



School Buses and Children's Health

Every day, children breathe in fine particles, ground-level ozone, and other air pollutants— all the result of our heavy dependence on fossil fuels such as diesel and gasoline to power our school buses and other motor vehicles. **More than 600,000 school buses, mostly powered by diesel**, transport approximately **24 million children** in the US to and from school, exposing them to the harmful emissions of diesel.

This fact sheet highlights some the most critical health problems impacting children as a result of exposure to diesel exhaust and steps school officials can take to reduce these risks.



Why are Children at Greater Risk from Air Pollution?

Children's physiology and behavioral patterns make them more vulnerable to environmental pollution.

- ✿ **Children inhale more air per kilogram of body weight than adults.** They breathe more quickly than adults and tend to do so through their mouths – which bypass the natural filters in the nose and allow large amounts of polluted air to go directly into their lungs.
- ✿ **The places where many children play** (in city parks and schoolyards near high traffic areas), **put them at greater risk of inhaling pollutants.**
- ✿ **Children's organs are still developing so they are more susceptible to the harmful impacts of pollution.** In fact, rapid lung development occurs in children between ages of 10 and 18 years.

Why is Diesel Harmful?

Diesel exhaust contains a number of pollutants which are known to be harmful to human health such as nitrogen oxides and volatile organic compounds – known precursors of smog- benzene, arsenic, dioxins, formaldehyde and other toxins. It is a significant contributor to airborne concentrations of fine particulate matter (PM). **On a yearly basis, school buses in America release 3,000 tons of particulate matter, 95,000 tons of smog forming pollutants, 11 million tons of greenhouse gas emissions and dangerous carcinogens.**

On average, children spend **90 minutes per day on a school bus.** **A recent University of California study found that in large urban areas, children riding in school buses with diesel engines collectively inhale more exhaust than everyone else in the city combined.** Increased exposures from commuting by school bus are estimated to **increase a child's lifetime cancer risk** by approximately **4 percent** or 30 per million.

Impacts of Diesel Emissions on Children's Health

Exposure to diesel exhaust is associated with a number of chronic and acute health effects. Fine particles from diesel exhaust pose a significant health risk because they can pass through the nose and throat and lodge themselves in the lungs. These fine particles **can cause lung damage and premature death.** They can also **aggravate conditions such as asthma and bronchitis.** Diesel exhaust may also hamper lung development and decrease lung function. The US Environmental Protection Agency has determined that **diesel exhaust is a likely human carcinogen.**

<i>Pollutants from Diesel Exhaust</i>	<i>Health Condition associated with pollutant</i>
Nitrogen Oxide (NOx) , Particulate Matter (PM ₁₀ , PM _{2.5})	Slowed lung growth
Ozone formed from the chemical reaction of NOx and Volatile Organic Compounds (VOC)	Asthma causation Acute respiratory illness
Nitrogen Oxide, Particulate Matter (PM ₁₀ , PM _{2.5})	Asthma exacerbation

- ❁ **Asthma affects more than 20 million Americans, including 9 million children.**
- ❁ **Asthma keeps children home from school more than any other ailment.** Nationally, students miss more than 14 million school days per year due to asthma-related illnesses, according to the Center for Disease Control. Rates for asthma-related deaths and hospitalizations are routinely higher for African-American children.
- ❁ **Air pollution can bring on asthma attacks.**
- ❁ **Air pollution may cause asthma not just exacerbate it.** A study by the University of California found that children who participated in sports in communities with high concentrations of ozone were more likely to develop asthma.
- ❁ **A University of Southern California study has shown that that smog limits the development of healthy lungs in children.**
- ❁ **Studies have linked chronic exposure to particle pollution to slowed lung function growth in children and teenagers.**

What can Schools Do to Reduce Exposure to Diesel Emissions?



- ❁ Implement an idling reduction program for your school or school district. Idling wastes fuel, harms health, and increases engine wear and tear. **Idling reduction is a low-cost and relatively easy-to-implement solution for school fleets.**
- ❁ Educate drivers about the health impacts of idling and the importance of minimizing idling.
- ❁ Encouraging drivers to minimize idling can save **schools thousands of dollars in fuel and maintenance costs. For example, a school bus fleet of 30 buses can save \$1,125 in fuel costs by reducing the amount of idling by just 10 minutes.**
- ❁ Encourage the **use of cleaner fuels in school buses such as biodiesel**, a cleaner, more renewable diesel fuel made from plant/animal matter. Biodiesel blended with regular diesel can be used in conventional diesel engines with little or no modification.
- ❁ Consider the **addition of pollution reduction devices like particulate matter filters or catalysts** to existing buses to minimize the impact of harmful diesel emissions. For example, retrofitting an existing bus with a particulate matter filter can cut fine particulate emissions by almost 90 percent.
- ❁ **Utilize federal, state and local incentives to replace the oldest, dirtiest buses with cleaner ones.**

This fact sheet is an excerpt from a policy brief “*The Crisis in Children’s Environmental Health*” available for download at <http://www.eesi.org/publications/Fact%20Sheets/ChildrenHealthfactsheet.pdf>

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