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# Poor Air Quality Lowers Worker Productivity In New England

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DURHAM, N.H.– Poor outdoor air quality lowers worker productivity, and most people do not change their behavior despite suffering from a host of symptoms, including breathing trouble. These are among the initial key findings of a survey conducted by researchers at the University of New Hampshire that is evaluating the impact of outdoor air quality on worker productivity in New England.

“We expected to see an impact. However, our initial survey data suggests a stronger impact than anticipated,” said Ross Gittell, the James R. Carter Professor of Management at the UNH Whittemore School of Business and Economics and the primary investigator for the study.

UNH researchers have partnered with several large New England employers to explore air quality’s potential impact on worker productivity. Study participants include members of the UNH and Durham communities, and volunteers with Cisco Systems, Exeter Health Resources, Wentworth-Douglass Hospital, Portsmouth Regional Hospital, and New Hampshire’s Departments of Environmental Services, and Health and Human Services. The study continues through the summer. The final report will be provided to the National Oceanographic Atmospheric Administration next year.

The researchers include an interdisciplinary team of UNH business, economics and atmospheric science faculty. In conjunction with the UNH Survey Center, Gittell’s research team is administering weekly surveys to study participants. The surveys track workplace and behavior changes and the researchers correlate these to air quality data.

The initial survey data was taken in conjunction with pollutant measurements made as part of a large-scale air quality study conducted in seacoast New Hampshire. On July 22 at 3 p.m. and July 23 at 2 p.m., ground ozone levels reached 120 parts per billion (ppb) and 93 ppb, respectively, at the UNH atmospheric observatory at Thompson Farm in Durham. These levels approach or meet the National Ambient Air Quality Standards for ground ozone levels of 120 ppb for one hour and 80 ppb for eight hours, which indicate that there is a health risk, according to the U.S. Environmental Protection Agency.

Ground-level ozone, even at low levels, can adversely affect anyone, according to the EPA. Ozone can irritate lung airways and cause inflammation. Other symptoms include wheezing, coughing, pain when taking a deep breath, and breathing difficulties during exercise or outdoor activities. People with respiratory problems are most vulnerable, but healthy people that are

active outdoors can be affected when ozone levels are high. Even at very low levels, ground-level ozone triggers a variety of health problems including aggravated asthma, reduced lung capacity, and increased susceptibility to respiratory illnesses like pneumonia and bronchitis.

In addition, carbon monoxide, a tracer of combustion emissions, remained around 300 ppb during both days, which is about double the average CO level during the summer of 2004. Worker health and productivity in much of New England appears to have been affected on these poor air quality days.
According to the survey's initial key findings:

• One third of participants felt worse on the recent poor air quality days, experiencing symptoms including watery eyes, throat irritation, and trouble breathing.

• One quarter of participants had lowered work productivity. Of this group, 70 percent attributed the lower productivity to not feeling well, yet fewer than 20 percent changed their behavior (e.g., spent less time outside or reduced physical activity) because of the poor air quality.

The initial data suggests there is potential to improve public health and worker productivity with behavioral and workplace responses to air quality. It also indicates the potential value of informing those responses with air quality information and forecasts, Gittell said.

"This summer, the largest air quality study ever conducted is occurring right here in New England," Gittell said. "Many studies have documented the severe health effects of poor air quality by looking at emergency room visits and hospital admissions. We want to use this summer's air quality data and build on existing research by surveying people who might not feel as well as they usually do during poor air quality days and finding out what impact outdoor air quality has on their health, behavior and productivity at the workplace."

A related issue the study has been exploring is the use of air quality information. Air quality data often are available with weather information. However, although 80 percent of respondents accessed weather information, only 27 percent obtained information about the air quality.

The survey is one part of a multifaceted study, known as the International Consortium for Atmospheric Research on Transport and Transformation or ICARTT, that began July 1 and will run through mid-August. Seacoast New Hampshire is serving as the center of operations for the research in large part because of UNH's Atmospheric Investigation, Regional Modeling, Analysis, and Prediction program.

Editors: Ross Gittell is available to discuss the results further and can be reached at 603-862-3340 or ross.gittell@unh.edu. For more information about ICARTT, contact David Sims with the UNH Institute for the Study of Earth, Oceans, and Space at 603-862-5369 or david.sims@unh.edu, or visit http://www.al.noaa.gov/ICARTT/.