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### Impact of air pollution to oxidative stress markers in mothers and newborns (Summary of the long-term research in the Czechia)

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In 2014, while studying the impact of air pollution on oxidative DNA damage [measured via 8-oxo-7,8-dihydro-2'-deoxyguanosine (8-oxodG)] and lipid peroxidation [measured via 15-F2t-isoprostane (15-F2t-IsoP)] in mothers and their newborns from Karvina (a polluted region) and Ceske Budejovice (CB) (a control locality), 8-oxodG and 15-F2t-IsoP levels were expected to increase with increasing concentration of air pollutants. While in winter 2014 in newborns from Karvina the 8-oxodG levels were significantly increased ( $P < 0.001$ ) compared to CB, in mothers from Karvina oxidative DNA damage levels were significantly decreased in the same period compared to mothers from the control locality ( $P < 0.05$ ). This may be explained by adaptation of the adult organism to adverse environmental conditions and development of protective mechanisms.

The 15-F2t-IsoP levels generally followed the same trend as 8-oxodG levels. The exception was observed for lipid peroxidation in samples from newborns collected in summer 2013, when 15-F2t-IsoP levels were significantly higher in the control group ( $P < 0.001$ ). This could be a result of the effect of other independent factors (e.g. type of delivery or anesthesia applied during delivery). Multivariate regression analysis of the effect of air pollution on oxidative stress in newborns from Karvina showed PM<sub>2.5</sub> concentrations to be a significant predictor for 8-oxodG levels. Exposure to PM<sub>2.5</sub> and B[a]P significantly affected lipid peroxidation.

The project "Healthy Aging in Industrial Environment" (HAIE) was carried out in 2018-2022 to verify these results. The partial aim of the study was again to analyze the same oxidative stress markers in urine and plasma from non-smoking mothers and newborns from the above-mentioned localities. Sampling of biological material was performed during the whole year including two time periods with different levels of air pollution: in summer (low pollutant levels) and in winter (high pollutant levels). Metabolites of polycyclic hydrocarbons (PAHs) were determined in urine.

Concentrations of pollutants (PAHs, PM2.5) in the air of Karvina and CB were obtained from web pages of The Czech Hydrometeorological Institute. Number of newborns included in the HAIE (N=250/locality) was higher compared to the previous study (N=100/locality). As the previous study, the morbidity of children will be monitored after 2 years. Comprehensive results, including a comparison of these projects, will be presented at the conference.

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Air pollution; Newborns; Oxidative DNA damage; Lipid peroxidation; effect of other independent factors.