

## TEMPORAL VARIATIONS IN SERUM PERSISTENT ORGANIC POLLUTANTS IN MIDLIFE WOMEN: THE STUDY OF WOMEN'S HEALTH ACROSS THE NATION (SWAN)

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### Description of the study

**Introduction:** Persistent organic pollutants (POPs), such as polychlorinated biphenyls (PCBs), organochlorine pesticides, and polybrominated diphenyl ethers (PBDEs), also known as endocrine disrupting chemicals, persist in the environment and human body over decades and may influence hormonal and homeostatic systems. Changes in fat and lipid metabolism as women transition through menopause may promote accumulation of lipophilic POPs, resulting in changes in circulating levels of these compounds.<sup>1,2</sup> However, little is known about temporal variations in serum POP concentrations in midlife women who had repeated measures while they were transitioning to menopause.

**Aims:** We examined changes in serum concentrations of POPs as women aged through the menopausal transition in a pilot sample from the Study of Women's Health Across the Nation (SWAN). We also investigated how changes in body mass index (BMI) in women who were transitioning to menopause influenced the POPs concentration changes. The small sample size in this pilot study does not allow us to distinguish the effect of time (aging) vs. the effect of menopausal transition, thus we focused on the effect of time which occurred in midlife women who were transitioning to menopause.

**Materials & Methods:** Thirty three women from the Michigan site of SWAN with a total of 75 observations (51 for PCBs) collected in pre-, early peri-, late peri-, and post-menopause were used. Gas chromatography-mass spectrometry was used to determine serum concentrations of POPs. Linear mixed effects models were used to evaluate the linear trajectory of each POP as women aged through the menopausal transition, adjusting for baseline age, smoking status, race (white/black), BMI and total lipid content. To evaluate how changes in BMI influenced changes in each POP, the difference in BMI from baseline ( $\Delta$ BMI) and its interaction with time along with baseline BMI were fit.

**Results:** Generally concentrations of PCBs significantly decreased, whereas PBDEs significantly increased with age during this midlife period. PCBs decreased 0.089 (PCB 153-132) to 0.14 (PCB 180) ng/mL per year (equivalent to a 4.2% (PCB 180) to 5.4% (PCB 153-132) decrease per year relative to baseline concentrations) over up to 9.8 years (median years of follow-up=3.15). PBDEs increased 0.42 (PBDE 153) to 0.57 (PBDE 99) ng/mL per year (equivalent to a 4.2% (PBDE 99) to 14.1% (PBDE 153) increase per year relative to baseline concentrations). We found a significant negative interaction between  $\Delta$ BMI and time for PCB 118, suggesting that PCB 118 decreased more for women who gained weight during the follow-up. No significant changes were found in organochlorine pesticides.

**Conclusion:** Decreasing trends in serum PCB concentrations may indicate decreases in body burden due to no external exposure or increased uptake of circulating PCBs by adipose tissues due to weight gain in midlife women while they were transitioning to menopause. Increasing trends in serum PBDE concentrations may reflect gradual increases in commercial usage and thus environmental contamination in the 2000's.

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### References:

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