Using Publicly Available Air Data to Compute Daily Estimates of PM2.5 for each Neighborhood in Orleans Parish

Tulane University Study Center
Arti Shankar, PhD; Liz Langlois, MSPH; Chuck Shorter, MPH

Introduction

Small area or individual exposure values are often not available or cost-prohibited for use in evaluations of disease-environment relationships. This project presents two methods to use publicly available data sources to estimate $PM_{2.5}$ for each of Orleans Parish's 72 neighborhoods.

Methods

The first method uses ambient air monitoring data downloaded from EPA's Air Quality System (AQS) Data Mart. Estimating $PM_{2.5}$ using the AQS data is a two-step process. The first step involves identifying all monitors located in the New Orleans area and uses spatiotemporal methods to interpolate $PM_{2.5}$ values for monitors that sample less than daily, and for those with missing values. Step 2 consists of spatial interpolation procedures using inverse weighted distance to estimate daily concentrations of $PM_{2.5}$ for each neighborhood. The second method uses air quality data produced using hierarchical Bayesian space-time modeling that provides daily $PM_{2.5}$ estimates at 12 kilometer grids across the United States. This data originally was developed for the CDC National Environmental Public Health Tracking Network. This method involves identifying all 12 kilometer grids across Orleans parish and plotting the grids on a map of the 72 neighborhoods. A weighted average to provide a single $PM_{2.5}$ estimate per neighborhood is computed based on distance of the centroid of each grid from the centroid of the closest neighborhood.

Results

Results from this exploratory analysis will be used to inform the feasibility of using extant data sources to estimate exposure for NCS participants and will identify strengths and limitations of these methods.