**Health Effects of CO2:**

Carbon dioxide (CO2) is a colorless gas that comprises approximately 0.04% of Earth’s atmosphere. In the human body, carbon dioxide is formed from the metabolism of carbohydrates, fats, and amino acids, in a process known as cellular respiration. While cellular respiration is notable for being a source of ATP, it also generates the waste product, CO2. The body gets rid of excess CO2 by breathing it out. However, CO2 in its normal range from 38 to 42 mm Hg plays various roles in the human body. It regulates the pH of blood, stimulates breathing, and influences the affinity hemoglobin has for oxygen (O2). Fluctuations in CO2 levels are highly regulated and can cause disturbances in the human body if normal levels are not maintained. Exposure to CO2 can produce a variety of health effects. These may include headaches, dizziness, restlessness, a tingling or pins or needles feeling, difficulty breathing, sweating, tiredness, increased heart rate, elevated blood pressure, coma, asphyxia, and convulsions.

* CO2 is a gas present in the atmosphere in a natural way in a concentration of 250 to 350 ppm.
* 350 to 1000 ppm is a good quality concentration in an enclosed room. This is what the Earth is, a confined space.
* 1000 to 2000 ppm, the air quality is low.
* From 2000 to 5000 ppm, CO2 concentration starts to cause problems **(headaches, insomnia, nausea).** It is a dirty air.
* From 5000 ppm, the presence of other gases in air is altered, arising a toxic atmosphere or poor in oxygen with fatal effects as the concentration increases.
* 40,000 ppm: this level is immediately harmful due to oxygen deprivation.

**Everyone's Reaction is Different**

* A person's reaction to chemicals depends on several things, including individual health, heredity, previous exposure to chemicals including medicines, and personal habits such as smoking or drinking. It’s also important to consider the length of exposure to the chemical, the amount of chemical exposure, and whether the chemical was inhaled, touched, or eaten.

**Health Effects of CO:**

Carbon monoxide, or CO, is a toxic gas that you cannot see or smell. CO is given off whenever fuel or other carbon-based materials are burned. CO usually comes from sources in or near your home that are not properly maintained or vented.

**Risk, Symptoms and Health Effects**

* All people are at risk for CO poisoning. Unborn babies, infants, the elderly, and people with chronic heart disease, anemia, or respiratory problems are generally more at risk than others.
* Breathing CO can cause headache, dizziness, vomiting, and nausea. If CO levels are high enough, you may become unconscious or die. Exposure to moderate and high levels of CO over long periods of time has also been linked with increased risk of [heart disease](http://www.cdc.gov/niosh/topics/heartdisease). People who survive severe CO poisoning may suffer long-term health problems.

**Health Effects of PM:**

Particulate Matter (PM) and Wildfire Smoke

Particulate Matter is a complex mixture that may contain soot, smoke, metals, nitrates, sulfates, dust, water and tire rubber. It can be directly emitted, as in smoke from a fire, or it can form in the atmosphere from reactions of gases such as nitrogen oxides.

The size of particles is directly linked to their potential for causing health problems. Small particles (known as PM2.5 or fine particulate matter) pose the greatest problems because they bypass the body’s natural defenses and can get deep into your lungs and potentially your bloodstream. Exposure to such particles can affect both your lungs and your heart.

Long-term exposure to particulate pollution can result in significant health problems including:

* Increased respiratory symptoms, such as irritation of the airways, coughing or difficulty breathing
* Decreased lung function
* Aggravated asthma
* Development of chronic respiratory disease in children
* Development of chronic bronchitis or chronic obstructive lung disease
* Irregular heartbeat
* Nonfatal heart attacks
* Premature death in people with heart or lung disease, including death from lung cancer

**Health Effects of O3:**

**Ground-level Ozone**

Ground-level ozone is formed when volatile organic compounds (VOCs) and oxides of nitrogen (NOx) react with the sun's ultraviolet rays. The primary source of VOCs and NOx is mobile sources, including cars, trucks, buses, construction equipment and agricultural equipment.

Ground-level ozone reaches its highest level during the afternoon and early evening hours. High levels occur most often during the summer months. It is a strong irritant that can cause constriction of the airways, forcing the respiratory system to work harder in order to provide oxygen.

It can also cause other health problems including:

* Aggravated respiratory disease such as emphysema, bronchitis and asthma
* Lung damage, even after symptoms such as coughing or a sore throat disappear
* Wheezing, chest pain, dry throat, headache or nausea
* Reduced resistance to infections
* Increased fatigue
* Weakened athletic performance

**Health Effects of NOx:**

Nitrogen oxides (NOx) are poisonous gases derived from nitrogen and oxygen combustion under high pressure and temperatures.

NOx is composed of nitric oxide (NO), and a smaller percentage of more poisonous nitrogen dioxide (NO2). Fossil-fuel burning is by far the main man-made source: cars, trucks, tractors and boats or industrial processes like power generation and cement-making.

**What does it do to humans?**

NOx has direct and indirect effects on human health.

It can causes [breathing problems](https://phys.org/tags/breathing+problems/), headaches, chronically reduced lung function, eye irritation, loss of appetite and corroded teeth. Indirectly, it can affect humans by damaging the ecosystems they rely on in water and on land—harming animals and plants. Also emitted in diesel fumes are solid particles which can penetrate deep into the lungs and cause cancer, chronic breathing problems and premature death in people with heart or lung disease.