|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Table S1.** Comparison of characteristics at 1 year between children to assess differences among included and excluded children at one year of age. | | | | |
|  | | | | |
| **Characteristics** | **Children assessed at age one year only**  **N=260 n (%)** | **Children assessed at age one and six years**  **N =425 n (%)** | **P** a |
| BLLs>50 µg/L | 163 (62. 7) | 234 (55.1) | 0.05 |
| BLLs>100 µg/L | 54 (20.8) | 70 (16.5) | 0.2 |
| Bushmeat consumption | 78 (34.8) | 156 (41.2) | 0.1 |
| Child drinks water from the pipe system | 191 (85.3) | 308 (81.3) | 0.2 |
| Presence of paint in the house | 37 (14.3) | 59 (14.0) | 0.9 |
| Presence of paint chips in the house | 16 (7.1) | 19 (5.0) | 0.3 |
| Gasoline stored at home | 156 (69.6) | 297 (78.4) | 0.02 |
| Maternal use of eye cosmetics | 51 (22.8) | 62 (16.4) | 0.05 |
| Paternal high or moderate risk of occupational exposure | 55 (22) | 77 (18.4) | 0.3 |
| Activity involving potential use of lead | 16 (7.1) | 34 (9.0) | 0.4 |
| **Sociodemographic characteristics** |  |  |  |
| Child’s gender (male) | 121 (46.9) | 212 (50.1) | 0.4 |
| Wealth score quartiles |  |  |  |
| lower | 89 (35.0) | 97 (22.9) | <0.01 |
| median | 53 (20.9) | 150 (35.5) |  |
| higher | 50 (19.7) | 71 (16.8) |  |
| highest | 62 (24.4) | 105 (24.8) |  |
| Child lives in collective housing | 216 (85.0) | 361 (85.3) | 0.9 |
| **Health centre location** |  |  |  |
| Sekou | 145 (56.2) | 276 (65.3) | 0.02 |
| Attogon/Allada | 113 (43.8) | 147 (34.8) |  |

a Pearson chi-square

**Table S2.** Bivariate analysis between sociodemographic factors and potential sources of lead in children at 6 years (N=425)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Independent variable** | **n/N a (%)** | **% Change in BLLs compared with the referent group**  **(95% CI)** | **Crude OR for 90th percentile of BLLs compared with the referent group (95% CI)** | |
| **Socio-demographic characteristics** |  |  |  | |
| Male sex (vs. female) | 212/425 (49.9) | **11.4 (2.6, 20.9) \*** | **2.8 (1.4, 5.6) \*** | |
| Some maternal education (vs. none) † | 155/37.0 | -4.3 (-12.2, 4.4) | 0.8 (0.43, 1.64) | |
| Quartiles of wealth score (vs. lower quintile) | |  |  | |
| lower | 144/421 (34.2) |  |  | |
| median | 102/421 (24.2) | **7.8 (-17.4, 2.9)** | **0.5 (0.20, 1.20)** | |
| high | 116/421 (27.6) | 1.1 (-9.0, 12.4) | 0.8 (0.35, 1.64) | |
| highest | 59/421 (14.0) | **12.1 (-22.9, 0.2)** | 0.5 (0.16, 1.47) | |
| Potential sources of lead |  |  |  | |
| Bushmeat consumption (vs. no consumption) | 135/325 (41.5) | 5.8 (-4.2, 16.8) | 1.5 (0.7, 3.0) | |
| Currently consuming meat killed by lead bullets (vs. never) | 88/399 (18.8) | **15.9 (4.2, 28.9)** | **1.8 (0.9, 3.8)** | |
| Use of pipe system for water source (vs. absence) | 371/423 (87.7) | 2.5 (-9.6, 16.3) | 1.4 (0.5, 4.2) | |
| Use of bore hole/cement/dug well for water source (vs. absence) | 188/423 (44.4) | **-6.2 (-13.7, 1.9)** | 0.8 (0.44, 1.16) | |
| Consumption of peanuts |  |  |  | |
|  |  |  |  | |
| **Supplementary Table 2 continued** | | | | |
| *never* | 240/418 (57.4) |  |  | |
| *<1 / month* | 137/418 (32.8) | 1.5 (-7.3, 11.2) | 0.6 (0.3, 1.3) | |
| *>1 / month* | 41/418 (9.8) | **23.6 (7.1, 42.7) \*** | 1.7 (0.7, 4.2) | |
| Consumption of beans |  |  |  | |
| *<1 / month+* | 61/423 (14.4) |  |  | |
| *>1 / month* | 362/423 (85.6) | 6.9 (-5.0, 20.2) | 1.7 (0.6, 4.9) | |
| Consumption of rice |  |  |  | |
| *1-3 times/month or less* | 35/423 (8.3) |  |  | |
| *1-3 times /week* | 106/423 (25.1) | 6.0 (-10.2, 25.0) | 0.6 (0.2, 2.7) | |
| *4-6 times/week* | 103/423 (24.4) | **88.8 (0.7, 40.3) \*** | 1.7 (0.5, 6.2) | |
| *At least once/day* | 179/423 (42.3) | **14.2 (-2.4, 33.6)** | 1.3 (0.4, 4.5) | |
| Consumption of sweet potatoes |  |  |  | |
| *never* | 122/423 (28.8) |  |  | |
| *<1 / month* | 204/423 (48.2) | **-9.0 (-17.4, 0.3)** | **0.5 (0.2, 1.0) \*** | |
| *>1 / month* | 97/423 (22.9) | 5.1 (-15.5, 6.5) | 0.8 (0.4, 1.8) | |
| Consumption of Cassava *(Manioc)* |  |  |  | |
| *<1 / month++* | 176/422 (41.7) |  |  | |
| *>1 / month* | 246/422 (58.3) | -0.6 (-8.6, 8.1) | 1.10 (0.6, 2.3) | |
| Ever ingested soil or other products (vs. no) | 174/418 (40.9) | -15.1(-55.9, 63.6) | 0.9 (0.4, 1.6) | |
| Child has hand-to-mouth-behavior (vs. no) | 135/421 (32.1) | 3.4 (-5.3, 13.0) | 1.1 (0.5, 2.1) | |
| House in mud (vs. not in mud) | 154/422 (36.5) | -0.8 (-9.0, 8.1) | 1.1 (0.6, 2.1) | |
| Presence of paint in the house | 56/421 (13.3) | **6.8 (-5.5, 2.7)** | **1.9 (0.9, 4.3)** | |
| Presence of paint chips in the house (vs. absence) | 23/421 (5.5) | **26.2 (4.0, 53.2) \*** | 1.4 (0.4, 4.9) | |
| Use of artisanal cookware (made from recycled material) | 403/422 (95.5) | 6.9 (-12. 5, 30.6) | 2.0 (0.3, 15.7) | |
|  |  |  |  | |
| **Supplementary Table 2.** | | | | |
| Use of artisanal cookware (made from terracotta/clay) | 59/418 (14.1) | 4.2 (-7.6, 17.5) | 0.8 (0.3, 2.2) | |
| Child use eye cosmetics *(Khol) (vs. no use)* | 58/413 (14.04) | 0.2 (-11.3, 13.2) | 1.0 (0.4, 2.6) | |
| Presence of activity with potential use of leadc (vs. absence) | 61/423 (14.4) | **11.6 (0.0, 26.0)** | **2.7 (1.3, 5.6) \*** | |
| Presence of high or moderate risk of paternal occupational exposure (vs. absence) | 79/424 (18.6) | 6.5 (-4.2, 18.5) | **2.8 (1.4, 5.5) \*** | |
| Residence at 200m of heavy traffic | 327/418 (78.2) | 1.00 (0.5, 2.1) | 1.00 (0.5, 2.1) |

a Totals may not equal to 260 and 425 due to missing data

b products include earth, kaolin, kalaba, termite mound

c activities include metal smelter, battery recycling/storage, radiator repair, metal recycling/storage, lead solder, vehicle repair, manufacturing of ammunition/metal objects

*\** *p<0.05, Beta coefficients in bold only have p<0.2*

*+* includes 9 never consumers, +*+* includes 21 never consumers

† defined as completion of primary or higher level

**Table S3.** **Associations between sources of lead and socio-demographic factors.**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Consumption of**  **bushmeat**  **n (%)** | ***P*** | **Rice more than 4-6 times per week**  **(vs. less)**  **n (%)** | ***P-value*** | **Peanut more than once per month (vs. less)**  **n (%)** | ***P*** | **Presence of paint**  **n (%)** | ***P*** | **Presence of occupational exposure**  **n (%)** | ***P*** | **Presence of activities with lead**  **n (%)** | ***P*** |
| **Gender**  Boys  Girls | 38 (19.1)  42 (21.1) | 0.6 | 142 (67.3)  140 (66.0) | 0.8 | 20 (9.7)  21 (10.0) | 0.9 | 29 (12.8)  27 (13.8) | 0.8 | 42 (19.8)  37 (17.5) | 0.5 | 31 (14.7)  30 (14.2) | 0.9 |
| **Family wealth quartiles**  lower  median  higher  highest | 29 (21.5)  20 (21.1)  22 (20.0)  8 (13.8) | 0.7 | 97 (67.4)  65 (63.7)  84 (72.4)  36 (61.0) | 0.4 | 15 (10.6)  5 (4.9)  17 (14.9)  4 (6.9) | 0.1 | 13 (9.2)  8 (7.8)  21 (18.1)  14 (23.7) | 0.01 | 23 (16.1)  20 (19.6)  21 (18.1)  14 (23.7) | 0.6 | 24 (16.7)  16 (15.7)  11 (9.5)  10 (17.0) | 0.4 |
| **Maternal education**  None  Some | 51 (20.7)  26 (17.7) | 0.5 | 176 (66.7)  103 (66.6) | 0.9 | 22 (8.33)  19 (12.7) | 0.2 | 27 (10.3)  29 (18.7) | 0.02 | 45 (17.1)  32 (20.7) | 0.4 | 43 (16.3)  18 (11.6) | 0.2 |

**\*** Pearson chi-square test

**Table S4.** **Sensitivity analysis - Multivariate analyses identifying potential sources of lead in six years old children in Benin, 2016-2018, including all children assessed at 6 years (n= 478).**

**The cells with significant differences (p<.05) are highlighted in light grey. The cells with p< .2 are in bold only**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Potential sources** | **n (%)** | **Expected % difference in BLLscompared with referent group** a | | **Expected difference in the percentiles of BLLs µg/L compared with the referent group**  **(95% CI)** a | | | | | | | | |
| **% (95% CI)** | ***p*** | **25th percentile** | p | **50th percentile** | p | **75th percentile** | | p | **90th percentile** | p |
| Currently consuming meat killed by lead bullets (vs. no) | 85 (19.5) | **10.2 (2.0, 19.1)** | 0.01 | 1.9 (-3.6; 7.4) | 0.5 | 3.1 (-1.6; 7.2) | 0.2 | 12.2 (-0.5; 18.7) | | 0.06 | 11.4 (-14.7; 37.5) | 0.4 |
| Consumption of rice (referent category: less than 1-3 times/months or less) |  |  |  |  |  |  |  |  | |  |  |  |
| 1-3 times/wk | 119 (25.3) | 9.0 (-7.3, 28.2) | 0.3 | 3.0 (-5.8 ; 11.8) | 0.5 | 1.9 (-7.4; 11.2) | 0.7 | 11.5 (-8.6; 31.7) | | 0.3 | 4.0 (-38.0; 46,0) | 0.9 |
| 4-6 times/wk | 118 (25.1) | **17.1 (-0.5, 37.9)** | 0.06 | 1.8 (-7.1;10.7) | 0.7 | 7.0 (-2.4; 16.4) | 0.1 | 19.0 (-1.2; 39.4) | | 0.07 | 9.9 (-32.4; 52.2) | 0.7 |
| at least once/day | 196 (41.7) | **15.1 (-1.4, 34.4)** | 0.08 | 3.9 (-4.6; 12.3) | 0.4 | 1.9 (-7.0; 10.8) | 0.7 | 14.1 (-5.1; 33.4) | | 0.2 | 5.5 (-34.6; 45.6) | 0.8 |
| Consumption of peanuts (referent category: never) |  |  |  |  |  |  |  |  | |  |  |  |
| <1 / month | 152 (32.8) | 2.4 (-6.1, 11.7) | 0.6 | 2.4 (-2.3; 7.2) | 0.3 | -0.5 (-5.5; 4.5) | 1.0 | 1.5 (-9.4; 12.3) | | 0.8 | 4.1 (-18.4; 26.6) | 0.7 |
| >1 / month | 43 (9.3) | **20.1 (4.3, 38.4)** | 0.01 | **6.6 (-1.1; 14.3)** | 0.09 | 5.7 (-2. 4; 13.8) | 0.2 | 11.1 (-6.5; 28.7) | | 0.2 | **46.8 (10.2; 83.4)** | 0.01 |
| Consumption of sweet potatoes (referent category: never) |  |  |  |  |  |  |  |  | |  |  |  |
| *<1 / month* | 226 (48.1) | -7.7 (-15.8, 1.3) | 0.1 | 0.7 (-4.5; 6.0) | 0.8 | **-5. 9(-11.2; -0.6)** | 0.03 | -6.1 (-17.6; 5.4) | | 0.3 | -14.4 (-38.3; 9.5) | 0.2 |
| *>1 / month* | 107 (22.8) | -7.7 (17.4, 3.1) | 0.2 | 0.1 (-6.2; 6.4) | 1.0 | -6.2 (-12.5; 0.1) | 0.06 | -6.8 (-20.6; 7.0) | | 0.3 | -13.0 (-41.7; 15.7) | 0.4 |
| Presence of activity with potential use of lead(vs. absence) | 67 (14.3) | **13.3 (1.3, 26.6)** | 0.03 | 3.9 (-2.2; 10.0) | 0.2 | **6.8 (0.4; 13.2)** | 0.04 | 7.4 (-6.4; 21.3) | | 0.3 | -19.4 (-9.5; 48.3) | 0.2 |
| Presence of high or moderate risk of paternal occupational exposure (vs. absence) | 81 (18.4) | 6.7 (-3.4, 17.9) | 0.2 | -0.8 (-6.3; 4.6) | 0.8 | -3.3 (-9.0; 2.4) | 0.3 | 6.2 (-6.2; 18.7) | | 0.3 | 10.2 (-15.6; 36.0) | 0.4 |
| **Supplementary Table 3. continued** | | | | | | | | | | | |  |
| Presence of paint in house (vs. absence) | 63 (13.5) | 3.6 (-2.7, 9.9) | 0.3 | 3.6 (-2.7; 9.9) | 0.3 | 0.9 (-5.8; 7.6) | 0.8 | 3.4 (-11.1; 17.9) | | 0.6 | 16.3 (-13.8; 46.4) | 0.3 |
| Use of bore hole/cement/dug well for water source (vs. absence) | 210 (44.7) | -1.4 (-5.8, 2.9) | 0.5 | -1.1 (-6.0; 3.8) | 0.5 | -1.3 (-5.9; 3.3) | 0.6 | -3.1 (-13.2; 6.9) | 0.5 | | -2.2 (-23.1; 18.7) | 0.8 |

aadjusted for gender and family wealth quartiles.