Six Year Update on Health Assessment of VOC Monitoring Results for Portland – South Portland

Thomas Simones, PhD

Acting State Toxicologist

Maine Center for Disease Control and Prevention

South Portland City Council Meeting

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General overview of tonight's presentations

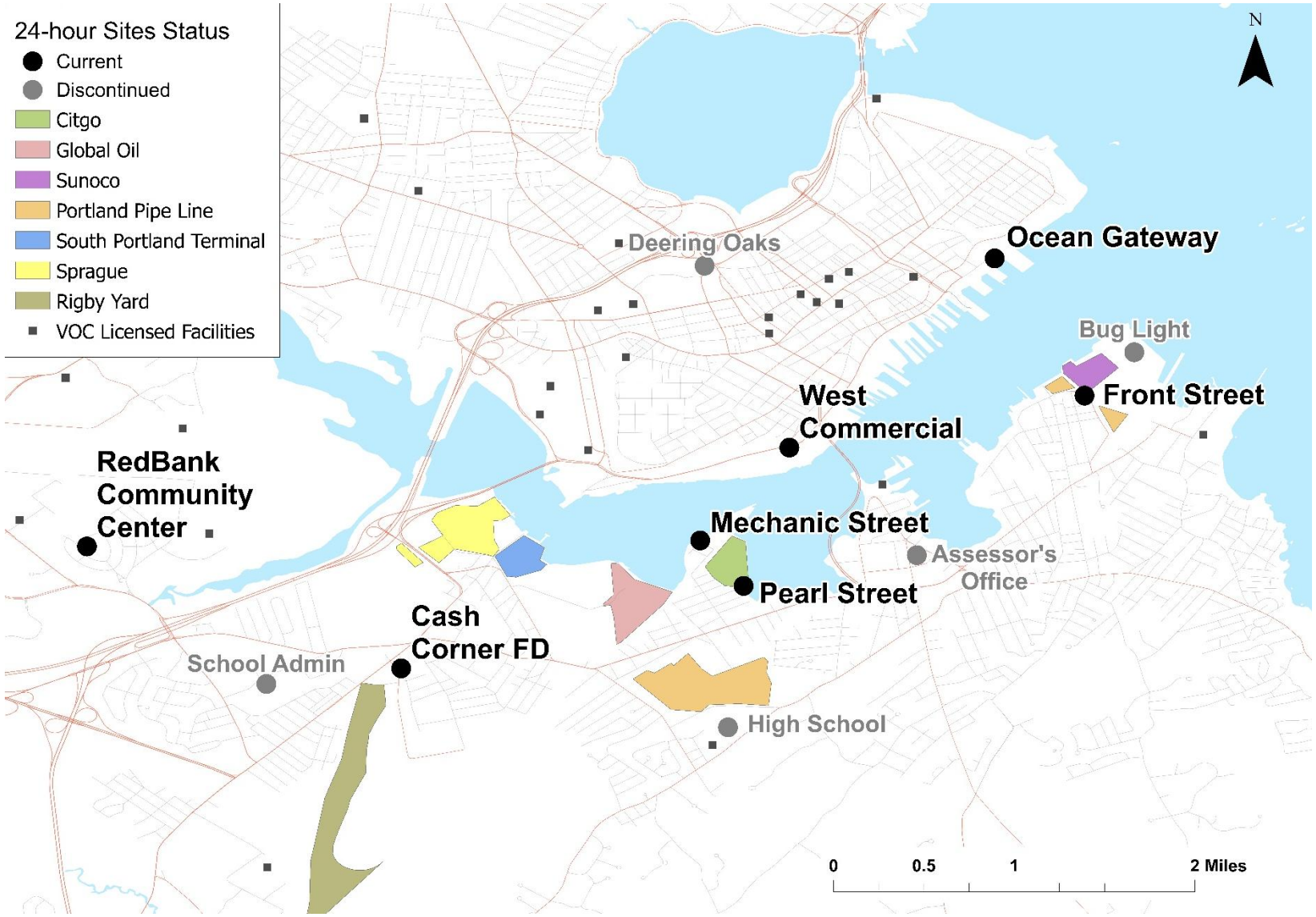
- Maine Center for Disease Control and Prevention (Maine CDC):
  - Summary of 24-hour volatile organic compound (VOC) 6-year monitoring results health assessment.

- Department of Environmental Protection (DEP):
  - Next steps on measuring naphthalene levels.
  - Summary of fenceline monitoring results.

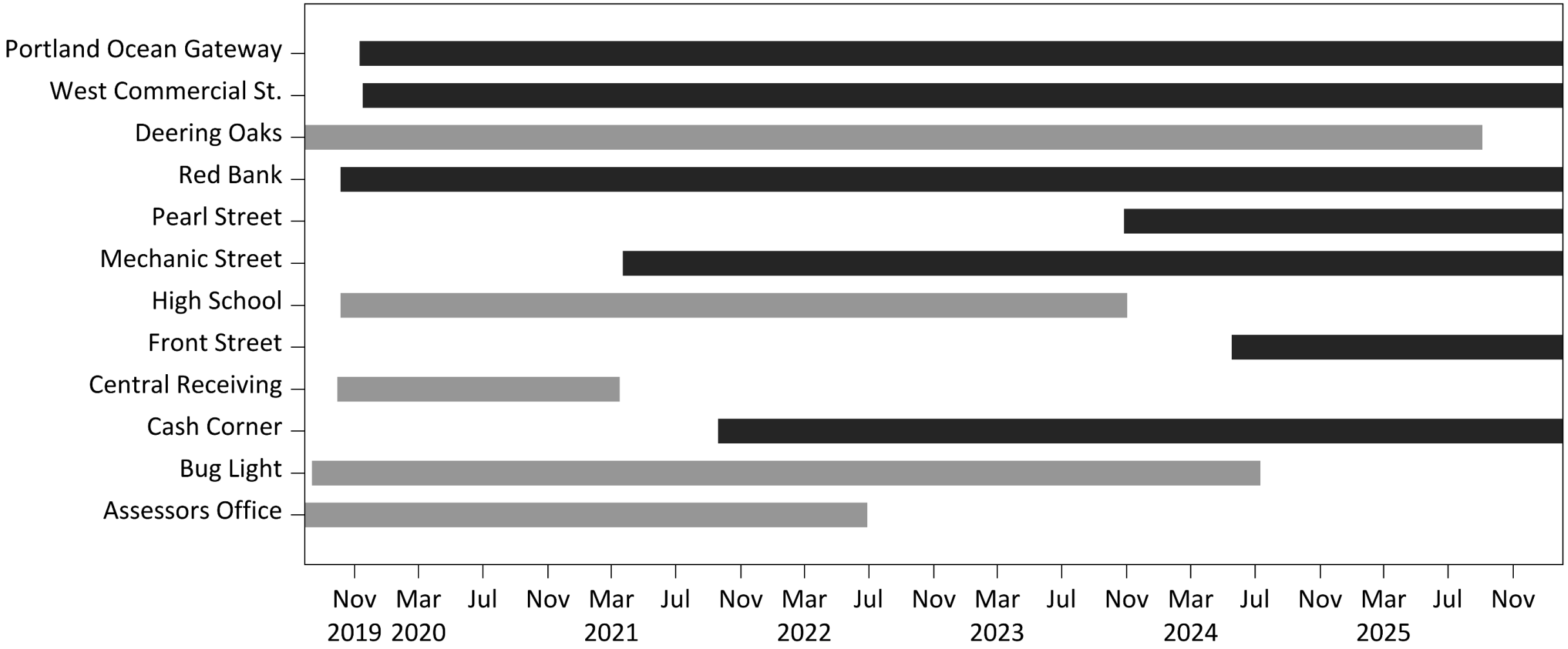
Background on the SoPo/Po ambient air VOC study

- Study began in response to community concerns about odor and volatile organic compounds (VOCs) potentially released from petroleum storage facilities.
- DEP initiated a community ambient air study in 2019.
- 24 hour ambient air samples were collected every 6 days at multiple SoPo/Po locations.
- Data are compiled and published on DEP's website.
- Written reports on data provided in 2020, 2023, and 2026.

Locations of monitoring stations



Monitoring stations operating timelines



Health Assessment - short-term and long-term exposures

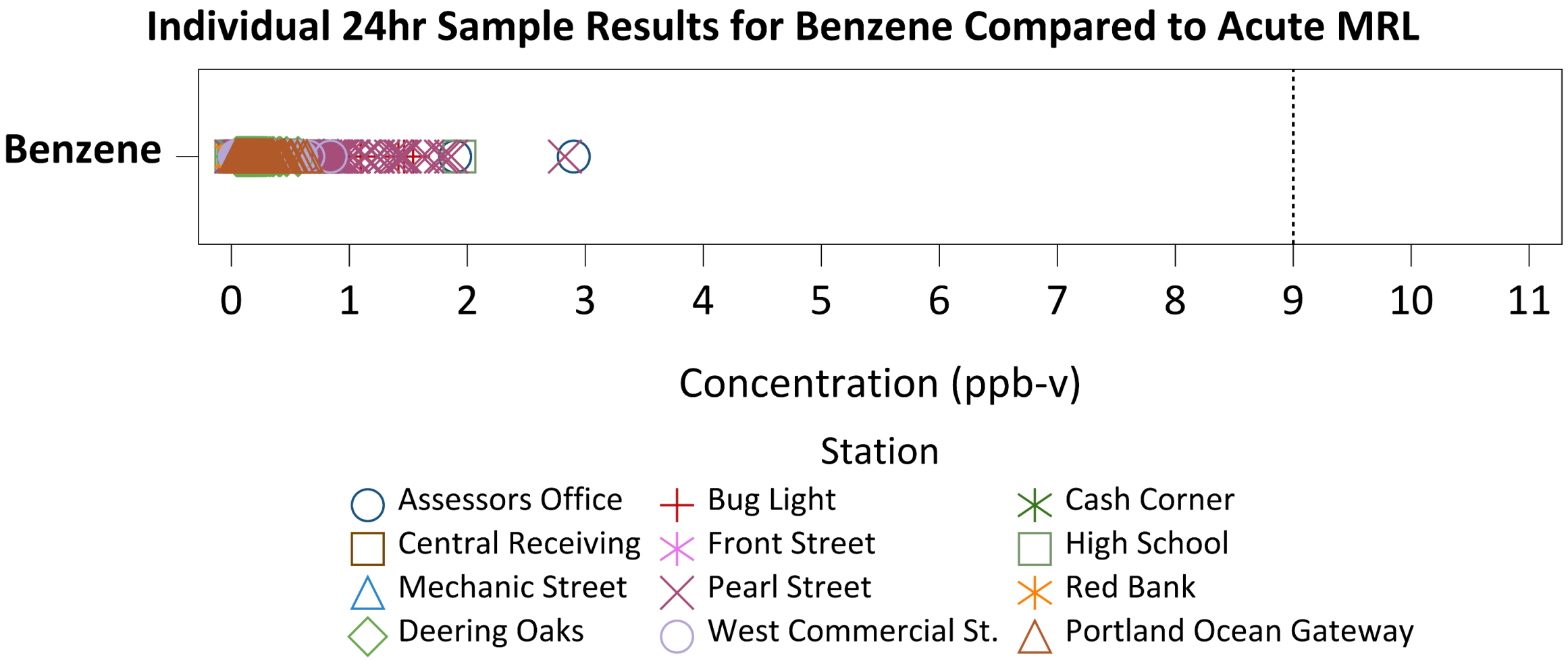
Short-term exposure health assessment

- Considers a 1 to 14 day exposure time
- Health guidelines are acute minimal risk levels (MRLs)
- Acute MRLs are always non-cancer endpoints

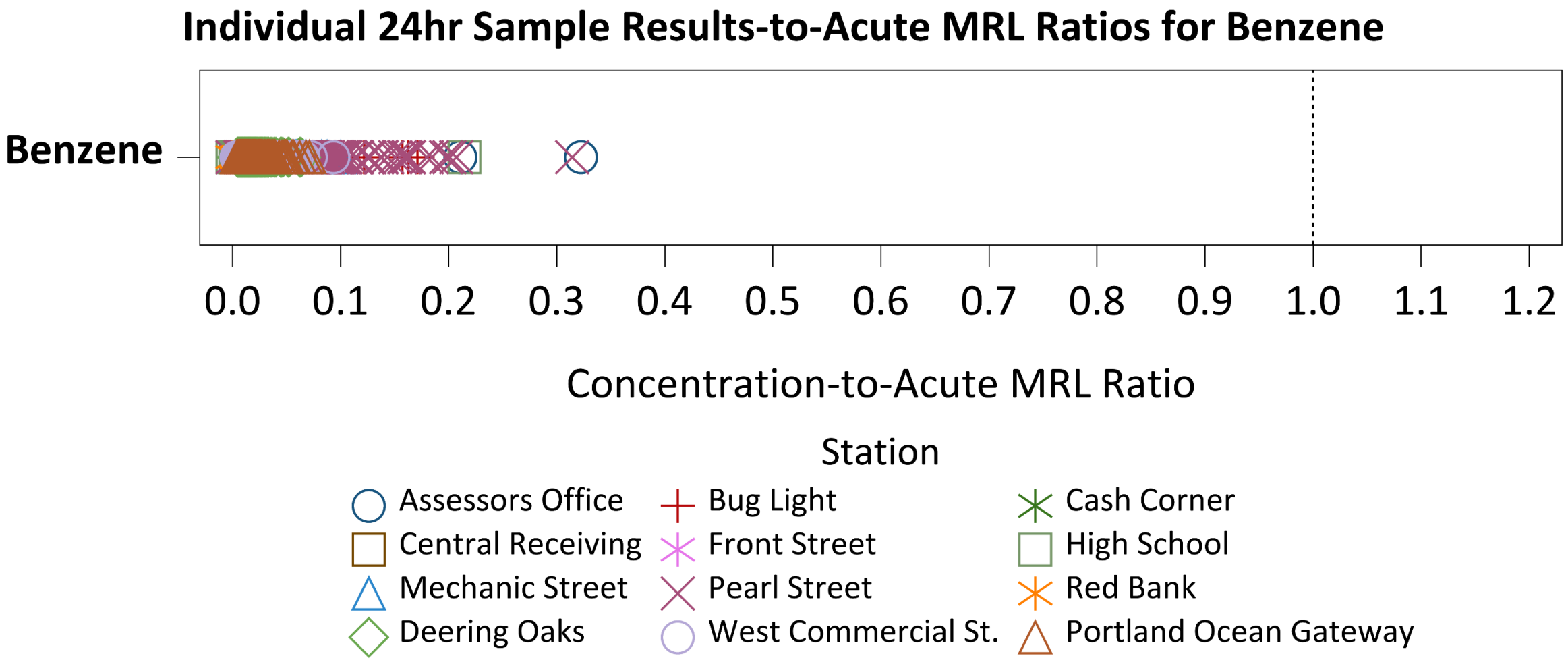
Long-term exposure health assessment

- Considers a greater than 1 year average exposure
- Health guidelines are ambient air guidelines (AAGs)
- AAGs can be based on both cancer and non-cancer endpoints
- Can also calculate a cumulative cancer risk for VOCs with cancer endpoints

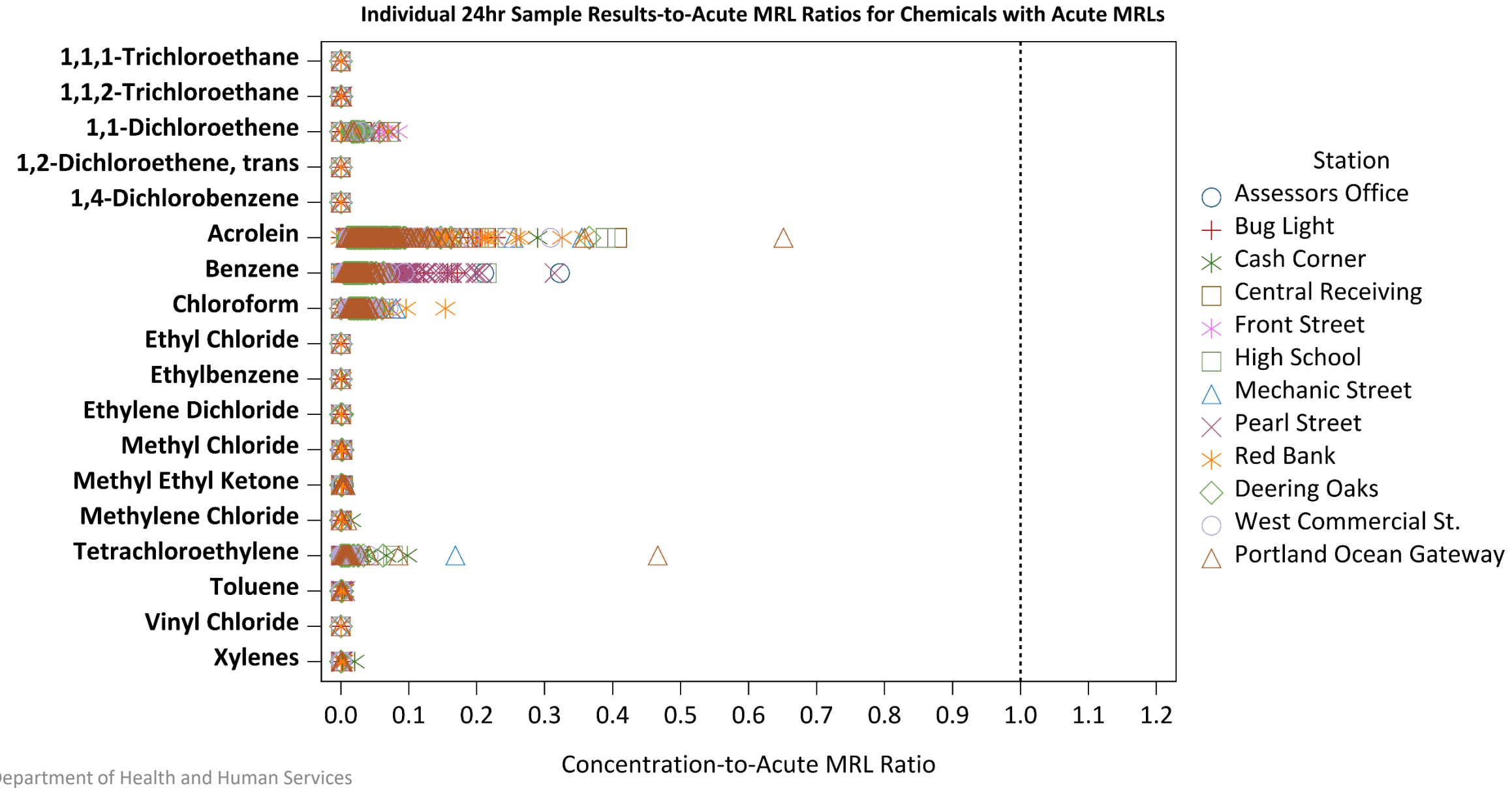
Short-term exposure health assessment - example figure



Short-term exposure health assessment - example figure



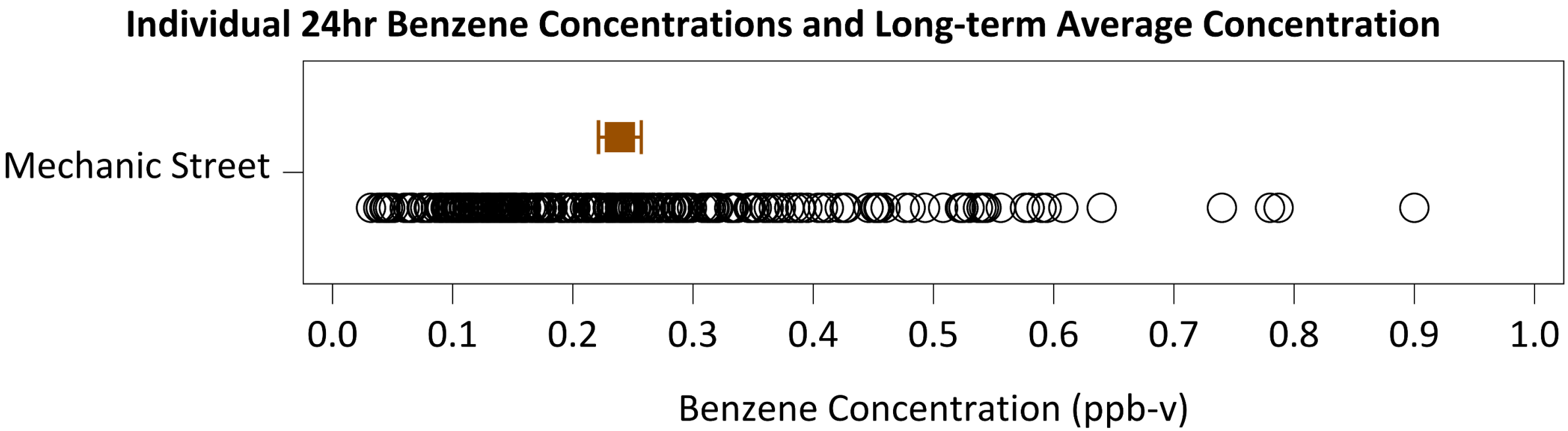
Short-term exposure health assessment



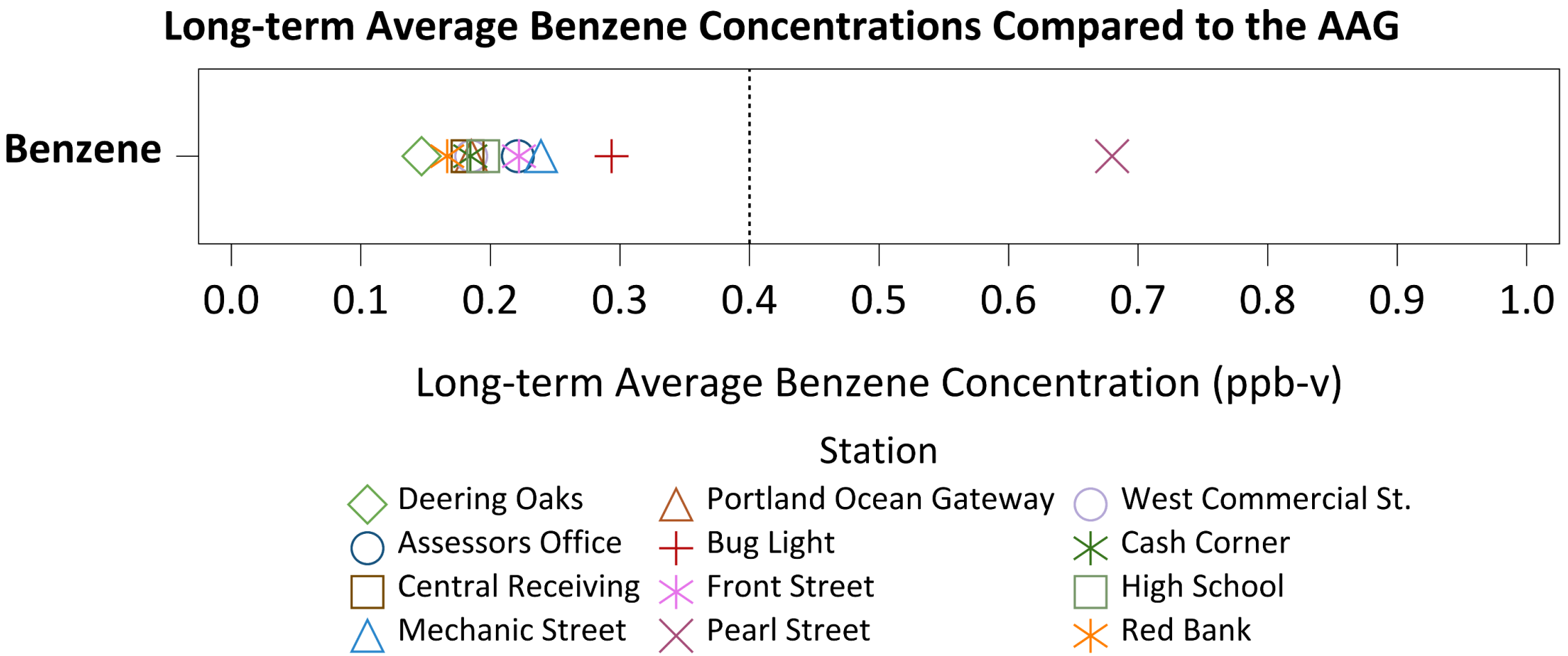
Short-term exposure health assessment findings

- No 24 hour monitoring result was above a short-term health guideline over the six year sampling period.

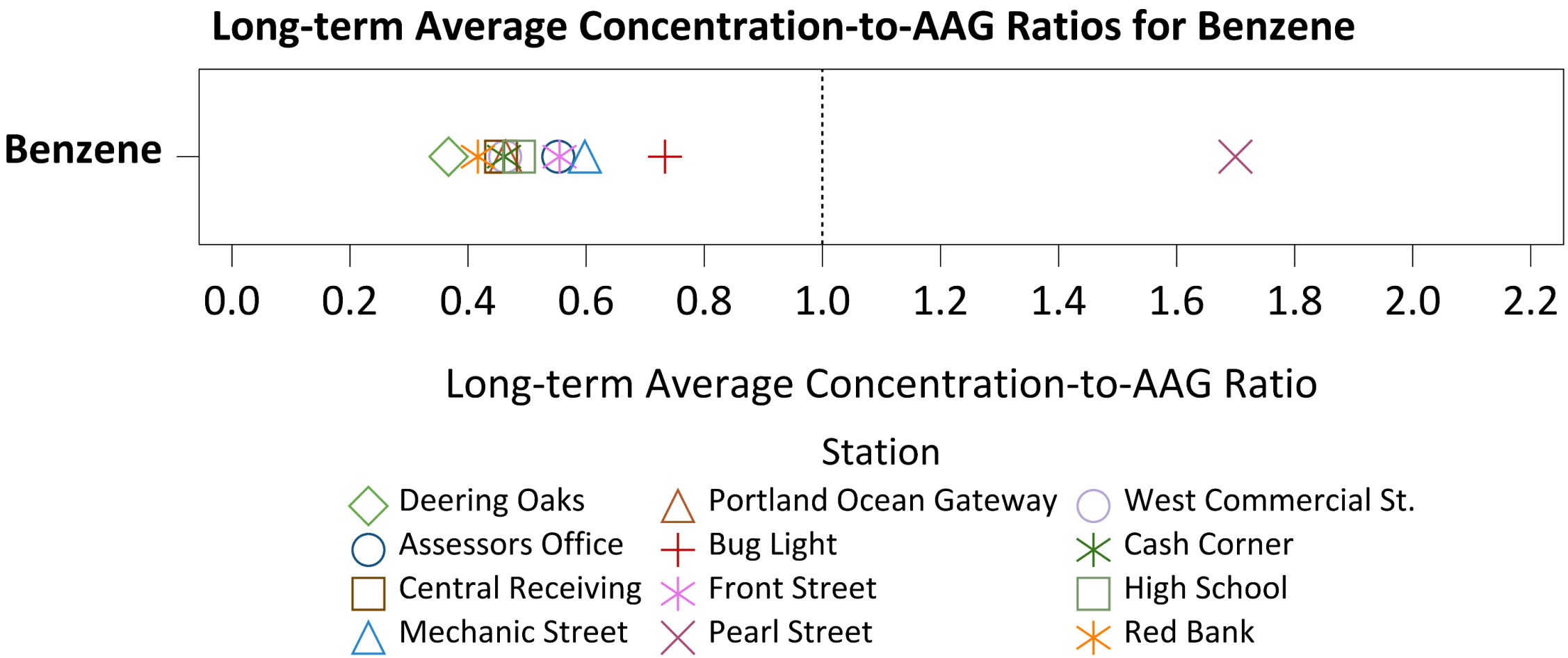
Estimating long-term average concentrations - example



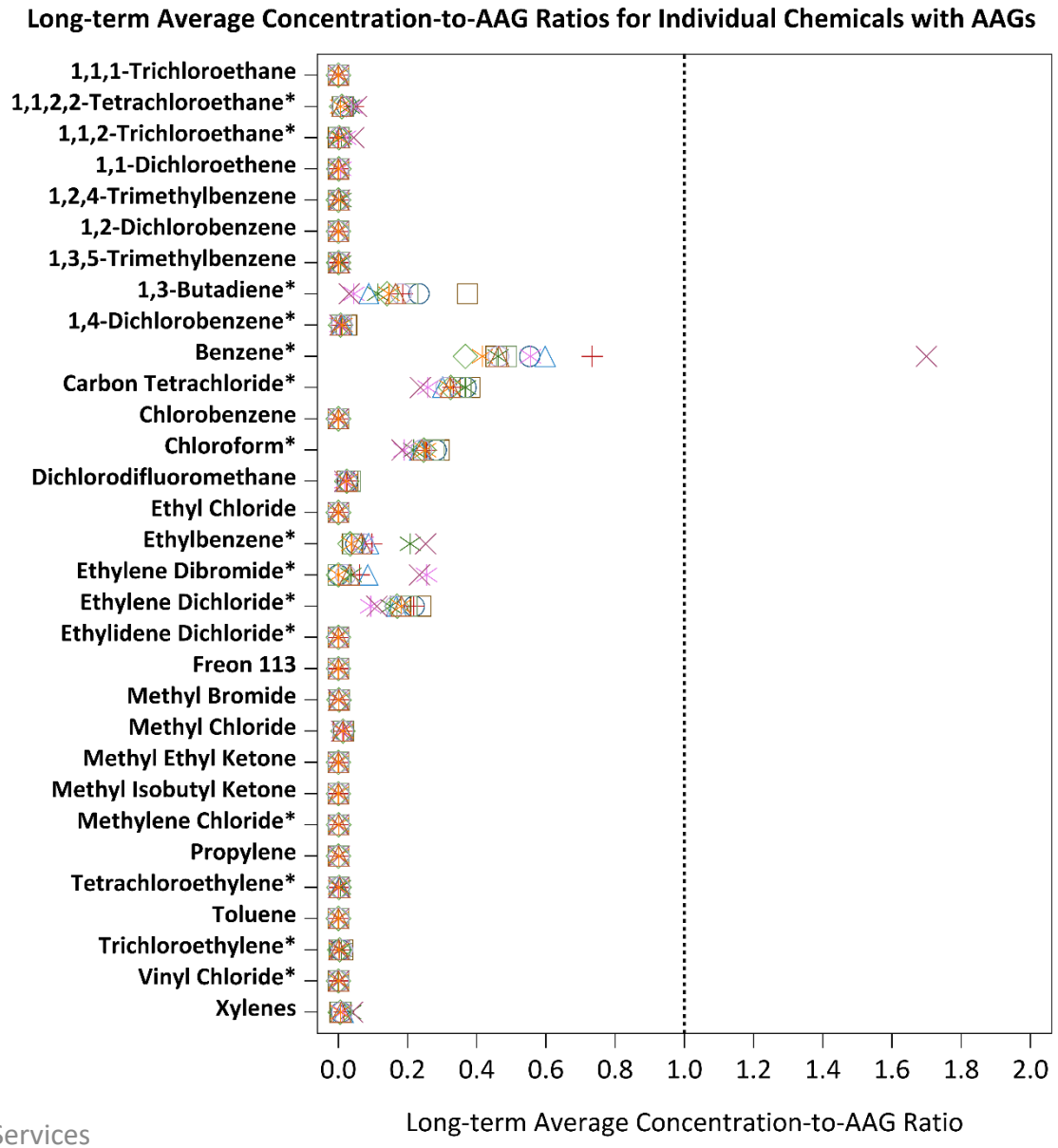
Long-term exposure health assessment - example figures



Long-term exposure health assessment - example figures

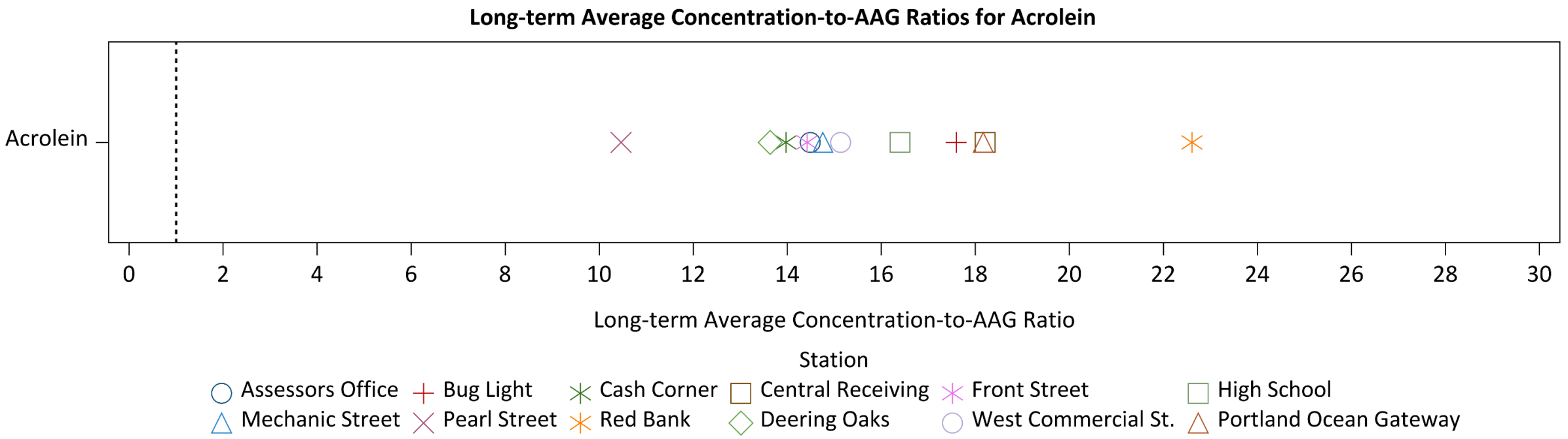


Long-term exposure health assessment



*VOC has a cancer toxicity value and contributes to cumulative cancer risk

Acrolein - Long-term exposure health assessment



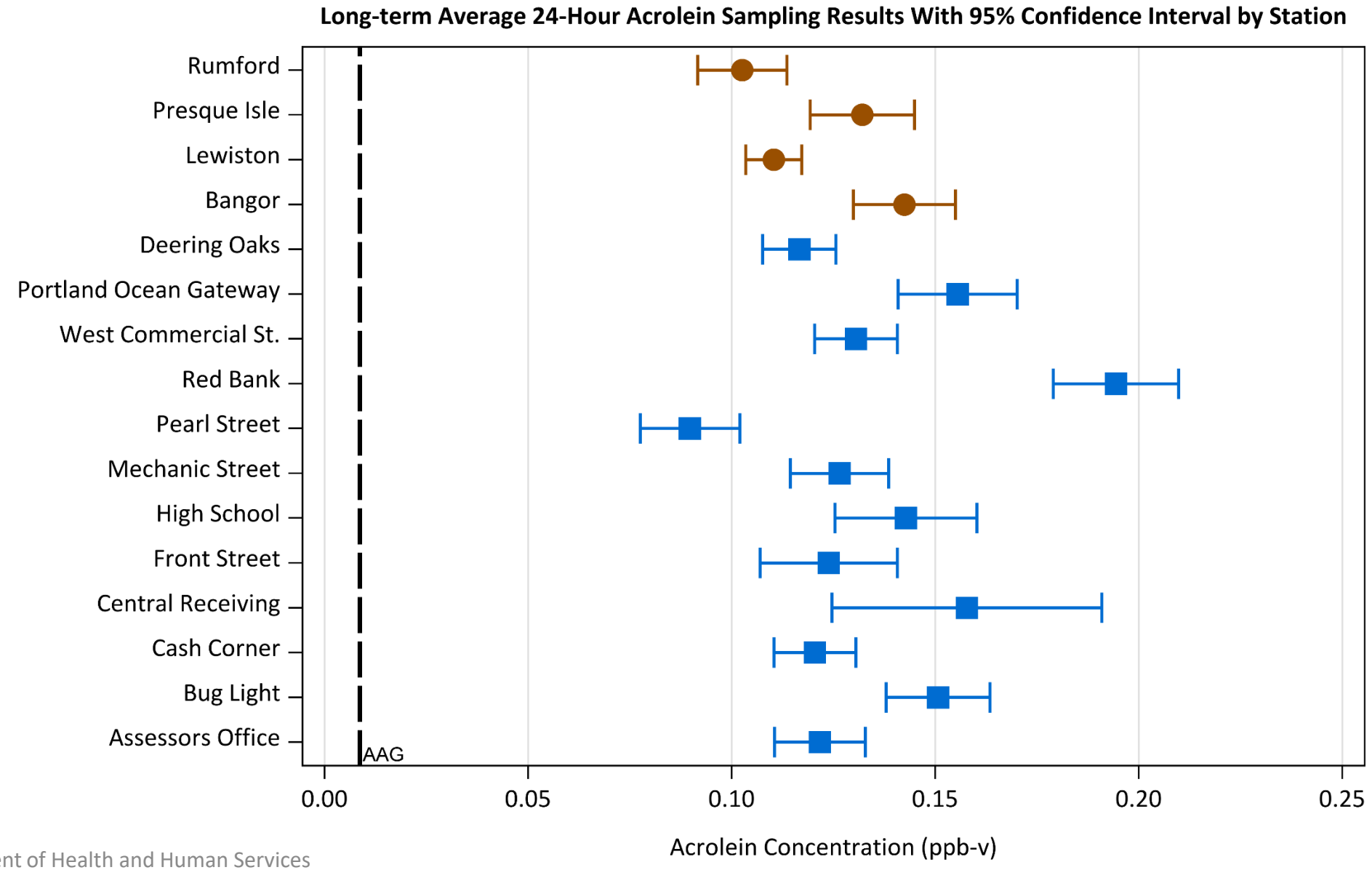
Long-term exposure health assessment findings

- Levels of two VOCs were found above the AAGs.
- Acrolein was above the AAG at all monitoring stations.
- Benzene was above the AAG at one monitoring station - Pearl Street at the fenceline.

Acrolein - sources and toxicity

- Sources: Burning fossil fuels, smoke from fires or tobacco, cooking fats and oils at high temperatures.
- Short-term exposure to acrolein caused nose and throat irritation in humans.
- Long-term exposure to acrolein caused an increase nasal lesions in studies with laboratory rats.
- Toxicity values are levels of exposure that have only a small risk of health effects from either short-term (acute MRLs) or long-term (AAGs) exposures.

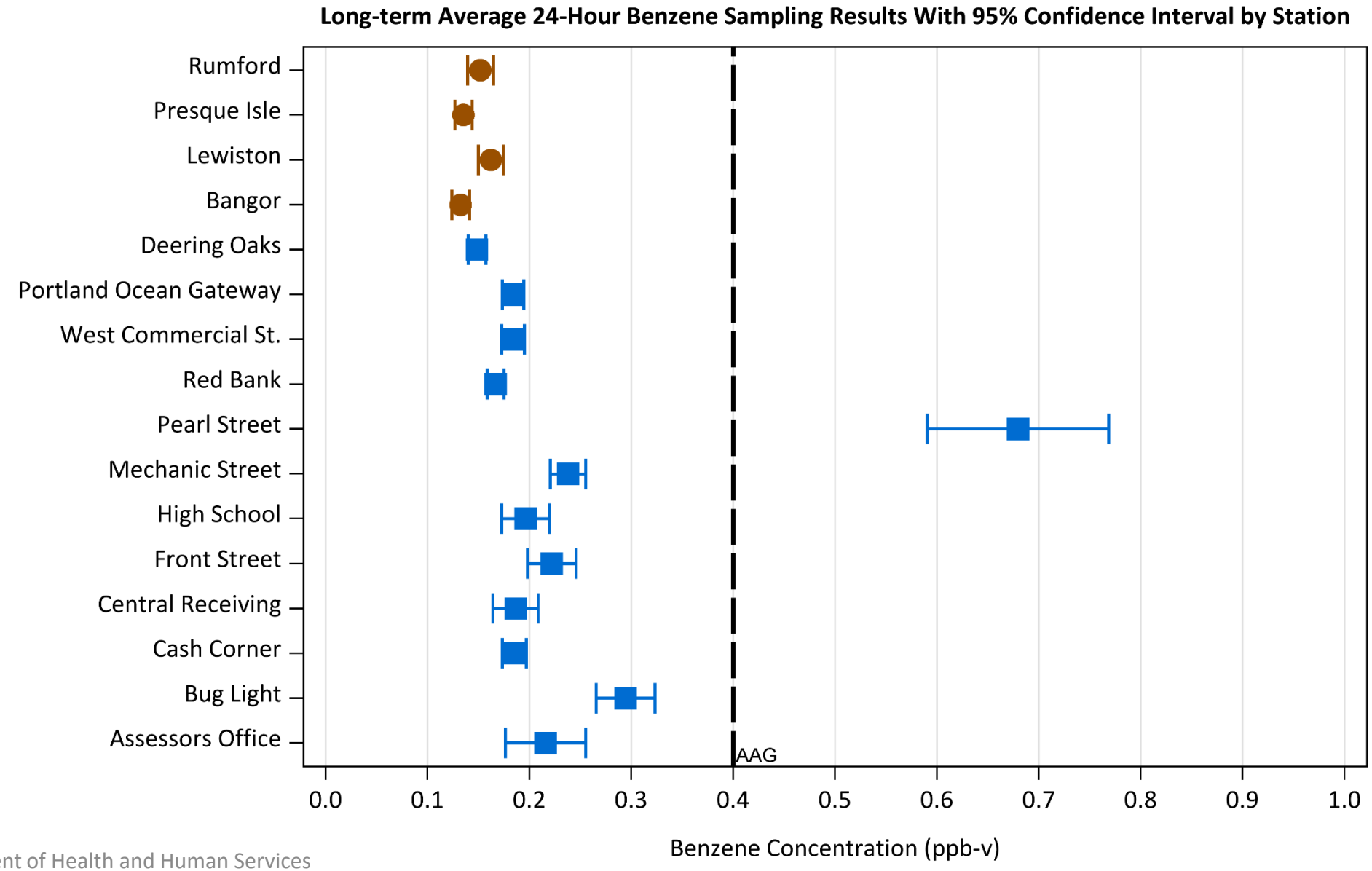
Acrolein - comparison to statewide concentrations



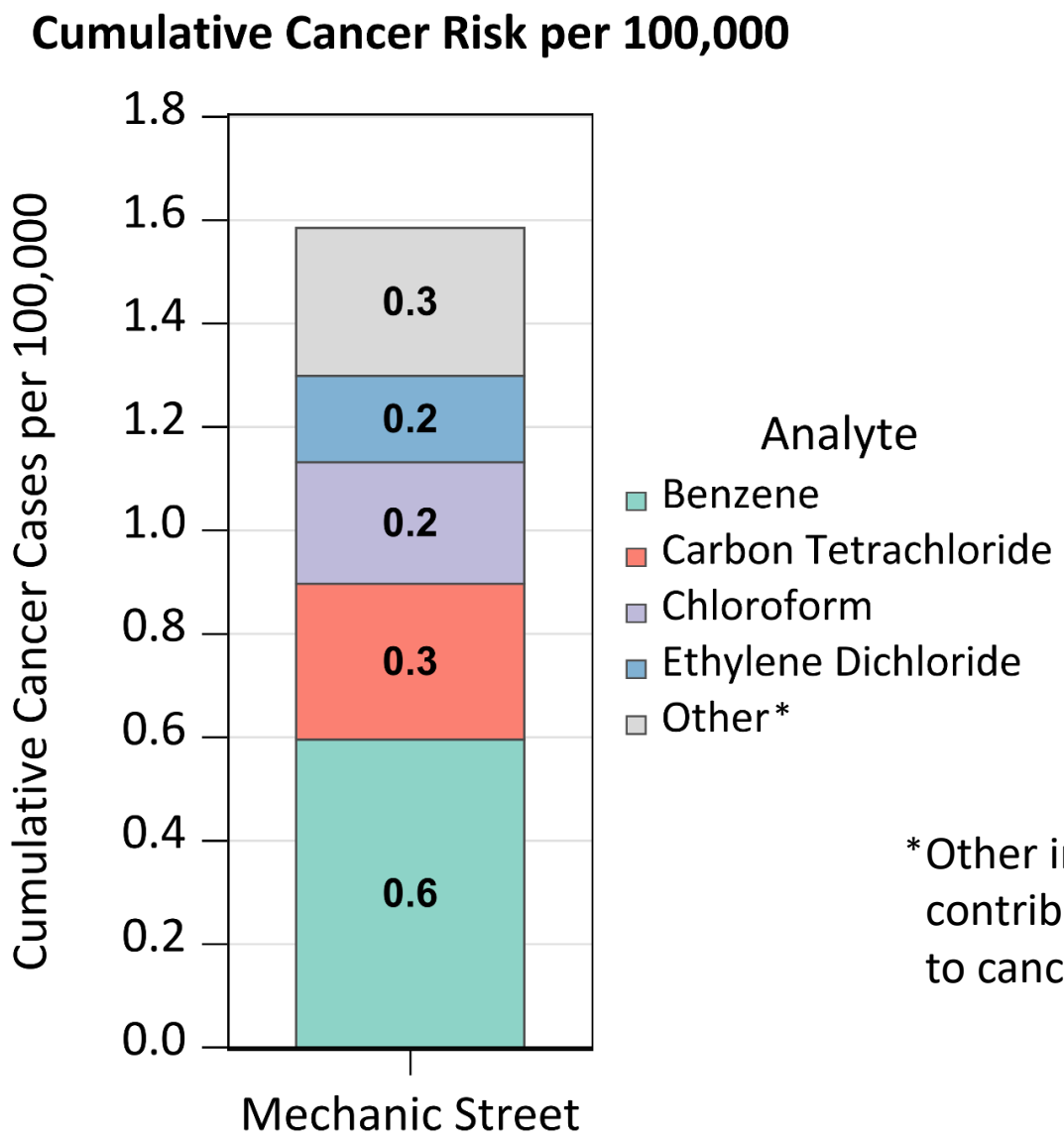
Benzene - sources and toxicity

- Sources: gasoline (up to 1% by volume), vehicle exhaust, burning wood, gas stoves, cigarette smoke.
- Short-term exposure to benzene in air can increase the risk of effects on white blood cells and the immune system.
- Long-term exposure to benzene may increase risk for certain types of cancer of the blood and bone marrow.
- Toxicity values are levels of exposure that have only a small risk of health effects from either short-term (acute MRLs) or long-term (AAGs) exposures.

Benzene - comparison to statewide concentrations

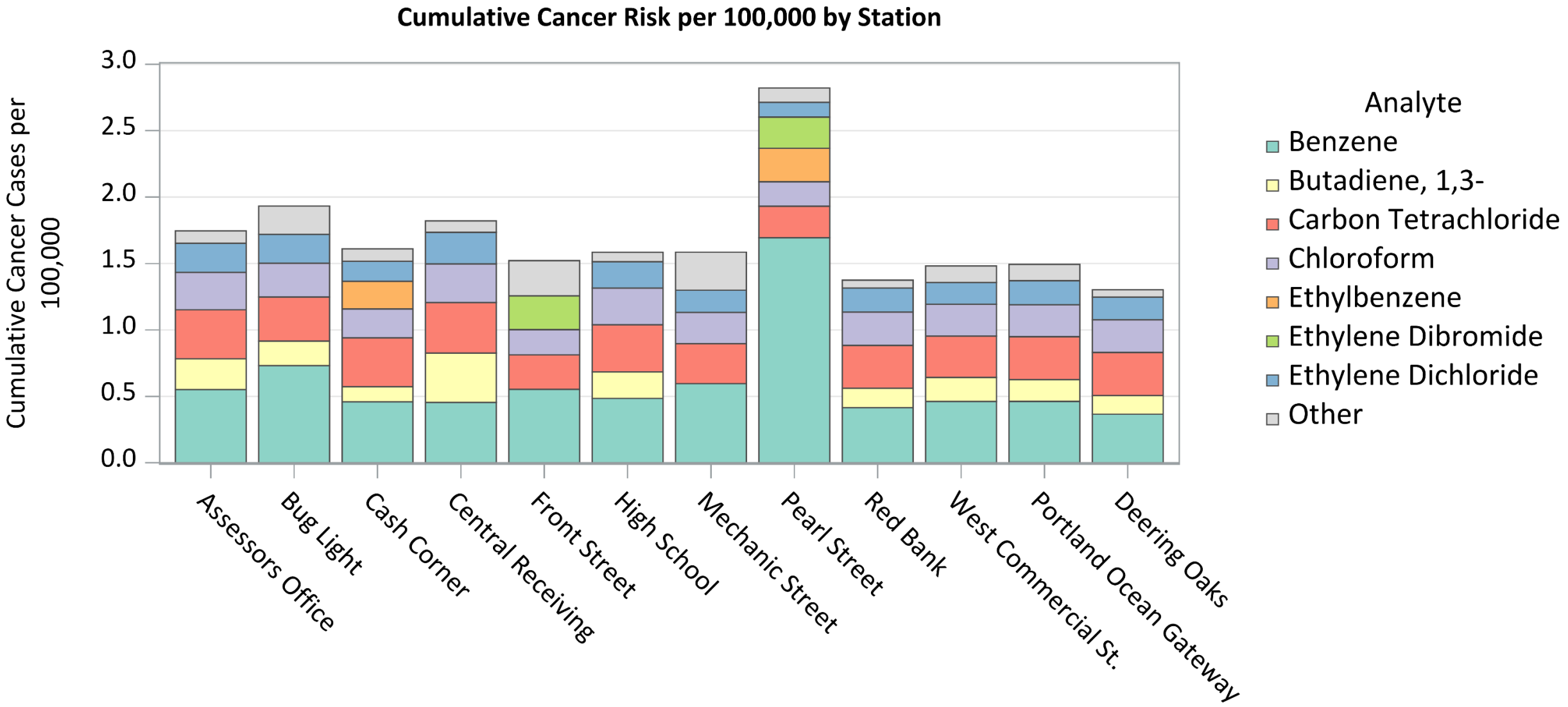


Cumulative cancer risk estimates - example figure

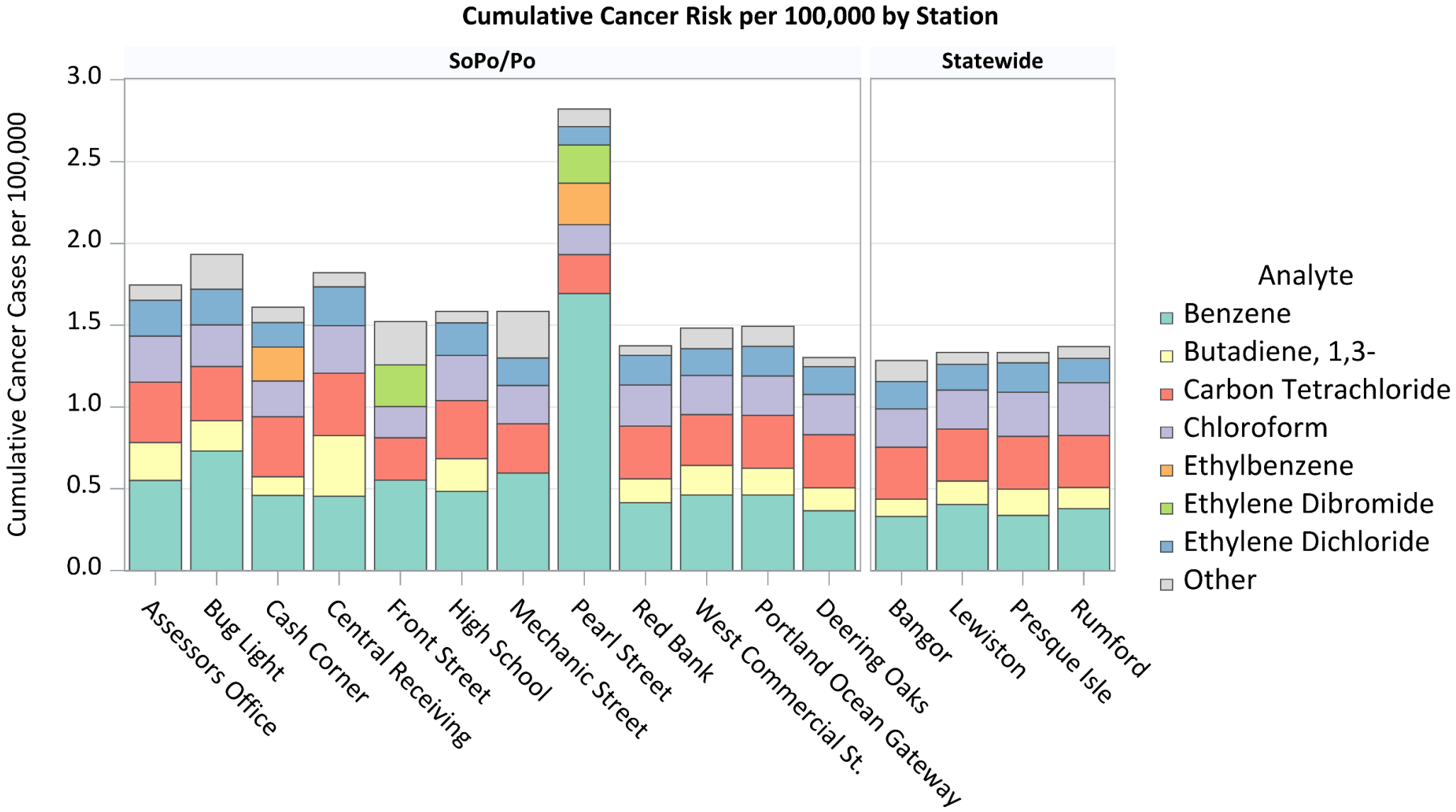


*Other includes any VOC that contributes < 0.1 per 100,000 to cancer risk

Cumulative cancer risk estimates



Cumulative cancer risk estimates - comparing statewide



Summary of findings

- No monitoring locations had 24 hour sample results exceeding short-term health guidelines.
- All monitoring locations had long-term ambient air levels of acrolein substantially higher than the AAG.
- Acrolein levels in South Portland and Portland were similar to measured levels in Bangor, Lewiston, Presque Isle and Rumford.

Summary of findings

- With the exception of Pearl Street, all monitoring locations had long-term ambient air levels of benzene below the AAG.
- Pearl Street had long-term benzene levels above the AAG. This site is located on a fenceline of a petroleum storage facility, but there are also nearby homes.
- Cumulative cancer risk estimates across Portland and South Portland ranged from 1.5 to 2.0 per 100,000 exposed people, with the exception of Pearl Street, which was higher at 2.8 per 100,000.

Qualitative comparison of naphthalene

