Online Supporting Material: The effects of supplementing maternal and infant diets with micronutrient fortified lipid-based nutrient supplements on physical activity and sedentary behavior at preschool age in Ghana

**Supplemental Tables**

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| **Table S1**: Selected baseline and child characteristics of children randomized to the physical activity sub sample (N=630) who were included or not included in analysis |
|  | **Included in activity analysis** |  **Not included in activity analysis** |  |
| Variable | Mean ± SD or %  | Mean ± SD or %  | P-value |
| Baseline Maternal age (yr) | 27.4 ± 5.2 [353] | 26.5 ± 5.8 [277] | 0.044 |
| Baseline Maternal education (yr) | 7.6 ± 3.6 [353] | 7.6 ± 3.7 [277] | 0.991 |
| Baseline Household asset score1 | 0.07 ± 1.0 [348] | -0.04 ± 1.0 [267] | 0.339 |
| Est. maternal pre-pregnancy BMI1 (kg/m2)  | 24.8 ± 4.6 [348] | 24.6 ± 4.5 [270] | 0.607 |
| Nulliparous (%) | 28.9 [102/353]  | 36.5 [101/277] | 0.044 |
| Child Male (%) | 44.8 [158/353]  | 50.6 [133/263] | 0.153 |
| Anemia (%) | 40.7 [127/312]  | 39.0 [67/172] | 0.707 |
| LAZ at 18mo | -0.80 ± 1.0 [326] | -0.88 ± 1.1 [103] | 0.478 |
| WLZ at 18mo | -0.51 ± 0.9 [326] | -0.65 ± 1.0 [177] | 0.120 |
| BMIZ at 18mo | -0.39 ± 0.9 [326] | -0.52 ± 1.0 [177] | 0.121 |
| Motor development at 18mo (score) | 39.8 ± 2.7 [293] | 39.1 ± 3.1 [155] | 0.021 |
| 1 Proxy indicator for household socioeconomic status constructed for each household based on ownership of a set of assets (radio, television etc.), lighting source, drinking water supply, sanitation facilities, and flooring materials. Household ownership of this set of assets is combined into an index (with a mean of zero and standard deviation of one) using principal components analysis. Higher value represents higher socioeconomic status. |

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| **Table S2: Selected characteristics of women and children in the two intervention groups at baseline & follow-up1** |
| **Variable** | **LNS**n=129 | **Non-LNS**n=224 |
| Mean ± SD [n] or % [n/total] | Mean ± SD [n] or % [n/total] |
| Baseline maternal age (y) | 27.8 ± 0.5 [129] | 27.2 ± 0.3 [224] |
| Baseline maternal education (y) | 7.9 ± 0.3 [129] | 7.5 ± 0.2 [224] |
| Baseline household asset score2 | -0.02 ± 0.1 [125] | 0.13 ± 0.07 [223] |
| Nulliparous (%) | 29.5 [38/129] | 28.6 [64/224] |
| Child male (%) | 43.4 [56/129] | 45.5 [102/224] |
| Age at follow-up (y) | 5.2 ± 0.1 [129] | 5.2 ± 0.0 [224] |
| Season measurement: Wet (%) | 75.2 [97/129] | 71.4 [160/224] |
| Home stimulation score at 4-6y | 28.3 ± 0.4 [129] | 27.7 ± 0.3 [223] |
| LNS = Lipid-based Nutrient Supplement. Non-LNS = Iron & folic acid + multiple micronutrient capsules (control group). 1We first tested the null hypothesis of no difference between the 3 treatment groups, and then combined the IFA/MMN groups because there were no significant differences between those 2 groups. 2 Proxy indicator for household socioeconomic status constructed for each household based on ownership of a set of assets (radio, television etc.), lighting source, drinking water supply, sanitation facilities, and flooring materials. Household ownership of this set of assets is combined into an index (with a mean of zero and standard deviation of one) using principal components analysis. Higher value represents higher socioeconomic status 1. |

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| **Table S3: Three-group comparison of physical activity at 4-6 years** |
|  | **Mean (95% CI)** | **P-value** | **Difference in mean or Ratio of the geometric mean (95% CI)** |
| **Variable** | **IFA****n=104** | **MMN****n=120** | **LNS****n=129** | **P1** | **P2** | **IFA vs MMN** | **IFA vs LNS** | **MMN vs LNS** |
| Vector magnitude (counts/min) | 1410(1363, 1457) | 1417(1373, 1460) | 1340(1298, 1382) | 0.025 | 0.0233 | 7(-70, 84) | -70(-145, 6)\* | -77(4, 149)\*\* |
| Time in MVPA (%)4 | 4.6(4.1, 5.0) | 4.8(4.3, 5.2) | 4.3(4.0, 4.7) | 0.353 | 0.3485 | 1.0(0.9, 1.2) | 1.0(0.8, 1.1) | 1.1(0.9, 1.3) |
| Time in SB (%) | 30.3(29.0, 31.6) | 30.7(29.5, 32.0) | 32.3(31.1, 33.4) | 0.059 | 0.0606 | 0.4(-1.7, 2.6) | 2.0(-0.1, 4.1)\* | -1.6(-3.6, 0.5) |
| Time in Light PA (%) | 64.6(63.5, 65.8) | 63.9(62.8, 65.0) | 62.9(61.8, 63.9) | 0.09 | 0.1187 | -0.7(-2.7, 1.2) | -1.8(-3.7, 0.2) | 1.0(-0.8, 2.9) |
| LNS = Lipid-based Nutrient Supplement. Non-LNS = Iron & folic acid + multiple micronutrient capsules (control group). MVPA = moderate-to-vigorous physical activity. SB = Sedentary behavior. **1**Adjusted for child age at follow-up. **2**Adjusted for baseline and other covariates.**3**Adjusted for child age at follow-up and child sex. 4Analyzed with log transformed values. Geometric mean (95% CI) and Ratio of the geometric mean (95% CI) presented. **5**Adjusted for child age at follow-up, child sex and HOME score. **6**Adjusted for child age at follow-up and nulliparity. **7**Adjusted for child age at follow-up, nulliparity, child sex and HOME score. \*p-difference ≤ 0.1. \*\*p-difference ≤ 0.05. |

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| **Table S4: Physical activity for weekdays at 4-6 years by intervention group1** |
| **Variables** | **Treatment group** | **Comparison between groups** |
| **LNS****n=129****Mean (95% CI)**  | **Non-LNS** **n=224****Mean (95% CI)** | **Difference in mean or Ratio of the geometric mean (95% CI)** | **P-value adjusted for child age at follow-up** | **P-value adjusted for baseline and other covariates** |
| Vector magnitude (counts/min) | 1308 (1263, 1353) | 1384 (1350, 1419) | -76 (-134, -19) | 0.008 | 0.0092 |
| Time in MVPA3a (%) | 4.1 (3.7, 4.5) | 4.4 (4.2, 4.7) | 1.1 (0.1, 1.2) | 0.160 | 0.1453b |
| Time in SB (%) | 33.3 (32.0, 34.6) | 31.5 (30.5, 32.5) | 1.8 (0.2, 3.5) | 0.031 | 0.0314 |
| LNS=Lipid-based Nutrient Supplement. Non-LNS= Iron & folic acid +multiple micronutrient capsules (non-LNS group). MVPA = moderate-to-vigorous physical activity. SB = Sedentary behavior. 1We first tested the null hypothesis of no difference between the 3 treatment groups, and then combined the IFA/MMN groups because there were no significant differences between those 2 groups. 2Adjusted for child age at follow-up and child sex. 3aAnalyzed with log transformed values. Geometric mean (95% CI) and Ratio of the geometric mean (95% CI) presented. 3bAdjusted for child age at follow-up, child sex and HOME score. 4Adjusted for child age at follow-up. |

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| **Table S5: Physical activity for weekend days at 4-6 years by intervention group1** |
| **Variables** | **Treatment group** | **Comparison between groups** |
| **LNS****n=129****Mean (95% CI)**  | **Non-LNS** **n=224****Mean (95% CI)** | **Difference in mean or Ratio of the geometric mean (95% CI)** | **P-value adjusted for child age at follow-up** | **P-value adjusted for baseline and other covariates** |
| Vector magnitude (counts/min) | 1421 (1371,1472) | 1497 (1458,1535) | -75 (-139, -12) | 0.020 | 0.0192 |
| Time in MVPA3a (%) | 4.8 (4.3, 5.2) | 4.9 (4.5, 5.3) | 1.0 (0.9, 1.2) | 0.719 | 0.6883b |
| Time in SB (%) | 29.7 (28.4, 31.0) | 28.1 (27.1, 29.1) | 1.6 (0.0, 3.2) | 0.049 | 0.0554 |
| LNS=Lipid-based Nutrient Supplement. Non-LNS= Iron & folic acid +multiple micronutrient capsules (control group). MVPA = moderate-to-vigorous physical activity. SB = Sedentary behavior. 1We first tested the null hypothesis of no difference between the 3 treatment groups, and then combined the IFA/MMN groups because there were no significant differences between those 2 groups. 2Adjusted for child age at follow-up, household asset score and child sex. 3aAnalyzed with log transformed values. Geometric mean (95% CI) and Ratio of the geometric mean (95% CI) presented. 3bAdjusted for child age at follow-up, household asset score, number of hours in instruction time at preschool, child sex and HOME score.  4Adjusted for child age at follow-up, child sex and nulliparity. |

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| **Table S6: Anthropometric indices at 4-6 years by intervention group1** |
|  | **LNS****n=129****Mean (95% CI)**  | **Non-LNS** **n=224****Mean (95% CI)** | **P-value adjusted for child age at follow-up** |
| Weight-for-age z-score | -0.64 (-0.79, -0.49) | -0.75 (-0.86, -0.64) | 0.243 |
| BMI-for-age z-score | -0.56 (-0.70, -0.43) | -0.55 (-0.65, 0.45) | 0.840 |
| Fat Mass Percentage | 15.4 (14.6, 16.2) | 15.5 (14.9, 16.1) | 0.860 |
| LNS = Lipid-based Nutrient Supplement. Non-LNS = Iron & folic acid + multiple micronutrient capsules (control group). 1We first tested the null hypothesis of no difference between the 3 treatment groups, and then combined the IFA/MMN groups because there were no significant differences between those 2 groups. |

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| **Table S7: Relationship between physical activity indicators and SDQ subscales at 4-6 years** |
| **Variable** | **Mean VM cpm** | **MVPA** | **Percent time in SB** |
|  | **r** | **P** | **r** | **P** | **r** | **P** |
| Emotional symptoms z-score | 0.00 | 0.929 | -0.01 | 0.214 | -0.02 | 0.723 |
| Conduct problems z-score | 0.10 | 0.090 | -0.02 | 0.654 | -0.10 | 0.051 |
| Hyperactivity z-score | 0.10 | 0.050 | -0.00 | 0.964 | -0.10 | 0.059 |
| Peer problems z-score | 0.10 | 0.062 | 0.10 | 0.070 | -0.02 | 0.664 |
| Social-emotional difficulties z-score | 0.11 | 0.040 | 0.02 | 0.729 | -0.09 | 0.077 |
| VM cpm: Vector magnitude counts/min. MVPA = moderate-to-vigorous physical activity. SB = sedentary behavior |

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| **Table S8: Relationship between percent body fat and physical activity indicators at 4-6 years** |
| **Variable** | **Mean VM cpm** | **MVPA** | **Percent time in SB** |
|  | **r** | **P** | **r** | **P** | **r** | **P** |
| Percent body fat | -0.186 | 0.0005 | -0.156 | 0.003 | 0.045 | 0.405 |
| VM cpm: Vector magnitude counts/min. MVPA = moderate-to-vigorous physical activity. SB = sedentary behavior |

**References for supplemental material**

1. Vyas S, Kumaranayake L. Constructing socio-economic status indices: how to use principal components analysis. Health Policy and Planning. 2006;21(6):459-68.