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**Title:** Pediatric asthma and in vivo phagocytosis of black carbon air pollution by airway macrophages

Dr. Rossa 13491 Brugha r.brugha@qmul.ac.uk MD <sup>1</sup>, Dr. Naseem 13492 Mushtaq n.mushtaq@qmul.ac.uk <sup>1</sup>, Dr. Isobel 13493 Dundas i.dundas@qmul.ac.uk <sup>1</sup>, Dr. Marek 13494 Sanak nfsanak@cyf-kr.edu.pl <sup>2</sup> and Prof. Jonathan 13495 Grigg j.grigg@qmul.ac.uk MD <sup>1</sup>. <sup>1</sup> Centre for Paediatrics, Blizard Institute, Barts and the London School of Medicine and Dentistry, Queen Mary, University of London, London, United Kingdom, E1 2AT and <sup>2</sup> Department of Medicine, Jagiellonian University Medical School, Krakow, Poland .

**Body:** Background Airway macrophages (AM) remove inhaled black carbon (BC) particulate matter. In severe asthma, in vitro studies suggest that AM phagocytosis is impaired. Prostaglandin E2 (PGE2), which inhibits airway macrophage phagocytosis in vitro, is increased in severe asthma. Aims and Objectives To assess AM black carbon and PGE2 in asthmatic children. Methods AM were obtained by induced sputum from healthy controls (n=39) and children with mild asthma (n=13) and moderate-to-severe asthma (n=20) with informed consent. The area of AM BC ( $\mu\text{m}^2$ ) was assessed by image analysis. Urinary 13,14-dihydro-15-keto-tetranor-PGE2 was measured by high performance liquid chromatography–tandem mass spectrometry. Results Children with severe asthma had reduced AM BC ( $p < 0.05$  vs. controls, [Figure 1]) and increased urinary 13,14-dihydro-15-keto-tetranor-PGE2 ( $p < 0.05$  vs. controls, [Figure 2]).

Compared with controls, there was no difference in AM black carbon, or urinary tetranor-PGE2 in children with mild asthma. Conclusions Phagocytosis of inhaled black carbon particles in vivo is impaired in severe asthma. We found indirect evidence that this is associated with increased PGE2.