

The webinar will begin shortly.

# Safer Products for Washington: Draft Priority Chemicals for Cycle 2

Implementing RCW 70A.350: The Pollution Prevention for Healthy People and Puget Sound Act

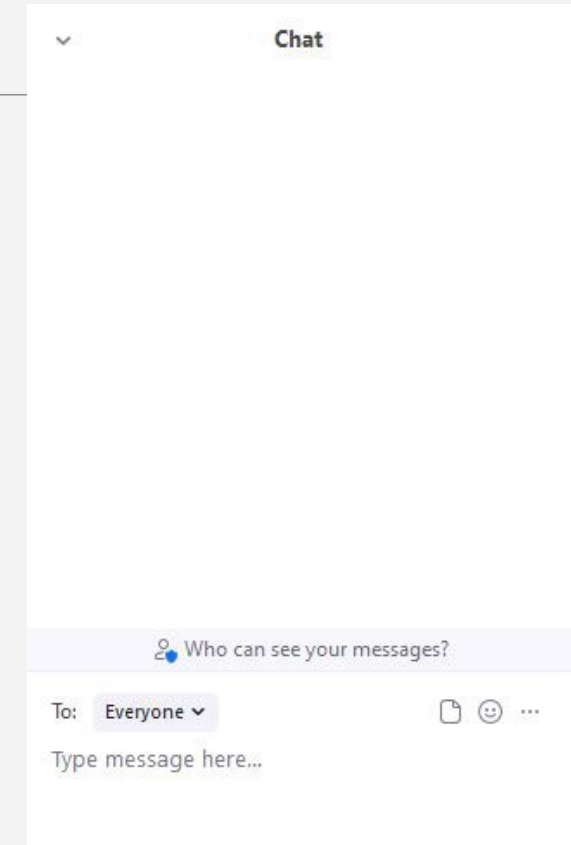
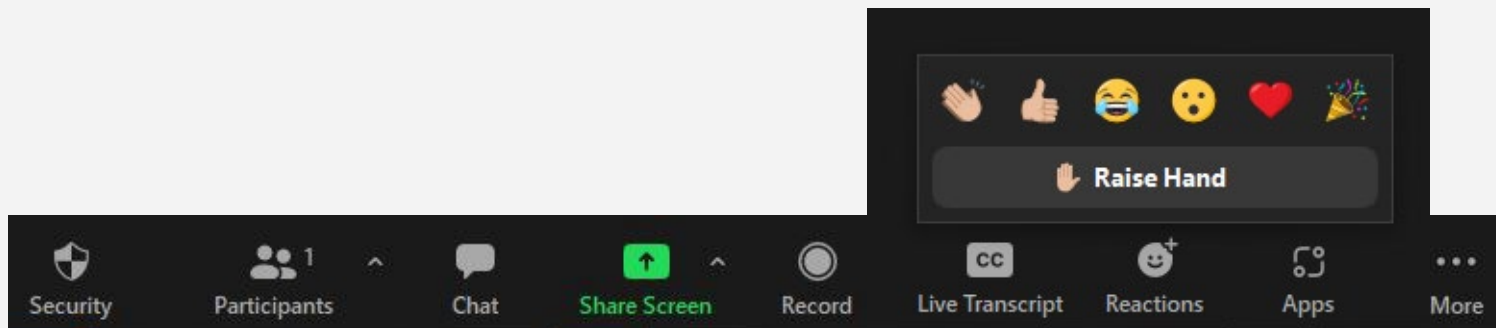
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JUNE 21, 2023



# Zoom logistics

- Send technical issues to the **host** in chat
- Send questions, comments, and discussion to **everyone** in chat
- Participants muted until we get to discussion



# Safer Products for Washington: Draft Priority Chemicals Cycle 2 Phase 1

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**From Ecology:** Cheryl Niemi, Marissa Smith, Saskia van Bergen, Sascha Stump, Kimberly Goetz, Stacey Callaway, Camille Bennett, Autumn Falls, Amber Sergent, Joshua Kinne.



**From Health:** Elinor Fanning, Holly Davies.

## Today's schedule

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1. Safer Products for Washington program overview
2. Approach for identifying priority chemicals
3. Draft priority chemicals and classes
4. Timeline
5. Questions





# Section 1. Safer Products for Washington Overview



## Safer Products for WA background

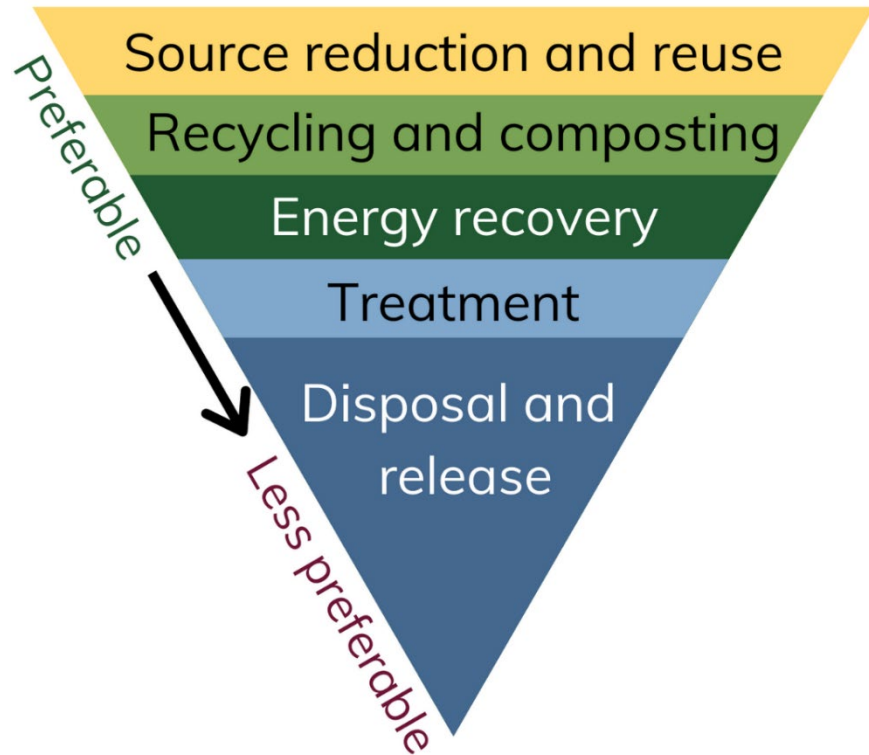
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- Implementation program
- Law signed in May 2019
- Goals include:
  - Equitably reducing exposure to toxic chemicals
  - Reducing the release of toxic chemicals to the environment

# Reduce risks by reducing the use of hazardous chemicals

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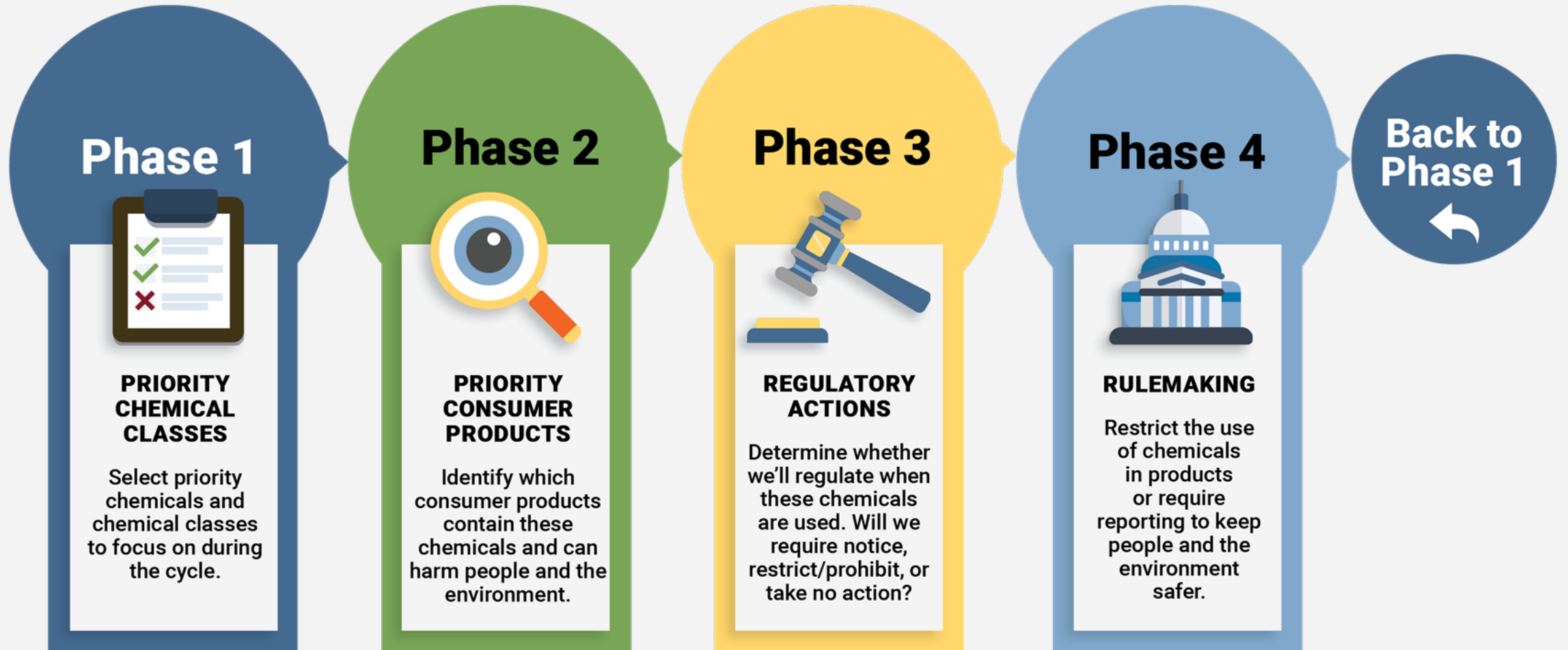
## Waste Management Hierarchy



- Focus on reducing risk by avoiding the use of hazardous chemicals.
- Healthier for people and the environment.
- Avoids monetary and environmental costs associated with hazardous chemical cleanups.

$$\downarrow \text{Hazard} \quad \times \quad \text{Exposure} \quad = \quad \downarrow \text{Risk}$$

# Safer Products for Washington: Cycle 2







## Section 2. Approach for Identifying Priority Chemicals

## Expectations for Cycle 2

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- Phase 1: Identify **at least five new** priority chemicals or chemical classes.
- Phase 2: Identify priority products that are significant sources or uses of any of the current or new priority chemicals.
  - Continue work on the priority chemical classes identified in the law: PFAS, Phthalates, Flame Retardants, Alkylphenol Ethoxylates, Bisphenols and PCBs.

## Priority chemical statutory requirements

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Every five years Ecology must designate **at least five new** priority chemicals or classes that meet **at least one** of the following criteria.

The chemical or a member of a class of chemicals is:

- A chemical of high concern for children (CSPA).
- A persistent, bioaccumulative, toxic chemical (PBT).
- Regulated in consumer products in Washington under relevant statutes.
- Regulated as a hazardous substance in Washington.
- A concern for sensitive populations and sensitive species.



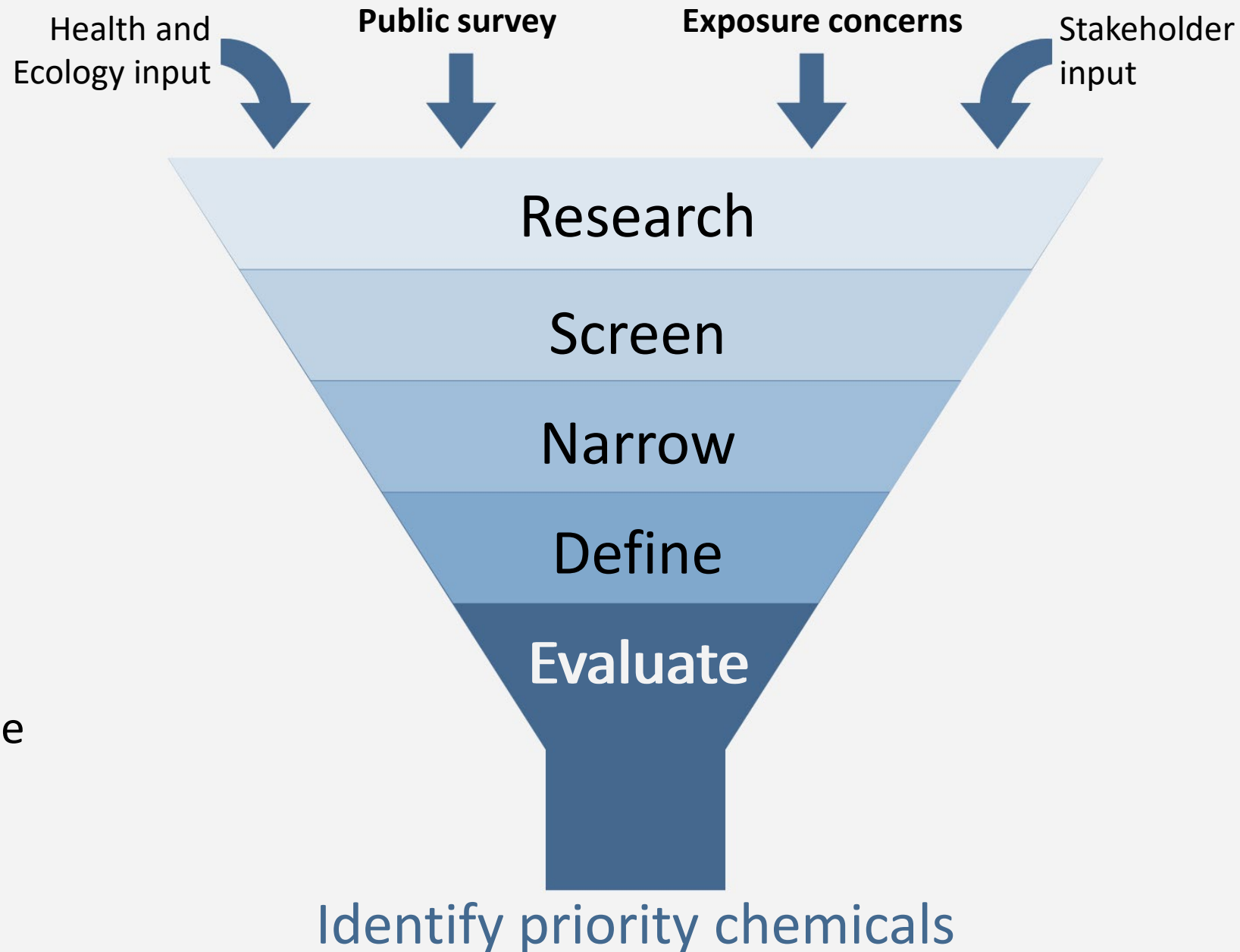
## Goals for identifying new priority chemicals or chemical classes

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- Transparent approach for identifying priority chemicals that is grounded in science and public input.
- Set ourselves up for success down the road.
- Center our work around equitably reducing exposure to toxic chemicals.
- Show that the priority chemicals selected meet the criteria in the law.

## Our process

- Research chemicals found in consumer products and chemicals with disproportionate exposures.
- Screen chemicals for known and potential hazards.
- Narrow chemical list.
- Define chemical classes.
- Evaluate chemicals against the criteria in the law.



# How do we narrow our chemical list?

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## Hazard and exposure considerations

- ↑ Carcinogens, mutagens, reproductive and developmental toxicants, endocrine disruptors
- ↑ High persistence or bioaccumulation
- ↑ Opportunities to equitably reduce exposure

## Use and regulation considerations

- ↑ High production and release volumes
- ↑ Opportunities to prevent regrettable substitution
- ↑ Chemicals identified in statute or by rule:
  - Persistent, bioaccumulative, and toxic chemicals (PBTs)
  - Chemicals of high concern to children list
  - Regulated in consumer products or as hazardous substances
- ↓ Chemicals with existing, effective regulatory structures

↑ Prioritize

↓ Deprioritize

## Defining chemical classes

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- Similarities in chemical structures.
- Similarities in hazards.
- Cumulative and aggregate exposure concerns.
- Similarities in persistence.
- History or potential for regrettable substitutions.
- Common breakdown or byproducts.

## Evaluating potential priority chemicals and classes

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Every five years Ecology must designate **at least five new** priority chemicals or classes of chemicals that meet **at least one** of the following criteria.

The chemical or a member of a class of chemicals is:

- A chemical of high concern for children (CSPA).
- A persistent, bioaccumulative, toxic chemical (PBT).
- Regulated in consumer products in Washington under relevant statutes.
- Regulated as a hazardous substance in Washington.
- **A concern for sensitive populations and sensitive species.**



# Concern for sensitive populations and species

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RCW 70A.350.020 provides a list of considerations when assessing concern for sensitive populations and species.

- Hazards
  - Hazard traits or environmental or toxicological endpoints;
  - Aggregate effects;
  - Cumulative effects with other chemicals with the same or similar hazard traits or environmental or toxicological endpoints;
  - Environmental fate;
  - Potential reaction products, or metabolize into another chemical or a chemical that exhibits one or more hazard traits or environmental or toxicological endpoints, or both;
- Potential impacts
  - The potential to contribute to or cause adverse health or environmental impacts;
  - The potential impact on sensitive populations, sensitive species, or environmentally sensitive habitats;
- Exposures
  - Potential exposure based on:
    - Reliable information regarding potential exposures and
    - Reliable information demonstrating occurrence, or potential occurrence, of multiple exposures

## Determining the concern for sensitive species and populations

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- Is there the potential for sensitive populations and species to be exposed to hazardous chemicals?
  - Hazards of the chemicals
  - Exposure potential
  - Potential for aggregate and cumulative effects
- Are there any known or potential impacts of these exposures?
  - Epidemiological studies
  - Observational environmental studies or toxicity testing on sensitive species



## Section 3. Draft Priority Chemicals

## Draft priority chemicals and classes

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- Cadmium and cadmium compounds
- Lead and lead compounds
- Brominated and/or chlorinated substances
- Benzene, toluene, ethylbenzene, xylenes (BTEX) substances
- Formaldehyde and formaldehyde releasers
- Cyclic volatile methyl siloxanes (cVMS)
- 6PPD

## Section outline

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For each draft priority chemical or chemical class:

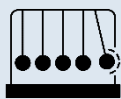
- Overview
  - Scope of class
  - Functions of the chemical class in products
  - Examples of products that may contain this chemical class
  - Hazards of the chemical class
- Why this chemical class?
  - Human Health
  - Environmental Impacts
  - Potential to Reduce Exposures
- Does this chemical class have the potential to impact sensitive populations and sensitive species?
- How does this chemical class meet the statutory requirements in the law?

## Cadmium and cadmium compounds overview

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Scope of class: Cadmium and any compounds that contain cadmium



Example functions: Contaminants (no function), plastic additives (heat and light stabilizers, colorants), anti-corrosion



Example products: Cosmetics, toys, jewelry, arts and crafts products, cookware and kitchen utensils, apparel



Hazards: Carcinogenicity, reproductive toxicity, developmental toxicity, systemic toxicity, asthmagenicity, aquatic toxicity, persistence, bioaccumulation

# Why cadmium and cadmium compounds?

## Human health

- Widely detected both in the environment and in our bodies.
- Cadmium is highly toxic.
- Accumulates in kidneys and liver and humans have no effective elimination pathways.
- Washingtonians have higher exposure to cadmium than the national average.

## Environmental impacts

- Cadmium is found in Washington's waters, sediment and air, with some samples exceeding screening thresholds.
- Toxic to salmonids and may impact these and other sensitive species.
- Persistent in the environment and bioaccumulates in organisms.

## Potential to reduce exposures

- Regulations on cadmium in children's products demonstrate that reducing cadmium in consumer products is possible.

# Cadmium and cadmium compounds are a concern for sensitive populations and sensitive species

## Sensitive populations

- Populations with higher exposures to cadmium include:
  - Washington residents – particularly children.
  - Women
  - Asian, Mexican, and Hispanic women have higher exposure relative to non-Hispanic white women.
  - People with occupational exposures and who live near contaminated soil.

## Sensitive species

- Exposure to cadmium and other metals leads to increased toxicity in water fleas, zebra mussels, frogs and fathead minnows.
- Cadmium has been shown to adversely impact the olfactory system in coho salmon linked to impaired survival and increased susceptibility to predation.



# Cadmium and cadmium compounds as a priority chemical class

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## Meeting the statutory requirements

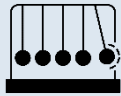
- Cadmium is identified as a metal of concern Washington (WAC 173-333).
- Cadmium is considered a hazardous substance in Washington.
- Cadmium is included on the WA Chemicals of High Concern to Children (CHCC) list.
- Cadmium is regulated in consumer products under relevant Washington statutes.
  - Children's Products (RCW 70A.430)
  - Packaging (RCW 70A.222)
  - Brake Friction Material (RCW 70A.340)
- Cadmium is a concern for sensitive populations and species.

## Lead and lead compounds overview

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Scope of class: Lead and any compounds that contain lead



Example functions: Contaminants (no function), plastic additives (heat and light stabilizers, colorants), weight additives



Example products: Cookware and kitchen essentials, cosmetics, toys, arts and crafts, jewelry, apparel, fishing weights, and ammunition



Hazards: Carcinogenicity, reproductive toxicity, developmental toxicity, endocrine disruption, neurotoxicity, aquatic toxicity, persistence, and bioaccumulation

# Why lead and lead compounds?

## Human health

- No safe level for lead exposure.
- Lead is widely detected in our environment and our bodies.
- Lead has damaging, lifelong impacts on children's development including their neurodevelopment.
- People are disproportionately exposed to lead.

## Environmental impacts

- Lead impacts ecosystems and is toxic to plants and animals.
- Lead is persistent in the environment and can bioaccumulate in organisms.
- Estimated approximately 520 metric tons of lead released in Puget Sound each year.

## Potential to reduce exposures

- Lead is already regulated in some consumer products and some uses have been discontinued, so it is likely possible to further reduce exposures and disproportionate impacts.

# Lead and lead compounds are a concern for sensitive populations and sensitive species

## Sensitive populations

- Populations with evidence suggesting higher exposures to lead include:
  - Children in low-income households, children under six years old, and children living in pre-1978 housing.
  - Recent immigrants
  - People with occupational exposures and some hobbyists.

## Sensitive species

- Lead is very toxic to aquatic life.
- Lead poisoning has pronounced impacts on birds, especially predatory birds.
- A recent study found evidence of chronic lead poisoning in nearly half of bald eagles and golden eagles sampled across the United States.

# Lead and lead compounds as a priority chemical class

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## Meeting the statutory requirements

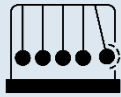
- Lead is regulated as a hazardous substance in Washington.
- Lead is regulated in consumer products under relevant Washington statutes.
  - Children's (RCW 70A.430)
  - Packaging (RCW 70A.222)
  - Brake Friction Material (RCW 70A.340)
- Lead is a concern for sensitive species and populations.

## Brominated and/or Chlorinated substances overview

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Scope of class: Substances containing bromine or chlorine bonded to carbon



Example functions: Solvents, flame retardants, colorants, biocides, base materials, and contaminants (no function)



Example products: Adhesives, sealants, paints, varnishes, paint and varnish removers, cosmetics, cleaners, degreasers, plastics



Hazards: Carcinogenicity, mutagenicity, reproductive toxicity, developmental toxicity, systemic toxicity, neurotoxicity, aquatic toxicity, persistence and bioaccumulation

# Why brominated and/or chlorinated substances?

## Human health

- Hazards of brominated and/or chlorinated substances are related to their functional use in products.
- Many are associated with increased risk of cancers.
- Evidence some of these chemicals impact fetal development.

## Environmental impacts

- Persistence and bioaccumulation generally increase with the number of bromines or chlorines in a chemical.
- Brominated and/or chlorinated substances have evidence of toxicity in aquatic organisms.
- Bromine and chlorine can deplete atmospheric ozone.

## Potential to reduce exposures

- History of regrettable substitutions.
- Many uses already successfully phased out, suggesting there may be additional opportunities to reduce exposures and disproportionate impacts.

# Brominated and/or Chlorinated substances are a concern for sensitive populations and sensitive species

## Sensitive populations

- Pregnant people exposed in their occupation and through use of consumer products
  - Associated with adverse impacts on fetal development.
- Children are exposed to brominated and/or chlorinated substances through house dust and indoor air.
- Disproportionately higher exposures reported for some of these substances or their metabolites in women of color.

## Sensitive species

- The United Nations Stockholm Convention identifies many brominated and/or chlorinated substances as persistent organic pollutants (POPs), and many others are also persistent and bioaccumulative.
- Some examples of potential impacts on sensitive species include:
  - Triclosan and triclocarban have been associated with olfactory disruption in fish.
  - Tetrachloroethylene and trichloroethylene associated with developmental deformities in amphibians.



# Brominated and/or Chlorinated substances as a priority chemical class

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## Meeting the statutory requirements

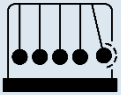
- Many brominated and/or chlorinated substances are regulated as hazardous substances in Washington.
- Various brominated and/or chlorinated substances are regulated in consumer products under relevant Washington statutes.
  - TDCPP, TCEP, DecaBDE, HBCD, and additive TBBPA are restricted in children's products and residential upholstered furniture (RCW 70A.430)
  - PDBEs (excluding decaBDE) are restricted in noncombustible products (RCW 70A.405)
  - DecaBDE is restricted in mattresses, upholstered furniture, and TVs and computers that have electronic enclosures (RCW 70A.405)
- Brominated and/or chlorinated substances are a concern for sensitive populations and species.

## BTEX substances overview

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Scope of class: Benzene, toluene, ethylbenzene, and xylenes (BTEX)



Example functions: Solvents, contaminants (no function)



Example products: Degreasers, paint thinners, brush cleaners, adhesives, inks, coatings, cosmetics (e.g., nail products)



Hazards: Carcinogenicity, mutagenicity, reproductive toxicity, developmental toxicity, neurotoxicity, systemic toxicity, aquatic toxicity

# Why BTEX substances ?

## Human health

- Co-occurrence as indoor and outdoor air contaminants.
- Used in manufacture of many consumer products, including children's products.
- Presence in surrounding soil can contaminate indoor air through vapor intrusion.
- Potential for aggregate and cumulative effects in people.

## Environmental impacts

- Contaminate environment through manufacturing, use and disposal of products.
- Presence in groundwater, soil, indoor and outdoor air.
- 16 million pounds of BTEX releases reported in EPA TRI for Washington between 2012 and 2021.

## Potential to reduce exposures

- Shared solvent function increases potential for regrettable substitution.
- Product recalls for BTEX suggest contamination can be reduced through changes in manufacturing processes.

# BTEX substances are a concern for sensitive populations and sensitive species

## Sensitive populations

- Pregnant people
  - Co-exposure to BTEX with ethanol is a concern for cumulative impacts of solvents on developing fetuses
  - Exposure to BTEX from products in combination with exposure from ambient air and drinking water contamination
- People with occupational exposures
  - Occupational exposure linked to hearing loss, color vision impairment in workers
  - Auto shop, construction, and nail salon workers
  - Nail salon jobs are held more often by Asian American women

## Sensitive species

- Benzene exposure associated with decreased respiration in chinook salmon and striped bass
- Salmon may be more sensitive during out migration
- Salmon may be vulnerable to impacts of BTEX; oil contamination (including BTEX) can impair salmon survival

## BTEX substances as a priority chemical class

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### Meeting the statutory requirements

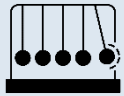
- BTEX substances are considered hazardous substances in Washington.
- Benzene and toluene are listed as Chemicals of High Concern to Children (70A.340 RCW).
- BTEX substances are a concern for sensitive populations and sensitive species.

## Formaldehyde and formaldehyde releasers overview

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Scope of class: Formaldehyde and chemicals determined to release formaldehyde



Example functions: preservatives, hair smoothing, colorfastness, wrinkle-resistance, contaminant (no function)



Example products: cosmetics, cleaning products, apparel and textiles, arts and craft supplies, building materials, adhesives, paint



Hazards: carcinogenicity, mutagenicity, asthmagenicity, aquatic toxicity

# Why formaldehyde and formaldehyde releasers?

## Human health

- Carcinogen
- Asthmagen
- Indoor air pollutant from multiple types of consumer products
- Potential for disproportionate exposures and impacts

## Environmental impacts

- Environmental concentrations suggest current exposure level is likely not a concern for sensitive species
- High levels have potential to adversely effect aquatic organisms

## Potential to reduce exposures

- Formaldehyde levels were reduced in some building materials (composite wood) – further reductions may be possible.
- Other preservatives are already used in many consumer products – we will need to determine whether they are safer alternatives.

# Formaldehyde and formaldehyde releasers are a concern for sensitive populations and sensitive species

## Sensitive populations

- Common ingredients in hair products marketed toward women of color.
- Formaldehyde exposure associated with childhood asthma.
  - Asthma rates are higher in Black and Indigenous children relative to White children.
- Residents of mobile and manufactured homes.
- Salon workers.

## Sensitive species

- Evidence of adverse impacts in salmon when used as a parasiticide in aquaculture.
- Formaldehyde as a component of air pollution may impact sensitive species.



# Formaldehyde and formaldehyde releasers as a priority chemical class

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## Meeting the statutory requirements

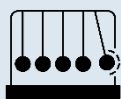
- Formaldehyde is considered a hazardous substance in Washington.
- Formaldehyde is listed as a Chemical of High Concern to Children (70A.340 RCW)
- Formaldehyde is a concern for sensitive populations and sensitive species.

## Cyclic volatile methyl siloxanes (cVMS) overview

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Scope of class: chemicals consisting of alternating silicon and oxygen atoms in a cyclic arrangement, with each silicon atom also bonded to two methyl groups



Example functions: Solvents, carriers, emollients, manufacturing uses (polymers, processing aids, dispersants for pigments, defoamers), contaminants (no function)

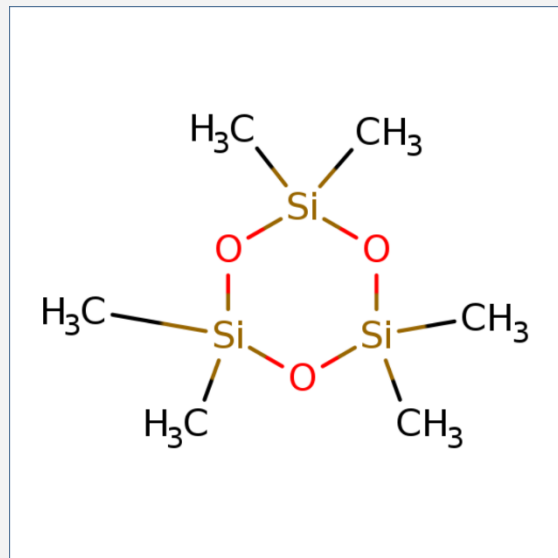


Example Products: Cosmetics, silicone products, paints, printing inks, coatings, sealants

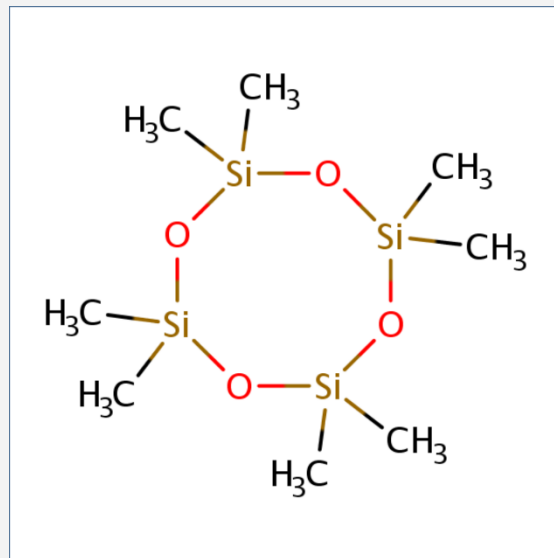


Hazards: Reproductive toxicity, developmental toxicity, endocrine disruption, aquatic toxicity, persistence, bioaccumulation

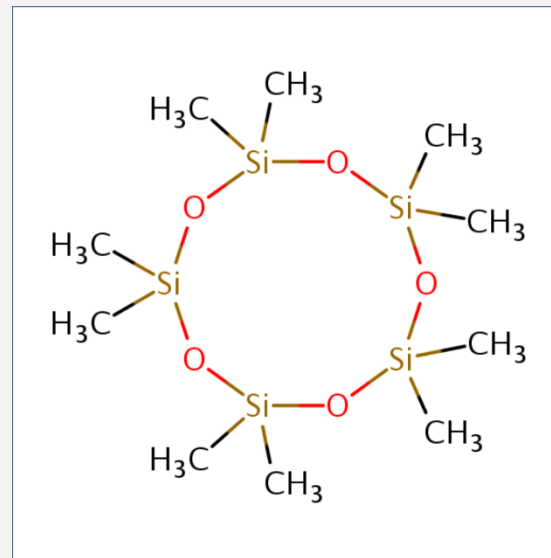
# Cyclic volatile methyl siloxanes (cVMS) chemical structures



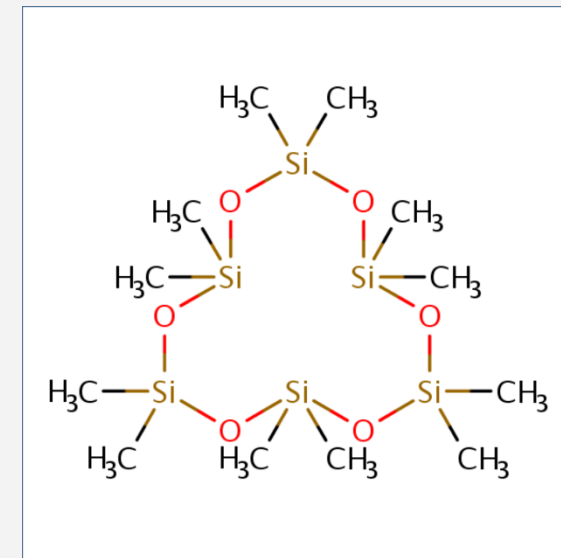
Hexamethylcyclotrisiloxane  
(D3)



Octamethylcyclotetrasiloxane  
(D4)



Decamethylcyclopentasiloxane  
(D5)



Dodecamethylcyclohexasiloxane  
(D6)

# Why cyclic volatile methyl siloxanes (cVMS)?

## Human health

- Volatilization from consumer products—over 90% of cVMS in personal care products released to air during use.
- Potential for migration and volatilization from food contact materials.
- Studies suggest potential for disproportionate exposures in sensitive populations.

## Environmental impacts

- High production volume chemicals.
- Persistent, bioaccumulate, and toxic with potential for long-range transport.
- Chronic toxicity in aquatic organisms.

## Potential to reduce exposures

- cVMS restrictions in some products in the European Union and other jurisdictions suggests there are opportunities to reduce use.
- The most effective method to address PBT chemicals is through pollution prevention.

# Cyclic volatile methyl siloxanes (cVMS) are a concern for sensitive populations and sensitive species

## Sensitive populations

- Women.
  - Women, particularly women of color, may have higher exposure.
  - Co-exposure to multiple endocrine disrupting chemicals.
- Infants and children.
  - Detected in infants and children—higher exposures near industrial sites.
  - Measured in breast milk samples.
  - Neurodevelopmental effects observed in a study of mice with a common cVMS (octamethylcyclotetrasiloxane, D4)
- Potential for higher occupational exposures in industrial workers and hair salon workers.

## Sensitive species

- Some cVMS have reported chronic aquatic toxicity in fish and aquatic invertebrates.
- As PBTs, concentrations of cVMS in the environment may continue to increase over time as they are released.
- Due to the potential for long range transport, cVMS are also a chemical of concern for the arctic ecosystem.

# Cyclic volatile methyl siloxanes (cVMS) as a priority chemical class

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## Meeting the statutory requirements

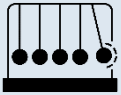
- cVMS are a concern for sensitive populations and sensitive species.
  - Octamethylcyclotetrasiloxane (D4) is classified as a reproductive toxicant by ECHA and suspected of damaging fertility.
  - Common cVMS are classified by the European Chemicals Agency as persistent, bioaccumulative, and toxic (PBTs).

## 6PPD overview

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Scope of class: 6PPD (N-(1,3-dimethylbutyl)-N'-phenyl-p-phenylenediamine) and relevant transformation products (6PPD-q)



Example functions: Anti-degradant



Example Products: Tires, other rubber products



Hazards: Reproductive toxicity, developmental toxicity, endocrine disruption, aquatic toxicity, persistence, bioaccumulation

# Why 6PPD?

## Human health

- First human biomonitoring of 6PPD and 6PPD-q reported detection frequencies ranging from 60 to 100% in urine from adults, children, and pregnant people in South China.

## Environmental impacts

- 6PPD is ubiquitous in vehicle tires.
- 6PPD and 6PPD-q released to the environment through tire-wear particles.
- 6PPD and 6PPD-q have been measured in road dust, parking lot dust, house dust, urban particulate matter, electronic waste dust, roadway runoff and in receiving waters including streams and rivers.

## Potential to reduce exposures

- Significant efforts by Washington, California, other states, and the tire industry are being undertaken to identify safer alternatives to 6PPD used as an anti-degradant in vehicle tires.
- Alternatives to 6PPD in tires may extend to other uses in rubber materials.



# 6PPD are a concern for sensitive populations and sensitive species

## Sensitive populations

- Animal studies suggest 6PPD is a reproductive toxicant and may adversely impact fetal development.
- Pregnant people had higher concentrations of 6PPD in their urine in single biomonitoring study.
- Children and adults who participate in sports and activities on crumb rubber infill may also have higher exposures.

## Sensitive species

- 6PPD-q is extremely toxic to coho salmon (LC50 = 0.1 parts per billion)
- 6PPD-q is also highly toxic to other species of fish as well, including brook trout and rainbow trout.
- Tire leachates (not specific to 6PPD or 6PPD-q) have been shown to be toxic to a broad range of other aquatic species.

## 6PPD as a priority chemical

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### Meeting the statutory requirements

- 6PPD considered a hazardous substance in Washington.
- 6PPD and 6PPD-q are a concern for sensitive populations and sensitive species.



0 — 500 mL

520

500

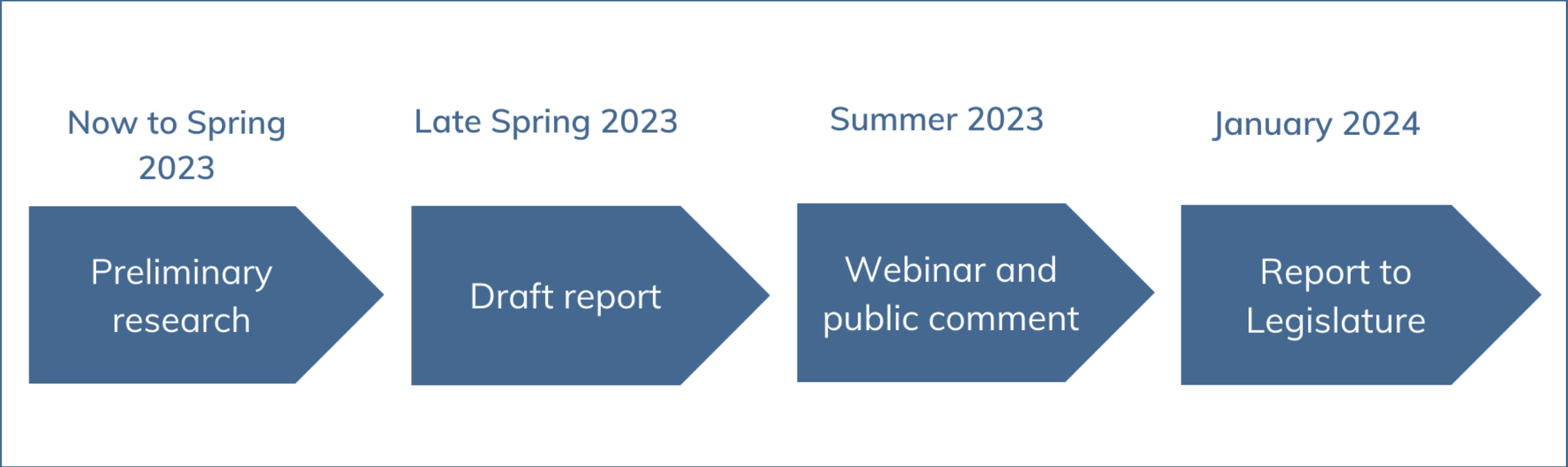
400

300

# Section 4. Timeline

# Draft timeline for next steps

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# Safer Products for Washington: Cycle 2

## Phase 1 January 2024



### **PRIORITY CHEMICAL CLASSES**

Select priority chemicals and chemical classes to focus on during the cycle.

## Phase 2 January 2025



### **PRIORITY CONSUMER PRODUCTS**

Identify which consumer products contain these chemicals and can harm people and the environment.

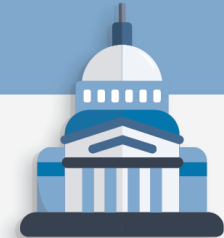
## Phase 3 January 2027



### **REGULATORY ACTIONS**

Determine whether we'll regulate when these chemicals are used. Will we require notice, restrict/prohibit, or take no action?

## Phase 4 June 2028



### **RULEMAKING**

Restrict the use of chemicals in products or require reporting to keep people and the environment safer.



## Section 5. Questions



## Tell us what you think

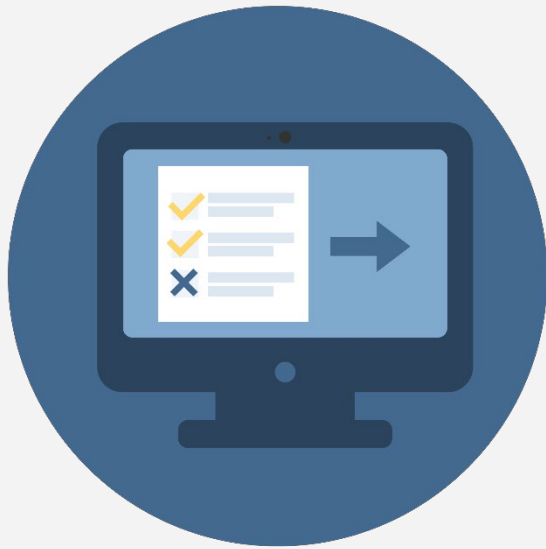
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Please share your thoughts and ask questions. Information that's helpful to us includes:

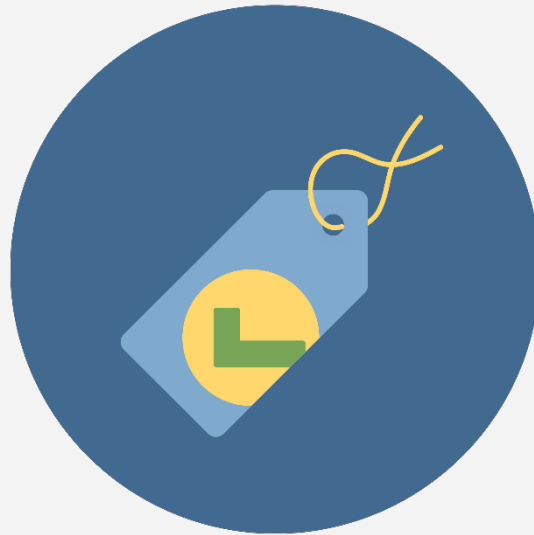
- Feedback on the draft report and the chemicals and chemical classes we identified.
- Any chemicals to consider prioritizing instead of those listed in the draft report.
- Your concerns about chemicals in products that you, your family, or your community use.
- Information about how you use and interact with the chemicals on our list.

Thank you for joining us!

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[SaferProductsWA@ecy.wa.gov](mailto:SaferProductsWA@ecy.wa.gov)



[ecology.wa.gov/Safer-Products-WA](http://ecology.wa.gov/Safer-Products-WA)



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