Data Notes for the Leaded Aviation Fuel Exposure Overlay on the Washington Tracking Network (WTN) Information by Location Tool (IBL)

Background

Leaded gasoline for on-road vehicles was banned in 1996 through the Clean Air Act. However, small piston-engine planes still use leaded aviation fuel. These small planes are now the largest source of lead in the air. These planes typically accommodate 2-10 passengers. A 2023 EPA determination states that emissions from these planes pose environmental and health risks to communities surrounding airports. Many of these communities have environmental justice concerns.[i] DOH recommends health care providers test children for lead exposure if they live within a kilometer of an airport.[ii]
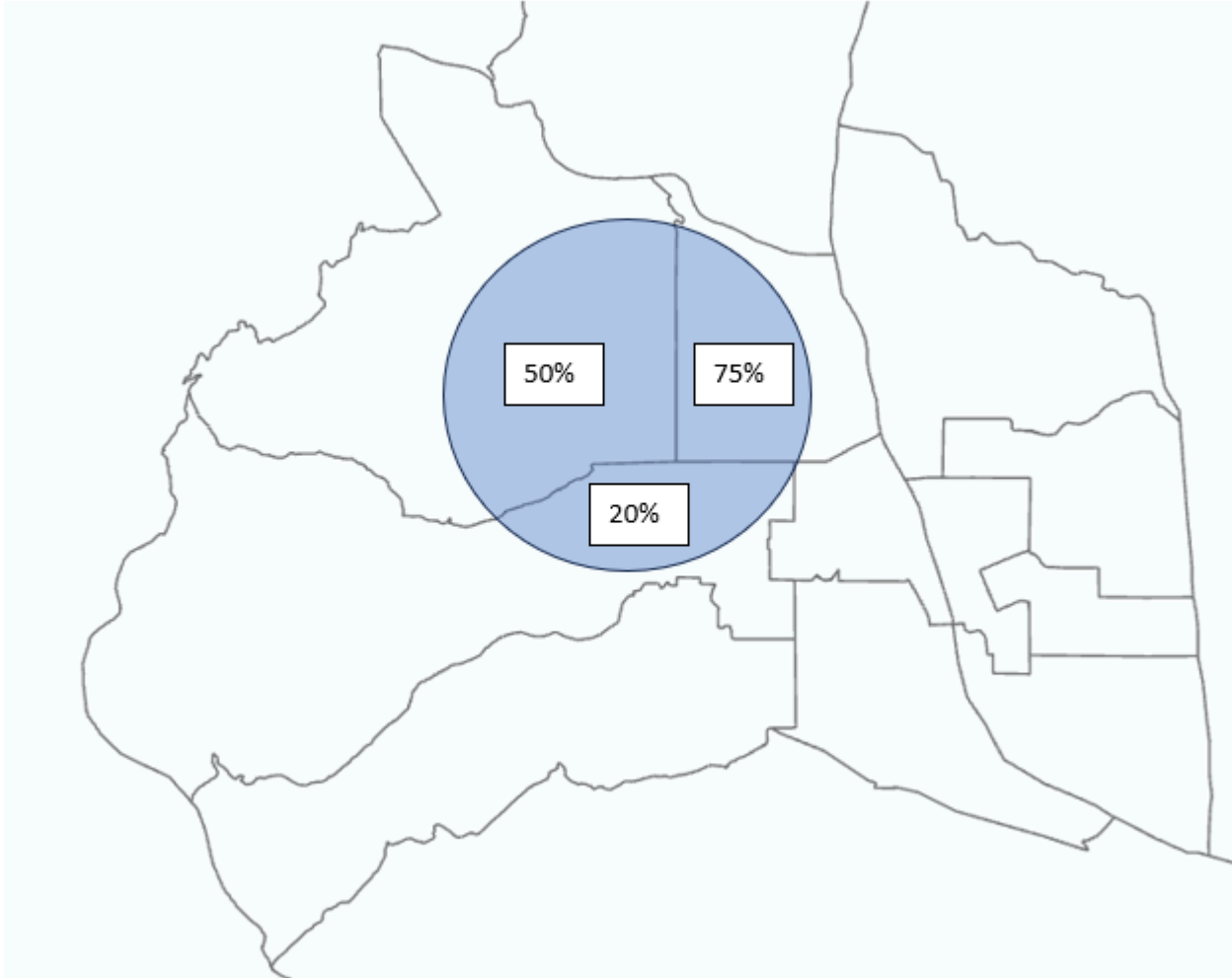
This overlay shows the location of all general aviation airports in the state that cater to small piston-engine planes. We created a 1km radius ("buffer") around each airport and summarized the populations and schools within these buffers. The overlay will help individuals and families learn if they live or their children attend school within a kilometer of an airport. It also shows which communities are at risk of exposure to aviation fuels and where there might be environmental justice issues.

Data Sources

Population Characteristic	Source	Year
Airports	WSDOT non-military airports (excluding SeaTac)	2022
Total Population	American Community Survey	2015-2019
Children 0-5 years old	American Community Survey	2015-2019
Families living below the federal poverty level	American Community Survey	2015-2019
People of Color	American Community Survey	2015-2019
Households with Limited English Proficiency	American Community Survey	2015-2019
Foreign Born	American Community Survey	2015-2019
Daycares	Department of Children, Youth and Families	2023
Public Schools	OSPI School Directory	2021
Private Schools	Washington Private Schools Directory - WFIS	2022

Methods

We used population characteristics at the census block group level to ensure a fine spatial resolution. We chose this geography to minimize errors in population estimation within buffer zones. To calculate population counts within the 1km buffers, we used an area-weighted population apportionment method. The percentage of area of each block group covered by the buffer serves as a proxy for the percentage of the population living in the buffer zone. We arrived at the approximate count of the population within each buffer by adding together the covered proportion of each block group. Here is a visual example of the area-weighted population apportionment for a fictitious airport:

In the above example, 50% of the area of block group 1, 20% of block group 2 and 75% of block group 3 fall within the buffer. The population within the buffer is then estimated as:

$$0.5 * \text{Population}_{BG1} + 0.2 * \text{Population}_{BG2} + 0.75 * \text{Population}_{BG3} = \text{Population in Buffer}$$

For schools and daycares, we summarized the number within the buffer of each airport. We separated out the number of elementary schools from the total number of schools due to the higher risk of negative health outcomes associated with lead exposure in younger children. Looking at both the total population and vulnerable populations helps identify potential exposure risks in communities surrounding airports hosting small piston-engine planes.

Summary/Findings

The information for each individual airport on the overlay. Here are statewide summary statistics to provide context (see table below).

Population in Buffer Zones: A total of 132,689 individuals live within the 1km buffer zones around airports. This is 1.79% of Washington state residents.

Educational and Childcare Facilities: Within the buffer zones, there are 8 private schools, 44 public schools (including 12 elementary schools), and 29 childcare centers.

Demographic Summary of Population Living Within 1km of a Small Plane, Non-military Airport and Washington State Residents

	1km Airport Buffer n (%)	Washington State n (%)
Total Population	132,689	7,404,107
Population 5 and under	5,867 (4%)	454,364 (6%)
People of Color	47,509 (36%)	2,330,162 (32%)
Foreign Born	26,190 (20%)	1,056,534 (14%)
Total Families	28,528	1,841,954
Families Living Below Federal Poverty Level	1,508 (5%)	127,119 (7%)
Total Households	64,262	2,848,396
Limited English-Speaking Households	2,515 (4%)	108,151 (4%)

Contact

If you would like additional information or access to this data set, please contact our team at washingtontrackingnetwork@doh.wa.gov.

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[i] United States Environmental Protection Agency. (2023, Oct 18). EPA Determines Lead Emissions from Aircraft Engines Cause or Contribute to Air Pollution. EPA News Releases. https://www.epa.gov/newsreleases/epa-determines-lead-emissions-aircraft-engines-cause-or-contribute-air-pollution

[ii] Washington State Department of Health. (n.d.). Blood Lead Testing Information for Health Care Providers. https://doh.wa.gov/public-health-healthcare-providers/healthcare-professions-and-facilities/professional-resources/blood-lead-testing