

Health Risks of Particle Pollution

Particle pollution is a lethal air pollutant. Particle pollution is made up of microscopic specks of soot, metals, acids, dirt, pollen, molds, and aerosols that are tiny enough to inhale.¹ These particles are many times smaller than the diameter of a human hair, as shown in the illustration.

Particles penetrate deep into the lungs and even into the bloodstream, leading to tens of thousands of premature deaths, heart attacks and asthma attacks every year. The World Health Organization concluded in 2013 that breathing particle pollution causes lung cancer.²

Breathing particles can trigger asthma attacks³; cause lung cancer⁴; increase the risk of heart attacks and strokes⁵; damage lung tissue and airways⁶; increase hospital visits for respiratory and cardiovascular problems⁷; contribute to cognitive decline such as dementia⁸; may impact pregnancy and birth outcomes, such as preterm birth, low birth weight, and fetal and infant mortality⁹; and can even kill.¹⁰

Someone in every family is vulnerable. Children; teens; people with chronic lung disease, such as asthma and COPD (which includes chronic bronchitis and emphysema); people with low incomes; people of color; and current and former smokers are more vulnerable to the risk of harm from particles.

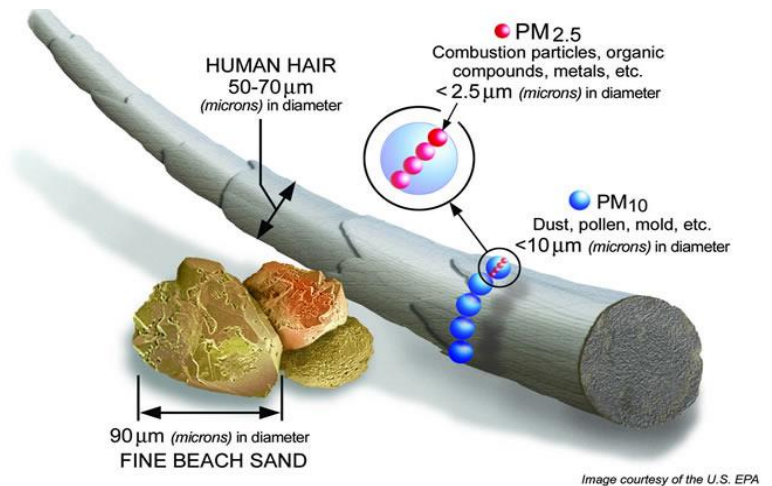
People with heart disease, high blood pressure, coronary artery disease, congestive heart failure and lung cancer, and people who are obese, also face higher risk from particle pollution.¹¹

Low levels of particles can be deadly. In recent large studies, scientists found that older adults faced a higher risk of dying from particle pollution even in communities that met current national standards.^{12,13}

We must clean up the sources of particles. Particles come from wide-ranging sources, including coal-fired power plants, industrial boilers, diesel vehicles, wildfires and woodstoves.

Cleaning up particle pollution saves lives and protects public health.

To learn more about the health effects of particle pollution, visit www.stateoftheair.org/health-risks.



Sources

- ¹ U.S. EPA. Integrated Science Assessment for Particulate Matter, December 2019. EPA/600/R-19/188.
- ² Loomis D, Gross Y, et al. [The carcinogenicity of outdoor air pollution](#). *The Lancet Oncology*. 2013; 14:1262-3. World Health Organization International Agency for Research on Cancer. *IARC Monograph on the Evaluation of Carcinogenic Risks to Humans*. Volume 109, Outdoor Air Pollution. Lyon: IARC (in Press).
- ³ U.S. EPA. Integrated Science Assessment for Particulate Matter, December 2019. EPA/600/R-19/188.
- ⁴ World Health Organization International Agency for Research on Cancer. Hamra GB, Guha N, Cohen A, Laden F, Raaschou-Nielsen O, Samet JM, Vineis P, Forastiere F, Saldiva P, Yorifuji T, and Loomis D. Outdoor Particulate Matter Exposure and Lung Cancer: A Systematic Review and Meta-Analysis. *Environ Health Perspect*. 2014: 122: 906-911.
- ⁵ U.S. EPA. Integrated Science Assessment for Particulate Matter, December 2019. EPA/600/R-19/188.
- ⁶ U.S. EPA. Integrated Science Assessment for Particulate Matter, December 2019. EPA/600/R-19/188.
- ⁷ U.S. EPA. Integrated Science Assessment for Particulate Matter, December 2019. EPA/600/R-19/188.
- ⁸ Peters R, Ee N, Peters J, Booth A, Mudway I, Anstey KJ. Air Pollution and Dementia: A Systematic Review. *J Alzheimers Dis*. 2019;70(s1):S145-S163. doi: 10.3233/JAD-180631.
- ⁹ Liang Z, Yang Y, Qian Z, Ruan Z, Chang J, Vaughn MG, Zhao Q, Lin H. Ambient PM2.5 and birth outcomes: Estimating the association and attributable risk using a birth cohort study in nine Chinese cities. *Environment International*. Volume 126, May 2019, Pages 329-335
- ¹⁰ U.S. EPA. Integrated Science Assessment for Particulate Matter, December 2019. EPA/600/R-19/188. . World Health Organization International Agency for Research on Cancer. Hamra GB, Guha N, Cohen A, Laden F, Raaschou-Nielsen O, Samet JM, Vineis P, Forastiere F, Saldiva P, Yorifuji T, and Loomis D. Outdoor Particulate Matter Exposure and Lung Cancer: A Systematic Review and Meta-Analysis. *Environ Health Perspect*. 2014: 122: 906-911.
- ¹¹ U.S. EPA. Integrated Science Assessment for Particulate Matter, December 2019. EPA/600/R-19/188.
- ¹² Di Q, Dai L, Wang Yun, Zanobetti A, Choirat C, Schwartz JD, Dominici F. Association of Short-Term Exposure to Air Pollution with Mortality in Older Adults. *JAMA*, online December 26, 2017, doi: 10.1001/jama.2017.17923
- ¹³ Di Q, Wang Yan, Zanobetti A, Wang Yun, Koutrakis P, Choirat C, Dominici F, Schwartz JD. Air Pollution and Mortality in the Medicare Population. *N Engl J Med* 2017; 376:2513-2522