

VALIDATING A PHARMACOKINETIC MODEL OF POLYCHLORINATED BIPHENYLS (PCBs) USING BLOOD LEVELS IN CHILDREN FROM BIRTH UP TO 22 MONTHS OF AGE

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Background and aims: Recent evidence suggests that not only can PCBs disrupt neurodevelopment following prenatal exposure, but also that there are postnatal windows of susceptibility during which exposure may impact additional processes. Estimation of children exposure during different time windows is crucial when assessing such chemically induced ailments. However, the validation of a previously developed pharmacokinetic tool was restricted to the first 6 months of life. We aimed at validating a physiologically based pharmacokinetic (PBPK) model for the postnatal exposure to PCBs using blood levels sampled up to 22 months of age in a birth cohort of children from Slovakia.

Methods: We simulated blood PCB-153 level profiles in 328 children with sufficient information on cord blood levels, weight and height at or close to blood sampling times, duration of breast-feeding, gender and blood levels at two time points (on average at 6 and 16 months, ranging from 5 to 22 months). Predictions were compared to measured levels through Spearman's rank correlations and linear regression.

Results: Estimated levels correlated to measured levels with Spearman correlation coefficients of 0.79 and 0.81 for the 6 month and 16 month sampling times, respectively. Linear regression analyses revealed that estimations explained 62 % and 63 % of the variability in measured levels at 6 and 16 months.

Conclusions: Although correlations in this study were slightly lower than that obtained in our previous study, results suggest that the model is suitable for the estimation of postnatal levels up to 22 months of age. Studies are underway to calibrate the model, extend its validation to children of 5 years of age and to investigate the impact of postnatal exposure to PCBs on a multitude of health outcomes.