Your Community
Deciphering the Chemistry Code

PFAS: per- and polyfluoroalkyl substances
- Over 3000 PFAS in commercial use
- At least 5000 PFAS known

Most health information is limited to two specific types of PFAS
- **PFOA**: Perfluorooctanoic acid
- **PFOS**: Perfluorooctane sulfonic acid
What Happens When You Drink PFAS-Contaminated Water?

Most, and possibly all, PFAS chemical will be absorbed into your bloodstream

PFOS & PFOA will remain unchanged in your body

◦ Some other PFAS’s will be converted by your body to PFOA

PFAS will stay in your body a long time – years after you drank the water

◦ Primarily stored in blood, liver, & kidneys
What About Other Exposures?

The air you breathe

- Especially steamy showers & baths
- Some PFAS can be inhaled as vapor – but not likely for PFOA and PFOS
- Any PFAS can be inhaled if dispersed as liquid droplets in air
- Inhaled PFAS will be absorbed but less efficiently than if ingested

Skin absorption possible but much less than if ingested or inhaled
Who is Most Vulnerable?

Pregnant women, unborn fetus, and newborn infant
- Low birth weight
- Preterm birth
- Pregnancy-induced hypertension/pre-eclampsia
- Delayed puberty onset
- Attention deficit/hyperactivity disorder (ADHD)
- Immune response suppression in child
Cancer Risks

International Agency for Research on Cancer (IARC) - World Health Organization
- Classified PFOA as “possibly carcinogenic to humans” (Group 2B)
- Based on limited evidence in humans that it can cause testicular and kidney cancer, and limited evidence in lab animals

US EPA
- Scientific Advisory Board draft report for PFOA: “suggestive evidence of carcinogenicity, but not sufficient to assess human carcinogenic potential”
Other Reported Health Risks to Adults

Reproduction
- Difficulty becoming pregnant
- Endometriosis

Altered liver function
Chronic kidney disease
Cardiovascular disease
Suppressed immune response
Osteoarthritis
Federal Drinking Water Regulation

Safe Drinking Water Act
- Empowers US EPA to set **standards** for drinking water quality in **public** drinking water supplies
- The US EPA does not have authority to regulate private wells nor does it provide recommended criteria or standards for individual wells
- PFAS contamination of drinking water is not regulated by the US EPA, but PFOA and PFAS have been identified by EPA as priority contaminants

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)
- Commonly known as Superfund
- PFAS, including PFOA and PFOS, are not listed as CERCLA/Superfund hazardous substances
Estimating Drinking Water Health Risks for PFOA and PFOS

US EPA can issue a **Drinking Water Health Advisories** for water contaminants
- Information on health risks of unregulated chemicals to operators and officials responsible for public drinking water
- Estimate health risks with a margin of protection from a lifetime of exposure from drinking water
- Levels are **non-enforceable** and **non-regulatory**

For PFOS and PFOA
- US EPA health advisory level for PFOS/PFOA combined: **70 parts per trillion = 70 ng PFAS/liter water**
- **Michigan adopted the US EPA health advisory level of 70 parts per trillion**
- Estimated based on fetuses during pregnancy and breastfed infants as the most sensitive populations

For more information: [https://www.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos](https://www.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos)
Individual Risk

Individual differences impact individual risk

Risk modified by biology
- Species, age, sex, exposure route, health status, lifestyle, pregnancy, and more

Risk modified by chemistry
- Different PFAS’s have different toxicities
Drinking Water should not be Hazardous to your Health
Estimating Drinking Water Health Risks for PFOA and PFOS

US EPA Drinking Water Health Advisories
- Provide information on the health risks of these chemicals to operators and officials who have the primary responsibility for public drinking water
- Levels estimate health risks with a margin of protection from a lifetime of exposure from drinking water
- Levels are non-enforceable and non-regulatory

For PFOS and PFOA
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