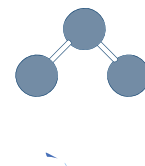


# Ozone & Air Quality



## What is Ozone and where does it come from?

Ozone is a colorless and odorless gas that contributes to poor air quality and has serious health effects. It occurs both naturally and as a product of human made pollution.



## When is Ozone beneficial? When is it harmful?

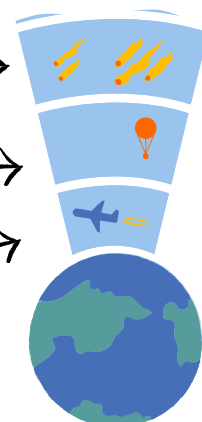
### Ozone in the Stratosphere

Ozone in this layer is natural and absorbs harmful sun rays. Human made chemicals can break down ozone in this layer, leaving us exposed to rays from the sun. This is commonly referred to as the "ozone hole".

Mesosphere

Stratosphere

Troposphere



### Ozone in the Troposphere

This is the layer in which we live and breathe in. Ozone in the troposphere, also known as ground level ozone, is created through reactions of manmade and naturally occurring pollutants. It can decrease visibility and cause serious health effects. Excess ozone from this layer does not travel to other layers.

Ground level ozone is created by a reaction between:

|   |                          |
|---|--------------------------|
| Volatile Organic<br>Compounds<br>(VOCs) | Nitrogen Oxides<br>(NOx) |
|   | Sunlight                 |

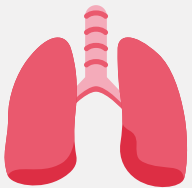
Sources of VOCs and NOx include:

- Industrial facilities
- Chemical solvents
- Vehicle gas vapors
- Power plants





## What are some of the health risks of ozone exposure?



- Difficulty breathing
- Lung-related emergency room visits
- Asthma
- Chronic obstructive pulmonary disorder (COPD)



- Premature birth and smaller babies at birth
- Brain damage and other birth defects
- High blood pressure during pregnancy

## Who is most likely to be affected?

People who are active outdoors



Older adults



Outdoor workers



People with asthma or other pre-existing conditions



Children



## How can I reduce my exposure?

Sensitive groups are advised to avoid outdoor activity on days when ozone levels are high, especially during the afternoon and early evening.



### How is ozone measured?

The ozone "design value" indicates the presence of ozone in the air to determine whether ozone levels are below the National Ambient Air Quality Standard (NAAQS). Ozone design values are determined by averaging readings on ozone monitors over long periods of time.

As wildfires increase, they are likely to influence the ozone design value.



### What are National Ambient Air Quality Standards (NAAQS)?

NAAQS are limits on the level of six pollutants (including ozone) in outdoor air in order to maintain air quality. These limits are meant to protect public health and the environment.

### How do I check ozone levels in my area?

Airnow.gov is one tool that can be used to check the Air Quality Index (AQI) in your area. This index considers ozone amongst other pollutants to determine how healthy outdoor air is.

### Air Quality Action Days for Ozone

Air Quality Action Days for Ozone are days when the levels of ozone are higher than what is considered healthy for certain groups.

|     |   |                    |
|-----|---|--------------------|
| AQI | { | Particulate Matter |
|     |   | <div>Ozone</div>   |
|     |   | Nitrogen Dioxide   |
|     |   | Sulfur Dioxide     |
|     |   | Carbon Monoxide    |

### How to read AQI values

|         |                                |
|---------|--------------------------------|
| 0-50    | Good                           |
| 51-100  | Moderate                       |
| 101-150 | Unhealthy for sensitive groups |
| 151-200 | Unhealthy                      |
| 201-300 | Very unhealthy                 |
| 300+    | Hazardous                      |



## How can local governments help?

Actions local governments can take to reduce ozone include:

1. Implement and enforce Southeast Michigan's Council of Government's (SEMCOG's) recommendation to incrementally reduce high-emitting polluting vehicles.
2. Upgrade poorly controlled emission sources such as power plants and major boilers, or phase them out.
3. Increase transit options using efficient buses, bus rapid transit and trains, which also have the benefit of reducing traffic congestion.
4. Require facilities to reduce VOC emissions by making process changes or implementing air pollution control technologies.

## References

- Environmental Protection Agency. What is Ozone? <https://www.epa.gov/ozone-pollution-and-your-patients-health/what-ozone>. Accessed 7/1/23.
- Environmental Protection Agency. Health Effects in the General Population. <https://www.epa.gov/ozone-pollution-and-your-patients-health/health-effects-ozone-general-population>. Accessed 7/1/23.
- Department of Environment, Great Lakes, and Energy. Ozone Nonattainment. <https://www.michigan.gov/egle/about/organization/air-quality/state-implementation-plan/ozone-nonattainment>. Accessed 7/1/23.
- Southeast Michigan Council of Governments. Keep the Air Clean. <https://semcog.org/keep-the-air-clean#640121-what-to-do-on-an-ozone-action-day>. Accessed 7/1/23.
- AirNow. Air Quality Index Basics. <https://www.airnow.gov/aqi/aqi-basics/>. Accessed 7/1/23.
- Le H.Q., Batterman S.A., Wirth J.et al. 2014. Air pollutant exposure and preterm and term small-for-gestational-age births in Detroit, Michigan: Long-term trends and associations. *Environmental International*, 44: 7-17

## CAPHE Project Partners

- Community Action Against Asthma
- Community Member-at-Large Theresa Landrum
- Detroit Community - Academic Urban Research Center
- Detroit Health Department
- Detroit Hispanic Development Cooperation
- Detroiters Working for Environmental Justice
- Green Door Initiative
- Healthy Environment Partnership
- Michigan Department of Environment, Great Lakes, and Energy (EGLE)
- Sierra Club
- Southwest Detroit Community Benefits Coalition
- Southwest Detroit Environmental Vision
- University of Michigan School of Public Health, Michigan Medicine, & Taubman College of Architecture and Urban Planning
- University of Michigan, Dearborn
- University of Detroit Mercy School of Law

Alison Walding  
Project Manager  
Community Engagement Core  
[walison@umich.edu](mailto:walison@umich.edu)  
[www.caphedetroit.sph.umich.edu](http://www.caphedetroit.sph.umich.edu)

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