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Title: Impact of close-proximity and background air pollution on lung function of elementary schoolchildren in Guadeloupe (French West Indies)

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Body: Background: Air pollution is often associated with respiratory diseases. High levels of asthma prevalence and severity of respiratory symptoms were found in West Indies, but little is known about the impact of air pollution in these regions. This study aimed at describing air pollution impact on lung function of schoolchildren in Guadeloupe. Methods: Data from 27 randomly chosen elementary Guadeloupian schools including 1,463 children (8-13 years old) were obtained using a standardized protocol adapted from the second phase of the International Study of Asthma and Allergy Childhood (ISAAC). Two dependent variables (peak expiratory flow before run (PEF) and variation of peak expiratory flow after run (Δ PEF)) were investigated using several linear mixed models to measure effects of i) medium-term close-proximity pollution (indoor and outdoor) of O₃ and NO₂ and ii) short and medium term background pollution of O₃, NO₂, SO₂ and PM₁₀. The heterogeneity between schools was assessed by random intercept. Results: Of 1,463 children, 223 (16 %) were found with asthma. The values of PF and Δ PF were in average 272 L/min (range: 130-460) and -1% (range: -56%-97%) respectively. A 1- μ g/m³ increase in outdoor medium-term close-proximity O₃ pollution level was significantly associated with a PF decrease (β =-0.32; 95% CI: -0.61;-0.03). Effect of medium term background O₃ pollution on PF was higher in asthmatic children than non-asthmatic children. No association was identified with the other air pollutants. Conclusion: Our results suggest that O₃ has an acute effect on child lung function in Guadeloupe even with value levels inferior to WHO guidelines.