

# Air Toxics and Public Health

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EPA has set national standards for some of the most dangerous and pervasive pollutants, including ozone, carbon monoxide, nitrogen dioxide, and fine particles. In addition, EPA has identified other pollutants, called air toxics, for which they have not set national standards, but EPA considers them to pose a threat to human health. Motor vehicle emissions produce many harmful pollutants, including some which may cause cancer. Some toxic pollutants are emitted as products of fuel combustion, while others are present in fuel, and as a result are emitted by evaporation and as byproducts of incomplete combustion. Of the 33 air toxics on EPA's list of the most dangerous, this report considers four which are found in the greatest quantity in motor vehicle emissions.

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## **Acetaldehyde**

Acetaldehyde is formed in two ways: directly as a byproduct of incomplete combustion of gasoline, and through chemical reactions in the atmosphere. Short-term exposure to low or moderate levels of acetaldehyde results in irritation of the eyes, skin and respiratory tract. Currently there is no information about acetaldehyde's human reproductive effects or effects on fetal and childhood development, but data from animal studies suggest that it is a potential developmental toxin. Although there is insufficient information on carcinogenic effects in humans, EPA has classified acetaldehyde as a probable human carcinogen based on evidence of tumors in animals.

## **Benzene**

Benzene is an ingredient in gasoline that is released to the atmosphere either through evaporation or as a byproduct of incomplete combustion. The short-term exposure effects at low to moderate levels are drowsiness, dizziness, headache, and unconsciousness as well as eye, skin, and respiratory tract irritation. Long-term exposure effects include blood and immune system disorders. Additionally, women exposed to high benzene levels have exhibited reproductive effects with reports of changes in human chromosome number and structure. Based on indisputable evidence of cancer in humans, EPA classifies benzene as a known human carcinogen.

## **1,3-Butadiene**

1,3-Butadiene is a byproduct of incomplete combustion of fuel. Short-term exposure by inhalation results in irritation of eyes, nasal passages, throat, and lungs, as well as blurred vision, fatigue, headache, and vertigo. Currently there is no information about human reproductive effects or effects on fetal and childhood development, but data from animal studies show that it is a potential developmental toxin. EPA has classified 1,3-butadiene as a probable human carcinogen based on a growing body of evidence of carcinogenic effects in humans and evidence of tumors in animals. EPA has proposed reclassifying 1,3-butadiene as a known human carcinogen.

## **Formaldehyde**

Formaldehyde, like acetaldehyde, is formed as a byproduct of incomplete combustion of fuel as well as through a secondary process in which other motor vehicle pollutants undergo chemical reactions in the atmosphere. Both short- and long-term effects on humans from exposure to formaldehyde are irritation of eyes, nose, and throat, with irritation of the respiratory tract at higher exposures. Little information is available about human reproductive effects or effects on fetal and childhood development, but data from animal studies do not indicate formaldehyde to be a developmental toxin. Limited human studies indicate a potential relationship between formaldehyde exposure and cancer, and, as such, EPA has classified formaldehyde as a probable human carcinogen.