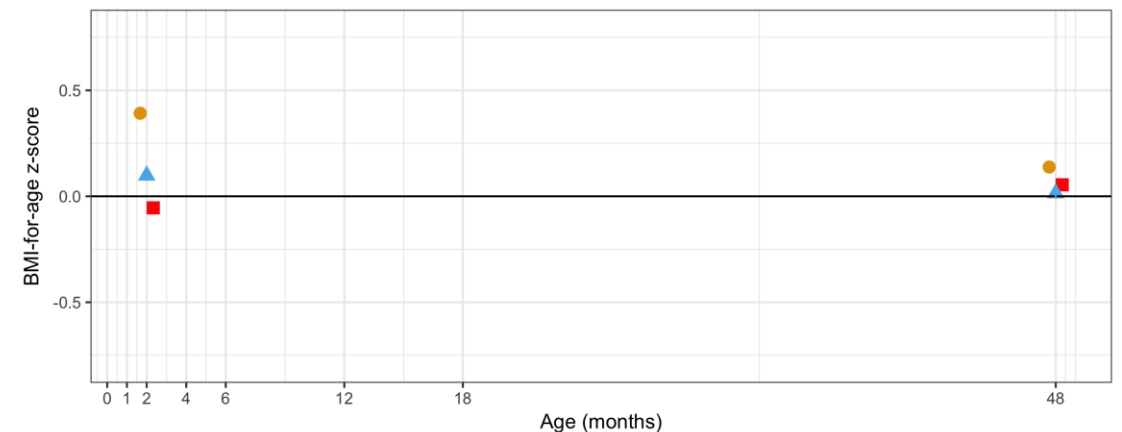
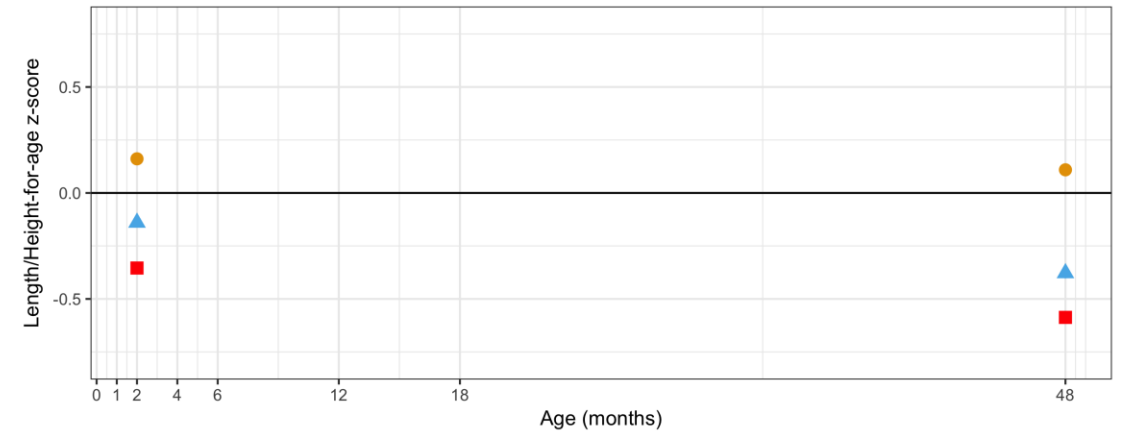
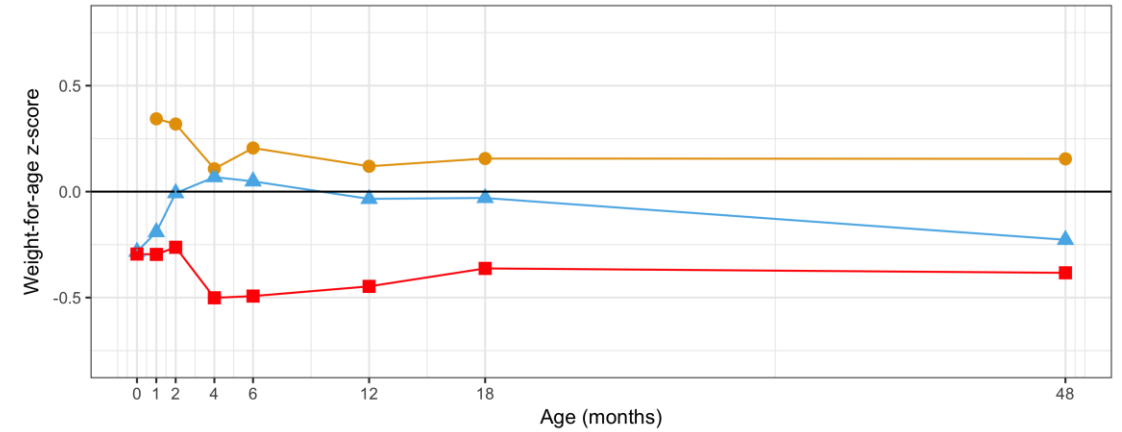
Confirmed secular trend of growth &
need for new growth charts

Secular trend 0-5 years

Limited existing data suggested there is a small secular increase in weight, length/height, and head circumference compared to the Hong Kong 1993 growth reference.

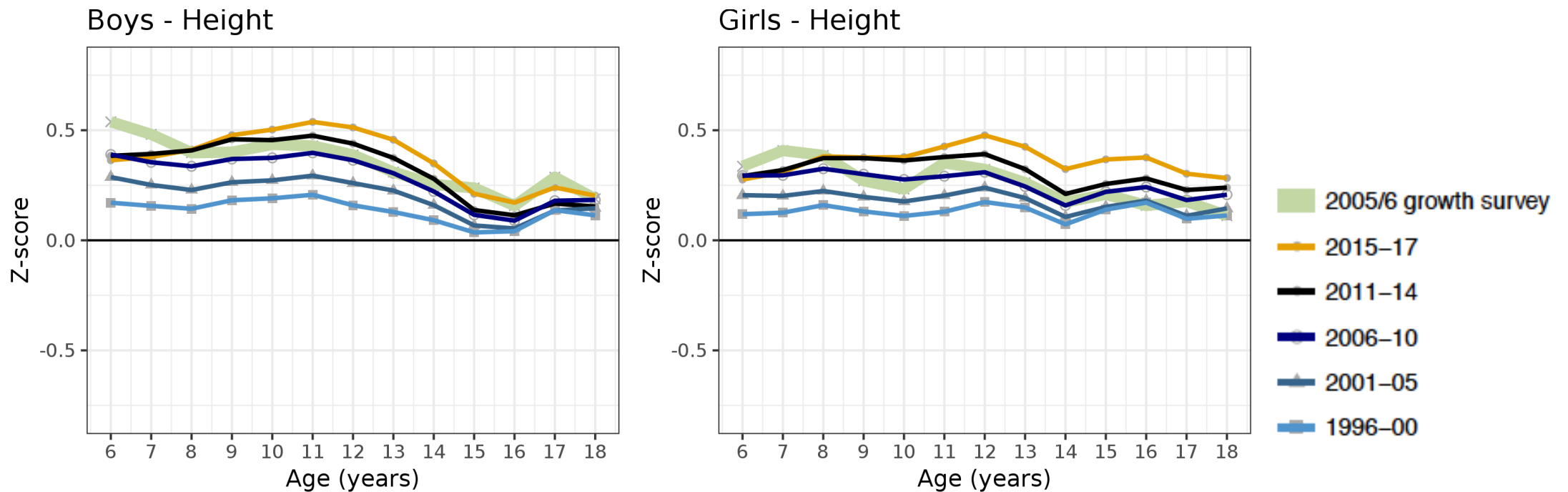
The proportion of children with length/height at 2 and 48 months below 2SD ranged from 0.9% to 1.5% on Hong Kong 1993 reference.

Data source
MCHC – 2011 to 2016



Secular trend in 6-18 years

A clear secular trend in height from 1990s to 2010s in Hong Kong



Data source
SHS – 1996/7 to 2017/18

Phase 2

Hong Kong Growth Survey Methodology

Sampling frame and sources

- Cross-sectional data on weight, length/height and head circumference
- May 2020 to Oct 2022
- Subject (0-20y) sources
 - 1 private birthing hospital, 1 public birthing hospital
 - 6 MCHC, 5 Nursery, 31 Kindergartens
 - 19 Primary schools, 14 Secondary schools, 1 Pri + Sec school
 - 5 Vocational schools, 3 Universities
 - 1 NGO



*centiles truncated at 18.0y to avoid the right-edge effect

Anthropometry methods

- **Using identical measurement equipment**

- Body weight:
 - TANITA BD-585 / TANITA BD-815U (Tare weight: SECA707 / SECA 769) (0-24m);
 - SECA 876 (>2 - <6y); TANITA MC-780 (6-20y)
- Body length: SECA 416 Infantometer
- Height: SECA 217 Stadiometer
- Head circumference: SECA 212 ($\leq 59.0\text{cm}$) / HOLTAIN 1.5m measuring tape

- **Following standard operational procedures**

- Always round down
- Multiple measurements for length/height and head circumference
- Maximum allowable difference of independent measurers
 - Length/height – 7mm
 - Head circumference – 5mm

- **Staff training**



Data for HK2020 growth chart construction

- **Inclusion criteria**

- Chinese
- Term births (37+ gestational weeks) for 0-2y
- Measurements within +5SD & -5SD

- **Birth weight**

- Babies in the private hospital are born earlier and lighter & we had over-sampled them
- Weighting was assigned to birthweight, length and head circumference to reflect the contemporary distribution of gestational age of newborns in Hong Kong in 2014 reported by the territory-wide obstetrics and gynaecology audit report 2019.

- **Multiple measurements**

- **Average was used** (length/height, head circumference)

- **Length for children under 2y**

- 0.7 cm was **subtracted from** length for children under 2y to obtain theoretical height so that the length/height from birth to 20y can be modelled together
- 0.7cm was **later added to** the resulting length-for-age charts

Phase 3

Focus Group discussions & Growth Chart
Construction

Chart review & focus groups

- Charts reviewed from Hong Kong, Mainland China, Taiwan region, Singapore, Japan, Korea, Saudi Arabia, Norway, Germany, the United Kingdom, Ireland, New Zealand, Canada and United States
- Main design features and components of training and education materials were summarised to guide 11 focus group discussions amongst 89 stakeholders and experts

Desirable features of new growth charts included

1. 0-2 years & 2-20 years
2. 9 centiles with thinner solid lines
3. Black and white readability for printed charts
4. Automated plotting on electronic charts
5. Addition of mid-parental height comparator
6. Retain the current puberty scale

2. Recommendations

Recommendations

1. The WHO2006 Child Growth Standards (WHO2006) are suitable for Hong Kong children 0-5 years and presumably for non-ethnic-Chinese children from 0-5 years. Healthcare professionals need to be aware of the lower weight of Hong Kong infants below 2 months and shorter children aged 3-5 years compared to WHO2006 to ensure correct interpretations when using these charts.
2. The HK2020 Growth References (HK2020) are suitable for Hong Kong children 0-18 years. Healthcare professionals need to be aware that age 0 represents the birth parameters of infants born at 38-39 gestational weeks instead of 40 to ensure correct interpretations when using these charts.

Recommendations

3. Including both WHO2006 and HK2020 in electronic growth monitoring systems would allow the frontline clinician to use the most suitable charts for each child.
4. Health care providers / organisations can decide whether or not to prioritize a particular set of growth charts (WHO-HK2020, HK2020 or WHO2006) for growth monitoring of Hong Kong Children.
5. Health professionals (and parents) must be educated on how to interpret children's growth using the various newly recommended growth charts.

Recommendations

6. In the new sets of HK2020 Growth References, BMI-for-age instead of weight-for-height is used to assess overweight and obesity.
 - Proposed cut offs can be used for individual screening in clinical practice and population surveillance.
 - While BMI is an easy-to-use tool for screening purpose, it is important to acknowledge that BMI cannot differentiate fat mass from lean mass and hence is not a good indicator of body composition.
 - Optimal BMI cutoffs for overweight and obesity in children are age- and sex-specific and require further studies.
 - For assessment of individuals who are above these cut offs of obesity and overweight, health care professionals should conduct a detailed clinical assessment and consider other factors including sex, body build (e.g. lean/fat mass proportions) and abdominal circumference, before making a diagnosis, giving advice or intervention.

Recommendations

7. Further studies are required to determine whether overseas guidelines on growth faltering are applicable in our population.
8. Regular growth and nutrition surveys should be supported with possible incorporation of routine anonymous collection of data by schools as an extension of current measurements undertaken by schools/Education Bureau

Thank you