**Supplementary Material:**

**Title:** Ambient air pollution during pregnancy and cardiometabolic biomarkers in cord blood

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**Supplementary Information**

Supplementary Figure 1: Flow diagram of study participants

1,410 enrolled participants in the Healthy Start study

11 withdrew prior to delivery

17 experienced fetal demise

1,382 potentially eligible

527 with no cord blood analyzed for cardiometabolic biomarkers

855 with cord blood analyzed for cardiometabolic biomarkers

43 residence not in study area or no O3 and/or PM2.5 monitors within 50 km of the residence with sufficient non-missing monitoring data

812 with air pollution exposure data available

Supplemental Table 1: Comparison between mother-infant pairs in the subset included in this analysis and the entire Healthy Start cohort

|  |  |  |  |
| --- | --- | --- | --- |
|  | This analysis (n=812)a | Excluded from this analysis (n=570)b | Healthy Start (n=1,382)c |
| Characteristic | Mean ± SD, N (%) | Mean ± SD, N (%) | Mean ± SD, N (%) |
|  |  |  |  |
| Maternal age at delivery (years) | 27.5 ± 6.2 | 28.3 ± 6.2 | 27.8 ± 6.2 |
| Pre-pregnancy body mass index (kg/m2) | 25.9 ± 6.5 | 25.4 ± 5.8 | 25.7 ± 6.2 |
| Race/ethnicity |  |  |  |
| Hispanic | 201 (25) | 144 (25) | 345 (25) |
| Non-Hispanic white | 428 (53) | 312 (55) | 740 (54) |
| Non-Hispanic black | 127 (16) | 84 (15) | 211 (15) |
| All others | 56 (7) | 30 (5) | 86 (6) |
| Maternal smoking during pregnancy (any) | 77 (10) | 43 (8) | 120 (9) |
| Exposure to secondhand smoke during pregnancy | 186 (23) | 121 (21) | 307 (22) |
| Maternal education completed |  |  |  |
| Less than 12th grade | 122 (15) | 78 (14) | 200 (14) |
| High school degree or GED//high  school equivalency diploma | 163 (20) | 90 (16) | 253 (18) |
| Some college or Associate's  degree | 178 (22) | 147 (26) | 325 (24) |
| Four years of college (BA, BS) | 174 (21) | 130 (23) | 304 (22) |
| Graduate degree (Master's, Ph.D.) | 175 (22) | 125 (22) | 300 (22) |
| Mode of delivery= Cesarean | 172 (21) | 112 (20) | 284 (21) |
| Previous pregnancy | 510 (63) | 375 (66) | 885 (64) |
| Gestational diabetes | 34 (4) | 21 (4) | 55 (4) |
| Season of birth |  |  |  |
| Winter | 173 (21) | 132 (24) | 305 (23) |
| Spring | 199 (25) | 124 (23) | 323 (24) |
| Summer | 250 (31) | 155 (28) | 405 (30) |
| Fall | 190 (23) | 134 (25) | 324 (24) |
| Infant sex = male | 432 (53) | 263 (46) | 695 (52) |
| Abbreviations: SD, standard deviation  aSample size differs for the following variable due to missing data: gestational diabetes, n=774  bSample sizes differs for the following variables due to missing data: maternal age at delivery, n=544; maternal pre-pregnancy BMI, n=568; secondhand smoke, n=569; mode of delivery, n=529; gestational diabetes, n=490; season of delivery, n=545; infant sex, n=529  cSample sizes differs for the following variables due to missing data: maternal age at delivery, n=1356; maternal pre-pregnancy BMI, n=1380; secondhand smoke, n=1379; mode of delivery, n=1341; gestational diabetes, n=1264; season of delivery, n=1357; infant sex, n=1341 | | | |

Supplemental Table 2: Distribution of ambient PM2.5 and O3 concentrations among eligible participants.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | n | 5th percentile | 25th percentile | 50th percentile | 75th percentile | 95th percentile |
| Average PM2.5 (µg/m3) a |  |  |  |  |  |  |
| Trimester 1 | 749 | 6.0 | 6.9 | 7.5 | 8.2 | 9.6 |
| Trimester 2 | 749 | 5.8 | 6.8 | 7.4 | 8.1 | 9.5 |
| Trimester 3 | 787 | 5.8 | 6.8 | 7.3 | 8.1 | 8.7 |
| Full Pregnancy | 806 | 6.6 | 7.0 | 7.5 | 7.9 | 8.4 |
| Prior 30 days to delivery | 765 | 5.0 | 6.4 | 7.2 | 8.3 | 10.6 |
| Prior 7 days to delivery | 771 | 4.1 | 5.6 | 6.7 | 8.2 | 11.9 |
| Average 8-hr max O3 (ppb) |  |  |  |  |  |  |
| Trimester 1 | 812 | 26.7 | 33.0 | 41.8 | 53.0 | 59.4 |
| Trimester 2 | 812 | 28.7 | 33.9 | 42.6 | 52.4 | 58.8 |
| Trimester 3 | 812 | 29.2 | 35.5 | 46.6 | 54.0 | 59.4 |
| Full Pregnancy | 812 | 36.6 | 40.7 | 43.9 | 47.0 | 49.9 |
| Prior 30 days to delivery | 812 | 27.2 | 34.2 | 48.0 | 55.9 | 61.9 |
| Prior 7 days to delivery | 812 | 26.0 | 35.5 | 47.0 | 55.7 | 63.7 |
| Abbreviations: PM2.5, particulate matter with diameter ≤ 2.5 micrometers; O3, average 8-hour maximum ozone concentration in parts per billion. | | | | | | |

Supplemental Table 3: Associations between average PM2.5 and 8-hour maximum O3 at the residential address during pregnancy and glucose, insulin, glucose-insulin ratio, and leptin in cord blood in single pollutant models.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Glucose  (mg/dL) |  | Log-transformed  Insulin  (log-unit) |  | Log-transformed  Glucose/insulin ratio |  | Log-transformed  Leptin  (log-unit) |
|  | n | β (95% CI)a per IQR | n | β (95% CI)a per IQR | n | β (95% CI)a per IQR | n | β (95% CI)a per IQR |
| Average PM2.5 (µg/m3) |  |  |  |  |  |  |  |  |
| Trimester 1 | 731 | -1.15 (-2.83, 0.53) | 706 | 0.00 (-0.05, 0.06) | 704 | -0.03 (-0.08, 0.03) | 614 | 0.09 (0.01, 0.18) |
| Trimester 2 | 731 | 0.98 (-0.76, 2.73) | 700 | -0.02 (-0.08, 0.03) | 698 | 0.04 (-0.01, 0.09) | 642 | 0.06 (-0.03, 0.14) |
| Trimester 3 | 768 | 0.94 (-0.93, 2.81) | 737 | 0.00 (-0.05, 0.06) | 735 | 0.00 (-0.06, 0.06) | 662 | 0.01 (-0.09, 0.10) |
| Full Pregnancy | 787 | 0.24 (-1.70, 2.18) | 756 | -0.01 (-0.07, 0.05) | 754 | 0.00 (-0.05, 0.06) | 665 | 0.11 (0.01, 0.20) |
| Prior 30 days to delivery | 747 | 0.77 (-0.94, 2.48) | 718 | -0.03 (-0.08, 0.02) | 716 | 0.04 (-0.02, 0.09) | 643 | 0.00 (-0.10, 0.09) |
| Prior 7 days to delivery | 752 | 0.84 (-0.30, 1.97) | 723 | 0.02 (-0.02, 0.05) | 721 | -0.01 (-0.04, 0.03) | 642 | 0.02 (-0.04, 0.07) |
| Average 8-hr max O3 (ppb) |  |  |  |  |  |  |  |  |
| Trimester 1 | 731 | 3.49 (-1.19, 8.18) | 706 | -0.02 (-0.17, 0.13) | 704 | 0.06 (-0.09, 0.21) | 614 | -0.18 (-0.43, 0.07) |
| Trimester 2 | 731 | -0.82 (-5.42, 3.77) | 700 | 0.16 (0.02, 0.30) | 698 | -0.17 (-0.31, -0.03) | 642 | -0.07 (-0.29, 0.15) |
| Trimester 3 | 768 | 0.00 (-4.66, 4.66) | 737 | 0.23 (0.09, 0.37) | 735 | -0.24 (-0.38, -0.10) | 662 | 0.08 (-0.16, 0.31) |
| Full Pregnancy | 787 | 0.56 (-2.31, 3.42) | 756 | 0.12 (0.03, 0.21) | 754 | -0.12 (-0.21, -0.03) | 665 | -0.04 (-0.18, 0.10) |
| Prior 30 days to delivery | 747 | -0.28 (-4.73, 4.17) | 718 | 0.21 (0.07, 0.35) | 716 | -0.23 (-0.37, -0.09) | 643 | 0.06 (-0.16, 0.29) |
| Prior 7 days to delivery | 752 | -2.03 (-5.89, 1.82) | 723 | 0.11 (-0.01, 0.23) | 721 | -0.15 (-0.27, -0.03) | 642 | 0.10 (-0.10, 0.29) |
| Abbreviations: 95% CI, 95% confidence interval; PM2.5, particulate matter with diameter ≤ 2.5 micrometers; O3, average 8-hour maximum ozone  concentration in parts per billion.  aAdjusted for race, maternal age, pre-pregnancy BMI, smoking status, exposure to secondhand smoke during pregnancy, median income in the  Census tract, education, mode of delivery, parity, season of birth and infant sex. | | | | | | | | |

Supplemental Table 4: Associations between average PM2.5 and 8-hour maximum O3 at the residential address during pregnancy and lipid biomarkers in cord blood in single pollutant models.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Non-HDL  Cholesterol  (mg/dL) |  | HDL  (mg/dL) |  | Free Fatty Acids  (µIU/ml) |  | Log-transformed  Triglycerides  (log-unit) |
|  | n | β (95% CI)a per IQR | n | β (95% CI)a per IQR | n | β (95% CI)a per IQR | n | β (95% CI)a per IQR |
| Average PM2.5 (µg/m3) |  |  |  |  |  |  |  |  |
| Trimester 1 | 647 | -0.16 (-1.85, 1.54) | 647 | 0.05 (-0.75, 0.85) | 657 | -5.87 (-20.48, 8.73) | 703 | -0.01 (-0.06, 0.03) |
| Trimester 2 | 647 | -1.23 (-2.86, 0.41) | 647 | -0.61 (-1.39, 0.17) | 644 | -4.61 (-18.91, 9.69) | 701 | -0.03 (-0.07, 0.02) |
| Trimester 3 | 684 | -0.91 (-2.60, 0.78) | 684 | 0.41 (-0.40, 1.23) | 682 | -12.36 (-28.16, 3.44) | 737 | -0.05 (-0.10, -0.01) |
| Full Pregnancy | 698 | -1.35 (-3.12, 0.43) | 698 | -0.19 (-1.04, 0.67) | 700 | -12.07 (-27.69, 3.55) | 756 | -0.05 (-0.10, 0.00) |
| Prior 30 days to delivery | 663 | -1.42 (-3.03, 0.18) | 663 | -0.30 (-1.07, 0.47) | 661 | -15.05 (-29.94, -0.16) | 716 | 0.00 (-0.04, 0.05) |
| Prior 7 days to delivery | 667 | -0.58 (-1.65, 0.48) | 667 | -0.59 (-1.09, -0.08) | 666 | -3.04 (-12.35, 6.26) | 721 | 0.01 (-0.02, 0.04) |
| Average 8-hr max O3 (ppb) |  |  |  |  |  |  |  |  |
| Trimester 1 | 647 | 3.12 (-1.62, 7.87) | 647 | 1.42 (-0.82, 3.66) | 657 | -25.57 (-66.43, 15.29) | 703 | -0.06 (-0.19, 0.07) |
| Trimester 2 | 647 | 6.62 (2.25, 10.99) | 647 | 1.02 (-1.08, 3.12) | 644 | 26.80 (-9.99, 63.60) | 701 | 0.09 (-0.03, 0.21) |
| Trimester 3 | 684 | 0.32 (-4.02, 4.66) | 684 | 0.58 (-1.50, 2.67) | 682 | 30.89 (-9.22, 70.99) | 737 | 0.08 (-0.04, 0.20) |
| Full Pregnancy | 698 | 3.32 (0.62, 6.02) | 698 | 1.48 (0.17, 2.78) | 700 | 8.52 (-14.59, 31.62) | 756 | 0.01 (-0.07, 0.08) |
| Prior 30 days to delivery | 663 | 0.09 (-4.13, 4.32) | 663 | 1.17 (-0.84, 3.19) | 661 | 14.71 (-23.77, 53.20) | 716 | 0.01 (-0.11, 0.12) |
| Prior 7 days to delivery | 667 | -1.17 (-4.82, 2.48) | 667 | 1.09 (-0.65, 2.83) | 666 | 6.55 (-26.11, 39.21) | 721 | -0.03 (-0.14, 0.07) |
| Abbreviations: 95% CI, 95% confidence interval; PM2.5, particulate matter with diameter ≤ 2.5 micrometers; O3, average 8-hour maximum ozone  concentration in parts per billion.  aAdjusted for race, maternal age, pre-pregnancy BMI, smoking status, exposure to secondhand smoke during pregnancy, median income in the  Census tract, education, mode of delivery, parity, season of birth and infant sex. | | | | | | | | |

Supplemental Table 5: Sex-specific associations between average PM2.5 and 8-hour maximum O3 at the residential address during pregnancy and glucose and insulin in cord blood.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Males  Glucose | Females  Glucose | Sex interaction |  | Males  Log-transformed  Insulin  (log-unit) | Females  Log-transformed  Insulin  (log-unit) | Sex interaction |
|  | n | β (95% CI)a per IQR | β (95% CI)a per IQR | p-value | n | β (95% CI)a per IQR | β (95% CI)a per IQR | p-value |
| Trimester 1 | 731 |  |  |  | 706 |  |  |  |
| Avg. PM2.5 (µg/m3) |  | -0.71 (-3.02, 1.40) | -1.16 (-3.73, 1.40) | 0.80 |  | 0.02 (-0.05, 0.09) | -0.01 (-0.10, 0.07) | 0.54 |
| Avg. 8-hr max O3 (ppb) |  | 3.64 (-1.78, 9.07) | 2.18 (-3.24, 7.61) | 0.56 |  | 0.05 (-0.13, 0.22) | -0.08 (-0.26, 0.09) | 0.11 |
| Trimester 2 | 731 |  |  |  | 700 |  |  |  |
| Avg. PM2.5 (µg/m3) |  | 0.06 (-2.39, 2.51) | 1.99 (-0.59, 4.57) | 0.28 |  | 0.04 (-0.03, 0.12) | -0.07 (-0.15, 0.01) | 0.04 |
| Avg. 8-hr max O3 (ppb) |  | -1.37 (-6.66, 3.93) | 1.03 (-4.41, 6.47) | 0.36 |  | 0.19 (0.03, 0.35) | 0.11 (-0.06, 0.27) | 0.32 |
| Trimester 3 | 768 |  |  |  | 737 |  |  |  |
| Avg. PM2.5 (µg/m3) |  | 1.36 (-1.16, 3.88) | 0.47 (-2.29, 3.22) | 0.64 |  | 0.02 (-0.06, 0.10) | -0.01 (-0.10, 0.07) | 0.61 |
| Avg. 8-hr max O3 (ppb) |  | 1.36 (-3.97, 6.68) | -1.21 (-6.44, 4.02) | 0.31 |  | 0.20 (0.04, 0.37) | 0.25 (0.09, 0.41) | 0.56 |
| Full pregnancy | 787 |  |  |  | 756 |  |  |  |
| Avg. PM2.5 (µg/m3) |  | -0.05 (-2.86, 2.76) | 0.86 (-2.07, 3.79) | 0.66 |  | 0.06 (-0.02, 0.15) | -0.03 (-0.12, 0.06) | 0.13 |
| Avg. 8-hr max O3 (ppb) |  | 0.79 (-2.94, 4.52) | 0.66 (-2.96, 4.29) | 0.96 |  | 0.17 (0.05, 0.28) | 0.10 (-0.01, 0.21) | 0.28 |
| Prior 30 days to delivery | 747 |  |  |  | 718 |  |  |  |
| Avg. PM2.5 (µg/m3) |  | 0.83 (-1.39, 3.04) | 0.64 (-1.74, 3.02) | 0.91 |  | -0.05 (-0.12, 0.02) | 0.00 (-0.07, 0.08) | 0.24 |
| Avg. 8-hr max O3 (ppb) |  | 1.49 (-3.56, 6.54) | -2.02 (-7.19, 3.14) | 0.17 |  | 0.15 (-0.01, 0.31) | 0.27 (0.11, 0.43) | 0.14 |
| Prior 7 days to delivery | 752 |  |  |  | 723 |  |  |  |
| Avg. PM2.5 (µg/m3) |  | 0.82 (-0.71, 2.36) | 0.75 (-0.88, 2.38) | 0.95 |  | 0.00 (-0.05, 0.05) | 0.04 (-0.01, 0.10) | 0.19 |
| Avg. 8-hr max O3 (ppb) |  | -0.53 (-4.93, 3.86) | -3.16 (-7.65, 1.33**)** | 0.24 |  | 0.07 (-0.06, 0.21) | 0.17 (0.03, 0.31) | 0.15 |
| Abbreviations: 95% CI, 95% confidence interval; PM2.5, particulate matter with diameter ≤ 2.5 micrometers; O3, average 8-hour maximum ozone concentration in parts per billion.  aAdjusted for race, maternal age, pre-pregnancy BMI, smoking status, exposure to secondhand smoke during pregnancy, median income in the Census tract, education, mode of delivery, parity, season of birth, the corresponding co-pollutant during the specified pregnancy period, and exposure-by-sex interaction terms. | | | | | | | | |

Supplemental Table 6: Sex-specific associations between average PM2.5 and 8-hour maximum O3 at the residential address during pregnancy and glucose-insulin ratio and leptin in cord blood.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Males  Log-transformed  Glucose/Insulin ratio | Females  Log-transformed  Glucose/Insulin ratio | Sex interaction |  | Males  Log-transformed  Leptin  (log-unit) | Females  Log-transformed  Leptin  (log-unit) | Sex interaction |
|  | n | β (95% CI)a per IQR | β (95% CI)a per IQR | p-value | n | β (95% CI)a per IQR | β (95% CI)a per IQR | p-value |
| Trimester 1 | 704 |  |  |  | 614 |  |  |  |
| Avg. PM2.5 (µg/m3) |  | -0.04 (-0.11, 0.04) | -0.01 (-0.09, 0.08) | 0.58 |  | 0.07 (-0.06, 0.19) | 0.10 (-0.03, 0.23) | 0.72 |
| Avg. 8-hr max O3 (ppb) |  | -0.01 (-0.18, 0.17) | 0.10 (-0.07, 0.28) | 0.18 |  | -0.19 (-0.48, 0.10) | -0.05 (-0.34, 0.23) | 0.32 |
| Trimester 2 | 698 |  |  |  | 642 |  |  |  |
| Avg. PM2.5 (µg/m3) |  | -0.03 (-0.11, 0.04) | 0.09 (0.02, 0.17) | 0.02 |  | 0.08 (-0.03, 0.21) | 0.02 (-0.11, 0.14) | 0.42 |
| Avg. 8-hr max O3 (ppb) |  | -0.19 (-0.35, -0.03) | -0.10 (-0.27, 0.07) | 0.25 |  | 0.00 (-0.25, 0.26) | -0.09 (-0.35, 0.17) | 0.47 |
| Trimester 3 | 735 |  |  |  | 662 |  |  |  |
| Avg. PM2.5 (µg/m3) |  | -0.01 (-0.09, 0.07) | 0.01 (-0.07, 0.10) | 0.68 |  | -0.04 (-0.16, 0.09) | 0.07 (-0.08, 0.21) | 0.29 |
| Avg. 8-hr max O3 (ppb) |  | -0.21 (-0.37, 0.04) | -0.27 (-0.43, -0.11) | 0.43 |  | 0.12 (-0.15, 0.39) | 0.05 (-0.21, 0.31) | 0.59 |
| Full pregnancy | 754 |  |  |  | 665 |  |  |  |
| Avg. PM2.5 (µg/m3) |  | -0.07 (-0.15, 0.01) | 0.04 (-0.05, 0.12) | 0.08 |  | 0.10 (-0.04, 0.24) | 0.12 (-0.02, 0.26) | 0.86 |
| Avg. 8-hr max O3 (ppb) |  | -0.16 (-0.27, -0.05) | -0.10 (-0.21, 0.01) | 0.34 |  | 0.01 (-0.17, 0.20) | 0.01 (-0.17, 0.18) | 0.94 |
| Prior 30 days to delivery | 716 |  |  |  | 643 |  |  |  |
| Avg. PM2.5 (µg/m3) |  | 0.06 (-0.01, 0.12) | 0.00 (-0.07, 0.07) | 0.24 |  | 0.01 (-0.10, 0.12) | -0.02 (-0.15, 0.11) | 0.70 |
| Avg. 8-hr max O3 (ppb) |  | -0.15 (-0.31, 0.00) | -0.30 (-0.46, -0.14) | 0.07 |  | 0.07 (-0.18, 0.33) | 0.05 (-0.21, 0.31) | 0.83 |
| Prior 7 days to delivery | 721 |  |  |  | 642 |  |  |  |
| Avg. PM2.5 (µg/m3) |  | 0.01 (-0.03, 0.05) | -0.03 (-0.08, 0.02) | 0.21 |  | 0.02 (-0.05, 0.10) | 0.01 (-0.07, 0.09) | 0.90 |
| Avg. 8-hr max O3 (ppb) |  | -0.10 (-0.24, 0.04) | -0.22 (-0.36, -0.08) | 0.08 |  | 0.10 (-0.11, 0.33) | 0.10 (-0.13, 0.33) | 0.95 |
| Abbreviations: 95% CI, 95% confidence interval; PM2.5, particulate matter with diameter ≤ 2.5 micrometers; O3, average 8-hour maximum ozone concentration in parts per billion.  aAdjusted for race, maternal age, pre-pregnancy BMI, smoking status, exposure to secondhand smoke during pregnancy, median income in the Census tract, education, mode of delivery, parity, season of birth, the corresponding co-pollutant during the specified pregnancy period, and exposure-by-sex interaction terms. | | | | | | | | |

Supplemental Table 7: Sex-specific associations between average PM2.5 and 8-hour maximum O3 at the residential address during pregnancy and total cholesterol and HDL in cord blood.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Males  Non-HDL cholesterol (mg/dL) | Females  Non-HDL cholesterol (mg/dL) | Sex interaction |  | Males  HDL  (mg/dL) | Females  HDL  (mg/dL) | Sex interaction |
|  | n | β (95% CI)a per IQR | β (95% CI)a per IQR | p-value | n | β (95% CI)a per IQR | β (95% CI)a per IQR | p-value |
| Trimester 1 | 647 |  |  |  | 647 |  |  |  |
| Avg. PM2.5 (µg/m3) |  | 0.79 (-1.57, 3.15) | -0.67 (-3.24, 1.89) | 0.41 |  | 0.03 (-1.09, 1.14) | 0.36 (-0.85, 1.57) | 0.69 |
| Avg. 8-hr max O3 (ppb) |  | 3.10 (-2.47, 8.66) | 3.39 (-2.08, 8.87) | 0.91 |  | 2.07 (-0.56, 4.69) | 1.02 (-1.57, 3.60) | 0.39 |
| Trimester 2 | 647 |  |  |  | 647 |  |  |  |
| Avg. PM2.5 (µg/m3) |  | -1.00 (-3.32, 1.31) | -0.36 (-2.74, 2.02) | 0.70 |  | 0.06 (-1.05, 1.17) | -1.19 (-2.33, -0.05) | 0.12 |
| Avg. 8-hr max O3 (ppb) |  | 4.96 (-0.14, 10.06) | 7.53 (2.34, 12.73) | 0.32 |  | 0.91 (-1.54, 3.35) | 0.35 (-2.14, 2.84) | 0.65 |
| Trimester 3 | 684 |  |  |  | 684 |  |  |  |
| Avg. PM2.5 (µg/m3) |  | -0.47 (-2.78, 1.83) | -1.41 (-3.90, 1.08) | 0.59 |  | 0.29 (-0.81, 1.39) | 0.56 (-0.64, 1.75) | 0.74 |
| Avg. 8-hr max O3 (ppb) |  | 0.57 (-4.45, 5.60) | -0.15 (-4.99, 4.69) | 0.76 |  | -0.17 (-2.58, 2.24) | 1.29 (-1.03, 3.61) | 0.20 |
| Full pregnancy | 698 |  |  |  | 698 |  |  |  |
| Avg. PM2.5 (µg/m3) |  | -0.17 (-2.79, 2.46) | -1.29 (-3.92, 1.35) | 0.55 |  | 0.23 (-1.04, 1.49) | 0.04 (-1.23, 1.31) | 0.84 |
| Avg. 8-hr max O3 (ppb) |  | 2.34 (-1.17, 5.84) | 3.60 (0.16, 7.05) | 0.54 |  | 1.39 (-0.30, 3.08) | 1.68 (0.02, 3.34) | 0.77 |
| Prior 30 days to delivery | 663 |  |  |  | 663 |  |  |  |
| Avg. PM2.5 (µg/m3) |  | -1.44 (-3.54, 0.66) | -1.42 (-3.63, 0.80) | 0.99 |  | -0.30 (-1.30, 0.70) | -0.23 (-1.29, 0.83) | 0.92 |
| Avg. 8-hr max O3 (ppb) |  | 0.22 (-4.59, 5.04) | -0.39 (-5.26, 4.49) | 0.80 |  | 0.47 (-1.82, 2.77) | 1.84 (-0.49, 4.16) | 0.24 |
| Prior 7 days to delivery | 667 |  |  |  | 667 |  |  |  |
| Avg. PM2.5 (µg/m3) |  | -0.18 (-1.63, 1.27) | -1.08 (-2.59, 0.43) | 0.39 |  | -0.54 (-1.22, 0.15) | -0.61 (-1.33, 0.11) | 0.88 |
| Avg. 8-hr max O3 (ppb) |  | -1.08 (-5.26, 3.11) | -1.68 (-5.90, 2.54) | 0.77 |  | 0.24 (-1.76, 2.23) | 1.65 (-0.35, 3.66) | 0.16 |
| Abbreviations: 95% CI, 95% confidence interval; PM2.5, particulate matter with diameter ≤ 2.5 micrometers; O3, average 8-hour maximum ozone concentration in parts per billion.  aAdjusted for race, maternal age, pre-pregnancy BMI, smoking status, exposure to secondhand smoke during pregnancy, median income in the Census tract, education, mode of delivery, parity, season of birth, the corresponding co-pollutant during the specified pregnancy period, and exposure-by-sex interaction terms. | | | | | | | | |

Supplemental Table 8: Sex-specific associations between average PM2.5 and 8-hour maximum O3 at the residential address during pregnancy and free fatty acids and triglycerides in cord blood.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Males  Free Fatty Acids  (µIU/ml) | Females  Free Fatty Acids  (µIU/ml) | Sex interaction |  | Males  Log-transformed  Triglycerides  (log-unit) | Females  Log-transformed  Triglycerides  (log-unit) | Sex interaction |
|  | n | β (95% CI)a per IQR | β (95% CI)a per IQR | p-value | n | β (95% CI)a per IQR | β (95% CI)a per IQR | p-value |
| Trimester 1 | 657 |  |  |  | 703 |  |  |  |
| Avg. PM2.5 (µg/m3) |  | 1.55 (-19.21, 22.32) | -20.57 (-42.33, 1.20) | 0.15 |  | 0.01 (-0.06, 0.07) | -0.05 (-0.12, 0.02) | 0.24 |
| Avg. 8-hr max O3 (ppb) |  | -26.24 (-73.91, 21.43) | -36.64 (-84.21, 10.92) | 0.64 |  | -0.08 (-0.24, 0.07) | -0.06 (-0.21, 0.09) | 0.77 |
| Trimester 2 | 644 |  |  |  | 701 |  |  |  |
| Avg. PM2.5 (µg/m3) |  | -9.85 (-30.37, 10.67) | 6.43 (-14.74, 27.61) | 0.28 |  | -0.04 (-0.10, 0.03) | 0.07 (-0.14, 0.00) | 0.27 |
| Avg. 8-hr max O3 (ppb) |  | 19.33 (-24.14, 62.79) | 33.62 (-10.95, 78.19) | 0.52 |  | 0.05 (-0.09, 0.19) | 0.10 (-0.04, 0.25) | 0.45 |
| Trimester 3 | 682 |  |  |  | 737 |  |  |  |
| Avg. PM2.5 (µg/m3) |  | -12.91 (-34.26, 8.44) | -12.31 (-35.40, 10.79) | 0.97 |  | -0.04 (-0.11, 0.04) | -0.07 (-0.14, 0.00) | 0.47 |
| Avg. 8-hr max O3 (ppb) |  | 32.49 (-13.00, 77.98) | 30.91 (-13.27, 75.10) | 0.94 |  | 0.11 (-0.03, 0.25) | 0.04 (-0.10, 0.18) | 0.28 |
| Full pregnancy | 700 |  |  |  | 756 |  |  |  |
| Avg. PM2.5 (µg/m3) |  | -6.45 (-29.30, 16.40) | -16.62 (-40.12, 6.88) | 0.54 |  | -0.03 (-0.11, 0.04) | -0.07 (-0.15, 0.00) | 0.47 |
| Avg. 8-hr max O3 (ppb) |  | 2.11 (-28.68, 32.89) | 4.43 (-24.69, 33.55) | 0.90 |  | -0.02 (-0.12, 0.07) | -0.02 (-0.11, 0.08) | 0.86 |
| Prior 30 days to delivery | 661 |  |  |  | 716 |  |  |  |
| Avg. PM2.5 (µg/m3) |  | -12.22 (-30.64, 6.20) | -19.42 (-40.86, 2.02) | 0.59 |  | 0.00 (-0.05, 0.06) | 0.00 (-0.06, 0.06) | 0.93 |
| Avg. 8-hr max O3 (ppb) |  | 19.40 (-23.85, 62.65) | 12.16 (-31.88, 56.19) | 0.73 |  | 0.03 (-0.10, 0.17) | -0.02 (-0.16, 0.11) | 0.39 |
| Prior 7 days to delivery | 666 |  |  |  |  |  |  |  |
| Avg. PM2.5 (µg/m3) |  | -8.08 (-20.74, 4.57) | 2.59 (-10.57, 15.76) | 0.24 | 721 | 0.03 (-0.01, 0.07) | -0.02 (-0.06, 0.03) | 0.10 |
| Avg. 8-hr max O3 (ppb) |  | 10.38 (-26.78, 47.54) | 2.79 (-34.96, 40.55) | 0.68 |  | -0.01 (-0.13, 0.11) | -0.06 (-0.18, 0.06) | 0.38 |
| Abbreviations: 95% CI, 95% confidence interval; PM2.5, particulate matter with diameter ≤ 2.5 micrometers; O3, average 8-hour maximum ozone concentration in parts per billion.  aAdjusted for race, maternal age, pre-pregnancy BMI, smoking status, exposure to secondhand smoke during pregnancy, median income in the Census tract, education, mode of delivery, parity, season of birth, the corresponding co-pollutant during the specified pregnancy period, and exposure-by-sex interaction terms. | | | | | | | | |

Supplemental Table 9: Associations between average PM2.5 and 8-hour maximum O3 at the residential address during pregnancy and glucose, insulin, glucose-insulin ratio, and leptin in cord blood, among those without gestational diabetes.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Glucose  (mg/dL) |  | Log-transformed  Insulin  (log-unit) |  | Log-transformed  Glucose/insulin ratio |  | Log-transformed  Leptin  (log-unit) |
|  | n | β (95% CI)a per IQR | n | β (95% CI)a per IQR | n | β (95% CI)a per IQR | n | β (95% CI)a per IQR |
| Trimester 1 | 702 |  | 679 |  | 677 |  | 587 |  |
| Avg. PM2.5 (µg/m3) |  | -1.39 (-3.16, 0.39) |  | 0.00 (-0.06, 0.06) |  | -0.03 (-0.08, 0.03) |  | 0.08 (-0.01, 0.18) |
| Avg. 8-hr max O3 (ppb) |  | 2.90 (-2.01, 7.81) |  | -0.05 (-0.21, 0.11) |  | 0.08 (-0.08, 0.24) |  | -0.13 (-0.39, 0.14) |
| Trimester 2 | 702 |  | 673 |  | 671 |  | 614 |  |
| Avg. PM2.5 (µg/m3) |  | 0.86 (-0.97, 2.69) |  | -0.01 (-0.06, 0.05) |  | 0.02 (-0.03, 0.08) |  | 0.06 (-0.03, 0.14) |
| Avg. 8-hr max O3 (ppb) |  | 0.46 (-4.36, 5.28) |  | 0.19 (0.04, 0.33) |  | -0.18 (-0.33, -0.03) |  | -0.03 (-0.26, 0.20) |
| Trimester 3 | 736 |  | 707 |  | 705 |  | 631 |  |
| Avg. PM2.5 (µg/m3) |  | 0.81 (-1.10, 2.73) |  | 0.00 (-0.06, 0.06) |  | 0.00 (-0.05, 0.06) |  | 0.01 (-0.08, 0.11) |
| Avg. 8-hr max O3 (ppb) |  | 0.51 (-4.25, 5.26) |  | 0.24 (0.09, 0.38) |  | -0.24 (-0.39, -0.10) |  | 0.09 (-0.15, 0.33) |
| Full pregnancy | 754 |  | 725 |  | 723 |  | 634 |  |
| Avg. PM2.5 (µg/m3) |  | 0.07 (-2.04, 2.18) |  | 0.02 (-0.04, 0.08) |  | -0.03 (-0.09, 0.04) |  | 0.12 (0.01, 0.22) |
| Avg. 8-hr max O3 (ppb) |  | 0.92 (-2.19, 4.02) |  | 0.14 (0.04, 0.23) |  | -0.13 (-0.23, -0.04) |  | 0.02 (-0.13, 0.18) |
| Prior 30 days to delivery | 714 |  | 687 |  | 685 |  | 612 |  |
| Avg. PM2.5 (µg/m3) |  | 0.83 (-0.95, 2.61) |  | -0.03 (-0.08, 0.03) |  | 0.03 (-0.02, 0.09) |  | -0.01 (-0.10, 0.09) |
| Avg. 8-hr max O3 (ppb) |  | 0.00 (-4.55, 4.55) |  | 0.21 (0.07, 0.35) |  | -0.23 (-0.37, -0.09) |  | 0.07 (-0.16, 0.30) |
| Prior 7 days to delivery | 719 |  | 692 |  | 690 |  | 611 |  |
| Avg. PM2.5 (µg/m3) |  | 0.63 (-0.53, 1.78) |  | 0.02 (-0.02, 0.05) |  | -0.01 (-0.05, 0.02) |  | 0.01 (-0.04, 0.07) |
| Avg. 8-hr max O3 (ppb) |  | -1.78 (-5.74, 2.17) |  | 0.11 (-0.01, 0.24) |  | -0.15 (-0.27, -0.03) |  | 0.10 (-0.10, 0.30) |
| Abbreviations: 95% CI, 95% confidence interval; PM2.5, particulate matter with diameter ≤ 2.5 micrometers; O3, average 8-hour maximum ozone  concentration in parts per billion.  aAdjusted for race, maternal age, pre-pregnancy BMI, smoking status, exposure to secondhand smoke during pregnancy, median income in the  Census tract, education, mode of delivery, parity, season of birth, infant sex, and the corresponding co-pollutant during the specified pregnancy period. | | | | | | | | |

Supplemental Table 10: Associations between average PM2.5 and 8-hour maximum O3 at the residential address during pregnancy and lipid biomarkers in cord blood, among those without gestational diabetes.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Non-HDL  Cholesterol  (mg/dL) |  | HDL  (mg/dL) |  | Free Fatty Acids  (µIU/ml) |  | Log-transformed  Triglycerides  (log-unit) |
|  | n | β (95% CI)a per IQR | n | β (95% CI)a per IQR | n | β (95% CI)a per IQR | n | β (95% CI)a per IQR |
| Trimester 1 | 624 |  | 624 |  | 630 |  | 675 |  |
| Avg. PM2.5 (µg/m3) |  | 0.15 (-1.66, 1.96) |  | 0.12 (-0.72, 0.97) |  | -9.64 (-25.10, 5.82) |  | -0.01 (-0.06, 0.04) |
| Avg. 8-hr max O3 (ppb) |  | 3.04 (-2.00, 8.08) |  | 1.67 (-0.68, 4.02) |  | -30.54 (-73.43, 12.35) |  | -0.07 ( -0.21, 0.06) |
| Trimester 2 | 624 |  | 624 |  | 617 |  | 673 |  |
| Avg. PM2.5 (µg/m3) |  | -0.51 (-2.23, 1.21) |  | -0.43 (-1.25, 0.40) |  | -4.75 (-19.83, 10.32) |  | -0.03 (-0.07, 0.02) |
| Avg. 8-hr max O3 (ppb) |  | 6.67 (2.05, 11.29) |  | 0.95 (-1.25, 3.15) |  | 25.08 (-13.54, 63.69) |  | 0.07 (-0.06, 0.19) |
| Trimester 3 | 658 |  | 658 |  | 652 |  | 706 |  |
| Avg. PM2.5 (µg/m3) |  | -1.10 (-2.85, 0.64) |  | 0.35 (-0.49, 1.18) |  | -9.92 (-26.01, 6.16) |  | -0.05 (-0.10, 0.00) |
| Avg. 8-hr max O3 (ppb) |  | 0.20 (-4.26, 4.66) |  | 0.61 (-1.51, 2.73) |  | 36.21 (-4.37, 76.79) |  | 0.09 (-0.04, 0.21) |
| Full pregnancy | 672 |  | 672 |  | 669 |  | 724 |  |
| Avg. PM2.5 (µg/m3) |  | -0.68 (-2.64, 1.27) |  | 0.18 (-0.75, 1.11) |  | -11.44 (-28.45, 5.58) |  | -0.06 (-0.11, 0.00) |
| Avg. 8-hr max O3 (ppb) |  | 3.05 (0.09, 6.01) |  | 1.67 (0.25, 3.08) |  | 8.05 (-16.90, 33.01) |  | -0.02 (-0.10, 0.06) |
| Prior 30 days to delivery | 637 |  | 637 |  | 630 |  | 684 |  |
| Avg. PM2.5 (µg/m3) |  | -1.59 (-3.27, 0.09) |  | -0.25 (-1.05, 0.55) |  | -16.71 (-31.83, -1.60) |  | -0.01 (-0.06, 0.04) |
| Avg. 8-hr max O3 (ppb) |  | -0.18 (-4.51, 4.16) |  | 1.01 (-1.04, 3.07) |  | 18.60 (-20.23, 57.43) |  | 0.02 (-0.10, 0.14) |
| Prior 7 days to delivery | 641 |  | 641 |  | 635 |  | 689 |  |
| Avg. PM2.5 (µg/m3) |  | -0.62 (-1.71, 0.47) |  | -0.58 (-1.09, -0.07) |  | -2.86 (-12.23, 6.52) |  | 0.01 (-0.02, 0.04) |
| Avg. 8-hr max O3 (ppb) |  | -1.53 (-5.28, 2.22) |  | 0.83 (-0.94, 2.60) |  | 9.13 (-24.02, 42.27) |  | -0.02 (-0.13, 0.08) |
| Abbreviations: 95% CI, 95% confidence interval; PM2.5, particulate matter with diameter ≤ 2.5 micrometers; O3, average 8-hour maximum ozone  concentration in parts per billion.  aAdjusted for race, maternal age, pre-pregnancy BMI, smoking status, exposure to secondhand smoke during pregnancy, median income in the  Census tract, education, mode of delivery, parity, season of birth, infant sex, and the corresponding co-pollutant during the specified pregnancy period. | | | | | | | | |

Supplemental Table 11: Associations between quartiles of average PM2.5 and 8-hour maximum O3 at the residential address during pregnancy and metabolic biomarkers in cord blood.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Glucose  (mg/dL) |  | Log-transformed  Insulin  (log-unit) |  | Log-transformed  Glucose/insulin ratio |  | Log-transformed  Leptin  (log-unit) |
|  | n | β (95% CI)a | n | β (95% CI)a | n | β (95% CI)a | n | β (95% CI)a |
| Trimester 1 | 731 |  | 706 |  | 704 |  | 614 |  |
| Avg. PM2.5 (µg/m3) |  |  |  |  |  |  |  |  |
| Q1 [5.3, 6.9] |  | Ref. |  | Ref. |  | Ref. |  | Ref. |
| Q2 [6.9, 7.5] |  | 0.49 (-3.50, 4.47) |  | 0.05 (-0.08, 0.18) |  | -0.05 (-0.17, 0.08) |  | 0.10 (-0.11, 0.32) |
| Q3 [7.5, 8.2] |  | 0.31 (-3.85, 4.46) |  | -0.06 (-0.19, 0.07) |  | 0.06 (-0.07, 0.19) |  | -0.07 (-0.29, 0.15) |
| Q4 [8.2, 12.4] |  | -0.37 (-4.88, 4.13) |  | 0.00 (-0.15, 0.14) |  | -0.02 (-0.16, 0.13) |  | 0.09 (-0.16, 0.33) |
| Avg. 8-hr max O3 (ppb) |  |  |  |  |  |  |  |  |
| Q1 [20.2, 33.0] |  | Ref. |  | Ref. |  | Ref. |  | Ref. |
| Q2 [33.0, 41.8] |  | 3.64 (-0.74, 8.02) |  | 0.00 (-0.15, 0.14) |  | 0.05 (-0.09, 0.19) |  | -0.21 (-0.44, 0.03) |
| Q3 [41.8, 52.9] |  | -0.23 (-6.78, 6.32) |  | -0.07 (-0.28, 0.14) |  | 0.07 (-0.14, 0.28) |  | -0.47 (-0.82, -0.13) |
| Q4 [53.0, 63.4] |  | 1.33 (-5.33, 7.98) |  | -0.09 (-0.30, 0.12) |  | 0.11 (-0.10, 0.32) |  | -0.41 (-0.76, -0.05) |
| Trimester 2 | 731 |  | 700 |  | 698 |  | 642 |  |
| Avg. PM2.5 (µg/m3) |  |  |  |  |  |  |  |  |
| Q1 [4.6, 6.8] |  | Ref. |  | Ref. |  | Ref. |  | Ref. |
| Q2 [6.8, 7.4] |  | 3.50 (-0.75, 7.74) |  | 0.13 (0.00, 0.25) |  | -0.09 (-0.22, 0.03) |  | -0.02 (-0.23, 0.18) |
| Q3 [7.4, 8.1] |  | 3.77 (-0.76, 8.30) |  | 0.03 (-0.11, 0.16) |  | 0.02 (-0.12, 0.15) |  | 0.26 (0.04, 0.48) |
| Q4 [8.1, 11.2] |  | 3.63 (-1.26, 8.52) |  | 0.06 (-0.09, 0.21) |  | -0.02 (-0.17, 0.13) |  | 0.25 (0.01, 0.48) |
| Avg. 8-hr max O3 (ppb) |  |  |  |  |  |  |  |  |
| Q1 [20.3, 33.9] |  | Ref. |  | Ref. |  | Ref. |  | Ref. |
| Q2 [33.9, 42.6] |  | 0.05 (-4.65, 4.76) |  | 0.13 (-0.01, 0.27) |  | -0.13 (-0.27, 0.01) |  | 0.25 (0.02, 0.49) |
| Q3 [42.6, 52.3] |  | 1.74 (-4.85, 8.32) |  | 0.28 (0.08, 0.47) |  | -0.28 (-0.47, -0.08) |  | 0.16 (-0.16, 0.48) |
| Q4 [52.4, 62.3] |  | -2.68 (-9.27, 3.91) |  | 0.20 (0.00, 0.40) |  | -0.23 (-0.43, -0.03) |  | -0.04 (-0.35, 0.28) |
| Trimester 3 | 768 |  | 737 |  | 735 |  | 662 |  |
| Avg. PM2.5 (µg/m3) |  |  |  |  |  |  |  |  |
| Q1 [3.3, 6.8] |  | Ref. |  | Ref. |  | Ref. |  | Ref. |
| Q2 [6.8, 7.3] |  | 1.63 (-2.40, 5.66) |  | 0.08 (-0.04, 0.20) |  | -0.06 (-0.19, 0.06) |  | 0.03 (-0.17, 0.24) |
| Q3 [7.3, 8.1] |  | -1.15 (-5.41, 3.11) |  | 0.06 (-0.08, 0.19) |  | -0.08 (-0.21, 0.05) |  | 0.12 (-0.09, 0.33) |
| Q4 [8.1, 12.7] |  | 2.19 (-2.29, 6.66) |  | 0.06 (-0.07, 0.20) |  | -0.05 (-0.19, 0.09) |  | 0.02 (-0.21, 0.25) |
| Avg. 8-hr max O3 (ppb) |  |  |  |  |  |  |  |  |
| Q1 [21.4, 35.5] |  | Ref. |  | Ref. |  | Ref. |  | Ref. |
| Q2 [35.6, 46.6] |  | -3.89 (-8.88, 1.10) |  | 0.04 (-0.11, 0.20) |  | -0.10 (-0.25, 0.06) |  | 0.00 (-0.26, 0.25) |
| Q3 [46.6, 54.0] |  | 3.49 (-3.39, 10.37) |  | 0.29 (0.07, 0.50) |  | -0.26 (-0.47, -0.05) |  | 0.28 (-0.07, 0.62) |
| Q4 [54.0, 63.2] |  | 1.11 (-5.67, 7.89) |  | 0.28 (0.07, 0.49) |  | -0.29 (-0.50, -0.08) |  | 0.21 (-0.14, 0.55) |
| Full pregnancy | 787 |  | 756 |  | 754 |  | 665 |  |
| Avg. PM2.5 (µg/m3) |  |  |  |  |  |  |  |  |
| Q1 [5.4, 7.0] |  | Ref. |  | Ref. |  | Ref. |  | Ref. |
| Q2 [7.0, 7.5] |  | 0.51 (-3.41, 4.44) |  | -0.08 (-0.20, 0.04) |  | 0.07 (-0.05, 0.19) |  | 0.18 (-0.01, 0.37) |
| Q3 [7.5, 7.9] |  | 1.92 (-1.92, 5.75) |  | -0.07 (-0.18, 0.05) |  | 0.08 (-0.04, 0.19) |  | 0.21 (0.02, 0.41) |
| Q4 [7.9, 9.4] |  | 1.36 (-2.53, 5.24) |  | 0.01 (-0.11, 0.13) |  | -0.01 (-0.13, 0.11) |  | 0.26 (0.07, 0.45) |
| Avg. 8-hr max O3 (ppb) |  |  |  |  |  |  |  |  |
| Q1 [28.9, 40.7] |  | Ref. |  | Ref. |  | Ref. |  | Ref. |
| Q2 [40.7, 43.9] |  | -0.43 (-4.26, 3.40) |  | 0.11 (-0.01, 0.23) |  | -0.12 (-0.24, -0.01) |  | 0.03 (-0.17, 0.22) |
| Q3 [43.9, 47.0] |  | 0.83 (-3.53, 5.19) |  | 0.15 (0.01, 0.28) |  | -0.14 (-0.27, -0.01) |  | 0.03 (-0.19, 0.24) |
| Q4 [47.1, 54.0] |  | 3.09 (-2.20, 8.39) |  | 0.20 (0.04, 0.36) |  | -0.17 (-0.33, -0.01) |  | -0.06 (-0.32, 0.20) |
| Prior 30 days to delivery | 747 |  | 718 |  | 716 |  | 643 |  |
| Avg. PM2.5 (µg/m3) |  |  |  |  |  |  |  |  |
| Q1 [3.0, 6.4] |  | Ref. |  | Ref. |  | Ref. |  | Ref. |
| Q2 [6.4, 7.2] |  | 0.32 (-3.90, 4.54) |  | 0.22 (0.10, 0.35) |  | -0.23 (-0.35, -0.10) |  | -0.10 (-0.31, 0.11) |
| Q3 [7.2, 8.3] |  | 0.08 (-4.34, 4.51) |  | 0.18 (0.04, 0.31) |  | -0.17 (-0.31, -0.04) |  | -0.01 (-0.23, 0.21) |
| Q4 [8.3, 15.2] |  | 2.49 (-1.97, 6.95) |  | 0.07 (-0.07, 0.20) |  | -0.04 (-0.18, 0.09) |  | -0.05 (-0.28, 0.18) |
| Avg. 8-hr max O3 (ppb) |  |  |  |  |  |  |  |  |
| Q1 [19.7, 34.2] |  | Ref. |  | Ref. |  | Ref. |  | Ref. |
| Q2 [34.3, 48.0] |  | -1.26 (-6.52, 4.01) |  | 0.16 (0.00, 0.32) |  | -0.19 (-0.35, -0.03) |  | 0.04 (-0.23, 0.30) |
| Q3 [48.0, 55.9] |  | -0.75 (-6.60, 5.10) |  | 0.27 (0.09, 0.45) |  | -0.30 (-0.48, -0.12) |  | 0.11 (-0.19, 0.41) |
| Q4 [55.9, 66.8] |  | 0.05 (-6.30, 6.39) |  | 0.34 (0.14, 0.53) |  | -0.36 (-0.55, -0.16) |  | 0.16 (-0.16, 0.48) |
| Prior 7 days to delivery | 752 |  | 723 |  | 721 |  | 642 |  |
| Avg. PM2.5 (µg/m3) |  |  |  |  |  |  |  |  |
| Q1 [1.9, 5.6] |  | Ref. |  | Ref. |  | Ref. |  | Ref. |
| Q2 [5.6, 6.7] |  | 0.03 (-3.91, 3.98) |  | -0.09 (-0.21, 0.03) |  | 0.10 (-0.02, 0.22) |  | -0.09 (-0.29, 0.11) |
| Q3 [6.7, 8.2] |  | 1.98 (-2.08, 6.03) |  | 0.05 (-0.07, 0.18) |  | -0.03 (-0.16, 0.09) |  | -0.02 (-0.23, 0.18) |
| Q4 [8.2, 38.4] |  | 4.22 (0.16, 8.28) |  | 0.11 (-0.02, 0.23) |  | -0.06 (-0.18, 0.07) |  | -0.05 (-0.26, 0.16) |
| Avg. 8-hr max O3 (ppb) |  |  |  |  |  |  |  |  |
| Q1 [18.5, 35.5] |  | Ref. |  | Ref. |  | Ref. |  | Ref. |
| Q2 [35.6, 47.0] |  | 0.75 (-3.83, 5.34) |  | 0.16 (0.02, 0.31) |  | -0.17 (-0.31, -0.03) |  | -0.07 (-0.30, 0.16) |
| Q3 [47.0, 55.5] |  | -2.05 (-7.43, 3.33) |  | 0.19 (0.02, 0.35) |  | -0.22 (-0.38, -0.05) |  | 0.03 (-0.25, 0.30) |
| Q4 [55.6, 69.5] |  | 1.45 (-4.78, 7.68) |  | 0.25 (0.06, 0.44) |  | -0.25 (-0.44, -0.06) |  | 0.05 (-0.27, 0.38) |
| Abbreviations: 95% CI, 95% confidence interval; PM2.5, particulate matter with diameter ≤ 2.5 micrometers; O3, average 8-hour maximum ozone  concentration in parts per billion.  aAdjusted for race, maternal age, pre-pregnancy BMI, smoking status, exposure to secondhand smoke during pregnancy, median income in the  Census tract, education, mode of delivery, parity, season of birth, infant sex, and the corresponding co-pollutant during the specified pregnancy period. | | | | | | | | |

Supplemental Table 12: Associations between quartiles of average PM2.5 and 8-hour maximum O3 at the residential address during pregnancy and lipid biomarkers in cord blood.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Non-HDL  Cholesterol  (mg/dL) |  | HDL  (mg/dL) |  | Free Fatty Acids  (µIU/ml) |  | Log-transformed  Triglycerides  (log-unit) |
|  | n | β (95% CI)a | n | β (95% CI)a | n | β (95% CI)a | n | β (95% CI)a |
| Trimester 1 |  |  |  |  |  |  |  |  |
| Avg. PM2.5 (µg/m3) | 647 |  | 647 |  | 657 |  | 703 |  |
| Q1 [5.3, 6.9] |  | Ref. |  | Ref. |  | Ref. |  | Ref. |
| Q2 [6.9, 7.5] |  | -5.60 (-9.55, -1.65) |  | -0.49 (-2.37, 1.40) |  | 7.66 (-26.65, 41.97) |  | -0.05 (-0.16, 0.06) |
| Q3 [7.5, 8.2] |  | -6.54 (-10.70, -2.37) |  | 0.89 (-1.10, 2.88) |  | -29.72 (-64.97, 5.54) |  | -0.07 (-0.18, 0.04) |
| Q4 [8.2, 12.4] |  | -4.39 (-8.90, 0.13) |  | 0.49 (-1.67, 2.65) |  | -12.85 (-51.76, 26.06) |  | -0.12 (-0.24, 0.01) |
| Avg. 8-hr max O3 (ppb) |  |  |  |  |  |  |  |  |
| Q1 [20.2, 33.0] |  | Ref. |  | Ref. |  | Ref. |  | Ref. |
| Q2 [33.0, 41.8] |  | -1.24 (-5.62, 3.13) |  | 0.29 (-1.80, 2.38) |  | -18.89 (-56.04, 18.26) |  | -0.03 (-0.15, 0.09) |
| Q3 [41.8, 52.9] |  | 3.28 (-3.26, 9.82) |  | 1.24 (-1.89, 4.36) |  | -32.88 (-88.46, 22.71) |  | -0.08 (-0.26, 0.09) |
| Q4 [53.0, 63.4] |  | 4.59 (-2.08, 11.26) |  | 1.45 (-1.73, 4.64) |  | -46.09 (-104.07, 11.90) |  | -0.09 (-0.28, 0.09) |
| Trimester 2 | 647 |  | 647 |  | 644 |  | 701 |  |
| Avg. PM2.5 (µg/m3) |  |  |  |  |  |  |  |  |
| Q1 [4.6, 6.8] |  | Ref. |  | Ref. |  | Ref. |  | Ref. |
| Q2 [6.8, 7.4] |  | -2.42 (-6.45, 1.61) |  | -1.87 (-3.81, 0.06) |  | -7.54 (-41.60, 26.51) |  | -0.07 (-0.18, 0.04) |
| Q3 [7.4, 8.1] |  | -0.71 (-4.95, 3.54) |  | -1.31 (-3.35, 0.73) |  | 4.37 (-32.26, 40.99) |  | -0.03 (-0.15, 0.09) |
| Q4 [8.1, 11.2] |  | -1.73 (-6.31, 2.86) |  | -2.20 (-4.41, 0.00) |  | -2.83 (-43.55, 37.90) |  | -0.09 (-0.21, 0.04) |
| Avg. 8-hr max O3 (ppb) |  |  |  |  |  |  |  |  |
| Q1 [20.3, 33.9] |  | Ref. |  | Ref. |  | Ref. |  | Ref. |
| Q2 [33.9, 42.6] |  | 5.74 (1.20, 10.28) |  | -0.10 (-2.28, 2.08) |  | -12.56 (-51.19, 26.07) |  | 0.05 (-0.08, 0.17) |
| Q3 [42.6, 52.3] |  | 6.61 (0.36, 12.85) |  | -0.19 (-3.19, 2.80) |  | 3.36 (-49.93, 56.65) |  | 0.00 (-0.17, 0.17) |
| Q4 [52.4, 62.3] |  | 10.29 (3.99, 16.58) |  | 0.38 (-2.65, 3.40) |  | 17.12 (-36.44, 70.68) |  | 0.11 (-0.06, 0.29) |
| Trimester 3 | 684 |  | 684 |  | 682 |  | 737 |  |
| Avg. PM2.5 (µg/m3) |  |  |  |  |  |  |  |  |
| Q1 [3.3, 6.8] |  | Ref. |  | Ref. |  | Ref. |  | Ref. |
| Q2 [6.8, 7.3] |  | -0.16 (-3.89, 3.58) |  | 0.52 (-1.27, 2.31) |  | -10.89 (-44.18, 22.40) |  | -0.04 (-0.15, 0.06) |
| Q3 [7.3, 8.1] |  | 1.93 (-2.06, 5.92) |  | 0.20 (-1.71, 2.11) |  | -0.35 (-36.00, 35.31) |  | -0.02 (-0.13, 0.09) |
| Q4 [8.1, 12.7] |  | -1.04 (-5.15, 3.07) |  | 0.62 (-1.35, 2.59) |  | -32.25 (-69.52, 5.01) |  | -0.10 (-0.22, 0.01) |
| Avg. 8-hr max O3 (ppb) |  |  |  |  |  |  |  |  |
| Q1 [21.4, 35.5] |  | Ref. |  | Ref. |  | Ref. |  | Ref. |
| Q2 [35.6, 46.6] |  | 1.46 (-3.28, 6.19) |  | 0.42 (-1.85, 2.69) |  | 29.57 (-15.55, 74.69) |  | 0.04 (-0.09, 0.17) |
| Q3 [46.6, 54.0] |  | 1.37 (-5.10, 7.83) |  | -0.76 (-3.86, 2.34) |  | 45.78 (-15.45, 107.01) |  | 0.09 (-0.09, 0.27) |
| Q4 [54.0, 63.2] |  | 0.91 (-5.45, 7.27) |  | 0.49 (-2.56, 3.54) |  | 51.32 (-9.12, 111.75) |  | 0.13 (-0.04, 0.31) |
| Full pregnancy | 698 |  | 698 |  | 700 |  | 756 |  |
| Avg. PM2.5 (µg/m3) |  |  |  |  |  |  |  |  |
| Q1 [5.4, 7.0] |  | Ref. |  | Ref. |  | Ref. |  | Ref. |
| Q2 [7.0, 7.5] |  | -4.72 (-8.34, -1.09) |  | -1.25 (-3.01, 0.52) |  | -15.37 (-47.06, 16.31) |  | 0.01 (-0.09, 0.11) |
| Q3 [7.5, 7.9] |  | -4.89 (-8.42, -1.37) |  | -0.41 (-2.12, 1.31) |  | -26.08 (-57.30, 5.13) |  | -0.09 (-0.19, 0.00) |
| Q4 [7.9, 9.4] |  | -1.99 (-5.57, 1.60) |  | -0.35 (-2.09, 1.40) |  | -15.39 (-46.90, 16.12) |  | -0.08 (-0.18, 0.02) |
| Avg. 8-hr max O3 (ppb) |  |  |  |  |  |  |  |  |
| Q1 [28.9, 40.7] |  | Ref. |  | Ref. |  | Ref. |  | Ref. |
| Q2 [40.7, 43.9] |  | 3.28 (-0.20, 6.76) |  | 1.02 (-0.67, 2.71) |  | -9.45 (-40.99, 22.08) |  | 0.06 (-0.04, 0.16) |
| Q3 [43.9, 47.0] |  | 0.82 (-3.17, 4.82) |  | 1.76 (-0.18, 3.71) |  | 1.13 (-33.92, 36.18) |  | -0.02 (-0.13, 0.09) |
| Q4 [47.1, 54.0] |  | 4.89 (0.01, 9.77) |  | 1.97 (-0.41, 4.34) |  | 0.46 (-43.10, 44.01) |  | -0.01 (-0.15, 0.13) |
| Prior 30 days to delivery | 663 |  | 663 |  | 661 |  | 716 |  |
| Avg. PM2.5 (µg/m3) |  |  |  |  |  |  |  |  |
| Q1 [3.0, 6.4] |  | Ref. |  | Ref. |  | Ref. |  | Ref. |
| Q2 [6.4, 7.2] |  | 1.53 (-2.58, 5.65) |  | 0.90 (-1.06, 2.86) |  | -21.34 (-56.22, 13.54) |  | -0.05 (-0.16, 0.06) |
| Q3 [7.2, 8.3] |  | 1.06 (-3.16, 5.28) |  | 0.95 (-1.06, 2.96) |  | -32.00 (-68.55, 4.55) |  | -0.07 (-0.18, 0.05) |
| Q4 [8.3, 15.2] |  | -2.31 (-6.62, 2.00) |  | -0.86 (-2.91, 1.19) |  | -47.16 (-84.55, -9.77) |  | 0.02 (-0.10, 0.13) |
| Avg. 8-hr max O3 (ppb) |  |  |  |  |  |  |  |  |
| Q1 [19.7, 34.2] |  | Ref. |  | Ref. |  | Ref. |  | Ref. |
| Q2 [34.3, 48.0] |  | -0.42 (-5.43, 4.59) |  | 0.91 (-1.47, 3.29) |  | -10.58 (-57.51, 36.36) |  | -0.07 (-0.21, 0.07) |
| Q3 [48.0, 55.9] |  | 0.06 (-5.49, 5.60) |  | 0.96 (-1.68, 3.59) |  | 5.08 (-46.82, 56.98) |  | 0.00 (-0.15, 0.16) |
| Q4 [55.9, 66.8] |  | 0.17 (-5.80, 6.13) |  | 2.85 (0.01, 5.69) |  | 26.43 (-29.05, 81.90) |  | -0.06 (-0.23, 0.11) |
| Prior 7 days to delivery | 667 |  | 667 |  | 666 |  | 721 |  |
| Avg. PM2.5 (µg/m3) |  |  |  |  |  |  |  |  |
| Q1 [1.9, 5.6] |  | Ref. |  | Ref. |  | Ref. |  | Ref. |
| Q2 [5.6, 6.7] |  | -2.38 (-6.18, 1.43) |  | -0.25 (-2.06, 1.55) |  | -23.02 (-55.84, 9.79) |  | -0.04 (-0.14, 0.07) |
| Q3 [6.7, 8.2] |  | -3.11 (-7.07, 0.85) |  | -0.85 (-2.73, 1.02) |  | -26.62 (-60.05, 6.82) |  | -0.07 (-0.18, 0.03) |
| Q4 [8.2, 38.4] |  | -4.29 (-8.18, -0.40) |  | -2.07 (-3.92, -0.23) |  | -21.80 (-55.70, 12.10) |  | -0.02 (-0.13, 0.08) |
| Avg. 8-hr max O3 (ppb) |  |  |  |  |  |  |  |  |
| Q1 [18.5, 35.5] |  | Ref. |  | Ref. |  | Ref. |  | Ref. |
| Q2 [35.6, 47.0] |  | -0.64 (-4.99, 3.70) |  | 0.40 (-1.66, 2.46) |  | -19.02 (-59.50, 21.46) |  | 0.00 (-0.12, 0.12) |
| Q3 [47.0, 55.5] |  | -1.07 (-6.18, 4.05) |  | -0.11 (-2.54, 2.32) |  | -4.90 (-51.78, 41.98) |  | 0.07 (-0.07, 0.22) |
| Q4 [55.6, 69.5] |  | -1.51 (-7.39, 4.38) |  | 2.35 (-0.45, 5.14) |  | 14.09 (-39.19, 67.37) |  | -0.03 (-0.19, 0.14) |
| Abbreviations: 95% CI, 95% confidence interval; PM2.5, particulate matter with diameter ≤ 2.5 micrometers; O3, average 8-hour maximum ozone  concentration in parts per billion.  aAdjusted for race, maternal age, pre-pregnancy BMI, smoking status, exposure to secondhand smoke during pregnancy, median income in the  Census tract, education, mode of delivery, parity, season of birth, infant sex, and the corresponding co-pollutant during the specified pregnancy period. | | | | | | | | |