

US EPA ARCHIVE DOCUMENT

Diesel engines emit particulate matter, ozone precursors and other toxic substances. This document discusses the health impacts of these pollutants and of exposure to diesel exhaust. Groups that are most susceptible to the health effects of diesel engine emissions include children, the elderly, and those with respiratory illnesses.

Particulate Matter

The primary negative health effects linked to PM include:¹

- o Aggravation of cardiovascular and respiratory disease
- o Hospital admissions for cardiopulmonary diseases
- o Premature death

Ozone and its Precursors (VOCs and NOx)

Diesel engines emit nitrogen oxides (NOx) and volatile organic compounds (VOC), which can react to form ground-level ozone, the primary component of smog. The Environmental Protection Agency (EPA) has identified several health impacts of exposure to ozone including:¹

- o Increased hospital admissions and emergency room visits for respiratory problems
- o Increased susceptibility to respiratory infection and lung inflammation
- o Chronic obstructive pulmonary disease (COPD)
- o Aggravation of asthma
- o Premature death

VOCs have detrimental health effects in addition to their role in forming ozone. Some VOCs emitted from diesel engines are toxic compounds and have health impacts that can affect the respiratory and neurological systems, reproductive health, and child development.⁴ Some VOCs are air toxics.¹ NOx also negatively affects human health. For example, nitrogen dioxide can irritate lungs and reduce resistance to respiratory infection.

Diesel Exhaust

EPA has concluded that diesel exhaust is likely to be carcinogenic to humans at occupational and environmental (ambient) levels of exposure.^{1,2} EPA's Health Assessment Document for Diesel Engine Exhaust provides a full discussion of the data and the uncertainties in those data that led to this conclusion. Diesel exhaust contains gaseous components like benzene that are known carcinogens in addition to gases that are possible or probable carcinogens.² Furthermore, a variety of inorganic and organic compounds can be adsorbed onto PM. PM_{2.5} can therefore act as both a delivery agent of these chemicals into the respiratory tract and a physical irritant. Exposure to diesel exhaust also likely causes noncancer health impacts. Acute exposure to diesel exhaust can cause symptoms such as headaches, eye irritation, and nausea. Chronic exposure to diesel exhaust is a respiratory system hazard.

¹ US EPA, *Regulatory Impact Analysis: Heavy-Duty Engine and Vehicle Standards and Highway Diesel Fuel Sulfur Control Requirements* (December 2000).

² US EPA, *Health Assessment Document for Diesel Engine Exhaust* (May 2002).

