**Maine Chapter**
INCORPORATED IN MAINE
American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN®



**Chapter Executive Director**
Dee Kerry
dakerry@aap.net

**30 Association Drive, Box 190**
**Manchester, ME 04351**
office: 207-480-4185

www.maineaap.org
MAAP Facebook Page
Twitter: @MaineAAP

**Testimony of Abby Fleisch, MD, MPH - In Support of LD1503—**

**An Act To Stop Perfluoroalkyl and Polyfluoroalkyl Substances Pollution**
**April 28, 2021**

Good morning Senator Brenner, Representative Tucker, and members of the Committee on Environment and Natural Resources. My name is Abby Fleisch –I am a pediatric endocrinologist and researcher. I live and practice in Portland, Maine, and I lead research on health effects of environmental exposures, including per- and polyfluoroalkyl substances (PFAS). I was recently awarded a 2.2 million dollar grant from the National Institute of Environmental Health Sciences to study the role of PFAS exposure on fat and bone accumulation in adolescence.

I am here to testify "in support of" LD1503—An Act to Stop Perfluoroalkyl and Polyfluoroalkyl Substances Pollution." I know you have already heard about the sources of PFAS and how PFAS persist in the environment and in our bodies. During this testimony, I want to tell you more about the research on *health effects* of exposure to these chemicals.

## Health Effects of PFAS Exposure

### *Adults*

In my research, we have used data from the Diabetes Prevention Program. This study was remarkable because it was a large study of about 1000 adults at risk for diabetes who were followed over 15 years, and we looked at a number of different PFAS. Adults with higher PFAS levels at the beginning of the study had greater:

- **Weight gain** [1]
- **Risk of diabetes** [2]
- **Risk of high cholesterol** [3]

### *Pregnant women*

I also study health effects of PFAS exposures in a longitudinal study called Project Viva. Project Viva studies about 2000 pregnant women and their children. We found that mothers with higher PFAS levels in early pregnancy had greater:

- **Weight gain during pregnancy** [4]
- **Weight retention by 3 years postpartum** [4]

### *Children*

In the children in Project Viva, we found **no consistent evidence of harmful effects of PFAS exposure on diabetes risk or cholesterol**.[5,6] However, greater PFAS exposure was associated with **adverse changes in body composition, including lower bone mineral density.**[7,8]
**Other researchers have consistently found PFAS exposure in childhood to be associated with other markers of poor health like lower immune function**.[4,5]

Replacement Compounds

As some long-chain PFAS have been largely phased out of production, either voluntarily or as a result of legislation, shorter chain replacement PFAS are increasingly used, with evidence in animal models that they may have similar deleterious health impact.

Determining the safety of replacement compounds will therefore be a challenge. However, the proposed bill may lead to more rapid innovation of replacement compounds. Also, the bill may spur manufacturers to consider production strategies that avoid the need for the chemicals completely or that leverage materials without chemical additives.

Summary

I am in support of LD1503 because I recognize the importance of phasing out PFAS and innovating safe replacement compounds. Research suggests that exposures to PFAS have potential to impact human health, so removing these chemicals from carpets and furniture is an important first step.

Thank you for your time, and I'm happy to answer any questions.

---


1. Cardenas A, Hauser R, Gold DR, Kleinman KP, Hivert M-F, **Fleisch AF**, Lin PD, Calafat AM, Webster TF, Horton ES, Oken E. Association of perfluoroalkyl and polyfluoroalkyl substances with adiposity. JAMA Netw Open 2018; 1(4):e181493.
2. Cardenas A, Hivert MF, Gold DR, Hauser R, Kleinman KP, Lin PD, **Fleisch AF**, Calafat AM, Ye X, Webster TF, Horton ES, Oken E. Associations of Perfluoroalkyl and Polyfluoroalkyl Substances With Incident Diabetes and Microvascular Disease. Diabetes Care. 2019; 42(9):1824-1832.
3. Lin Pi-I D, Cardenas A, Hauser R, Gold DR, Kleinman KP, Hivert M-F, **Fleisch AF**, Calafat AM, Webster TF, Horton ES, Oken E. Per- and polyfluoroalkyl substances and blood lipid levels in pre-diabetic adults—longitudinal analysis of the diabetes prevention program outcomes study. Environ Int 2019; 129: 343-353.
4. Mitro SD, Sagiv SK, Rifas-Shiman SL, **Fleisch AF**, Jaacks LM, Williams PL, Oken E, James-Todd TM. Per- and polyfluoroalkyl substance exposure, gestational weight gain, and postpartum weight changes in Project Viva. Obesity. 2020; 28(10):1984-1992.
5. Fleisch, AF, Rifas-Shiman, SL, Mora, AM, Gibson, H, Gillman, MW, Oken, E, Sagiv, SK. Early life exposure to perfluoroalkyl substances and childhood metabolic function. Environ Health Perspect 2017; 125(3): 481-487.
6. Mora AM, Fleisch AF, Oken E, Rifas-Shiman SL, Fleisch AF, Baidal JW, Pardo L, Webster TF, Calafat AM, Ye X, Gillman MW, Sagiv SK. Early life exposure to per- and polyfluoroalkyl substances and mid-childhood lipid and liver enzyme levels. Environ Int 2018; 111:1-13.
7. Janis J, Rifas-Shiman S, Seshasayee S, Sagiv S, Calafat A, Rosen C, Oken E, **Fleisch AF**. Plasma concentrations of per- and polyfluoroalkyl substances and body composition from mid-childhood to early adolescence. Journal of Clinical Endocrinology and Metabolism. 2021. *In press.*
8. Cluett R, Seshasayee SM, Rokoff LB, Rifas-Shiman SL, Ye X, Calafat AM, Gold DR, Coull B, Gordon CM, Rosen CJ, Oken E, Sagiv SK, **Fleisch AF**. Per- and Polyfluoroalkyl Substance Plasma Concentrations and Bone Mineral Density in Mid-Childhood: A Cross-Sectional Study (Project Viva, USA). Environ Health Perspect 2019; 127(8):87006.
9. Rappazzo KM, Coffman E, Hines EP. Exposure to Perfluorinated Alkyl Substances and Health Outcomes in Children: A Systematic Review of the Epidemiologic Literature. Int J Environ Res Public Health. 2017 Jun 27;14(7). pii: E691.
10. Grandjean P, Andersen EW, Budtz-Jørgensen E, Nielsen F, Mølbak K, Weihe P, Heilmann C. Serum vaccine antibody concentrations in children exposed to perfluorinated compounds. JAMA. 2012; 307(4):391-7
11. Gomis MI, Vestergren R, Borg D, Cousins IT Comparing the toxic potency in vivo of long-chain perfluoroalkyl acids and fluorinated alternatives. *Environment International* 2018; 113: 1–9