

# Forever Chemicals Linked to High Blood Pressure in Some Women

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✓ Fact Checked

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## STORY AT-A-GLANCE

- › Research published June 13, 2022, showed women with the highest concentration of PFAS chemicals had a 71% increased risk of developing high blood pressure. Coincidentally, two days later the EPA announced four planned water advisories to reduce levels of PFAS in the water supply
- › The EPA advises capping the levels of two chemicals in the PFAS class of chemicals: PFOA to more than 17,000 times lower than what it is currently and PFOS to 3,500 times lower. The announcement stunned scientists; the Environmental Working Group vice president said it would affect at least 1,943 public utilities
- › The government is releasing more than \$12 billion in grants and loans to help communities pay for the new infrastructure needed to protect citizens, but one expert thinks the move may not have gone far enough as agencies are not addressing the source of the pollution
- › The strategies you use to reduce your exposure to PFAS chemicals can help vote these products out of the marketplace. These include opting out of treatment on clothing, carpet and furniture, avoiding fast food and carry-out containers, eating old-fashioned stovetop non-GMO popcorn instead of microwave popcorn and filtering your water supply

Research published in the American Heart Association<sup>1</sup> journal Hypertension<sup>2</sup> in June 2022, showed that women with the highest concentration of PFAS chemicals in their blood also had a 71% increased risk of high blood pressure.

In the mid-20th century, a group of complex, manmade chemicals called per- and polyfluoroalkyl substances (PFASs) were first produced<sup>3</sup> from the fusion of carbon and fluorine in the lab.<sup>4</sup> The unique properties of this class of chemical give other structures the ability to repel water and oil, reduce friction and resist temperature.<sup>5</sup>

These properties make the chemical valuable in aerospace technology, construction, photography, electronics and aviation. The chemicals are also commonly found in everyday items like textiles, nonstick cookware and paper products. A combination of ubiquitous use, delays in reducing use and the known bio accumulative and persistent effects have produced a massive environmental problem.

The problem developed largely because many of these chemicals can take over 1,000 years to degrade,<sup>6</sup> which has earned them the nickname “forever chemicals.” In May 2015, 200 scientists from 38 countries signed what is called the Madrid Statement on PFAS.<sup>7</sup> The statement warned about the health effects associated with long-chain PFAS that could include obesity, reduced birth weight, reduced hormone levels and tumors in multiple organ systems.<sup>8</sup>

Yet, thousands of products that rely on the characteristics of PFAS have been created, used and disposed of in landfills where they contaminate the soil and water supply.<sup>9</sup> If the products are incinerated, the chemicals become air pollutants. These chemicals have been measured in human blood and are now linked to high blood pressure in middle-aged women.<sup>10</sup>

There are significant health consequences from high blood pressure,<sup>11</sup> including stroke, heart attack, kidney disease, heart failure, vision loss and sexual dysfunction. High blood pressure is also associated with metabolic syndrome and Type 2 diabetes. According to the Centers for Disease Control and Prevention,<sup>12</sup> heart disease, stroke, diabetes and kidney disease are four of the top 10 leading causes of death in the U.S.

## **‘Forever Chemicals’ Linked to High Blood Pressure**

The research data showed that middle-aged women who had higher blood levels of PFAS chemicals were at the greatest risk of developing high blood pressure when they were compared to their peers who had lower levels.<sup>13</sup> The researchers used data from the large prospective Study of Women's Health Across the Nation Multi-Pollutant Study (SWAN-MPS) that engaged midlife women from across a diverse range of racial and ethnic backgrounds.<sup>14</sup>

The researchers compared blood concentrations of seven PFAS chemicals against the participants' risk of developing high blood pressure. They included data from 1,058 women who did not have high blood pressure at the beginning of the study and received annual follow-ups between 1999 and 2017.<sup>15</sup>

The study used the definition of hypertension that was in effect in those years, defined as a blood pressure of 140/90 or greater. If women received antihypertensive treatment, they were also counted as having high blood pressure. The current definition of high blood pressure is 130/80,<sup>16</sup> which was estimated to raise the number diagnosed with high blood pressure by 14%. An estimated 103 million adults in the U.S. now have high blood pressure.<sup>17</sup>

During the study, 470 women developed high blood pressure.<sup>18</sup> The data included measurements of PFAS at the start of the study. Participants<sup>19</sup> came from five sites located in Boston, Pittsburgh, Southeast Michigan, Los Angeles and Oakland California.

The study's senior researcher, Sung Kyun Park, is an associate professor of epidemiology and environmental health sciences at the University of Michigan School of Public Health. He commented on the importance of the study in a press release, saying:<sup>20</sup>

*"It's important to note that we examined individual PFAS as well as several PFAS together, and we found that the combined exposure to multiple PFAS had a stronger effect on blood pressure. Our findings make it clear that strategies to limit the widespread use of PFAS in products need to be developed."*

*We have known for some time that PFAS disrupts metabolism in the body, yet, we didn't expect the strength of the association we found. We hope that these findings alert clinicians about the importance of PFAS and that they need to understand and recognize PFAS as an important potential risk factor for blood pressure control."*

## **Exposure to PFAS Linked to Liver Disease**

Data from the C8 Science Panel<sup>21</sup> that conducted studies in the Mid-Ohio Valley communities after the release of PFOA (C8) in the 1950s, have found a "probable link" between exposure and ulcerative colitis, thyroid disease, testicular cancer, kidney cancer, pregnancy-induced high blood pressure, and high cholesterol.

Research<sup>22</sup> published in 2022 by Keck School of Medicine of USC found that the endocrine-disrupting PFAS chemicals that accumulate in the body tissue can disrupt liver homeostasis.

The researchers conducted a systematic review and meta-analysis, analyzing the data from 85 rodent studies and 24 epidemiological studies. There were four PFAS chemicals that accounted for most known human exposure, which are PFOS, PFOA, perfluorohexanesulfonic acid (PFHxS) and perfluorononanoic acid (PFNA).

The researchers use the data to compare exposure from PFAS to indicators of liver injury, including serum alanine aminotransferase (ALT), NAFLD, NASH or steatosis, a buildup of fat in the liver. A meta-analysis of the human studies showed that higher levels of ALT were associated with exposure to PFOA, PFOS and PFNA.

Exposure to PFOA was also linked to higher aspartate aminotransferase and gamma-glutamyl transferase levels – two widely used markers of liver disease – in humans. Rodents were also affected. Those exposed to PFAS tended to have higher ALT levels and steatosis,<sup>23</sup> or fatty changes in the liver.

"There is consistent evidence for PFAS hepatotoxicity from rodent studies, supported by associations of PFAS and markers of liver function in observational human studies," the

researchers concluded.<sup>24</sup>

## **EPA Stuns Officials With New Health Advisory**

June 15, 2022, the Environmental Protection Agency released four new health advisories for levels of PFAS in drinking water.<sup>25</sup> The announcement stunned scientists and environmental groups. The Environmental Working Group (EWG) has tracked PFAS chemicals in drinking water across the country.

Senior vice president Scott Faber told USA Today that this announcement would affect at least 1,943 public water supplies in which they found some amount of PFAS. Faber said:<sup>26</sup>

*“This will set off alarm bells for consumers, for regulators, and for manufacturers, who thought the previous (advisories) were safe. I can't find the words to explain what kind of a moment this is ... The number of people drinking what are, according to these new numbers, unsafe levels of PFAS, is going to grow astronomically.”*

The new advisories would reportedly cap the safe level of PFOA more than 17,000 times lower than what it is currently and PFOS 3,500 times lower.<sup>27</sup> PFOA and PFOS are part of the class of PFAS chemicals. The agency explained that the updated levels “are based on new science and consider lifetime exposure, indicate that some negative health effects may occur with concentrations of PFOA or PFOS in water that are near zero.”<sup>28</sup>

The implications for water utilities across the country are immeasurable. The agency is also releasing \$1 billion in grant funding as part of the infrastructure bill passed in 2021 to help communities where the water supply is contaminated with PFAS.

An additional \$5 billion has already been allocated and another \$6.6 billion may be available through loan programs. After years of research demonstrating that PFAS are dangerous to humans in even minute amounts, EPA administrator Michael Regan said in a press release:<sup>29</sup>

*“People on the frontlines of PFAS contamination have suffered for far too long. That’s why EPA is taking aggressive action as part of a whole-of-government approach to prevent these chemicals from entering the environment and to help protect concerned families from this pervasive challenge.”*

One water utility company has experience with how much it will cost to remove PFAS from the water supply.<sup>30</sup> The Warminster Municipal Authority in Pennsylvania learned that PFOA and PFOS had leaked from nearby military bases into the town's water supply. By 2016, the town decided it was time to filter the water to remove all the chemicals, costing the town up to tens of millions of dollars and surcharges on customer water bills.

## **Experts Say This May Not Have Gone Far Enough**

PFAS chemicals have been used for decades in a range of products from food packaging, furniture, clothing, and cosmetics. Studies have shown that at least one type of PFAS can be found in the blood of nearly every American who was tested by the U.S. Biomonitoring Program and has been detected in the water supply of more than 200 million people.<sup>31</sup>

Philippe Grandjean is a PFAS researcher at the Harvard T.H. Chan School of Public Health. He warns that PFAS chemicals build your risk of disease over a lifetime of consuming the products. His work has shown the chemicals can negatively impact children's immune response and warns, “If increased exposures have been in a community, then there will be an increased occurrence of these adverse effects.”<sup>32</sup>

Emily Rimmel is the director of regulatory affairs for the National Association of Clean Water Agencies. Her organization represents water and sewer utilities that are facing the grueling task of removing PFAS chemicals from the water supply. Rimmel wants the EPA to take the next logical step and “get rid of PFAS at the source.”<sup>33</sup>

PFAS chemicals are found in your clothes, cosmetics and detergents. These everyday consumer products are used and washed, and then they contaminate the environment

and the water supply. Until the source of the chemicals is removed, the task of adequately cleaning the water supply may be astronomical. Rimmel said that one filter on a single well can cost \$500,000.

And, ultimately, the cost will be passed on to the consumer. In the past 10 years, utility companies have taken on the task of replacing outdated infrastructure, which has also affected pricing. “This should not be on the backs of municipalities, of ratepayers,” she said.

## **Tips to Lower Your Exposure to PFAS**

Although no government agency is taking a strong stand against PFAS chemicals at the source, when you take steps to lower your exposure to forever chemicals, you are also voting with your pocketbook and making it clear that you don't want products that can harm your family in your home.

It was more than 15 years ago that the EWG<sup>34</sup> found 287 chemicals in umbilical cord blood that passes between mother and baby. Of these, 180 are known to cause cancer in humans and animals, 217 are known toxins to the nervous system and 208 are known to cause abnormal development or birth defects in animal models.

Environmental and health safety advocates have been pushing to have PFAS use restricted, especially in items that contact food. Consumer Reports<sup>35</sup> tested 118 types of food packages from grocery chains and restaurants and found PFAS in measurable amounts from every retailer tested.<sup>36</sup>

The widespread use may also mean it shows up in food packaging unintentionally since machines that make the packaging, recycled paper and ink may also contain PFAS. Concerns about plastic pollution have pushed some fast-food companies to invest in biodegradable wrappers and containers. Yet, analysis shows that these fiber bowls can also contain high levels of fluorine.<sup>37</sup>

The scientists who signed the Madrid statement recommend avoiding any and all products containing PFAS. You may find additional helpful tips in the EWG's<sup>38</sup> “Guide to

Avoiding PFAS.” Here are several ways you can avoid PFASs that I've suggested in the past:

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**Pretreated or stain-repellent treatments** – Opt out of treatments on clothing, furniture and carpeting. Clothing advertised as "breathable" are typically treated with polytetrafluoroethylene, a synthetic fluoropolymer.

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**Products treated with flame retardant chemicals** – This includes furniture, carpet, mattresses and baby items. Instead, opt for naturally less flammable materials such as leather, wool and cotton.

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**Fast food and carry-out foods** – The containers are typically treated.

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**Microwave popcorn** – PFASs may be present in the inner coating of the bag and may migrate to the oil from the packaging during heating. Instead, use “old-fashioned” stovetop non-GMO popcorn.

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**Nonstick cookware and other treated kitchen utensils** – Healthier options include ceramic and enameled cast iron cookware, both of which are durable, easy to clean and completely inert, which means they won't release any harmful chemicals into your home.

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**Personal care products containing PTFE or “fluoro” or “perfluoro” ingredients such as Oral B Glide floss** – The EWG Skin Deep database<sup>39</sup> is an excellent source to search for healthier personal care options.

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**Unfiltered tap water** – Unfortunately, your choices are limited when it comes to avoiding PFAS in drinking water. Either you must filter your water or get water from a clean source. Although you may think that opting for bottled water is safe, it's important to realize that PFAS are not regulated in bottled water, so there's absolutely no guarantee that it'll be free of these or other chemicals.

Bottled water also increases your risk of exposure to hazardous plastic chemicals such as bisphenol A, which has its own set of health risks. Unlike a high-quality carbon filtration system, most common water filters available in supermarkets will not remove PFASs.

The New Jersey Drinking Water Quality Institute<sup>40</sup> recommends using granulated activated carbon “or an equally efficient technology” to remove PFC chemicals such as PFOA and PFOS from your drinking water. Activated carbon has been shown to remove about 90% of these chemicals.

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## Sources and References

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- <sup>5</sup> [Interstate Technology Regulatory Council, April 2020](#)
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