|  |
| --- |
| eTable 1. Factors associated with having an address able to link to a census tract among NTD cases and controls, National Birth Defects Prevention Study, 1997-2011 |
|   |   | **NTD Cases**  | **NTD Controls**  |
| **Characteristics** | **Address linked to census tract**  | **Address unable to link** | **Address linked to census tract**  | **Address unable to link** |
| (n=2058) | (n=63) | (n=10890) | (n=361) |
| **n (%)** | **n (%)** | **n (%)** | **n (%)** |
| Maternal education  |  |  |   |   |
| < High School | 401 (96) | 15 (4) | 1775 (97) | 56 (3) |
| High School Graduate | 552 (99) | 6 (1) | 2537 (97) | 67 (3) |
| Some college + | 1059 (98) | 23 (2) | 6368 (98) | 107 (2) |
| Missing | 46 (71) | 19 (29) | 210 (67) | 131 (38) |
| Maternal age at delivery (years) |   |   |   |   |
|
| <20 | 217 (96) | 9 (4) | 1065 (94) | 66 (6) |
| 20-34 | 1568 (97) | 50 (3) | 8311 (97) | 257 (3) |
| 35+ | 273 (99) | 4 (1) | 1514 (98) | 38 (2) |
| Maternal race/ethnicity |  |  |   |   |
|
| Non-Hispanic White | 1061 (98) | 22 (2) | 6342 (97) | 168 (3) |
| Non-Hispanic Black | 191 (98) | 4 (2) | 1167 (96) | 54 (4) |
| Hispanic | 675 (96) | 31 (4) | 2680 (96) | 112 (4) |
| Other | 131 (96) | 6 (4) | 695 (96) | 26 (4) |
| Missing |  |  | 6 (86) | 1 (14) |
| Maternal birthplace |   |   |   |   |
|
| United States | 1525 (98) | 25 (2) | 8513 (98) | 161 (2) |
| Mexico | 356 (96) | 15 (4) | 1244 (96) | 54 (4) |
| Other | 132 (97) | 4 (3) | 932 (98) | 15 (2) |
| Missing | 45 (70) | 19 (30) | 201 (61) | 131 (40) |
| Household Income |   |   |   |   |
|
| < $10,000 | 412 (97) | 13 (3) | 1881 (97) | 63 (3) |
| $10,000 - $19.999 | 282 (98) | 7 (2) | 1300 (98) | 26 (2) |
| $20,000 - $29,999 | 286 (99) | 4 (1) | 1374 (98) | 25 (2) |
| $30,000 - $39,999 | 217 (99) | 3 (1) | 962 (97) | 28 (3) |
| $40,000 - $49,999 | 137 (97) | 4 (3) | 784 (99) | 8 (1) |
| $50,000 + | 517 (99) | 6 (1) | 3559 (99) | 45 (1) |
| Missing | 207 (89) | 26 (11) | 1030 (86) | 166 (14) |
| First degree family history of NTD |   |   |   |   |
|
| No | 2033 (97) | 63 (3) | 10866 (97) | 361 (3) |
| Yes | 25 (100) | 0 (0) | 24 (100) | 0 (0) |
| Pre-pregnancy BMI (kg/m2) |   |   |   |   |
|
| Underweight (<18.5) | 78 (98) | 2 (3) | 548 (97) | 18 (3) |
| Normal weight (18.5-24.9) | 902 (97) | 31 (3) | 5526 (97) | 161 (3) |
| Overweight (25.0-29.9) | 459 (98) | 10 (2) | 2391 (98) | 62 (3) |
| Obese (>=30.0) | 489 (99) | 7 (1) | 1964 (98) | 47 (2) |
| Missing | 130 (91) | 13 (9) | 461 (86) | 73 (14) |
| Number of previous pregnancies |   |   |   |   |
|
| No prior pregnancies | 548 (97) | 18 (3) | 3215 (97) | 94 (3) |
| 1-2 prior pregnancies | 964 (97) | 31 (3) | 5244 (97) | 148 (3) |
| 3+ prior pregnancies | 540 (99) | 7 (1) | 2423 (97) | 77 (3) |
| Missing | 6 (46) | 7 (54) | 8 (16) | 42 (84) |
| Maternal cigarette smoking |   |   |   |   |
|
| Yes | 320 (99) | 5 (2) | 1930 (98) | 48 (2) |
| No | 1702 (98) | 40 (2) | 8788 (98) | 187 (2) |
| Missing | 36 (67) | 18 (33) | 172 (58) | 126 (42) |
| Infant sex |   |   |   |   |
|
| Male | 955 (97) | 31 (3) | 5578 (97) | 186 (3) |
| Female | 990 (97) | 29 (3) | 5301 (97) | 175 (3) |
| Missing | 113 (97) | 3 (3) | 11 (100) | 0 (0) |

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| eTable 2. Birth and maternal characteristics of neural tube defect (NTD) cases and controls, overall and by NTD type, National Birth Defects Prevention Study, 1997-2011  |
|  |  | **Controls** | **Any NTD** | **Spina Bifida** | **Anencephaly & Craniorachischisis** | **Encephalocele** |
| **n (%)** | **n (%)** | **n (%)** | **n (%)** | **n (%)** |
| Total |   | 10,028 | 1,829 | 1,085 | 555 | 189 |
|   |   |   |   |   |   |   |
| Maternal education |   |   |   |   |   |   |
| < High School | 1601 (16) | 350 (19) | 182 (17) | 123 (22) | 45 (24) |
| High School Graduate | 2323 (23) | 499 (27) | 293 (27) | 149 (27) | 57 (30) |
| Some college + | 5995 (60) | 967 (53) | 599 (55) | 281 (51) | 87 (46) |
| Missing | 109 (1) | 13 (1) | 11 (1) | 2 (0) | 0 (0) |
|   |   |   |   |   |   |   |
| Maternal age at delivery (years) |   |   |   |   |   |   |
| <20 | 977 (10) | 191 (10) | 102 (9) | 66 (12) | 23 (12) |
| 20-34 | 7670 (77) | 1396 (76) | 834 (77) | 424 (76) | 138 (73) |
| 35+ | 1381 (14) | 242 (13) | 149 (14) | 65 (12) | 28 (15) |
|   |   |   |   |   |   |   |
| Maternal race/ethnicity |   |   |   |   |   |   |
| Non-Hispanic White | 5935 (59) | 965 (53) | 607 (56) | 279 (50) | 79 (42) |
| Non-Hispanic Black | 1073 (11) | 168 (9) | 87 (8) | 46 (8) | 35 (19) |
| Hispanic | 2379 (24) | 578 (32) | 325 (30) | 192 (35) | 61 (32) |
| Other | 635 (6) | 118 (7) | 66 (6) | 38 (7) | 14 (7) |
| Missing | 6 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) |
|   |   |   |   |   |   |   |
| Maternal birthplace |   |   |   |   |   |   |
| United States | 7996 (80) | 1394 (76) | 832 (77) | 413 (74) | 149 (79) |
| Mexico | 1083 (11) | 304 (17) | 165 (15) | 107 (19) | 32 (17) |
| Other | 848 (9) | 117 (6) | 76 (7) | 33 (6) | 8 (4) |
| Missing | 101 (1) | 14 (1) | 12 (1) | 2 (0) | 0 (0) |
|   |   |   |   |   |   |   |
| Household Income |   |   |   |   |   |   |
| < $10,000 | 1667 (17) | 360 (20) | 201 (19) | 114 (21) | 45 (24) |
| $10,000 - $19.999 | 1209 (12) | 259 (14) | 157 (15) | 73 (13) | 29 (15) |
| $20,000 - $29,999 | 1266 (13) | 258 (14) | 170 (16) | 63 (11) | 25 (13) |
| $30,000 - $39,999 | 913 (9) | 198 (11) | 118 (11) | 64 (12) | 16 (9) |
| $40,000 - $49,999 | 737 (7) | 129 (7) | 74 (7) | 43 (8) | 12 (6) |
| $50,000 + | 3388 (34) | 476 (26) | 278 (26) | 152 (27) | 46 (24) |
| Missing | 848 (9) | 149 (8) | 87 (8) | 46 (8) | 16 (9) |
|   |   |   |   |   |   |   |
| First degree family history of NTD |   |   |   |   |   |   |
| No | 10005 (100) | 1806 (99) | 1069 (99) | 552 (100) | 185 (98) |
| Yes | 23 (0) | 23 (1) | 16 (2) | 3 (1) | 4 (2) |
|   |   |   |   |   |   |   |
| Pre-pregnancy BMI (kg/m2) |   |   |   |   |   |   |
| Underweight (<18.5) | 509 (5) | 65 (4) | 34 (3) | 26 (5) | 5 (3) |
| Normal weight (18.5-24.9) | 5155 (51) | 814 (45) | 457 (42) | 257 (46) | 100 (53) |
| Overweight (25.0-29.9) | 2207 (22) | 417 (23) | 259 (24) | 127 (23) | 31 (16) |
| Obese (>=30.0) | 1782 (18) | 428 (23) | 270 (25) | 116 (21) | 42 (22) |
| Missing | 375 (4) | 105 (6) | 65 (6) | 29 (5) | 11 (6) |
|   |   |   |   |   |   |   |
| Number of previous pregnancies |   |   |   |   |   |   |
| No prior pregnancies | 2984 (30) | 492 (27) | 285 (26) | 153 (28) | 54 (29) |
| 1-2 prior pregnancies | 4855 (48) | 869 (48) | 524 (48) | 257 (46) | 88 (47) |
| 3+ prior pregnancies | 2187 (22) | 467 (26) | 275 (25) | 145 (26) | 47 (25) |
| Missing | 2 (0) | 1 (0.1) | 1 (0.1) | 0 (0) | 0 (0) |
|   |   |   |   |   |   |   |
| Maternal cigarette smoking |   |   |   |   |   |   |
| Yes | 1776 (18) | 288 (16) | 184 (17) | 67 (12) | 37 (20) |
| No | 8175 (82) | 1534 (84) | 894 (82) | 488 (88) | 152 (80) |
| Missing | 77 (1) | 7 (0) | 7 (1) | 0 (0) | 0 (0) |
|   |   |   |   |   |   |   |
| Infant sex |   |   |   |   |   |   |
| Male | 5121 (51) | 862 (47) | 548 (51) | 233 (42) | 81 (43) |
| Female | 4898 (49) | 870 (48) | 513 (4) | 253 (46) | 104 (55) |
| Missing | 9 (0) | 97 (5) | 24 (2) | 69 (12) | 4 (2) |

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| eTable 3.  Unadjusted associations between maternal periconceptional census tract socioeconomic measures and neural tube defects (NTD), overall and by NTD type, National Birth Defects Prevention Study, 1997-2011  |
|   |   | **Controls** | **Any NTD** | **Spina Bifida** | **Anencephaly** | **Encephalocele** |
| Census tract level measurea | **n** | **n** | **OR** | **n** | **OR** | **n** | **OR** | **n** | **OR** |
| **(95% CI)** | **(95% CI)** | **(95% CI)** | **(95% CI)** |
| NDI Total |  |  |  |  |  |  |  |  |  |
|  | Q1 (lowest)  | 2506 | 354 | Ref | 203 | Ref | 117 | Ref | 34 | Ref |
|   | Q2 | 2507 | 452 | 1.3 (1.1, 1.5) | 289 | 1.4 (1.2, 1.7) | 127 | 1.1 (0.8, 1.4) | 36 | 1.1 (0.7, 1.7) |
|   | Q3 | 2506 | 505 | 1.4 (1.2, 1.7) | 296 | 1.5 (1.2, 1.8) | 153 | 1.3 (1.0, 1.7) | 56 | 1.6 (1.1, 2.5) |
|   | Q4 (highest)  | 2507 | 517 | 1.5 (1.3, 1.7) | 297 | 1.5 (1.2, 1.8) | 157 | 1.3 (1.0, 1.7) | 63 | 1.9 (1.2, 2.8) |
|   | Missing | 2 | 1 |   |   |   | 1 |   |   |   |
| NDI Components |   |   |   |   |   |   |   |   |   |
| Crowding |  |  |  |  |  |  |  |  |  |
|  | Q1 (lowest)  | 2506 | 355 | Ref | 217 | Ref | 105 | Ref | 33 | Ref |
|   | Q2 | 2506 | 427 | 1.2 (1.0, 1.4) | 253 | 1.2 (1.0, 1.4) | 134 | 1.3 (1.0, 1.7) | 40 | 1.2 (0.8, 1.9) |
|   | Q3 | 2508 | 521 | 1.5 (1.3, 1.7) | 315 | 1.5 (1.2, 1.7) | 143 | 1.4 (1.1, 1.8) | 63 | 1.9 (1.2, 2.9) |
|   | Q4 (highest)  | 2507 | 525 | 1.5 (1.3, 1.7) | 300 | 1.4 (1.2, 1.7) | 172 | 1.6 (1.3, 2.1) | 53 | 1.6 (1.0, 2.5) |
|   | Missing | 1 | 1 |   |   |   | 1 |   |   |   |
| Female headed |   |   |   |   |   |   |   |   |   |
| households  |
|  | Q1 (lowest)  | 2506 | 383 | Ref | 228 | Ref | 115 | Ref | 40 | Ref |
|   | Q2 | 2507 | 477 | 1.2 (1.1, 1.4) | 282 | 1.2 (1.0, 1.5) | 147 | 1.3 (1.0, 1.6) | 48 | 1.2 (0.8, 1.8) |
|   | Q3 | 2507 | 483 | 1.3 (1.1, 1.5) | 294 | 1.3 (1.1, 1.5) | 149 | 1.3 (1.0, 1.7) | 40 | 1.0 (0.6, 1.6) |
|   | Q4 (highest)  | 2507 | 485 | 1.3 (1.1, 1.5) | 281 | 1.2 (1.0, 1.5) | 143 | 1.2 (1.0, 1.6) | 61 | 1.5 (1.0, 2.3) |
|   | Missing | 1 | 1 |   |   |   | 1 |   |   |   |
| Males in management |   |   |   |   |   |   |   |   |   |
|  | Q1 (lowest)  | 2506 | 534 | Ref | 306 | Ref | 169 | Ref | 59 | Ref |
|   | Q2 | 2506 | 488 | 0.9 (0.8, 1.0) | 286 | 0.9 (0.8, 1.1) | 142 | 0.8 (0.7, 1.1) | 60 | 1.0 (0.7, 1.5) |
|   | Q3 | 2507 | 442 | 0.8 (0.7, 0.9) | 280 | 0.9 (0.8, 1.1) | 124 | 0.7 (0.6, 0.9) | 38 | 0.6 (0.4, 1.0) |
|   | Q4 (highest)  | 2508 | 365 | 0.7 (0.6, 0.8) | 213 | 0.7 (0.6, 0.8) | 120 | 0.7 (0.6, 0.9) | 32 | 0.5 (0.4, 0.8) |
|   | Missing | 1 |   |   |   |   |   |   |   |   |
| Unemployment |   |   |   |   |   |   |   |   |   |
|  | Q1 (lowest)  | 2457 | 386 | Ref | 234 | Ref | 113 | Ref | 39 | Ref |
|   | Q2 | 2534 | 469 | 1.2 (1.0, 1.4) | 282 | 1.2 (1.0, 1.4) | 146 | 1.3 (1.0, 1.6) | 41 | 1.0 (0.7, 1.6) |
|   | Q3 | 2485 | 439 | 1.1 (1.0, 1.3) | 267 | 1.1 (0.9, 1.4) | 126 | 1.1 (0.9, 1.4) | 46 | 1.2 (0.8, 1.8) |
|   | Q4 (highest)  | 2551 | 535 | 1.3 (1.2, 1.5) | 302 | 1.2 (1.0, 1.5) | 170 | 1.4 (1.1, 1.8) | 63 | 1.6 (1.0, 2.3) |
|   | Missing | 1 |   |   |   |   |   |   |   |   |
| Low education |   |   |   |   |   |   |   |   |   |
|  | Q1 (lowest)  | 2487 | 381 | Ref | 232 | Ref | 121 | Ref | 28 | Ref |
|   | Q2 | 2527 | 415 | 1.1 (0.9, 1.2) | 239 | 1.0 (0.8, 1.2) | 124 | 1.0 (0.8, 1.3) | 52 | 1.8 (1.2, 2.9) |
|   | Q3 | 2503 | 504 | 1.3 (1.1, 1.5) | 317 | 1.4 (1.1, 1.6) | 138 | 1.1 (0.9, 1.5) | 49 | 1.7 (1.1, 2.8) |
|   | Q4 (highest)  | 2511 | 529 | 1.4 (1.2, 1.6) | 297 | 1.3 (1.1, 1.5) | 172 | 1.4 (1.1, 1.8) | 60 | 2.1 (1.4, 3.3) |
| Poverty |   |   |   |   |   |   |   |   |   |
|  | Q1 (lowest)  | 2506 | 369 | Ref | 213 | Ref | 123 | Ref | 33 | Ref |
|   | Q2 | 2507 | 461 | 1.2 (1.1, 1.4) | 279 | 1.3 (1.1, 1.6) | 132 | 1.1 (0.8, 1.4) | 50 | 1.5 (1.0, 2.4) |
|   | Q3 | 2506 | 495 | 1.3 (1.2, 1.6) | 294 | 1.4 (1.1, 1.7) | 151 | 1.2 (1.0, 1.6) | 50 | 1.5 (1.0, 2.4) |
|   | Q4 (highest)  | 2508 | 504 | 1.4 (1.2, 1.6) | 299 | 1.4 (1.2, 1.7) | 149 | 1.2 (0.9, 1.5) | 56 | 1.7 (1.1, 2.6) |
|   | Missing | 1 |   |   |   |   |   |   |   |   |
| Public assistance |   |   |   |   |   |   |   |   |   |
|  | Q1 (lowest)  | 2506 | 426 | Ref | 245 | Ref | 146 | Ref | 35 | Ref |
|   | Q2 | 2505 | 440 | 1.0 (0.9, 1.2) | 269 | 1.1 (0.9, 1.3) | 125 | 0.9 (0.7, 1.1) | 46 | 1.3 (0.8, 2.0) |
|   | Q3 | 2509 | 441 | 1.0 (0.9, 1.2) | 259 | 1.1 (0.9, 1.3) | 130 | 0.9 (0.7, 1.1) | 52 | 1.5 (1.0, 2.3) |
|   | Q4 (highest)  | 2507 | 521 | 1.2 (1.1, 1.4) | 312 | 1.3 (1.1, 1.5) | 153 | 1.0 (0.8, 1.3) | 56 | 1.6 (1.0, 2.4) |
|   | Missing | 1 | 1 |   |   |   | 1 |   |   |   |
| Low Income |   |   |   |   |   |   |   |   |   |
|  | Q1 (lowest)  | 2506 | 369 | Ref | 211 | Ref | 125 | Ref | 33 | Ref |
|   | Q2 | 2506 | 472 | 1.3 (1.1, 1.5) | 295 | 1.4 (1.2, 1.7) | 133 | 1.1 (0.8, 1.4) | 44 | 1.3 (0.8, 2.1) |
|   | Q3 | 2508 | 487 | 1.3 (1.1, 1.5) | 276 | 1.3 (1.1, 1.6) | 155 | 1.2 (1.0, 1.6) | 56 | 1.7 (1.1, 2.6) |
|   | Q4 (highest)  | 2507 | 500 | 1.4 (1.2, 1.6) | 303 | 1.4 (1.2, 1.7) | 141 | 1.1 (0.9, 1.4) | 56 | 1.7 (1.1, 2.6) |
|   | Missing | 1 | 1 |   |   |   | 1 |   |   |   |
| NTD=neural tube defect; NDI=neighborhood deprivation index |
| aCensus tract measures were obtained from either the 2000 Decennial Census, the 2005-2009 5-Year American Community Survey estimates,  |
| or the 2010-2014 5-year American Community Survey estimates. More information is detailed in the methods. |
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| eTable 4.  Unadjusted associations between maternal periconceptional census tract socioeconomic measures and any neural tube defect (NTD), stratified by maternal race/ethnicity, National Birth Defects Prevention Study , 1997-2011 |
|  |  | **Non-Hispanic White**  | **Non-Hispanic Black**  | **Hispanic** |
|  |  | **Controls** | **Any NTD** | **Controls** | **Any NTD** | **Controls** | **Any NTD** |
|  | **n** | **n** | **OR (95% CI)**  | **n** | **n** | **OR (95% CI)**  | **n** | **n** | **OR (95% CI)**  |
| Census tract level measurea |
| NDI Total |  |  |  |  |  |  |  |  |  |
| NDI |   |   |   |   |   |   |   |   |   |
|  | Q1 (lowest) | 2064 | 283 | Ref | 101 | 14 | Ref | 143 | 35 | Ref |
|   | Q2 | 1845 | 309 | 1.2 (1.0, 1.5) | 200 | 39 | 1.4 (0.7, 2.7) | 297 | 77 | 1.1 (0.7, 1.7) |
|   | Q3 | 1466 | 280 | 1.4 (1.2, 1.7) | 336 | 40 | 0.9 (0.4, 1.6) | 556 | 147 | 1.1 (0.7, 1.6) |
|   | Q4 (highest) | 560 | 92 | 1.2 (0.9, 1.5) | 434 | 75 | 1.2 (0.7, 2.3) | 1383 | 319 | 0.9 (0.6, 1.4) |
|   | Missing |   | 1 |   | 2 |   |   |   |   |   |
| NDI Components |   |   |   |   |   |   |   |   |   |
| Crowding |  |  |  |  |  |  |  |  |  |
|  | Q1 (lowest) | 1974 | 273 | Ref | 199 | 29 | Ref | 153 | 29 | Ref |
|   | Q2 | 1882 | 293 | 1.1 (0.9, 1.3) | 234 | 40 | 1.2 (0.7, 2.0) | 236 | 62 | 1.4 (0.9, 2.3) |
|   | Q3 | 1458 | 283 | 1.4 (1.2, 1.7) | 357 | 56 | 1.1 (0.7, 1.7) | 529 | 147 | 1.5 (0.9, 2.3) |
|   | Q4 (highest) | 621 | 115 | 1.3 (1.1, 1.7) | 282 | 43 | 1.0 (0.6, 1.7) | 1461 | 340 | 1.2 (0.8, 1.9) |
|   | Missing |   | 1 |   | 1 |   |   |   |   |   |
| Female headed |   |   |   |   |   |   |   |   |   |
| households  |
|  | Q1 (lowest) | 2069 | 298 | Ref | 72 | 8 | Ref | 223 | 63 | Ref |
|   | Q2 | 1744 | 314 | 1.3 (1.1, 1.5) | 142 | 17 | 1.1 (0.4, 2.6) | 451 | 118 | 0.9 (0.7, 1.3) |
|   | Q3 | 1241 | 223 | 1.2 (1.0, 1.5) | 263 | 34 | 1.2 (0.5, 2.6) | 840 | 186 | 0.8 (0.6, 1.1) |
|   | Q4 (highest) | 881 | 129 | 1.0 (0.8, 1.3) | 595 | 109 | 1.6 (0.8, 3.5) | 865 | 211 | 0.9 (0.6, 1.2) |
|   | Missing |   | 1 |   | 1 |   |   |   |   |   |
| Males in management |   |   |   |   |   |   |   |   |   |
|  | Q1 (lowest) | 840 | 163 | Ref | 401 | 61 | Ref | 1138 | 273 | Ref |
|   | Q2 | 1567 | 266 | 0.9 (0.7, 1.1) | 296 | 56 | 1.2 (0.8, 1.8) | 515 | 131 | 1.1 (0.8, 1.3) |
|   | Q3 | 1727 | 296 | 0.9 (0.7, 1.1) | 225 | 31 | 0.9 (0.6, 1.4) | 397 | 96 | 1.0 (0.8, 1.3) |
|   | Q4 (highest) | 1801 | 240 | 0.7 (0.6, 0.9) | 150 | 20 | 0.9 (0.5, 1.5) | 329 | 78 | 1.0 (0.7, 1.3) |
|   | Missing |   |   |   | 1 |   |   |   |   |   |
| Unemployment |   |   |   |   |   |   |   |   |   |
|  | Q1 (lowest) | 1974 | 302 | Ref | 110 | 16 | Ref | 224 | 48 | Ref |
|   | Q2 | 1739 | 295 | 1.1 (0.9, 1.3) | 232 | 38 | 1.1 (0.6, 2.1) | 404 | 110 | 1.3 (0.9, 1.9) |
|   | Q3 | 1385 | 224 | 1.1 (0.9, 1.3) | 277 | 38 | 0.9 (0.5, 1.8) | 662 | 142 | 1.0 (0.7, 1.4) |
|   | Q4 (highest) | 837 | 144 | 1.1 (0.9, 1.4) | 453 | 76 | 1.2 (0.6, 2.1) | 1089 | 278 | 1.2 (0.8, 1.7) |
|   | Missing |   |   |   | 1 |   |   |   |   |   |
| Low education |   |   |   |   |   |   |   |   |   |
|  | Q1 (lowest) | 2003 | 293 | Ref | 126 | 20 | Ref | 157 | 41 | Ref |
|   | Q2 | 1825 | 277 | 1.0 (0.9, 1.2) | 253 | 46 | 1.1 (0.6, 2.0) | 273 | 63 | 0.9 (0.6, 1.4) |
|   | Q3 | 1457 | 279 | 1.3 (1.1, 1.6) | 376 | 48 | 0.8 (0.5, 1.4) | 523 | 142 | 1.0 (0.7, 1.5) |
|   | Q4 (highest) | 650 | 116 | 1.2 (1.0, 1.5) | 318 | 54 | 1.1 (0.6, 1.9) | 1426 | 332 | 0.9 (0.6, 1.3) |
| Poverty |   |   |   |   |   |   |   |   |   |
|  | Q1 (lowest) | 2059 | 293 | Ref | 117 | 17 | Ref | 155 | 39 | Ref |
|   | Q2 | 1798 | 299 | 1.2 (1.0, 1.4) | 214 | 42 | 1.4 (0.7, 2.5) | 317 | 94 | 1.2 (0.8, 1.8) |
|   | Q3 | 1414 | 260 | 1.3 (1.1, 1.5) | 329 | 43 | 0.9 (0.5, 1.6) | 616 | 155 | 1.0 (0.7, 1.5) |
|   | Q4 (highest) | 664 | 113 | 1.2 (0.9, 1.5) | 412 | 66 | 1.1 (0.6, 2.0) | 1291 | 290 | 0.9 (0.6, 1.3) |
|   | Missing |   |   |   | 1 |   |   |   |   |   |
| Public assistance |   |   |   |   |   |   |   |   |   |
|  | Q1 (lowest) | 1759 | 281 | Ref | 209 | 38 | Ref | 325 | 77 | Ref |
|   | Q2 | 1736 | 288 | 1.0 (0.9, 1.2) | 216 | 23 | 0.6 (0.3, 1.0) | 407 | 104 | 1.1 (0.8, 1.5) |
|   | Q3 | 1574 | 247 | 1.0 (0.8, 1.2) | 256 | 48 | 1.0 (0.6, 1.6) | 555 | 119 | 0.9 (0.7, 1.2) |
|   | Q4 (highest) | 866 | 148 | 1.1 (0.9, 1.3) | 391 | 59 | 0.8 (0.5, 1.3) | 1092 | 278 | 1.1 (0.8, 1.4) |
|   | Missing |   | 1 |   | 1 |   |   |   |   |   |
| Low income |   |   |   |   |   |   |   |   |   |
|  | Q1 (lowest) | 1919 | 263 | Ref | 147 | 24 | Ref | 225 | 56 | Ref |
|   | Q2 | 1724 | 286 | 1.2 (1.0, 1.4) | 236 | 39 | 1.0 (0.6, 1.8) | 372 | 113 | 1.2 (0.9, 1.8) |
|   | Q3 | 1425 | 255 | 1.3 (1.1, 1.6) | 279 | 48 | 1.1 (0.6, 1.8) | 660 | 154 | 0.9 (0.7, 1.3) |
|   | Q4 (highest) | 867 | 160 | 1.3 (1.1, 1.7) | 410 | 57 | 0.9 (0.5, 1.4) | 1122 | 255 | 0.9 (0.7, 1.3) |
|   | Missing |   | 1 |   | 1 |   |   |   |   |   |
| NTD=neural tube defect; NDI=neighborhood deprivation index, OR=odds ratio, aOR=adjusted odds ratio, CI=confidence interval  |
| aCensus tract measures were obtained from either the 2000 Decennial Census, the 2005-2009 5-Year American Community Survey estimates,  |
| or the 2010-2014 5-year American Community Survey estimates. More information is detailed in the methods. |

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| eTable 5. Adjusted associations between neighborhood deprivation index and any NTD by maternal race/ethnicity adjusting for racial composition of the census tract, National Birth Defects Prevention Study, 1997-2011 |
|  |  | **Non-Hispanic White** |
|  |  | **Model 1** | **Model 2** | **Model 3** |
| **aOR (95% CI)\*** | **aOR (95% CI)\*\*** | **aOR (95% CI)** **§** |
| NDI |  |  |  |
|  | Q1 (lowest) | Ref | Ref | Ref |
|  | Q2 | 1.2 (1.0, 1.4) | 1.2 (1.0, 1.4) | 1.2 (1.0, 1.4) |
|  | Q3 | 1.3 (1.1, 1.6) | 1.3 (1.1, 1.6) | 1.3 (1.1, 1.6) |
|   | Q4 (highest) | 1.1 (0.9, 1.5) | 1.1 (0.9, 1.5) | 1.1 (0.8, 1.5) |
|   |   | **Non-Hispanic Black** |
|   |   | **Model 1** | **Model 2** | **Model 3** |
| **aOR (95% CI)\*** | **aOR (95% CI)\*\*** | **aOR (95% CI) §** |
| NDI |  |  |  |
|  | Q1 (lowest) | Ref | Ref | Ref |
|  | Q2 | 1.6 (0.8, 3.2) | 1.5 (0.7, 2.9) | 1.4 (0.7, 2.8) |
|  | Q3 | 1.0 (0.5, 2.0) | 0.9 (0.5, 1.8) | 0.9 (0.4, 1.7) |
|   | Q4 (highest) | 1.6 (0.8, 3.0) | 1.3 (0.6, 2.6) | 1.2 (0.6, 2.5) |
|   |   | **Hispanic** |
|   |   | **Model 1** | **Model 2** | **Model 3** |
| **aOR (95% CI)\*** | **aOR (95% CI)\*\*** | **aOR (95% CI) §** |
| NDI |  |  |  |
|  | Q1 (lowest) | Ref | Ref | Ref |
|  | Q2 | 1.0 (0.6, 1.6) | 1.0 (0.6, 1.6) | 1.0 (0.6, 1.6) |
|  | Q3 | 1.0 (0.7, 1.6) | 1.0 (0.7, 1.6) | 1.0 (0.6, 1.5) |
|   | Q4 (highest) | 0.9 (0.6, 1.3) | 0.9 (0.6, 1.3) | 0.9 (0.6, 1.3) |
|  \*Adjusted on maternal age at delivery, smoking, and number of previous pregnancies; census tract was included as a correlation matrix |
| **\*\***Adjusted on maternal age at delivery, smoking, number of previous pregnancies, and percent African American residing in census tract; census tract was included as a correlation matrix |
| **§** Adjusted on maternal age at delivery, smoking, number of previous pregnancies, and percent non-White residing in census tract; census tract was included as a correlation matrix |

