



Air Quality

Improving Air Quality to Improve Heart and Brain Health

OVERVIEW

All people deserve to breathe clean air. Unfortunately, millions of people living in the U.S. are exposed to polluted air where they live, work, and commute, causing a serious threat to their health. Air pollution, which contains tiny particles and invisible gases, comes from sources such as power plants, vehicle and industry emissions, and wildfires.¹

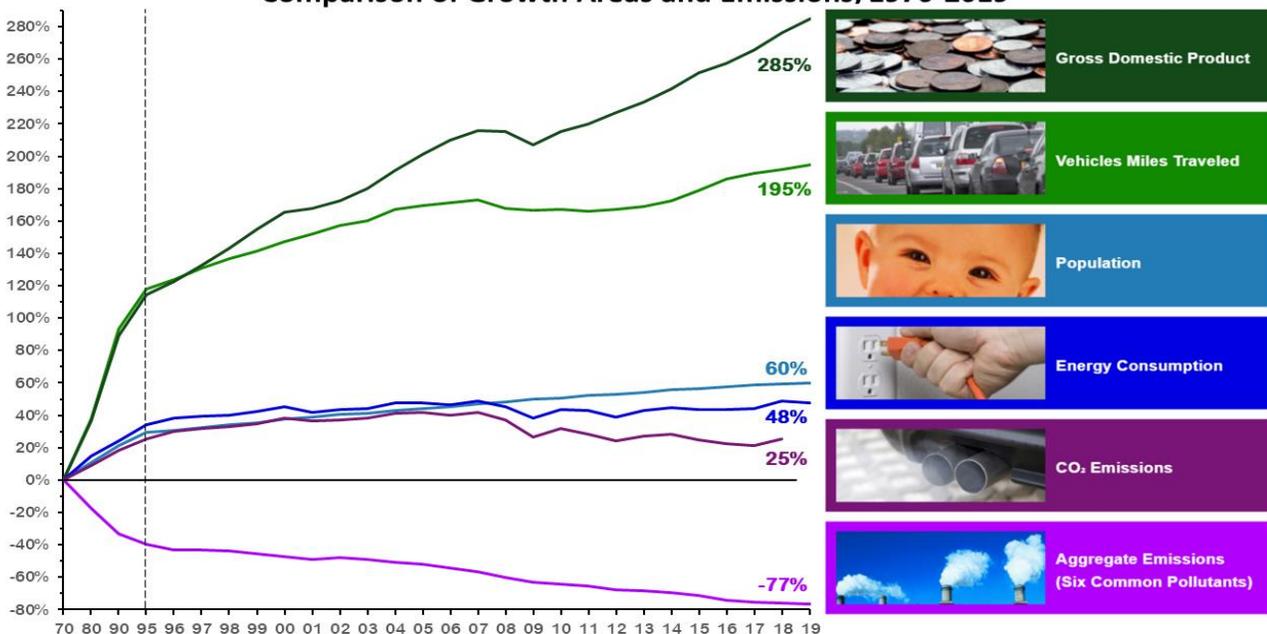
Fine particulate matter (PM_{2.5}) is a significant source of heart-damaging air pollution. Scientific evidence shows a causal relationship between PM_{2.5} and cardiovascular disease and death.² Because PM_{2.5} is so small, when inhaled it can reach deep inside the lungs, leading to a wide range of health problems.¹ Yet, PM_{2.5} exposure is a modifiable risk factor,² meaning if we reduce our exposure to air pollution, we reduce our risk of disease and death.

The good news is that with the implementation of the Clean Air Act (CAA) of 1970, air pollution levels have dramatically improved in the U.S. From 1970-2018, there has been a 77% reduction of six common air pollutants.³ This improvement was seen despite a substantial increase in the economy and in the U.S. population over the same time period.⁴ It has been estimated that improvements in air quality due to the extension and strengthening of CAA in 1990 will have prevented more than 230,000 early deaths by 2020 and the benefits are estimated to outweigh the costs by about 30 to 1.⁴ Despite these improvements, from 2016-2018, approximately 150 million people living in U.S., just under half the U.S. population, live in counties with unhealthy air quality,⁵ leaving them at risk of serious health issues.

Why does the American Heart Association care about air quality? Research shows that air pollution can affect your heart and circulation by:

- Narrowing and hardening blood vessel walls, which restricts blood flow.
- Increasing blood pressure.
- Changing the structure of the heart increasing risk of heart failure.
- Increasing likelihood of blood clots.
- Affecting the heart's electrical functioning, leading to abnormal heart rhythms.
- Triggering heart attacks and strokes.

Comparison of Growth Areas and Emissions, 1970-2019



Because of the Clean Air Act air pollution has steadily declined while the economy and population have increased. Source: U.S. EPA, Air Trends: [Air Quality National Summary](#), 2019.

THE INEQUITY OF AIR QUALITY

The burden of poor air quality is not equally distributed. Due to decades of residential segregation, people of color and people with lower socioeconomic status are more likely to live, work, and commute in higher-pollution areas, leading to greater air pollution exposure.⁵⁻⁷ According to the 2020 “State of the Air” report, people of color are 1.5 times more likely to live in an area with poor air quality than white people.⁵ Data suggests that air pollution exposure results in worst health outcomes for Black, Hispanic, Asian, and lower-income individuals compared to non-Hispanic whites.^{8,9} Recent modeling studies suggest that Black and Hispanic communities generate less air pollution—through transportation and consumption—than they are exposed to.¹⁰ Whereas, white communities generate more air pollution than they are exposed to.¹⁰ The concept of environmental justice has gained prominence in recent years as inequity in exposure and health effects of environmental hazards including air pollution has received increased attention.¹¹ Greater attention needs to be given to the inequitable distribution of risks and benefits of transportation and industry across different populations.

THE ASSOCIATION ADVOCATES

To improve air quality in the United States and across the globe, the American Heart Association advocates to:

- Focus on those most impacted by poor air quality, including Black and Hispanic populations and communities that have historically been marginalized and under-resourced.
- Establish robust air quality standards that are regularly reviewed, updated, and enforced to protect human health in consideration of available scientific evidence and improve air pollution monitoring.
- Address vehicle emissions by establishing effective and technology-forcing vehicle emission standards, increasing fuel efficiency, moving toward zero-emission vehicles, reducing traffic and congestion, establishing anti-idling policies, and improving active and public transportation.
- Support renewable energy production by establishing ambitious renewable portfolio standard goals and timelines.
- Continue industry innovation and develop transformational partnerships that improve air quality.

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1. U.S. Environmental Protection Agency. Healthy Heart Toolkit: Resources for Healthy Professionals [Internet]. 2020. [cited September 14, 2020]; Available from: <https://www.epa.gov/air-research/healthy-heart-toolkit-resources-health-professionals#effects>.
 2. Brook RD, Rajagopalan S, Pope III CA, Brook JR, Bhatnagar A, Diez-Roux AV, Holguin F, Hong Y, Luepker RV, Mittleman MA, Peters A, Siscovick DS, Smith SC, Whitsel L and Kaufman JD. Particulate matter air pollution and cardiovascular disease: an update to the scientific statement from the American Heart Association. *Circulation*. 2010;121:2331-2378.
 3. United States Environmental Protection Agency. Air quality - national summary [Internet]. 2019. [cited 6/14/19]; Available from: <https://www.epa.gov/air-trends/air-quality-national-summary>.
 4. United States Environmental Protection Agency. The benefits and costs of the Clean Air Act from 1990 to 2020. 2011 [cited May 7, 2020]. Available from: <https://www.epa.gov/clean-air-act-overview/benefits-and-costs-clean-air-act>.
 5. American Lung Association. State of the air 2020. Chicago, IL: American Lung Association.; 2020 [cited May 2020]. Available from: <https://www.lung.org/clean-air/outdoors/who-is-at-risk/disparities>.
 6. Clark LP, Millet DB and Marshall JD. Changes in Transportation-Related Air Pollution Exposures by Race-Ethnicity and Socioeconomic Status: Outdoor Nitrogen Dioxide in the United States in 2000 and 2010. *Environ Health Perspect*. 2017;125:097012.
 7. Rowangould GM. A census of the US near-roadway population: Public health and environmental justice considerations. *Transportation Research Part D: Transport and Environment*. 2013;25:59-67.
 8. Di Q, Wang Y, Zanobetti A, Wang Y, Koutrakis P, Choirat C, Dominici F and Schwartz JD. Air Pollution and Mortality in the Medicare Population. *N Engl J Med*. 2017;376:2513-2522.
 9. Chi GC, Hajat A, Bird CE, Cullen MR, Griffin BA, Miller KA, Shih RA, Stefanick ML, Vedal S, Whitsel EA and Kaufman JD. Individual and Neighborhood Socioeconomic Status and the Association between Air Pollution and Cardiovascular Disease. *Environ Health Perspect*. 2016;124:1840-1847.
 10. Tessum CW, Apte JS, Goodkind AL, Muller NZ, Mullins KA, Paoletta DA, Polasky S, Springer NP, Thakrar SK, Marshall JD and Hill JD. Inequity in consumption of goods and services adds to racial-ethnic disparities in air pollution exposure. *Proc Natl Acad Sci U S A*. 2019;116:6001-6006.
 11. Corburn J. Concepts for Studying Urban Environmental Justice. *Curr Environ Health Rep*. 2017;4:61-67.