

Data Details - Ozone/Air Quality

Interpreting the Data

What these data tell us:

- These data can be used to identify yearly measures of ozone levels within counties where measurements have been taken.
- These data represent two metrics for ozone: the number of days for which an 8-hour average for ozone exceeded the National Ambient Air Quality Standard (NAAQS), and the person days that the average value exceeded the NAAQS.

What these data do not tell us:

- These data do not give us measures of actual exposure to ozone for individual or communities.
- Because these data are based on values taken from fixed points they can only reflect air quality at those specific locations, not the actual air quality of the entire county. Air quality can vary within a county.
- Comparisons of air quality data to health measures are done at an aggregate level, and just because events occur in the same geographic area does not mean one must cause the other for each individual person. Elevated rates and certain health effects in areas of potentially higher ozone exposure do not necessarily mean the ozone is causing that health outcome. There may be different factors contributing to the health of different individuals.

Putting the data in perspective

The United States Environmental Protection Agency (EPA) sets NAAQS or standards allowed in air quality. NAAQS are levels of chemicals that can be in air that EPA still finds safe (i.e., acceptable) to breathe. Units of measure for the standards are parts per million (ppm) by volume, milligrams per cubic meter of air (mg/m³), and micrograms per cubic meter of air (µg/m³).

How much is ppm? Consider the following: 1 ppm = 1 drop of water diluted into approximately 13 gallons or 1 second of time in roughly 11.5 days.

Limitations of the Data

It is not representative of overall air quality. Because the data are only a small snapshot of air quality characteristics in an area and do not take into account all factors that contribute to overall air quality, the data only represent what may be possible given the data that has been collected.

When there is more than one air monitor within a county, the highest reading on any day is used. Estimates for larger areas with more than one air monitor may be biased higher than estimates for smaller areas with only one air monitor.

These data do not give us any information about air quality in counties where there are not air monitors. Air monitors tend to be located in urban areas, where the most people live, and air quality is often worse than in rural areas.

Variation in population between counties can have a significant effect on the number of person-days about the National Ambient Air Quality Standard (NAAQS). For example, if two counties have the same number of days above NAAQS but one of the counties has a much larger population, that county will have more person-days above NAAQS because: Number of days above NAAQS x number of people = number of person-days above NAAQS.

About these Measurements

This indicator is comprised of two measures: the number of days above the National Ambient Air Quality Standard (NAAQS), and the number of person-days above the NAAQS. The NAAQS applied to the ozone data is 0.075 parts per million (ppm). These measures are provided only for counties where air quality monitors are maintained and measurements are taken. Not all counties have monitors or have air quality measurements taken. Data is available for the years that have been supplied to EPHT by the Air Monitoring Department. Data may not be available for each monitor each year.

The data are obtained only from monitors that are designated as Federal Reference Methods or equivalent. The data include values associated with exceptional events such as high winds, fires, or construction.

Calculation Methods

For all of these calculations, [EPA's Air Quality System \(AQS\) DataMart](#) is used to access daily maximum 8-hour average ozone concentrations and supplemental data (such as latitude, longitude and elevation) for all the monitoring sites across the United States. These calculations only include data from monitors that meet the minimum data completeness criteria set by [EPA's national air quality standards](#).

Calculating number of days above National Ambient Air Quality Standard (NAAQS)

This measure is of the 8-hour average of hourly measurements taken. A day is counted in this metric for ozone if the maximum 8-hour average for a 24 hour period exceeds the 0.075 ppm.

Calculating person-days above National Ambient Air Quality Standard (NAAQS)

Person-days above NAAQS are calculated by multiplying the number of days that monitored levels are above the NAAQS for ground-level ozone concentrations in a given county by the population of that county. Note: This metric only provides an estimation of the population that may be exposed on a specific day over time and is not directly reflective of the health-based NAAQS established by the USEPA. NOTE: This calculation method is population based and therefore, would not be the preferred measurement on an individual basis.

Data Details - PM 2.5/Air Quality

Interpreting the Data

What these data tell us:

- These data can be used to identify yearly measures of PM_{2.5} levels within counties where measurements have been taken.
- These data represent three metrics for PM_{2.5}: the average, the percent of days in a calendar year that the average for PM_{2.5} exceeded the National Ambient Air Quality Standard (NAAQS), and the person days that the average value exceeded the NAAQS.

What these data do not tell us:

- These data do not give us measures of actual exposure to PM_{2.5} for individuals or communities.
- Because these data are based on values taken from a fixed point or points, they can only reflect air quality at that location and not the actual air quality of the entire county. Air quality can vary within a county.
- Comparisons of air quality data to health measures are done at an aggregate or overall level, and just because events occur in the same geographic area does not necessarily mean that one must cause the other for each individual person. Elevated rates of certain health effects in areas of potentially higher exposure to particulate matter in the air do not necessarily mean the particulate matter is causing that health outcome. There may be different factors contributing to the health of different individuals.

Putting the data in perspective

The United States Environmental Protection Agency (EPA) sets NAAQS or standards allowed in air quality. NAAQS are levels of chemicals that can be in air that EPA still finds safe (i.e., acceptable) to breathe. You may see units of measure for the standards expressed as parts per million (ppm) by volume, milligrams per cubic meter of air (mg/m³), and micrograms per cubic meter of air (µg/m³).

How much is ppm? Consider the following: 1 ppm = 1 drop of water diluted into approximately 13 gallons or 1 second of time in roughly 11.5 days.

Limitations of the Data

It is not representative of overall air quality. Because the data are only a small snapshot of air quality characteristics in an area and do not take into account all factors that contribute to overall air quality, the data only represent what may be possible given the data that has been collected.

These data do not give us any information about air quality in counties where there are not air monitors. Air monitors tend to be located in urban areas, where the most people live, and air quality is often worse than in rural areas. It is not necessary for a monitor to be located in every county to have an idea of the local air quality. Monitoring is focused on the areas where pollutant concentrations are expected to be highest, so areas with fewer sources of air pollution are expected to have better air quality.

Variation in population between counties can have a significant effect on the number of person-days above the National Ambient Air Quality Standard (NAAQS). For example, if two counties have the same number of days above the NAAQS but one of the counties has a much larger population, then that county will have more person-days above NAAQS because: $\text{Number of days above NAAQS} \times \text{number of people} = \text{number of person-days above NAAQS}$.

About these Measurements

The indicator is comprised of three measures; annual mean concentration of PM_{2.5} in parts per million (ppm), the percent of days above the National Ambient Air Quality Standard (NAAQS), and the number of person-days above the NAAQS. These measures are provided only for counties where air quality monitors are maintained and measurements are taken. Not all counties have monitors or have air quality measurements taken. Data is available for the years 2005 - 2011. Data may not be available for each monitor each year.

The data are obtained only from monitors that are designated as [Federal Reference Methods](#) or equivalent. The data include values associated with exceptional events such as high winds, fires, or construction.

Calculation Methods

EPA extracts data on PM_{2.5} daily concentrations from the EPA Air Quality System (AQS).

Calculating the Annual mean concentration

The average levels of PM_{2.5} from each monitor (weighted by the number of samples within a quarter) in a county is calculated for each year. If there is more than one monitor per county, then the means are averaged.

Calculating number of days above National Ambient Air Quality Standard (NAAQS)

The percent of days above the NAAQS is the total number of days annually with daily maximum PM_{2.5} average concentration above the daily NAAQS divided by the total number of days in a year. This value is then multiplied by one hundred to give a percentage. The annual NAAQS for PM_{2.5} is 15 µg/m³. The daily NAAQS for PM_{2.5} is 35 µg/m³.

Calculating person-days above National Ambient Air Quality Standard (NAAQS)

Person-days above NAAQS are calculated by multiplying the number of days that monitored levels are above the NAAQS for PM 2.5 concentrations in a given county by the population of that county. Note: This metric only provides an estimation of the population that may be exposed on a specific day over time and is not directly reflective of the health-based NAAQS established by the USEPA. NOTE: This calculation method is population based and therefore, would not be the preferred measurement on an individual basis.