

How Weather Affects the Air Quality Index (AQI)

Weather conditions have an affect on the quality of your indoor and outdoor air. For example, sunshine, rain, air temperature, humidity, and wind can increase or decrease the amount of air pollution you are exposed to:

- Sunshine - makes some pollutants undergo chemical reactions, producing smog.
- Higher air temperatures - speed up chemical reactions in the air.
- Rain - washes out water-soluble pollutants and particulate matter.
- Humidity- particulate matter attaches to water droplets in the air dissolving pollutants and increasing airborne pollution
- Wind speed and atmospheric turbulence - affect dispersal and concentration of pollutants

Sun

On a sunny day with no wind pollution can behave and be affected in several ways. The sun can cause chemical reactions with certain chemicals resulting in the production of ozone which creates smog and makes the air hazy or cloudy. If the temperature is high the heat can cause additional chemical reactions increasing the amount of pollution present. If there is no wind the pollutants in the air are not being dispersed and build up at the source of emissions and in the air around you.

Wind

Wind can have different impacts on air quality depending on speed and direction. If you are downwind of an emission source the wind can carry pollutants towards you. However wind can also disperse pollutants making the concentration less. Wind usually improves the quality of the air since it disperses pollutants. In some cases if the wind speeds are very high they can move dust and particles from the ground which may increase particulate matter in the air.

Rain and Humidity

Rain can improve air quality by washing pollutants from the air. Humidity can increase the amount of pollution in the air since pollutants can bond to water molecules and the wind movement is often low on a humid day. If the water molecules attach to corrosive gases, such as sulfur dioxide, the gas will dissolve in the water and form an acid solution that can damage health and property.

Atmospheric Turbulence/Stability

Atmospheric turbulence occurs when the temperature between the ground and the air changes. This turbulence means winds that vary in speed and direction. Atmospheric turbulence stirs the air combining water vapor and particulate matter in the air and distributing it both vertically and horizontally. This type of activity is most common in the middle of the day. At night when the temperature of the ground and air are similar the air is more stable. This lack of turbulence in the air can cause localized pollution to stay and build in an area rather than being dispersed.

Temperature Inversion Layers

Air temperature usually cools as it rises in the atmosphere, sometimes the upper air is warmer than the lower air this is called an inversion layer. When an inversion occurs it can act like a lid trapping pollutants below it, rather than being circulated, and increase the amount of pollution in the air. Inversions often occur overnight when the ground cools, in the winter when the ground is covered with a heavy snow, and in mountain valleys when the cold air falls into the valley creating a layer of warmer air above.

Using The Air Quality Index To Protect Your Health

You can download the Speck Sensor App at www.specksensor.com to stay informed about trends and changes in particulate concentration.



The Air Quality Index (AQI) is a measure for reporting daily air quality based on how clean or polluted the air is in your community. A high AQI value is associated with a greater level of air pollution and increased health risks. AQI is based on five major pollutants - ozone, fine particulate matter, nitrogen dioxide, carbon monoxide and sulfur dioxide. The two that pose the highest health risks are ozone and fine particulate matter. The EPA implemented the Clean Air Act to control air pollution, but millions of Americans live in areas that exceed government established safety levels.

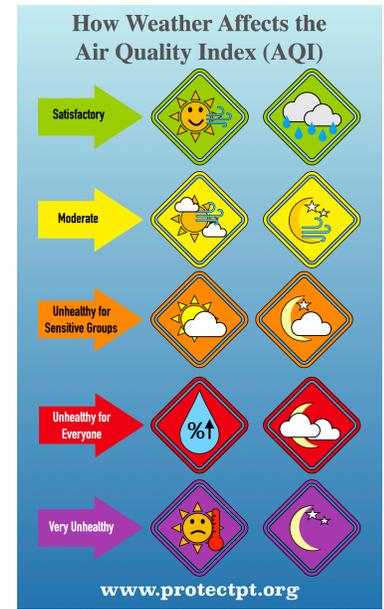
People with diabetes, lung disease, asthma, or heart disease are very sensitive to air pollution. A high AQI reading can make it harder to breathe or worsen chronic disease by irritating lungs and airways. Fine particles can lodge deep into the lungs and enter the bloodstream.

Children are particularly susceptible to asthma because their lungs and defense systems are developing. Children breathe more rapidly than adults and take in more air per pound, which exposes them to higher levels of fine particulate or pollutants.

If the AQI is in an unhealthy zone for you it is best to do the following:

- Avoid heavy exertion outside
- Stay indoors if possible
- Close doors and windows
- If possible run air filters

The Air Quality Index (AQI) can be used to plan your day and change behaviors to protect you and your family's health against the harmful effects of air pollution. The index uses six colors to indicate the level of health concern. This information can also be found on the EPA's website www.airnow.gov. We have created a magnet for quick reference that coincides with the EPA's color rating and recommendations.



Good (Satisfactory) 0 - 50: Air quality is considered satisfactory, and air pollution poses little or no risk.

Moderate 51 - 100: Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people. For example, people who are unusually sensitive to ozone may experience respiratory symptoms.

Unhealthy For Sensitive Groups 101 - 150: Although general public is not likely to be affected at this AQI range, people with lung disease, older adults and children are at a greater risk from exposure to ozone, whereas persons with heart and lung disease, older adults and children are at greater risk from the presence of particles in the air.

Unhealthy 151 - 200: Everyone may begin to experience some adverse health effects, and members of the sensitive groups may experience more serious effects.

Very Unhealthy 201 - 300: This would trigger a health alert signifying that everyone may experience more serious health effects.

Hazardous Greater than 300: This would trigger a health warnings of emergency conditions. The entire population is more likely to be affected.

Helpful Links

- <https://www.airnow.gov/index.cfm?action=airnow.main>
- <http://www.lung.org/our-initiatives/healthy-air/outdoor/air-pollution/10-tips-to-protect-yourself.html>