A REVIEW OF PUBLIC HEALTH AIR SURVEILLANCE EVALUATION PROJECT

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Background:

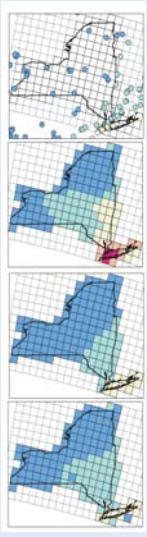
CDC, EPA, and the health departments of New York, Maine, and Wisconsin, have been collaborating on an evaluation of different air characterization methods for use in Environmental Public Health Tracking (EPHT).

Approach:

The three public health departments collected health tracking data associated with cardiovascular and respiratory health events. In doing so, the states developed consistent case definitions and addressed spatial qualities of the health data. EPA provided air quality data based on four different approaches of estimating exposure. With these air quality data sets, the three states applied a "case-crossover" analysis technique to evaluate the association between the health and air quality data.

Methods:

We examined the sensitivity of the associations between the health outcome data and fine particles or ozone levels for four different air datasets provided by EPA.



Ambient PM monitors- nearest monitor was assigned to each case. In NYS, 95% of monitors take measurements only every third day (only these monitors were used).

CMAQ (Community Multiscale Air Quality Model)- meteorology and emissions inventories (point, area, biogenic, and mobile sources) were used to estimate air quality levels and transport.

Interpolated- third day monitor data were first interpolated in time using splines, and then in space using ordinary kriging.

Combination monitor/CMAQ- Hierarchical Bayesian method that provided more weight to monitoring data in areas where monitoring exists, and greater weight to the CMAQ model in areas far from monitors.

Results:

The statistical technique produced less error than the CMAQ predictions when compared to a set of independent air quality monitor data. Figure 1 compares the fine particle CMAQ predictions and the ambient fine particle data in metropolitan New York City. Figure 2 compared the statistical technique estimates and the ambient fine particle data in metropolitan New York City. The qualitative contrast shows the effect of the statistical technique.

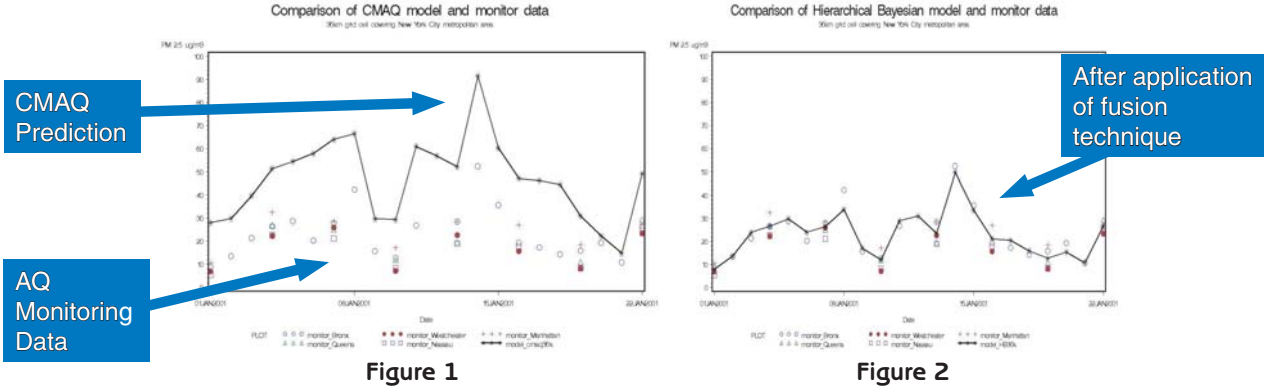


Figure 1 Figure 2

Discussion and Conclusions:

These results are one piece of a larger evaluation of air characterization methods by the Public Health Air Surveillance Evaluation (PHASE) team to select a method that could be routinely used in a sustainable EPHT Network. Note that all of these methods provide only surrogate measures of true personal exposure.

The PHASE collaboration demonstrated the ability to link air quality and surveillance health data. This will enable State public health departments to assess the impact of air pollution in rural and urban populations and to take appropriate action at the community level. The techniques have been evaluated and implementation activities are underway. Next steps include: a menu-driven software tool to link health and air quality data and readily available air quality data available. This will enable health department professionals to link and analyze air quality and health data routinely.

Disclaimer:

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