

National Air Toxics Assessment and Cancer Risk in Allegheny County Pennsylvania Updated – May 2021

What is NATA?

In August 2018, the U.S. Environmental Protection Agency (EPA) released the results of its 2014 National Air Toxics Assessment (NATA). More recent data are not yet available. The purpose of NATA is to identify and prioritize air toxics (a subset of chemicals in the air pollution mixture, also called Hazardous Air Pollutants (HAPs)), emission source type, and locations that are of greatest potential concern in terms of contributing to population risk. Based on 2014 emissions data, this assessment characterizes potential public health risk due to inhalation of air toxics including both cancer and non-cancer effects. The U.S. EPA considers cancer risks over its 1 in 1 million benchmark to be of concern.

WHAT DOES NATA TELL US ABOUT CANCER RISK FROM INHALABLE AIR POLLUTION?

Hazardous air pollutants (HAPs) include contaminants that cause cancer but do not include the six “criteria air pollutants” for which the Clean Air Act (CAA) requires National Ambient Air Quality Standards, some of which also confer cancer risk. The CAA differentiates these six ubiquitous pollutants (e.g. ozone, fine particulate matter, sulfur dioxide) from the 187 pollutants categorized as HAPs. EPA’s NATA reports 71 cancer-causing HAPs; some of the better-known include benzene, formaldehyde, perchloroethylene and methylene chloride. While criteria pollutants have ambient standards that must be met, HAPs regulations center on emissions standards at the source of the pollutant (which can be point sources or mobile sources) followed by a residual risk analysis. The residual risk refers to ambient HAPs levels and community risk after sources meet their emissions standards. NATA helps to assess this remaining risk by modeling known emission levels to determine exposure levels in the community. Though NATA reports exposure estimates from diesel particulate matter (DPM), it does not quantify this risk. **Total cancer risk from air pollution derives from HAPs, DPM and fine particulate matter. This fact sheet summarizes cancer risk from HAPs and DPM.**

CANCER RISK FROM HAZARDOUS AIR POLLUTANTS

According to the 2014 NATA, the estimated cancer risk from HAPs for Allegheny County is 39.7 per million. **The cancer risk from HAPs in the county ranked 238th out of more than 3,200 counties nationwide, well within the worst 10%. Cancer risk from air toxics in Allegheny County ranked 34th of 262 counties with population greater than 250,000 people (worst 13%).** The 2014 NATA also estimated that over under 0.2% of all census tracts in the US (106/73,000), had total cancer risks from HAPs of greater than 100 in 1 million. Of these high-risk census tracts in the US, ~3% (3/106) are located in Allegheny County. The apparent improvement of HAPs-related cancer risk in Allegheny County—relative to other counties—between 2011 and 2014 NATA resulted from an increase in the estimated risk for ethylene oxide, which impacted the overall estimated cancer risk in other regions of the country more so than Allegheny County. For example, while coke oven emissions are major drivers of the high risk in Allegheny County, ethylene oxide is a more significant contributor in other counties, such as St. John Parish Louisiana.

CANCER RISK FROM POINT SOURCE EMISSIONS: A LOCAL CONCERN

As with prior years, the 2014 NATA suggests that point sources are of particular concern for Allegheny County in terms of cancer risk from HAPs. **Among all counties in the US, urban and non-urban, Allegheny County ranks 27th in cancer risk from point source air toxics emissions, e.g., in the top 1% of all counties.** People living in

Allegheny County are subject to a risk of 12.8 per million of contracting cancer as a result of exposure to air toxic emissions from point sources, ranked 9th of all urban counties (top 3%) in the U.S. for risk from point sources. The risk level is over 6 times higher than the risk for people living in other urban counties on average (2.1 per million), and nearly twice that of the neighboring high population county (Westmoreland County, PA at 7.6 per million). Other high-risk high population counties from point sources are located in the metro Houston area and bordering cancer alley in Louisiana. Nearly 90% of the point source cancer risk estimated in Allegheny County is attributable to coke oven emissions, with ~90% of those emissions from the Clairton facility.¹

Within Allegheny County, over half of the census tracts have an estimated cancer risk above 10 per million due to point sources, indicating a serious concern throughout the county that is not limited to just a few localized areas. Further, EPA determined that more than 10% of US Census tracts with point source risk over 10 per million were located in Allegheny County, with another 1% of the tracts in Westmoreland County, though Allegheny County has only ~0.5% of US census tracts (402/73,215).

CANCER RISK FROM MOBILE SOURCE EMISSIONS REMAIN PROBLEMATIC

Mobile sources account for over 9% of the estimated cancer risk from HAPs in Allegheny County, mostly due to gasoline cars (85% of the 3.7 per million risk from mobile sources). The cancer risk from cars ranks the county in the worst 7% of all counties nationally, although the risk is 90% of the median mobile source risk for high population counties (i.e., in the middle of the pack for cities).

It is important to note that NATA does not include cancer risks attributable to particulate matter. NATA reports exposure estimates for diesel particulate matter (DPM) but does not quantify that risk. The risk can be determined using the toxicity estimate for DPM reported by the State of California. For all ten southwestern Pennsylvania Counties,² the DPM cancer risk exceeds the risk from the sum of the other modeled HAPs. In Allegheny County, the DPM cancer risk is nearly double that of other HAPs. In fact, 42 tracts in the region have cancer risk from DPM that exceeds 100 per million, with all but two tracts located in Allegheny County.

TOTAL CANCER RISK FROM HAPs AND DIESEL PARTICULATE MATTER

The population averaged cancer risk in Allegheny County from HAPs and DPM exceeds 100 per million people. **This places Allegheny County in the top 4% of all counties in the country for summed HAPs and DPM cancer risk. Risk from fine particulate matter—not included in NATA—elevates the cancer risk from air pollution further.** This indicates a serious public health problem with regard to cancer risk from air pollution in Allegheny County.

ENVIRONMENTAL JUSTICE

Pennsylvania defines an environmental justice (EJ) area as any census tract where 20 percent or more individuals live at or below the federal poverty line, and/or 30 percent or more of the population identifies as a non-white minority, based on US Census data. Analysis of NATA results for EJ tracts as determined by 2010 census data reveal disparities between EJ and non-EJ tracts in Allegheny County for certain Hazardous Air Pollutants. The analysis focused on mobile source and point source air toxic impacts. Total cancer risk was calculated by summing the risks from all modeled NATA toxic species and risk due to exposure to DPM. **This population-averaged total cancer risk for EJ and non-EJ tracts³ in the County exceeded 100 per million (see above) and was 26% greater in EJ**

¹ Shenango Cokeworks, which ceased operations in January 2016, accounted for the remainder in 2014 NATA.

² Here Southwestern Pennsylvania refers to Allegheny, Armstrong, Beaver, Butler, Fayette, Greene, Indiana, Lawrence, Washington and Westmoreland Counties.

³ Composite risk for all EJ tracts is weighted by the risk and population of each tract; population times risk in each tract summed and divided by total population in EJ tracts. Similar calculation for non-EJ tracts yields the population-weighted risk in non-EJ tracts.

tracts.⁴ Most of the difference is due to DPM (78%), followed by risk from point sources (16%). Non-EJ tracts had two-thirds of the modeled total risk across the county and account for 72% of the population.⁵

Population-weighted risk from DPM in Allegheny County was 32% higher in EJ tracts as compared to non-EJ tracts. For point sources, the risk was 25% higher at EJ tracts.⁶ Coke oven emissions contribute 85% of the total point source risk. Gasoline vehicle cancer risk is 18% higher for EJ tracts. Individual mobile source air toxics such as benzene (+9% risk), 1,3-butadiene (+15%) and naphthalene (+17%) contribute to this differential. Both formaldehyde and acetaldehyde risks are greater in EJ tracts, but these additional risks are small at 3% and 2%, respectively.

SPECIES SPECIFIC RISK FROM NATA IN SOUTHWESTERN PENNSYLVANIA

EPA reports cancer risk from 71 carcinogenic species. For Southwestern Pennsylvania, nearly all of the cancer risk comes from a handful of compounds: Formaldehyde, Coke Oven Emissions, Benzene, Carbon Tetrachloride, Acetaldehyde, Naphthalene, Hexavalent Chromium and 1,3-butadiene. Risks for Coke Oven emissions and Hexavalent Chromium show significant gradients, an indication that they are derived primarily from point sources. There are six census tracts across the region exceeding 10 per million risk from Hexavalent Chromium. On the other hand, every tract in the region exceeds 10 per million risk from formaldehyde. Since the majority of formaldehyde results from chemical reactions in the atmosphere, the concentration gradients are modest. Formaldehyde and acetaldehyde account for roughly half of the cancer risk from HAPs in Southwestern Pennsylvania, while benzene and 1,3-butadiene represent 10 and 2 percent, respectively.

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⁴ Statistically significant at the 95% level.

⁵ There were 136 tracts identified as EJ tracts. When considering HAPs and DPM risk separately, 1 and 32 tracts had risk over 100 per million, respectively; however, HAPs + DPM risk exceeded 100 per million in 131 of the 136 tracts. For non-EJ tracts, there were 2, 8 and 168 tracts out of 264 that exceeded 100 per million cancer risk for HAPs only, DPM only, or HAPs + DPM.

⁶ Statistically significant at the 95% level.