

## Supplement tables and figures

**Supplement Table 1.** Maternal plasma phospholipid polyunsaturated fatty acids (PUFAs) composition at each study visits, the NICHD Fetal Growth Studies–Singleton Cohort

	Visit 0 (8–13 weeks)	Visit 1 (16–22 weeks)	Visit 2 (24–29 weeks)	Visit 4 (34–37 weeks)
<b>Sum of n-3 PUFAs</b> (% of total fatty acids)	5.39 (0.08)	5.10 (0.08)*	5.11 (0.10)*	4.88 (0.09)*
18:3n-3 (ALA)	0.21 (0.004)	0.25 (0.0004)*	0.27 (0.01)*	0.26 (0.01)*
20:5n-3 (EPA)	0.34 (0.01)	0.19 (0.01)*	0.31 (0.01)	0.28 (0.01)*
22:5n-3 (DPA)	0.69 (0.01)	0.63 (0.01)*	0.61 (0.01)*	0.54 (0.01)*
22:6n-3 (DHA)	4.16 (0.07)	4.03 (0.08)*	3.92 (0.09)*	3.80 (0.08)*
<b>Sum of n-6 PUFAs</b> (% of total fatty acids)	37.08 (0.14)	36.93 (0.13)	37.03 (0.16)	36.88 (0.17)*
18:2n-6 (LA)	20.67 (0.15)	21.69 (0.15)*	21.93 (0.19)*	22.38 (0.18)*
18:3n-6 (GLA)	0.08 (0.002)	0.08 (0.002)	0.07 (0.002)	0.07 (0.002)
20:2n-6 (EDA)	0.50 (0.01)	0.51 (0.01)	0.51 (0.01)	0.46 (0.01)*
20:3n-6 (DGLA)	3.38 (0.05)	3.40 (0.04)	3.40 (0.05)	3.30 (0.06)*
20:4n-6 (AA)	11.36 (0.11)	0.42 (0.12)*	9.98 (0.14)*	9.55 (0.13)*
22:4n-6 (DTA)	0.52 (0.01)	0.30 (0.01)*	0.53 (0.01)	0.48 (0.01)*
22:5n-6 (n6-DPA)	0.56 (0.01)	0.53 (0.01)	0.61 (0.02)*	0.63 (0.02)*
<b>PUFA ratios</b>				
GLA/LA ( $\Delta 6$ -desaturase)	0.004 (0.0001)	0.004 (0.0001)*	0.003 (0.0001)	0.003 (0.0001)*
AA/DGLA ( $\Delta 5$ -desaturase)	3.61 (0.07)	3.27 (0.07)*	3.11 (0.07)*	3.12 (0.08)*

- Data are presented as weighted mean (standard errors, SE).
- Sampling weights were applied to all analyses to represent the full NICHD Fetal Growth Studies–Singletons Cohort.
- \*P-values < 0.05 when comparing each visit to visit 0 using paired *t*-tests.
- Abbreviations: PUFA, polyunsaturated fatty acids; AA, arachidonic acid; ALA, alpha-linolenic acid; DGLA, dihomo-gamma-linolenic acid; DHA, docosahexaenoic acid; DPA, docosapentaenoic acid; DTA, docosatetraenoic acid; EDA, eicosadienoic acid; EPA, eicosapentaenoic acid; GDM, gestational diabetes mellitus; GLA, gamma-linolenic acid; LA, linoleic acid; PUFA, polyunsaturated fatty acid

**Supplement Table 2.** Associations of maternal moderate-to-vigorous physical activity (MVPA) and plasma phospholipid polyunsaturated fatty acids (PUFAs) at visit 2 and visit 4 among women without GDM, the NICHD Fetal Growth Studies–Singleton Cohort

	Visit 2 (24-29 weeks) (N=107)		Visit 4 (34-37 weeks) (N=102)	
	$\beta$ (SE)	<i>P</i>	$\beta$ (SE)	<i>P</i>
<b>MVPA as continuous variable (hour per week)</b>				
<b>Sum of n-3 PUFAs (% of total fatty acids)</b>	0.043 (0.053)	0.98	0.034 (0.067)	0.80
18:3n-3 (ALA)	-0.006 (0.004)	0.13	-0.002 (0.005)	0.55
20:5n-3 (EPA)	0.005 (0.008)	0.80	0.003 (0.008)	0.48
22:5n-3 (DPA)	0.013 (0.008)	0.51	0.010 (0.009)	0.72
22:6n-3 (DHA)	0.030 (0.048)	0.99	0.023 (0.062)	0.71
<b>Sum of n-6 PUFAs (% of total fatty acids)</b>	<b>-0.159 (0.099)</b>	<b>0.003*</b>	0.027 (0.126)	0.61
18:2n-6 (LA)	-0.291 (0.119)	0.02	-0.154 (0.148)	0.52
18:3n-6 (GLA)	0.002 (0.001)	0.67	-0.002 (0.002)	0.11
20:2n-6 (EDA)	-0.002 (0.004)	0.22	-0.006 (0.005)	0.64
20:3n-6 (DGLA)	-0.012 (0.029)	0.21	0.009 (0.039)	0.46
20:4n-6 (AA)	0.115 (0.079)	0.87	0.163 (0.094)	0.55
22:4n-6 (DTA)	-0.001 (0.008)	0.60	0.002 (0.010)	0.74
22:5n-6 (n6-DPA)	0.030 (0.011)	0.12	0.016 (0.015)	0.53
<b>PUFA ratio</b>				
GLA/LA ( $\Delta 6$ -desaturase)	0.0001 (0.00007)	0.38	-0.00008 (0.00009)	0.90
AA/DGLA ( $\Delta 5$ -desaturase)	0.033 (0.040)	0.46	0.036 (0.052)	0.50
<b>MVPA high vs. low (reference group)</b>				
<b>Sum of n-3 PUFAs (% of total fatty acids)</b>	0.42 (0.25)	0.09	0.07 (0.27)	0.79
18:3n-3 (ALA)	-0.01 (0.02)	0.72	-0.001 (0.02)	0.95
20:5n-3 (EPA)	0.08 (0.04)	0.02	0.03 (0.03)	0.30
22:5n-3 (DPA)	0.05 (0.04)	0.16	0.004 (0.04)	0.91
22:6n-3 (DHA)	0.30 (0.23)	0.19	0.04 (0.25)	0.89
<b>Sum of n-6 PUFAs (% of total fatty acids)</b>	-0.89 (0.46)	0.06	-0.03 (0.51)	0.95
18:2n-6 (LA)	-1.28 (0.56)	0.02	-0.42 (0.60)	0.48
18:3n-6 (GLA)	0.01 (0.01)	0.31	-0.002 (0.01)	0.80

20:2n-6 (EDA)	-0.01 (0.02)	0.43	-0.03 (0.02)	0.15
20:3n-6 (DGLA)	-0.06 (0.14)	0.67	-0.01 (0.16)	0.93
20:4n-6 (AA)	0.35 (0.38)	0.35	0.37 (0.38)	0.34
22:4n-6 (DTA)	0.02 (0.04)	0.55	0.01 (0.04)	0.72
22:5n-6 (n6-DPA)	0.09 (0.05)	0.09	0.05 (0.06)	0.38
<b>PUFA ratios</b>				
GLA/LA ( $\Delta$ 6-desaturase)	0.0005 (0.0003)	0.12	0.0004 (0.0004)	0.91
AA/DGLA ( $\Delta$ 5-desaturase)	0.15 (0.19)	0.42	0.15 (0.21)	0.48

- Multivariable linear regression models adjusted for age (years), race, education, marital status, nulliparous, and pre-pregnancy body mass index (BMI; kg/m<sup>2</sup>), Alternative Health Eating Index (AHEI) score.
- Individual PUFA is measured as % of total fatty acids.
- Women were classified into high MVPA group if they had  $\geq$  150 minutes of moderate-to-vigorous physical activity (MVPA) per week.
- \*P-value is significant after Bonferroni correction.
- Abbreviations: PUFA, polyunsaturated fatty acids; AA, arachidonic acid; ALA, alpha-linolenic acid; DGLA, dihomo-gamma-linolenic acid; DHA, docosahexaenoic acid; DPA, docosapentaenoic acid; DTA, docosatetraenoic acid; EDA, eicosadienoic acid; EPA, eicosapentaenoic acid; GDM, gestational diabetes mellitus; GLA, gamma-linolenic acid; LA, linoleic acid; PUFA, polyunsaturated fatty acid

**Supplement Table 3.** Associations of change in maternal moderate-to-vigorous physical activity (MVPA) levels between visit 0 and visit 4 and plasma phospholipid polyunsaturated fatty acids (PUFAs) at visit 4 among women without GDM, the NICHD Fetal Growth Studies–Singleton Cohort

	Reference	Low-Low (N=42)		High-High (N=16)		High-Low (N=37)		Low-High (N=7)	
		$\beta$ (SE)	<i>P</i>	$\beta$ (SE)	<i>P</i>	$\beta$ (SE)	<i>P</i>	$\beta$ (SE)	<i>P</i>
<b>Sum of n-3 PUFAs</b> (% of total fatty acids)	Reference	0.21 (0.39)	0.59	0.20 (0.25)	0.43	-0.16 (0.48)	0.74		
18:3n-3 (ALA)	Reference	0.02 (0.03)	0.55	-0.003 (0.02)	0.87	-0.05 (0.03)	0.10		
20:5n-3 (EPA)	Reference	0.02 (0.04)	0.61	-0.05 (0.02)	0.04	-0.04 (0.04)	0.28		
22:5n-3 (DPA)	Reference	0.10 (0.05)	0.03	0.02 (0.03)	0.47	-0.06 (0.06)	0.26		
22:6n-3 (DHA)	Reference	0.07 (0.35)	0.84	0.23 (0.23)	0.32	-0.004 (0.43)	0.99		
<b>Sum of n-6 PUFAs</b> (% of total fatty acids)	Reference	-0.83 (0.65)	0.20	-0.66 (0.45)	0.14	1.31 (0.71)	0.06		
18:2n-6 (LA)	Reference	-1.57 (0.72)	0.03	-0.94 (0.54)	0.08	0.90 (0.87)	0.30		
18:3n-6 (GLA)	Reference	0.003 (0.01)	0.78	-0.01 (0.01)	0.28	-0.02 (0.01)	0.04		
20:2n-6 (EDA)	Reference	-0.004 (0.03)	0.88	0.02 (0.02)	0.38	-0.07 (0.04)	0.06		
20:3n-6 (DGLA)	Reference	0.27 (0.23)	0.24	0.08 (0.14)	0.57	-0.48 (0.29)	0.09		
20:4n-6 (AA)	Reference	0.38 (0.53)	0.47	0.25 (0.33)	0.45	1.09 (0.58)	0.06		
22:4n-6 (DTA)	Reference	-0.04 (0.05)	0.45	-0.08 (0.03)	0.01	-0.02 (0.07)	0.81		
22:5n-6 (n6-DPA)	Reference	0.13 (0.09)	0.17	0.03 (0.05)	0.59	-0.10 (0.10)	0.33		
<b>PUFA ratios</b>									
GLA/LA ( $\Delta 6$ -desaturase)	Reference	0.0004 (0.0005)	0.45	-0.0002 (0.0003)	0.59	-0.001 (0.0005)	0.03		
AA/DGLA ( $\Delta 5$ -desaturase)	Reference	-0.16 (0.31)	0.60	-0.12 (0.19)	0.55	0.85 (0.38)	0.03		

- Multivariable linear regression models adjusted for age (years), race, education, marital status, nulliparous, and pre-pregnancy body mass index (BMI; kg/m<sup>2</sup>), and Alternative Health Eating Index (AHEI) score.
- Individual PUFA is measured as % of total fatty acids.
- \*P-value is significant after Bonferroni correction.
- Abbreviations: **PUFA**, polyunsaturated fatty acids; AA, arachidonic acid; ALA, alpha-linolenic acid; DGLA, dihomo-gamma-linolenic acid; DHA, docosahexaenoic acid; DPA, docosapentaenoic acid; DTA, docosatetraenoic acid; EDA, eicosadienoic acid; EPA, eicosapentaenoic acid; GDM, gestational diabetes mellitus; GLA, gamma-linolenic acid; LA, linoleic acid; PUFA, polyunsaturated fatty acid.

**Supplement Table 4.** Time-specific associations of maternal moderate-to-vigorous physical activity (MVPA) and plasma phospholipid polyunsaturated fatty acids (PUFAs) at each study visits, the NICHD Fetal Growth Studies–Singleton Cohort

	Visit 0 <sup>§</sup> (8-13 weeks) (N=318)		Visit 1 <sup>†</sup> (16-22 weeks) (N=308)		Visit 2 <sup>‡</sup> (24-29 weeks) (N=207)		Visit 4 <sup>‡</sup> (34-37 weeks) (N=190)	
	$\beta$ (SE)	<i>P</i>	$\beta$ (SE)	<i>P</i>	$\beta$ (SE)	<i>P</i>	$\beta$ (SE)	<i>P</i>
<b>MVPA as continuous variable (hour per week)</b>								
Sum of n-3 PUFAs (% of total fatty acids)	0.008 (0.027)	0.78	-0.050 (0.038)	0.19	0.004 (0.038)	0.92	0.001 (0.042)	0.99
18:3n-3 (ALA)	-0.0001 (0.001)	0.95	0.001 (0.002)	0.51	-0.005 (0.003)	0.05	0.001 (0.003)	0.86
20:5n-3 (EPA)	0.006 (0.004)	0.11	0.002 (0.003)	0.42	0.001 (0.005)	0.80	-0.003 (0.005)	0.55
22:5n-3 (DPA)	0.002 (0.005)	0.68	-0.011 (0.006)	0.04	0.006 (0.006)	0.30	0.013 (0.005)	0.02
22:6n-3 (DHA)	0.00001 (0.026)	1.00	-0.042 (0.035)	0.22	0.002 (0.034)	0.95	-0.010 (0.038)	0.80
Sum of n-6 PUFAs (% of total fatty acids)	-0.145 (0.058)	0.01	0.009 (0.061)	0.88	<b>-0.278 (0.068)</b>	<b>&lt;0.001*</b>	-0.092 (0.080)	0.25
18:2n-6 (LA)	-0.107 (0.061)	0.08	-0.071 (0.074)	0.34	<b>-0.280 (0.081)</b>	<b>0.001*</b>	-0.180 (0.094)	0.05
18:3n-6 (GLA)	-0.0001 (0.001)	0.92	0.002 (0.001)	0.04	0.001 (0.001)	0.56	<b>-0.004 (0.001)</b>	<b>&lt;0.001*</b>
20:2n-6 (EDA)	0.0002 (0.002)	0.90	-0.0002 (0.003)	0.95	-0.004 (0.002)	0.15	-0.001 (0.003)	0.80
20:3n-6 (DGLA)	0.010 (0.019)	0.59	0.014 (0.021)	0.52	-0.030 (0.020)	0.15	0.026 (0.027)	0.34
20:4n-6 (AA)	-0.043 (0.042)	0.31	0.050 (0.054)	0.35	0.020 (0.058)	0.73	0.053 (0.064)	0.41
22:4n-6 (DTA)	-0.003 (0.004)	0.45	0.002 (0.003)	0.59	-0.005 (0.006)	0.42	0.001 (0.006)	0.86
22:5n-6 (n6-DPA)	-0.002 (0.005)	0.65	0.012 (0.007)	0.07	0.019 (0.007)	0.01	0.012 (0.010)	0.21
<b>PUFA ratios</b>								
GLA/LA ( $\Delta$ 6-desaturase)	0.00002 (0.00004)	0.58	0.0001 (0.00004)	0.03	0.0001 (0.0001)	0.15	-0.0002 (0.0001)	0.01
AA/DGLA ( $\Delta$ 5-desaturase)	-0.025 (0.026)	0.35	-0.008 (0.029)	0.78	0.028 (0.028)	0.33	-0.023 (0.039)	0.55
<b>MVPA high vs. low (reference group)</b>								
Sum of n-3 PUFAs (% of total fatty acids)	-0.28 (0.14)	0.06	-0.32 (0.17)	0.06	0.25 (0.18)	0.17	-0.08 (0.19)	0.69
18:3n-3 (ALA)	-0.003 (0.01)	0.65	0.01 (0.01)	0.40	-0.01 (0.01)	0.53	0.01 (0.01)	0.32
20:5n-3 (EPA)	-0.03 (0.02)	0.12	-0.002 (0.01)	0.90	0.06 (0.02)	0.02	0.02 (0.02)	0.42
22:5n-3 (DPA)	-0.03 (0.02)	0.22	-0.06 (0.03)	0.01	0.05 (0.03)	0.04	0.02 (0.02)	0.33
22:6n-3 (DHA)	-0.21 (0.13)	0.12	-0.26 (0.16)	0.09	0.15 (0.16)	0.36	-0.13 (0.18)	0.45

<b>Sum of n-6 PUFAs (% of total fatty acids)</b>	-0.43 (0.31)	0.17	0.09 (0.27)	0.73	<b>-1.37 (0.33)</b>	<b>&lt;0.001*</b>	-0.46 (0.37)	0.21
18:2n-6 (LA)	-0.34 (0.32)	0.29	-0.10 (0.34)	0.76	<b>-1.53 (0.39)</b>	<b>&lt;0.001*</b>	-0.44 (0.43)	0.30
18:3n-6 (GLA)	-0.002 (0.004)	0.52	0.01 (0.004)	0.05	0.01 (0.004)	0.05	-0.01 (0.01)	0.12
20:2n-6 (EDA)	-0.00003 (0.01)	1.00	-0.0004 (0.01)	0.97	-0.03 (0.01)	0.02	-0.01 (0.01)	0.29
20:3n-6 (DGLA)	0.06 (0.10)	0.51	0.14 (0.09)	0.14	-0.13 (0.10)	0.18	0.03 (0.13)	0.79
20:4n-6 (AA)	-0.001 (0.001)	0.31	-0.02 (0.24)	0.93	0.23 (0.28)	0.42	-0.08 (0.29)	0.79
22:4n-6 (DTA)	-0.03 (0.02)	0.14	0.0004 (0.02)	0.98	0.02 (0.03)	0.60	0.01 (0.03)	0.65
22:5n-6 (n6-DPA)	0.05 (0.02)	0.07	0.07 (0.03)	0.02	0.07 (0.03)	0.04	0.04 (0.04)	0.42
<b>PUFA ratios</b>								
GLA/LA ( $\Delta$ 6-desaturase)	-0.0001 (0.0002)	0.75	0.0004 (0.0002)	0.05	0.001 (0.0002)	0.004	-0.0003 (0.0003)	0.34
AA/DGLA ( $\Delta$ 5-desaturase)	-0.18 (0.14)	0.20	-0.17 (0.13)	0.20	0.21 (0.14)	0.13	-0.04 (0.18)	0.80

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- Multivariable linear regression models adjusted for age (years), race, education, marital status, nulliparous, pre-pregnancy body mass index (BMI; kg/m<sup>2</sup>), Alternative Health Eating Index (AHEI) score, and **time between last time of food intake and specimen acquisition (hours)** $\pm$ .
  - Individual PUFA is measured as % of total fatty acids.
  - Sampling weights were applied to all analyses to represent the full NICHD Fetal Growth Studies–Singletons population.
  - \*P-value is significant after Bonferroni correction.
  - § Physical activity in the previous year.
  - † Physical activity since the last visit.
  - $\pm$  Missing values in AHEI were imputed by mean of each visit.
  - Abbreviations: PUFA, polyunsaturated fatty acids; AA, arachidonic acid; ALA, alpha-linolenic acid; DGLA, dihomo-gamma-linolenic acid; DHA, docosahexaenoic acid; DPA, docosapentaenoic acid; DTA, docosatetraenoic acid; EDA, eicosadienoic acid; EPA, eicosapentaenoic acid; GDM, gestational diabetes mellitus; GLA, gamma-linolenic acid; LA, linoleic acid; PUFA, polyunsaturated fatty acid
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