

Per- and poly-fluoroalkyl substances in serum and breastmilk samples among pregnant farmworkers in Thailand

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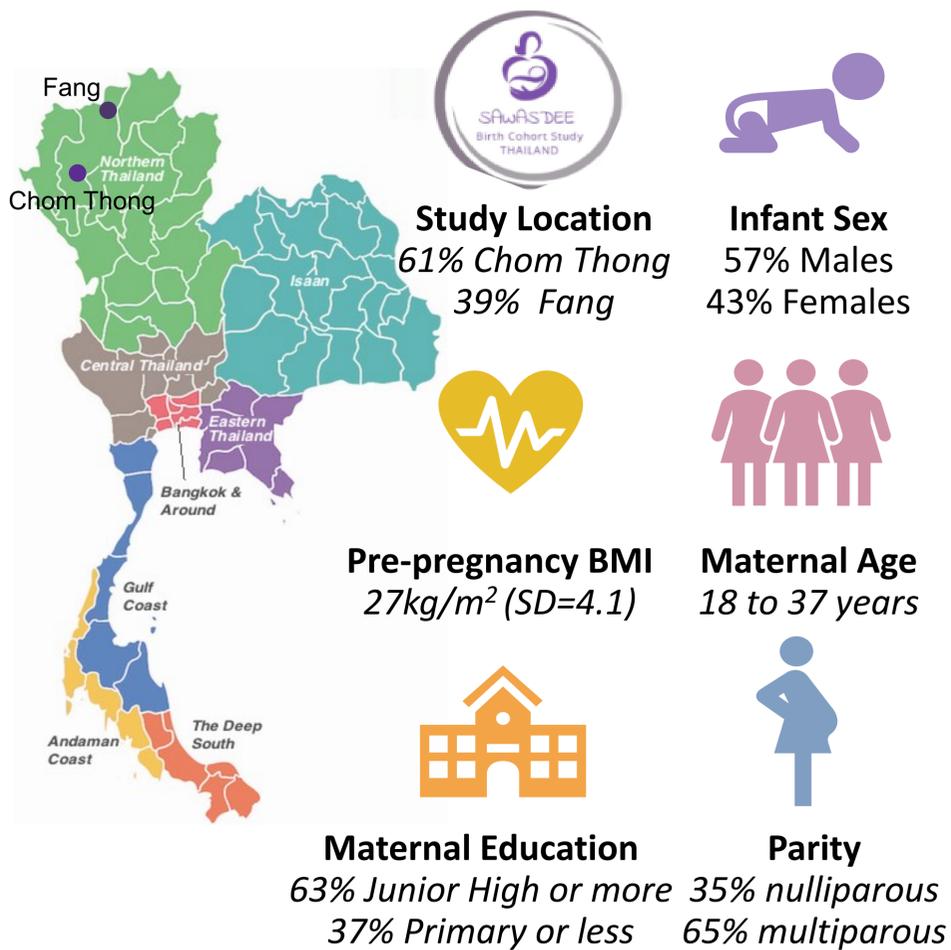
BACKGROUND

- Per- and polyfluoroalkyl substances (PFAS) can be transferred to the developing fetus *in utero*.^{1,2}
- After birth, infants may continue to be exposed to PFAS via breastfeeding.^{2,3}
- Studies quantifying PFAS levels in breastmilk remain scarce, particularly in low- and middle-income countries.

STUDY AIM

- To examine breastmilk as a postnatal PFAS exposure source among farm-working mothers and their infants in Thailand.

STUDY POPULATION: NORTHERN THAILAND



PFAS ASSESSMENT, TE, AND EDIs

- Quantified eight PFAS levels in 2nd trimester maternal sera samples and breastmilk samples collected at 9.5 months and 11.5 months postnatally.
- N = 46 maternal-infant pairs
- **Lactational transfer efficiencies (TE)** = (PFAS in breastmilk / PFAS in serum)*100
- **Lactational estimated daily intake (EDI)** = concentration of a given PFAS in breastmilk X food ingestion rate (150 mL/kg/day)

REFERENCES

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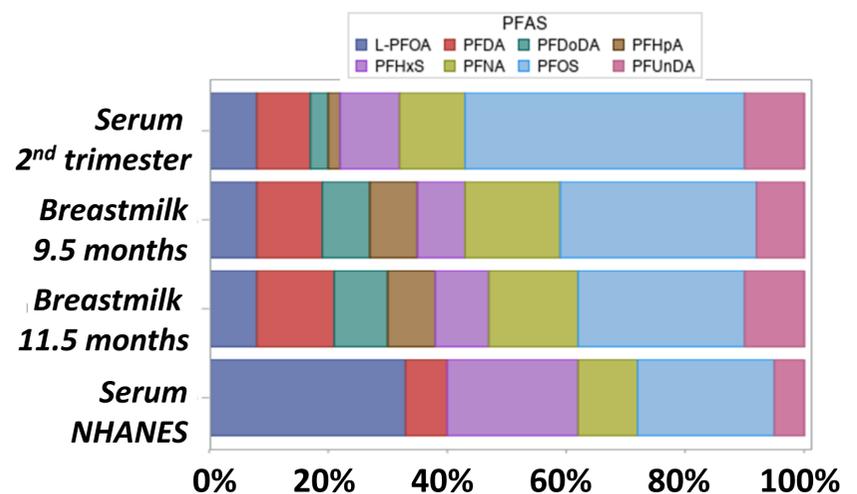
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RESULTS

1 PFAS in sera and breastmilk of pregnant Thai farmworkers

- PFOA, PFOS, PFHxS, PFNA, PFDA, and PFUnDA were detected in >90% of sera.
- PFOS was detected in >60% of breastmilk samples obtained at 9.5 and 11.5 months
- PFNA was detected in >50% of 11.5-month breastmilk samples only.
- All remaining PFAS were detected in <50% of breastmilk samples.

2 Compositional Profile of PFAS: greatest exposure to PFOS



3 Lactational TE and EDIs differ by socio-demographics

	N	Lactational TE (%)			Lactational EDI (ng/kg/day)		
		PFNA	PFOS	PFNA	PFOS	PFNA	PFOS
		11.5 mo	9.5 mo	11.5 mo	11.5 mo	9.5 mo	11.5 mo
Overall Mean ± SD	46	13.3 ±15.1	7.03 ±5.78	5.83 ±5.21	5.63 ±4.10	12.1 ±5.49	10.0 ±6.22
Infant Sex							
	Male	26	13.4	6.65	5.16	4.87	11.0
	Female	20	13.2	7.52	6.70	6.62	13.6
						8.24	12.4
Location							
	Chom Thong	28	13.3	4.97	4.07	6.55	13.9
	Fang	18	13.3	10.2	8.56	4.20	9.40
Household Adjusted Income (baht)							
	1600 or below	23	11.0	9.24	7.27	4.43	11.3
	Above 1600	20	13.4	4.66	4.04	7.14	12.7
Maternal Education							
	Junior High or more	29	14.1	5.48	4.84	6.50	13.0
	Primary or less	17	12.1	9.68	7.51	4.14	10.6

*Note: Statistically significant differences (p<0.05) are bolded.

CONCLUSIONS

Among pregnant farmworkers in Thailand, levels of PFNA, PFDA, and PFUnDA were higher than levels in reproductive-aged women in the US NHANES during the same period, suggesting that long-chain and legacy PFAS may be on the rise in low- and middle-income countries, despite their decline in high-income countries. Nonetheless, except for PFNA and PFOS, we observed that most PFAS were not widely detected in our longitudinal breastmilk samples, and future studies are needed to quantify infant PFAS levels.