Health Effects of Ozone

Air pollution, including ozone, contributes to lung disease, which causes more than 350,000 deaths annually, making it the third leading cause of death in the United States. People with chronic bronchitis, emphysema, and asthma are at risk from high ozone levels.

The American Lung Association released the following statistics in 2007:

- Approximately 34.1 million Americans have been diagnosed with asthma by a health professional during their lifetime.
- An average of one out of every 10 school-aged children has asthma.
- On high-pollution days, children with asthma are 40 percent more likely to suffer attacks than on average-pollution days.
- Asthma is the leading chronic illness of children in the United States and the leading cause of school absenteeism due to chronic illness.

Understanding the harmful effects of air pollution, particularly ozone, is a process that is just beginning. It's proven that exposure to ozone inflames lungs, especially those of sensitive groups including children, elderly, those with lung and heart illnesses, and those who work or are active outdoors.

Short term exposures affect the lungs much like sunburn: the inflammation goes away and new cells replace the damaged cells. However, these replacement cells are not exactly like those that are replaced, so it isn't a case of "everything back to normal." Results from long-term effects of repeated ozone exposures are not available yet, but researchers expect to see similar effects as repeated over-the-long-term skin sunburns are connected to skin cancer.

Sensitive populations should stay indoors when ozone levels rise. Ozone doesn't penetrate indoors very well, so on days when ozone levels rise into the "unhealthy for sensitive groups" range of the Air Quality Index, cut back or reschedule strenuous outside activities. Stay indoors in a well-ventilated or air-conditioned building. If you must be active outdoors, try to schedule activity before 10 a.m. or after 7 p.m.

Ozone and Ozone Precursors Enter the Lungs as Fine Particles

Researchers have learned that not all ozone and ozone precursors (particularly nitrogen oxides) that enter the lungs as fine particles become "lodged" in the lungs (which cause scarring and decreased lung function). Fine particles pass into the blood stream and contribute to plaque buildup in arteries, increase risk for and effects of heart disease, and enter all organs and the nervous system, including the brain. There is evidence that some people are genetically more predisposed to the effects of air pollution — up to 10 times the susceptibility.

Respiratory Symptoms

☑ Pain, burning, or discomfort in the chest when taking a deep breath
☑ Chest tightness, wheezing, or shortness of breath
☑ Coughing
☑ Throat irritation

Ozone Effects on the Environment

• Ground-level ozone interferes with the ability of plants to produce and store food, so that growth, reproduction and overall plant health are compromised.

•By weakening sensitive vegetation, ozone makes plants more susceptible to disease, pests, and environmental stresses.

•Ground-level ozone has been shown to reduce agricultural yields for many economically important crops such as soybeans.

•The effects of ground-level ozone on long-lived species such as trees are believed to add up over many years so that whole forests or ecosystems can be affected. For example, ozone can adversely impact ecological functions such as water movement, mineral nutrient cycling, and habitats for various animal and plant species.

Signs of ozone damage include flecking, stippling, bronzing and reddening on plant leaves. Photo courtesy of USDA.

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