

ABSTRACT

The Effect of Air Quality and Weather on Human Health in New England: Assessing Vulnerability and Generating Decision Relevant Information

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The scientific community has identified the human health consequences of climate change and variability as an issue of primary concern. The range of related morbidity and mortality effects include those resulting from extreme heat, storms, floods, vector-borne disease, and poor air quality. The relationship of climate and health is complex and presents significant challenges to improving our understanding of relevant causal relationships. We have chosen to focus on one area of research: the relationship between air quality, weather, and pulmonary function.

Our geographic focus is New England. Very few studies examining the link between air quality, weather, and pulmonary function have been conducted in New England, despite the fact that the region is experiencing an asthma epidemic and has considerable climate variability, both spatially and temporally. New England's air quality is probably the most affected of any region in the United States by air pollution transported from upwind sources, including those from the mid-Atlantic states, the Midwest, eastern Canada, as well as from pollution produced locally in New England. Projected climate changes, which may exacerbate a myriad of human health effects, make understanding the relationship between air quality, weather and pulmonary function even more critical.

To attain its goal of improving public health, the organizational framework of the New England Integrated Sciences and Assessment (NEISA) will consist of two integrated activities: 1.) engaging a wide range of stakeholders in the development and implementation of a strategic plan to investigate the link between pulmonary health and air quality and 2.) using the results of the investigation to create informed public policy and guide the product development of the NOAA-funded AIRMAP (Atmospheric Investigations, Regional Modeling, Analysis and Prediction) air quality forecasting research effort.

Guided by a collaborative process with the stakeholders, NEISA plans to embark upon a series of prospective studies examining the link between pulmonary health and air quality. We will collect data describing changes in pulmonary function in northern New England that are comparable in spatial and temporal resolution to the hourly air quality data that are currently being collected by the AIRMAP air quality monitoring stations and by state air quality monitoring programs in New England. Unlike previous studies, we hope to examine a variety of health indices: mortality, ER and hospital visits, lost workdays, school absenteeism, school nurse visits, and peak flow and spirometry measurements. We plan to conduct our investigations in three cities in northern New England – Manchester, NH; Portland, Maine and Burlington, Vermont. This unique nested approach will be capable of providing data for each community at various resolutions, from population-based institutional data to individual measurements of changes in pulmonary function in children. The results of this research will, in turn, foster the effective design and implementation of regional and community-based preventative public health interventions.