Air Quality Data Available on the Environmental Public Health Tracking Network

The U.S. Centers for Disease Control and Prevention (CDC) and U.S. Environmental Protection Agency (EPA) worked together to develop air quality indicators and measures for CDC's [National Environmental Public Health Tracking Network](#).

This collaboration involved two major areas of activity:

- Monitoring Data: EPA provided ozone and particulate matter ($PM_{2.5}$) data from the Air Quality System (AQS) to CDC, and the two agencies collaborated to develop county-based measures of air quality from AQS data.
- Modeled Data: CDC and EPA developed daily estimates of air quality for Ozone and $PM_{2.5}$ using a Hierarchical Bayesian (HB) model. This model fuses monitoring data from AQS and results from EPA's Community Multiscale Air Quality (CMAQ) model.

Both monitored and modeled data are available on the Tracking Network to highlight possible exposure to ozone and $PM_{2.5}$, estimate the impact that exposure may have on health, guide public health actions and provide data for researchers to conduct analytic studies linking health and the environment.

Differences in Monitoring and Modeled Data:

- AQS monitoring data are viewed as the "gold standard" for determining outdoor air pollution and compliance with National Ambient Air Quality Standards (NAAQS), but they are limited in space and time. Approximately only 20% of the counties in the United States are monitored. Most $PM_{2.5}$ monitors operate once every three days while many ozone monitors operate only during local ozone seasons, which vary across the country, but generally occur from May through October[1].
- In contrast, the modeled air quality estimates are available for every day of the year (except for the first and the last day of the year) and cover the United States, excluding Alaska and Hawaii.

The Hierarchical Bayesian Model:

The Hierarchical Bayesian (HB) approach developed by CDC and EPA makes modeled predictions available in areas that do not have monitors and to fill in the time gaps when monitors may not be recording data. This approach:

- relies on CMAQ model output in non-monitored areas, which results in an improved estimation of the uncertainty of the air pollutant concentration, and
- uses monitoring data in areas where it data exists.

The HB data on the Tracking Network are available at two resolutions:

- 36-km grid-level data are available across the United States, excluding Alaska and Hawaii

- 12-km grid-level data are available for the Eastern United States
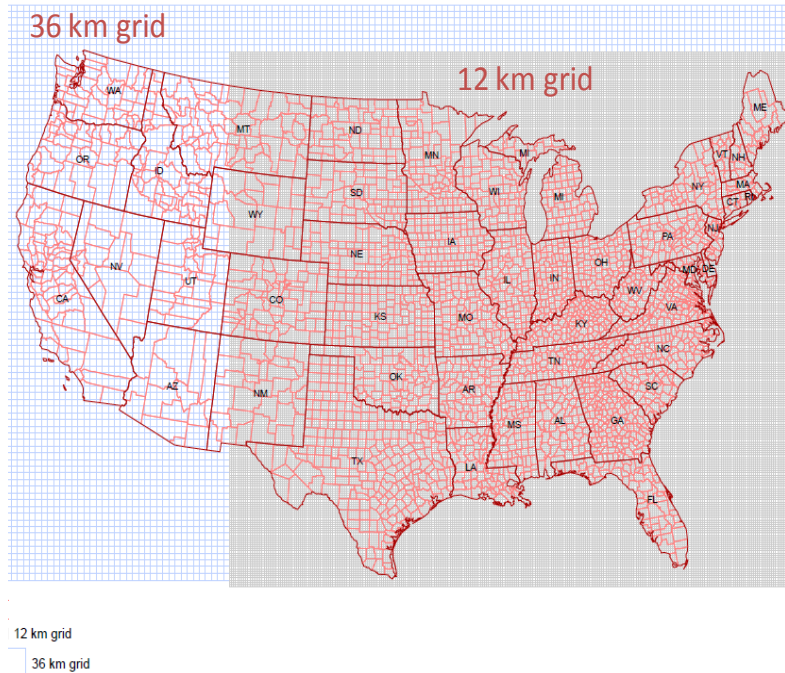
The table below compares the two air quality datasets used to create indicators and measures on the Tracking Network:

	Monitoring data (using AQS data)	**Modeled data (using HB model)**
Pollutants	Ozone (8-hr) and PM$_{2.5}$ (24-hr)	Ozone (8-hr) and PM$_{2.5}$ (24-hr)
Time Period	2001-2008	2001-2006
Temporal Scale	Depends on monitors' operating frequency: • Most PM$_{2.5}$ monitors operate every third day • Ozone monitors operate during local ozone seasons.	Available every day (except for first and last day of the year)
Geographic Scope	United States	United States, excluding Alaska and Hawaii
Geographic Scale	Available as point locations (latitude /longitude)	Available in 12- and 36-km grid: • 12-km available for Eastern United States • 36-km grid available for the United States, excluding Alaska and Hawaii
Data Source	Obtained from EPA's Air Quality System (AQS)	Combined AQS data and results from EPA's Community Multiscale Air Quality (CMAQ) model using a Hierarchical Bayesian (HB) model approach