

## **Online Data Supplement**

### **Ambient Air Pollution Adversely Impacts Various Domains of Asthma Morbidity among Peruvian Children**

Nadia N Hansel, Karina M Romero, Suzanne L Pollard, Sonali Bose, Kevin J. Psoter, Lindsay Underhill, Caroline Johnson, D'Ann Williams, Frank C Curriero, Patrick Breysse, Kirsten Koehler, William Checkley; GASP Study Investigators

**Supplemental Table e1: Single and multi-pollutant mixed effects linear regression models: association of PM, BC and NO<sub>2</sub> with uncontrolled asthma and adverse asthma-related quality of life, as continuous measures**

<b>Air Pollutants</b>	<b>Single-pollutant Unadjusted OR (95% CI)</b>	<b>Multi-pollutant Adjusted* OR (95% CI)</b>
<b>Uncontrolled asthma<sup>+</sup></b>		
PM <sub>2.5</sub>	<b>-0.22 (-0.32, -0.13)</b>	<b>-0.41 (-0.57, -0.26)</b>
Total BC	<b>-0.40 (-0.68, -0.12)</b>	
Proportion BC		<b>-1.21 (-1.90, -0.51)</b>
NO <sub>2</sub>	<b>-0.54 (-0.66, -0.41)</b>	<b>-0.24 (-0.40, -0.08)</b>
<b>Adverse asthma-related quality of life<sup>++</sup></b>		
PM <sub>2.5</sub>	<b>-0.05 (-0.07, -0.03)</b>	<b>-0.08 (-0.11, -0.04)</b>
Total BC	0.09 (0.04, 0.13)	
Proportion BC		-0.13 (-0.27, 0.00)
NO <sub>2</sub>	<b>-0.16 (-0.19, -0.12)</b>	<b>-0.11 (-0.15, -0.07)</b>

*Abbreviations:* OR: odds ratio; CI: confidence interval; PM<sub>2.5</sub>: particulate matter <2.5µg in aerodynamic diameter; BC: black carbon; NO<sub>2</sub>: nitrogen dioxide

\* *Adjusted models include the following covariates: age (continuous), gender (male vs. female), SES, BMI (normal, overweight, obese), baseline FEV<sub>1</sub> z score, site (Pampas, Villa), temperature (°C) and each pollutant.*

<sup>+</sup> as measured by ACT with lower score representing worse control

<sup>++</sup> as measured by PAQLQ with lower score representing worse impairment in asthma-related QOL

**Supplemental Table e2: Single and multi-pollutant random effects logistic regression models: association of PM, BC and NO<sub>2</sub> with odds of selected adverse outcomes adjusted for additional covariates of SHS, ICS use and atopy**

<b>Air Pollutants</b>	<b>Single-pollutant Unadjusted OR (95% CI)</b>	<b>Multi-pollutant Adjusted* OR (95% CI)</b>
<b>Uncontrolled asthma</b>		
PM <sub>2.5</sub>	<b>1.29 (1.12, 1.49)</b>	<b>1.47 (1.14, 1.89)</b>
Total BC	1.25 (0.88, 1.77)	
Proportion BC		2.78 (0.81, 9.56)
NO <sub>2</sub>	<b>2.06 (1.65, 2.58)</b>	<b>1.53 (1.15, 2.03)</b>
<b>Adverse asthma-related quality of life</b>		
PM <sub>2.5</sub>	<b>1.21 (1.10, 1.33)</b>	<b>1.31 (1.11, 1.55)</b>
Total BC	1.19 (0.98, 1.44)	
Proportion BC		1.41 (0.70, 2.85)
NO <sub>2</sub>	<b>2.11 (1.84, 2.42)</b>	<b>1.60 (1.34, 1.90)</b>
<b>Health care utilization</b>		
PM <sub>2.5</sub>	0.93 (0.74, 1.15)	1.18 (0.84, 1.65)
Total BC	1.11 (0.71, 1.74)	
Proportion BC		1.97 (0.58, 6.68)
NO <sub>2</sub>	1.15 (0.90, 1.46)	0.95 (0.72, 1.26)
<b>School days missed</b>		
PM <sub>2.5</sub>	1.20 (0.95, 1.52)	1.26 (0.87, 1.83)
Total BC	1.60 (0.95, 2.70)	
Proportion BC		1.82 (0.45, 7.40)
NO <sub>2</sub>	<b>1.46 (1.10, 1.93)</b>	1.28 (0.92, 1.78)

*Abbreviations:* OR: odds ratio; CI: confidence interval; PM<sub>2.5</sub>: particulate matter <2.5µg in aerodynamic diameter; BC: black carbon; NO<sub>2</sub>: nitrogen dioxide

\* *Adjusted models include the following covariates: age (continuous), gender (male vs. female), SES, BMI (normal, overweight, obese), baseline FEV<sub>1</sub> z score, site (Pampas, Villa), temperature (°C), second hand smoke exposure, inhaled corticosteroid use and each pollutant.*