New York State Department of Health

Center for Environmental Health

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Public Health Consultation

Respiratory Hospitalizations in Areas Surrounding the AES Greenidge Power Plant

Town of Torrey,
Yates County, New York

Prepared by:
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Center for Environmental Health
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Under a Cooperative Agreement with
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Introduction / Background:

AES Greenidge is a power plant that burns coal to generate electricity. It is located just south of the village of Dresden in Yates County, NY. In 2005, Senator Hillary Clinton contacted the Agency for Toxic Substances and Disease Registry (ATSDR) and asked that they assess the health of the communities around the facility due to concerns about respiratory illness in the area. The New York State Department of Health, using funds from ATSDR, agreed to conduct a health statistics review to look at respiratory illness in the communities around Greenidge. The purpose of the health statistics review was to act as a pilot investigation, to explore the relationship between available respiratory disease information and past emissions from the AES power plant in order to determine if further detailed health investigations are warranted.

Coal-Burning Power Plants and Air Pollution:

The Greenidge plant, like other coal-burning power plants, releases many pollutants as it produces electricity. Some of these have been linked to health problems with the lungs. One pollutant of concern is particulate matter or PM. PM is made up of tiny bits of solid and liquid materials that are released into and move around in the air. Larger particles are called PM_{10} and smaller particles are called $PM_{2.5}$. Smaller particles can be inhaled deeper into the lungs. Other pollutants of concern are ozone, nitrogen oxides and sulfur dioxide. Nitrogen oxides are a group of gases that are released into the air when fuels are burned. These gases react with sunlight to form ozone, one of the main ingredients in smog. Sulfur dioxide is a gas released during coal burning that joins with other substances in the air to form acids, which can fall to the ground as rain, fog, snow or dry particles. Sulfates, formed mainly from sulfur dioxide, are a main component of $PM_{2.5}$. The main source of sulfur dioxide in the Eastern United States is electric utilities, especially those that burn coal.

Even healthy people can have short term problems when they breathe in air pollutants. These include coughing, wheezing and shortness of breath. However, in general, air pollutants have a more harmful effect on older adults, children and people who already have breathing problems.

How was this study carried out?

Scientists identified the areas that were most likely to have problems with air pollution from the power plant. They used information about wind direction and speed, local geography, and weather in the Greenidge area to do this. Then they found out how many people living in those areas had to go to the hospital for certain breathing problems. The illnesses they looked at were acute and chronic bronchitis, asthma, emphysema, and chronic obstructive pulmonary disorder (COPD). COPD is a chronic lung disease that includes two major illnesses, chronic bronchitis and emphysema. People with one of these diseases often have both.

To find out if there were unusual patterns of respiratory illness in the AES Greenidge area, scientists compared the number of hospital admissions for respiratory illnesses in ZIP Codes near the Greenidge facility to the number of admissions expected, based on levels in similar rural counties in upstate New York. They did not look at the counties of the New York City

metropolitan area in the comparison. Also left out of the comparison group were the upstate metropolitan areas of Newburg-Poughkeepsie; Albany; Utica; Syracuse; Binghamton; Rochester; and Buffalo.

What happened when the scientists compared the numbers?

Compared to similar counties of upstate New York, people living in the areas around the Greenidge facility were much less likely to have been hospitalized for most of the breathing problems of interest. Admissions for acute bronchitis, asthma, chronic bronchitis, emphysema and total COPD were all lower than expected. Only COPD not otherwise specified (NOS) was higher than expected. COPD (NOS) is what COPD is called when the doctor doesn't say which type of COPD a patient has. However, COPD (NOS) was only higher in the areas likely to have less pollution from the power plant. In addition, when COPD (NOS) was combined with chronic bronchitis and emphysema (the two major types of COPD), the total number of admissions for COPD was lower than expected.

What do these results mean?

The results of this health statistics review show that there were fewer hospitalizations for breathing problems than expected in a population with this size and age profile. Given what we know about air pollution and respiratory health, we would expect that these illnesses would increase when air pollution increases. So why are they generally lower than expected? One explanation might be that the study area is relatively rural, so there may be less air pollution from other sources such as automobiles.

Information on other risk factors for respiratory illnesses among the people included in this review was not available, and this limits our ability to draw conclusions from this type of review. For example, while countywide smoking rates in the area are similar to those in other parts of the state, we did not have information about individual smoking habits. Smoking is important because it contributes to about 80% of all COPD cases. We also did not have information about other things that could cause breathing problems. Finally, although we saw fewer respiratory hospitalizations than expected in the area, it is still possible that the number of hospitalizations would have been even lower if there had been no facility emissions.

Information on hospital admissions was used to look at respiratory health in the area because this information was available to researchers. Hospital admissions represent a severe form of disease. These data did not include Emergency Department, out-patient or doctors' office visits, and do not reflect overall disease incidence in the community. It would have been preferable to look at all people with these conditions in the area, regardless of whether or not they went to the hospital. However, this was not possible since this information was not readily available.

Even though this analysis did not suggest an association between potential exposures to pollution related to AES and respiratory hospital admissions, more subtle adverse respiratory effects may have occurred among the exposed population during this time period. Power plant emissions have been associated with decreased respiratory health and any reductions in emissions from power plants should benefit the public's health.

Dr. David Carpenter, Director of the University at Albany's Institute for Health and the Environment, conducted a similar statistical summary of respiratory hospitalizations in this area. Why are the results different?

Dr. Carpenter reported higher than expected hospitalization rates for chronic bronchitis and chronic obstructive pulmonary disease (COPD) combined as well as for all forms of infectious respiratory disease in a six ZIP Code area near the AES Greenidge facility. In the NYSDOH study the use of an air model to select ZIP codes for our study resulted in selection of different areas for study which lead to different results (see accompanying map).

Concern remained, however, regarding the higher than expected respiratory hospitalization rates reported by Dr. Carpenter in the six ZIP code area that he analyzed, even though this area was less likely to be impacted by power plant emissions. To address this issue, we used the same methodology described in the NYSDOH study to evaluated respiratory hospitalization rates in the six ZIP Code area, identified by Dr. Carpenter. Rates of chronic bronchitis and COPD (Chronic Obstructive Pulmonary Disease) as well as rates of acute respiratory infections were found to be statistically similar to those of other parts of upstate New York between 1993 and 2000. These are the same outcomes and years that Dr. Carpenter originally evaluated. Several differences in the methods used in the two analyses may explain the different results, the main one being NYSDOH compared the local rates in the six ZIP codes to those in 40 upstate rural counties, while Dr Carpenter compared the local rates to those in ZIP codes in upstate New York and Long Island which did not have a hazardous waste site.

Things you should know about this type of study:

A health statistics review cannot prove that something specific (like a power plant or a pollutant) is making people sick. This type of analysis allows scientists to quickly look at the situation to see if there is evidence that unusual levels of illness are occurring in a community. This investigation did not find more hospital admissions for respiratory illness than would be expected.

Recommendations

These findings are reassuring that additional detailed health studies are probably not warranted at this time. This is also supported by the fact that additional efforts to reduce pollution are underway as a result of the 2005 settlement between AES and NYS. New pollution control devices are being tested which will reduce emissions of SO_2 and NO_X from this facility. NYSDOH will continue ongoing environmental health surveillance activities.

For more information, please contact Steven Forand, New York State Department of Health, Center for Environmental Health, 1-800-458-1158 ext 27950 or via email at beoe@health.state.ny.us

Comparison of ZIP codes used in NYSDOH/ATSDR's and Dr. Carpenter's analyses

ZIP code 14441 (pop ~325) only ZIP code in common