## **ERRATUM**

## Erratum to: Long-term exposure to air pollution and the incidence of asthma: meta-analysis of cohort studies

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We wish to correct the estimates for  $NO_2$  and asthma incidence reported in the above paper. The original analysis was based on 13 studies, 2 of which reported only  $NO_x$ . We believed we had scaled these two  $NO_x$  estimates to  $NO_2$  equivalents so that they could be included in the meta-analysis but have since discovered that this scaling was not implemented. The corrected estimates for the main meta-analysis and sensitivity analyses are given in a revised version

of Table 2 presented below. Correcting for this error now gives a random effects estimate for  $NO_2$  ( $10~\mu g/m^3$ ) and asthma incidence for the 13 studies of 1.15 (95 % CI 1.06 to 1.26) which compares with the estimate of 1.07 (95 % CI 1.02 to 1.13) previously reported. As in the original analysis there was some evidence of publication bias and correcting for this using the Trim and Fill technique reduced the revised estimate from 1.15 to 1.11. The conclusion drawn from the original analysis was that long term exposure to  $NO_2$  is significantly associated with the incidence of asthma. This revised analysis strengthens this conclusion.

The online version of the original article can be found at http://dx.doi.org/10.1007/s11869-011-0144-5.

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Table 2 Revised results. Cohort studies of air pollution and asthma incidence. Meta-analyses of associations between  $NO_2$  per  $10~\mu g/m^3$  and the incidence or lifetime prevalence of asthma or wheeze symptom

Adults only 10 LTP(4) 1(6) children (7) A(9) W(1) 0.003 1.06 1.14 (1.06; 1.26; 1.14) (1.06; 1.26; 1.14) (1.06; 1.26; 1.14) (1.06; 1.26; 1.14) (1.06; 1.26; 1.14) (1.06; 1.26; 1.14) (1.06; 1.26; 1.14) (1.06; 1.26; 1.14) (1.06; 1.26; 1.14) (1.06; 1.26; 1.14) (1.06; 1.26; 1.14) (1.06; 1.17) (1.18) (	Analysis	No. of estimates	Parameter <sup>a</sup> (No. of estimates)	Age group (No. of estimates)	Outcome (No. of estimates)	Heterogeneity P value and I <sup>2</sup>	Fixed Effect (95 % CI)	Random Effect (95 % CI)
Odds ratios only    10	Main analysis	13	LTP(4) I (9)	children (10)	A(12) W(1)	0.003	1.09	1.15
Adults (3)   Control   C				adults (3)		60.1 %	(1.05; 1.14)	(1.06; 1.26)
LTP over age 7 excluded  12	Odds ratios only	10	LTP(4) I(6)	children (7)	A(9) W(1)	0.003	1.06	1.14
Adults (3)				adults (3)		63.7 %	(1.01; 1.12)	(1.02; 1.27)
Children only    10	LTP over age 7 excluded	12	LTP(3) I(9)	children (9)	A (11) W(1)	0.761	1.17	1.17
Children younger than 2 yrs excluded  Children younger than 2 yrs excluded  Adults (1)				adults (3)		0.0 %	(1.11; 1.23)	(1.11; 1.23)
Children younger than 2 yrs excluded  Adults (1)	Children only	10	LTP(4) I(6)	children (10)	A(9) W(1)	0.004	1.08	1.12
Adults only   3				adults (0)		62.6 %	(1.03; 1.13)	(1.03; 1.22)
Adults only 3 LTP(0) I(3) children (0) A(3) W(0) 0.795 1.42 1.42 adults (3) 0.00 % (1.14; 1.78) (1.14; 1.78) Asthma only 12 LTP(3) I(9) children (9) A(12) W(0) 0.002 1.09 1.17 adults (3) 63.3 % (1.05; 1.14) (1.06; 1.29) LTP only 4 LTP(4) I(0) children (4) A(3) W(1) 0.008 1.02 1.03 adults (0) 74.8 % (0.97; 1.08) (0.90; 1.18) Incidence only 9 LTP(0) I(9) children (6) A(7) W(0) 0.896 1.22 1.22 adults (3) 0.0 % (1.14; 1.31) (1.14; 1.31) NO2 only 11 LTP(3) I(8) children (8) A(9) W(0) 0.002 1.08 1.17 adults (3) 64.8 % (1.03; 1.14) (1.05; 1.31) Birth cohorts only 7 LTP(4) I (3) children (7) A(6) W(1) 0.023 1.04 1.07 adults (3) 64.8 % (1.03; 1.14) (1.05; 1.31) Emission -dispersion models only 5 LTP(2) I (3) children (3) A(6) W(0) 0.680 1.23 1.23 1.24 adults (3) 0.0 % (1.14; 1.34) (1.14; 1.34) Emission -dispersion models only 5 LTP(2) I (3) children (3) A(6) W(0) 0.680 1.23 1.23 1.24 adults (2) 80.2 % (0.98; 1.10) (0.97; 1.33) Land use regression models only 5 LTP(2) I (3) children (5) A(5) W(0) 0.947 1.14 1.14 1.14 adults (2) 80.2 % (0.98; 1.10) (0.97; 1.33) Land use regression models only 12 LTP(4) I(8) children (5) A(5) W(0) 0.947 1.14 1.14 1.14 per study Adults (3) 60.6 % (1.04; 1.13) (1.04; 1.25) (1.05; 1.25) Most significant estimate 13 LTP(5) I (8) children (11) A(11) W(2) <0.001 1.11 1.18 per study A(10) (1.07; 1.30) Most significant estimate 12 LTP(4) I (8) children (10) A(10) W(2) 0.220 1.19 1.20	Children younger than 2 yrs excluded	9	LTP(3) I(6)	children (10)	A(8) W(1)	0.002	1.08	1.12
Asthma only 12 LTP(3) I(9) children (9) A(12) W(0) 0.002 1.09 1.17 adults (3) 63.3 % (1.05; 1.14) (1.06; 1.29) LTP only 4 LTP(4) I(0) children (4) A(3) W(1) 0.008 1.02 1.03 adults (0) 74.8 % (0.97; 1.08) (0.90; 1.18) Incidence only 9 LTP(0) I(9) children (6) A(7) W(0) 0.896 1.22 1.22 adults (3) 0.0 % (1.14; 1.31) (1.14; 1.31) [1.14; 1.31] NO2 only 11 LTP(3) I(8) children (8) A(9) W(0) 0.002 1.08 1.17 adults (3) 64.8 % (1.03; 1.14) (1.05; 1.31) [1.14; 1.31]				adults (1)		66.4 %	(1.03; 1.13)	(1.03; 1.23)
Asthma only  12 LTP(3) I(9) children (9) A(12) W(0) 0.002 1.09 1.17  adults (3) 63.3 % (1.05; 1.14) (1.06; 1.29)  LTP only  4 LTP(4) I(0) children (4) A(3) W(1) 0.008 1.02 1.03  adults (0) 74.8 % (0.97; 1.08) (0.90; 1.18)  Incidence only  9 LTP(0) I(9) children (6) A(7) W(0) 0.896 1.22 1.22  adults (3) 0.0 % (1.14; 1.31) (1.14; 1.31)  NO2 only  11 LTP(3) I(8) children (8) A(9) W(0) 0.002 1.08 1.17  adults (3) 64.8 % (1.03; 1.14) (1.05; 1.31)  Birth cohorts only  7 LTP(4) I (3) children (7) A(6) W(1) 0.023 1.04 1.07  adults (0) 59.3 % (0.99; 1.09) (0.96; 1.19)  Child/adult cohorts only  6 LTP(0) I (6) children (3) A(6) W(0) 0.680 1.23 1.23  adults (3) 0.0 % (1.14; 1.34) (1.14; 1.34)  Emission -dispersion models only  5 LTP(2) I (3) children (3) A(4) W(1) <0.001 1.03 1.14  Emission -dispersion models only  5 LTP(2) I (3) children (3) A(4) W(1) 0.947 1.14 1.14  adults (0) 0.99; 1.19  Land use regression models only  5 LTP(2) I (3) children (5) A(5) W(0) 0.947 1.14 1.14  adults (0) 0.0 % (1.06; 1.23) (1.06; 1.23)  Within community only  12 LTP(4) I(8) children (9) A(11) W(1) 0.003 1.09 1.14  adults (3) 60.6 % (1.04; 1.13) (1.04; 1.25)  Most significant estimate 13 LTP(5) I (8) children (11) A(11) W(2) 0.001 1.11 1.18  per study  Most significant estimate 12 LTP(4) I (8) children (10) A(10) W(2) 0.220 1.19 1.20	Adults only	3	LTP(0) I(3)	children (0)	A(3) W(0)	0.795	1.42	1.42
Adults (3)   G3.3 %   (1.05; 1.14)   (1.06; 1.29)				adults (3)		0.00 %	(1.14; 1.78)	(1.14; 1.78)
LTP only  4 LTP(4) I(0) children (4) A(3) W(1) 0.008 1.02 1.03 adults (0) 74.8 % (0.97; 1.08) (0.90; 1.18) Incidence only  9 LTP(0) I(9) children (6) A(7) W(0) 0.896 1.22 1.22 adults (3) 0.0 % (1.14; 1.31) (1.14; 1.31) NO2 only  11 LTP(3) I(8) children (8) A(9) W(0) 0.002 1.08 1.17 adults (3) 64.8 % (1.03; 1.14) (1.05; 1.31) Birth cohorts only  7 LTP(4) I (3) children (7) A(6) W(1) 0.023 1.04 1.07 adults (0) 59.3 % (0.99; 1.09) (0.96; 1.19) Child/adult cohorts only  6 LTP(0) I (6) children (3) A(6) W(0) 0.680 1.23 1.23 adults (3) 0.0 % (1.14; 1.34) (1.14; 1.34) Emission -dispersion models only  5 LTP(2) I (3) children (3) A(4) W(1) <0.001 1.03 1.14 adults (2) 80.2 % (0.98; 1.10) (0.97; 1.33) Land use regression models only  5 LTP(2) I (3) children (5) A(5) W(0) 0.947 1.14 1.14 adults (0) 0.0 % (1.06; 1.23) (1.06; 1.23) Within community only  12 LTP(4) I(8) children (9) A(11) W(1) 0.003 1.09 1.14 adults (3) 60.6 % (1.04; 1.13) (1.04; 1.25) Most significant estimate 13 LTP(5) I (8) children (11) A(11) W(2) <0.001 1.11 1.18 per study  Most significant estimate 12 LTP(4) I (8) children (10) A(10) W(2) 0.220 1.19 1.20	Asthma only	12	LTP(3) I(9)	children (9)	A(12) W(0)	0.002	1.09	1.17
Adults (0)   74.8 % (0.97; 1.08) (0.90; 1.18]   Incidence only   9   LTP(0) I(9)   children (6)   A(7) W(0)   0.896   1.22   1.22   1.22   adults (3)   0.0 % (1.14; 1.31) (1.14; 1.31)     NO2 only   11   LTP(3) I(8)   children (8)   A(9) W(0)   0.002   1.08   1.17   adults (3)   64.8 % (1.03; 1.14) (1.05; 1.31)     Birth cohorts only   7   LTP(4) I (3)   children (7)   A(6) W(1)   0.023   1.04   1.07   adults (0)   59.3 % (0.99; 1.09) (0.96; 1.19)     Child/adult cohorts only   6   LTP(0) I (6)   children (3)   A(6) W(0)   0.680   1.23   1.23   adults (3)   0.0 % (1.14; 1.34) (1.14; 1.34)     Emission -dispersion models only   5   LTP(2) I (3)   children (3)   A(4) W(1)   <0.001   1.03   1.14   adults (2)   80.2 % (0.98; 1.10) (0.97; 1.33)     Land use regression models only   5   LTP(2) I (3)   children (5)   A(5) W(0)   0.947   1.14   1.14   1.14   adults (0)   0.0 % (1.06; 1.23) (1.06; 1.23)     Within community only   12   LTP(4) I (8)   children (9)   A(11) W(1)   0.003   1.09   1.14   adults (3)   60.6 % (1.04; 1.13) (1.04; 1.25)     Most significant estimate   13   LTP(5) I (8)   children (11)   A(11) W(2)   <0.001   1.11   1.18   per study   adults (2)   70.3 % (1.06; 1.15) (1.07; 1.30)     Most significant estimate   12   LTP(4) I (8)   children (10)   A(10) W(2)   0.220   1.19   1.20				adults (3)		63.3 %	(1.05; 1.14)	(1.06; 1.29)
Incidence only	LTP only	4	LTP(4) I(0)	children (4)	A(3) W(1)	0.008	1.02	1.03
Adults (3) 0.0 % (1.14; 1.31) (1.14; 1.31)  NO <sub>2</sub> only 11 LTP(3) I(8) children (8) A(9) W(0) 0.002 1.08 1.17  adults (3) 64.8 % (1.03; 1.14) (1.05; 1.31)  Birth cohorts only 7 LTP(4) I (3) children (7) A(6) W(1) 0.023 1.04 1.07  adults (0) 59.3 % (0.99; 1.09) (0.96; 1.19)  Child/adult cohorts only 6 LTP(0) I (6) children (3) A(6) W(0) 0.680 1.23 1.23  adults (3) 0.0 % (1.14; 1.34) (1.14; 1.34)  Emission -dispersion models only 5 LTP(2) I (3) children (3) A(4) W(1) <0.001 1.03 1.14  adults (2) 80.2 % (0.98; 1.10) (0.97; 1.33)  Land use regression models only 5 LTP(2) I (3) children (5) A(5) W(0) 0.947 1.14 1.14  adults (0) 0.0 % (1.06; 1.23) (1.06; 1.23)  Within community only 12 LTP(4) I (8) children (9) A(11) W(1) 0.003 1.09 1.14  adults (3) 60.6 % (1.04; 1.13) (1.04; 1.25)  Most significant estimate 13 LTP(5) I (8) children (11) A(11) W(2) <0.001 1.11 1.18  per study 70.3 % (1.06; 1.15) (1.07; 1.30)  Most significant estimate 12 LTP(4) I (8) children (10) A(10) W(2) 0.220 1.19 1.20				adults (0)		74.8 %	(0.97; 1.08)	(0.90; 1.18)
NO <sub>2</sub> only  11 LTP(3) I(8) children (8) A(9) W(0) 0.002 1.08 1.17  adults (3) 64.8 % (1.03; 1.14) (1.05; 1.31)  Birth cohorts only  7 LTP(4) I (3) children (7) A(6) W(1) 0.023 1.04 1.07  adults (0) 59.3 % (0.99; 1.09) (0.96; 1.19)  Child/adult cohorts only  6 LTP(0) I (6) children (3) A(6) W(0) 0.680 1.23 1.23  adults (3) 0.0 % (1.14; 1.34) (1.14; 1.34)  Emission -dispersion models only  5 LTP(2) I (3) children (3) A(4) W(1) <0.001 1.03 1.14  adults (2) 80.2 % (0.98; 1.10) (0.97; 1.33)  Land use regression models only  5 LTP(2) I (3) children (5) A(5) W(0) 0.947 1.14 1.14  adults (0) 0.0 % (1.06; 1.23) (1.06; 1.23)  Within community only 12 LTP(4) I(8) children (9) A(11) W(1) 0.003 1.09 1.14  adults (3) 60.6 % (1.04; 1.13) (1.04; 1.25)  Most significant estimate 13 LTP(5) I (8) children (11) A(11) W(2) <0.001 1.11 1.18  per study  Most significant estimate 12 LTP(4) I (8) children (10) A(10) W(2) 0.220 1.19 1.20	Incidence only	9	LTP(0) I(9)	children (6)	A(7) W(0)	0.896	1.22	1.22
Adults (3)   64.8 %   (1.03; 1.14)   (1.05; 1.31)				adults (3)		0.0 %	(1.14; 1.31)	(1.14; 1.31)
Birth cohorts only  7 LTP(4) I (3) children (7) A(6) W(1) 0.023 1.04 1.07 adults (0) 59.3 % (0.99; 1.09) (0.96; 1.19) Child/adult cohorts only  6 LTP(0) I (6) children (3) A(6) W(0) 0.680 1.23 1.23 adults (3) 0.0 % (1.14; 1.34) (1.14; 1.34) Emission -dispersion models only  5 LTP(2) I (3) children (3) A(4) W(1) <0.001 1.03 1.14 adults (2) 80.2 % (0.98; 1.10) (0.97; 1.33) Land use regression models only  5 LTP(2) I (3) children (5) A(5) W(0) 0.947 1.14 1.14 adults (0) 0.0 % (1.06; 1.23) (1.06; 1.23) Within community only  12 LTP(4) I (8) children (9) A(11) W(1) 0.003 1.09 1.14 adults (3) 60.6 % (1.04; 1.13) (1.04; 1.25) Most significant estimate 13 LTP(5) I (8) children (11) A(11) W(2) <0.001 1.11 1.18 per study  Most significant estimate 12 LTP(4) I (8) children (10) A(10) W(2) 0.220 1.19 1.20	NO <sub>2</sub> only	11	LTP(3) I(8)	children (8)	A(9) W(0)	0.002	1.08	1.17
Adults (0) 59.3 % (0.99; 1.09) (0.96; 1.19)  Child/adult cohorts only 6 LTP(0) I (6) children (3) A(6) W(0) 0.680 1.23 1.23				adults (3)		64.8 %	(1.03; 1.14)	(1.05; 1.31)
Child/adult cohorts only  6 LTP(0) I (6) children (3) A(6) W(0) 0.680 1.23 1.23  adults (3) 0.0 % (1.14; 1.34) (1.14; 1.34)  Emission -dispersion models only 5 LTP(2) I (3) children (3) A(4) W(1) <0.001 1.03 1.14  adults (2) 80.2 % (0.98; 1.10) (0.97; 1.33)  Land use regression models only 5 LTP(2) I (3) children (5) A(5) W(0) 0.947 1.14 1.14  adults (0) 0.0 % (1.06; 1.23) (1.06; 1.23)  Within community only 12 LTP(4) I(8) children (9) A(11) W(1) 0.003 1.09 1.14  adults (3) 60.6 % (1.04; 1.13) (1.04; 1.25)  Most significant estimate 13 LTP(5) I (8) children (11) A(11) W(2) <0.001 1.11 1.18  per study 70.3 % (1.06; 1.15) (1.07; 1.30)  Most significant estimate 12 LTP(4) I (8) children (10) A(10) W(2) 0.220 1.19 1.20	Birth cohorts only	7	LTP(4) I (3)	children (7)	A(6) W(1)	0.023	1.04	1.07
Adults (3)   Children (3)   A(4) W(1)   Children (5)   A(5) W(0)   Children (6)   A(5) W(0)   Children (7)   A(1) W(1)   Children (8)   A(1) W(1)   Children (9)   A(11) W(1)   Children (9)   A(11) W(1)   Children (10)   A(11) W(2)   Children (11)   A(11) W(2)				adults (0)		59.3 %	(0.99; 1.09)	(0.96; 1.19)
Emission -dispersion models only 5 LTP(2) I (3) children (3) A(4) W(1) <0.001 1.03 1.14 adults (2) 80.2 % (0.98; 1.10) (0.97; 1.33)  Land use regression models only 5 LTP(2) I (3) children (5) A(5) W(0) 0.947 1.14 1.14 1.14 adults (0) 0.0 % (1.06; 1.23) (1.06; 1.23)  Within community only 12 LTP(4) I (8) children (9) A(11) W(1) 0.003 1.09 1.14 adults (3) 60.6 % (1.04; 1.13) (1.04; 1.25)  Most significant estimate 13 LTP(5) I (8) children (11) A(11) W(2) <0.001 1.11 1.18 per study 70.3 % (1.06; 1.15) (1.07; 1.30)  Most significant estimate 12 LTP(4) I (8) children (10) A(10) W(2) 0.220 1.19 1.20	Child/adult cohorts only	6	LTP(0) I (6)	children (3)	A(6) W(0)	0.680	1.23	1.23
adults (2) 80.2 % (0.98; 1.10) (0.97; 1.33)  Land use regression models only 5 LTP(2) I (3) children (5) A(5) W(0) 0.947 1.14 1.14  adults (0) 0.0 % (1.06; 1.23) (1.06; 1.23)  Within community only 12 LTP(4) I (8) children (9) A(11) W(1) 0.003 1.09 1.14  adults (3) 60.6 % (1.04; 1.13) (1.04; 1.25)  Most significant estimate 13 LTP(5) I (8) children (11) A(11) W(2) <0.001 1.11 1.18  per study 70.3 % (1.06; 1.15) (1.07; 1.30)  Most significant estimate 12 LTP(4) I (8) children (10) A(10) W(2) 0.220 1.19 1.20				adults (3)		0.0 %	(1.14; 1.34)	(1.14; 1.34)
Land use regression models only 5 LTP(2) I (3) children (5) A(5) W(0) 0.947 1.14 1.14 1.14 adults (0) 0.0 % (1.06; 1.23) (1.06; 1.23) Within community only 12 LTP(4) I(8) children (9) A(11) W(1) 0.003 1.09 1.14 adults (3) 60.6 % (1.04; 1.13) (1.04; 1.25) Most significant estimate 13 LTP(5) I (8) children (11) A(11) W(2) <0.001 1.11 1.18 per study adults (2) 70.3 % (1.06; 1.15) (1.07; 1.30) Most significant estimate 12 LTP(4) I (8) children (10) A(10) W(2) 0.220 1.19 1.20	Emission -dispersion models only	5	LTP(2) I (3)	children (3)	A(4) W(1)	< 0.001	1.03	1.14
Adults (0)   0.0 %   (1.06; 1.23)   (1.06; 1.23)				adults (2)		80.2 %	(0.98; 1.10)	(0.97; 1.33)
Within community only 12 LTP(4) I(8) children (9) A(11) W(1) 0.003 1.09 1.14  adults (3) 60.6 % (1.04; 1.13) (1.04; 1.25)  Most significant estimate 13 LTP(5) I (8) children (11) A(11) W(2) <0.001 1.11 1.18  per study 70.3 % (1.06; 1.15) (1.07; 1.30)  Most significant estimate 12 LTP(4) I (8) children (10) A(10) W(2) 0.220 1.19 1.20	Land use regression models only	5	LTP(2) I (3)	children (5)	A(5) W(0)	0.947	1.14	1.14
Most significant estimate per study       13       LTP(5) I (8) children (11) A(11) W(2)       <0.001				adults (0)		0.0 %	(1.06; 1.23)	(1.06; 1.23)
Most significant estimate       13       LTP(5) I (8)       children (11)       A(11) W(2)       <0.001	Within community only	12	LTP(4) I(8)	children (9)	A(11) W(1)	0.003	1.09	1.14
per study adults (2) 70.3 % (1.06; 1.15) (1.07; 1.30) Most significant estimate 12 LTP(4) I (8) children (10) A(10) W(2) 0.220 1.19 1.20				adults (3)		60.6 %	(1.04; 1.13)	(1.04; 1.25)
Most significant estimate 12 LTP(4) I (8) children (10) A(10) W(2) 0.220 1.19 1.20	Most significant estimate per study	13	LTP(5) I (8)	children (11)	A(11) W(2)	< 0.001	1.11	1.18
				adults (2)		70.3 %	(1.06; 1.15)	(1.07; 1.30)
per study—positive direction only adults (2) 22.8 % (1.13; 1.25) (1.13; 1.28)	Most significant estimate per study—positive direction only	12	LTP(4) I (8)	children (10)	A(10) W(2)	0.220	1.19	1.20
				adults (2)		22.8 %	(1.13; 1.25)	(1.13; 1.28)

<sup>&</sup>lt;sup>a</sup> One parameter per study chosen according to algorithm described in text. I = incidence; LTP = lifetime prevalence; A = asthma; W = wheeze

