ENVIRONMENTAL HEALTH PROJECT
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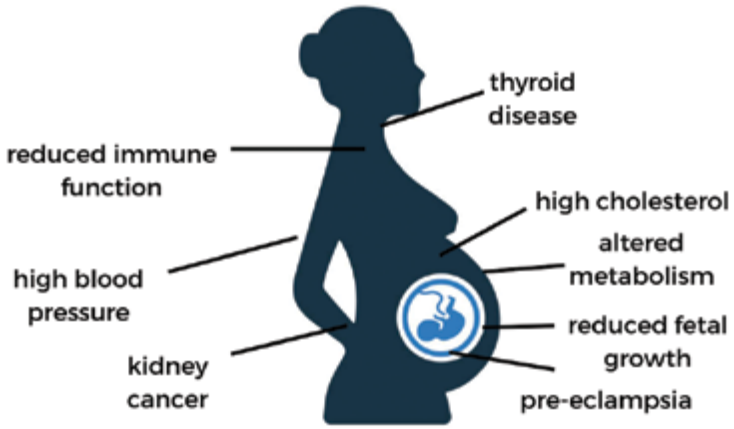
Per- and Polyfluoroalkyl Substances (PFAS) and Shale Gas Development

What are PFAS?

Per- and polyfluoroalkyl substances (PFAS) is a class of over 9,000 toxic, human-made chemicals. These chemicals persist in the environment and are used in many industries around the world (*Centers for Disease Control and Prevention, 2021*).

The Environmental Protection Agency (EPA) recently set new health advisory limits for a handful of the most well-studied PFAS, including PFOA (perfluorooctanoic acid) and PFOS (perfluoro-octanesulfonic acid). Health advisory limits are not enforceable regulations but are recommended limits on how much of a chemical people should be exposed to over the course of their lives to avoid health risks. Although U.S. manufacturers have voluntarily phased out most uses of PFOA and PFOS, these chemicals persist in the environment and in our bodies (*Marusic, 2022*).

Health Impacts of PFAS on the Body



How are they used?

PFAS can be found in air, water, soil, and materials found in homes and workplaces, including food packaging, cleaning products, personal care products, water- and stain-resistant coatings, and more (*Environmental Protection Agency, 2022*). PFAS do not break down easily, allowing them to accumulate over time and earning their name "forever chemicals." Researchers found that more than 98% of the U.S. population has been exposed to and has measurable concentrations of PFAS in their bodies (*Calafat et al., 2007*).

In recent years, public and private water systems in all 50 states and two territories have tested positive for PFAS contamination *(Environmental Working Group, 2022)*.

In 2011, the EPA approved three chemical substances that can break down into PFAS for commercial use in oil and gas drilling/fracking despite the agency's concerns about their toxicities. Similarly named chemicals were used in more than 1,200 oil and gas wells across Arkansas, Louisiana, Oklahoma, New Mexico, Texas, and Wyoming between 2012 and 2020 (*Horwitt, 2021*). Additionally, PFAS are believed to be in use in many other states, like Colorado (*Horwitt & Gottlieb, 2022*) and Pennsylvania (*Marusic, 2022*).

There are many ways in which PFAS exposure can occur during shale gas development. During drilling, chemicals can leach into groundwater if they are injected into the ground before wells are sealed from surrounding aquifers. Once fracking begins, potential exposure pathways include fluid spills that seep into groundwater and airborne chemicals from ground-level wastewater pools. During the disposal process, exposure pathways include accidents involving spills and improperly treated leachate from waste sites accepting shale gas waste (*Horwitt, 2021*).

Health impacts

According to the Agency for Toxic Substances and Disease Registry (ATSDR), more than 200 articles have been published on PFAS and their harmful effects on health. PFAS have been linked to kidney and testicular cancers, increased cholesterol levels, changes in liver enzymes, increased risk of high blood pressure or pre-eclampsia in pregnant women, small decreases in infant birth weights, and reduced effectiveness of vaccines in children (*Agency for Toxic Substances and Disease Registry, 2020*).

Protecting your health

- Try to avoid exposures to PFAS. Currently, there are no medically approved treatments to speed up the removal of PFAS from the body, but you can reduce your exposure.
- If you are concerned about PFAS exposure, a blood test for PFAS can tell how much of certain PFAS is in your blood, but it cannot tell if that exposure has caused a health condition. A PFAS blood test is not a routine test, and health insurance may not cover the cost of testing. You may need to contact a private laboratory to arrange such testing.
- PFAS do not have any taste, color, or odor in drinking water. The only way to confirm the presence of PFAS is through proper sampling and analysis at a certified lab, which can be costly.

- If you know or suspect PFAS in your drinking water, you can use a filter to lower the levels. Activated filters and reverse osmosis have been found to be effective at filtration. However, EHP recommends consulting an expert before determining filtration options.
- Urge your local water utility to test for PFAS.
- Urge your representatives to pass legislation that protects your health from PFAS exposure.

For more information on PFAS, visit: Cancer Free Economy Network, Environmental Working Group, PFAS Exchange, PubMed, and Safer States.

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