The American Academy of Pediatrics has concluded that levels of ozone and particulate matter are high enough in many parts of the U.S. to threaten children's health.[1]

Summary of Findings

- **Air Pollution and Human Health**

  Scientific experts now believe the nation faces an epidemic of illnesses that are exacerbated by air pollution. These illnesses include cardiovascular disease, asthma, chronic obstructive pulmonary disease, lung cancer, and diabetes.

- **Children at Special Risk**

  The American Academy of Pediatrics has concluded that levels of ozone and particulate matter are high enough in many parts of the U.S. to threaten children's health.[1] Eleven million U.S. children live in areas that exceed one or more federal air quality standards; 9 million children live in areas where ozone standards are exceeded; 3.5 million children live in areas where the particulate standards are exceeded, and 2.8 million children live in counties where the carbon monoxide standard is exceeded.[2]

- **Elderly at Special Risk**

  Cardiovascular disease, hypertension, diabetes and cancer are all illnesses disproportionately borne by the elderly. Nearly one-half million Connecticut residents are over 65 years of age.

- **Asthma**

  Chemicals in vehicle exhaust are harmful to asthmatics. Exhaust can adversely affect lung function[3,4,5,6] and may promote allergic reactions and airway constriction.[7] All vehicles, especially diesel engines, emit very fine particles that deeply penetrate lungs and inflame the circulatory system, damaging cells and causing respiratory problems.[8] Even short-term exposure to vehicle exhaust may harm asthmatics.[9,10,11,12] Asthmatic children are particularly sensitive to air pollution. New England states have some of the highest asthma rates in the country. About 9 percent of Connecticut's youth have the disease.[13] Inhalation of vehicle emissions, even for short periods, may be harmful to asthmatics. One study found that children are 40 percent more likely to have an attack on high outdoor pollution days.[14]

- **Chronic Obstructive Pulmonary Disease**

  Vehicle emissions are particularly harmful to people afflicted with chronic obstructive pulmonary disease (COPD), such as chronic bronchitis. Significant and replicated associations have been found

between increased ozone levels and a range of adverse effects on the lungs,[15] and several studies have shown increased risk of hospital admission from COPD associated with high ozone levels.[16] There is also a relationship between the levels of PM_{10} and morbidity[17] in patients with COPD. These associations were noted in Philadelphia, where the major source of these particles is motor vehicles.[18] Fine particle matter is especially harmful to people with COPD[19, 20] and has been found to increase their hospital admission rates.[21] High levels of PM_{10} are also associated with increased morbidity among those with the illness.

- **Cardiovascular Disease**

  Mortality and hospital admissions for myocardial infarction, congestive cardiac failure and cardiac arrhythmia increase with a rise in the concentrations of particulate and gaseous pollutants.[22] As concentrations of airborne particles increase, those with cardiovascular disease may experience increasing severity of symptoms, rates of hospitalization, and mortality.[23] The risk of having a heart attack is greater for people exposed to pollution from heavy traffic, as well as for those living near air-polluted roadways.[24]

- **Cancer**

  Vehicles emit numerous carcinogenic chemicals. Diesel contains benzene, formaldehyde, and 1,3-butadiene—all three are well recognized carcinogens. EPA estimates that vehicle emissions account for as many as half of all cancers attributed to outdoor air pollution.[25]

- **Diabetes**

  Increasing levels of air pollution are associated with rising mortality rates among diabetics. Because of the overlap between diabetes and cardiovascular disease, the nature of this association is not yet clear.[26]

- **Air Pollution Increases Mortality Among Susceptible Groups**

  Air pollution kills more Americans than breast and prostate cancers combined,[27] and the premature deaths associated with particulate matter pollution alone are comparable to deaths from traffic accidents.[28] Air pollution is a serious and growing threat to the health of Connecticut residents. We estimate that nearly one million of Connecticut's 3.5 million residents experience one or more of these illnesses, some without knowing it.

Summary of Findings

As concentrations of airborne particles increase, those with cardio-vascular disease may experience increasing severity of symptoms, rates of hospitalization, and mortality. [23]

Summary of Findings

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Diesel emissions increase the severity and duration of asthma attacks.

- **Vehicle Emissions**

  Mobile emissions that are believed to present the greatest health risk to Connecticut residents include ozone, particulate matter, acetaldehyde, acrolein, benzene, 1,3-butadiene, formaldehyde, and diesel exhaust.

- **Ozone and Motor Vehicles**

  Motor vehicles emit millions of pounds of hazardous pollutants into the air each year in the U.S., including volatile organic compounds and oxides of nitrogen (NO_x). These chemicals form ozone in the presence of sunlight.

- **Fine Particulate Matter**

  Fine particulate matter is a serious threat to human health. Fine particles can aggravate both heart and lung diseases. Those with diabetes, older adults, and children are especially sensitive. Fine particulate matter is responsible for several tens of thousands of premature deaths annually in the U.S.[29] and is measured at levels above federal air quality standards in Connecticut.[30]

- **Diesel Exhaust**

  Diesel exhaust is especially dangerous, containing nearly 40 hazardous pollutants. The mixture contains carbon particles that are exceptionally small in size, less than one micron. These fine particles may be deeply inhaled into the lung and carry with them a collection of attached hazardous compounds. Diesel emissions increase the severity and duration of asthma attacks.

- **Diesel Emissions**

  The California Air Resources Board concluded that diesel emissions account for the majority of cancer risk created by all outdoor air pollution sources in the state. The American Academy of Pediatrics recommends that children's exposure to diesel exhaust particles should be decreased and that idling of diesel vehicles in places where children live and congregate should be minimized to protect their health.[31] School bus particulate emissions sometimes exceed the federal $PM_{2.5}$ standards by as much as ten-fold.

- **Averaging Air Pollution**

  The government is allowed to average some pollutants across long periods of time. For example, $PM_{2.5}$ is permitted to be averaged over 24 hour intervals, and the 24-hour averages are then averaged over three years, before compliance with federal standards is determined. The results mask serious high pollution episodes. Medical scientists have determined that much shorter-term exposures, measured in hours or minutes, are potentially dangerous to susceptible populations, such as those with cardiovascular, respiratory, and other illnesses.

- **Air Quality Monitoring Deficiencies**

  Government understanding of the severity of air pollution depends upon what is being monitored and where the monitoring occurs. Air quality varies across space and time, and is dependent upon climatic conditions. It is poorest, but may not be monitored, where traffic is most intense, normally where highways slow near urban areas, near construction sites, and where trucks, buses, and cars tend to concentrate and idle: schools, hospitals, shopping centers, truck stops, warehouses, ports and shipping facilities, oil tank farms, rail stations, bus terminals, and where gas and diesel powered vehicles are used within warehouses or ships.

- **Diesel Fuel Consumption**

  Use of diesel fuel doubled in the U.S. between 1982 and 1998. The demand for transportation fuel continues to rise throughout the nation, particularly for diesel fuel.

- **Fuel Economy Stagnation**

  In the last 15 years, there has been little improvement in the miles per gallon (MPG) rating of cars and light trucks. The average MPG achieved by trucks has remained the same for the last 30 years at approximately 5.5 miles per gallon.

- **Highways as Air Pollution Corridors**

  Highways are recognized by scientific experts to act as three-dimensional corridors of air pollution containing many hazardous chemicals.

Summary of Findings

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Summary of Findings

The increase in the vehicle miles traveled in recent years has overwhelmed the technological advances made with respect to vehicle emissions reductions.[41]

- **Fuel Oil Consumption**

  Home heating fuel is essentially the same as diesel fuel, although the sulfur content is higher. Connecticut is exceptionally dependent on No. 2 fuel oil for heating purposes, and last year ranked fourth in the nation in raw consumption at more than 660 million gallons. By contrast, 230 million gallons of diesel fuel were used for transport purposes. Connecticut ranks first in the nation in fuel oil consumption per square mile of state area. This means that diesel pollution will be most severe where residential and traffic density are highest. It also explains the high particulate counts routinely measured in areas where population density is high and where multiple traffic lanes funnel into single lanes. Chronic traffic congestion leads to chronic human exposure to known hazardous air pollutants.

- **$PM_{2.5}$ Non-Compliance**

  Fine particulate matter in Connecticut exceeds federal air quality standards.[32] During the first six months of 2005, levels of fine particulates, or $PM_{2.5}$, in New Haven, Connecticut, exceeded the federal standard for 70 days, roughly 40 percent of the time.

- **Ozone Non-Compliance**

  The entire state of Connecticut exceeds the eight-hour ozone standard.[33]

- **Connecticut's Dependence on Motor Vehicles**

  Fewer than three percent of Connecticut residents walk to work,[34] and 45 percent of all Connecticut trips under a half-mile are made in a vehicle.[35] Connecticut residents spend on average 70 minutes a day in their cars, often breathing this polluted air.[36]

- **Connecticut Citizens' Proximity to Highways**

  One in three Connecticut citizens live within a mile of an interstate highway. As many as 70,000 of those residents are under the age of five.[37] In addition, 37 percent of the state's schools are located within a mile of an interstate highway.[38]

- **Vehicle Miles Traveled (VMT)**

  Connecticut residents own nearly three million vehicles, and travel nearly 31 billion miles each year. Each year residents put more miles on their vehicles in a year than ever before. The number of vehicles driven in

the state is also growing. Between 1995 and and 2000, state residents increased the miles driven by 10 percent[39] and this trend is expected to continue. The number of Vehicle miles traveled (VMT) in the state is projected to rise by another 12 percent by 2010 and by 27 percent by 2025.[40] The increase in VMT in recent years has overwhelmed the technological advances made with respect to vehicle emissions reductions.[41]

- **Idling and Wasted Fuel**
  The U.S. Argonne National Laboratory estimates that about 20 million barrels of diesel fuel are consumed each year by idling long-haul trucks. Estimated truck emissions total about 10 million tons of CO_2, 50,000 tons of nitrogen oxides, and 2,000 tons of particulates.[42]

- Natural Resources Canada estimates that idling a light duty vehicle for 10 minutes a day uses an average of 26.4 gallons (100 liters) of gas a year. Assuming Connecticut has approximately 2.2 million light duty vehicles, if idling time were reduced by 10 minutes per day for each, nearly 58 million gallons of gas would be saved per year, along with $145 million in fuel costs per year if one assumes that gas costs $2.50 per gallon.

- **Vehicle Emissions and Climate Change**
  Vehicle emissions contribute to air pollution generated from the combustion of fossil fuels from many other sources, including the burning of coal and oil in power plants, incinerators, home heating oil, and construction equipment. The combustion of gas and diesel fuels produce greenhouse gases that are contributing to local, regional and global climatic changes. A recent study published in *Science* analyzed more than 900 scientific articles listed with the keywords "global climate change." Not one disagreed with the consensus view that humans are contributing to global warming.[43] Little initiative is expected on this issue at the national and international levels of government. Connecticut has the potential to become a leader among states in reducing these gases.

- **Carbon Dioxide**
  Carbon dioxide (CO_2), considered the largest contributor to greenhouse climate change, accounts for more than 80 percent of U.S. greenhouse gas emissions. One-third of these emissions come from the transportation sector.[44] Carbon dioxide emissions originate almost entirely from fossil fuel consumption, and two-thirds of U.S. fuel consumption is used for transportation. [45]

Summary of Findings

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