

Air Pollution

Public Health Brief



Ronya Nassar, Health Policy Analyst



Air Pollution & Particulate Matter

The harmful effects of elevated air pollution on health have been well researched. Studies show exposure to air pollution results in decreased lung function, chronic bronchitis, asthma, and other adverse pulmonary effects. Long-term exposure leads to an increased risk for premature death among people age 65 and older, even when exposure is at levels below the National Ambient Air Quality Standards. Particulate matter (PM) is a mixture of solid particles and liquid droplets found in the air. The term "air pollution" is a measure of the PM in the air. Particles less than 2.5 micrometers in diameter are known as fine particles or PM 2.5, which pose the greatest risk to health. Air pollution is generally reported by the average daily density of fine particulate matter (PM 2.5) in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$).^{1,2}

Vehicle emissions, stationary power generation, other industrial and agricultural emissions, residential heating and cooking, re-emission from terrestrial and aquatic surfaces, and the manufacturing, distribution and use of chemicals and natural processes are just a few sources that contribute to outdoor air pollution.³

Health Disparities

A health disparity is a difference in health outcomes and their causes among groups of people. Health disparities and the impact of air pollution have been studied and show that poorer people and some racial and ethnic groups are among those who often face higher exposure to pollutants and who may experience greater responses to such pollution. The three possible explanations behind this include: pollution sources tend to be located near disadvantaged communities, low social position may make some groups more susceptible to health threats because of factors related to their disadvantage, and existing health conditions, behaviors or traits may predispose some groups to greater risk.⁴

Sources:

1. Robert Wood Johnson Foundation County Health Rankings www.countyhealthrankings.org/app/maryland/2018/rankings/harford/county/factors/overall/snapshot
2. United States Environmental Protection Agency www3.epa.gov/region1/airquality/reducepollution.html
3. Unger N, Bond TC, Wang JS, Koch DM, Menon S, Shindell DT, et al. Attribution of climate forcing to economic sectors. Proc Natl Acad Sci USA. 2010;107(8):3382-7
4. American Lung Association Disparities in the Impact of Air Pollution <https://www.lung.org/clean-air/outdoors/who-is-at-risk/disparities>
5. Bekkar B, Pacheco S, Basu R, DeNicola N. Association of Air Pollution and Heat Exposure With Preterm Birth, Low Birth Weight, and Stillbirth in the US: A Systematic Review. JAMA Netw Open. 2020.

AIR POLLUTION DATA 2020*

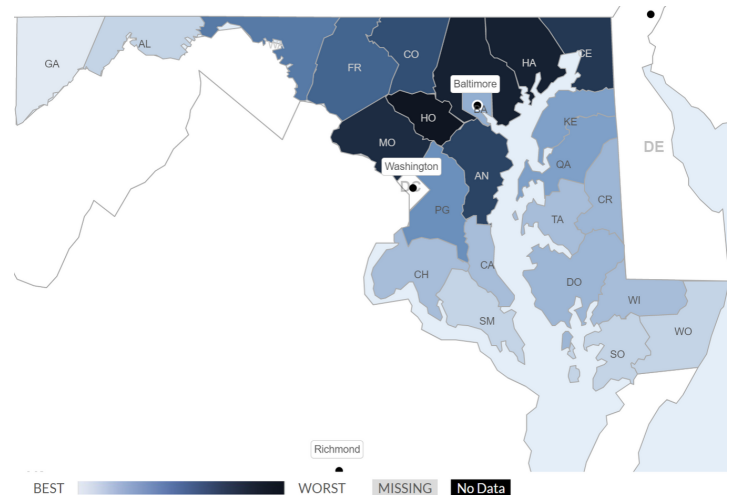
Average Density of Fine Particulate Matter**	
Harford County	10.9 $\mu\text{g}/\text{m}^3$
Maryland	9.6 $\mu\text{g}/\text{m}^3$
United States	6.1 $\mu\text{g}/\text{m}^3$

*2020 County Health Rankings
 ** The World Health Organization's Fine particulate matter (PM2.5) guideline values are 10 $\mu\text{g}/\text{m}^3$ for an annual mean

Air Pollution and Birth Outcomes

A systematic review of 68 articles (a total of 32,798,152 births) was completed to see the relationship between climate change and birth outcomes. The review revealed a significant association between air pollutants and heat exposure with birth outcomes. Specifically, exposure to particulate matter and ozone were associated with increased risk to preterm and low birth. The populations that showed highest risk were women with asthma and minority groups, especially black mothers. This review provides evidence that common environmental exposures are associated with serious adverse pregnancy outcomes.⁵

Average daily density of fine particulate matter in micrograms per cubic meter (PM2.5)



Harford County, with an average daily density of 10.9 $\mu\text{g}/\text{m}^3$, is ranked 2nd worst compared to the other Maryland jurisdictions. The 2020 County Health Rankings used data from 2014 for this measure.