Asthma and Diesel

It is estimated that diesel causes 3,500 premature deaths in California in a single year.
— California Air Resource Board

"There is a family [where] all three of them have asthma and they feel like they're prisoners in their own home. The grandmother and two grandsons have asthma and they're literally four houses down from the 710 freeway and two houses away from the train yards. It's affecting their schoolwork, their grades, and their existence. Their asthma is a major problem." *— Angelo Logan, East Yard Communities for Environmental Justice*

What Is Diesel Exhaust?

Diesel engines emit a complex mixture of air pollutants. In California diesel particulate matter (PM) contributes to an estimated 3,500 premature deaths each year as well as thousands of hospital admissions, asthma attacks and other respiratory symptoms, and lost workdays.

- Diesel exhaust is emitted by trucks, school buses, trains, ships, harbor craft, off-road vehicles, and cargo-handling and industrial equipment with diesel engines.
- Diesel engines emit a complex mixture of air pollutants composed of gaseous and solid materials. The visible emissions in diesel exhaust are known as diesel exhaust particulates (DEP) or soot. Diesel exhaust also contains a variety of harmful gases and over 40 other cancer-causing substances. In addition diesel exhaust contributes to the formation of ozone.
- Diesel exhaust incurs high societal costs. The cost of premature deaths resulting from exposure to diesel PM is estimated to be $16 billion per year in California. An annual cost of over $3.5 billion is associated with hospitalizations, treatment of illnesses, and lost workdays each year.

Why Should We Be Concerned About Diesel Exhaust for Children?

Many diesel emission sources such as heavily traveled roads, ports, and rail yards are concentrated near densely populated areas, which leads to higher exposures and greater health consequences for our children. Additionally, diesel pollution has been observed on every school bus tested in California regardless of the age of the bus. On any given day, the cumulative exhaust inhaled by the 40 or so children on a self-polluting bus is comparable to, or in many cases larger than, the cumulative amount of exhaust inhaled by all the other people in the South Coast Air Basin, which covers the urban portions of Los Angeles, Orange, Riverside, and San Bernardino counties.

Children are one of the most vulnerable populations since their lungs are still developing. They have higher respiration rates than adults, which can increase their exposure to air pollutants relative to their body weight. Fine particulates from diesel exhaust can penetrate children's narrow airways and lodge deep within the lung—an area where the particulates are more likely to be retained and absorbed.

The health risks of diesel exhaust have been recognized by the State of California:

- In 1998 California formally recognized DEP as a toxic air contaminant; it is subject to regulation for reducing emissions and human exposure.
- In 2001 the Office of Environmental Health Hazard Assessment, under the Children's Environmental Health Protection Act of 1999 (Senate Bill 25, M. Escutia), determined that one of the "top 5" outdoor air pollutants affecting children's health is diesel exhaust PM.
- On December 12, 2008, the California Air Resources Board adopted two critical regulations designed to clean up harmful emissions from the estimated one million heavy-duty diesel trucks operating in California. The Statewide Truck and Bus rule requires truck owners to install diesel exhaust filters on their rigs by 2014. Owners must also replace engines built before 2010 by the year 2022.

How Is Diesel Exhaust Linked to Asthma?

Many of the compounds in diesel exhaust have been increasingly implicated in asthma. Researchers have often used proximity to traffic as a proxy for diesel exhaust exposure because it is measurable and a significant source of diesel pollution. A growing body of evidence indicates that exposure to traffic emissions is associated with increased risk of adverse respiratory health outcomes, including asthma incidence, severity, and persistence among children. Traffic-related pollutants are associated with airway inflammation, reduced lung function, and reduced lung development. The research shows the following health effects on childhood asthma:

Increased asthma occurrence

The Southern California Children's Health Study indicates that traffic exposure may cause asthma among children, which is

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reflected by increased lifetime asthma diagnoses and asthma prevalence.

Reduced lung function

Children exposed to high levels of diesel pollutants are five times more likely than other children to have underdeveloped lungs.

Increased respiratory symptoms

Increases in symptoms such as cough, wheeze, runny nose, and doctor-diagnosed asthma have been linked with traffic exposure. A San Francisco Bay Area study also linked traffic-related pollution exposure at schools to the same symptoms.

Increased doctor visits and use of medications

Studies have shown that children who live near high-density traffic areas have higher rates of doctor visits for asthma in San Diego and increased use of asthma medications in Los Angeles than children who live near low-density traffic areas.

Increased risk of Emergency Department visits and/or hospitalization

A study done in Atlanta, Georgia, during the 1996 Summer Olympic Games found fewer recorded doctor visits and hospitalizations for asthma among children during the Games, because of a reduction in traffic, than they found four weeks before and after the Games.

Increased allergic inflammation and the development of new allergies

DEP can disrupt the regulation of the immune system in sensitive individuals, which can increase their risk of having allergic reactions to other substances in their environments.

What Can Be Done About Exposure to Diesel Pollution?

Community Action to Fight Asthma (CAFA) is a network of asthma coalitions in California working to shape local, regional, and state policies to reduce the environmental triggers of asthma for school-aged children where they live, learn, and play. Below are a few examples of local and state policies related to diesel pollution.

- Implement regulatory actions and other incentives to cut diesel emissions from trucks and school buses.
- Promote siting of schools, playgrounds, athletic fields, and subsidized housing away from major outdoor air pollutant sources such as high-traffic roads and freeways.
- Enforce idling regulations for trucks and buses to reduce human exposure to diesel exhaust.
- Shape policies around California's goods movement, reducing pollution at the ports, on truck routes, and in communities across the state.

Please visit our website at **www.rampasthma.org** to learn more about Community Action to Fight Asthma, connect with local coalitions, locate asthma resources across California, and sign up for our e-newsletter.

Selected Bibliography *(For complete references, please visit www.rampasthma.org.)*

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