

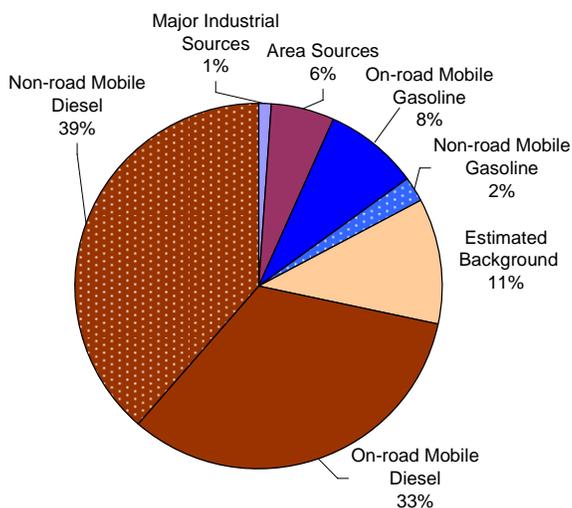
# Environmental Protection Agency 1999 National Air Toxics Assessment Overview

The US Environmental Protection Agency (EPA) estimates health risks from air toxics on a national level in its National Air Toxics Assessment (NATA). EPA uses a national emissions inventory to estimate ambient (outdoor) air toxics concentrations and population risk around the country.

To date, EPA has conducted two NATAs, based on 1996 and 1999 emissions inventories. EPA has made several changes between the two NATAs in an effort to improve estimates, making it difficult to compare the two. Results for the Puget Sound region are provided in this fact sheet.<sup>i</sup> Results of EPA's NATA confirm our dedication to reduce diesel emissions in our area.

## Puget Sound Area Contributors to Average Potential Cancer Risk\*

*The Puget Sound area includes King, Kitsap, Pierce and Snohomish counties.*



**Major industrial:** large business and manufacturing plants.

**Area sources:** burning in woodstoves and fireplaces, outdoor burning as well as smaller businesses such as dry cleaners and gas stations.

**On-road mobile gasoline:** gasoline-powered cars, trucks and motorcycles.

**Non-road mobile gasoline:** primarily gasoline-powered marine vessels and yard equipment.

**Estimated background:** sources from neighboring areas and, to a lesser degree, natural sources.

**On-road mobile diesel:** diesel-powered trucks, buses and cars.

**Non-road mobile diesel:** diesel-powered marine vessels, construction equipment, trains and aircraft support equipment.

\* Using California EPA toxicity for diesel particulate matter and EPA IRIS toxicity for formaldehyde.

**Air toxics are a group of air pollutants known or suspected to cause serious health problems.**

Potential health effects include cancer, birth defects, lung damage and nerve damage.<sup>ii</sup> Most of the discussion in this overview focuses on cancer risk, as it provides a basis of comparison. Many air toxics associated with cancer also have other adverse health effects.

Diesel particulate matter, as a subset of fine particulate matter, is linked with health effects in addition to the potential cancer risk described in following sections. These effects include heart problems, aggravated asthma, chronic bronchitis and premature death.<sup>iii,iv,v</sup>

**Diesel sources account for over 70% of the potential air toxics cancer risk in our region.**

And all mobile sources combined account for over 80% of the potential air toxics cancer risk. The upper bound risk from all air toxics sources in the Puget Sound area amounts to 430 potential cancer cases for every million people.<sup>vi</sup> Upper bound risks (based on the 95<sup>th</sup> percentile of possible risk) are typically used to be protective of public health.

This level of risk is 430 times the acceptable risk for individual air toxics cleanup levels at hazardous waste sites.<sup>vii</sup> These estimates are consistent with findings from our local 2003 air toxics evaluation.<sup>viii</sup>

**The Puget Sound area's potential cancer risk from air toxics is comparable to other major metropolitan areas.**

Our region ranked in the highest 5<sup>th</sup> percentile of risk when compared to the entire country, which is typical for major metropolitan areas. Our urban areas have health risks higher than the four-county Puget Sound average (a mix of urban and rural).

King County's upper bound potential cancer risk from air toxics amounts to 740 potential cancer cases for every million people. In some areas, such as high traffic, industrial and/or port areas, risks can exceed 1,000 potential cancer cases per million people.

**Top Air Toxics in the Puget Sound area\*  
Based on Average Potential Cancer Risk per Million (RPM)**

| <b>Air Toxic</b>             | <b>Average RPM</b> | <b>Upper Bound** RPM</b> | <b>Source</b>   |
|------------------------------|--------------------|--------------------------|---|
| Diesel Particulate Matter    | 182                | 327                      | Mobile sources  |
| Formaldehyde                 | 23                 | 32                       | Mobile sources, wood burning and other combustion   |
| Benzene                      | 15                 | 27                       | Mobile sources, wood burning and other combustion   |
| Polycyclic Organic Matter*** | 4.7                | 9.2                      | Mobile sources, wood burning and other combustion   |
| Ethylene Dibromide           | 4.7                | 4.8                      | No longer in widespread use, historically used in leaded gasoline; NATA attributes source as "background" |
| 1,3-Butadiene                | 4.0                | 7.9                      | Mobile sources, wood burning and other combustion   |
| Carbon Tetrachloride         | 3.4                | 4.0                      | No longer in use but historically used solvent<br>NATA attributes source as "background"                  |
| Acetaldehyde                 | 3.4                | 4.9                      | Mobile sources, wood burning and other combustion   |
| Chromium VI                  | 3.3                | 6.0                      | Major industrial and area sources (electroplating facilities) and mobile sources                          |
| Tetrachloro-ethane 1,1,2,2   | 2.9                | 3.0                      | No longer in use but historically used in paints/pesticides<br>NATA attributes source as "background"     |
| Bis(2-ethylhexyl) phthalate  | 2.2                | 2.3                      | Plasticizer used in industry<br>NATA attributes source as "background"                                    |

\* Using California EPA toxicity for diesel particulate matter and EPA IRIS toxicity for formaldehyde.

\*\* Upper Bound is based on the 95<sup>th</sup> percentile of risk.

\*\*\* Polycyclic organic matter includes polycyclic aromatic hydrocarbons (PAHs). The group presented on this table includes speciated POM groups 1, 2, and 5 and the PAH naphthalene.

**Diesel particulate matter, formaldehyde, and benzene pose the greatest potential cancer risk.**

Top air toxics are shown in the previous table, from highest to lowest risk.<sup>ix</sup> Both average and upper bound risks are shown to demonstrate a range of risk that people can be exposed to. Several of the highest risk toxics listed are associated with mobile sources and wood burning.

Acrolein is also an air toxic of concern in the Puget Sound region but is not shown because acrolein's primary health impact is respiratory irritation (not cancer). Acrolein is emitted primarily from mobile sources, wood burning and other combustion.

For technical questions about the Puget Sound data in the EPA 1999 NATA, contact Kathy Himes, Air Resource Specialist, 206.689.4095 or [kathyh@psc Clean Air.org](mailto:kathyh@psc Clean Air.org).

<sup>i</sup> Results shown here are risk estimates directly taken from the 1999 NATA, with two local calculations for diesel particulate matter and formaldehyde. Risks for these two air toxics were estimated using the HAPEM modeling concentrations from the 1999 NATA and the California and EPA IRIS unit risk estimates, respectively. Diesel: Proposed Identification of Diesel Exhaust as a Toxic Air Contaminant. California Environmental Protection Agency, June 1998. <http://www.arb.ca.gov/regact/diesltac/diesltac.htm>. Formaldehyde: EPA Integrated Risk Information System <http://www.epa.gov/iris/subst/0419.htm>.

<sup>ii</sup> Environmental Protection Agency. About Air toxics, Health, and Ecological Effects. <http://www.epa.gov/air/toxicair/newtoxics.html>.

<sup>iii</sup> Environmental Protection Agency. Health and Environmental Effects of Particulate Matter. <http://www.epa.gov/ttn/oarpg/naaqsfm/pmhealth.html>.

<sup>iv</sup> California Environmental Protection Agency. Recent Research Findings: Health Effects of Particulate Matter and Ozone Air Pollution. January 2004. <http://www.arb.ca.gov/research/health/fs/PM-03fs.pdf>.

<sup>v</sup> California Environmental Protection Agency and the American Lung Association of California. Health Effects of Diesel Exhaust. April 2002. [http://www.oehha.ca.gov/public\\_info/facts/pdf/diesel4-02.pdf](http://www.oehha.ca.gov/public_info/facts/pdf/diesel4-02.pdf).

<sup>vi</sup> All potential cancer risks are based on a lifetime 70-year cumulative exposure.

<sup>vii</sup> Washington Administrative Code, Model Toxics Control Act. WAC 173-340-750, Cleanup Standards to protect air quality. Equation 750-2. <http://www.leg.wa.gov/WAC/index.cfm?section=173-340-750&fuseaction=section>.

<sup>viii</sup> Average cancer risks in our local air toxics evaluation were 550 in a million based on ambient monitoring. This estimate does not include human exposure modeling (NATA does). Our local evaluation also includes risk from wood smoke particulate matter (NATA does not). Final Puget Sound Air Toxics Evaluation, October 2003. [http://www.pscleanair.org/news/other/psate\\_final.pdf](http://www.pscleanair.org/news/other/psate_final.pdf).

<sup>ix</sup> Air toxics with an average cancer risk greater than one in a million are shown in this table. Average cancer risk was calculated for the entire Puget Sound region (King, Kitsap, Pierce and Snohomish counties).

## Current local efforts to reduce priority air toxics

Several local, regional and national programs and voluntary actions to reduce air toxics have been implemented since EPA gathered the NATA information in 1999.

- Through the agency's Diesel Solutions program, launched in 2001, partners work to reduce diesel particulate matter emissions by retrofitting vehicles with pollution control equipment, using cleaner fuels and promoting reduced idling. These efforts include the Washington School Bus Program, enacted and funded by the Washington State Legislature in 2003. This state funding provides retrofitting for thousands of school buses, reducing diesel particulate exposures to children, an especially vulnerable population. [http://www.pscleanair.org/dieselsolutions/ds\\_overview.shtml](http://www.pscleanair.org/dieselsolutions/ds_overview.shtml)
- The West Coast Collaborative is a public-private partnership working to improve public health by reducing air pollution emissions from diesel sources along the West Coast. Members are targeting the highest polluting engines with the most cost-effective control strategies and using federal and local funds to reduce emissions in the most affected communities. <http://www.westcoastdiesel.org/index.htm>

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## Current local efforts to reduce priority air toxics (*continued*)

- The Puget Sound Maritime Air Forum is a voluntary association of private and public maritime organizations, air agencies and other parties with operational or regulatory responsibilities related to maritime industry air quality impacts. Members are committed to accurately identifying, quantifying and seeking ways to voluntarily reduce air pollution impacts from the maritime transportation sector.  
<http://www.maritimeairforum.org/index.shtml>
- The agency works with refiners and local gas stations to reduce gasoline emissions of air toxics. Examples include BP voluntarily going above and beyond regulatory requirements by reducing air toxics and sulfur levels in all grades of gasoline produced at its Blaine, Washington - Cherry Point refinery. [http://www.pscleanair.org/news/2004/08\\_15\\_bp.shtml](http://www.pscleanair.org/news/2004/08_15_bp.shtml)

Additionally, regional oil refiners and suppliers voluntarily supply special smog-reducing gasoline during the summer smog season. Low-vapor pressure fuel reduces smog-forming pollutants in our region by more than five percent by reducing tailpipe emissions and evaporation of hydrocarbons from vehicle gas tanks, gas stations and fuel-transfer operations. Hydrocarbons are a key contributor to the formation of ozone, or summer smog.  
[http://www.pscleanair.org/news/2004/06\\_09\\_smog.shtml](http://www.pscleanair.org/news/2004/06_09_smog.shtml)

- The agency works with the hearth products industry and local communities to reduce air toxics from wood burning.  
<http://www.pscleanair.org/burning/indoor/index.shtml>  
<http://www.pscleanair.org/burning/outdoor/index.shtml>
- The agency works with large and small industrial sources, through compliance and voluntary actions, to reduce air toxics emitted from manufacturing. A small business success story in our region is dry cleaners: they've replaced older equipment with new technology that emits almost no air toxics. As a result, emissions and health risks from tetrachloroethylene (also called "perc", the solvent used in dry cleaning) are now very small.  
<http://www.pscleanair.org/businfo/>
- In 2005, the Washington Legislature adopted the California Clean Car Standards. This makes Washington the ninth state to adopt strong state standards for air toxics and smog forming pollution. These standards will reduce mobile source air toxics emissions.  
<http://www.leg.wa.gov/pub/billinfo/2005-06/Htm/Bills/Session%20Law%202005/1397-S.SL.htm>

Additional national air toxics projects are described at EPA's air toxics website.  
<http://www.epa.gov/ttn/atw/allabout.html>

**You, too, can reduce air toxics emissions.** Small steps cumulatively make a difference. To see how you can do your part, visit <http://www.pscleanair.org/whatcan/airchoice.shtml>.