"Trends in Air Pollution and Health Effects Across New York State"

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Abstract:
Over the past decade, policy initiatives to improve air quality have been implemented nationwide and in New York State (NYS). These measures included the lowering of the sulfur content of on-road and non-road diesel and home heating fuels, use of particle regenerative traps to capture diesel emissions, and nitrogen oxide controls, actions to reduce sulfur dioxide (SO_2) and nitrogen oxide (NOx) emissions from power plants in upwind source areas (i.e. Cross-State Air Pollution Rule), and Ontario going carbon-free in electricity generation between 2009 and 2014. Additionally, economic changes have also led to changes in emissions. These changes included the recession of 2008 that resulted in a general decrease in economic activity and thus lower emissions, and a dramatic decline in the price of natural gas that displaced coal as a fuel for electricity generation. Thus, many coal-fired power plants have been closed including those in western NY. With NYSERDA funding, we examined whether there were changes in PM concentration and composition, and then further examined their association with cardiovascular and respiratory hospitalizations and emergency department visits before, during, and after these air quality policies and economic changes. We also investigated sources of $PM_{2.5}$ across the state (Buffalo, Rochester, Albany, Queens, Bronx, and Rochester) and identified ten $PM_{2.5}$ sources at six urban sites in NYS. We then examined associations between these same health outcomes and these $PM_{2.5}$ sources. These analysis help understand the increases in the observed toxicity per unit mass of $PM_{2.5}$ over time.

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