

Table S1: Descriptive statistics for age and gender cohorts: Boys (A) and Girls (B)

| Boys Weight |       |       |       |       |       |       |       |       |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Age         | 10-11 | 11-12 | 12-13 | 13-14 | 14-15 | 15-16 | 16-17 | 17-18 |
| Q1          | 29.3  | 33.0  | 36.1  | 41.7  | 48.5  | 53.3  | 58.1  | 60.3  |
| Median      | 32.7  | 36.7  | 41.3  | 48.1  | 54.8  | 59.9  | 63.7  | 65.5  |
| Mean        | 33.7  | 38.1  | 42.6  | 49.4  | 55.8  | 60.9  | 64.7  | 67.3  |
| Q3          | 36.5  | 41.4  | 47.6  | 55.6  | 62.4  | 66.9  | 70.4  | 73.3  |
| SD          | 6.32  | 7.54  | 9.07  | 10.70 | 10.69 | 10.94 | 10.23 | 10.46 |
| Skew        | 1.22  | 1.30  | 0.78  | 0.86  | 0.45  | 0.85  | 0.61  | 0.73  |
| Kurtosis    | 2.46  | 2.91  | 0.51  | 1.14  | 0     | 1.63  | 0.74  | 1     |
| N           | 744   | 747   | 861   | 779   | 776   | 766   | 714   | 613   |

| Girls Weight |       |       |       |       |       |       |       |       |
|--------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Age          | 10-11 | 11-12 | 12-13 | 13-14 | 14-15 | 15-16 | 16-17 | 17-18 |
| Q1           | 29    | 33.6  | 39.2  | 43.1  | 47.2  | 48.8  | 49.7  | 50.8  |
| Median       | 33.4  | 38.3  | 45.4  | 49    | 52    | 54.3  | 54.9  | 56    |
| Mean         | 34.7  | 40.1  | 46.5  | 50.4  | 53.6  | 55.5  | 56.5  | 56.9  |
| Q3           | 38.6  | 45.1  | 51.8  | 56.2  | 59.3  | 59.9  | 61.5  | 61.9  |
| SD           | 7.44  | 9.13  | 9.98  | 10.18 | 9.35  | 9.75  | 9.81  | 9.12  |
| Skew         | 1.00  | 0.86  | 0.72  | 0.81  | 0.66  | 0.94  | 1.08  | 0.88  |
| Kurtosis     | 1.63  | 0.55  | 0.77  | 1.14  | 0.55  | 1.22  | 1.58  | 1.59  |
| N            | 759   | 683   | 747   | 780   | 748   | 659   | 684   | 582   |

Descriptive statistics for weight (kg) by age and gender for subjects in the NCHS-R dataset (after exclusions). Interquartile range is given by Q1-Q3. A symmetric distribution will have skew = 0 and a normally peaked distribution will have sample kurtosis = 3 (not to be confused with the  $\tau$  parameter in the BCPE model, as discussed in the statistical methods manual [17] available at <http://www.cpeg-gcep.net>)

Table S2: Mean absolute discrepancy (MAD, kg) vs CDC 2000 curves

| Smoothed Centiles | Boys 5-19y MAD | Girls 5-19y MAD |
|-------------------|----------------|-----------------|
| 3                 | 0.47±0.35      | 0.52±0.34       |
| 25                | 0.58±0.40      | 0.64±0.41       |
| 50                | 0.64±0.41      | 0.78±0.45       |
| 75                | 0.84±0.54      | 0.93±0.41       |
| 97                | 3.48±1.55      | 4.35±3.14       |

Mean absolute discrepancy (MAD, kg ± SD) is based on monthly observations from NCHS-R and CDC 2000 weight-for-age reference curves (5–19y).