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I hold a Ph.D. in environmental health and have been studying exposure and health effects of halogenated flame retardants and PFASs for the past 15 years. My research has contributed to our understanding that halogenated flame retardants and PFASs escape from products they are added to, enter the air and dust of our indoor environments, enter our bodies and cause reproductive harm. Most notably, as a postdoc at Harvard in 2017 I found that women with higher exposure to organophosphate flame retardants were less likely to become pregnant and to have a viable birth, and that these effects were cumulative across the three investigated OPFRs.

I'm testifying today in favor of the proposed rule and in favor of regulating phthalates, phenols, halogenated flame retardants and PFAS each as a class to stop the cycle of regrettable substitution of one problematic chemical to a similar, but less studied, chemical that is later found to be similarly harmful.

For example, changing from DecaBDE to hexabromocyclododecane (HBCD) in the plastic casings of electronics. Both are highly persistent, easily migrate from products into air and dust, enter our bodies, are toxic, and are excreted in breast milk. As part of my dissertation research at Boston University, I found higher levels of HBCD in breast milk among mothers who had a larger number of stereo and video electronics in their home. One of my coauthors later found those products were being recycled overseas into cooking utensils such as spatulas and ladles. I also found that women who ate conventionally grown foods had higher levels of HBCD in their breast milk, suggesting a possible exposure pathway via land application of sludge – which has been found to contain HBCD and HBCD has been shown to be taken up into produce. These are just a few examples of sustainability issues with ongoing use of halogenated flame retardants.

I also conducted a series of studies that discovered high exposure to flame retardants among gymnasts from polyurethane foam pits and landing mats. These products are also commonly used in trampoline parks. Like with furniture, covers do not contain flame retardants in the products - and they easily migrate into air, dust, and our bodies. We accidentally ingest them and they are absorbed through the skin. I collaborated with a fire safety engineer who created guidelines for fire inspectors to maintain fire safety without the use of flame retardants in gyms, and then worked with a gym to replace their foam pit with flame retardant free foam and found a subsequent significant reduction in gymnast exposure.

Fire safety can be maintained without the use of halogenated flame retardants and safer alternatives for electronics are available but will not be widely or equitably adopted without the proposed rule.

I cannot overstate what a serious problem widespread use of halogenated flame retardants and PFASs have created. Among the most highly exposed include infants, young children, workers including fire fighters and construction workers, and indigenous populations. We are all initially exposed in the womb, then via breast milk and in our homes through our products. We are all secondarily exposed through their ubiquitous presence in our outdoor environment where they migrate and accumulate in our foods – crops, livestock, fish and seafood. PFAS additionally travel with the water cycle into our drinking water, aquaculture, and agriculture.

Widespread exposure and health effects of phthalates, phenols, halogenated flame retardants and PFAS are well documented and it's time to take decisive action. I support the proposed rule and recommend its full adoption.