

Mobile lab allows researchers to study air quality, health effects

October 7 2009



MSU professor Jack Harkema and Emily White, a post-doctoral fellow at the University of Michigan, analyze data at the new mobile air research laboratory dubbed AirCARE 2.

(PhysOrg.com) -- A new mobile air research laboratory will help a team of researchers led by a Michigan State University professor better understand the damaging health effects of air pollution and why certain airborne particles - emitted from plants and vehicles - induce disease and illness.

Jack Harkema, a University Distinguished Professor of pathobiology and diagnostic investigation in the College of Veterinary Medicine, will deploy the new 53-foot, 36,000-pound center - dubbed "AirCARE 2" - throughout southern Michigan, including metropolitan Detroit.

"The mobile laboratory allows us to analyze 'real-world' pollution in communities that may be at risk," he said. "We can study why certain

ailments, such as asthma, cardiovascular disease and even obesity, may be more pronounced after exposure to particulate [air pollution](#)."

With about 450 square feet of indoor laboratory space, the \$400,000 center helps researchers study fine and ultrafine particles in air pollution. These small particles have been found to increase mortality and morbidity among susceptible people with pre-existing health conditions such as heart disease.

Housed in a converted semitrailer, the mobile laboratory pulls air from the surrounding atmosphere through an air-particle concentrator, allowing the scientists to selectively collect the particles and analyze for chemical components that may be responsible for damaging health effects.

Researchers can study the subtle effects of controlled particle exposure on both laboratory animals and human subjects, providing clues on why and how pollutant particles are so harmful to the heart and lungs. Harkema works closely with environmental and biomedical researchers from the University of Michigan on the projects.

"We know particles in the air can exacerbate pre-existing respiratory and cardiovascular disease in people," Harkema said. "We need to understand why. There are many different components to air pollution, and we want to determine which of these are most harmful and where there come from."

The addition of the new mobile laboratory allows Harkema and U-M collaborators Robert Brook, a cardiologist, and Gerald Keeler, an atmospheric scientist, to conduct a new study funded by the Environmental Protection Agency. As part of the project, Harkema, Brook and Keeler will deploy AirCARE 2 in rural southeastern Michigan to study the cardiovascular health effects of transported air pollution

originating from distant emission sites in Michigan or adjacent states.

AirCARE 2 was partly funded through the MSU strategic partnership grant, the Michigan Agricultural Experiment Station, the College of Veterinary Medicine and the Office of the Vice President for Research and Graduate Studies. The new fine particle concentrator in the AirCARE 2 received some funds from the Electric Power Research Institute and the American Petroleum Institute.

The first MSU Mobile Air Research Laboratory, AirCARE 1, currently spends six months of the year in metro Detroit conducting air pollution studies and then six months in Los Angeles as part of a six-university partnership known as the federal Southern California Particle Center in California. The \$8 million partnership, funded by the EPA and led by UCLA, is a five-year endeavor to investigate how exposure to airborne particles affects health and how the impact varies with the source, chemical composition and physical size.

Provided by Michigan State University ([news](#) : [web](#))

Citation: Mobile lab allows researchers to study air quality, health effects (2009, October 7) retrieved 19 July 2024 from <https://phys.org/news/2009-10-mobile-lab-air-quality-health.html>

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