Supplementary Material

# Supplementary Figures and Tables for manuscript:

Paldánius PM et al., Serum and urinary osteocalcin in healthy 7-19- year-old Finnish children and adolescents

Supplementary Figure 1: Age and Height SD distribution per allocated robust age categories, pooled for both girls and boys. Chronological age ranges at inclusion for Girls (G) and Boys (B) per age category (indicated with mean, minimum and maximum age): 8 years (G: 7.4-9.0; B: 7.7- 8.9), 11 years (G: 10.5-12.4; B: 10.4-12.4), 14 years (G:12.5-15.4; B: 12.5-15.4), 17 years (G: 15.5- 18.4; B: 15.4- 18.1) and 19 years (G: 18.5-18.8; B: none)





Supplementary Table 1: Baseline demographics per age category for GIRLS

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter by age category (range) | Mean | SD | Std. Error | 95% Confidence Interval for Mean | Minimum | Maximum |
| **Lower Bound** | **Upper Bound** |
| Age (years) | **8** (7.4-9.0) | 8.2 | 0.65 | 0.24 | 7.60 | 8.80 | 7.4 | 9.0 |
| **11** (10.5-12.4) | 11.6 | 0.49 | 0.10 | 11.37 | 11.76 | 10.5 | 12.4 |
| **14** (12.5-15.4) | 13.7 | 0.88 | 0.14 | 13.45 | 14.02 | 12.5 | 15.4 |
| **17** (15.5- 18.4) | 16.7 | 0.80 | 0.15 | 16.43 | 17.06 | 15.5 | 18.4 |
| **19** (18.5-18.8) | 18.6 | 0.13 | 0.06 | 18.47 | 18.81 | 18.5 | 18.8 |
| Height (cm) | **8** (7.4-9.0) | 129.6 | 5.69 | 2.15 | 124.57 | 134.83 | 122.5 | 137.0 |
| **11** (10.5-12.4) | 148.9 | 7.42 | 1.43 | 145.94 | 151.80 | 135.5 | 165.0 |
| **14** (12.5-15.4) | 161.8 | 7.39 | 1.17 | 159.40 | 164.12 | 145.0 | 176.5 |
| **17** (15.5- 18.4) | 164.8 | 5.89 | 1.13 | 162.49 | 167.14 | 151.0 | 178.2 |
| **19** (18.5-18.8) | 165.2 | 4.54 | 2.03 | 159.52 | 170.80 | 160.2 | 172.0 |
| Height SD | **8** (7.4-9.0) | 0.5 | 0.80 | 0.30 | -0.24 | 1.24 | -0.5 | 1.5 |
| **11** (10.5-12.4) | 0.4 | 1.01 | 0.19 | 0.01 | 0.81 | -1.3 | 2.8 |
| **14** (12.5-15.4) | 0.5 | 1.00 | 0.16 | 0.17 | 0.81 | -2.3 | 2.3 |
| **17** (15.5- 18.4) | 0.0 | 0.78 | 0.15 | -0.30 | 0.31 | -2.0 | 1.6 |
| **19** (18.5-18.8) | 0.0 | 0.81 | 0.36 | -1.03 | 0.99 | -0.9 | 1.2 |
| Weight | **8** (7.4-9.0) | 28.8 | 7.18 | 2.71 | 22.20 | 35.48 | 20.9 | 39.7 |
| **11** (10.5-12.4) | 39.0 | 7.76 | 1.49 | 35.93 | 42.07 | 29.0 | 59.0 |
| **14** (12.5-15.4) | 51.0 | 11.76 | 1.86 | 47.23 | 54.75 | 27.3 | 86.8 |
| **17** (15.5- 18.4) | 55.7 | 8.90 | 1.71 | 52.18 | 59.22 | 36.3 | 84.6 |
| **19** (18.5-18.8) | 58.5 | 6.69 | 2.99 | 50.17 | 66.79 | 49.7 | 67.4 |
| BMI | **8** (7.4-9.0) | 17.0 | 3.13 | 1.18 | 14.10 | 19.90 | 13.6 | 22.3 |
| **11** (10.5-12.4) | 17.5 | 2.50 | 0.48 | 16.51 | 18.49 | 14.2 | 24.3 |
| **14** (12.5-15.4) | 19.4 | 3.71 | 0.59 | 18.18 | 20.56 | 13.0 | 28.0 |
| **17** (15.5- 18.4) | 20.4 | 2.60 | 0.50 | 19.41 | 21.46 | 15.9 | 28.5 |
| **19** (18.5-18.8) | 21.4 | 1.79 | 0.80 | 19.18 | 23.62 | 19.4 | 23.4 |
| WB BMD Z score | **8** (7.4-9.0) | 0.8 | 0.50 | 0.19 | 0.33 | 1.25 | 0.0 | 1.4 |
| **11** (10.5-12.4) | 0.2 | 0.47 | 0.09 | 0.06 | 0.43 | -1.0 | 1.3 |
| **14** (12.5-15.4) | 0.1 | 0.66 | 0.10 | -0.08 | 0.33 | -1.0 | 1.3 |
| **17** (15.5- 18.4) | 0.1 | 0.57 | 0.11 | -0.15 | 0.30 | -1.0 | 1.1 |
| **19** (18.5-18.8) | -0.1 | 0.54 | 0.24 | -0.75 | 0.60 | -1.0 | 0.4 |
| S-25-OH Vit D | **8** (7.4-9.0) | 44.3 | 14.26 | 5.39 | 31.1 | 57.47 | 21.0 | 60.0 |
| **11** (10.5-12.4) | 40.1 | 11.75 | 2.26 | 35.50 | 44.79 | 19.0 | 61.0 |
| **14** (12.5-15.4) | 37.7 | 9.86 | 1.56 | 34.55 | 40.85 | 18.0 | 63.0 |
| **17** (15.5- 18.4) | 46.0 | 16.43 | 3.22 | 39.32 | 52.60 | 18.0 | 82.0 |
| **19** (18.5-18.8) | 42.8 | 12.97 | 5.80 | 26.70 | 58.90 | 29.0 | 61.0 |
| PTH | **8** (7.4-9.0) | 45.2 | 25.07 | 10.24 | 18.86 | 71.48 | 19.0 | 79.0 |
| **11** (10.5-12.4) | 43.7 | 13.90 | 2.67 | 38.17 | 49.16 | 20.0 | 78.0 |
| **14** (12.5-15.4) | 54.4 | 27.08 | 4.45 | 45.38 | 63.44 | 17.0 | 135.0 |
| **17** (15.5- 18.4) | 37.5 | 15.37 | 3.01 | 31.33 | 43.74 | 14.0 | 87.0 |
| **19** (18.5-18.8) | 41.8 | 11.08 | 4.95 | 28.05 | 55.55 | 27.0 | 54.0 |
| WB total fat% | **8** (7.4-9.0) | 29.8 | 9.13 | 3.45 | 21.40 | 38.28 | 20.5 | 44.4 |
| **11** (10.5-12.4) | 29.0 | 6.48 | 1.25 | 26.44 | 31.57 | 13.6 | 40.5 |
| **14** (12.5-15.4) | 28.4 | 8.15 | 1.29 | 25.78 | 31.00 | 17.1 | 49.8 |
| **17** (15.5- 18.4) | 29.8 | 5.33 | 1.26 | 27.12 | 32.42 | 19.4 | 37.7 |
| **19\*** (18.5-18.8) | -  | - | - | - | - | - | - |

*\*Whole Body (WB) fat% missing from all GIRLS in age category 19*

Supplementary Table 2: Baseline demographics per age category for BOYS

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  Parameter by age category (range) | Mean | SD | Std. Error | 95% Confidence Interval for Mean | Minimum | Maximum |
| **Lower Bound** | **Upper Bound** |
| Age | **8** (7.7- 8.9) | 8.6 | 0.45 | 0.13 | 8.28 | 8.85 | 7.7 | 8.9 |
| **11** (10.4-12.4) | 11.4 | 0.60 | 0.13 | 11.10 | 11.63 | 10.4 | 12.4 |
| **14** (12.5-15.4) | 13.6 | 0.94 | 0.22 | 13.11 | 14.05 | 12.5 | 15.4 |
| **17** (15.4- 18.1) | 16.5 | 0.74 | 0.20 | 16.09 | 16.98 | 15.6 | 18.1 |
| Height | **8** (7.7- 8.9) | 131.7 | 6.29 | 1.81 | 127.71 | 135.70 | 118.5 | 141.5 |
| **11** (10.4-12.4) | 147.5 | 6.90 | 1.44 | 144.52 | 150.48 | 129.5 | 161.5 |
| **14** (12.5-15.4) | 162.9 | 11.70 | 2.76 | 157.08 | 168.72 | 147.0 | 183.5 |
| **17** (15.4- 18.1) | 178.2 | 10.67 | 2.96 | 171.76 | 184.65 | 160.0 | 199.9 |
| Height SD | **8** (7.7- 8.9) | 0.4 | 1.13 | 0.33 | -0.34 | 1.09 | -1.3 | 2.3 |
| **11** (10.4-12.4) | 0.5 | 1.02 | 0.21 | 0.08 | 0.96 | -1.8 | 2.9 |
| **14** (12.5-15.4) | 0.6 | 0.85 | 0.20 | 0.20 | 1.04 | -0.8 | 2.1 |
| **17** (15.4- 18.1) | 0.4 | 1.43 | 0.40 | -0.45 | 1.27 | -1.6 | 3.2 |
| Weight | **8** (7.7- 8.9) | 30.1 | 4.57 | 1.32 | 27.21 | 33.02 | 20.7 | 37.1 |
| **11** (10.4-12.4) | 40.2 | 7.30 | 1.52 | 37.01 | 43.32 | 26.4 | 54.3 |
| **14** (12.5-15.4) | 55.1 | 16.72 | 3.94 | 46.79 | 63.42 | 36.3 | 96.5 |
| **17** (15.4- 18.1) | 70.3 | 15.31 | 4.25 | 61.06 | 79.57 | 53.5 | 113.0 |
| BMI | **8** (7.7- 8.9) | 17.3 | 1.98 | 0.57 | 16.04 | 18.56 | 14.7 | 21.8 |
| **11** (10.4-12.4) | 18.3 | 2.32 | 0.48 | 17.33 | 19.34 | 14.0 | 22.3 |
| **14** (12.5-15.4) | 20.4 | 5.01 | 1.21 | 17.87 | 23.02 | 15.6 | 34.8 |
| **17** (15.4- 18.1) | 22.1 | 3.88 | 1.07 | 19.74 | 24.42 | 17.7 | 32.7 |
| WB BMD Z score | **8** (7.7- 8.9) | 0.7 | 0.60 | 0.17 | 0.29 | 1.06 | 0.0 | 1.6 |
| **11** (10.4-12.4) | 0.3 | 0.66 | 0.14 | 0.05 | 0.62 | -1.0 | 1.8 |
| **14** (12.5-15.4) | 0.1 | 0.55 | 0.13 | -0.16 | 0.37 | -1.0 | 1.4 |
| **17** (15.4- 18.1) | 0.1 | 0.48 | 0.13 | -0.14 | 0.43 | -1.0 | 0.9 |
| S-25-OH Vit D | **8** (7.7- 8.9) | 48.2 | 7.93 | 2.29 | 43.13 | 53.20 | 39.0 | 69.0 |
| **11** (10.4-12.4) | 45.8 | 10.35 | 2.16 | 41.35 | 50.30 | 26.0 | 65.0 |
| **14** (12.5-15.4) | 43.1 | 14.05 | 3.31 | 36.12 | 50.1 | 17.0 | 77.0 |
| **17** (15.4- 18.1) | 42.8 | 12.56 | 3.48 | 35.18 | 50.36 | 26.0 | 69.0 |
| PTH | **8** (7.7- 8.9) | 37.4 | 16.41 | 4.74 | 26.99 | 47.84 | 20.0 | 83.0 |
| **11** (10.4-12.4) | 41.7 | 18.31 | 3.82 | 33.82 | 49.66 | 8.0 | 78.0 |
| **14** (12.5-15.4) | 51.1 | 33.23 | 8.06 | 34.03 | 68.20 | 14.0 | 136.0 |
| **17** (15.4- 18.1) | 35.5 | 12.75 | 3.53 | 27.76 | 43.16 | 14.0 | 51.0 |
| Whole body total fat% | **8** (7.7- 8.9) | 25.2 | 5.75 | 1.66 | 21.57 | 28.88 | 17.8 | 37.0 |
| **11** (10.4-12.4) | 26.1 | 6.20 | 1.29 | 23.45 | 28.81 | 15.2 | 39.9 |
| **14** (12.5-15.4) | 24.2 | 9.46 | 2.23 | 19.54 | 28.95 | 9.5 | 43.5 |
| **17** (15.4- 18.1) | 18.7 | 10.36 | 3.12 | 11.71 | 25.63 | 9.7 | 43.7 |

Supplementary Table 3: Dependent variables and regression model coefficients

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Total serum OC** | **cOC** | **Urinary mid-OC** |
| ***Betastd*** | ***95% CI*** | ***p value*** | ***Betastd*** | ***95% CI*** | ***p value*** | ***Betastd*** | ***±-95% CI*** | ***p value*** |
| constant | - | -162.5, 36.1 | 0.210 | **-** | -183.9, 23.6 | 0.129 | - | -49.2, 63.2 | 0.807 |
| ***Age*** | **-1.007** | -7.464, -2.739 | **<0.001** | -**1.083** | -8.448, -3.509 | **<0.001** | **-0.631** | -3.280, -0.610 | **0.005** |
| ***Height*** | **1,354** | 0.407, 1.953 | **0.003** | **1.454** | 0.573, 2.188 | **0.001** | 0.516 | -0.160, 0.703 | 0.216 |
| ***Weight*** | -1.043 | -1.841, 0.033 | 0.059 | **-1.105** | -2.023, -0.065 | **0.037** | -0.197 | -0.633, 0.425 | 0.697 |
| Sex | -0.035 | -5.676, 3.943 | 0.722 | -0.032 | -5.902, 4.149 | 0.731 | 0.136 | -0.606, 4.793 | 0.127 |
| Height SD  | -0.175 | -5.973, 1.640 | 0.262 | -0.236 | -7.166, 0.789 | 0.115 | -0.161 | -3.403, 0.898 | 0.251 |
| Weight % | 0.116 | -0.337, 0.502 | 0.699 | 0.033 | -0.413, 0.464 | 0.908 | 0.042 | -0.215, 0.252 | 0.874 |
| BMI | 0.449 | -1.810, 5.042 | 0.353 | 0.593 | -1.257, 5.903 | 0.202 | -0.168 | -2.326, 1.575 | 0.704 |
| ***Puberty*** | 0.002 | -3.575, 3.641 | 0.986 | -0.097 | -5.273, 2.267 | 0.432 | **-0.272** | -4.525, -0.233 | **0.030** |
| ***PTH*** | 0.144 | -0.002, 0.159 | 0.054 | **0.163** |  0.013, 0.181 | **0.023** | 0.085 | -0.017, 0.075 | 0.216 |
| 25-OH Vit D | -0.135 | -0.280, 0.014 | 0.076 | -0.099 | -0.260, 0.047 | 0.174 | 0.006 | -0.079, 0.087 | 0.927 |
| WB fat% | -0.208 | -0.724, 0.081 | 0.116 | -0.209 | -0.772, 0.069 | 0.101 | 0.098 | -0.131, 0.319 | 0.409 |
| WB Z score | -0.103 | -6.975, 2.824 | 0.404 | -0.010 | -5.340, 4.899 | 0.932 | 0.112 | -1.392, 4.231 | 0.319 |
| Femur Z score | -0.016 | -3.574, 3.091 | 0.886 | -0.106 | -5.189, 1.777 | 0.334 | -0.131 | -2.089, 1.829 | 0.896 |
| LS Z score | 0.003 | -3.429, 3.515 | 0.981 | 0.029 | -3.195, 4.062 | 0.814 | -0.056 | -2.496, 1.513 | 0.628 |