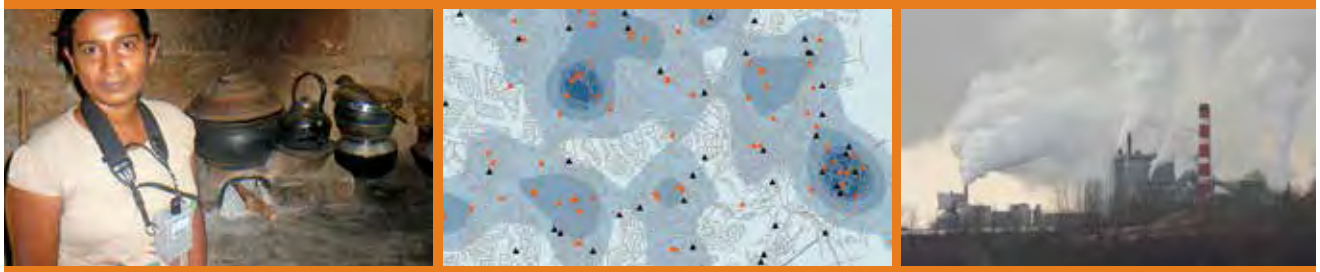


Epidemiology and Environmental Exposure



The goal of every RTI International epidemiology and environmental exposure study is to obtain the objective results necessary to support sound research and policy. Our researchers help us meet this goal by using a multidisciplinary approach to understand exposure-disease relationships and to illuminate the complex interactions of the environment, exposure, and disease.

Our Expertise

Our research staff members have expertise in epidemiology, environmental health, environmental and air quality engineering, geography, and biostatistics. This multidisciplinary team provides a range of capabilities, including primary data collection (environmental, biological, interview) and analysis; personal exposure monitoring; exposure and risk modeling; application of geospatial technologies; development of standard environmental exposure measures; and quality assurance (QA) review of environmental epidemiology studies.

Research Capabilities and Selected Research Highlights

Environmental Field Studies

RTI researchers design and conduct studies to elucidate the health effects from environmental exposures. Our expertise includes development and administration of questionnaires and forms, collection and analysis of biological and environmental specimens, and data management and statistical analysis of epidemiological and laboratory data. Recent projects include the following:

Children's Health After the Storms (CHATS). RTI worked with the Centers for Disease Control and Prevention to assess the health effects from environmental

exposures to Federal Emergency Management Agency-provided temporary housing units among 420 children who lived in areas affected by hurricanes Katrina and Rita. We obtained health data from parent interviews, medical records, and physical exams. We also gathered exposure data from MicroPEM™ personal air samplers, biospecimens, and home and neighborhood air and dust.

National Children's Study (NCS) Center—Davidson County, Tennessee. RTI worked with Vanderbilt University to enroll women in the NCS to investigate the effects of environment and genetics on child health, growth, and development. Home visits included collection of infant blood pressure and anthropometrics; blood, urine, cord blood, saliva, and breast milk; and samples of dust and tap water.

Millsboro Inhalation Exposure and Biomonitoring Study (MIEBS). RTI sampled indoor, outdoor, and personal air to determine the exposures of residents in Sussex County, Delaware, to particulate matter (PM) and associated inorganic species. Samples were assessed for PM mass and a suite of inorganic elements. We also collected and analyzed blood, urine, and hair samples for volatile organic compounds and metals.

Personal and Indoor Monitoring of Aerosol Exposures

RTI's research scientists developed the MicroPEM, a high-performance miniaturized, battery-operated, lightweight (<240g), wearable personal PM exposure monitor. It defines acute and chronic exposure patterns for sized aerosols at both indoor and personal levels and has been used in more than 50 domestic and international exposure studies.

Validation and Demonstration of Devices for Environmental Exposure Assessment. RTI and Columbia University are using the MicroPEM to measure PM exposure in a study on cardiovascular impacts of biking in urban environments. We will validate techniques for estimating real-time inhaled dose and feasibility of monitoring blood pressure and heart rate prior to enrolling a cohort of urban cyclists.

Environmental Exposure and Risk Methods and Modeling

RTI has 30 years of experience developing integrated methods and models for performing human and ecological exposure and risk assessments. These assessments evaluate potential releases to the environment and the subsequent exposures and impacts to humans and animals through direct contact and food chain contamination. We conducted modeling and assessment for several Environmental Protection Agency (EPA) climate change projects, including air impacts from the destruction of housing debris after Hurricane Katrina. We also helped the Food and Drug Administration develop a farm-to-fork model that simulates potential pathogen transfer to fresh produce on the farm and during post-harvest processing and food preparation.

Geographic Information System (GIS) Technologies

At RTI, we apply GIS technologies to environmental and public health-related research. Our GIS staff members use census geographic and demographic data to develop geospatial tools like an internet-based tool for drinking water protection and assessment. Our risk modelers use GIS methods to examine the potential impact of environmental contaminants on human health. For example, they developed an accurate and a detailed synthetic population of every U.S. household to use for disease modeling, population

projections, and proximity analyses. Our risk modelers also enhanced and improved EPA's BenMap system to project the long-term health benefits of air pollution reductions around the world.

Consensus Measures for Phenotypes and Exposures (PhenX)

Since 2007, RTI has been leading the PhenX project (sponsored by the National Human Genome Research Institute) to provide the scientific community with recommended, standard high-priority measures of phenotypes and exposures for use in epidemiological and biomedical research. The PhenX Toolkit includes validated measures of environmental exposure (e.g., air contaminants, water source, and dust samples) and residential history. The toolkit provides detailed protocols, information about the measures, and tools to help investigators incorporate PhenX measures into their studies. Inclusion of PhenX measures facilitates cross-study analysis downstream.

Quality Assurance of Health and Environmental Data

RTI has highly qualified personnel with the broad knowledge of QA programs needed to provide defensible, unbiased, third-party QA oversight services for review of scientific research on the health effects of environmental exposures. For example, our air pollution-related work with the Health Effects Institute includes providing QA oversight support in various subject areas ranging from spatial analysis of health data to evaluating the impact on health of changes in regulations and sources of air pollution worldwide.

More Information

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