

# Ozone

## What is it?

Ozone is one of six key air pollutants that scientists have identified as being particularly harmful to humans and the environment. National health standards have been developed for the six pollutants and are used as measurements of air quality. Ozone (O<sub>3</sub>) is a gas composed of three oxygen atoms. It is not emitted directly into the air but is created by a chemical reaction between oxides of nitrogen (NO<sub>x</sub>) and volatile organic compounds (VOCs) in the presence of heat and sunlight. Ozone has the same chemical structure whether it occurs miles above the earth or at ground level and can be “good” or “bad” depending on its location in the atmosphere. “Good” ozone occurs naturally in the stratosphere approximately 10 to 30 miles above the earth’s surface and forms a layer that protects life on earth from the sun’s harmful rays. In the earth’s lower atmosphere, ground-level ozone is considered “bad” because of its health effects.



## Where does it come from?

Motor vehicle exhaust, industrial emissions, gasoline vapors and chemical solvents are some of the major sources of NO<sub>x</sub> and VOC that help to form ozone. Sunlight and hot weather cause ground-level ozone to form in harmful concentrations in the air. As a result, ozone is known as a summertime air pollutant. Indiana’s ozone season is May 1 to September 30.

Many urban areas tend to have high levels of “bad” ozone but even rural areas can have elevated levels of ozone because wind carries ozone and pollutants that form it hundreds of miles away from their original sources.

## Why should I be concerned?

Ozone

- can trigger a variety of health problems and some people are especially sensitive.
- may cause permanent lung damage after long-term exposure.
- damages plants and ecosystems.

## AIR QUALITY INDEX (AQI) for Ozone

Index Values	Descriptors	Cautionary Statements
0 to 50	Good	None
51 to 100	Moderate	Unusually sensitive people should consider limiting prolonged outdoor exertion.
101 to 150	Unhealthy for Sensitive Groups	Active children and adults and people with respiratory disease, such as asthma, should limit prolonged outdoor exertion.
151 to 200	Unhealthy	Active children and adults and people with respiratory disease, such as asthma, should avoid prolonged outdoor exertion; everyone else, especially children should limit prolonged outdoor exertion.
201 to 300	Very unhealthy	Active children and adults and people with respiratory disease, such as asthma, should avoid prolonged outdoor exertion; everyone else, especially children, should limit prolonged outdoor exertion.
301 to 500	Hazardous	Everyone should avoid all physical activity outdoors.

You can learn about your air quality on a given day by looking at the Air Quality Index. The purpose of the AQI is to help you understand what local air quality means to your health. Each category corresponds to a different level of health concern. The higher the AQI value, the greater the level of air pollution and the greater the health concern. The Air Quality Index is published on U.S. EPA’s Web site at <http://www.epa.gov/airnow/> and in some newspapers.

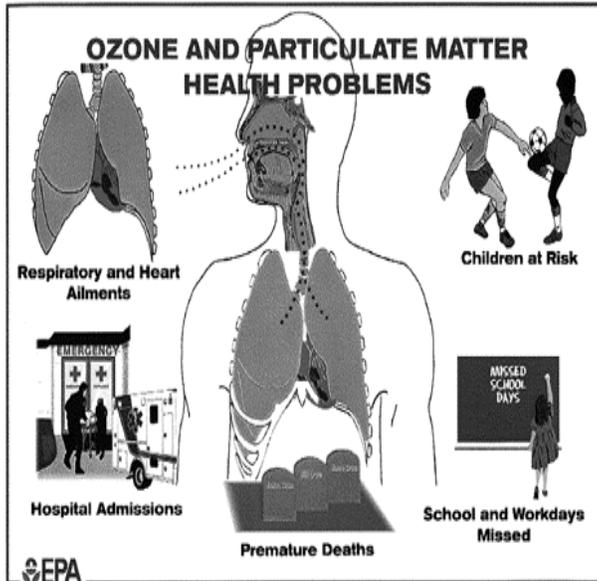
## How does ozone affect health?

Ozone can irritate lung airways and cause inflammation. Symptoms include wheezing, coughing, pain when taking a deep breath, and breathing difficulties during exercise or outdoor activities. People with respiratory problems are most vulnerable but even healthy people who are active outdoors can be affected when ozone levels are high.

Repeated exposure to ozone pollution for several months may cause permanent lung damage. Anyone who spends time outdoors during the summer is at risk, particularly children and other people who are active outdoors.

**Even at low levels, ground-level ozone triggers a variety of health problems including :**

- aggravated asthma
- increases in respiratory symptoms like wheezing, coughing and difficult or painful breathing
- increased susceptibility to respiratory illnesses such as pneumonia and bronchitis
- decreased lung function



## How does ozone affect the environment?



### Plant and Ecosystem Damage

Ground level ozone interferes with the ability of plants to produce and store food, which makes them more susceptible to disease, insects, other pollutants and harsh weather.

Ozone damages the leaves of trees and other plants, harming the appearance of cities, national parks, and recreation areas.

Ozone reduces crop and forest yields and increases plant vulnerability to disease, pests, and harsh weather.

### Pollution Travels

Ozone and the chemicals that react to form it can be carried long distances from their origins, thus causing air pollution over wide regions.

## What can I do to reduce ozone?

- Carpool, use mass transit, walk, bicycle and/or reduce driving, especially on hot summer days.
- Keep your automobile well tuned and maintained and its tires properly inflated and wheels aligned.
- Avoid drive-thru service lanes.
- Be careful not to spill gasoline when filling your car or gasoline-powered lawn equipment. During the summer, fill your gas tank during the cooler evening hours.
- Participate in your local utility's energy conservation programs.
- Seal containers household cleaners, chemicals and solvents to prevent VOC from evaporating into the air and dispose of the containers properly.

## For More Information:

Smogwatch Website  
National Ambient Air Quality Standards for Ozone  
How Ozone Affects the Way We Live and Breathe  
What Are the Six Common Air Pollutants?  
Air Quality Index

<http://www.in.gov/idem/air/smog/index.html>  
[http://www.in.gov/idem/air/8hour\\_standard/faqs.html](http://www.in.gov/idem/air/8hour_standard/faqs.html)  
<http://www.epa.gov/air/urbanair/ozone/index.html>  
<http://www.epa.gov/air/urbanair/6poll.html>  
<http://www.epa.gov/airnow/>

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