

Exposure and dietary sources of bisphenol A (BPA) and BPA-alternatives among mothers in the APrON cohort study

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Abstract

Diet is regarded as the main source of bisphenol A (BPA) exposure, but comparatively little is known about dietary sources of BPA-alternatives. Here we measured exposure of BPA and BPA-alternatives among pregnant women in Canada, estimated their 24-h intakes and examined the importance of various dietary sources. Free and total BPA, bisphenol S (BPS) and bisphenol F (BPF) were measured in 467 second trimester maternal urine samples, and in 455 paired samples collected at three months postpartum. Linear regression was used to evaluate associations between urinary concentrations of bisphenols and 24-h dietary recall data. The geometric means of total BPA in second trimester and postpartum urine (1.2 and 0.95 ng/mL, respectively) were 5–7 times higher than corresponding total BPS (0.16 and 0.17 ng/mL). The detection frequency of BPF was only 9% (i.e. >1.0 ng/mL). However, at

both time points 95th percentiles of total BPF (7.3 and 4.2 ng/mL, respectively) were similar to total BPA (8.2 and 5.0 ng/mL). Free BPS and BPF were detected in <2% of samples, but were detectable when total BPS or BPF concentrations were highest, always at <1% of the total concentration. The tolerable daily intake for total BPA (i.e. 18 nmol/kg BW/d) was not exceeded, but for BPS the estimated 24-h intake was as high as 14 nmol/kg BW/d (95th percentile: 0.12 nmol/kg BW/d), and for BPF was even higher among the highest centile of exposure (maximum and 95th percentile: 30, 0.81 nmol/kg BW/d). Canned food consumption was associated with higher total BPA, but was not associated with BPS. For BPF, mustard consumption may be an important exposure source, particularly among the highest exposed. Relatively high exposure to BPS and BPF in a minority of pregnant women highlights the need to better understand the associated health risks and exposure sources of BPA-alternatives.

Keywords: Bisphenol A, Bisphenol S, Bisphenol F, Bisphenol AF, Pregnant women, Dietary exposure