

PATTERNS OF AGE OF PUBERTY IN RELATION TO PFOA AND PFOS AMONG CHILDREN IN THE MID-OHIO VALLEY

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Background and Aims: Animal studies have suggested that some perfluorocarbons (PFCs), including perfluorooctanoate (PFOA) and perfluorooctane sulfonate (PFOS), may alter sexual maturation. Relationships of human PFC exposure with puberty are not clear. We conducted a study to investigate whether PFOA and PFOS affect pubertal status based on sex steroid hormone levels and self-reported menarche.

Methods: We analyzed patterns of puberty in a 2005-2006 survey of residents with PFOA water contamination from the Mid-Ohio Valley (3,076 boys and 2,931 girls, aged 8-18 years). Participants were classified as having reached puberty based on either hormone levels (total >50 ng/dL and free >5 pg/mL testosterone in boys, and estradiol >20 pg/mL in girls) or onset of menarche. We estimated the odds of reaching puberty and the fitted median age of reaching puberty in relation to serum PFOA and PFOS levels measured when puberty status was assigned, after controlling for other potential explanatory factors. Further analyses of puberty in relation to in utero levels of PFCs are ongoing and will be presented.

Results: Median PFOA and PFOS levels were 26 and 20 ng/mL in boys, and 20 and 18 ng/mL in girls, respectively. For boys, odds to reach puberty were reduced with increasing PFOS (delay of 190 days between the highest and lowest quartile). For girls, odds of post-menarche were lower with higher exposure to PFOA or PFOS (130 and 138 days of delay, respectively).

Conclusions: This is the first study indicating a possible association between delay of puberty and current serum levels of PFOS in boys and PFOA/S in girls. Exposure was assessed at the same time as puberty was classified and this work is being extended to assess timing of puberty in relation to estimates of PFC levels in utero.