



King County

King County Board of Health

Staff Report

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Subject

Reducing exposure to harmful chemicals in King County through increased use of safer alternatives.

Purpose

The Local Hazardous Waste Management Program (LHWMP) is seeking the Board of Health's leadership to help reduce human exposure to toxic and carcinogenic chemicals, protect the environment, and help businesses prepare for anticipated federal changes in chemical policy.

Summary

An important part of LHWMP's work is to identify safer alternatives to hazardous chemicals and help businesses and residents switch to those alternatives. Recent changes in federal law have prompted LHWMP to prioritize this important work.

The Toxic Substances Control Act of 1976 (TSCA) was amended in 2016. The Environmental Protection Agency (EPA) must now review chemicals under strict deadlines, at a pace of twenty chemicals every three years. EPA must regulate a chemical if it presents an unreasonable risk. EPA's decisions on chemical regulation will preempt (i.e., supersede) local and state laws. While this approach will hopefully lead to reduced exposure and environmental harm, there is a risk that EPA's actions will lead to negative unintended local consequences.

LHWMP is implementing an enhanced "safer alternatives" framework to strengthen its work to identify safer alternatives and help businesses and residents move to safer choices. This framework will also prevent unintended consequences of EPA actions and help business prepare for anticipated federal regulatory changes.

Background

Exposure to harmful chemicals in King County

King County citizens are exposed to harmful chemicals in their homes, community spaces, and at work. Approximately 85,000 chemicals are currently used in the United States⁽¹⁾ and EPA receives about 1,000 notifications per year from companies seeking to bring new chemicals to market in the United States.⁽²⁾

We all carry a “burden” of environmental chemicals in our bodies. The Centers for Disease Control and Prevention (CDC) conducts the most comprehensive national biomonitoring study - the National Health and Nutrition Examination Survey (NHANES). The recent NHANES Fourth Report describes widespread human exposure to environmental chemicals in nearly all participants.⁽³⁾ For example, polybrominated diphenyl ethers (PBDEs) (a flame retardant) and highly fluorinated chemicals (used in firefighting foams) were found in nearly all participants. Bisphenol A (a component of epoxy resins and polycarbonates) was found in the urine of more than 90% of the NHANES participants.

Exposure to toxic chemicals can cause acute and chronic health effects. The National Academies of Sciences suggest that 3% of brain development disorders are solely attributable to toxic environmental exposures and another 25% result from a combination of genetic and environmental factors.⁽⁴⁾ Low-income households, people of color, and children face a disproportionate burden of chemical exposure. For example, economically disadvantaged immigrant neighborhoods of non-English speaking Latinos are more likely to be exposed to cancer-causing air toxics than comparable communities of any other racial group in the United States.⁽⁵⁾ Because of the type of work they do, people of color in King County are disproportionately over-exposed to lead. These exposures put them at high risk for a range of diseases – from hypertension and infertility to neurological and neurobehavioral effects. Several studies have shown disproportionate health impacts from environmental chemicals in South Park - a largely industrial area in Seattle with residents of relatively low socioeconomic status - coupled with high rates of risk factors for poor health and disease.⁽⁶⁾

King County and LHWMP are committed to investing in addressing these disproportionate chemical burdens on some of our most vulnerable and underserved residents.

Increased federal review and regulation of chemicals under amended Toxic Substances Control Act (TSCA)

The Toxic Substances Control Act of 1976 (TSCA) is the nation’s primary chemicals management law. TSCA regulates the manufacture and sale of chemicals to protect the public from unreasonable risk of injury to health or the environment. TSCA provides EPA with authority to require reporting, record keeping, testing, and restrictions related to chemical substances.

TSCA was amended in June 2016, giving EPA greater authority to review chemicals and restrict their use. EPA must review chemicals at a pace of twenty chemicals at a time (after a slow start with ten chemicals), with a three-year review period for each chemical. ⁽⁷⁾ EPA’s final decisions on chemicals will preempt local and state rules. ⁽⁸⁾

Hopefully, EPA will successfully review and restrict the usage of harmful chemicals, leading to fewer exposures and less environmental damage. To ensure that EPA’s regulations are appropriate for King County, LHWMP must engage with EPA so that our local conditions are considered and protected. In addition, local businesses will face future restrictions and will be required to implement replacement chemicals and processes. LHWMP can help business identify safer processes so that businesses are not trading one harmful chemical for another (i.e., a “chemical whack-a-mole strategy”).

EPA is currently reviewing the first ten chemicals under TSCA to evaluate their potential risks to human health and the environment. EPA selected these chemicals based on their potential for high hazard and exposure. The chemicals, and a description of their uses in King County, are shown in Appendix 1.

LHWMP’s “Safer Alternative” Framework to reduce exposure to harmful chemicals, protect the environment, and help businesses

Safer Alternative Overview

A “safer alternative” is an option, including the option of discontinuing an activity, which is healthier for humans and the environment than the existing means of meeting that need. A safer alternative to a chemical may include a chemical substitute or a system re-design that eliminates the need for a hazardous chemical. Safer alternatives work is an “upstream” preventative strategy, which eliminates the hazard at the source before it causes a “downstream” health or environmental problem. Central to this process is the concept of “informed substitution,” which involves identifying alternatives and evaluating their health and safety hazards, social impacts, potential trade-offs, and technical and economic feasibility.

Adopting safer alternatives is also good for business. A very important component of safer alternatives evaluation is ensuring that any replacement chemical or process is cost-effective. Using safer chemical alternatives often reduces workplace safety and materials management costs (including worker compensation, protective equipment and health care costs). Safer alternatives also prevent chemicals management risks and accidents that can lead to fines, decreased demand, and long-term reputational damage. Businesses can also avoid the difficulty and expense of complying with evolving lists of restricted substances. Finally, businesses can demonstrate their human health and environmental leadership. ⁽⁹⁾

An example of LHWMP's current work in this area is helping auto body shops overcome barriers to adopting waterborne paints, a safer alternative that is widely available within the industry. Waterborne paints contain lower quantities of volatile organic compounds than traditional paints, which contribute to poor air quality and can harm workers' health. Another example is LHWMP's Latino Ambassador Project, which helps Spanish-speaking residents choose safer household cleaning products.

Safer alternatives work also avoids replacing a toxic chemical with another chemical with even more severe health effects. This is known as "regrettable substitution." One example of regrettable substitution occurred at a furniture manufacturing company in the early 2000s.⁽¹⁰⁾ The situation began with a federal ban on trichloroethane (TCA) because of its effects on the ozone layer. To comply with air quality regulations, a furniture manufacturer in North Carolina that was using a TCA-based glue switched to a new product that contained a more toxic chemical (n-propyl bromide). As a result, dozens of workers who used this glue now suffer from permanent neurological disease and other health effects.

LHWMP's Framework for Safer Alternatives Identification and Adoption

LHWMP is establishing a framework to strengthen its work to identify safer alternatives and help businesses and residents move to safer choices. This includes:

- **Reviewing and prioritizing key chemicals of concern.** LHWMP is updating its safer alternative identification methods. This methodology will apply not only to the chemicals that EPA is reviewing, but also to other chemicals of concern to LHWMP. LHWMP prioritizes chemicals using a systematic approach, which considers whether the issue is within LHWMP's domain, the number of people potentially affected, severity of health effects, impacts on traditionally underserved and vulnerable populations, and impacts on susceptible wildlife and the environment.
- **Preventing unintended consequences of EPA action.** While EPA's work under TSCA is intended to protect humans and the environment, EPA could potentially make a decision that does not protect our local conditions and concerns. EPA could also ban a chemical and a "regrettable substitute" could be used in its place (as in the furniture manufacturing example mentioned above). LHWMP will work to prevent unintended consequences of EPA action by: (1) engaging EPA through comment letters and other communications and (2) helping local businesses transition to safer alternative processes and avoid regrettable substitutions ahead of federal regulations.
- **Equity considerations.** King County and LHWMP are committed to addressing the disproportionate burden of toxic chemical exposures faced by low-income households, people of color, children, and other disadvantaged and vulnerable individuals. Equity considerations will be embedded throughout the safer alternative strategy. For example, we may focus on hazardous chemicals that are most prevalent in low-income

neighborhoods or those that are used in workplaces comprised predominantly of immigrant populations. The Social Impact Module for assessing alternatives evaluates impacts on communities.

- **Collaboration.** LHWMP will strengthen its partnerships with local, state, and national agencies, programs, and institutions to better protect the health and environment of King County. For example, LHWMP is currently working closely with the following partners:
 - Washington State Department of Ecology and the Interstate Chemical Clearinghouse (IC2) (on perchloroethylene and dry cleaners);
 - University of Washington on eliminating methylene chloride from small businesses; and
 - Clean Production Action and Toxic Free Future on highly fluorinated chemicals (i.e., PFAS).
- **Helping Businesses and Residents.** LHWMP is uniquely positioned to help businesses and residents make safer chemical choices. Over the past 25 years, LHWMP has formed deep, positive ties within the small business community by providing technical assistance and education. In 2017, LHWMP visited over 400 businesses to help them safely manage hazardous materials or adopt safer alternatives. In 2017, LHWMP also partnered with 16 other agencies to launch an expanded EnviroStars program, which provides incentives and recognition to businesses that implement green business practices. King County residents also rely on LHWMP for advice on how to safely manage the toxic materials that are present in most homes. LHWMP's hazardous waste customer service line responded to over 12,700 calls and nearly 60,000 individuals visited LHWMP's hazardous waste collection facilities in 2017.

Case Study: Dry cleaners and perchloroethylene

An example of a safer alternative strategy that LHWMP is currently pursuing is transitioning dry cleaners away from using perchloroethylene (PERC), a probable human carcinogen. Because PERC is under review by EPA under the revised TSCA, LHWMP is helping these local businesses in advance of expected federal rules that would restrict the use of PERC.

Epidemiological studies indicate a link between occupation in the dry cleaning industry and increased risk for cancer of the kidney, bladder, lung, esophagus, and cervix.⁽¹¹⁾ Chronic exposure to PERC may cause neurological, liver, and kidney damage.⁽¹²⁾ People living in areas with high densities of PERC dry cleaning facilities are at greater risk for kidney cancer.⁽¹³⁾ It is not clear whether the relatively low exposures from residual PERC on clothing would have any adverse health effects on customers.⁽¹¹⁾

PERC causes costly environmental contamination. PERC has been detected in most drinking water, groundwater, surface water and rainwater supplies.⁽¹⁴⁾ In King County, ~190 current and former dry cleaning locations are under active investigation for soil or groundwater

contamination with chlorinated solvents, including PERC.^(15,16) This is a particular problem in local communities that draw their drinking water from relatively shallow aquifers, like Redmond and Issaquah. PERC is also a hazardous waste – LHWMP’s household hazardous waste facilities collected over 13,000 pounds of PERC in 2017.

In 2017, LHWMP worked to identify a safer alternative to PERC and identified “professional wet cleaning” as the safest alternative. There are also regrettable substitutes, such as 1-bromopropane. LHWMP is currently evaluating other alternatives to PERC, to ensure that they do not represent regrettable substitutes.

Professional wet cleaning is safer, uses less energy, and saves money compared to PERC and other alternatives.^(12,17) Professional wet cleaning uses water coupled with computer-controlled detergent metering systems. Clothes labeled “dry clean only” can be cleaned via professional wet cleaning with exceptional results. The cost to switch to professional wet cleaning is \$35,000 - \$60,000.⁽¹²⁾

In 2018, LHWMP will award grants of \$20,000 each to help up to five dry cleaners replace their PERC machines with professional wet cleaning. Depending on funding and the success of the pilot project, we would like to award up to 10 grants a year, beginning in 2019. Similar financial assistance programs are employed in California, Massachusetts and New York.

This program will run concurrently with a federal law that bans the use of PERC dry cleaning machines in residential buildings. This regulation will be implemented in 2020 and affect about six dry cleaners in King County, out of a total of 90 dry cleaners in King County that use PERC. Dry cleaners may also face a federal ban or restriction of PERC in about 2021, based on EPA’s assessment and risk reduction actions under the revised TSCA.

Potential Next Steps

LHWMP is seeking the Board of Health’s support and commitment to reduce human exposure to toxic and carcinogenic chemicals, protect the environment from hazardous chemicals, and help businesses make safer chemical choices. The attached proposed Resolution expresses support for identifying and adopting safer alternatives to harmful chemicals.

Attachment

1. Board of Health Resolution No. **XXXX**

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Appendix 1. The EPA’s first ten chemicals for review under new TSCA legislation

TSCA Chemical	Health & Environmental Effects ⁱ	Presence in King County & Uses ⁱⁱ
1,4-Dioxane	Cancer Persistent in environment	Yes. Primarily used as a solvent in the manufacture of chemicals and as a laboratory reagent. A trace contaminant of some chemicals used in cosmetics, detergents, and shampoos. [LHWMP recently became aware of its presence in dry cleaning detergents and is currently investigating]
1-Bromopropane	Cancer Developmental effects Reproductive effects Depletes ozone Persistent in environment	Likely. Used in the production of pesticides, flavors and fragrances, pharmaceuticals, and other chemicals. Currently used as a solvent in the adhesives, dry cleaning, vapor degreasing, and electronic and metal cleaning industries. Production has increased over the last 10 years due to its use as a replacement solvent. [Regarded by LHWMP as a “regrettable substitution” because of its toxicity]
Asbestos	Cancer Persistent in environment	Yes. Used for a wide range of manufactured goods, mostly in building materials, friction products, heat-resistant fabrics, packaging, gaskets, and coatings. Some vermiculite or talc products may contain asbestos.
Carbon Tetrachloride	Depletes ozone Cancer Persistent in environment Global warming potential	Likely. Was used in the production of refrigeration fluid and propellants for aerosol cans, as a pesticide, as a cleaning fluid and degreasing agent, in fire extinguishers, and in spot removers. Because of its harmful effects, these uses are now banned and it is only used in some industrial applications.
Cyclic Aliphatic Bromide Cluster	Persistent Bioaccumulative Toxicant Developmental effects	Yes. Brominated flame retardant used in extruded (XPS) and expanded (EPS) polystyrene foam that is used as thermal insulation in the building industry. [On LHWMP’s Research Agenda for further evaluation]

TSCA Chemical	Health & Environmental Effects ⁱ	Presence in King County & Uses ⁱⁱ
Methylene Chloride	Cancer Developmental effects Persistent in environment	Yes. Used as an industrial solvent and as a paint stripper. Also found in some aerosol and pesticide products and used in the manufacture of photographic film. [LHWMP currently evaluating use in King County and helping local businesses switch to safer alternatives]
N-methylpyrrolidone	Developmental effects Reproductive effects	Yes. A solvent used in a variety of industries and applications, such as paint and coating removal, petrochemical processing, engineering plastics coatings, agricultural chemicals, electronic cleaning and industrial/domestic cleaning.
Pigment Violet 29	Persistent in environment Harm to aquatic organisms	Yes. Uses include: automotive under paints and coatings, automobile and industrial carpeting, merchant inks for printing and packaging, odor agents, cleaning/washing agents, pharmaceuticals, solar cells, paper, architectural uses, polyester fibers, sporting goods, appliances, agricultural equipment and oil and gas pipelines. Also used in consumer products including watercolors and acrylic paints.
Perchloroethylene	Cancer Persistent in environment	Yes. Used as a dry cleaning agent and metal degreasing solvent. Also used as a starting material (building block) for making other chemicals and is used in some consumer products [LHWMP currently evaluating approaches to replace with safer alternatives in local dry cleaners]
Trichloroethylene (TCE)	Cancer Developmental effects Reproductive effects Persistent in environment	Yes. Used mainly as a solvent to remove grease from metal parts, but is also an ingredient in adhesives, paint removers, typewriter correction fluids, and spot removers. [LHWMP currently helping local dry cleaners switch to safer alternatives to TCE for their spot cleaning products]

ⁱ From Pharos Green Screen List Translator. Principal high hazard endpoints. Accessed Nov. 12, 2017.

ⁱⁱ Primarily from the Agency for Toxic Substances Control's (ATSDR's) ToxFAQs.