



# Indicators of Environmental Health Disparities: Childhood Asthma Prevalence

## About the Indicators of Environmental Health Disparities

EPA's indicators of environmental health disparities aim to illustrate disparities in key environmental and public health conditions across race/ethnicity and socioeconomic status, as well as the relationship between these health outcomes and the work of EPA programs. This project was created in direct response to EPA's [2022-2026 Strategic Plan](#). These indicators are intended solely as an informational tool and are not intended to be the basis for agency decision making. EPA does not, consistent with applicable laws, distribute governmental benefits or burdens based on race, color, national origin, or sex.

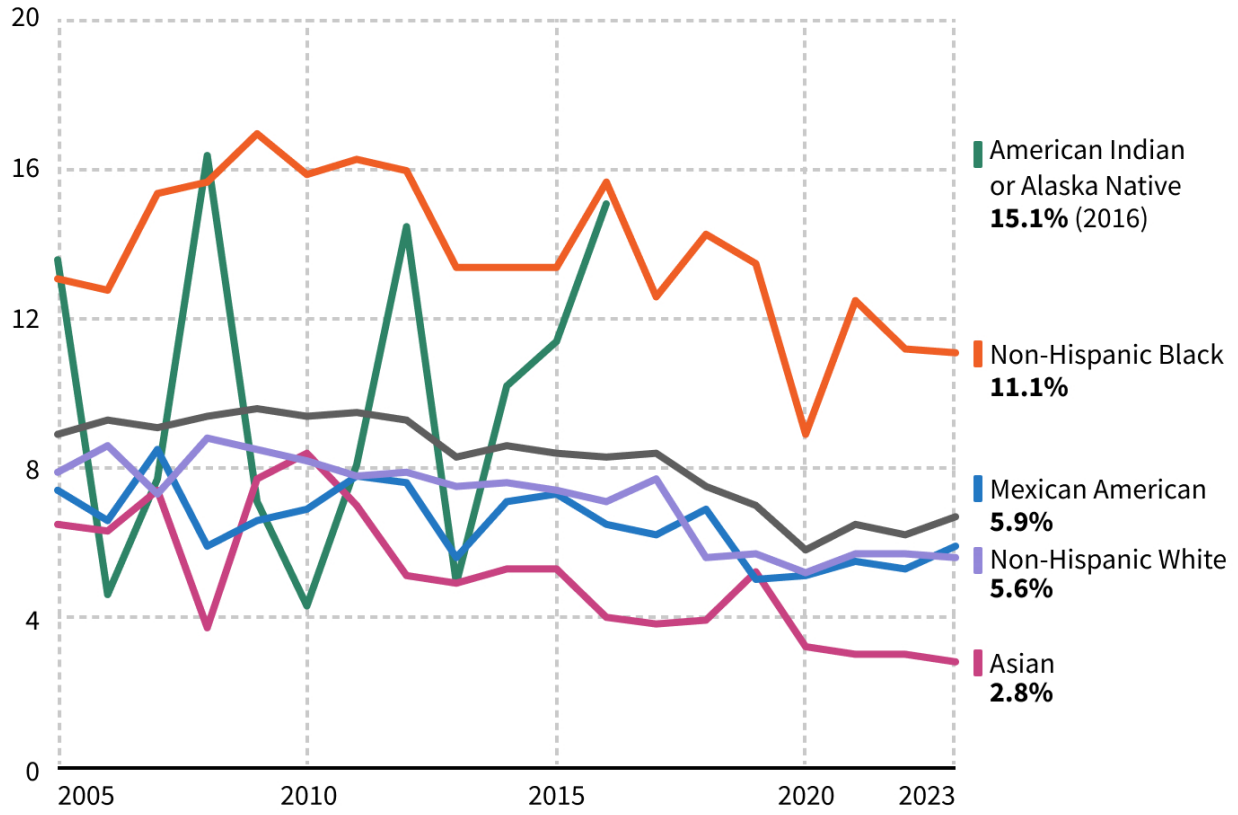
## Background Information

Asthma is a chronic inflammatory disease of the lungs and airways that impacts more than 25 million Americans, including 4 million children.<sup>1,2</sup> There are some known genetic and environmental factors that impact susceptibility to asthma, but asthma's causes are largely unknown. Asthma attacks occur when the airways within the lungs of someone with asthma become restricted and symptoms include wheezing, coughing, and breathlessness. These asthma attacks can range from mild to life-threatening.<sup>1</sup>

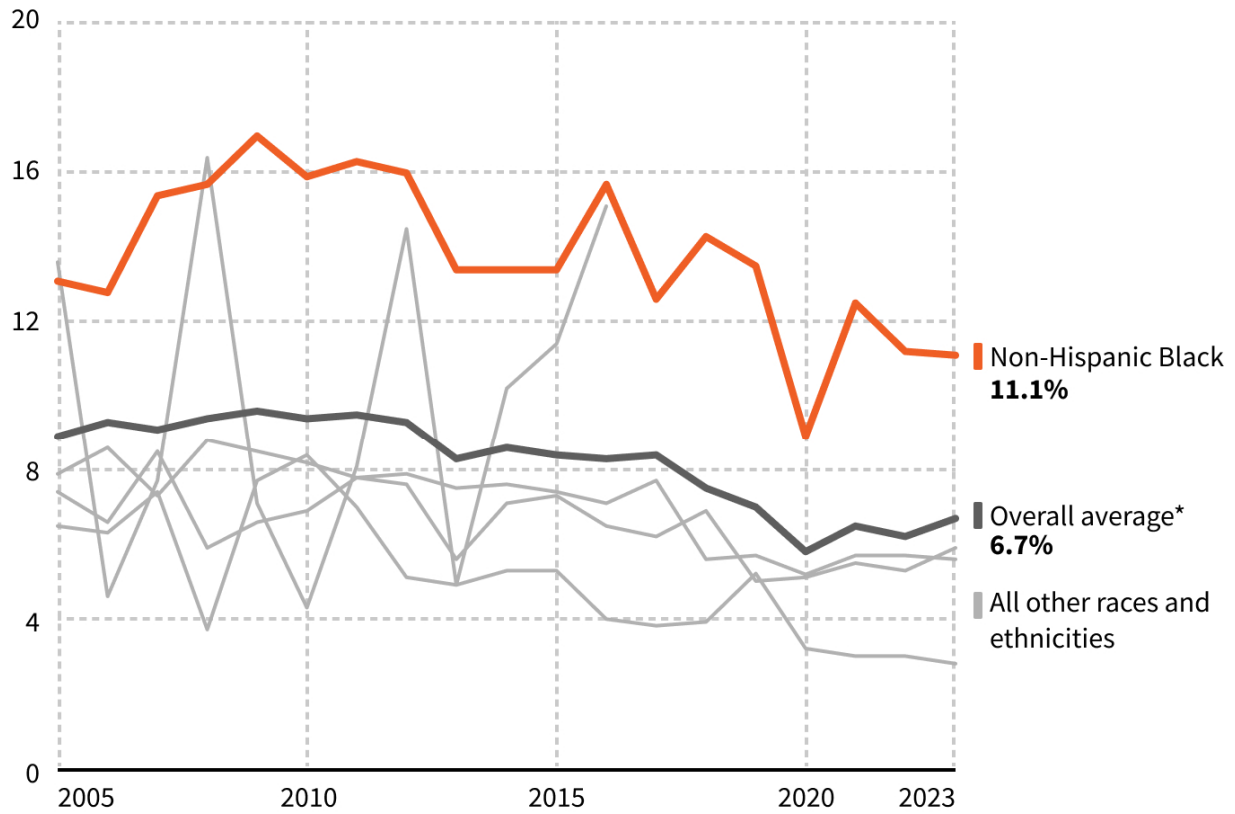
There is no cure for asthma; however, the harmful effects of asthma can be reduced through medications and managing triggers so that individuals with asthma can live healthy lives. There are many indoor and outdoor environmental triggers that are known to worsen asthma symptoms or cause asthma attacks. These include secondhand smoke, dust mites, mold, outdoor air pollution, pets, and cockroaches and other pests.<sup>3</sup> Several criteria air pollutants are known to exacerbate asthma symptoms and contribute to asthma development.<sup>4,5,6</sup> In addition, climate change may affect air quality and worsen asthma in several ways. Climate-driven changes in weather can increase certain criteria air pollutants like ozone and particulate matter, as well as other triggers such as pollen, mold, dust mites, and bacteria, all of which may exacerbate asthma. Climate change also leads to more frequent wildfires, which worsen respiratory illnesses including asthma.<sup>7</sup>

Asthma impacts certain groups more than others, including children, older adults, people of color, and those of lower socioeconomic status. These disparate impacts may be due to environmental factors related to socioeconomic status, like housing conditions or proximity to sources of pollution. Children of color have a higher prevalence of asthma and asthma-related emergencies. Children with asthma seem to be impacted by particle pollution more so than adults with asthma.<sup>8</sup>

**Figure 1. Childhood Asthma by Race and Ethnicity**  
Percent

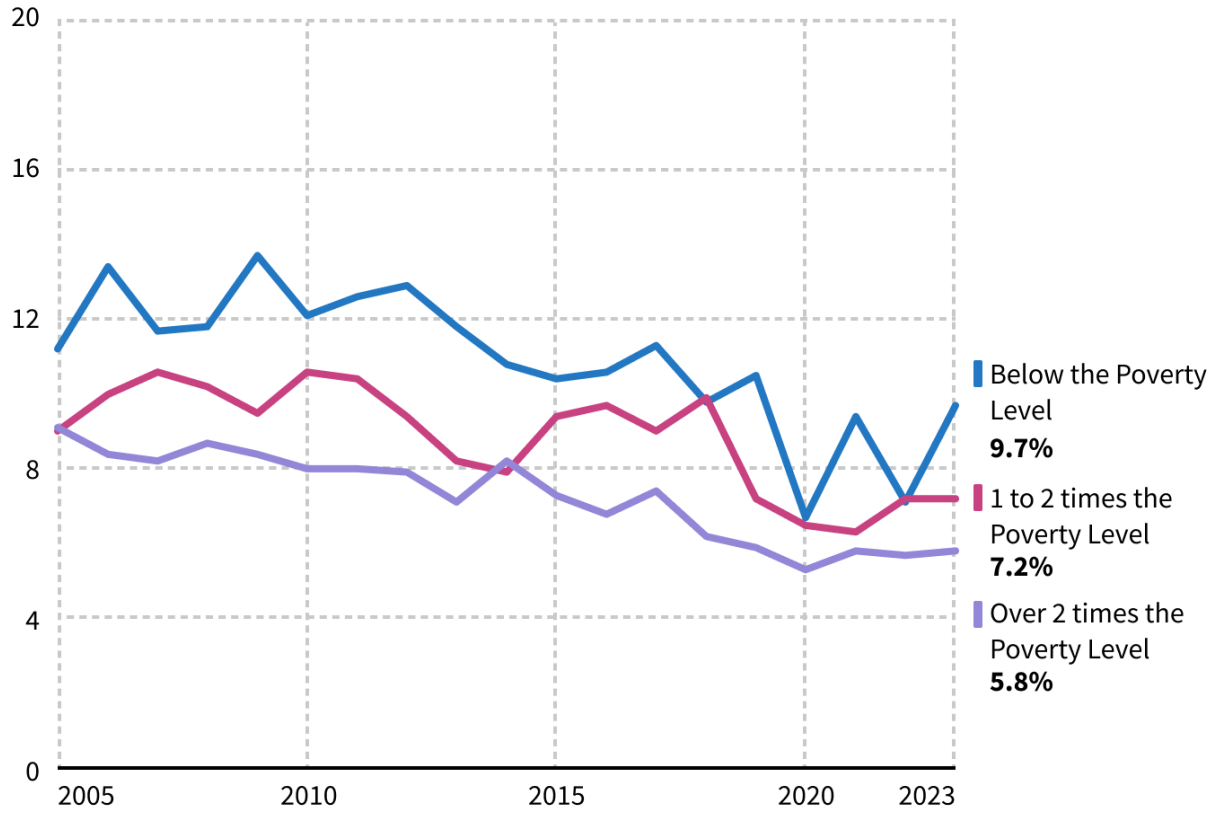


**Figure 2. Disparities in Childhood Asthma by Race and Ethnicity**  
Percent



\*The "overall average" line includes other racial and ethnic groups not shown in the other charts.

**Figure 3. Childhood Asthma by Poverty Level**  
Percent



## What these charts show

These charts show the age-adjusted prevalence of asthma in children (age 0-17) in the U.S. from 2005 to 2023.<sup>9</sup>

- 6.7% of children in the U.S. currently had asthma in 2023 (Figure 2). However, this number varies based on socioeconomic and racial and ethnic backgrounds (Figure 1).
- The prevalence of asthma in Non-Hispanic Black or African American children is nearly double (11.1%) the overall average in 2023 (Figure 2). Note: the erratic year to year changes in asthma for American Indian/Alaska Natives can be partially attributed to limited data availability.
- For those below the poverty level,<sup>10</sup> the age-adjusted percent of children with asthma in 2023 was 9.7%, compared to 7.2% for those one to two times the poverty level and 5.8% for those over two times the poverty level (Figure 3).

This data was collected by the Centers for Disease Control and Prevention's (CDC's) National Center for Health Statistics (NCHS) through the National Health Interview Survey (NHIS). For more information on how data is collected, see the technical documentation.

## What these charts do not show

These charts do not show why there are higher percentages of children with asthma for certain socioeconomic and racial and ethnic groups. While analyzing the prevalence of asthma by demographic groups is useful for determining those who may be most vulnerable and impacted, these graphs do not suggest that socioeconomic level or race and ethnicity cause asthma. Instead, there are many factors that may influence the prevalence of asthma in a specific population that are often related to systemic inequities, including poor access to medical care, environmental exposures, and higher levels of chronic stress.<sup>11</sup> These inequities may be higher in low socioeconomic communities and certain racial and ethnic groups. As discussed above, the effects of climate change can also exacerbate asthma symptoms. Some racial and ethnic and socioeconomic groups are also more vulnerable to the health impacts of climate change than others, due to a range of factors, including: living in areas with aging infrastructure (e.g. some rural areas) or areas that are more prone to climate-related health hazards; limited financial resources or cultural, language or citizenship barriers that restrict access to care; and existing medical conditions.<sup>12</sup>

## Relevant EPA Activities

The EPA leads a variety of activities focused on researching asthma, establishing regulations required by law, and educating the public around the relationship between asthma and air pollution. For those with asthma, air pollution poses a greater risk for health effects than those without asthma. Airway hyperactivity in people with asthma can cause inhaled particles to be deposited in some areas of the lungs more due to obstruction and increased air flow. Particle pollution can worsen preexisting inflammation in the airways as well, accelerating the inflammatory cascade. Those with allergic asthma are also at a higher risk of health effects from pollution when allergen exposure is high.<sup>13</sup>

Different types of air contaminants can impact the development and the symptoms of asthma. There is some variability in the causal relationship of different [criteria air pollutants](#), or the six commonly found air pollutants, to asthma. [Nitrogen dioxide](#) (NO<sub>2</sub>), [sulfur dioxide](#) (SO<sub>2</sub>), and [ozone](#) (O<sub>3</sub>) are all known to exacerbate asthma symptoms after short-term exposures, and there is likely to be a causal relationship between NO<sub>2</sub> and O<sub>3</sub> and long term exposure and asthma development.<sup>4,5,6</sup> Particulate matter below 2.5 micrometers in diameter ([PM<sub>2.5</sub>](#)) is also likely to contribute to asthma following short-term and long-term exposures.<sup>13</sup> [Hazardous air pollutants](#), which includes 188 pollutants identified by the EPA that are

known to cause negative health effects like cancer, are believed to potentially induce and exacerbate asthma symptoms, although more research in this area is needed.<sup>14</sup>

EPA is engaged in a range of activities aimed at contributing to reductions in asthma rates, including the following:

- **Regulating criteria air pollutants and their precursors:** Under the Clean Air Act, the EPA sets the National Ambient Air Quality Standards (NAAQS) and works with state and local air quality management agencies to meet those standards. These standards are set for all criteria air pollutants, including [NO<sub>2</sub>](#), [SO<sub>2</sub>](#), and [O<sub>3</sub>](#). In 2024, the EPA [updated](#) the standard for particulate matter below 2.5 micrometers in diameter (PM<sub>2.5</sub>) from 12 micrograms per cubic meter to 9 micrograms per cubic meter – a regulation that is estimated to prevent 4,500 premature deaths 800,000 avoided cases of asthma symptoms. For further information about the enforcement of these regulations, see EPA’s webpage on [Air Enforcement](#).
- **Providing resources to communities to improve air quality:** Although the primary ways that the EPA addresses PM emissions is through regulatory action, through the [Inflation Reduction Act](#) and [Bipartisan Infrastructure Law](#), the EPA is leading a number of grant programs also aimed at reducing air pollution and greenhouse gases, with a focus on low-income and disadvantaged communities:<sup>15</sup>
  - Through the Bipartisan Infrastructure Law, the EPA [Clean School Bus Program](#) provides \$5 billion over five years to replace existing school buses with zero-emission school buses.
  - EPA is distributed \$5 billion dollars in [Climate Pollution Reduction Grants](#) to reduce emissions of greenhouse gases and other harmful air pollutants
  - The [Environmental and Climate Justice Grant Programs](#) is providing \$3 billion for environmental and climate justice activities to benefit disadvantaged communities, including activities that reduce pollution and improve air quality.
  - The EPA is providing funding for [grants](#) to monitor and reduce greenhouse gas emissions and other air pollutants at [schools](#) in low-income and disadvantaged communities.
  - The [Clean Ports Program](#) funds zero-emission port equipment and infrastructure to help address the public health and environmental impacts of air pollution on surrounding communities.
  - The [2024 Clean Heavy-Duty Vehicles Grant Program](#) is working towards replacing non-zero emission Class 6 and Class 7 vehicles (such as school buses, delivery trucks, utility trucks) with zero-emission models to reduce air pollution.
- **Reducing disparities through coordinated federal action:** The Asthma Disparities Subcommittee, co-chaired by the EPA, the U.S. Department of Health and Human Services (HHS), and the U.S. Department of Housing and Urban Development (HUD), released the [Coordinated Federal Action Plan to Reduce Racial and Ethnic Asthma Disparities](#) in May of 2012. The proposed plan builds on previous federal asthma programs by presenting a framework to maximize the use of existing federal resources and combine efforts among federal programs at the community level.
- **Supporting in-home environmental asthma interventions:** The EPA has led a nationwide effort to reduce the environmental risk posed by poor indoor air quality through the delivery of [in-home environmental interventions](#). This includes: co-chairing the [Asthma Disparities Subcommittee](#) and coordinating with other federal agencies; supporting community asthma programs with technical assistance, such as through a cooperative agreement with the Public Health Institute; facilitating the [Asthma Community Network](#) for asthma programs to connect and to share and host resources; promoting model programs through the annual [National](#)

[Environmental Leadership Award in Asthma Management](#); and convening leading practitioners from across the country to share successful strategies for [financing](#) and reimbursement of in-home environmental interventions, especially focused on those for children covered by Medicaid.

- **Researching childhood asthma:** The EPA [researches](#) the link between air pollution and asthma to better understand their association with childhood asthma. This research includes what kind of air pollutants impact asthma and which factors make children particularly vulnerable to asthma.
- **Developing public educational campaigns and resources:** The EPA helps contribute to [AirNow](#), a website that provides Air Quality Index (AQI) data on city, state, and national levels. People can use AirNow to determine the quality of the outdoor air to [take action](#) and protect their health. The EPA also promotes asthma awareness for children on [noattacks.org](#), an educational campaign dedicated towards teaching parents and children how to prevent asthma attacks. Finally, the EPA is targeting air quality in schools by sharing [resources](#) on creating healthy school environments.
- **Understanding and addressing climate change:** Climate change poses many threats to the health and well-being of all Americans, including children with asthma; as such, understanding and addressing climate change is critical to EPA's mission of protecting human health and the environment. EPA tracks and reports [greenhouse gas emissions](#), produces and leverages [sound science](#), manages [grant programs](#) aimed at tackling climate pollution and advancing environmental justice, and produces [reports](#) on climate impacts, vulnerability, and health. For more general information about climate change, visit EPA's [climate change webpage](#), and for more information on climate change and human health impacts, visit EPA's Climate [change and human health webpage](#).

For further information on indicators related to environmental and human health, explore EPA's [Report on the Environment](#), and for further information on indicators related to children's environmental health, explore EPA's [America's Children and the Environment \(ACE\)](#) report.

## References

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- 2) U.S. EPA. What is Asthma?. U.S. EPA. Published July 16, 2013. Accessed June 17, 2024. <https://cfpub.epa.gov/roe/indicator.cfm?i=71>.
- 3) U.S. EPA. Asthma triggers: gain control. U.S. EPA. Published August 18, 2014. Accessed June 17, 2024. <https://www.epa.gov/asthma/asthma-triggers-gain-control>.
- 4) U.S. EPA. Integrated Science Assessment (ISA) for Oxides of Nitrogen – Health Criteria (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-15/068, 2016.
- 5) U.S. EPA. Integrated Science Assessment (ISA) for Sulfur Oxides – Health Criteria (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-17/451, 2017.
- 6) U.S. EPA. Integrated Science Assessment (ISA) for Ozone and Related Photochemical Oxidants (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-20/012, 2020.
- 7) U.S. EPA. Climate Change Impacts on Air Quality. U.S. EPA. Last Updated June 4, 2024. Accessed July 19, 2024. <https://www.epa.gov/climateimpacts/climate-change-impacts-air-quality>.
- 8) U.S. EPA. Particle Pollution and Respiratory Effects. U.S. EPA. Published September 15, 2014. Accessed June 17, 2024. <https://www.epa.gov/pmcourse/particle-pollution-and-respiratory-effects>
- 9) This indicator represents the number of children aged 0-17 who had ever received an asthma diagnosis from a healthcare practitioner and reported that they still have asthma.
- 10) Following the Office of Management and Budget's (OMB) [Statistical Policy Directive 14](#), the Census Bureau uses a set of money income thresholds that vary by family size and composition to determine who is in poverty. If a family's total income is less than the family's threshold, then that family and every individual in it is considered in poverty. The official poverty thresholds do not vary geographically, but they are updated for inflation using the Consumer Price Index (CPI-U). For more information, see: [How the Census Bureau Measures Poverty](#).
- 11) U.S. EPA. Coordinated Federal Action Plan to Reduce Racial and Ethnic Asthma Disparities. U.S. EPA. Published May, 2012. Accessed June 27, 2024. <http://www.epa.gov/asthma/coordinated-federal-action-plan-reduce-racial-and-ethnic-asthma-disparities>.
- 12) U.S. EPA. Climate Change and the Health of Socially Vulnerable People. U.S. EPA. Last Updated July 16, 2014. Accessed July 19, 2024. <https://www.epa.gov/climateimpacts/climate-change-and-health-socially-vulnerable-people>.
- 13) U.S. EPA. Integrated Science Assessment (ISA) for Particulate Matter (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-19/188, 2019.
- 14) Leikauf, G. D. (2002). Hazardous air pollutants and asthma. *Environmental Health Perspectives* (suppl 4), 505-526.
- 15) Most EPA grant programs identify 'disadvantaged communities' using the White House Council on Environmental Quality's Climate and Economic Justice Screening Tool (CEJST) and/or EPA's EJScreen Supplemental Indexes, in addition to any statutorily required factors. For projects funded through the Inflation Reduction Act, EPA defined disadvantaged by a specific set of criteria that expressly reflects the Agency's efforts to distribute funds based on race-neutral criteria. For more information on this criteria, see [this webpage](#).