Identifying Harmful Pollutants in City Air
Worst pollutants often fly under the radar

Smog in the City

Air pollution causes tens of thousands of deaths each year. Traditionally, when scientists conduct toxicology studies in the lab, they are able to identify few health effects from exposure to measured pollutants found in the air around us.

What is Missing?

• *The Toxic Mix*
People breathe a mixture of pollutants that are directly emitted (e.g., automobile, industrial stack) and others that are made in the air by chemical reactions. Many of the products from these reactions are typically not measured or even known.

• *Understanding the Toxic Mix*
Scientists need to study not only the effects of individual pollutants, but how their combination affects human health.

• *Capturing the Sun's Effect*
Studies in the UNC Gillings School of Global Public Health's rooftop environmental chamber, where air quality is examined, have shown that pollutants are 5–10 times more harmful when aged in sunlight.
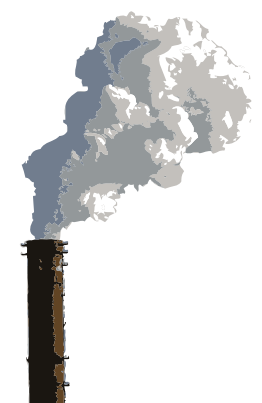
Up On the Roof

This project will use the roof chamber data to identify the pollutants that are harmful to people's lungs. Researchers also will work to develop a portable device that uses technology similar to that used in the rooftop chamber. This advance would allow them to use cultured human lung cells to study air in the field where actual pollution occurs.

Leadership

William Vizuete, PhD, assistant professor of environmental sciences and engineering, UNC Gillings School of Global Public Health, will lead the team which includes scientists from the UNC School of Medicine. "Our role at UNC is to provide the necessary tools and expertise to systematically evaluate and diagnose the complex relationships found in these air quality models."

IMPACT!
Improving Air Quality

The team will apply new technology to study air pollution and lung cell damage, first in the laboratory smog chamber, and then in the field. These data will be used to create comprehensive models of air pollution chemistry and toxicity. Chamber data and new biological instrumentation will be made available to others.

GOAL
To produce a field-portable instrument that measures air pollution's effects on human lung cells.

PARTNERS
UNC School of Medicine, UNC Center for Environmental Medicine, Asthma and Lung Biology, N.C. Department of Environment and Natural Resources, the EPA and other collaborators.