



STATE ACTIVITIES TO ADDRESS PFAS

PANEL Barbara, Morrissey, DOH
Bonnie Brooks, ECY
Claire Nitsche, DOH
Holly Davis, DOH
Marissa Smith, ECY



State Programs Working on PFAS

Washington State Department of Ecology

- Enviro. Assessment Program
- Air Quality Program
- **Hazardous Waste and Toxics Reduction**
 - RCRA
 - Pollution Prevention
 - Climate Pollution Reduction
- Office of Equity and Environmental Justice
- Solid Waste Management Program
 - Biosolids
 - Landfills
 - Industrial
- **Toxics Cleanup Program**
- Water Quality Program
 - Wastewater
 - Stormwater
- Nuclear Waste Program
 - Cleanup

Washington State Department of Fish and Wildlife

- Toxics Biological Observation System

Washington State Attorney General's Office

- Lawsuit against the manufacturers of AFFF

Washington State Department of Health

- Office of Drinking Water
 - Source Monitoring
 - Policy and Planning
 - Water Quality
 - Engineering and Technical Services
 - Regional Offices
 - Statewide Revolving Fund
 - Operator Certification Program
- **Office of Environmental Public Health Sciences**
 - Site Assessment and Toxicology
- Office of Public Affairs and Equity
 - **Center for Health Promotion and Education**

Washington State Department of Agriculture

- Food Protection Task Force
- Animal Health

Washington State Department of Commerce

- Local Government Division
 - Emergency Rapid Response
 - Public Works Board – Construction Loan Program

Panel Outline

- Overview (Barb)
- PFAS in Foods and Fish (Barb)
- PFAS Clean up Sites (Bonnie)
- PFAS Health Promotion and Education (Claire)
- PFAS in Consumer Products (Holly)
- Safer Products for WA Program (Marissa)

Overview of PFAS

Barb Morrissey (she/her)

Toxicologist

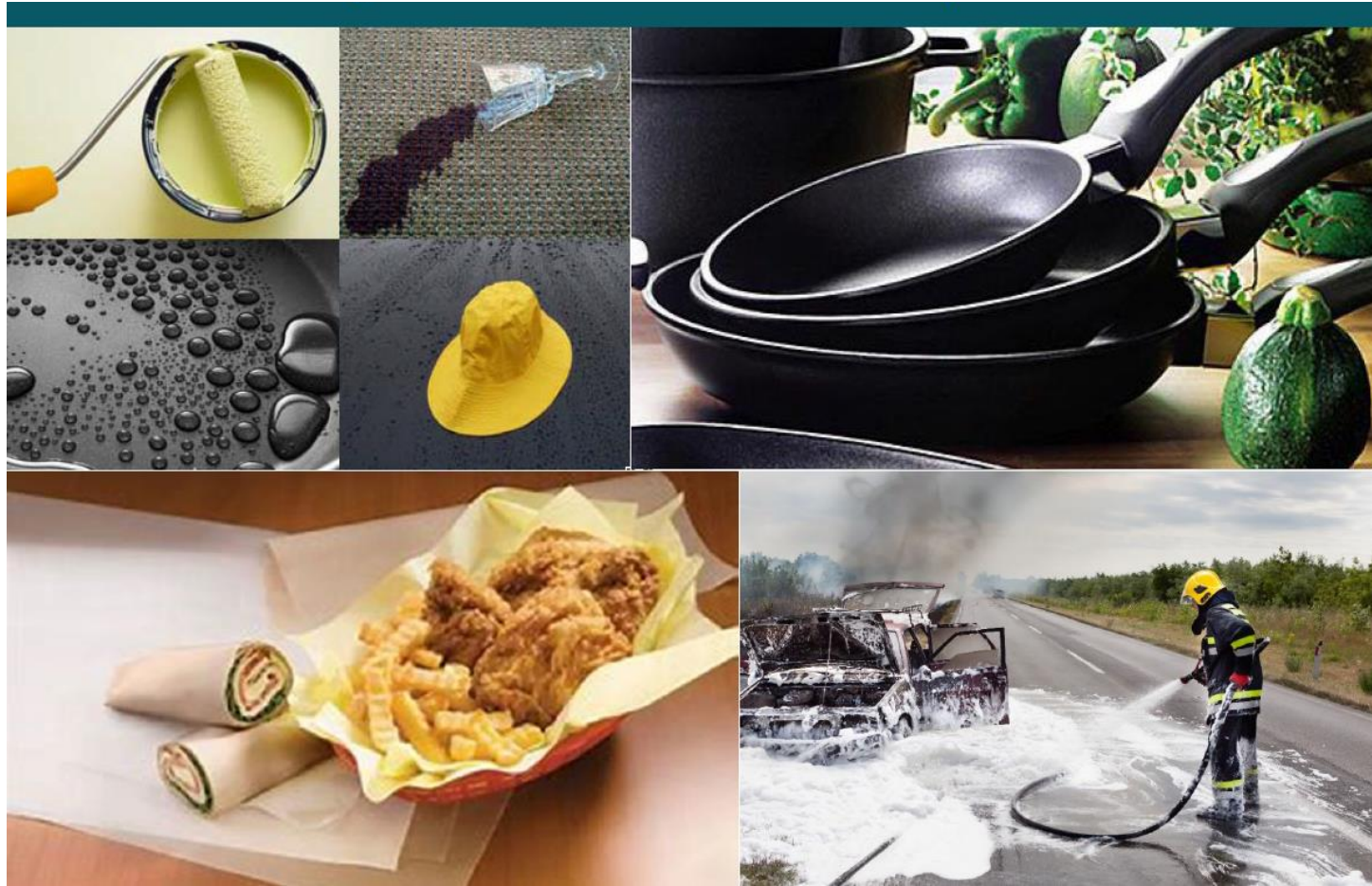
Environmental Public Health Sciences

Washington Dept of Health

barbara.morrissey@doh.wa.gov



Per- and Poly-Fluoroalkyl Substances (PFAS) Nonstick, Stain and Water Resistant, Heat Stable



Some PFAS are PBTs

Persistent
in the
environment

Bioaccumulate
in humans

Toxic at
relatively low
(ppt) levels

Human Health Effects

<https://ATSDR.CDC.gov/PFAS>

Research is ongoing to understand the mechanisms of PFAS toxicity. The epidemiological evidence suggests associations between increases in exposure to (specific) PFAS and certain health effects



Increases in cholesterol levels (PFOA, PFOS, PFNA, PFDA)



Changes in liver enzymes (PFOA, PFOS, PFHxS)



Small decreases in birth weight (PFOA, PFOS)



Lower antibody response to some vaccines (PFOA, PFOS, PFHxS, PFDA)

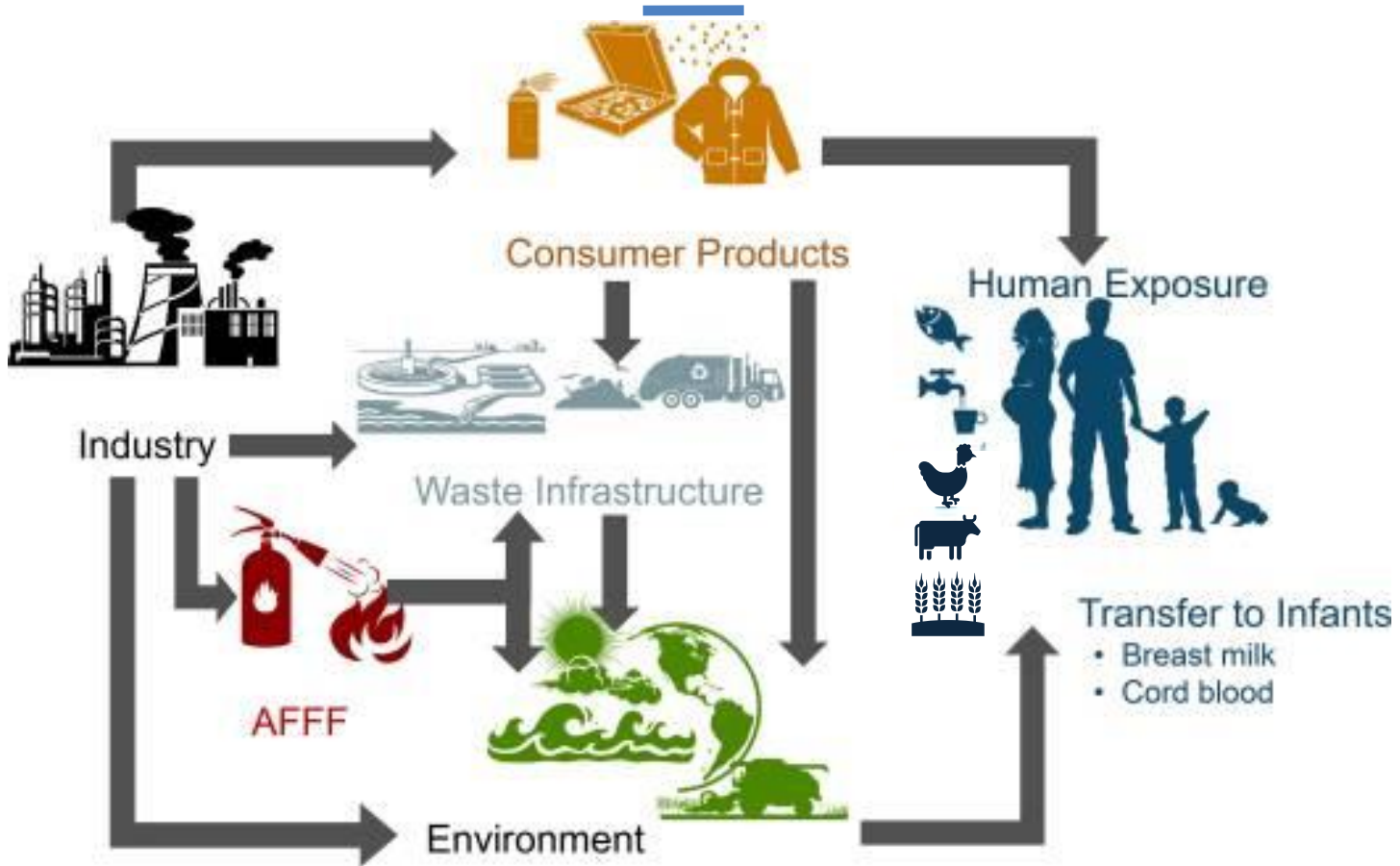


Pregnancy-induced hypertension and preeclampsia (PFOA, PFOS)



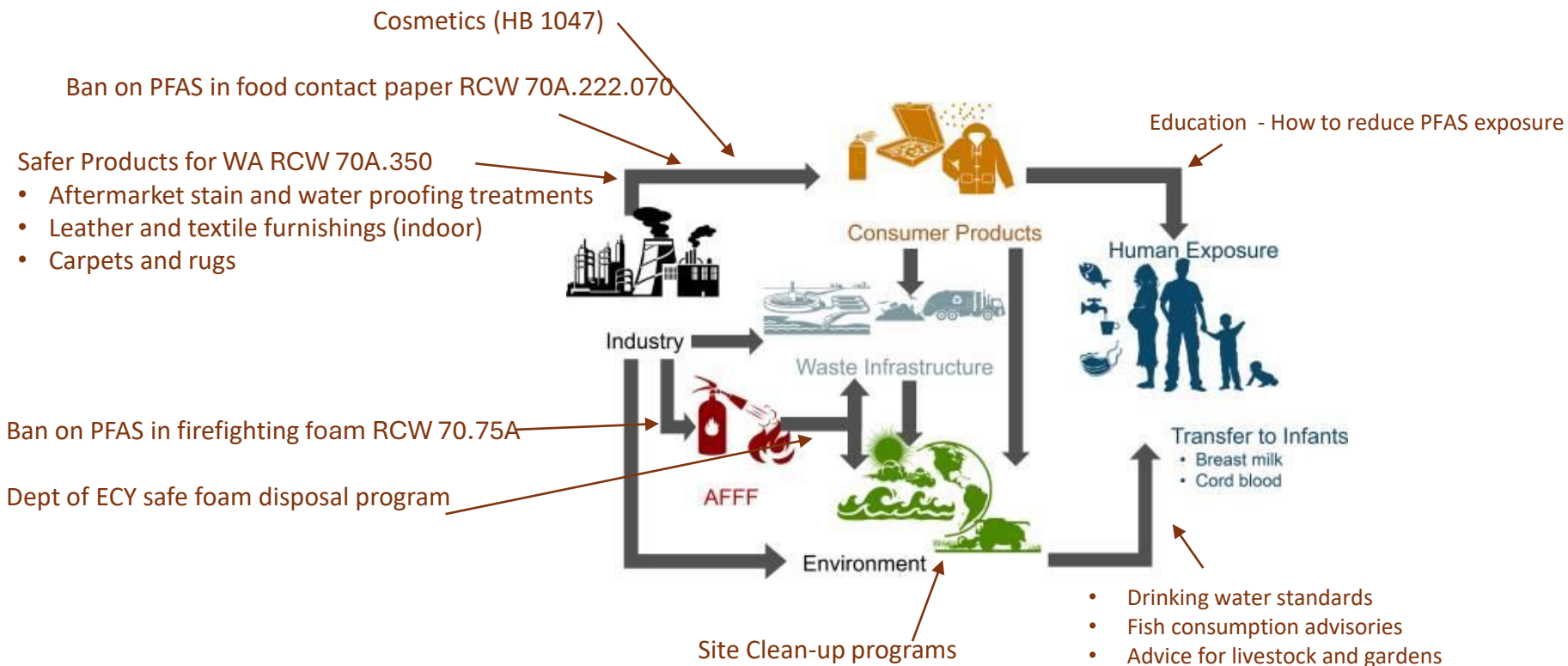
Kidney and testicular cancer (PFOA)

Exposure Pathways



Modified from Sunderland EM et al. (2019) A review of the pathways of human exposure to poly- and perfluoroalkyl substances (PFASs) and present understanding of health effects. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6380916/>

State Action to Address PFAS

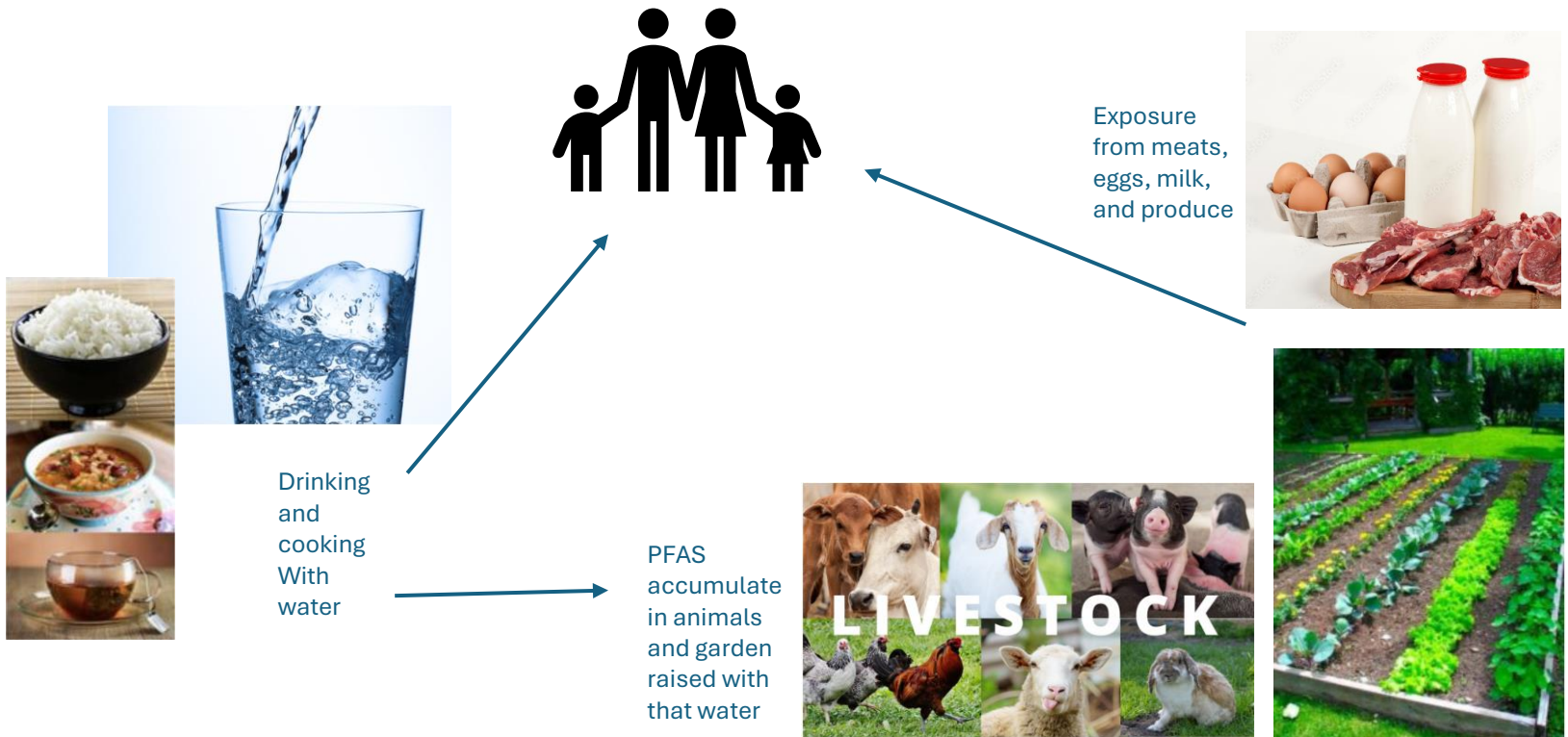


Source: Sunderland EM et al. (2019) A review of the pathways of human exposure to poly- and perfluoroalkyl substances (PFASs) and present understanding of health effects. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6380916/>

PFAS in Home-raised Foods

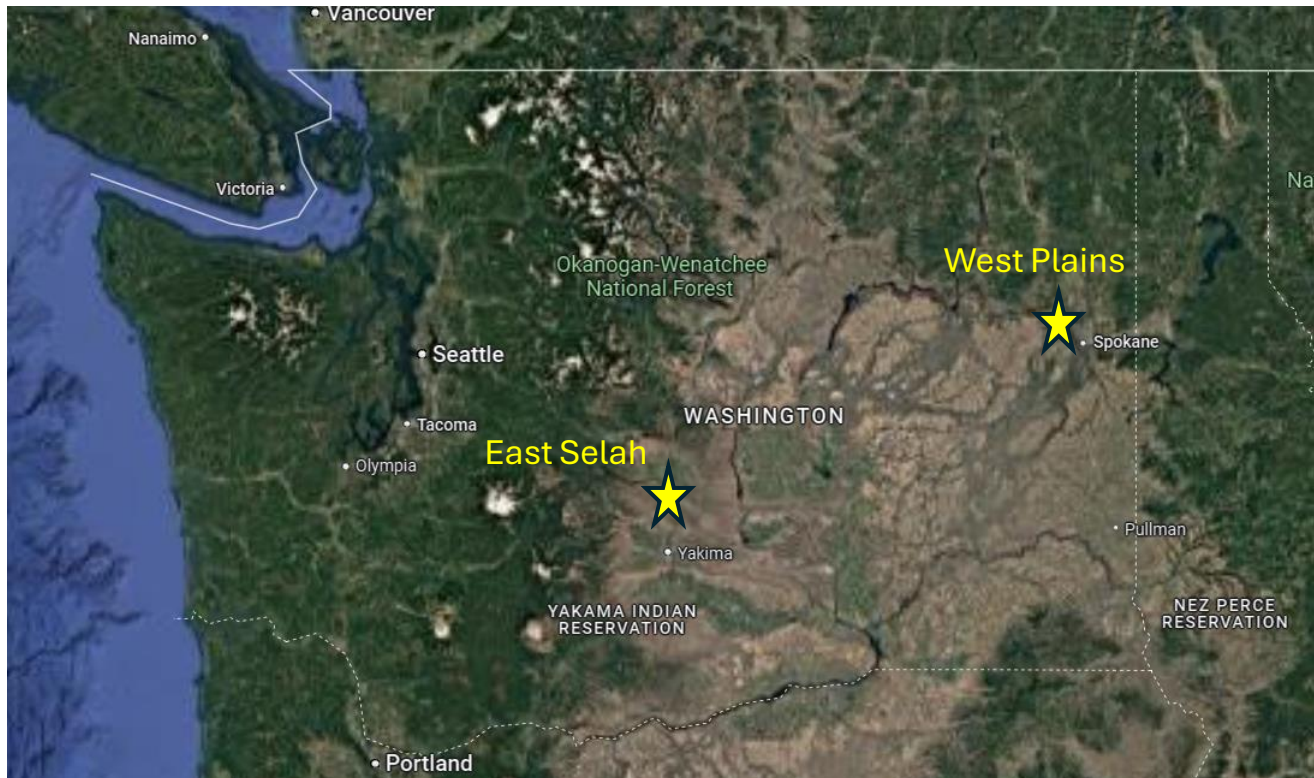
Barbara.Morrissey@doh.wa.gov

PFAS in Drinking Water - Potential Exposure Routes



Learn more at: <https://pfas-1.itrcweb.org/2-6-pfas-releases-to-the-environment/>

Rural Communities with PFAS in Private Wells



What We Heard

We need answers NOW
about the safety of
home-raised meats and
eggs

I'm not comfortable eating
our livestock, eggs, and
produce until we have
answers on whether it is
safe to do so

Fall is
butcher
season

A lot of us can't wait a lot longer
to find out what to do with the
animals, and if in good
conscience we can sell to our
neighbors



Source: KIMA Action News by Alexandria Rayford Fri, February 3rd 2023

What We Did to Address Concerns

- DOH partnered with USDA Food Safety Inspection Service to test -Dec 2023.
- 11 families volunteered 18 samples for PFAS testing

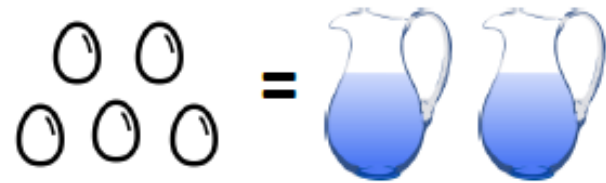


- DOH derived state advice for home-raised foods.
- Provided individualized food safety advice as recommended limits for # servings per week. DOH also made recommendations for how to reduce PFAS uptake into livestock. (March/April 2024)

Results

- Detected PFOS (72%) and PFHxS (44%) of samples.
 - No other PFAS detected.
 - 2 highest in drinking water wells.
- Higher water levels of PFAS correlated with higher levels of PFAS in food.

- **Key Take-away:** Livestock can be an important exposure source.



At one home with approximately 250 parts per trillion (ppt) of PFOS in their well water, adults eating 5 home-raised eggs per week would get the same exposure as drinking 2 liters of that same water every day for a week.

Our Recommended Eating Restrictions

Significant restriction:

- Adults:** No more than 1 egg/month and 8oz meat/month on average
- Child:** Do not eat

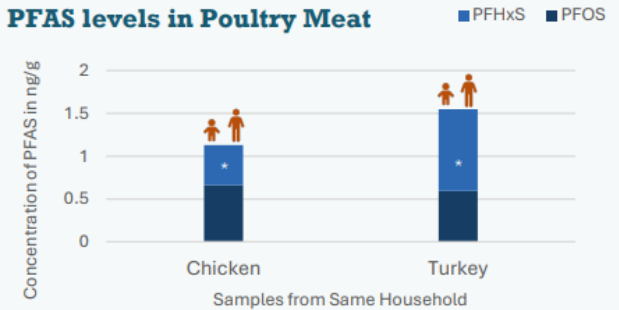
Moderate restriction:

- Adults:** No more than 4-7 eggs/week and two 8oz servings meat/wk on average
- Child:** No more than 1-2 eggs/week and 3-4oz meat/week on average

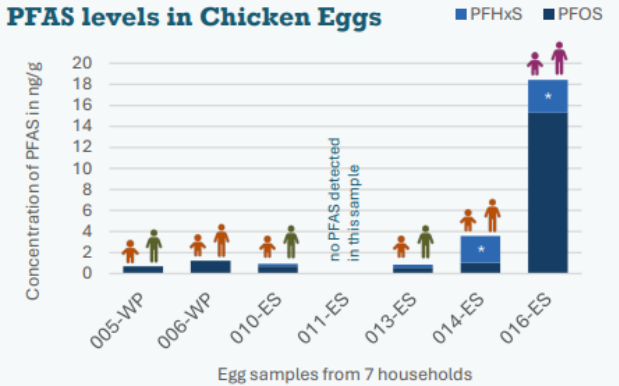
Slight Restriction:

- Adults:** No more than 7-12 eggs/wk and three 8oz servings meat/wk on average
- Child:** No more than 3-4 eggs/week and 5-6oz meat/week on average

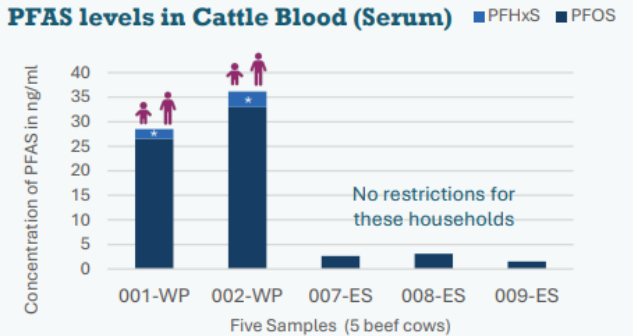
PFAS levels in Poultry Meat



PFAS levels in Chicken Eggs



PFAS levels in Cattle Blood (Serum)



*PFHxS result was a lab estimate
 We estimated PFOS in meat by dividing cattle serum results by 9.1
 No PFAS were detected in 4 beef samples collected (data not shown).

Key things you can do to reduce PFAS exposure in poultry and cattle



- Forever chemicals are not forever in your animals once you stop the exposure.
 - Switch animals to filtered water
 - Move chicken coop and pen to a new area.
- PFOS concentrates in egg yolk. Eating less yolk and more whites could reduce your exposure
- PFAS concentrate in organ meats of animals, avoid eating liver, kidney and product made from blood.
- Don't use manure from contaminated animals in food gardens.



Project Outcomes

- Direct testing of livestock can provide more specific and actionable food safety advice.
- Individual health advice was appreciated by participants
- 1-page community factsheet helps disseminate key take-aways widely.
- DOH advocacy for investigating and mitigating livestock exposure pathways is supported by results.

Project Results: Home-Raised Livestock PFAS Testing

PFAS exposure from home-raised livestock products is a public health concern.

When animals drink water contaminated with per- and polyfluoroalkyl substances (PFAS), the chemicals can end up in their milk, eggs, or meat. People can be exposed to PFAS when they eat these home-raised foods. This is a problem, because when PFAS build up in our bodies it could increase our risks for certain health conditions, including kidney cancer, low birthweights for babies, and decreased immune system response to vaccines.

In December 2023, we worked with 11 households between East Selah and the West Plains to test their home-raised eggs and meat for 16 types of PFAS. The USDA Food Safety Lab tested the samples for us. Each household had PFAS detections in their private well water or had neighbors who had contaminated private wells.

We gave participants tailored health consultations on their results. These consultations included:

- A summary of their test results.
- Individualized advice on how much of their meat or eggs each member of their family can eat safely each week.
- Recommended steps to lower PFAS levels in their livestock and chickens.

Community members asked us to test their home-raised livestock products for PFAS.

Community members in East Selah and the West Plains needed to know whether they could safely eat their meat and eggs.

We collected 18 livestock samples from 11 homes between East Selah and the West Plains to test for PFAS.

Samples included cow blood, beef, chicken and turkey meat, and chicken eggs.

7 out of 11 participating households were told to limit how much home-raised livestock products they eat.

Exposure to **Perfluorooctane Sulfonic Acid (PFOS)** from chicken eggs was a main concern. **Perfluorohexane Sulfonic Acid (PFHxS)** was also detected.

Our Recommended Eating Restrictions

The people scores tell you whether we recommended a **Slight, Moderate, or Significant** limit on eating that food for **adults and children in the household**. The large people scores represent adults, and the small people scores represent children.

Significant restriction:

- **Chick Or not eat**
- **Adults:** Avoid more than 1 egg/week and eat restriction on average.

Moderate restriction:

- **Adults:** No more than 1-2 eggs/week and eat restriction on average.
- **Child:** No more than 1-2 eggs/week and 2-3 eat restriction on average.

Slight restriction:

- **Adults:** No more than 7-12 eggs/week and eat restriction on average.
- **Child:** No more than 3-6 eggs/week and 3-6 eat restriction on average.

PFAS levels in Poultry Meat

Bar chart showing PFAS levels in poultry meat. Y-axis: Concentration of PFAS (ng/g). X-axis: Chickens, Turkey (Samples from Same Household). Legend: PFOS, PFHxS.

PFAS levels in Chicken Eggs

Bar chart showing PFAS levels in chicken eggs. Y-axis: Concentration of PFAS (ng/g). X-axis: Egg Samples from 7 households. Legend: PFOS, PFHxS.

PFAS levels in Cattle Blood (Serum)

Bar chart showing PFAS levels in cattle blood serum. Y-axis: Concentration of PFAS (ng/mL). X-axis: 001-WP, 002-WP, 007-ES, 008-ES, 009-ES. Legend: PFOS, PFHxS.

Office of Environmental Public Health Sciences
 Site Assessment and Toxicology Unit
 eha@doh.wa.gov (email)

Washington State Department of Health

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****PFAS levels were a lab estimate. We estimated PFOS in meat by plating/outer serum results by a 1:1 ratio. No PFAS were detected in 4 total separate samples (3 beef and 1 turkey).**

Next Steps

- Offer re-testing at households that acted to lower exposure in their animals.
- Expand testing to more households



Free

Home-Raised Meat and Egg PFAS Testing

*Limited-Time Offer from Washington
State Department of Health (DOH)—
Sign Up By October 28, 2024!*

What We Can Do:

- Free PFAS testing of home-raised eggs and meat from cattle, swine, chickens, and turkeys. Please contact us about other food items. Space is limited.

What You Get:

- Your test results.
- Individual consultation on your test results from DOH, including advice on the safety of eating the meat or eggs and how to reduce your exposure.



To Qualify, You Must:



Be a West Plains or East Selah resident with PFAS in your water higher than at least one of these values:

- PFOS: 4.0 ppt
- PFOA: 4.0 ppt
- PFHxS: 10 ppt



Have used the water to raise animals at home for personal, family, or friend consumption (not commercial production).

Email, Text, or Call to Sign Up:

Barbara Morrissey — Toxicologist

barbara.morrissey@doh.wa.gov

(564) 999-3485

PFAS in Fish and Shellfish



DOH Contact:

Emerson Christie, PhD, Toxicologist

Emerson.Christie@doh.wa.gov

DOH Fish Advisories for PFOS






Fish consumption advisories for PFOS in 3 urban lakes, King Co.

Potentially 9 more in 2025



PFOS Fish Advisory

Lake Washington, Lake Sammamish, and Lake Meridian

Smallmouth Bass: Do Not Eat	
Yellow Perch: 1 meal max per month	
Brown Bullhead: 4 meals max per month	
Pumpkinseed: Healthy Choice	
Kokanee: Healthy Choice	

Eating fish is good for you and provides many health benefits.

Perfluorinated sulfonate (PFOS) has been found in fish species in Lake Washington, Lake Sammamish, and Lake Meridian. PFOS comes from a chemical called perfluorooctyl sulfonate (PFOS), a polyfluoroalkyl sulfonate (PFAS). PFAS chemicals are called "forever chemicals" in the media because they have not been made since the late 1940s and have not been phased out of production in the United States due to health concerns.

PFOS can interfere with your body's endocrine system and make some hormones less effective and increase your risk of cancer, a lower birthweight and high cholesterol. PFOS can also increase your risk for prostate cancer, testicular cancer, high blood pressure, pregnancy loss, and other health problems.

Age, lifestyle and other factors can impact how your body reacts to PFOS exposure.



A map showing the location of Lake Washington, Lake Sammamish and Lake Meridian in relation to Seattle, Issaquah and Kent.

<https://doh.wa.gov/sites/default/files/2022-12/334-471.pdf>

DOH testing of Fish and Shellfish

- Top ten species of Market fish in WA (2022)
 - Canned tuna, catfish, cod, flounder, halibut, red snapper, pollock, Chinook salmon, and tilapia
 - All were below current PFOS screening level
 - To inform our fish advisories
- Underway- reconnaissance testing of Puget Sound recreational shellfish for PFAS
 - Preliminary results from recreational shellfish sampling are optimistic, however, additional surveys will be needed



Questions?

Barbara Morrissey, Toxicologist
Environmental Public Health Sciences

Barbara.morrissey@doh.wa.gov

564-999-3485 (cell)