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Biomonitoring of Perfluorochemicals Exposures in Newborn Infants from New York State Using Blood Spots: 1997 to 2004

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Perfluorochemicals (PFCs) have been widely used as surfactants in industrial and commercial products for over 50 years. These chemicals are persistent in the environment, accumulate in human bodies, and can pose adverse health effects. In this study, we developed a novel method of using blood spots to monitor perfluorochemicals exposures in newborn infants, for the first time. Archived samples of blood spots from newborn infants from New York State Department of Health were analyzed for PFCs including PFOS, PFOA, PFOSA, PFNA, and PFHS using HPLC-ESI-MS/MS. We found PFOS was the dominant compound in all blood spot samples followed by PFOA and PFOSA. Mean concentrations of PFOS in newborn blood spots in 1997, 2001, and 2004 were 4.6, 4.42, and 2.08 ng/mL (wet wt), respectively. These values are 10 to 20 times lower than the concentrations reported for adult blood. Concentrations of PFOSA were 2.37, 1.06, and 0.29 ng/mL, and the concentrations of PFOA were 1.19, 1.90, and 0.65 ng/mL, for 1997, 2001, and 2004, respectively. Statistical difference in concentrations was found among years, but less between summer and winter seasons within each year. The levels of PFOS in 1997 and 2001 were similar but decreased significantly in 2004. The levels of PFOSA decreased significantly from 1997 to 2004; the temporal trend of PFOA was not clear. These findings indicate a positive effect of the phase-out of PFOS in 2000.