

### **Background and Purpose**

The Governor’s Interagency Council on Health Disparities is charged with creating a state policy action plan to eliminate health disparities by race/ethnicity and gender, and to update the plan regularly. In June 2010, the Council submitted its action plan to the Governor and Legislature. The plan focused on five priorities: education, health insurance coverage, healthcare workforce diversity, obesity, and diabetes. The Council’s first update in 2012 will focus on a new set of five priorities: environmental exposures and hazards, poverty, behavioral health, adverse childhood experiences, and the state system.

This policy paper provides context and supporting research on the Environmental Exposures and Hazards priority for the 2012 update. An advisory committee was convened to review, prioritize, and identify policy recommendations for the Council’s consideration. The specific charge of the committee was to identify actions to reduce the disproportionate health impacts from environmental exposures and hazards related to race/ethnicity, gender, and the developmental period from preconception to age 3.

The final recommendations reflect the committee’s belief in the basic human right to a clean and healthy environment. The committee recognizes that every person deserves a health-promoting home, job, and community and the opportunity to reach their full developmental potential, regardless of one’s race, status, or gender. To work toward these ends, the committee determined that Washington should first make a fundamental commitment to addressing environmental injustice. Next, communities should be equipped with information, tools, and resources to support community-driven environmental and health policies. And finally, as recommended by the President’s Environmental Cancer Panel, institutionalize a chemical regulatory system that takes “preventive action when uncertainty exists about the potential harm a chemical or other environmental contaminant may cause” (Reuben SH, 2010).

### **Disproportionate Environmental Exposure**

It is well recognized that health starts where we live, learn, work, and play<sup>1</sup>. However, in the United States, access to safe and healthy homes, schools, jobs, and communities is often segregated by race and income. Environmental justice research demonstrates that people of color and low-income persons are disproportionately exposed to environmental hazards, such as pollution and chemicals, in their communities, schools, and at work (U.S. Department of Health and Human Services 2010, Bullard 2007).

*“The environment is a leading determinant of human health and well-being”*

- U.S. Department of Health and Human Services

For example, national research conducted in 1987 and 2007, concluded that toxic waste facilities are disproportionately located in low-income and communities of color (UCC 1987) and that this disparate pattern persists today (Bullard, 2007). Native American populations, in particular, are at the highest risk of toxic exposure, including living on indigenous lands that are subject to illegal dumping, hazardous waste facilities, industrial pollution, and the toxic legacy of the nuclear industry (Brook, 1998). Studies of Washington State reflect these national findings that a disproportionately larger number of facilities (e.g., contaminated sites, entities that generate regulated hazardous wastes, solid waste landfills, and incinerators) are located in low-income communities and communities of color (Washington State Department of Ecology, 1995). The Washington State Board of Health, in its 2001 environmental justice report, stated that the higher number of facilities likely results in higher levels of exposures and potentially higher risk for adverse health outcomes in affected communities (Washington State Board of

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<sup>1</sup> Commission on Social Determinants of Health, 2008

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Health, 2001). The result being disproportionate exposure to toxic hazards, that in combination with various negative social determinants such as stress and poverty, cumulatively lead to poorer childhood and lifetime health outcomes.

Abel and White's (2011) analysis of air toxic release data in Seattle reveals that air pollution impacts follow a similar pattern. The researchers examine how gentrification in Seattle has led to the concurrent concentration of populations along socio-economic and racial/ethnic lines, and the location of polluting industry within lower-income communities and communities of color. Data from the Washington State Department of Health (2007a) specifically identifies exposure to higher levels of air pollution for African American and Asian and Pacific Islander communities. And research assessing freeway air pollution in Seattle and Portland documented that low-income communities and communities of color were more likely to live closer to freeways and major arterials than white and middle-income households, and that freeway air pollution results in adverse health outcomes for those who live nearby (Bae et al., 2007).

While few data are available assessing disparities in occupational environmental exposures, evidence of inequities exist for some populations known to be at risk in Washington (Washington State Department of Health, 2007a). For example, pesticide illness significantly impacts farmworkers. In 2005, Hispanics composed 8.5% of Washington's population, but accounted for 83% of occupational pesticide illnesses in the agricultural industry (Washington State Department of Health, 2007b). Moreover, research has demonstrated that Washington children living in agricultural areas who have parents who apply pesticides have higher exposures to pesticides than other children (Washington State Department of Health, 2007c).

Other environmental hazards that disproportionately impact specific Washington populations include foodborne illness, mercury exposure, and exposure to persistent environmental contaminants such as PCBs and DDT from seafood consumption among Native American, Alaska Native, and Asian and Pacific Islander communities (Washington State Department of Health, 2007a). Nationally, African-American and Hispanic children have been found to have high rates of lead poisoning. In Washington, however, few children are tested, and race and ethnicity are rarely reported to the Childhood Blood Lead Registry, so it is unknown whether this disparity exists in Washington as well (Washington State Department of Health, 2007c).

Research therefore demonstrates that across the United States, and in Washington State, people of color and low-income populations are disproportionately exposed to environmental hazards. Despite this evidence, there is little public policy that directly addresses disproportionate exposure and environmental injustice. Further, information is inadequate on the level of pollution and chemicals people are exposed to and what the resulting health impacts are. This is particularly alarming given the significant role environmental determinants play in influencing health outcomes.

### **Health Outcomes from Environmental Exposures and Hazards**

The U.S. Department of Health and Human Services calls the environment a "leading determinant of human health and well-being" (U.S. Department of Health and Human Services, 2011). In its draft strategic plan, the agency lists asthma, respiratory disease, cardiovascular disease, obesity, mental health problems, depression, anxiety, and developmental disabilities as known health outcomes associated with exposure to adverse environmental conditions, both physical and social. The President's Cancer Panel stated in its 2010 report "that the true burden of environmentally induced cancer has been grossly underestimated" (Reuben SH, 2010). Research in this field underscores not only the significant link between environmental exposures and health outcomes, but also that

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disparities are greatest for low-income populations and people of color (White, 1998; Reuben SH, 2010; Steingraber, 2007). Further, the emerging field of epigenetics reveals that fetal and early life exposures to chemicals, pollutants, and maternal stress are tied to chronic adult diseases and disorders that may be multi-generational (Baccarelli, 2009; Kuzawa, 2009).

Epidemiological research supporting causal relationships between exposures to environmental contaminants and adverse health outcomes is limited to a relatively small set of pollutants. One well-documented area is health problems resulting from exposure to particulate matter, such as diesel exhaust and wood smoke. The Centers for Disease Control and Prevention recently published its first health disparities and inequalities report (2011) that documented the link between particulate matter and premature death, lung cancer, and worsening respiratory and heart disease. Asthma is a widespread health condition that can result from or worsen from environmental exposures such as diesel emissions.<sup>2</sup> Washington State data reveal disparities in asthma's impact within the population. American Indian and Alaskan Native adults were 30% more likely to have asthma than whites. Prevalence rates were somewhat higher for African American and Pacific Islander adults, though differences were not significant (Washington State Department of Health, 2007d). Adults with lower income are more likely to have asthma, black youth were about 30 percent more likely to have asthma than white youth, and women were more likely than men to have asthma and were at greater risk of dying from asthma (Washington State Department of Health, 2008).

Adverse birth and children's health outcomes have been shown to result from prenatal or childhood exposure to environmental chemical contaminants (Wigle et al., 2008). Examples include prenatal exposure to methylmercury causing developmental and cognitive impairments, maternal smoking causing preterm birth, and childhood exposure to biomass smoke causing lung infections. Even low-level chemical exposures are hazardous to children, such as with pesticides, lead, and mercury (Gilbert, 2008). More recently, research has revealed that exposure to endocrine disrupting chemicals, especially when young, can cause adverse reproductive effects, obesity, and certain cancers (Soto and Sonnenschein, 2010). There is also evidence that children's exposure to air pollution from living near a transportation corridor increases their risk of lung and cognitive impairment (Amram, 2011).

Increasingly, we are learning how exposures to environmental contaminants are linked to various human diseases and health effects. Environmental exposures like air pollutants, toxics, and common chemicals compromise the health of children and adults and contribute to acute and chronic health concerns. The magnitude of the challenge to address health disparities from environmental exposures is especially daunting when one considers the President's Cancer Panel that warned of "nearly 80,000 chemicals on the market in the United States, many of which are used by millions of Americans in their daily lives and are un- or understudied and largely unregulated, exposure to potential environmental carcinogens is widespread (Reuben SH, 2010)." Further complicating these issues, is the lack of understanding about the interplay between chemicals, and the cumulative impacts of exposure to multiple chemicals combined with the spectrum of social determinants of health.

### **Addressing Environmental Health Disparities**

In a recent editorial on environmental justice, Onyemaechi Nweke and Charles Lee (2011) from the Office of Environmental Justice at the U.S. Environmental Protection Agency provide the following perspective on the connection between health disparities, social stratification, and our environment:

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<sup>2</sup> Known triggers for asthma symptoms include indoor allergens (e.g., cat dander, dust mites, cockroach particles, mold), outdoor air pollutants (e.g., diesel exhaust, ozone), and occupational exposures.

*“The process that yields health disparities is complex and the result of interactions between multiple social determinants of health, including the physical environment. It is also common knowledge that populations that experience health disparities related to other social determinants of health, such as access to health care and access to healthy foods, tend to be the same populations that live in communities overburdened with environmental pollution. This understanding suggests that meaningful progress toward the goal of eliminating health disparities is more likely if as a society we make significant progress on simultaneously addressing disparities related to multiple social determinants including the physical environment. In other words, the goals to eliminate health disparities and achieve health equity are more attainable with due consideration of environmental justice issues.”*

This statement from the U.S. EPA reflects a growing national awareness about health disparities, and the significance of taking action at the nexus of social determinants of health, through the advancement of environmental justice. Closing these health gaps through social policies that increase equity is imperative, especially in light of state demographic trends. Washington's communities of color - who suffer a disproportionate burden of health disparities - comprise an ever-increasing segment of the state's population (25.2%).<sup>3</sup> The State also has the highest growth in populations with limited English proficiency (LEP) in the U.S. and counts more than half a million LEP persons.<sup>4</sup>

Further, financial costs of not protecting human health and the environment from environmental contaminants are substantial. Landrigan (2002) found that per year costs to address the impacts of environmental pollutants on children were estimated to be \$54.9 billion (range \$48.8–64.8 billion). A Washington study found “the annual cost of selected childhood diseases and disabilities attributable to environmental contaminants in Washington State is \$1,875 million in 2004 dollars” (Davies, 2006).

Preventing harm from environmental pollutants and injustice, eliminating health disparities, and safeguarding children's health are our collective responsibility. This includes leadership and government, who play a key role in ensuring healthy communities for all of Washington's residents. Because low-income and communities of color are disproportionately burdened with adverse human health and environmental impacts, actions to promote environmental justice can address this imbalance. Due to invested leadership<sup>5</sup>, Washington State has engaged in a number of notable actions related to environmental justice and health disparities.

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<sup>3</sup> Washington is becoming more diverse. According to 2010 Census data, Washington State's overall population grew by 14.2% from 2000-2010 (Office of Financial Management, 2010). During this same time, each of the communities of color grew at considerably faster rates – the Hispanic population grew by 54.9%, the Asian and Pacific Islander population by 39.3%, the Multiracial population by 29.1%, the African American population by 22.8%, and the American Indian and Alaska Native populations by 18.6%. Communities of color account for more than a quarter (25.2%) of the state's total population.

<sup>4</sup> Washington State is also among the top ten states with the largest limited English proficient (LEP) population and the highest growth in LEP population (Migration Policy Institute 2011). From 1990-2000, the LEP population grew 210%. Currently, there are more than half a million LEP persons in Washington State. The most prevalent languages spoken are Spanish, Chinese, Vietnamese, Korean, and Russian.

<sup>5</sup> The Honorable Rosa Franklin (D-Tacoma, Senator for Washington 1993-2010) has led Washington State's efforts to address environmental justice and health equity. In 1993, Senator Franklin proposed that Washington conduct an environmental equity study. The study was completed by the Department of Ecology after the Legislature appropriated funding for it in 1994. Senator Franklin was also the sponsor of four bills addressing health disparities that were signed into law in 2006 by Washington State Governor Christine Gregoire.

## Environmental Justice Activities in Washington State

### ***Legislative Action***

In 1994, the Legislature funded a study to assess the distribution of facilities and toxic chemical releases to determine whether different populations were disproportionately impacted. The results of that study revealed that facilities were not distributed equally, but rather were more likely to be in low-income communities and communities of color (Washington State Department of Ecology, 1995).

### ***Washington State Board of Health***

In 2000, the Washington State Board of Health identified environmental justice as a priority and began to actively work on three goals. The first goal was to raise awareness of environmental justice issues by participating in community forums and other events, publishing articles in newsletters, and presenting information at conferences. Its second goal was to create a clearinghouse of environmental justice information. Though not updated regularly, the clearinghouse still exists today and can be accessed on the Board's Web site. The Board's third goal was to encourage state and local agencies to incorporate environmental justice principles into practice. Toward this end, the Board convened an Interagency Workgroup on Environmental Justice and published a set of guidelines for use by agency staff to promote environmental justice in government decision making.

### ***Department of Ecology Activities***

The Washington State Department of Ecology has taken a leadership role on environmental justice issues. Ecology has an Environmental Justice Coordinator who collaborates with local governments, community organizations, and EPA Region 10 to address environmental justice issues statewide that relate to the work of Ecology. Ecology developed an internal environmental justice checklist to assess and guide activities to promote equity. The checklist invites Ecology staff to think broadly about what communities are affected by the agency's actions and to consider language and cultural barriers and "cumulative effects" in the agencies public engagement and decision-making processes. Ecology currently has four language translation and interpretation teams: Spanish, Korean, Chinese, and Vietnamese. The team provides staff online resources and a language mapping tool to better identify areas in Washington where there are significant populations that do not speak English as a primary language. Ecology and U.S. EPA Region 10 have included commitment to ongoing coordination to improve environmental justice in Washington State within their interagency Performance Partnership Agreement.

### ***Department of Health Activities***

In 2010, the Department of Health committed to a public health Agenda for Change which focuses public health priorities on fostering communities and environments that address disparities in health and provide the opportunity for all Washingtonians live in healthy environments regardless of their income, education, racial or ethnic background. The Department of Health supports communities in their work to become healthy places for people to live, work, and play by providing access to data through the Washington Tracking Network so communities can identify health and environmental inequities and by making information available to communities in their preferred language as much as possible. For example, in 2006, the Department of Health convened the Environmental Public Health Community Equity Workgroup to address equity issues in accessibility of environmental and health information. As a result of this Community Equity workgroup Department of Health has been able to provide health and environmental information for communities in different languages, including Spanish, Vietnamese, Chinese, Arabic, Amaharic, Bengali, Burmese, and Cambodian.

### ***Local Initiatives***

Similarly, there are strong initiatives at the local level to promote environmental justice. Both the city of Seattle and King County have initiatives to intentionally promote equity in government activities. The Seattle Race and Social Justice Initiative is a citywide effort to end institutionalized racism and race-based disparities in city government. The Initiative's long term goal is to change the underlying system that creates race-based disparities and to achieve racial equity. More information can be found on the Race and Social Justice Initiative Web site at: [www.seattle.gov/rsji/](http://www.seattle.gov/rsji/). The King County Equity and Social Justice Initiative works to intentionally promote equity in all county programs and activities in order to achieve equitable opportunities for all people and communities. King County staff has developed and are applying tools (equity impact assessments, translation policies, community engagement tools, etc) to guide the work of the Initiative. More information is available on the King County Equity and Social Justice Web site: <http://www.kingcounty.gov/exec/equity.aspx>.

### ***Key National Actions***

At the National level, there is much momentum around environmental justice. In August 2011, 17 federal agencies signed a Memorandum of Understanding (MOU) on Environmental Justice and Executive Order 12898. The MOU broadened the agencies originally named in the 1994 Executive Order, renewed each agencies commitment to EJ, and adopted a charter for an Interagency Workgroup on EJ. In September 2011, the Environmental Protection Agency released Plan EJ 2014, the agency's roadmap for integrating environmental justice into its programs, policies, and activities. And in October 2011, the Department of Health and Human Services released its draft 2012 Environmental Justice strategy that focuses on policy development and dissemination, education and training, research and data collection, and services.

### **Framework for the Council's Environmental Exposures and Hazards Work**

Environmental exposures and hazards is a broad topic, and therefore, the Council's environmental exposures and hazards advisory committee invested time in early meetings to define its scope and select focus areas for its recommendations. The committee conducted a literature review to assess current research and gaps in field of environmental health disparities. This information was consolidated into a DPSIR (Drivers-Pressures-State-Impacts-Response) model adapted from the European Environmental Agency (2002) to guide the review process (see Appendix). In response to the Council's guidance to focus on the target population age group of preconception to 3-years, the committee examined current research on epigenetics (Stein 2012, Baccarelli and Bollati 2009, Kuzawa and Sweet 2009) and the life course model (U.S. Department of Health and Human Services 2010b). At the conclusion of the process, the committee's recommendations to the Council focused on three areas: the need for comprehensive, statewide, environmental justice policy, the implementation of community capacity building, and chemical policy reform that is proactive and protects people from harm in the face of scientific uncertainty.

In its review of the literature and deliberations, the committee identified the following key findings, which formed the basis for its recommendations:

- On August 4, 2011, federal agencies signed an environmental justice memorandum of understanding to reaffirm Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations", to provide environmental justice strategies and implementation progress reports, to establish structures and procedures to ensure the effective and efficient operation of the Interagency Working Group, and to identify areas of focus to include in agency environmental justice efforts (The White House, 2011).

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- The U.S. Department of Health and Human Services (2011) in its draft 2012 Environmental Justice Strategy called the environment a leading determinant of health and well-being.
- Adverse health outcomes such as asthma, respiratory disease, cardiovascular disease, obesity, developmental disabilities, and poor mental health have been associated with environmental toxicants and unhealthy social conditions (U.S. Department of Health and Human Services 2011).
- Environmental exposures and hazards are not uniformly distributed across populations; low-income communities and communities of color are at disproportionately high risk for environmental health disparities (Washington State Department of Ecology 1995, Washington State Board of Health 2001). Moreover, impacted communities do not always receive their fair share of beneficial societal resources.
- Environmental exposures such as toxic chemicals and maternal stress can affect fetal development and result in adverse health effects over a child’s life course and into future generations (Kuzawa and Sweet 2009, Baccarelli and Bollati 2009).
- A contributing factor to environmental health disparities is the obstacles affected communities face in providing meaningful input into agency decision making. Strengthening community capacity to participate in making policy decisions about environmental health is essential in promoting environmental health equity and reducing environmental health disparities (Freudenberg 2011).
- An important approach to preventing harm to public health and the environment is incorporating the precautionary principle into decision making (Gilbert 2005).
- Regardless of a person’s income, race, or culture, all Washington residents should have access to homes, schools, recreational spaces, food, and jobs that are clean and safe. Sustainable development is essential and “all human beings have the fundamental right to an environment adequate for their health and well-being” (Brundtland, 1987).
- We have an ethical responsibility to ensure an environment in which children from preconception onward can reach and maintain their full potential which includes one that minimizes hazardous chemical exposure and creates a healthy supportive environment (Gilbert, 2005) - Ethical, Legal, and Social Issues: Our Children’s Future. Steven G. Gilbert NeuroToxicology 26 (2005) 521–530

The committee agreed that because health starts where we live, learn, work, and play, many, if not all, state agencies have a role to play in promoting environmental justice and ensuring safe and healthy communities. In developing its recommendations, the committee chose to focus primarily on state government actions, but also recognized they can be used by local agencies, community-based organizations, and the private sector. It also wanted its recommendations to be budget neutral and believe recommendations can be accomplished with limited costs and through reprioritization of existing resources.

## **Recommendations to the Council**

### **RECOMMENDATION 1: ENVIRONMENTAL JUSTICE**

Washington State should make a clear commitment to environmental justice. This includes establishing a statewide environmental justice policy that creates accountability for addressing disproportionate exposures and health disparities.

- A. Government policies should advance the principles of environmental justice, and ensure “the fair treatment and meaningful involvement of all people regardless of race, color, national origin, age, or

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income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.” Environmental Justice goals should be reflected in:

- Institutional Awareness and Diversity:
  - Provide staff and management training (e.g., environmental justice, institutional racism, government-to-government, and cultural competence).
  - Improve diversity of agency staff, particularly leadership and management positions. Prioritize hiring and contracting from impacted communities. Create internships, fellowships, and scholarships for students from affected communities.
  - Agencies whose actions may affect public health or the environment should adopt an ethical policy that acknowledges that children have a right to an environment in which they can reach and maintain their full potential.
- Service Equity, Accountability, and Metrics:
  - Formalize practices that establish service equity to ensure the most underserved and disproportionately overburdened communities are state priorities (e.g., reducing pollution, creating parks, strengthening education, promoting health). This should include routine assessment to ensure services are provided based on needs.
  - Ensure existing and forthcoming agency plans address equity and social justice.
  - Systematically and proactively assess proposed changes to agency programs, policies, and budget decisions for potential adverse impacts on health and environmental equity. Ensure resources and services are distributed equitably (e.g., health impact assessment, environmental justice analysis, cumulative impacts analysis, equity impact assessment).
  - Identify appropriate measures and baseline indicators for tracking disparate impacts and progress towards reducing disparities.
  - Formalize interagency processes for gathering, investigating, and resolving environmental justice issues and complaints.
  - Reconvene a collaborative, cross-agency and community environmental justice working group (as first recommended by the State Board of Health) to provide guidance and to evaluate state activities and progress towards environmental justice. The working group should help facilitate communication, coordination, and collaboration across sectors to promote health and environmental equity.

**RECOMMENDATION 2: PROMOTE HEALTHY COMMUNITIES THROUGH CAPACITY BUILDING & INVOLVEMENT**

Washington State should work to strengthen community capacity to reduce exposures to harmful substances and conditions and increase access to beneficial resources that are health-protective. This includes supporting impacted communities with creating circumstances that promote health, such as access to healthy food, quality schools, unpolluted and safe neighborhoods, and economic security.

- A. Government agencies should increase community capacity to participate as equal partners in making policy decisions about environmental and community health.
  - Provide outreach, training, and technical assistance to high risk and overburdened communities. Examples include information about environmental justice, grant writing, data access and analysis, and community mobilization and advocacy.
  - Ensure effective community engagement in agency decision-making. Measures to strengthen community and agency collaboration include: appointing a dedicated agency/community ombudsperson, comprehensive language access services, and public meeting planning that accommodates diverse community needs.



- Strengthen protocols for meaningful Tribal consultation.
- Dedicate funds to assist communities with environmental justice concerns and prioritize underserved and highest risk communities.

**RECOMMENDATION 3: PRECAUTIONARY APPROACH**

Washington State should aggressively reduce the use of chemicals that are known to or may potentially pose a risk to human health and child development, and prioritize reducing impacts in disproportionately burdened communities.

- A. The state should take a precautionary, prevention-oriented approach to environmental contaminants.
- Reasonable measures should be taken whenever an activity threatens harm to human health or the environment even if all evidence has not been fully established scientifically.
  - Decision-making processes should help reduce harm by selecting the least potential threat.
  - The proponent of an activity, rather than the public, should bear the burden of proof.
- B. State agencies should take actions and set tangible goals for reducing or eliminating harmful environmental exposures.
- The public should be provided comprehensive information about potential environmental and health impacts and safer alternatives.
  - Agencies should have the authority to require an alternative assessment be conducted to identify safer alternatives to known or potentially harmful chemicals.
  - Applicable natural resources and health agencies should formalize a process of incorporating cumulative exposures into risk assessment and decision-making processes.
  - Agencies should have the authority to request a Health Impact Assessment (HIA) to examine the potential health effects of proposed actions, policies, programs, and projects. The proponent of the activity should bear the cost of the health impact assessment.
  - Agencies should review the scientific literature describing new or emerging chemicals or technologies that may present a health concern.
- C. Children's health and development should be prioritized by reducing unnecessary chemical exposures and creating a supportive environment from preconception onward.

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APPENDIX: DPSIR Framework: Environmental Health Disparities

Drivers/Pressures	State of Environment & Populations Affected	Impacts/Disparities	Responses	Gaps and Priorities
<b>INDIVIDUAL &amp; HOME (FOOD, CONSUMABLES, PERSONAL CARE)</b>				
<ul style="list-style-type: none"> <li>• Social and economic disadvantage</li> <li>• Limitations of education</li> <li>• Limited access to quality health care</li> <li>• Poor infrastructure</li> <li>• Limited Social Capital</li> </ul>	<p><b>Cumulative Impacts (environmental, health, economic, social)</b></p> <p><b>Children</b>  <b>Communities of Color</b>  <b>Low-Income Communities</b></p>	<ul style="list-style-type: none"> <li>• Asthma</li> <li>• Obesity</li> <li>• Hypertension</li> <li>• Diabetes</li> <li>• Neurodevelopmental disorders</li> <li>• Learning disabilities</li> <li>• Attention deficit hyperactivity disorder</li> </ul>		
Contaminated stormwater polluting Puget Sound.	<b>Contaminated shellfish</b> – AIAN and API populations	Foodborne illness	Monitoring Beach closures Public education NPDES compliance actions	
Adverse health effects of hazardous chemicals on children	<b>Maternal and child exposure</b> in all communities - in particular communities with multiple environmental burdens	Increased incidence of illness from environmental chemical exposure	Policy to remove mercury from schools, Children’s Safe Products Act	<ul style="list-style-type: none"> <li>• Lack of toxicological research, data</li> <li>• Insufficient/non-existent protective and preventive chemical policy</li> <li>• Reactionary not precautionary guided policies</li> </ul>
Waste disposal practices	<b>Contaminated drinking water</b> results in exposure to trihalomethanes (chlorination by-product)	Increased risk of low birthweight and stillbirth.	Brownfields clean up and Redevelopment program and Underground Storage Tank Programs	

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Drivers/Pressures	State of Environment & Populations Affected	Impacts/Disparities	Responses	Gaps and Priorities
	Prenatal and early postnatal exposure to <b>tobacco smoke</b> – Native American and low-income communities disproportionately affected. Tobacco smoke results in exposure to metals (cadmium, magnesium), arsenic, and lead.	Infant and pediatric morbidity and mortality: low birth weight, sudden infant death, respiratory disease, and middle ear infections, and cognitive effects.  Hypertension in adults.		
Need for food subsistence fishers	Prenatal and early postnatal exposure to <b>mercury, PCBs, or other organochlorine compounds from fish consumption</b> – Native American, Alaska Native, and Asian and Pacific Islander communities disproportionately impacted.	Neurodevelopmental impacts – neurobehavioral effects in kids and neurological effects in adults. Diabetes in adults. Immune effects Cardiovascular effects.	<ul style="list-style-type: none"> <li>• Inform fishers and families.</li> <li>• Reduce mercury contamination.</li> <li>• Assure clean water for fish.</li> <li>• Follow recommendations in Mercury CAP.</li> <li>• Partner with DOH safe fish program.</li> </ul>	
	<b>Alcohol and recreational drug use.</b>			
<ul style="list-style-type: none"> <li>• Inexpensive food production</li> <li>• Fast food marketing</li> <li>• Uneven economic development / food deserts</li> </ul>	Artificial <b>food additives, colorings, preservatives</b> (e.g., 2-MI and 4-MI in studies caused lung, liver, or thyroid <b>cancer</b> or leukemia in laboratory mice or rats; Sodium benzoate FD&C Yellow No. 6, D&C Yellow No. 10, FD&C Yellow No. 5 (tartrazine), FD&C Red No.40 (allura red))	<ul style="list-style-type: none"> <li>• Carcinogen</li> <li>• Neurodevelopmental impacts – neurobehavioral effects (may increase hyperactive behavior in some children)</li> <li>• Diabetes in adults</li> </ul>		Lack of precautionary principle

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Drivers/Pressures	State of Environment & Populations Affected	Impacts/Disparities	Responses	Gaps and Priorities
Need for affordable housing (own/rent)	Prenatal and early childhood exposure to <b>lead</b> via lead-based paint in older homes. Low-income families (especially those in rental housing) may have fewer resources to remediate hazards and prevent children from being exposed. Cumulative impacts from <b>poor nutrition and chronic stress</b> (including maternal stress). Other exposures: occupational exposures, ethnic spices/remedies, jewelry, fishing weights, ammunition, etc.	Neurodevelopmental toxicity and learning disabilities, including decreases in IQ and ADHD.  Disparities in lead poisoning by race/ethnicity and income are well-documented in national data, though not well-documented in WA blood lead data.	<ul style="list-style-type: none"> <li>• Monitor blood lead levels.</li> <li>• Test for lead in homes.</li> <li>• Assure lead-safe rental housing.</li> <li>• Connect eligible children to Department of Commerce Lead Hazard Control Program.</li> <li>• Educate parents on primary prevention of lead poisoning.</li> </ul>	
Poverty; Housing in poor repair	Exposure to <b>asthmagens (pests, mold, dustmites, air pollution, violence)</b> – African American communities and urban communities disproportionately affected.	Asthma		
Poverty; Unreliable heating source	Exposure to <b>carbon monoxide</b> (fetus and neonate have highest physiologic vulnerability) – Limited English Proficient populations disproportionately affected.	Carbon monoxide poisoning and death.		
Push for inexpensive toys Lack of precautionary principle Lack of regulation	<b>Chemical exposures in toys</b> (lead, phthalates, mercury, cadmium); endocrine disruptors (BPA, Phthalates)	<ul style="list-style-type: none"> <li>• Chemicals block our hormones and disrupt the body’s normal functions. (e.g., “obesogens” and obesity, diabetes)</li> <li>• Cancer (BPA/Breast cancer)</li> </ul>	Require manufacturers to remove hazardous materials.	
Industry secrecy protection  Inexpensive products	Chemical exposures in <b>personal care products. (endocrine disruptors, carcinogens)</b> Including: Phthalates (plastics, food, wrappers, and fragrances); BPA	<ul style="list-style-type: none"> <li>• Chemicals block our hormones and disrupt the body’s normal functions. (e.g., “obesogens” and obesity, diabetes)</li> <li>• Cancer (BPA/Breast cancer)</li> </ul>		<ul style="list-style-type: none"> <li>• Lack of precautionary principle</li> <li>• Lack of regulation</li> <li>• Lack of transparency</li> </ul>

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<b>Drivers/Pressures</b>	<b>State of Environment &amp; Populations Affected</b>	<b>Impacts/Disparities</b>	<b>Responses</b>	<b>Gaps and Priorities</b>
Industry secrecy protection	Chemical exposures in <b>cleaning products. (endocrine disruptors, carcinogens)</b> Including: <b>Phthalates</b>  Low-income residents, children, infants	Allergic reactions, cancer, birth defects, pregnancy complications.	National legislation introduced Cleaning Product Right-to-Know Act	<ul style="list-style-type: none"> <li>• Lack of precautionary principle</li> <li>• Lack of regulation</li> <li>• Lack of transparency</li> <li>• No requirements to label or disclose any ingredient</li> </ul>
<ul style="list-style-type: none"> <li>• Inexpensive food sources and kitchen supplies</li> <li>• Poor neighborhood access to fresh food</li> </ul>	Chemical exposures in <b>food and storage products. e.g., bisphenol A (BPA)</b> in baby & water bottles, beverage cans.  Low-income residents, children, infants	<ul style="list-style-type: none"> <li>• BPA found in biologically active levels in urine of 93% of Americans</li> <li>• BPA link to breast cancer, obesity</li> </ul>		<ul style="list-style-type: none"> <li>• Lack of precautionary principle</li> <li>• Lack of regulation</li> <li>• Lack of transparency</li> </ul>
<ul style="list-style-type: none"> <li>• Lack of regulation</li> <li>• Lack of precautionary principle</li> </ul>	<b>Industrial pollutants</b> <b>Endocrine disrupting, carcinogenic</b> chemicals (e.g., toxins includes PCBs, DDT, dioxin, some pesticides, and many plasticizers, like BPA.)  <b>EJ Communities, Children, Pregnant Women</b>	<ul style="list-style-type: none"> <li>• Chemicals block our hormones and disrupt the body’s normal functions. (e.g., “obesogens” and obesity, diabetes)</li> <li>• Cancer (BPA/Breast cancer)</li> </ul>		
Racial segregation	<b>Poor quality housing</b> (structural problems) in neighborhoods with higher concentrations of Blacks and Hispanics.	Anxiety, depression, psychological distress.	Mixed use development Improvement to distressed communities (e.g., High Point Development in King County, WA	

**NEIGHBORHOOD**



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Drivers/Pressures	State of Environment & Populations Affected	Impacts/Disparities	Responses	Gaps and Priorities
<ul style="list-style-type: none"> <li>• Socioeconomic inequality</li> <li>• Gentrification</li> <li>• Racial segregation</li> <li>• Lack of affordable housing (own/rent)</li> <li>• Too many cars</li> </ul>	<p>Exposure to <b>outdoor air pollution/criteria air pollutants</b> –wood stoves</p> <p>Residents of Pierce and Yakima counties disproportionately impacted. In Pierce County, wood stoves are a driver of poor air quality. For some families, wood stoves may be their only heat source.</p>	<p>Multiple adverse birth outcomes (low birthweight, small for gestational age, pre term birth) and development of bronchiolitis, other respiratory infections, and asthma.</p>	<ul style="list-style-type: none"> <li>• Reduce exposure.</li> <li>• Provide affordable means to replace uncertified stoves with cleaner heating methods.</li> <li>• Provide education on clean, economical, burning.</li> </ul>	<p>Research conducted in Seattle<sup>i</sup> found exposures not equally distributed and people of color and working class were disproportionately impacted.</p> <p>Study by the Department of Health found mobile sources and wood stoves/fireplaces were responsible for bulk of air pollution health risk in the Duwamish Valley.<sup>ii</sup></p>
<ul style="list-style-type: none"> <li>• Socioeconomic inequality</li> <li>• Gentrification</li> <li>• Racial segregation</li> <li>• Lack of affordable housing (own/rent)</li> <li>• Car infrastructure</li> <li>• Urban pollution concentration</li> <li>• Mixed use zoning / no buffers</li> <li>• Lack of service equity &amp; resource distribution</li> </ul>	<p>Exposure to <b>outdoor air pollution/criteria air pollutants</b> –traffic, industrial</p> <p>People of color and working class disproportionately living in close proximity to roads, ports, industry, and hazardous waste sites.</p> <p>Exposure to fine particulate matter (PM2.5)</p>	<p>Cardiovascular disease and death in adult women.</p>	<p>ATSDR Health Consultation<sup>iii</sup></p> <p>Livable community initiatives and other investments in transportation choices.</p>	<p>Examining mobile sources of pollution.</p>

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<ul style="list-style-type: none"> <li>• Socioeconomic inequality</li> <li>• Gentrification</li> <li>• Racial segregation</li> <li>• Lack of affordable housing (own/rent)</li> <li>• Car infrastructure</li> <li>• Urban pollution concentration</li> <li>• Mixed use zoning / no buffers</li> </ul> Lack of service equity & resource distribution	Environmental inequalities: exposure to hazardous air pollutants.  Pollution & toxin exposure Traffic related air pollutants, ozone and diesel  Multiple agent exposures synergistic effects on neurocognitive development.  Children Prenatal and early post natal Low-income Communities Communities of Color / Immigrants	Neurocognitive outcomes: depression, anxiety, and attention disorders  Behavioral: conduct disorders	Educational enrichment programs aimed at enhancing specific neurocognitive functions may bridge disparities in mental health, academic achievement, and cognition.	
	<b>Nitrate contaminated private drinking water wells</b> (the fetus and newborn at physiologically highest risk) – rural communities disproportionately affected.	Methemoglobinemia		
	Environmentally induced cancer has been grossly underestimated (Single-gene inherited cancer accounts for < 5%)	Rising incidence of preventable disease  Prenatal/early-life, Puberty		
Neighborhood crime; poverty; residential segregation	<b>Chronic stress</b> mediates vulnerability to certain chemical exposures – communities of color are disproportionately impacted.	Multiple health outcomes, including maternal child health disparities, e.g., poor birth outcomes.		
	Exposure to <b>toxins</b> (all media: land, air, water, consumption) e.g., contaminated fish and shellfish.	Increased risk/incidence of both cancer and non-cancer disease, e.g., reproductive, immunological.		Pollution in People Study in Washington. <sup>iv</sup>

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	Exposure to contaminated sediment and fish from the <b>Duwamish</b> – people of color, low-income residents, Tribal members, Asians/Pacific Islanders, limited English proficient residents are disproportionately affected. This is combined with cumulative impacts from other sources (crime, air pollution, etc.).			*Research in South Seattle <sup>v</sup>
	Exposure to <b>combined sewage overflows</b> from heavy rainfall resulting in biological and chemical water pollution.			
Some communities have more capacity to advocate for changes in their built environment that make healthier choices easier to make.	Low-income communities and communities of color have less access to <b>opportunities for physical education and healthy eating</b> .	Obesity and related chronic diseases.	Changes to zoning laws in communities.  Improvements in community capacity.  Encourage Health Impact Assessments that take into account effects on chronic disease risk.	

**EMPLOYMENT & INSTITUTIONS**

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Drivers/Pressures	State of Environment & Populations Affected	Impacts/Disparities	Responses	Gaps and Priorities
	<p><b>Organophosphate and pesticide exposure</b> – Children who reside in close proximity to treated fields and whose parents working in agricultural provide “take home” exposure. Hispanic/Latino populations disproportionately impacted.</p> <p>Also household use of pesticides</p>	<p>Neurocognitive and neurobehavioral deficits (attention deficit and hyperactivity disorder, autism), birthweight and length</p> <p>Anomalies of the circulatory/respiratory and musculoskeletal/integumental systems increased where wheat occupies a larger percentage of the land and chlorophenoxy herbicide use is higher.</p>	<p>Integrated pest management.</p>	
<p>Hanford nuclear site remediation delays and mismanagement</p>	<p><b>Hanford nuclear site</b> is the largest US site of nuclear waste (radioactive contamination of air, soil, and water) – workers, local residents and Tribes are disproportionately affected.</p> <p>Occupational exposures to noise, asbestos, beryllium, plutonium.</p> <p>Airborne release of radioactive byproducts led to radioactive iodine exposure to residents downwind.</p>	<p>Variety of occupational-related cancer(s) to exposed workers.</p> <p>Thyroid cancer to residents downwind.</p>	<p>The American Public Health Association issued a policy statement called, “Prioritizing Cleanup of the Hanford Nuclear Reservation to Protect the Public’s Health” in 2010.</p>	
<p>Poor regulatory oversight</p>	<p>African Americans have a 37% greater chance of suffering an <b>occupationally induced injury or illness</b>, and a 20% greater chance of dying from an occupational disease or injury</p>	<ul style="list-style-type: none"> <li>• 50,000 to 70,000 workers in the US die from occupational diseases annually</li> <li>• New cases of work related illnesses between 125,000 and 350,000 each year</li> </ul>		
<b>STATEWIDE</b>				

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Drivers/Pressures	State of Environment & Populations Affected	Impacts/Disparities	Responses	Gaps and Priorities
Anti-regulatory environment	Lack of comprehensive EJ policy	Environmental health disparities persist.	Board of Health issued recommendations for adoption of agency guidelines in 2001.	
	Failure to adopt the <b>precautionary principle</b> results in unnecessary exposures to environmental contaminants to children and families.			
	Families with <b>limited English proficiency</b> have difficulty obtaining necessary health related information		Translation of materials.	
	Lack of access to <b>health and environmental data</b> at a community level hampers communities' ability to assess their own health and environmental conditions.	Disparities persist and communities lack an important tool to address them.	Support and advise resources like Washington Tracking Network to improve access to community indicators that are helpful for addressing EJ issues.	
Climate changes appear inevitable.	Some vulnerable populations will suffer disparate health and environmental effects as the <b>climate changes</b> .	Health disparities will worsen.	Build community capacity and ensure that communities can be resilient to changes in the environment, including severe weather events as well as changes to water, food supply.  Strengthen community safety nets.	

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Declining public resources forcing government agencies to discontinue public services.	Vulnerable communities are made more vulnerable by declining <b>public services</b> (access to health insurance, drug treatment, public health and safety net resources).	Health disparities worsen.	Protect public health and safety infrastructure.  Assure access to health care for all.	
<ul style="list-style-type: none"> <li>• Lack of regulation</li> <li>• Lack of precautionary principle</li> <li>• Information about chemical health effects accessible to the general public</li> <li>• Streamline and integrate scientific data on chemicals</li> </ul>	<p>Exposure to <b>endocrine-disrupting chemicals: Bisphenol A / BPA</b> (polycarbonate plastic water bottles, baby bottles, the linings of metal food and soft-drink cans, thermal receipt paper, and dental sealants.)</p> <p><b>Phthalates</b> (plasticizers in PVC tubing, plastic, cosmetics, shampoos, soaps, lotions, lubricants, paint, pesticides, fragrances) <b>Pesticides:</b> Atrazine weed killer, dieldrin</p> <p><b>Perfluorooctanoic acid (PFOA)</b> non-stick cookware, grease-proof food packaging, and stain-proof coating on clothing and carpeting.</p> <p><b>African American and Mexican American girls, low-income communities</b></p>	<ul style="list-style-type: none"> <li>• Obesity</li> <li>• Insulin resistance</li> <li>• Reduced birth weight</li> <li>• Early puberty</li> <li>• Higher breast cancer</li> </ul>		

<sup>i</sup> Abel and White (2011). Skewed Risksapes and Gentrified Inequities: Environmental Exposure Disparities in Seattle, Washington. Am J Pub Health.

<sup>ii</sup> Washington State Department of Health (2008). Summary of Results of the Duwamish Valley Regional Modeling and Health Risk Assessment Seattle, Washington. DOH Publication Number 334-165.

<sup>iii</sup> IBID

<sup>iv</sup> Schreder (2006). Pollution in People. A Toxic-Fee Legacy Coalition Report.

<sup>v</sup> Addington (2009). Environmental justice for the Lower Duwamish Waterway Superfund Site: A Review of U.S. Environmental Protection Agency Region 10 Effectiveness in Identifying and Addressing Concerns in the Georgetown and South Park Neighborhoods of South Seattle (thesis project).