



# Climate Change & Children's Health

## AIR QUALITY

Climate change is worsening air quality, and children will experience greater health risks from more exposure to pollution.

### SCIENCE SUMMARY

Air pollution can have lifelong impacts on children's health. [Poor air quality](#) increases risks of respiratory infections and can trigger asthma, which affects about [6.5% of children \(4.7 million\) in the U.S.](#) Childhood exposure to air pollution is associated with [long-term health consequences](#), including effects on [lung](#) and [brain](#) development, as well as [greater risks](#) of other diseases as adults. Research also shows that exposure to pollution from either [burning fossil fuels](#) or [wildfire smoke](#) corresponds to lower test scores.

Infants and children are especially sensitive to air pollution because they breathe faster and take in more air per pound of body weight, and because their lungs, brains, and other organs are still developing. Children also tend to spend more time playing outdoors and are at greater risk of exposure.

[Air pollution](#) can come in the form of harmful gases and [particulate matter](#). Fine particulate matter pollution (known as PM2.5) is among the [most dangerous to human health](#). Pollution sources include vehicle exhaust, [wildfire smoke](#), and burning fossil fuels (coal, oil, and methane gas) for energy.

Heat-trapping pollution and climate warming [worsen air pollution](#) in several ways. [Burning fossil fuels pollutes the air](#) and produces heat-trapping gases that warm the planet and [exacerbate ill effects on air quality](#). [Hot, dry conditions](#) that fuel wildfires and dangerous smoke are amplified in a warming world. Summer [heat](#) drives the [production of harmful ground-level ozone gas](#). Carbon pollution brings a [longer, worse allergy season](#) for [millions of American children](#).

Air quality in the U.S. has [drastically improved](#) since the Clean Air Act of 1970. [Climate change](#) threatens to [stall or reverse this progress](#), however, as [wildfires](#) and [extreme heat](#) become more frequent and intense — and [children](#) are among those most at risk from worsening air quality. Research estimates that 2°C (3.6°F) of global warming could result in a [4% annual increase in new cases of asthma in children](#) from air pollution exposure, relative to baseline conditions (1986-2005).

### TOP TAKEAWAYS

- Human-caused climate change is worsening air pollution by increasing wildfires, pollen, and extreme heat.
- Children are among the most vulnerable to the health impacts from air pollution, and exposure (especially to wildfire smoke) can have significant, life-long impacts.
- Air quality will likely continue to decline as the planet warms — and children could experience even worse health impacts with continued warming, including more asthma diagnoses.
- Parents and caregivers can protect children's health, now and in the future, by minimizing exposure to air pollution and supporting a transition away from burning fossil fuels.

### KEY TERMS

- **Air pollutants** – chemical, physical, or biological substances that degrade air quality, introduced through natural processes or human activity (including ozone, particulate matter, nitrogen dioxide, lead, and carbon monoxide)
- **Ground-level ozone** – a primary component of [smog](#) made by a reaction between pollution and sunlight, linked to an [array of health concerns](#)
- **PM2.5** – fine particles with a diameter of 2.5 micrometers or smaller which can make their way into the lungs and bloodstream when inhaled, causing [a range of health effects](#)

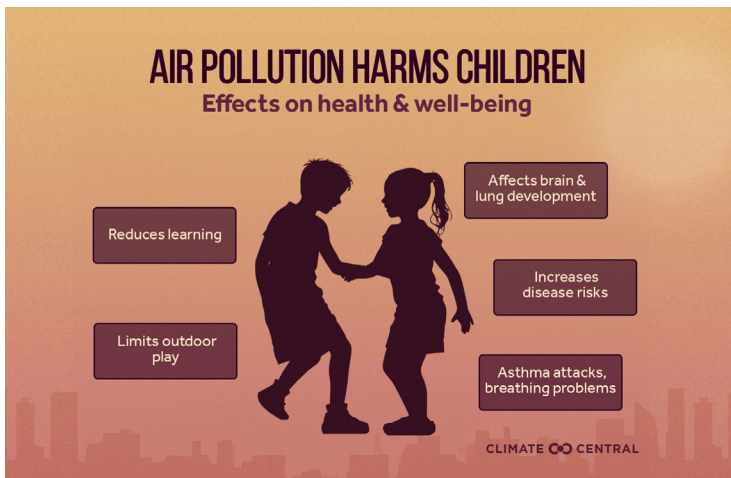
## CHILDREN & CLIMATE CHANGE

Children are especially sensitive to climate change impacts, in part because they are still growing and developing and they spend more time outdoors. The effects of climate change experienced in childhood can have lifelong consequences on physical and mental health.

Children also have less control over their surrounding environments and less understanding of health risks. They rely on their adult caregivers — from parents and older family members to coaches and teachers — to help protect their health at home, in school, and when recreating outdoors.

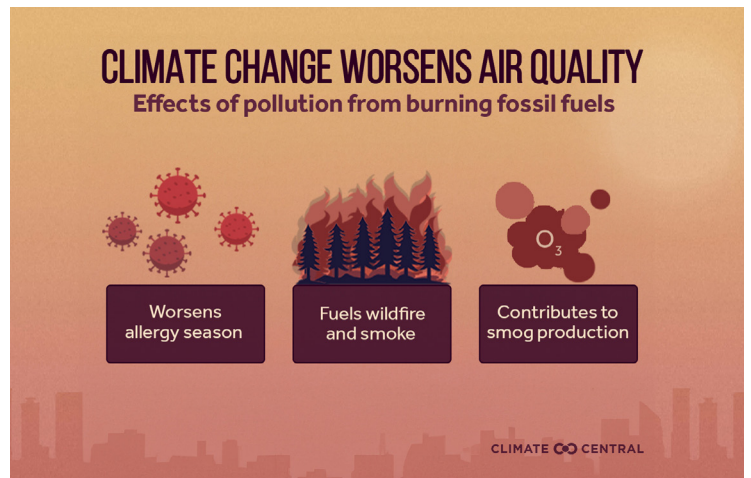
## AIR POLLUTION HARMS CHILDREN

Effects on health & well-being



## CLIMATE CHANGE WORSENS AIR QUALITY

Effects of pollution from burning fossil fuels



Heat-trapping pollution from burning fossil fuels is worsening air quality — and children are among the most vulnerable to the health impacts.

### WHO'S MOST AT RISK?

Chronic exposure to air pollution in childhood increases risks of harm. Children who live near sources of air pollution — such as busy roadways, industrial facilities, or coal or gas-fired power plants — or in [areas frequently exposed to wildfire smoke](#) may breathe more polluted air and face greater health risks over time. Studies have shown that communities of color and low-income communities [face greater harm](#) from exposure to air pollution.

Harmful [wildfire smoke can travel](#) hundreds or thousands of miles from where fires burn — making it a nationwide health concern. Wildfire smoke is estimated to be [10 times more harmful](#) to children's respiratory health than other sources of PM<sub>2.5</sub> — especially for children aged five years or younger.

### PROTECTING CHILDREN'S HEALTH

**Minimize exposure to poor air quality.** Check local [air quality reports](#), [wildfire smoke alerts](#), and [allergen counts](#) before heading outside. Children are considered a "sensitive population" on the [Air Quality Index](#). When the Air Quality Index is high (meaning air quality is poor), limit time outdoors for children accordingly. Keep infants and very young children indoors unless necessary.

**Watch for symptoms of asthma or allergies.** Wildfire smoke can travel great distances and linger in the air for days or weeks. Seek guidance from doctors about medication and other interventions when there are high levels of smoke, pollen, or other pollutants in the air.

**Make the indoors safer and more comfortable.** Close windows and doors to keep out smoke and other air pollutants. Use high-efficiency particulate air (HEPA) filters in living spaces and bedrooms to clean the air. [Do-it-yourself air filters](#) can be inexpensive and relatively easy to build. During hot weather, when exterior ventilation may be key to keeping cool, filters can be especially valuable for breathing easier. [Replace gas-burning appliances](#) like furnaces and stoves with cleaner electric options.

**Maintain good air quality in schools.** Most children spend a lot of time at school, and [classroom air quality](#) can affect their health, well-being, and productivity. Proper ventilation, [electrifying building systems](#) and [school buses](#), and adequate cleaning can improve air quality for students and staff during school days.

**Commit to rapid, sustained cuts to carbon pollution from burning fossil fuels — now.** With continued warming, [future generations](#) are likely to face accelerating change and intensifying risks. Because burning fossil fuels contributes to both air pollution and climate warming, transitioning to low-carbon energy sources will [immediately improve air quality](#) for people of all ages. Ultimately, cutting carbon pollution is the most meaningful action to slow the rate of warming and set younger generations on a different path, toward a safer future.

### ADDITIONAL RESOURCES

- Climate Central resources about [wildfire smoke](#), [seasonal allergies](#), and [extreme heat](#)
- Environmental Protection Agency's report, [Climate Change and Children's Health and Well-Being in the United States](#)

### Endnotes & Acknowledgements

This is part of a series about climate change and children's health produced by Climate Central.

Thanks to Lisa Patel, MD, of Stanford Children's Health and the [Medical Society Consortium on Climate and Health](#), for her contributions.

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Published: September 2024