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Hip circumference percentile curves for the UK child and youth population

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Hip circumference (HC) has traditionally been combined into a ratio with waist circumference (WHR) as a measure of upper body or abdominal fatness. However, there is now accumulating evidence to suggest that HC is an independent measure of metabolic health in adults^(1–3). Although there is limited research on HC and health in children, HC percentile charts are now appearing in the literature⁽⁴⁾. Here, we report the construction of HC percentile curves for British children.

Data on 9514 children (4164 boys and 5350 girls) aged 2–17 years collected in 1977 and 1987 were analysed. HC was measured to the nearest 0.1 cm at the maximum girth around the buttocks⁽⁵⁾. Decimal age was recorded. Smoothed percentile curves for HC were constructed separately for boys and girls using the Generalized Additive Models for Location, Scale and Shape⁽⁶⁾.

Table 1 shows the HC values (cm) at each percentile and age for boys and girls. An age-related increase in HC followed a similar pattern between boys and girls with neither gender showing evidence of reaching a plateau at the upper end of the age range. There was a suggestion of a pubertal effect on HC with girls tending to show a steeper increase at around ages 11–13 years and boys showing a similar but less exaggerated increase a little later at ages 14–16 years.

| Age (years) | Boys | | | | | | | | | Girls | | | | | | | | |
|-------------|-------|------|------|------|------|------|------|-------|--------|-------|------|------|------|------|------|-------|-------|--------|
| | 0.4th | 2nd | 9th | 25th | 50th | 75th | 91st | 98th | 99.6th | 0.4th | 2nd | 9th | 25th | 50th | 75th | 91st | 98th | 99.6th |
| 2 | 42.7 | 44.1 | 45.9 | 47.3 | 49.0 | 50.8 | 52.9 | 56.3 | 60.4 | 42.4 | 44.1 | 46.3 | 48.0 | 50.0 | 52.1 | 54.1 | 57.0 | 59.5 |
| 3 | 45.7 | 47.3 | 49.2 | 50.8 | 52.6 | 54.6 | 56.8 | 60.7 | 65.1 | 45.3 | 47.0 | 49.2 | 51.0 | 53.1 | 55.4 | 57.6 | 60.9 | 63.8 |
| 4 | 47.9 | 49.6 | 51.7 | 53.3 | 55.2 | 57.4 | 59.8 | 63.9 | 68.5 | 47.9 | 49.6 | 51.9 | 53.8 | 56.0 | 58.5 | 60.9 | 64.6 | 67.9 |
| 5 | 49.0 | 50.7 | 52.9 | 54.6 | 56.6 | 58.9 | 61.4 | 65.6 | 70.4 | 50.0 | 51.8 | 54.1 | 56.1 | 58.5 | 61.2 | 63.9 | 68.0 | 72.0 |
| 6 | 49.8 | 51.6 | 53.9 | 55.7 | 57.9 | 60.3 | 62.9 | 67.2 | 72.3 | 51.9 | 53.7 | 56.1 | 58.2 | 60.8 | 63.6 | 66.7 | 71.4 | 76.0 |
| 7 | 51.7 | 53.6 | 56.1 | 58.0 | 60.3 | 62.9 | 65.8 | 70.6 | 76.2 | 53.9 | 55.8 | 58.4 | 60.6 | 63.3 | 66.5 | 69.9 | 75.3 | 80.9 |
| 8 | 53.9 | 56.1 | 58.7 | 60.8 | 63.3 | 66.2 | 69.3 | 74.9 | 81.4 | 56.2 | 58.3 | 61.0 | 63.4 | 66.4 | 69.9 | 73.7 | 79.8 | 86.3 |
| 9 | 55.9 | 58.2 | 61.0 | 63.2 | 65.9 | 69.1 | 72.6 | 78.9 | 86.6 | 58.3 | 60.5 | 63.5 | 66.1 | 69.3 | 73.0 | 77.0 | 83.4 | 90.2 |
| 10 | 57.9 | 60.2 | 63.2 | 65.7 | 68.6 | 72.0 | 75.9 | 82.8 | 91.4 | 60.3 | 62.7 | 65.9 | 68.7 | 72.1 | 76.0 | 80.2 | 86.8 | 93.6 |
| 11 | 59.5 | 62.1 | 65.4 | 68.0 | 71.2 | 74.9 | 79.0 | 86.2 | 95.1 | 62.2 | 64.8 | 68.5 | 71.5 | 75.2 | 79.5 | 83.8 | 90.7 | 97.3 |
| 12 | 61.0 | 63.9 | 67.5 | 70.4 | 73.8 | 77.7 | 82.0 | 89.2 | 97.5 | 64.6 | 67.6 | 71.6 | 75.0 | 79.1 | 83.6 | 88.1 | 95.0 | 101.5 |
| 13 | 62.8 | 66.2 | 70.3 | 73.5 | 77.2 | 81.3 | 85.5 | 92.5 | 99.9 | 68.0 | 71.3 | 75.7 | 79.3 | 83.6 | 88.2 | 92.8 | 99.4 | 105.5 |
| 14 | 65.0 | 68.9 | 73.6 | 77.1 | 81.1 | 85.2 | 89.4 | 95.9 | 102.3 | 72.3 | 75.6 | 80.0 | 83.6 | 87.7 | 92.2 | 96.5 | 102.7 | 108.3 |
| 15 | 66.9 | 71.6 | 76.8 | 80.5 | 84.6 | 88.7 | 92.7 | 98.5 | 104.0 | 76.2 | 79.3 | 83.4 | 86.7 | 90.5 | 94.6 | 98.6 | 104.3 | 109.4 |
| 16 | 68.6 | 73.9 | 79.5 | 83.4 | 87.4 | 91.4 | 95.1 | 100.3 | 105.1 | 78.8 | 81.7 | 85.5 | 88.6 | 92.2 | 96.1 | 99.9 | 105.4 | 110.4 |
| 17 | 70.2 | 76.1 | 82.0 | 86.0 | 89.9 | 93.7 | 97.1 | 101.8 | 106.0 | 81.1 | 83.8 | 87.4 | 90.4 | 93.9 | 97.7 | 101.5 | 107.2 | 112.4 |

These curves represent the first of their kind in British children. They can be added to the suite of existing references for childhood growth and body fatness. They will now allow the calculation of individual sds for HC in current and future epidemiological studies that incorporate children’s hip measurement into body composition and metabolic health studies.

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