Understanding the Health Risk of PFAS in Drinking Water

Sarah Yang, Ph.D.
Groundwater Toxicologist
November 7, 2019
Per- and polyfluoroalkyl substances (PFAS) are a family of man-made chemicals.
Most people have some PFAS in their blood.
PFAS have been used in many products since the 1940s.
We can be exposed to PFAS from:
We can be exposed to PFAS from:
We can be exposed to PFAS from:
PFAS can cause health effects in people.
High levels of PFAS may increase cholesterol
High levels of PFAS may

Increase cholesterol

Reduce antibody response
High levels of PFAS may

- Increase cholesterol
- Reduce antibody response
- Decrease fertility in women
PFAS may also increase the risk of

- Thyroid disease
- Osteoarthritis
- Ulcerative colitis
- Testicular cancer
- Kidney cancer
Groundwater can be a source of PFAS exposure.

https://pubs.acs.org/doi/10.1021/acs.estlett.6b00260
Two-thirds of Wisconsin residents use groundwater.
Wisconsin develops groundwater standards to protect public health.
Enforcement Standard

Preventive Action Limit
Public health enforcement standards can be based on:

- Federal number
- EPA health-based value
- State drinking water standard
- Technical information
In March 2018, DNR requested that DHS develop groundwater standards for PFOA and PFOS.
PFOA and PFOS are the most commonly detected PFAS in blood.

**Perfluorooctanoic acid (PFOA)**

**Perfluorooctane sulfonate (PFOS)**
We do not know how much PFAS has to be in our blood to cause health effects.
Many studies have evaluated the health effects of PFOA and PFOS in research animals.
Babies are most sensitive to the effects of PFOA and PFOS.
In 2016, EPA established a combined health advisory of 70 ng/L for PFOA and PFOS.
PFOS and PFOA stays in people longer than animals.

- Animals: 4 days
- People: 840 days
EPA used a model that estimates exposure to pregnant women.
We continue to learn about the health effects of PFAS.
PFOA and PFOS can cross the placenta during pregnancy.
PFOA and PFOS can pass through breastmilk.
PFOS may increase the risk for asthma, food allergies, and certain infectious diseases.
In June 2019, DHS recommended a groundwater standard of 20 ng/L for PFOA and PFOS.
DHS’ recommended standard for PFOA and PFOS are based on:

- Federal number
- EPA health-based value
- State drinking water standard
- Technical information
We recommend using a model that estimates exposure in infants.
We recommend a combined standard for PFOA and PFOS.

Both chemicals cause the same critical effect.

Both have a long half-life in people.

Both affect activate the same biological pathways.
We are working on standards for up to 20 more PFAS.
Most people have some PFAS in their blood.

PFAS can cause health effects in people.

DHS recommends a standard of 20 ng/L for PFOA and PFOS.

DHS is working on standards for more PFAS.
Thanks!

Sarah Yang, Ph.D.
Groundwater Toxicologist
Bureau of Environmental and Occupational Health
Division of Public Health
Wisconsin Department of Health Services

sarahp.yang@wi.gov
608-266-9337