

# **Associations of infant subcutaneous fat mass with total and abdominal fat mass at school-age. The Generation R Study**

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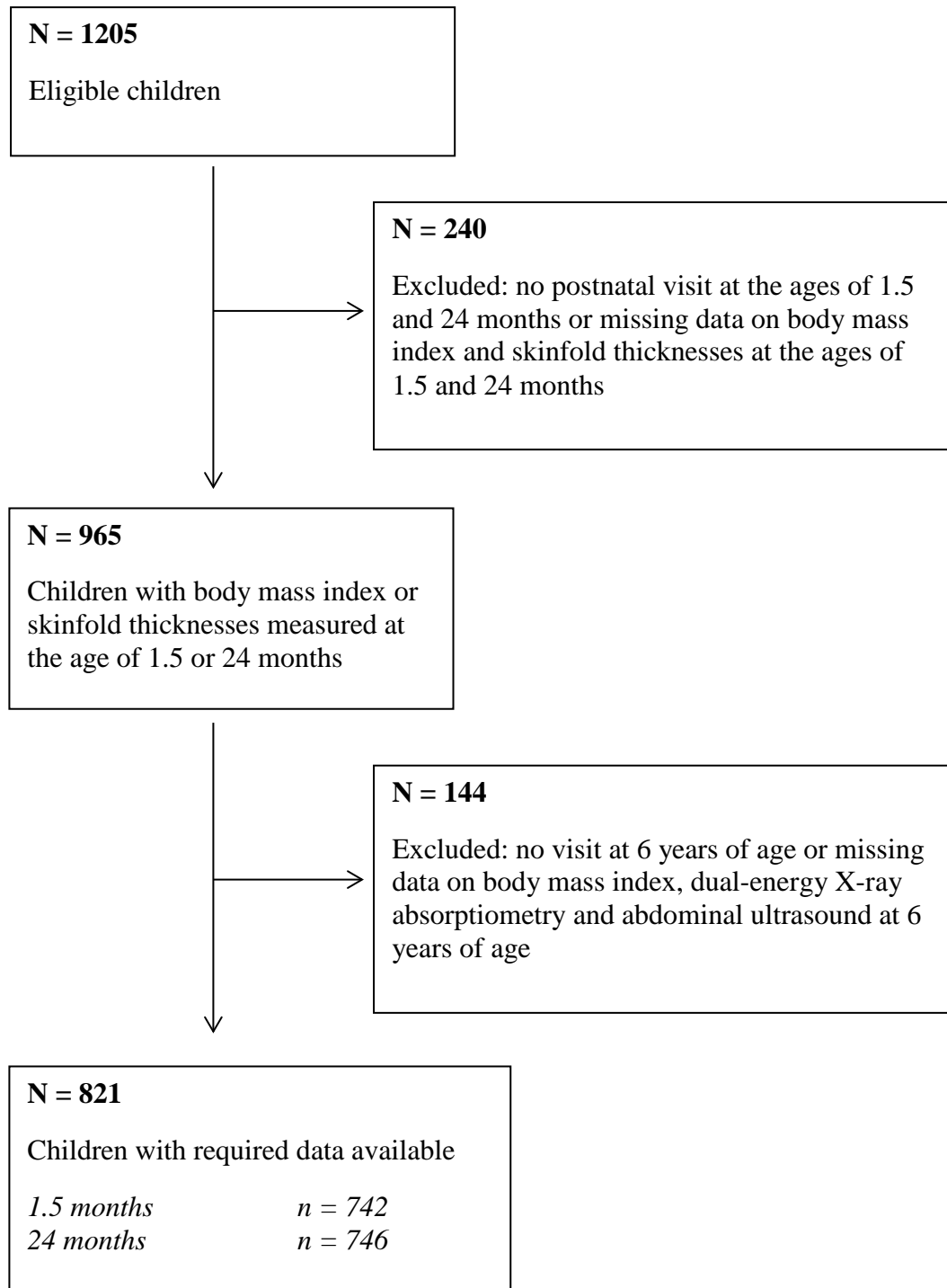
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**Figure S1** Flow chart of participants in study



## **Supplemental Methods:** Log-log regression analyses

Measurements of body fat quantity and distribution require appropriate adjustment for body size or total fat mass, respectively, in order to undertake informative comparisons between children and within children over time. The relationships between total subcutaneous fat mass and length or height, and between central subcutaneous fat mass and total subcutaneous fat mass were assessed using log-log regression analyses. Total and central subcutaneous fat mass measures as well as length or height were all log-transformed. Log-total subcutaneous fat mass was regressed on log-length or height. The regression slope corresponds to the power  $P$  by which length or height should be raised in order to calculate an index uncorrelated with length or height (total subcutaneous fat mass/length or height <sup>$P$</sup> ). A similar calculation was undertaken for log-central and -total subcutaneous fat mass.<sup>1</sup>

## **References**

1. Wells JC, Cole TJ, ALSPAC study team. Adjustment of fat-free mass and fat mass for height in children aged 8 y. *International Journal of Obesity and Related Metabolic Disorders* 2002; 26:947-952.

**Table S1** Characteristics of study participants<sup>a</sup>

|   | <b>Total group<br/>(n = 821)</b> | <b>Boys (n = 412)</b> | <b>Girls (n = 409)</b> | <b>P-value</b> |
|---|----------------------------------|-----------------------|------------------------|----------------|
| <b>Maternal characteristics</b>                               |                                  |                       |                        |                |
| Age (years), mean (SD)  | 32.0 (3.9)                       | 31.8 (3.9)            | 32.1 (3.8)             | 0.346          |
| Highest completed education, n (%)                            |                                  |                       |                        |                |
| Primary school  | 10 (1.2)                         | 3 (0.7)               | 7 (1.7)                | 0.429          |
| Secondary school  | 265 (32.4)                       | 135 (32.9)            | 130 (31.9)             |                |
| Higher education  | 542 (66.3)                       | 272 (66.3)            | 270 (66.3)             |                |
| Parity, n (%) primiparae                                      | 522 (63.6)                       | 262 (63.6)            | 260 (63.6)             | 0.995          |
| Pre-pregnancy body mass index (kg/m <sup>2</sup> ), mean (SD) | 23.6 (4.2)                       | 23.4 (4.2)            | 23.8 (4.2)             | 0.159          |
| Smoking habits during pregnancy, n (%) yes                    | 157 (21.1)                       | 76 (20.7)             | 81 (21.5)              | 0.781          |
| <b>Child's characteristics</b>                                |                                  |                       |                        |                |
| Sex, %  |                                  | 50.2                  | 49.8                   |                |
| Birthweight (g), mean (SD)                                    | 3533 (522)                       | 3588 (503)            | 3477 (536)             | 0.002          |
| Gestational age at birth (weeks), median (95% range)          | 40.3 (36.3-42.4)                 | 40.3 (36.5-42.4)      | 40.3 (36.0-42.4)       | 0.710          |
| Breast feeding duration (months), mean (SD)                   | 4.6 (3.9)                        | 4.5 (3.8)             | 4.8 (4.0)              | 0.394          |
| Introduction of solid foods, n (%)                            |                                  |                       |                        |                |
| <3 months   | 41 (5.4)                         | 20 (5.2)              | 21 (5.6)               | 0.857          |
| 3 to 6 months   | 578 (76.7)                       | 290 (76.1)            | 288 (77.2)             |                |
| >6 months   | 135 (17.9)                       | 71 (18.6)             | 64 (17.2)              |                |
| TV watching time, n (%) ≥ 2 hours/day                         | 65 (8.7)                         | 38 (10.2)             | 27 (7.3)               | 0.153          |

<sup>a</sup>Values are observed data and represent means (SD), medians (95% range) or numbers of subjects (valid %). Of the total group, data were missing on maternal highest completed education (n = 4), pre-pregnancy body mass index (n = 121), smoking habits during pregnancy (n = 78), and child's breast feeding duration (n = 117), timing of introduction of solid foods (n = 67) and TV watching time (n = 77). SD, standard deviation.

**Table S2** Subcutaneous fat mass (mm)<sup>a</sup>

|                   | <b>Total group</b> | <b>Boys</b>    | <b>Girls</b>   | <b>P-value</b> |
|-------------------|--------------------|----------------|----------------|----------------|
| <b>1.5 months</b> | <b>n = 742</b>     | <b>n = 372</b> | <b>n = 370</b> |                |
| Triceps           | 6.6 (2.2)          | 6.6 (2.1)      | 6.6 (2.3)      | 0.746          |
| Biceps            | 5.4 (2.0)          | 5.5 (2.0)      | 5.4 (2.1)      | 0.318          |
| Suprailiacal      | 5.7 (2.0)          | 5.6 (2.0)      | 5.8 (2.1)      | 0.111          |
| Subscapular       | 6.2 (1.8)          | 6.1 (1.8)      | 6.2 (1.8)      | 0.222          |
| <b>24 months</b>  | <b>n = 746</b>     | <b>n = 381</b> | <b>n = 365</b> |                |
| Triceps           | 8.9 (2.9)          | 8.9 (3.0)      | 8.9 (2.8)      | 0.722          |
| Biceps            | 6.8 (2.4)          | 6.6 (2.3)      | 7.0 (2.4)      | 0.059          |
| Suprailiacal      | 5.6 (2.2)          | 5.3 (2.0)      | 6.0 (2.3)      | <0.001         |
| Subscapular       | 6.1 (1.9)          | 5.8 (1.7)      | 6.3 (2.0)      | <0.001         |

<sup>a</sup>Values are means (standard deviation).

**Table S3** Comparison of maternal and child's characteristics between children included and not included in the analyses<sup>a</sup>

|   | <b>Participants<br/>(n = 821)</b> | <b>Non-participants<br/>(n = 144)</b> | <b>P-value</b> |
|---|-----------------------------------|---------------------------------------|----------------|
| <b>Maternal characteristics</b>                               |                                   |                                       |                |
| Age (years), mean (SD)  | 32.0 (3.9)                        | 30.8 (4.9)                            | 0.008          |
| Highest completed education, n (%)                            |                                   |                                       |                |
| Primary school  | 10 (1.2)                          | 8 (5.6)                               | <0.001         |
| Secondary school  | 265 (32.4)                        | 58 (40.8)                             |                |
| Higher education  | 542 (66.3)                        | 76 (53.5)                             |                |
| Parity, n (%) primiparae                                      | 522 (63.6)                        | 74 (51.4)                             | 0.005          |
| Pre-pregnancy body mass index (kg/m <sup>2</sup> ), mean (SD) | 23.6 (4.2)                        | 22.9 (3.4)                            | 0.082          |
| Smoking habits during pregnancy, n (%) yes                    | 157 (21.1)                        | 47 (34.6)                             | 0.001          |
| <b>Child's characteristics</b>                                |                                   |                                       |                |
| Sex, % male   | 50.2                              | 58.3                                  | 0.071          |
| Birthweight (g), mean (SD)                                    | 3533 (522)                        | 3402 (611)                            | 0.017          |
| Gestational age at birth (weeks), median (95% range)          | 40.3 (36.3-42.4)                  | 39.9 (34.9-42.5)                      | 0.001          |
| Breast feeding duration (months), mean (SD)                   | 4.6 (3.9)                         | 3.3 (3.6)                             | 0.001          |
| Introduction of solid foods, n (%)                            |                                   |                                       |                |
| <3 months   | 41 (5.4)                          | 7 (6.8)                               | 0.322          |
| 3 to 6 months   | 578 (76.7)                        | 72 (69.9)                             |                |
| >6 months   | 135 (17.9)                        | 24 (23.3)                             |                |
| TV watching time, n (%) ≥ 2 hours/day                         | 65 (8.7)                          | 4 (7.0)                               | 0.656          |
| <i>1.5 months</i>   |                                   |                                       |                |
| Body mass index (kg/m <sup>2</sup> ), mean (SD)               | 15.1 (1.4)                        | 15.2 (1.3)                            | 0.553          |
| Total subcutaneous fat mass (mm), mean (SD)                   | 23.9 (7.1)                        | 24.9 (9.2)                            | 0.267          |
| Central-to-total subcutaneous fat mass ratio, mean (SD)       | 0.50 (0.05)                       | 0.50 (0.04)                           | 0.304          |
| <i>24 months</i>  |                                   |                                       |                |
| Body mass index (kg/m <sup>2</sup> ), mean (SD)               | 15.9 (1.3)                        | 15.9 (1.2)                            | 0.660          |
| Total subcutaneous fat mass (mm), mean (SD)                   | 27.4 (7.5)                        | 27.0 (5.8)                            | 0.712          |
| Central-to-total subcutaneous fat mass ratio, mean (SD)       | 0.43 (0.06)                       | 0.44 (0.07)                           | 0.161          |

<sup>a</sup>Values are observed data and represent means (SD), medians (95% range) or numbers of subjects (valid %). Differences were tested using Student's t-tests and Mann-Whitney tests for normally and non-normally distributed variables, respectively and  $\chi^2$ -test for dichotomous variables. SD, standard deviation.

**Table S4** Correlation coefficients between body fat mass measures at 1.5 months and 6 years old<sup>a</sup>

| <b>Fat mass measures at 1.5 months</b>       | <b>Fat mass measures at 6 years</b>     |                |                                 |                                  |  |
|--|---|----------------|---------------------------------|----------------------------------|--|
|  | <i>Pearson correlation coefficients</i> |                |                                 |                                  | <i>Spearman correlation coefficients</i> |
|  | Body mass index                         | Fat mass index | Central-to-total fat mass ratio | Android-to-gynoid fat mass ratio | Preperitoneal fat mass area              |
| <b>Total group</b>                           |   |                |                                 |                                  |  |
| Body mass index                              | 0.22**                                  | 0.08*          | -0.01                           | 0.05                             | 0.08*                                    |
| Total subcutaneous fat mass                  | 0.08*                                   | 0.05           | 0.01                            | 0.03                             | 0.05                                     |
| Central-to-total subcutaneous fat mass ratio | 0.06                                    | 0.12**         | 0.11**                          | 0.07                             | 0.07                                     |
| <b>Boys</b>                                  |   |                |                                 |                                  |  |
| Body mass index                              | 0.29**                                  | 0.17**         | 0.06                            | 0.12*                            | 0.18**                                   |
| Total subcutaneous fat mass                  | 0.14**                                  | 0.07           | 0.06                            | 0.06                             | 0.08                                     |
| Central-to-total subcutaneous fat mass ratio | 0.05                                    | 0.09           | 0.07                            | 0.08                             | 0.01                                     |
| <b>Girls</b>                                 |   |                |                                 |                                  |  |
| Body mass index                              | 0.16**                                  | 0.09           | -0.01                           | 0.01                             | 0.08                                     |
| Total subcutaneous fat mass                  | 0.02                                    | 0.03           | -0.05                           | 0.01                             | 0.01                                     |
| Central-to-total subcutaneous fat mass ratio | 0.07                                    | 0.07           | 0.07                            | 0.05                             | 0.04                                     |

<sup>a</sup>Values are correlation coefficients between body fat mass measures standard-deviation scores using Pearson r tests for normally distributed variables and Spearman's rho tests for skewed variables. Body mass index = weight/height<sup>2</sup>. Total subcutaneous fat mass = biceps + triceps + supriliacal + subscapular skinfold thicknesses. Central-to-total subcutaneous fat mass ratio = (supriliacal + subscapular skinfold thicknesses)/total subcutaneous fat mass. Fat mass index = total fat mass/height<sup>3</sup>. Central-to-total fat mass ratio = trunk fat mass/total fat mass. Android-to-gynoid fat mass ratio = android fat mass/gynoid fat mass.

\*P-value<0.05; \*\*P-value<0.01.

**Table S5** Correlation coefficients between body fat mass measures at 24 months and 6 years old<sup>a</sup>

| <b>Fat mass measures at 24 months</b>        | <b>Fat mass measures at 6 years</b>     |                |                                 |                                  |  |
|--|---|----------------|---------------------------------|----------------------------------|--|
|  | <i>Pearson correlation coefficients</i> |                |                                 |                                  | <i>Spearman correlation coefficients</i> |
|  | Body mass index                         | Fat mass index | Central-to-total fat mass ratio | Android-to-gynoid fat mass ratio | Preperitoneal fat mass area              |
| <b>Total group</b>                           |   |                |                                 |                                  |  |
| Body mass index                              | 0.52**                                  | 0.36**         | 0.18**                          | 0.17**                           | 0.11**                                   |
| Total subcutaneous fat mass                  | 0.32**                                  | 0.37**         | 0.28**                          | 0.24**                           | 0.25**                                   |
| Central-to-total subcutaneous fat mass ratio | 0.11**                                  | 0.17**         | 0.14**                          | 0.12**                           | 0.13**                                   |
| <b>Boys</b>                                  |   |                |                                 |                                  |  |
| Body mass index                              | 0.47**                                  | 0.33**         | 0.14**                          | 0.08                             | 0.06                                     |
| Total subcutaneous fat mass                  | 0.26**                                  | 0.32**         | 0.20**                          | 0.11                             | 0.18**                                   |
| Central-to-total subcutaneous fat mass ratio | -0.01                                   | 0.00           | 0.01                            | 0.03                             | 0.13*                                    |
| <b>Girls</b>                                 |   |                |                                 |                                  |  |
| Body mass index                              | 0.57**                                  | 0.48**         | 0.28**                          | 0.25**                           | 0.21**                                   |
| Total subcutaneous fat mass                  | 0.36**                                  | 0.39**         | 0.32**                          | 0.32**                           | 0.30**                                   |
| Central-to-total subcutaneous fat mass ratio | 0.21**                                  | 0.23**         | 0.18**                          | 0.18**                           | 0.08                                     |

<sup>a</sup>Values are correlation coefficients between body fat mass measures standard-deviation scores using Pearson r tests for normally distributed variables and Spearman's rho tests for skewed variables. Body mass index = weight/height<sup>2</sup>. Total subcutaneous fat mass = biceps + triceps + suprailiacal + subscapular skinfold thicknesses. Central-to-total subcutaneous fat mass ratio = (suprailiacal + subscapular skinfold thicknesses)/total subcutaneous fat mass. Fat mass index = total fat mass/height<sup>3</sup>. Central-to-total fat mass ratio = trunk fat mass/total fat mass. Android-to-gynoid fat mass ratio = android fat mass/gynoid fat mass.

\*P-value<0.05; \*\*P-value<0.01.