

Publication

Increased impact of air pollution on lung function in preterm versus term infants: the BILD study

JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)**ID** 4651530**Author(s)** Decrue, F.; Gorlanova, O.; Salem, Y.; Vienneau, D.; de Hoogh, K.; Gisler, A.; Usemann, J.; Korten, I.; Nahum, U.; Sinues, P.; Schulzke, S.; Fuchs, O.; Latzin, P.; Rösli, M.; Frey, U.; Bild Study Group,**Author(s) at UniBasel** [Vienneau, Danielle](#) ; [de Hoogh, Kees](#) ; [Rösli, Martin](#) ;**Year** 2022**Title** Increased impact of air pollution on lung function in preterm versus term infants: the BILD study**Journal** Am J Respir Crit Care Med**Volume** 205**Number** 1**Pages / Article-Number** 99-107**Keywords** Copd; Longitudinal Studies; Particulate Matter; Premature Infants; Prenatal Injuries**Mesh terms** Air Pollutants, toxicity; Air Pollution, statistics & numerical data; Case-Control Studies; Female; Humans; Infant, Newborn; Infant, Premature, physiology; Linear Models; Lung, physiopathology; Male; Maternal Exposure, statistics & numerical data; Nitrogen Dioxide, toxicity; Oxidative Stress; Particulate Matter, toxicity; Pregnancy; Prenatal Exposure Delayed Effects, etiology; Prospective Studies; Respiratory Function Tests; Switzerland

Rationale Infants born prematurely have impaired capacity to deal with oxidative stress shortly after birth. **Objectives** We hypothesize that the relative impact of exposure to air pollution on lung function is higher in preterm than in term infants. **Methods** In the prospective BILD-birth-cohort of 254 preterm and 517 term infants, we investigated associations of particulate matter (PM₁₀) and nitrogen dioxide with lung function at 44 weeks postconceptional age and exhaled markers of inflammation and oxidative stress response (fraction of exhaled nitric oxide (FeNO)) in an explorative hypothesis-driven study design. Multilevel mixed-effects models were used and adjusted for known confounders. **Measurements and Main Results** Significant associations of PM₁₀ during the second trimester of pregnancy with lung function and FeNO were found in term and preterm infants. Importantly, we observed stronger positive associations in preterm infants (born 32 - 36 weeks), with an increase of [184.9 (79.1, 290.7) mL/min] minute ventilation per 10 microg/m³ increase in PM₁₀ than in term infants [75.3 (19.7, 130.8) mL/min] (pprematurity x PM₁₀ interaction = 0.04, after multiple comparison adjustment padj = 0.09). Associations of PM₁₀ and FeNO differed between moderate to late preterm [3.4 (-0.1, 6.8) ppb] and term [-0.3 (-1.5, 0.9) ppb] infants, the interaction with prematurity was significant (pprematurity x PM₁₀ interaction = 0.006, padj = 0.036). **Conclusion** Preterm infants showed significant higher susceptibility even to low-to-moderate prenatal air pollution exposure than term infants, leading to increased impairment of postnatal lung function. FeNO results further elucidate differences in inflammatory/oxidative stress response comparing preterms to terms.

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