**Supplementary material**

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| **Supplementary Table 1:** Association between s-25(OH)D in early pregnancy, late pregnancy, umbilical cord, and at age 5 years, and continuous TBLH BMD (g/cm2). |
|  | S-25(OH)D (nmol/l) | Beta Coefficient |  95 % C.I. | *p*-value |
| *Early pregnancy*\* |
| Continuous s-25(OH)D |  |  |  |  |  |
|  Model 1, *n =* 600 |  | −0.000 | (−0.000; 0.000) | 0.12 |
|  Model 2, *n =* 600 |  | −0.000 | (−0.000; 0.000) | 0.76 |
|  Model 3, *n =* 472 |  | −0.000 | (−0.000; 0.000) | 0.59 |
| Quartiles of s-25(OH)D† |  |  |  |  |  |
|  Model 1, *n =* 600 | Q1 [8.47, 49.10] | 0.009 | (0.000; 0.019) | **0.04** |
|  | Q2 [49.11, 64.65] | −0.000 | (−0.009; 0.009) | 0.95 |
|  | Q3 [64.75, 77.41] | 0.000 | (−0.009; 0.009) | 0.97 |
|  Model 2, *n =* 600 | Q1 | 0.004 | (−0.005; 0.012) | 0.39 |
|  | Q2 | −0.002 | (−0.010; 0.006) | 0.67 |
|  | Q3 | −0.001 | (−0.009; 0.0077) | 0.90 |
|  Model 3, *n =* 472 | Q1 | 0.003 | (−0.006; 0.012) | 0.49 |
|  | Q2 | 0.001 | (−0.008; 0.010) | 0.83 |
|  | Q3 | −0.001 | (−0.010; 0.008) | 0.84 |
| Clinical cuts of s-25(OH)D‡ |  |  |  |  |  |
|  Model 1, *n =* 600 | < 25 | −0.005 | (−0.026; 0.015) | 0.62 |
|  | 25–50 | 0.010  | (0.001; 0.018) | **0.04** |
|  | 50–75 | 0.001 | (−0.007; 0.009) | 0.80 |
|  Model 2, *n =* 600 | < 25 | −0.012 | (−0.031; 0.006) | 0.19 |
|  | 25–50 | 0.004 | (−0.004; 0.012) | 0.37 |
|  | 50–75 | −0.001 | (−0.008; 0.006) | 0.74 |
|  Model 3, *n =* 472 | < 25 | −0.014 | (−0.034; 0.005) | 0.15 |
|  | 25–50 | 0.004 | (−0.004; 0.013) | 0.32 |
|  | 50–75 | −0.001 | (−0.008; 0.007) | 0.90 |
| *Late pregnancy*§ |
| Continuous s-25(OH)D |  |  |  |  |  |
|  Model 1, *n =* 679 |  | −0.000 | (−0.000; 0.000) | 0.09 |
|  Model 2, *n =* 679 |  | −0.000 | (−0.000; 0.000) | 0.31 |
|  Model 3, *n =* 546 |  | −0.000 | (−0.000; 0.000) | 0.14 |
| Quartiles of s-25(OH)D† |  |  |  |
|  Model 1, *n =* 679 | Q1 [10.02, 60.42] | 0.007 | (−0.002; 0.015) | 0.14 |
|  | Q2 [60.53, 78.82] | 0.005 | (−0.004; 0.013) | 0.27 |
|  | Q3 [79.20, 96.35] | 0.005 | (−0.004; 0.013) | 0.30 |
|  Model 2, *n =* 679 | Q1 | 0.003 | (−0.005; 0.011) | 0.47 |
|  | Q2 | 0.003 | (−0.005; 0.011) | 0.47 |
|  | Q3 | 0.001 | (−0.007; 0.009) | 0.78 |
|  Model 3, *n =* 546 | Q1 | 0.006 | (−0.003; 0.014) | 0.19 |
|  | Q2 | 0.001 | (−0.008; 0.009) | 0.88 |
|  | Q3 | 0.004 | (−0.005; 0.013) | 0.36 |
| Clinical cuts s-25(OH)D‡ |  |  |  |  |  |
|  Model 1, *n =* 679 | < 25 | 0.002 | (−0.019; 0.022) | 0.87 |
|  | 25–50 | 0.003 | (−0.006; 0.012) | 0.54 |
|  | 50–75 | 0.001 | (−0.006; 0.008) | 0.76 |
|  Model 2, *n =* 679 | < 25 | 0.001 | (−0.017; 0.019) | 0.91 |
|  | 25–50 | 0.002 | (−0.006; 0.010) | 0.65 |
|  | 50–75 | 0.001 | (−0.006; 0.007) | 0.85 |
|  Model 3, *n =* 546 | < 25 | 0.002 | (−0.018; 0.022) | 0.83 |
|  | 25–50 | 0.003 | (−0.006; 0.012) | 0.50 |
|  | 50–75 | −0.000 | (−0.007; 0.007) | 0.90 |
| *Umbilical cord* |  |  |  |  |  |
| Continuous of s-25(OH)D |  |  |  |  |  |
|  Model 1, *n =* 997 |  | 7.57∙10−6 | (−0.000; 0.000) | 0.90 |
|  Model 2, *n =* 941 |  | 0.0000 | (−0.000; 0.000) | 0.55 |
|  Model 3, *n =* 797 |  | −0.0000 | (−0.000; 0.000) | 0.85 |
| Quartiles of s-25(OH)D† |  |  |  |  |  |
|  Model 1, *n =* 997 | Q1 [1.53, 31.35] | 0.0005 | (−0.007; 0.008) | 0.89 |
|  | Q2 [31.52, 45.97] | −0.0026 | (−0.010; 0.004) | 0.47 |
|  | Q3 [46.04, 61.08] | 0.0025 | (−0.005; 0.009) | 0.53 |
|  Model 2, *n =* 997 | Q1 | −0.0014 | (−0.008; 0.005) | 0.66 |
|  | Q2 | −0.0014 | (−0.008; 0.005) | 0.67 |
|  | Q3 | 0.0005 | (−0.006; 0.007) | 0.89 |
|  Model 3, *n =* 797 | Q1 | 0.0010 | (−0.006; 0.008) | 0.79 |
|  | Q2 | −0.0004 | (−0.007; 0.007) | 0.91 |
|  | Q3 | 0.0010 | (−0.006; 0.008) | 0.78 |
| Clinical cuts of s-25(OH)D|| |  |  |  |  |  |
|  Model 1, *n =* 997 | < 25 | −0.0012 | (−0.009; 0.006) | 0.76 |
|  | 25–50 | −0.0023 | (−0.008; 0.004) | 0.45 |
|  | > 75 | −0.0003 | (−0.009; 0.008) | 0.94 |
|  Model 2, *n =* 997 | < 25 | −0.0015 | (−0.008; 0.005) | 0.67 |
|  | 25–50 | −0.0012 | (−0.006; 0.004) | 0.65 |
|  | > 75 | 0.0027 | (−0.005; 0.010) | 0.50 |
|  Model 3, *n =* 797 | < 25 | 0.0015 | (−0.006; 0.009) | 0.69 |
|  | 25–50 | −0.0012 | (−0.007; 0.005) | 0.69 |
|  | > 75 | 0.0026 | (−0.006; 0.011) | 0.55 |
| *Age 5 years* |  |  |  |  |  |
| Continuous of s-25(OH)D |  |  |  |  |  |
|  Model 1, *n =* 658 |  | −0.000 | (−0.000; 0.000) | 0.42 |
|  Model 2, *n =* 658 |  | −0.000 | (−0.000; 0.000) | 0.30 |
|  Model 3, *n =* 530 |  | −0.000 | (−0.000; 0.000) | 0.22 |
| Quartiles of s-25(OH)D† |  |  |  |  |  |
|  Model 1, *n =* 658 | Q1 [6.80, 53.90] | 0.003 | (−0.006; 0.012) | 0.46 |
|  | Q2 [53.90, 71.77] | −0.000 | (−0.009; 0.009) | 0.99 |
|  | Q3 [71.89, 86.72] | −0.003 | (−0.012; 0.006) | 0.51 |
|  Model 2, *n =* 658 | Q1 | 0.005 | (−0.003; 0.013) | 0.22 |
|  | Q2 | 0.001 | (−0.007; 0.009) | 0.74 |
|  | Q3 | −0.001 | (−0.009; 0.007) | 0.84 |
|  Model 3, *n =* 530 | Q1 | 0.006 | (−0.003; 0.015) | 0.16 |
|  | Q2 | 0.000 | (−0.008; 0.009) | 0.92 |
|  | Q3 | −0.003 | (−0.011; 0.006) | 0.51 |
| Clinical cuts of s-25(OH)D‡ |  |  |  |  |  |
|  Model 1, *n =* 658 | < 25 | −0.003 | (−0.025; 0.018) | 0.75 |
|  | 25–50 | 0.005 | (−0.004; 0.014) | 0.29 |
|  | 50–75 | −0.000 | (−0.007; 0.007) | 0.97 |
|  Model 2, *n =* 658 | < 25 | 0.001 | (−0.018; 0.020) | 0.92 |
|  | 25–50 | 0.005 | (−0.003; 0.013) | 0.20 |
|  | 50–75 | 0.001 | (−0.005; 0.007) | 0.79 |
|  Model 3, *n =* 530 | < 25 | −0.002 | (−0.025; 0.020) | 0.84 |
|  | 25–50 | 0.008 | (−0.001; 0.016) | 0.08 |
|  | 50–75 | 0.002 | (−0.005; 0.008) | 0.66 |
| Abbreviations: s-25(OH)D, serum 25-hydroxyvitamin D; TBLH BMD, total-body-less-head bone mineral density; C.I., confidence interval.\*Early pregnancy s-25(OH)D is measured in blood samples collected before week 20 of pregnancy.†The reference group at all time points is those in the highest s-25(OH) quartile.‡The reference group is those with s-25(OH)D > 75 nmol/l.§Late pregnancy s-25(OH)D is measured in blood samples collected after week 20 of pregnancy.||The reference group is those with s-25(OH)D 50-75 nmol/l.Model 1 is adjusted for height (cm) and sex (male/female). Model 2 is adjusted for height (cm), sex (male/female), gestational age (weeks), parity (unipara/multipara) and child BMI (kg/m2). Model 3 is adjusted for height (cm), sex (male/female), gestational age (weeks), parity (unipara/multipara), child BMI (kg/m2), physical activity (less active than peers/as active as peers/more active than peers), skin tone (Fitzpatrick scale 1-2/3-6), and daily dairy consumption (< 3 dl/day vs. ≥ 3 dl/day). Outcomes were calculated using multiple linear regression. |

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| **Supplementary Table 2:** Association between s-25(OH)D in early pregnancy, late pregnancy, umbilical cord, and age 5 years, and TBLH BMD (g/cm2) ≤ 10th vs. > 10th percentile (reference group\*). |
|  | S-25(OH)D (nmol/l) | Odds ratio  | 95 % C.I. | *p*-value |
| *Early pregnancy*† |  |  |  |  |
| Continuous |  |  |  |  |
|  Model 1, *n =* 600 |  | 0.70 | (0.98; 1.01) | 0.55 |
|  Model 2, *n =* 600 |  | 0.99 | (0.98; 1.01) | 0.30 |
|  Model 3, *n =* 472 |  | 0.99 | (0.97; 1.01) | 0.21 |
| Quartiles of s-25(OH)D‡ |  |  |  |  |
|  Model 1, *n =* 600  | Q1 [8.47, 49.10] | 0.79 | (0.34; 1.84) | 0.59 |
|   | Q2 [49.11, 64.65] | 1.17 | (0.55; 2.56) | 0.68 |
|  | Q3 [64.75, 77.41] | 0.52 | (0.22; 1.23) | 0.14 |
|  Model 2, *n =* 600  | Q1 | 1.04 | (0.42; 2.56) | 0.94 |
|  | Q2 | 1.21 | (0.55; 2.67) | 0.64 |
|  | Q3 | 0.52 | (0.22; 1.26) | 0.15 |
|  Model 3, *n =* 472 | Q1 | 1.28 | (0.47; 3.47) | 0.63 |
|  | Q2 | 1.34 | (0.56; 3.24) | 0.51 |
|  | Q3 | 0.51 | (0.19; 1.39) | 0.19 |
| Clinical cuts of s-25(OH)D§ |  |  |  |  |
|  Model 1, *n =* 600 |  < 25 | 3.03 | (0.87; 10.53) | 0.08 |
|   | 25–50 | 0.67 | (0.27; 1.68) | 0.40 |
|  | > 75 | 1.30 | (0.67; 2.55) | 0.44 |
|  Model 2, *n =* 600 | < 25 | 4.89 | (1.24; 19.25) | **0.023** |
|  | 25–50 | 0.69 | (0.26; 1.82) | 0.45 |
|  | > 75 | 1.14 | (0.57; 2.28) | 0.70 |
|  Model 3, *n =* 472 | < 25 | 4.82 | (1.08; 21.57) | **0.040** |
|  | 25–50 | 0.90 | (0.32; 2.56) | 0.84 |
|  | > 75 | 1.03 | (0.47; 2.23) | 0.95 |
| *Late pregnancy*|| |
| Continuous s-25(OH)D |
|  Model 1, *n =* 679 |  | 1.01 | (1.00; 1.02) | 0.31 |
|  Model 2, *n =* 679 |  | 1.00 | (0.99; 1.01) | 0.81 |
|  Model 3, *n =* 546 |  | 1.00 | (0.99; 1.01) | 0.91 |
| Quartiles§ of s-25(OH)D‡ |
|  Model 1, *n =* 679 | Q1 [10.02, 60.42] | 0.60 | (0.26; 1.41) | 0.24 |
|  | Q2 [60.53, 78.82] | 1.26 | (0.60; 1.41) | 0.54 |
|  | Q3 [79.20, 96.35] | 1.23 | (0.59; 2.57) | 0.59 |
|  Model 2, *n =* 679 | Q1 | 0.78 | (0.32; 1.90) | 0.58 |
|  | Q2 | 1.52 | (0.70; 3.32) | 0.29 |
|  | Q3 | 1.53 | (0.71; 3.31) | 0.28 |
|  Model 3, *n =* 546 | Q1 | 0.78 | (0.29; 2.31) | 0.63 |
|  | Q2 | 1.61 | (0.69; 3.80) | 0.27 |
|  | Q3 | 1.21 | (0.51; 2.86) | 0.66 |
| Clinical cuts of s-25(OH)D§ |
|  Model 1, *n =* 679 | < 25 | 0.64 | (0.08; 5.28) | 0.67 |
|  | 25–50 | 0.46 | (1.16; 1.34) | 0.16 |
|  | > 75 | 0.99 | (0.54; 1.82) | 0.98 |
|  Model 2, *n =* 679 | < 25 | 0.65 | (0.08; 5.72) | 0.70 |
|  | 25–50 | 0.58 | (0.19; 1.72) | 0.32 |
|  | > 75 | 0.95 | (0.51; 1.80) | 0.89 |
|  Model 3, *n =* 546 | < 25 | 0.85 | (0.09; 8.30) | 0.89 |
|  | 25–50 | 0.60 | (0.18; 2.02) | 0.41 |
|  | > 75 | 0.82 | (0.40; 1.67) | 0.58 |
| *Umbilical cord* |
| Continuous s-25(OH)D |
|  Model 1, *n =* 997 |  | 1.01 | (1.00; 1.02) | 0.30 |
|  Model 2, *n =* 941 |  | 1.01 | (1.00; 1.02) | 0.29 |
|  Model 3, *n =* 797 |  | 1.00 | (1.00; 1.01) | 0.82 |
| Quartiles of s-25(OH)D |
|  Model 1, *n =* 997 | Q1 [1.53, 31.35] | 0.79 | (0.41; 1.50) | 0.47 |
|   | Q2 [31.52, 45.97] | 0.97 | (0.54; 1.77) | 0.93 |
|   | Q3 [46.04, 61.08] | 0.78 | (0.42; 1.45) | 0.44 |
|  Model 2, *n =* 997 | Q1 | 0.84 | (0.42; 1.67) | 0.62 |
|  | Q2 | 0.95 | (0.51; 1.75) | 0.86 |
|  | Q3 | 0.88 | (0.46; 1.67) | 0.69 |
|  Model 3, *n =* 797 | Q1 | 1.26 | (0.58; 2.71) | 0.56 |
|  | Q2 | 1.05 | (0.52; 2.10) | 0.90  |
|  | Q3 | 1.07 | (0.51; 2.26) | 0.86 |
| Clinical cuts of s-25(OH)D |
|  Model 1, *n =* 997 | < 25 | 0.67 | (0.30; 1.49) | 0.33 |
|  | 25–50 | 0.11 | (0.66; 1.87) | 0.69 |
|  | > 75 | 0.24 | (0.61; 2.55) | 0.55 |
|  Model 2, *n =* 997 | < 25 | 0.63 | (0.27; 1.45) | 0.28  |
|  | 25–50 | 1.07 | (0.62; 1.84) | 0.81 |
|  | > 75 | 1.12 | (0.53; 2.38) | 0.76 |
|  Model 3, *n =* 797 | < 25 | 0.96 | (0.39; 2.34) | 0.92 |
|  | 25–50 | 1.27 | (0.68; 2.37) | 0.45 |
|  | > 75 | 1.23 | (0.53; 2.85) | 0.63 |
| *Age 5 years*  |
| Continuous of s-25(OH)D |
|  Model 1, *n =* 658 |  | 1.01 | (1.00; 1.02) | 0.09 |
|  Model 2, *n =* 658 |  | 1.01 | (1.00; 1.02) | 0.14 |
|  Model 3, *n =* 530 |  | 1.01 | (1.01; 1.02) | 0.57 |
| Quartiles of s-25(OH) |
|  Model 1, *n =* 658 | Q1 [6.80, 53.90] | 0.46 | (0.21; 1.05) | 0.07 |
|  | Q2 [53.90, 71.77] | 0.69 | (0.33; 1.44) | 0.32 |
|  | Q3 [71.89, 86.72] | 0.84 | (0.41; 1.71) | 0.62 |
|  Model 2, *n =* 658 | Q1 | 0.44 |  (0.18; 1.03) | 0.06 |
|  | Q2 | 0.79 | (0.36; 1.73) | 0.55 |
|  | Q3 | 0.80 | (0.37; 1.73) | 0.58 |
|  Model 3, *n =* 530 | Q1 | 0.56 | (0.22; 1.42) | 0.22 |
|  | Q2 | 0.69 | (0.27; 1.72) | 0.42 |
|  | Q3 | 0.91 | (0.38; 2.17) | 0.84 |
| Clinical cuts of s-25(OH)D |
|  Model 1, *n =* 658 | < 25 | 1.44 | (0.25; 8.33) | 0.68 |
|  | 25–50 | 0.59 | (0.22; 1.56) | 0.28 |
|  | > 75 | 1.41 | (0.76; 2.60) | 0.28 |
|  Model 2, *n =* 658 | < 25 | 0.91 | (0.15; 5.68) | 0.92 |
|  | 25–50 | 0.55 | (0.20; 1.51) | 0.25 |
|  | > 75 | 1.30 | (0.68; 2.48) | 0.43 |
|  Model 3, *n =* 530 | < 25 | 2.67 | (0.30; 23.32) | 0.38 |
|  | 25–50 | 0.94 | (0.32; 2.80) | 0.91 |
|  | > 75 |  1.82 |  (0.85; 3.91) | 0.12 |
| Abbreviations: s-25(OH)D, serum 25-hydroxyvitamin D; TBLH BMD; total-body-less-head bone mineral density; C.I., confidence interval.\*10th percentile BMD: Early pregnancy = 0.554 g/cm2; late pregnancy = 0.556 g/cm2; umbilical cord = 0.556 g/cm2; 5 years = 0.554 g/cm2.†Early-pregnancy s-25(OH)D is measured in blood samples collected before week 20 of pregnancy.‡Reference group is those within the highest s-25(OH)D quartile at all time points.§Reference group is those with s-25(OH)D 50-75 nmol/l.||Late-pregnancy s-25(OH)D is measured in blood samples collected after week 20 of pregnancy.Model 1 is adjusted for height (cm) and sex (male/female). Model 2 is adjusted for height (cm), sex (male/female), gestational age (weeks), parity (unipara/multipara) and child BMI (kg/m2). Model 3 is adjusted for height (cm), sex (male/female), gestational age (weeks), parity (unipara/multipara), child BMI (kg/m2), physical activity (less active than peers/as active as peers/more active than peers), skin tone (Fitzpatrick scale 1-2/3-6), and daily dairy consumption (< 3 dl/day vs. ≥ 3 dl/day). Outcomes were calculated using logistic regression. |

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| **Supplementary Table 3:** Association between vitamin D supplementation at age 5 and 7 years, and BMD (g/cm2), BMD z-score, BMD (g), and BA (cm2). |
|  | Model\* | Beta Coefficient  | 95 % C.I. | *p-*value |
| *Supplement age 5*† |  |  |  |  |  |
| TBLH BMD | Model 1, *n =* 960 | 0.004 | (−0.001; 0.009) | 0.15 |
|  | Model 2, *n =* 960 | 0.002 | (−0.003; 0.006) | 0.41 |
|  | Model 3, *n =* 816 | −0.002 | (−0.007; 0.003) | 0.42 |
| TBLH BMD  | Model 1, *n =* 960 | 0.057 | (−0.027; 0.140) | 0.18 |
| *z*-score | Model 2, *n =* 960 | 0.027 | (−0.047; 0.101) | 0.47 |
|  | Model 3, *n =* 816 | 0.029 | (−0.049; 0.107) | 0.47 |
| TBLH BMC | Model 1, *n =* 960 | 6.417 | (−0.439; 13.274) | 0.07 |
|  | Model 2, *n =* 960 | 3.295 | (−1.920; 8.511) | 0.22 |
|  | Model 3, *n =* 816 | 3.484 | (−2.055; 9.023) | 0.22 |
| TBLH BA | Model 1, *n =* 960 | 4.354 | (−1.350; 10.06) | 0.13 |
|  | Model 2, *n =* 960 | 2.387 | (−2.348; 7.123) | 0.32 |
|  | Model 3, *n =* 816 | 2.036 | (−3.185; 7.256) | 0.44 |
| *Supplement age 7*† |  |  |  |  |  |
| TBLH BMD | Model 1, *n =* 1,021 | 0.006 | (0.001; 0.011) | **0.02** |
|  | Model 2, *n =* 1,021 | 0.002 | (−0.002; 0.007) | 0.29 |
|  | Model 3, *n =* 952 | 0.002 | (−0.002; 0.007) | 0.31 |
| TBLH BMD | Model 1, *n =* 1,021 | 0.096 | (0.0130; 0.180) | **0.02** |
| *z*-score | Model 2, *n =* 1,021 | 0.034 | (−0.040; 0.108) | 0.37 |
|  | Model 3, *n =* 952 | 0.031 | (−0.045; 0.107) | 0.42 |
| TBLH BMC | Model 1, *n =* 1,021 | 9.705 | (2.876; 16.534) | **0.005** |
|  | Model 2, *n =* 1,021 | 2.915 | (−2.323; 8.153) | 0.28 |
|  | Model 3, *n =* 952 | 2.441 | (−2.934; 7.816) | 0.37 |
| TBLH BA | Model 1, *n =* 1,021 | 5.817 | (0.177; 11.457) | **0.04** |
|  | Model 2, *n =* 1,021 | 1.061 | (−3.687; 5.810) | 0.66 |
|  | Model 3, *n =* 952 | 0.225 | (−4.730; 5.179) | 0.93 |
| Abbreviations: BMD, bone mineral density; BMC, bone mineral content; BA, bone area; C.I., confidence interval; TBLH, total-body-less-head\*Model 1 is adjusted for height (cm) and sex (male/female). Model 2 is adjusted for height (cm), sex (male/female), gestational age (weeks), parity (unipara/multipara) and child BMI (kg/m2). Model 3 is adjusted for height (cm), sex (male/female), gestational age (weeks), parity (unipara/multipara), child BMI (kg/m2), physical activity (less active than peers/as active as peers/more active than peers), skin tone (Fitzpatrick scale 1-2/3-6), and daily dairy consumption (< 3 dl/day vs. ≥ 3 dl/day).†Consuming vitamin D supplementation is defined as consuming supplementation 2 days/week or more (reference group). Data on vitamin D supplementation in pregnancy and at ages 5 and 7 years could not be specified in more details with regards to doses.Differences between the groups were calculated using multiple linear regression. |

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| **Supplementary Table 4:** Descriptive characteristics of participants with incomplete covariate data (participants excluded in regression Model 3) and complete covariate data set (participants in Model 1). |
| **Variable** | **All***n* = 881 | **Incomplete data***n* = 144 | **Complete data***n* = 737 | ***p-*values** |
| Mother’s age at delivery, years, *n* = 881 | 31 [6] | 30 [6] | 31 [6] | **0.04** |
| Mother’s parity *n* = 881 Unipara\*, *n* (%) | 464 (52.7 %) | 80 (55.6 %) | 384 (52.1 %) | 0.44 |
| Maternal education, *n* = 876 Lower, *n* (%) Intermediate, *n* (%) Higher, *n* (%) | 232 (26.5 %)437 (49.9 %)207 (23.6 %) | 53 (37.6 %)57 (40.4 %)31 (22.0 %) | 179 (24.4 %)380 (51.7 %)176 (24.0 %) | **0.004** |
| Smoking in pregnancy, *n* = 876 Yes, *n* (%) | 38 (4.3 %) | 13 (9.0%) | 25 (3.4 %) | **0.003** |
| Alcohol in pregnancy, *n* = 594  Yes, *n* (%) | 74 (12.5 %) | 9 (9.9 %) | 65 (12.9 %) | 0.42 |
| Vitamin D suppl. in pregnancy†, *n* = 474  Yes *n* (%) | 406 (85.7 %) | 67 (88.2 %) | 339 (85.2 %) | 0.50 |
| s-25(OH)D early preg, nmol/l | 65.8 [28.5] | 65.7 [29.5] | 65.8 [28.4] | 0.80 |
| s-25(OH)D late preg, nmol/l | 78.5 [36.0] | 77.5 [38.1] | 78.6 [38.1] | 0.46 |
| Sex, *n* = 881 Male *n* (%) | 458 (52.0 %) | 66 (45.8 %) | 392 (53.2 %) | 0.11 |
| Gestation age at birth, weeks, *n* = 881 | 40.1 [1.7] | 40.4 [1.7] | 40.1 [1.9] | 0.31 |
| Body weight at birth, g, *n* = 881 | 3555 [675] | 3616 [712] | 3550 [655] | 0.21 |
| Body length at birth, cm, *n* = 874 | 52 [3] | 52 [3] | 52[3] | 0.77 |
| s-25(OH)D cord, nmol/l |  |  |  |  |
| Skintone, Fitzpatrick scale, *n* = 829Fitzpatrick scale 1-2 | 449 (54.2 %) | 44 (47.8 %) | 405 (55.0 %) | 0.20 |
| Season at 18 months questionnaire, *n*=881 November to April  | 383 (43.5 %) | 75 (52.1 %) | 308 (41.8 %) | **0.02** |
| Exclusive breastfeeding, weeks, *n* = 874  | 14 [15] | 12 [16] | 14 [14] | 0.08 |
| Vitamin D suppl. at age 5 years†, *n* = 762 ≤ 1 time per week, *n* (%) ≥ 2 times per week, *n* (%) | 378 (49 .6 %)384 (50.4 %) | 56 (54.4 %)47 (45.6 %) | 322 (48.9 %)337 (51.1 %) | 0.30 |
| s-25(OH)D 5 years, nmol/l | 72.0 [32.4] | 67.7 [38.5] | 72.8 [31.2] | 0.31 |
| Holiday weeks‡, *n* = 881 | 0 [0] | 0 [0] | 0 [0] | **0.001** |
| Physical activity, *n* = 791 Less active, *n* (%) As active, *n* (%) More active, *n* (%) | 64 (8.1 %)533 (67.4 %)194 (24.5 %) | 5 (9.3 %)31 (57.4 %)18 (33.3 %) | 59 (8.0 %)502 (68.1 %)176 (23.9 %) | 0.25 |
| Meat intake, days/month, *n* = 765 | 23 [10] | 20 [7] | 23 [10] | 0.69 |
| Daily dairy consumption *n* = 781 ≥ 3 dl/day | 438 (56.1 %) | 22 (50.0 %) | 416 (56.5 %) | 0.40 |
| Vitamin D suppl. at age 7 years†, *n* = 783 ≤ 1 time per week, *n* (%) ≥ 2 times per week, *n* (%) Unsure of frequency, *n* (%) | 411 (52.5 %)335 (42.8 %)37 (4.73 %) | 23 (48.9 %)21 (44.7 %)3 (6.4 %) | 388 (52.7 %)314 (42.7 %)34 (4.6 %) | 0.80 |
| Age at DXA scan, years, *n* = 881  | 7.08 [0.08] | 7.09 [0.08] | 7.07 [0.08] | **0.002** |
| TBLH BMD, g/cm2, *n* = 881 | 0.613 (0.049) | 0.615 (0.049) | 0.613 (0.049) | 0.61 |
| TBLH BMC, g, *n* = 881 | 621.400 [134.750] | 615.136 [122.305] | 622.237 [135.702] | 0.69 |
| TBLH BA, cm2, *n* = 881 | 1028.37 (93.801) | 1032.57 (93.866) | 1027.55 (93.830) | 0.56 |
| TBLH *z*-score, *n* = 881 | 0.364 (0.816) | 0.363 (0.828) | 0.364 (0.305) | 0.99 |
| Height, cm, *n* = 881 | 125.6 (5.2) | 125.7 (5.1) | 125.6 (5.2) | 0.83 |
| Weight, kg, *n* = 881 | 24.1 [4.7] | 24.4 [4.6] | 24.0 [4.7] | 0.37 |
| Child BMI, kg/m2, *n* = 881 | 15.4 [1.9] | 15.5 [2.1] | 15.3 [1.8] | 0.30 |

Abbreviations: suppl., supplementation; s-25(OH)D, serum 25-hydroxyvitamin D; DXA, dual-energy X-ray absorptiometry; TBLH BMD, total-body-less-head bone mineral density; TBLH BMC, total-body-less-head bone mineral content; TBLH BA, total-body-less-head bone area;

\*Mothers carrying their first child during the studied pregnancy.

†Data on vitamin D supplementation in pregnancy and at ages 5 and 7 years could not be specified in more details with regards to doses.

‡Weeks during the winter half-year spend by the child (age 3–7 years) in countries with average monthly UV index high enough that the skin produces vitamin D.

Differences between those with complete covariate data and those with incomplete data were tested using two-sample Wilcoxon rank sum (Mann-Whitney) test on non-normally distributed variables, Pearson χ2 test on categorical variables, and two-sample *t-*test with equal variances on normally distributed variables.

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| **Supplementary Table 5:** Participant vs. non-participant analyses. |
| **Variable**  | **All**[IQR]*n =* 2,640 | **Participants**[IQR]*n =* 1,194 | **Non-participants** [IQR]*n =* 1,446 | ***p-*value**  |
| Age of mother, years | 30 [6], *n* = 2,5262,556805 (31.5 %)1,243 (48.6 %)508 (19.9 %) | 30 [6], *n* = 1,194 | 30 [6], *n* = 1,332 | **0.001** |
| Maternal educational level, total *n* Low, *n* (%) Intermediate, *n* (%) High, *n* (%) | 1,181322 (27.3 %)591 (50.0 %)268 (22.7 %) | 1,375483 (35.1 %)652 (47.4 %)240 (17.4 %) | **0.001** |
| Parity, total *n* Unipara\*, *n* (%) | 2,5161,392 (55.3 %) | 997620 (51.93 %) | 1,065772 (58.4 %) | **0.001** |
| Smoking during pregnancy, total *n* Yes, *n* (%)  | 2,502124 (5.0 %) | 1,18750 (4.2 %) | 1,31574 (5.63 %) | 0.10 |
| Alcohol during pregnancy, total *n* Yes, *n* (%)  | 1,538167 (10.9 %) | 78193 (11.9%) | 75774 (9.8 %) | 0.18 |
| Vitamin D suppl. (preg)†, total *n* Yes, *n* (%)  | 1,2131,054 (86.9 %) | 607520 (85.7 %) | 606534 (88.12 %) | 0.20 |
| s-25(OH)D early preg, nmol/l  | 65.8 [29.0], *n =* 1,219 | 64.7 [28.4], *n =* 600 | 67.0 [29.8], *n =* 619 | **0.01** |
| s-25(OH)D late preg, nmol/l | 78.7 [37.0], *n =* 1,349 | 78.8 [35.9], *n =* 679 | 78.6 [38.5], *n =* 670 | 0.80 |
| s-25(OH)D cord, nmol/l | 45.4 [29.9], *n =* 2,063 | 46.0 [29.7], *n =* 997 | 44.4 [29.8], *n =* 1,066 | 0.23 |
| Sex, total *n* Males, *n* (%) | 2,5331,344 (53.1 %) | 1,194624 (52.3 %) | 1,339720 (53.8 %) | 0.45  |
| Gestation age at birth, weeks | 40.1 [1.9], *n* = 2,520 | 40.1 [1.9], *n* = 1,194 | 40.1 [1.9], *n* = 1,326 | 0.77 |
| Body weight at birth, g | 3,545 [607], *n* = 2,515 | 3,550 [680], *n* = 1,193 | 3,530 [660], *n* = 1,322 | 0.14 |
| Body length at birth, cm | 52.0 [3.0], *n* = 2495 | 52.0 [3.0], *n* = 1184 | 52.0 [3.0], *n* = 1311 | **0.02** |
| Skin tone, Fitzpatrick scale, total *n* Fitzpatrick scale 1–2, *n* (%) | 1847962 (52.1 %) | 1,114599 (53.8 %) | 733363 (49.5 %) | 0.07 |
| Exclusive breastfeeding, weeks | 12 [16], *n* = 1,989 | 12 [16], *n* = 1,048 | 11 [15], *n* = 941 | **0.001** |
| Season, 18 mo questionnaire, total, *n* November to April, *n* | 1613710 (44.0 %) | 908398 (43.8 %) | 705312 (44.3 %) | 0.87 |
| Adherence, vitamin D suppl. (18 mo), *n* High adherence‡, *n* (%) | 1574816 (51.8 %) | 881475 (53.9 %) | 693341 (49.2 %) | 0.06 |
| Physical activity level, total *n* Low, *n* (%) Intermediate, *n* (%) High, *n* (%) | 1,434102 (7.1 %)967 (67.4 %)365 (25.5 %) | 1,03076 (7.4 %)694 (67.4 %)260 (25.2 %) | 40426 (6.4 %)273 (67.6 %)105 (26.0 %) | 0.81 |
| Daily dairy consumption, total *n* ≤ 3 dl/day, *n* (%)  | 1,413627 (44.4 %) | 1,017442 (43.5 %) | 396185 (46.7 %) | 0.27 |
| Vitamin D suppl. (5 years)†, total *n* ≥ 2 times per week, *n* (%)  | 1,571776 (49.4 %) | 960481 (50.1 %) | 611295 (48.3 %) | 0.48 |
| s-25(OH)D 5 years, nmol/l  | 71. [32.4], *n* = 931 | 71.9 [32.8], *n* = 658 | 72.0 [30.5], *n* = 273 | 0.82 |
| Holiday weeks§ | 0 [0], *n* = 2,241 | 0 [0], *n* = 1,193 | 0 [0], *n* = 1,048 | **0.001** |
| Vitamin D suppl. (7 years)†, total *n* ≥ 2 times per week, *n* (%)  | 1,417614 (43.3 %) | 1,021442 (43.3 %) | 396172 (43.4 %) | 0.81 |
| Abbreviations: vs., versus; suppl., supplementation; preg, pregnancy; s-25(OH)D, serum 25-hydroxyvitamin D; mo, months.\*Mothers carrying their first child during the studied pregnancy. †Data on vitamin D supplementation in pregnancy and at ages 5 and 7 years could not be specified in more details with regard to doses.‡ High adherence was defined as consuming 10 µg vitamin D supplementation 6–7 times per week during at least 80 % of the observation time, and non-adherent as otherwise.§Weeks during the winter half year spend by the child (age 3–7 years) spend in countries with average monthly UV index high enough that the skin produces vitamin D.Differences between the participants and the non-participants groups were tested using two-sample Wilcoxon rank sum (Mann-Whitney) test on non-normally distributed variables, and Pearson χ2 test on categorical variables. Inter-quartile ranges are given for means in square brackets [IQR]. |