

Additional Public Health Hazard Studies & Assessments: Impacts of Noise, Carcinogens, Ozone, Pollutants From Internal Combustion Engine Gas Leaf Blowers

39 additional studies, articles, and assessments representing hundreds of pages of documented evidence that the noise and emissions of gas powered leaf blowers are a serious and actionable public health threat.

Part I: Noise Studies

- [California EPA Air Resources Board “A Report to the California Legislature on the Potential Health and Environmental Impacts of Leaf Blowers” February 2000](#)
An exhaustive research document on gas-powered leaf blower noise and emissions on public health that resulted in a phased-in total state ban on internal combustion equipment statewide.
- [Hearing Loss: A Guide to Prevention and Treatment](#) (2016). Harvard Medical School, **gas leaf blowers** and lawn mowers are noted prominently as sources of noise that cause hearing damage.
- [Noise and Its Effects on Children](#) (2009). This educational flyer from the US Environmental Protection Agency describes the dangers of high levels of noise for children’s health and hearing, and includes **leaf blowers** as a source.
- [Characteristics of Lawn and Garden Equipment Sound](#) National Institutes of Health, National Library of Medicine Erica Walker^{1,*} and Jamie L Banks
- [Too Loud! For Too Long!](#) (2017). *US Centers for Disease Control* describes sources of harmful environmental noise, **highlighting lawn and garden equipment,** and includes a powerful infographic.
- [Noise As A Public Health Hazard](#) 2019, *American Public Health Association*
- [Environmental Noise and the Cardiovascular System](#) (2018). *Journal of the American College of Cardiology* by cardiologist Thomas Munzel and associates, focuses on the mechanisms and the epidemiology of noise-induced cardiovascular diseases and explains how **noise damages the cardiovascular system.**

- [Ambient Noise Is “The New Secondhand Smoke”](#) (2019). Dr Dan Fink, QC Health Advisor and Founder of The Quiet Coalition, evaluates the evidence on noise levels and their effects on auditory and non-auditory health in *Acoustics Today*.
- [Supporting healthier urban environments with a sound and noise curriculum for students](#) (2019) This article in journal, *Cities & Health*, introduces readers to the [Sound and Noise Module](#) developed in conjunction with New York City’s Department of Environmental Protection.
- [The effect of elevated train noise on reading ability](#) (1975). One of the first articles to document the impact of noise on children’s learning, co-authored by environmental psychologist and noise expert, *Dr. Arline Bronzaft*.
- [What is a Safe Noise Level for the Public?](#) (2016) 2016 article by *Dr. Dan Fink* in the *American Journal of Public Health*, where he dispels the notion that the 85-decibel occupational noise threshold is a safe level for the public. The actual level is much lower.
- [Auditory and non-auditory effects of noise on health](#) (2014). A comprehensive scientific review article by Dr. Mathias Basner in *The Lancet*, a premier medical journal, describing the effects of noise on hearing as well as non-hearing health — for example, blood pressure and heart disease.
- [Environmental noise pollution in the United States: Developing an effective public health response](#) (2014). *National Institutes of Health* Monica Hammer on the public health problem of environmental noise and the need for effective health policies and prevention. Tens of Millions of Americans are being exposed to noise levels that can cause hearing damage, heart problems, and other adverse health issues. Co-author Dr. Rick Neitzel
- [Valuing Quiet: An Economic Assessment of U.S. Environmental Noise](#) as a cardiovascular health hazard — estimates that the US spends \$3.9 billion every year on noise-related cardiac problems.
- [Burden of Disease from Environmental Noise](#) (2011). An extensive report from the *World Health Organization* describing and quantifying the health impact of environmental noise in Western Europe.
- [Auditory and non-auditory effects of noise on health](#) (2014). A comprehensive scientific review article by Dr. Mathias Basner in *The Lancet*, a premier medical journal, describing the effects of noise on hearing as well as non-hearing health — for example, blood pressure and heart disease.
- [Environmental noise pollution in the United States: Developing an effective public health response](#). (2014). *National Institutes of Health* A scientific article by Monica

Hammer and colleagues on the public health problem of environmental noise and the need for effective health policies and prevention. Over 100 Americans are being exposed on a daily basis to noise levels that can cause hearing damage, heart problems, and other adverse health issues. Co-author Dr. Rick Neitzel and colleague's 2015 article — [Valuing Quiet: An Economic Assessment of U.S. Environmental Noise](#) as a Cardiovascular Health Hazard — estimates that the US spends \$3.9 billion every year on noise-related cardiac problems.

- [Burden of Disease from Environmental Noise](#) (2011). An extensive report from the *World Health Organization* describing and quantifying the health impact of environmental noise in Western Europe.
- [What Noises Cause Hearing Loss? | NCEH | CDC](#), US Centers for Disease Control

Part Two: Emissions from Internal Combustion Engines

The health consequences of gas leaf blower emissions is a substantial public health problem. Most **gas-powered leaf blowers** are 2-stroke engines, which burn a mixture of gasoline and oil, and are remarkably inefficient at fuel combustion. They emit high levels of nitrous oxide (NO), hydrocarbons (HC), and carbon monoxide (CO) in the form of aerosolized particulates that can hang in the air for up to a week, before falling on our grounds where families gather and children play. The particulates travel across property lines exposing everyone to the impact of landscaper equipment choices.

- [California EPA Air Resources Board “A Report to the California Legislature on the Potential Health and Environmental Impacts of Leaf Blowers” February 2000](#)
An exhaustive research document on gas-powered leaf blower emissions and noise on public health that resulted in a phased-in total state ban on internal combustion equipment statewide. According to the California Air Resources Board, “these engines emit **499 times more hydrocarbons, 49 times more particulates, and 26 times more carbon monoxide** than an average car...Our children are particularly vulnerable with their small but rapidly growing bodies, and because they are most likely to be **playing outdoors**.”
- [National Emissions from Lawn and Garden Equipment](#) (2015) quantifies annual levels of **toxic and carcinogenic exhaust emissions** produced by gas-powered lawn and garden equipment ranging from **leaf blowers** and string trimmers to lawn mowers to heavy turf equipment. It was presented at the *2015 International Emissions Inventory Conference* (San Diego, CA).

- [Air Contaminant Exposures During Operation of Lawn and Garden Equipment](#) (2006) published in the *Journal of Exposure Science and Environmental Epidemiology* measured the exposure of equipment operators to **air toxics and fine particulates**. The authors found operators are likely to be exposed to unsafe levels.
- [Carbonaceous species emitted from handheld two-stroke engines](#) (2008) and [Emissions profile from new and in-use handheld, 2-stroke engines](#). (2007). These scientific studies authored by *Dr. John Volckens (Colorado State U)* and co-workers, published in the journal, *Atmospheric Environment*, document the various exhaust **emissions** from 2-stroke engines like **leaf blowers**, string trimmers, and other handheld tools and discusses their potential effects. “Operators of handheld engines—may be exposed to excessively high concentrations of these emissions; the analog emissions from gasoline-powered equipment (i.e., gasoline-powered vehicles) have become **a serious public health issue**.”
- [Assessment of Occupational Noise Exposure Among Groundskeepers in North Carolina Public Universities](#) *National Library of Medicine*: Study finding that groundskeepers have excessive noise exposures.
- Truck Exhaust vs. Leaf Blower Exhaust
[Leaf Blower's Emissions Dirtier than High-Performance Pick-Up Trucks](#)
[Edmunds](#): 2 Stroke Gas-powered leaf blowers emit **299 times more carcinogenic hydrocarbons**, and 29 times more carbon monoxide than a Ford F-150 Truck. The less common 4-stroke gas blowers emitted 7 times more NOX particulates (smog), and 13 times more carbon monoxide as compared to the F-150.
- [Hydrocarbon Toxicity - StatPearls - NCBI Bookshelf](#) Toxicity of **hydrocarbons** to human health: National Institutes of Health
- [Air Pollution and Cancer](#) (2013). A major report from the cancer research arm of the World Health Organization on air pollution concluding that **fine particulate matter** is a **human carcinogen**.
- [Integrated Science Assessment of Ozone and Related Photochemical Oxidants](#) (2020) is the EPA's comprehensive and systematic evaluation of evidence on the adverse effects of **ozone pollution** and provides the basis for the nation's air quality standards.
- [Integrated Science Assessment for Particulate Matter](#) (2019). An extensive scientific report from the US Environmental Protection Agency examining the large body of evidence on **fine particulate matter** and harm to health.

- [Particulate Matter Air Pollution and Cardiovascular Disease](#) (2010). A scientific consensus statement from the American Heart Association on the link between **fine particulate matter** in the air and cardiovascular disease. Published in the journal, *Circulation*
- [Protect Yourself: 10 Tips](#) (2017). Recommendations from the American Lung Association on how to protect your lungs from air pollution. One recommendation is to avoid the use of **gas-powered lawn and garden equipment**.
- [Fact Sheet: Gas Leaf Blowers](#) by Quiet Communities, Inc. (2019). A fully referenced set of facts on **gas leaf blowers** and their impacts, last revised 2/28/19.
- [Particle Pollution and Health](#) (2012). A 3-page fact sheet from the EPA describing the thousands of studies showing **fine particle pollution** is harmful to health.
- [Heart Disease, Stroke, and Outdoor Air Pollution](#) (2015). An educational flyer from the American Heart Association, American Stroke Association, and US Environmental Protection Agency with recommendations on reducing your risk of heart disease and stroke from **outdoor air pollution**.
- [Danger in the Air: Air Pollution and Cardiovascular Disease](#) (2014). A fact sheet from the American Heart Association and American Stroke Association on fossil fuels as a **major source of air pollution** and a cause of cardiovascular disease and stroke.
- [Health Effects of Ozone in the General Population](#) (2016). An EPA website that provides an evidence-based summary of the adverse effects of ground level ozone ranging from lung disease to heart disease to premature death.
- [Health Effects of Ozone in Patients with Asthma and Other Chronic Respiratory Disease](#) (2016). A related EPA website describing the health effects on some of the most vulnerable populations — patients with asthma and other respiratory disorders.
- [Health and Environmental Effects of Particulate Matter](#) (accessed 2020). An EPA website providing an overview of particulate matter impacts on health and environment.
- [Noisy, But That's Not All: Leaf Blowers Flagged as Prodigious Polluters — And Possible Health Threat](#) (2017). This detailed investigative journalism report explores emissions from **gas powered leaf blowers** and other gas-powered lawn and garden engines and focused on the dangers to workers. Statements from workers and health experts attest to the dangers from the emissions. An independent test of several commercial **gas leaf blowers** show excessive levels of ultrafine particle emissions. [A TV broadcast](#) covers much the same ground and features health experts at California health and environmental agencies.

