



NYC AIR POLLUTANTS AND THEIR AFFECT ON OUR HEALTH

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COMMON AIR POLLUTANTS IN NYC

- FINE PARTICULATE MATTER (PM_{2.5})
 - Commonly found in all combustion sources such as vehicles and boilers, composition changes depending on source this may cause additional health effects.
 - Due to its small size PM_{2.5} can penetrate deep into the lungs as well as make its way into the bloodstream.
 - Short term exposure worsens existing lung diseases, can cause heart attacks and irregular heart beats for those with heart diseases.
 - Long term exposure leads to reduced lung function, the development of respiratory and cardiovascular diseases as well as helping them progress quicker, and lastly leads to a reduction in life expectancy.

COMMON AIR POLLUTANTS IN NYC (CONT)

- Nitrogen Dioxide (NO₂)
 - Highly reactive gas created from emissions of vehicles and gas appliances
 - NO₂ is a respiratory irritant main health effects are air way inflammation, increased chance for lung infections, increased asthma triggers and worsening symptoms of asthma attacks.
- Sulphur Dioxide (SO₂)
 - Another highly reactive gas caused by fossil fuel combustion commonly found around power plants and other industrial facilities. Known for causing acid rain.
 - SO₂ irritates the lining of the nose throat and lungs, worsens existing respiratory/cardiovascular issues and narrows the airways

COMMON AIR POLLUTANTS IN NYC (CONT)

- Ozone (O₃)
 - Ground level ozone is created a chemical reaction between nitrogen oxides and volatile organic compounds in the presence of sunlight. Is the main component in smog.
 - Ozone causes irritation and inflammation of the eyes nose and throat, reduced lung function, worsens asthma and other respiratory diseases, increases chance of respiratory infections and can continue to damage lungs even after symptoms have disappeared.

AIR POLLUTANTS EFFECTS ON HEALTH

- In June 6 2016 the city had estimated that up to 2,700 premature deaths could be attributed to PM_{2.5} and O₃ in the air, 8 times more than the number of murders that took place in 2013

Table 1. Health impacts from current PM_{2.5} exposure and benefits of reducing exposure in New York City.*

Health Effect	Age Groups Affected (in years)	Annual Health Events Attributable to Current PM _{2.5} Levels	Annual Health Events Avoided If PM _{2.5} Levels Were Reduced by 10%	Annual Health Events Avoided If PM _{2.5} Levels Were Reduced to Cleanest Air of Any Large City
Premature mortality	30 and above	3,200	350	760
Hospital admissions for respiratory conditions	20 and above	1,200	130	280
Hospital admissions for cardiovascular conditions	40 and above	920	100	220
Emergency department visits for asthma	Under 18	2,400	270	580
Emergency department visits for asthma	18 and above	3,600	390	850

PM_{2.5}-particulate matter

* Based on 2005-2007 data on air pollution, mortality and illnesses

Table 2. Health impacts from current O₃ exposure and benefits of reducing exposure in New York City.*

Health Effect	Age Groups Affected (in years)	Annual Health Events Attributable to Current O ₃ Levels	Annual Health Events Avoided If O ₃ Levels Were Reduced by 10%
Premature mortality	All ages	400	80
Hospital admissions for asthma	Under18	420	90
Hospital admissions for asthma	18 and above	450	90
Emergency department visits for asthma	Under18	1,800	370
Emergency department visits for asthma	18 and older	2,900	600

O₃—ozone

* Based on 2005-2007 data on air pollution, mortality and illnesses

CHANGES IN POLLUTANTS

- Studies from the environmental air survey collected changes in air pollutants over time from 2008 to fall of 2014.
- Overall the levels of PM_{2.5}, NO₂, SO₂ had declined heavily while O₃ levels remained stable.
 - PM_{2.5} declined by 0.4 micrograms per cubic meter each year, 16% decline at the end of 6 years
 - NO₂ declined by 1.2ppb each year, 21% decline by the end of the 6 years
 - SO₂ declined by 0.8ppb each year, 68% decline by the end of the 6 years

CONCLUSION

- There are many air pollutants within NYC that have adverse health affects however as shown NYC is taking steps to lower the amount of pollutants in order to provide a better life for those living here. As we keep up this trend we can assume to see even less air pollutants and better air quality in the up coming years.

BIBLIOGRAPHY

- Hinsdale, Jeremy. “By the Numbers: Air Quality and Pollution in New York City.” *State of the Planet*, 11 Oct. 2017, blogs.ei.columbia.edu/2016/06/06/air-quality-pollution-new-york-city/.
- *Air Pollutants in NYC*, www.nyc.gov/html/dep/html/air/air_pollutants_in_nyc.shtml.
- New York City Department of Health and Mental Hygiene, Queens College. “The New York City Community Air Survey.” *Neighborhood Air Quality 2008-2014*, NYC Health, 2016, www1.nyc.gov/assets/doh/downloads/pdf/environmental/comm-air-survey-08-14.pdf

BIBLIOGRAPHY (CONT)

- Environmental Health, NSW. “Air Quality – Common Air Pollutants and Their Health Effects.” NSW Government Environmental Health, 29 Apr. 2013, <http://www.health.nsw.gov.au/environment/air/Pages/common-air-pollutants.aspx>
- Kheirbek, Iyad, et al. “Air Pollution and the Health of New Yorkers: The Impact of Fine Particles and Ozone.” Edited by Lise Millay Stevens, <https://www1.nyc.gov/assets/doh/downloads/pdf/eode/eode-air-quality-impact.pdf>.