**Appendix Table A1.** Adjusteda odds ratios (AOR) and 95% confidence intervals (CI) of neural tube defects, spina bifida and anencephaly comparing highest (4th) to lowest (1st) quartile exposure to PM10b, stratified by neighborhood socioeconomic factors, between 1997 and 2006 in 8 counties in the San Joaquin Valley of California.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Neural tube defects | Spina bifida | Anencephaly |
| AOR | 95% CI | AOR | 95% CI | AOR | 95% CI |
| High poverty | **1.92** | [1.01, | 3.67] | **2.58** | [1.11, | 5.98] | 1.30 | [0.51, | 3.30] |
| Low poverty | 0.77 | [0.41, | 1.46] | 0.78 | [0.37, | 1.65] | 0.79 | [0.28, | 2.26] |
| Low income | **2.37** | [1.15, | 4.90] | **5.07** | [1.68, | 15.26] | 1.04 | [0.38, | 2.84] |
| High income | 0.81 | [0.45, | 1.43] | 0.71 | [0.36, | 1.40] | 1.10 | [0.44, | 2.74] |
| Low education | **1.88** | [1.03, | 3.43] | **3.20** | [1.39, | 7.36] | 0.99 | [0.43, | 2.29] |
| High education | 0.67 | [0.35, | 1.31] | 0.57 | [0.26, | 1.25] | 1.10 | [0.35, | 3.45] |
| High male unemployment | 1.50 | [0.86, | 2.61] | 1.74 | [0.88, | 3.43] | 1.19 | [0.52, | 2.75] |
| Low male unemployment | 0.82 | [0.41, | 1.64] | 0.82 | [0.37, | 1.85] | 0.87 | [0.28, | 2.74] |
| High female unemployment | 1.75 | [1.00, | 3.06] | 1.95 | [0.99, | 3.84] | 1.45 | [0.61, | 3.42] |
| Low female unemployment | 0.64 | [0.32, | 1.30] | 0.68 | [0.29, | 1.56] | 0.61 | [0.19, | 1.94] |
| High public assistance | 1.65 | [0.82, | 3.30] | 1.85 | [0.75, | 4.59] | 1.49 | [0.57, | 3.85] |
| Low public assistance | 0.93 | [0.53, | 1.63] | 1.08 | [0.57, | 2.04] | 0.63 | [0.22, | 1.78] |
| Low median home value | 1.12 | [0.64, | 1.93] | 1.15 | [0.59, | 2.22] | 1.07 | [0.46, | 2.50] |
| High median home value | 1.27 | [0.62, | 2.63] | 1.57 | [0.67, | 3.68] | 0.88 | [0.26, | 3.04] |
| Majority older housing | 1.34 | [0.81, | 2.22] | 1.60 | [0.86, | 2.95] | 1.01 | [0.47, | 2.19] |
| Majority newer housing | 0.84 | [0.37, | 1.93] | 0.74 | [0.28, | 1.95] | 1.25 | [0.31, | 4.97] |
| High PCA | 1.61 | [0.88, | 2.93] | **2.57** | [1.15, | 5.75] | 0.91 | [0.39, | 2.10] |
| Low PCA | 0.78 | [0.41, | 1.52] | 0.68 | [0.32, | 1.47] | 1.18 | [0.38, | 3.70] |

Abbreviations: AOR, adjusted odds ratio; CI, confidence interval.

a Analyses are adjusted for maternal race/ethnicity, education and vitamin use (for the month prior to and/or the first two months of pregnancy)

b PM10 levels are based on 24-hour average measurements, which are then averaged over 1st and 2nd months of pregnancy and analyzed in quartiles (determined from controls). Quartile ranges: 1st =7.90-25.24; 2nd =25.25-33.43; 3rd =33.44-44.08; 4th=44.09-95.32 μg/m3

**Appendix Table A2.** Adjusteda odds ratios (AOR) and 95% confidence intervals (CI) of neural tube defects, spina bifida and anencephaly comparing highest (4th) to lowest (1st) quartile exposure to PM2.5b, stratified by neighborhood socioeconomic factors, between 1997 and 2006 in 8 counties in the San Joaquin Valley of California.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Neural tube defects  | Spina bifida | Anencephaly |
| AOR | 95% CI | AOR | 95% CI | AOR | 95% CI |
| High poverty | 1.62 | [0.75, | 3.52] | 1.97 | [0.77, | 5.08] | 1.08 | [0.31, | 3.75] |
| Low poverty | 1.35 | [0.68, | 2.71] | 0.96 | [0.39, | 2.36] | 2.11 | [0.78, | 5.74] |
| Low income | 1.33 | [0.60, | 2.92] | 1.62 | [0.64, | 4.12] | 0.80 | [0.20, | 3.14] |
| High income | 1.54 | [0.78, | 3.02] | 1.15 | [0.48, | 2.75] | 2.18 | [0.83, | 5.71] |
| Low education | 1.30 | [0.66, | 2.55] | 1.34 | [0.59, | 3.03] | 1.26 | [0.45, | 3.50] |
| High education | 1.61 | [0.72, | 3.57] | 1.32 | [0.48, | 3.65] | 2.07 | [0.64, | 6.71] |
| High male unemployment | 1.23 | [0.62, | 2.46] | 1.30 | [0.55, | 3.06] | 1.14 | [0.40, | 3.20] |
| Low male unemployment | 1.75 | [0.81, | 3.79] | 1.45 | [0.56, | 3.72] | 2.40 | [0.71, | 8.09] |
| High female unemployment | 1.13 | [0.60, | 2.14] | 1.11 | [0.52, | 2.38] | 1.17 | [0.44, | 3.14] |
| Low female unemployment | 2.19 | [0.91, | 5.30] | 2.03 | [0.64, | 6.41] | 2.46 | [0.70, | 8.65] |
| High public assistance | 1.08 | [0.47, | 2.47] | 1.19 | [0.42, | 3.38] | 0.94 | [0.28, | 3.13] |
| Low public assistance | 1.72 | [0.89, | 3.31] | 1.47 | [0.66, | 3.26] | 2.24 | [0.80, | 6.27] |
| Low median home value | 0.94 | [0.49, | 1.80] | 0.85 | [0.40, | 1.81] | 1.18 | [0.40, | 3.50] |
| High median home value | **2.77** | [1.18, | 6.52] | 3.41 | [0.99, | 11.72] | 2.35 | [0.78, | 7.09] |
| Majority older housing | 1.48 | [0.82, | 2.67] | 1.58 | [0.77, | 3.23] | 1.28 | [0.51, | 3.20] |
| Majority newer housing | 1.19 | [0.41, | 3.46] | 0.47 | [0.09, | 2.56] | 2.53 | [0.59, | 10.90] |
| High PCA | 1.00 | [0.50, | 1.98] | 1.08 | [0.48, | 2.42] | 0.85 | [0.28, | 2.57] |
| Low PCA | **2.21** | [1.01, | 4.85] | 1.77 | [0.64, | 4.93] | 2.88 | [0.94, | 8.83] |

Abbreviations: AOR, adjusted odds ratio; CI, confidence interval.

a Analyses are adjusted for maternal race/ethnicity, education and vitamin use (for the month prior to and/or the first two months of pregnancy)

b PM2.5 levels are based on 24-hour average measurements, which are then averaged over 1st and 2nd months of pregnancy and analyzed in quartiles (determined from controls). Quartile ranges: 1st =3.57-10.93; 2nd =10.94-14.82; 3rd =14.83-26.12; 4th=26.13-66.29 μg/m3

**Appendix Table A3.** Adjusteda odds ratios (AOR) and 95% confidence intervals (CI) of neural tube defects, spina bifida and anencephaly comparing highest (4th) to lowest (1st) quartile exposure to NO2b, stratified by neighborhood socioeconomic factors, between 1997 and 2006 in 8 counties in the San Joaquin Valley of California.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Neural tube defects | Spina bifida | Anencephaly |
| AOR | 95% CI | AOR | 95% CI | AOR | 95% CI |
| High poverty | 1.46 | [0.79, | 2.70] | 1.40 | [0.67, | 2.95] | 1.54 | [0.60, | 3.94] |
| Low poverty | **2.09** | [1.11, | 3.90] | **2.19** | [1.00, | 4.80] | 1.98 | [0.79, | 4.98] |
| Low income | 1.68 | [0.88, | 3.22] | 1.45 | [0.67, | 3.16] | 2.21 | [0.79, | 6.19] |
| High income | 1.78 | [0.99, | 3.23] | 2.02 | [0.96, | 4.28] | 1.48 | [0.63, | 3.48] |
| Low education | **1.83** | [1.00, | 3.33] | 1.75 | [0.84, | 3.64] | 1.98 | [0.80, | 4.87] |
| High education | 1.67 | [0.88, | 3.17] | 1.76 | [0.80, | 3.89] | 1.52 | [0.58, | 3.97] |
| High male unemployment | **1.88** | [1.04, | 3.37] | 2.05 | [0.99, | 4.24] | 1.62 | [0.69, | 3.81] |
| Low male unemployment | 1.56 | [0.81, | 3.02] | 1.38 | [0.62, | 3.09] | 1.94 | [0.69, | 5.40] |
| High female unemployment | **1.79** | [1.01, | 3.15] | **2.04** | [1.02, | 4.08] | 1.44 | [0.61, | 3.41] |
| Low female unemployment | 1.68 | [0.84, | 3.33] | 1.35 | [0.57, | 3.17] | 2.29 | [0.82, | 6.39] |
| High public assistance | 1.58 | [0.77, | 3.24] | 1.29 | [0.54, | 3.09] | 2.13 | [0.70, | 6.42] |
| Low public assistance | **1.84** | [1.06, | 3.21] | **2.08** | [1.05, | 4.13] | 1.55 | [0.68, | 3.54] |
| Low median home value | 1.46 | [0.83, | 2.57] | 1.21 | [0.61, | 2.39] | 2.00 | [0.83, | 4.82] |
| High median home value | **2.28** | [1.13, | 4.57] | **3.11** | [1.27, | 7.62] | 1.47 | [0.54, | 4.04] |
| Majority older housing | **1.90** | [1.13, | 3.21] | 1.85 | [0.98, | 3.49] | 1.94 | [0.88, | 4.30] |
| Majority newer housing | 1.34 | [0.58, | 3.09] | 1.38 | [0.48, | 3.97] | 1.36 | [0.41, | 4.54] |
| High PCA | 1.54 | [0.84, | 2.81] | 1.50 | [0.73, | 3.09] | 1.59 | [0.63, | 4.00] |
| Low PCA | **1.98** | [1.04, | 3.76] | 2.03 | [0.90, | 4.55] | 1.94 | [0.76, | 4.94] |

Abbreviations: AOR, adjusted odds ratio; CI, confidence interval.

a Analyses are adjusted for maternal race/ethnicity, education and vitamin use (for the month prior to and/or the first two months of pregnancy)

b NO2 levels are based on 24-hour average measurements, which are then averaged over 1st and 2nd months of pregnancy and analyzed in quartiles (determined from controls). Quartile ranges: 1st =2.40-13.36; 2nd =13.37-16.81; 3rd =16.82-20.53; 4th=20.54-38.94 ppb

**Appendix Table A4.** Adjusteda odds ratios (AOR) and 95% confidence intervals (CI) of neural tube defects, spina bifida and anencephaly comparing highest (4th) to lowest (1st) quartile exposure to COb, stratified by neighborhood socioeconomic factors, between 1997 and 2006 in 8 counties in the San Joaquin Valley of California.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Neural tube defects  | Spina bifida | Anencephaly |
| AOR | 95% CI | AOR | 95% CI | AOR | 95% CI |
| High poverty | 1.93 | [0.86, | 4.33] | 2.48 | [0.90, | 6.81] | 1.23 | [0.35, | 4.27] |
| Low poverty | 1.85 | [0.93, | 3.69] | 1.75 | [0.78, | 3.95] | 2.09 | [0.67, | 6.52] |
| Low income | 1.61 | [0.70, | 3.73] | 2.47 | [0.82, | 7.42] | 0.88 | [0.25, | 3.10] |
| High income | **2.07** | [1.06, | 4.06] | 1.83 | [0.84, | 3.96] | 2.78 | [0.84, | 9.16] |
| Low education | 1.37 | [0.67, | 2.81] | 1.61 | [0.66, | 3.88] | 1.10 | [0.37, | 3.21] |
| High education | **2.66** | [1.22, | 5.80] | **2.53** | [1.03, | 6.21] | 2.94 | [0.74, | 11.71] |
| High male unemployment | 1.97 | [0.97, | 3.97] | **2.66** | [1.13, | 6.22] | 1.02 | [0.32, | 3.22] |
| Low male unemployment | 1.80 | [0.82, | 3.97] | 1.41 | [0.55, | 3.62] | 2.88 | [0.76, | 11.02] |
| High female unemployment | 1.58 | [0.79, | 3.16] | 2.00 | [0.85, | 4.67] | 1.04 | [0.35, | 3.03] |
| Low female unemployment | **2.36** | [1.05, | 5.28] | 2.02 | [0.79, | 5.18] | 3.35 | [0.83, | 13.48] |
| High public assistance | 1.25 | [0.54, | 2.91] | 1.74 | [0.59, | 5.07] | 0.74 | [0.21, | 2.61] |
| Low public assistance | **2.37** | [1.21, | 4.66] | 2.15 | [0.99, | 4.69] | 3.08 | [0.93, | 10.16] |
| Low median home value | 1.59 | [0.80, | 3.15] | 1.85 | [0.79, | 4.36] | 1.23 | [0.44, | 3.44] |
| High median home value | **2.35** | [1.04, | 5.31] | 2.24 | [0.88, | 5.70] | 2.64 | [0.62, | 11.24] |
| Majority older housing | 1.70 | [0.92, | 3.13] | 1.75 | [0.84, | 3.61] | 1.56 | [0.58, | 4.17] |
| Majority newer housing | 2.35 | [0.84, | 6.57] | 2.78 | [0.77, | 9.98] | 1.90 | [0.40, | 9.12] |
| High PCA | 1.21 | [0.58, | 2.55] | 1.70 | [0.68, | 4.24] | 0.63 | [0.19, | 2.08] |
| Low PCA | **2.84** | [1.34, | 6.02] | 2.36 | [0.99, | 5.62] | **4.53** | [1.19, | 17.28] |

Abbreviations: AOR, adjusted odds ratio; CI, confidence interval.

a Analyses are adjusted for maternal race/ethnicity, education and vitamin use (for the month prior to and/or the first two months of pregnancy)

b CO levels are based on 24-hour average measurements, which are then averaged over 1st and 2nd months of pregnancy and analyzed in quartiles (determined from controls). Quartile ranges: 1st =0.13-0.39; 2nd =0.40-0.52; 3rd =0.53-0.71; 4th=0.72-1.37 ppm

**Appendix Table A5.** Adjusteda odds ratios (AOR) and 95% confidence intervals (CI) of neural tube defects, spina bifida and anencephaly comparing highest (4th) to lowest (1st) quartile exposure to NOb, stratified by neighborhood socioeconomic factors, between 1997 and 2006 in 8 counties in the San Joaquin Valley of California.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Neural tube defects  | Spina bifida | Anencephaly |
| AOR | 95% CI | AOR | 95% CI | AOR | 95% CI |
| High poverty | 1.75 | [0.89, | 3.43] | 1.39 | [0.65, | 3.01] | 2.99 | [0.89, | 10.10] |
| Low poverty | 1.79 | [0.95, | 3.37] | 1.47 | [0.69, | 3.12] | 2.53 | [0.94, | 6.84] |
| Low income | 1.89 | [0.93, | 3.84] | 1.70 | [0.70, | 3.80] | 2.49 | [0.71, | 8.78] |
| High income | 1.69 | [0.92, | 3.10] | 1.25 | [0.61, | 2.58] | **2.80** | [1.06, | 7.44] |
| Low education | 1.63 | [0.87, | 3.06] | 1.39 | [0.66, | 2.90] | 2.27 | [0.80, | 6.40] |
| High education | **1.97** | [1.00, | 3.87] | 1.49 | [0.68, | 3.29] | **3.44** | [1.08, | 11.03] |
| High male unemployment | 1.68 | [0.91, | 3.12] | 1.45 | [0.72, | 2.94] | 2.34 | [0.82, | 6.72] |
| Low male unemployment | 1.98 | [0.98, | 3.99] | 1.49 | [0.64, | 3.44] | **3.22** | [1.02, | 10.19] |
| High female unemployment | 1.67 | [0.93, | 3.00] | 1.66 | [0.83, | 3.30] | 1.69 | [0.65, | 4.37] |
| Low female unemployment | 1.97 | [0.94, | 4.15] | 1.15 | [0.49, | 2.72] | **6.65** | [1.45, | 30.62] |
| High public assistance | 1.80 | [0.86, | 3.81] | 1.57 | [0.64, | 3.82] | 2.29 | [0.71, | 7.36] |
| Low public assistance | 1.77 | [0.99, | 3.18] | 1.36 | [0.69, | 2.68] | **3.19** | [1.13, | 9.05] |
| Low median home value | 1.53 | [0.84, | 2.79] | 1.19 | [0.59, | 2.41] | 2.56 | [0.93, | 7.03] |
| High median home value | **2.20** | [1.07, | 4.51] | 1.86 | [0.80, | 4.33] | 3.04 | [0.93, | 9.96] |
| Majority older housing | **1.74** | [1.01, | 3.00] | 1.53 | [0.81, | 2.90] | 2.20 | [0.91, | 5.33] |
| Majority newer housing | 1.91 | [0.81, | 4.54] | 1.25 | [0.45, | 3.44] | **5.18** | [1.03, | 26.01] |
| High PCA | 1.32 | [0.69, | 2.52] | 1.06 | [0.51, | 2.24] | 2.16 | [0.70, | 6.69] |
| Low PCA | **2.40** | [1.24, | 4.66] | 1.99 | [0.90, | 4.39] | **3.34** | [1.16, | 9.61] |

Abbreviations: AOR, adjusted odds ratio; CI, confidence interval.

a Analyses are adjusted for maternal race/ethnicity, education and vitamin use (for the month prior to and/or the first two months of pregnancy)

b NO levels are based on 24-hour average measurements, which are then averaged over 1st and 2nd months of pregnancy and analyzed in quartiles (determined from controls). Quartile ranges: 1st =0.69-4.14; 2nd =4.15-8.15; 3rd =8.16-20.19; 4th=20.20-67.34 ppb