In this article, pyrethroid metabolite measurements were reported to be specific gravity-corrected. However, the statistical analyses were completed with uncorrected pyrethroid metabolite measurements. The results using specific gravity-corrected metabolite measurements are largely consistent with the uncorrected analyses. This error affected the data in Tables S2, S3, S5, S7, S10, S11, S14, S15 and Figures S2–S16 and Tables 2, 6, 7, and 8 in the article, as well as associated text. The main text tables and associated text, as well as the supplemental tables and figures, have been corrected in this erratum and the original article. This error does not affect the results with DDT/DDE serum measurements.

In addition, the fourth sentence of the fifth paragraph in the “Results” section read “There was a significant interaction of cis-DBCA and sex on Receptive Communication and Language Composite with a negative coefficient in girls and a positive coefficient in boys, although neither sex stratum was significant.” The statement regarding a lack of a significant sex stratum is incorrect, both for the specific gravity-corrected and uncorrected data and has been removed from the article. In addition in Table 7, the first column heading read “cis-DBCA” and has been corrected to “cis-DBCA”.

Likewise, “carboxylic acid” has been corrected to “carboxylic acid” throughout the manuscript.

Finally, the data for Cognitive and Receptive Communication Bayley Scales of Infant Development measures were inadvertently omitted from Table 6 of the article. These data are now provided in the corrected table.

The “Results” section of the abstract should read:

“DDT and DDE were not associated with significantly lower scores for any BSID-III scale. In contrast, each 10-fold increase in cis-DCCA, trans-DCCA, and 3-phenoxybenzoic acid were associated, respectively, with −0.70 (95% CI: −1.25, −0.15), −0.49 (95% CI: −0.96, −0.02), and −0.65 (−1.23, −0.06) decrement in Social-Emotional scores at 1 y of age. In addition, each 10-fold increase in maternal cis-DBCA levels was associated with significant decrements at 2 y of age in Language Composite scores and Expressive Communication scores [β = 1.90; 95% CI: −3.67, −1.14 and β = −0.41; 95% CI: −0.81, −0.01, respectively, for a 10-fold increase]. Significant differences by sex were estimated for pyrethroid metabolites and motor function scores at 2 y of age, with higher scores for boys and lower scores for girls.”

The second paragraph of the “Results” section of the main manuscript should read:

“Table 2 presents the maternal serum concentrations of DDT/DDE and the urinary concentrations of pyrethroid metabolites. The median serum concentration for p,p’-DDT was 55.3 ng/g lipid and for p,p’-DDE was 240.4 ng/g lipid. The median urinary concentrations were 0.323 μg/L for cis-DCCA, 0.455 μg/L for cis-DCCA, 0.535 μg/L for trans-DCCA, and 1.049 μg/L for 3PBA (see Table S1 for weight-averaged concentrations and creatinine-adjusted pyrethroid levels). p,p’- DDT and p,p’- DDE concentrations were strongly correlated (r = 0.85, p < 0.001) with each other but were not correlated with the pyrethroid metabolite levels (r = −0.03 to 0.04) (see Table S2). However, three pyrethroid metabolite concentrations were highly correlated with each other, with an approximate r of 0.85 between cis-DCCA, trans-DCCA, and 3PBA. cis-DBCA concentrations were moderately correlated with the other pyrethroid metabolites (r = 0.32–0.51).”

Table 2. Maternal serum concentrations of p,p’- and o,p’-DDT and DDE (ng/g, lipid-adjusted), and maternal urinary concentrations of pyrethroid metabolites (μg/L; specific gravity-adjusted), VHEMBE Cohort, Limpopo South Africa.

| Exposure | n   | Percent detected | Percent quantifiable | GM | ± GSD | Min | 10  | 25  | 50  | 75  | 90  | Max  | Percentile |
|----------|-----|------------------|----------------------|----|-------|-----|-----|-----|-----|-----|-----|------|------------|
| p,p’-DDT | 705 | 98.2             | 90.8                 | 69.0 | ±0.64 | <LOD | 8.1 | 18.6 | 55.3 | 254.0 | 947.9 | 15027.6 | 100 |
| p,p’-DDE | 705 | 100.0            | 97.3                 | 286.2 | ±4.82 | 4.0  | 45.3 | 92.2 | 240.4 | 832.5 | 2585.4 | 26301.3 | 100 |
| o,p’-DDT | 705 | 90.2             | 43.6                 | 8.9  | ±4.67 | <LOD | 1.5 | 3.4  | 7.2  | 7.2   | 73.4  | 2029.3  | 100 |
| o,p’-DDE | 827 | 87.2             | 15.9                 | 4.1  | ±2.76 | <LOD | <LOD| 2.3  | 4.2  | 6.9   | 13.9  | 117.5   | 100 |
| cis-DBCA | 695 | 100              | 99.6                 | 0.349 | ±0.03 | 0.017| 0.085| 0.161 | 0.323 | 0.737 | 1.479  | 13.393  | 100 |
| cis-DCCA | 695 | 100              | 99.9                 | 0.479 | ±2.55 | 0.051| 0.153| 0.263 | 0.455 | 0.784 | 1.446  | 209.488 | 100 |
| trans-DCCA | 695 | 100              | 99.9                 | 0.559 | ±3.06 | 0.032| 0.142| 0.269 | 0.535 | 1.049 | 2.310  | 268.945 | 100 |
| 3PBA     | 694 | 100              | 100                  | 1.113 | ±2.39 | 0.103| 0.403| 0.654 | 1.049 | 1.840 | 3.163  | 102.383 | 100 |
| 4F3PBA   | 672 | 12.5             | 7.7                  | N/A  | <LOD  | <LOD | <LOD| <LOD | <LOD | <LOD | <LOD  | 0.016  | 518 |

Note: 3PBA, 3-phenoxybenzoic acid; 4F3PBA, 4-fluoro-1-phenoxybenzoic acid; DBCA, (2,2-dibromo-1,1-dichloroethane); DDE, dichlorodiphenylchloroethylene; DDT, dichlorodiphenyltrichloroethane; GM, geometric mean; GSD, geometric standard deviation; LOD, limit of detection; Max, maximum; Min, minimum; N/A, not available; VHEMBE, Venda Health Examination of Mothers, Babies and their Environment.

Detection limits are 0.01 ng/g wet weight for p,p’-DDT, o,p’-DDT, and o,p’-DDE; 0.03 ng/g for p,p’-DDE; and 0.0025 μg/L for cis-DBCA, 0.0045 μg/L for cis-DCCA, 0.0038 μg/L for trans-DCCA, 0.0047 μg/L for 3PBA, and 0.0005 μg/g/L for 4F3PBA.

Quantification limits are 0.05 μg/g wet weight for p,p’-DDT, o,p’-DDT, and o,p’-DDE; and 0.15 ng/g for p,p’-DDE; 0.0082 μg/L for cis-DBCA, 0.015 μg/L for cis-DCCA, 0.013 μg/L for trans-DCCA, 0.016 μg/L for 3PBA, and 0.011 μg/L for 4F3PBA.

Supplemental Material is available online (https://doi.org/10.1289/EHP6427).
Table 6. Adjusted linear regression β coefficient and 95% confidence interval for the association between maternal prenatal urinary pyrethroid metabolite concentration (specific gravity-adjusted) and children’s performance on the Bayley Scales of Infant Development (3rd edition) at the 1- and 2-y visits, VHEMBE study, Limpopo, South Africa.

| BSID measure | cis-DBCA [β (95% CI)] | cis-DCCA [β (95% CI)] | trans-DCCA [β (95% CI)] | 3PBA⁺ [β (95% CI)] |
|--------------|-----------------------|------------------------|--------------------------|-------------------|
| At 1-y visit (n = 681) | | | | |
| Cognitive | 0.12 (−0.24, 0.47) | 0.09 (−0.27, 0.54) | 0.08 (−0.22, 0.38) | 0.12 (−0.28, 0.52) |
| Receptive Communication | 0.06 (−0.21, 0.33) | −0.09 (−0.40, 0.21) | −0.14 (−0.41, 0.13) | −0.06 (−0.41, 0.29) |
| Expressive Communication | −0.21 (−0.54, 0.12) | −0.01 (−0.35, 0.32) | −0.05 (−0.33, 0.23) | −0.06 (−0.44, 0.31) |
| Fine Motor | 0.10 (−0.27, 0.47) | −0.12 (−0.55, 0.32) | −0.10 (−0.47, 0.27) | −0.03 (−0.49, 0.44) |
| Gross Motor | 0.15 (−0.27, 0.57) | 0.51 (−0.01, 1.02) | 0.31 (−0.12, 0.74) | 0.42 (−0.13, 0.97) |
| Language Composite | −0.47 (−1.85, 0.92) | −0.33 (−1.79, 1.14) | −0.55 (−1.79, 0.69) | −0.37 (−1.99, 1.24) |
| Motor Composite | 0.76 (−1.13, 2.65) | 1.16 (−1.21, 3.53) | 0.65 (−1.33, 2.63) | 1.18 (−1.32, 3.68) |
| Social-Emotionalb | −0.14 (−0.62, 0.34) | −0.70 (−1.25, −0.15) | −0.49 (−0.96, −0.02) | −0.65 (−1.23, −0.06) |
| At 2-y visit (n = 671) | | | | |
| Cognitive | 0.01 (−0.25, 0.27) | 0.08 (−0.29, 0.45) | −0.01 (−0.31, 0.29) | 0.09 (−0.28, 0.45) |
| Receptive Communication | −0.26 (−0.53, 0.00) | 0.09 (−0.25, 0.42) | −0.12 (−0.39, 0.15) | −0.10 (−0.45, 0.26) |
| Expressive Communication | −0.41 (−0.81, −0.01)* | 0.13 (−0.33, 0.59) | −0.19 (−0.56, 0.18) | −0.16 (−0.66, 0.33) |
| Fine Motor | 0.12 (−0.18, 0.42) | 0.30 (−0.07, 0.67) | 0.12 (−0.20, 0.44) | 0.29 (−0.12, 0.70) |
| Gross Motor | −0.25 (−0.51, 0.01) | 0.09 (−0.26, 0.44) | −0.07 (−0.36, 0.23) | 0.01 (−0.39, 0.42) |
| Language Composite | −1.90 (−3.67, −0.14)* | 0.65 (−1.47, 2.76) | −0.85 (−2.56, 0.86) | −0.69 (−2.93, 1.55) |
| Motor Composite | −0.40 (−1.77, 0.96) | 1.19 (−0.59, 2.97) | 0.18 (−1.35, 1.70) | 0.92 (−1.07, 2.90) |

Note: Coefficients show the change in scaled BSID score associated with a 10-fold increase in maternal urinary pyrethroid metabolite concentrations. Models adjusted for maternal education, age, marital status, poverty status at delivery, child hemoglobin levels (see Tables S12–S15) did not alter the above results.

The fifth, sixth, and seventh paragraphs of the “Results” section of the main manuscript should read:

“The sixth table shows the relationship of maternal urinary levels of the four pyrethroid metabolites and children’s BSID scores at the 1- and 2-y visits. At the 1-y visit, we found only Social-Emotional scores to be inversely associated with pyrethroid metabolites cis-DCCA [β = −0.70 (95% CI = −1.25, −0.15)], trans-DCCA [β = −0.49 (95% CI = −0.96, −0.02)], and 3PBA [β = −0.65 (95% CI = −1.23, −0.06)]. These associations were similar for girls and boys (p-Int ≥0.17; Table 7). The relationship between cis-DBCA and Language Composite at 1 year was significant for girls (β = −2.08, 95% CI = −4.08, −0.07), but not boys (β = 1.28, 95% CI = −0.58, 3.15), with a significant interaction by sex (p = 0.03). We saw a similar interaction in the relationship between cis-DBCA and Receptive Communication, with a negative coefficient for girls and a positive coefficient for boys, although neither stratum was significant. At 2 y of age, we observed that a 10-fold increase in maternal cis-DBCA concentrations was associated with a 0.41-unit decrease in Expressive Communication scores (95% CI: −0.81, −0.01) and a 1.90-unit decrease in Language Composite scores (95% CI: −3.67, −0.14) (Table 6). These associations were similar by sex (p-Int = 0.71 and 0.44, respectively; Table 7). However, there were significant differences in associations between Motor Composite scores and each of the four metabolites (p-Int 0.01−0.03), which were negative for girls and positive for boys [e.g., for trans-DCCA, β = −2.03 (95% CI: −3.61, −0.45) for girls and β = 1.86 (95% CI: −0.56, 4.28) for boys, p-Int = 0.01] as well as significant differences in fine and/or gross motor scores between girls and boys (p-Int ≤0.06) for all four metabolites (Table 7). Several exposure–time interaction terms in GEE models did not indicate a consistent longitudinal association across the two assessment ages for either DDT/DDE or pyrethroids, and therefore we deemed the results at each time point more relevant.”

“In sensitivity analyses, we reran the models restricting the analysis to the maternal–children dyads (n = 425 for 1-y and 418 for 2-y visits) for whom maternal urine samples were obtained prior to delivery (Table S3). Overall, the trends in associations in this restricted and full sample (Table 6) were similar, with some results slightly attenuated (e.g., Social-Emotional and cis- and trans-DCCA and 3PBA) and others slightly strengthened (e.g., cis-DBCA and language measures). However, significant inverse associations emerge between cis- and trans-DCCA and 3PBA and Fine Motor scores at the 1-y visit but were no longer apparent at the 2-y visit, and between trans-DCCA and Language Composite at the 2-y visit, primarily driven by Expressive Communication. In other sensitivity analyses, removing the covariate for preterm status from the models (see Tables S4–S5) or including variables in the regression models for maternal HIV status (see Tables S6–S7), child lead levels (see Tables S8–S11), or child hemoglobin levels (see Tables S12–S15) did not alter the above results.”

“Table 8 presents the PIP results from the BKMR analysis indicating the relative ranking of exposure variable importance within the DDT/DDE and pyrethroid mixture. At the 1-y visit, pyrethroid-group PIPs ranked higher than DDT/DDE-group PIPs for the study outcomes, with the exception of Cognitive scores. At the 2-y visit, group PIPs were approximately equal to or higher for pyrethroids than for DDT/DDE. DDT/DDE did not reach the PIP group inclusion of 50% for any of the analyses at the 1- or 2-y visit. The pyrethroids did reach the group PIP inclusion criterion of 50% at the 1-y visit for Receptive Communication (PIPyrethroid = 56%), with 3PBA resulting in the highest conditional PIP; for Fine Motor (PIPyrethroid = 51%), with 3PBA having the highest conditional PIP; and for the Social-Emotional domain (PIPyrethroid = 73%), with cis-DCCA resulting in the highest conditional PIP ranking. No associations of the pyrethroid group for the 2-y assessment reached the PIP inclusion criterion. Based upon review of bivariate plots of exposure responses for each chemical, the BKMR models showed no evidence for interaction between DDT or DDE and any of the pyrethroid metabolites (see Figures S2–S14).”
Table 7. Sex-stratified adjusted linear regression β coefficient and 95% confidence interval for the association between maternal prenatal urinary pyrethroid metabolite concentration (specific gravity-adjusted) and children’s performance on the Bayley Scales of Infant Development (3rd edition) at the 1- and 2-y visits, VHEMBE study, Limpopo, South Africa.

| BSID measure                  | Boys | Girls | $P_{b}$ *  |
|-------------------------------|------|-------|------------|
|                               | cis-DBCA |      |            |
| Cognitive                     | $-0.06 (-0.51, 0.38)$ | $0.32 (-0.24, 0.87)$ | 0.24 |
| Receptive Communication       | $0.40 (-0.02, 0.82)$  | $-0.24 (-0.60, 0.11)$ | 0.03 |
| Expressive Communication      | $0.06 (-0.35, 0.47)$  | $-0.47 (-0.97, 0.04)$ | 0.14 |
| Fine Motor                    | $-0.03 (-0.53, 0.47)$ | $-0.28 (-0.79, 0.86)$ | 0.38 |
| Gross Motor                   | $0.01 (-0.60, 0.61)$  | $-0.29 (-0.31, 0.89)$ | 0.49 |
| Language Composite            | $1.28 (-0.58, 3.15)$  | $-2.08 (-4.08, -0.07)^*$ | 0.03 |
| Motor Composite               | $-0.11 (-2.67, 2.46)$ | $1.77 (-1.11, 4.65)$  | 0.30 |
| Social-Emotional              | $-0.16 (-0.87, 0.55)$ | $-0.27 (-0.91, 0.36)$ | 0.85 |
|                               | trans-DBCA |      |            |
| Cognitive                     | $0.15 (-0.26, 0.55)$  | $-0.11 (-0.45, 0.23)$ | 0.35 |
| Receptive Communication       | $-0.11 (-0.51, 0.29)$ | $-0.39 (-0.76, -0.03)^*$ | 0.23 |
| Expressive Communication      | $-0.39 (-0.97, 0.20)$ | $-0.48 (-1.05, 0.09)^*$ | 0.71 |
| Fine Motor                    | $0.42 (-0.07, 0.91)$  | $-0.17 (-0.50, 0.17)$ | 0.06 |
| Gross Motor                   | $-0.07 (-0.43, 0.29)$ | $-0.45 (-0.83, -0.06)^*$ | 0.12 |
| Language Composite            | $-1.38 (-4.02, 2.62)$ | $-2.49 (-4.92, -0.06)^*$ | 0.44 |
| Motor Composite               | $1.04 (-1.08, 3.16)$  | $-1.87 (-3.58, -0.17)^*$ | 0.03 |
|                               | 3PBA   |      |            |
| Cognitive                     |          |       |            |
| Receptive Communication       |          |       |            |
| Expressive Communication      |          |       |            |
| Fine Motor                    |          |       |            |
| Gross Motor                   |          |       |            |
| Language Composite            |          |       |            |
| Motor Composite               |          |       |            |

Note: Coefficients show the change in scaled BSID score associated with a 10-fold increase in maternal urinary pyrethroid metabolite concentrations. Models adjusted for maternal education, age, marital status, poverty status at delivery, risk for depression (CES-D) and Raven’s Coloured Progressive Matrices score (at 1-y visit); food insecurity (USDA Food Security Survey); HOME score; preterm delivery; psychometrician at the time of exam; and urine sample collection before or after delivery. 3PBA: 3-phenoxbenzonic acid; BSID, Bayley Scales of Infant Development (3rd edition); CES-D, Center for Epidemiologic Studies Depression Scale; CI, confidence interval; DBCA, (2,2-dichlorovinyl)-2,2-dimethylcyclopropane-1-carboxylic acid; DCCA, (2,2-dichlorovinyl)-2,2-dimethylcyclopropane-1-carboxylic acid; HOME, Home Observation Measurement of the Environment; $P_{b}$, $p$ for the interval; VHEMBE, Venda Health Examination of Mothers, Babies and their Environment.

* $p$-Value for sex interaction. Interactions were considered statistically significant at $p < 0.1$.  *  $p < 0.05$. 

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Table 8. Posterior inclusion probabilities for group inclusion into models and conditional inclusion into models using Bayesian kernel machine regression to describe relative ranking of variable “importance.”

| BSID measure          | Group PIP* | Conditional PIP* |
|-----------------------|------------|------------------|
|                       | DDT/DDE    | Pyrethroid       | p,p'-DDT | p,p'-DDE | cis-DBCA | cis-DCCA | trans-DCCA | 3PBA |
| At 1-y visit          |            |                  |          |          |          |          |            |      |
| Cognitive             | 0.30       | 0.08             | 0.22     | 0.78     | 0.28     | 0.19     | 0.36       | 0.17  |
| Receptive Communication| 0.03       | 0.56             | 0.46     | 0.54     | 0.01     | 0.19     | 0.34       | 0.46  |
| Expressive Communication| 0.06      | 0.07             | 0.73     | 0.27     | 0.28     | 0.17     | 0.21       | 0.35  |
| Fine Motor            | 0.08       | 0.51             | 0.75     | 0.25     | 0.03     | 0.14     | 0.34       | 0.49  |
| Gross Motor           | 0.14       | 0.17             | 0.54     | 0.46     | 0.16     | 0.52     | 0.18       | 0.14  |
| Language Composite    | 0.02       | 0.04             | 0.48     | 0.52     | 0.05     | 0.12     | 0.25       | 0.58  |
| Motor Composite       | 0.02       | 0.08             | 0.48     | 0.52     | 0.21     | 0.38     | 0.18       | 0.22  |
| Social-Emotional      | 0.31       | 0.73             | 0.18     | 0.82     | 0.01     | 0.51     | 0.29       | 0.18  |
| At 2-y visit          |            |                  |          |          |          |          |            |      |
| Cognitive             | 0.09       | 0.25             | 0.41     | 0.59     | 0.14     | 0.66     | 0.14       | 0.07  |
| Receptive Communication| 0.08       | 0.15             | 0.40     | 0.60     | 0.71     | 0.12     | 0.11       | 0.06  |
| Expressive Communication| 0.24      | 0.25             | 0.17     | 0.83     | 0.74     | 0.08     | 0.11       | 0.07  |
| Fine Motor            | 0.15       | 0.16             | 0.34     | 0.66     | 0.19     | 0.26     | 0.16       | 0.38  |
| Gross Motor           | 0.11       | 0.11             | 0.53     | 0.47     | 0.55     | 0.26     | 0.12       | 0.07  |
| Language Composite    | 0.06       | 0.11             | 0.22     | 0.78     | 0.86     | 0.05     | 0.07       | 0.02  |
| Motor Composite       | 0.06       | 0.03             | 0.47     | 0.53     | 0.07     | 0.74     | 0.12       | 0.07  |

Note: Models were adjusted for maternal education, age, marital status, poverty status at delivery, risk for depression (CES-D) and Raven’s Coloured Progressive Matrices score (at 1-y visit); food insecurity (USDA Food Security Survey); HOME score; psychometrician; preterm delivery; and time of urine collection (before or after delivery). 3PBA, 3-phenoxybenzoic acid; BKM R, Bayesian kernel machine regression; BSID, Bayley Scales of Infant Development (3rd edition); CES-D, Center for Epidemiologic Studies Depression Scale; DBCA, (2,2-dibromovinyl)-2,2-dimethylcyclopropane-1-carboxylic acid; DCCA, (2,2-dichlorovinyl)-2,2-dimethylcyclopropane-1-carboxylic acid; DDE, dichlorodiphenyldichloroethylene; DDT, dichlorodiphenyltrichloroethane; HOME, Home Observation Measurement of the Environment; PIP, posterior inclusion probability; USDA, U.S. Department of Agriculture; VHEMBE, Venda Health Examination of Mothers, Babies and their Environment.

*Group PIPs indicate the posterior probability that an exposure grouping (e.g., pyrethroids) was included into the “true” model from the multiple iterations (25,000) of the Markov Chain Monte Carlo (MCMC) sampler. For example, the pyrethroid grouping was included 73% of the time across all models for the Social-Emotional outcome at the 1-y visit.

*Conditional PIPs indicate the posterior probability that a particular chemical exposure (e.g., cis-DCCA) within an exposure grouping (e.g., pyrethroids) was included into the “true” model from the multiple iterations (25,000) of the MCMC sampler, conditional on the exposure grouping being included. For example, within the pyrethroid grouping, cis-DCCA was included 51% of the time across all models that included pyrethroids for the Social-Emotional measure at the 1-y visit.

Note that within a group, the conditional PIPs will total 1.0.

*Group PIP with probability exceeding the threshold of 0.5 (the median probability model). Emphasis should be placed on the relative ranking across groups (pyrethroids or DDT/DDE).