



National Institute of Environmental Health Sciences

WORLD TRADE CENTER RESPONSE

The September 11, 2001 terrorist attack on New York City's World Trade Center resulted in intense fires, and the subsequent collapse of the structures released tons of dust on lower Manhattan. The dust cloud contained a wide range of toxins and irritant agents with the potential to result in significant human and environmental health impacts.

The National Institute of Environmental Health Sciences (NIEHS) responded immediately. NIEHS Worker Education and Training Program (WETP) staff delivered 3,000 respirators to the site and provided expert support to coordinate occupational health issues during the recovery and cleanup processes. NIEHS-supported researchers were on-site collecting environmental and air samples shortly after the disaster. NIEHS responded by providing funds to support these efforts. Early in 2002, Congress appropriated \$10.5 million to NIEHS for worker training and research support.

The Superfund Basic Research Program (SBRP) made \$4.5 million in grant awards to university researchers in support of an integrated research approach that provides a framework to address current and future health and environmental matters arising from the WTC attacks. The Worker Education and Training Program made \$6 million in grant awards with the goal of training new and current hazardous material teams for the New York City Fire Department, environmental remediation workers, site cleanup workers and hazardous material teams in response to weapons of mass destruction.

RESEARCH

Research grants were awarded to four NIEHS Environmental Health Science Centers and two Superfund Basic Research Program grantees. The research is focused along two major themes – analysis of exposure/risk and assessment of human health impacts resulting from the WTC disaster. The grantees receiving these funds understand that the research they are conducting is for the benefit of society, rather than to benefit their own research programs. As such, there has been a great spirit of coordination and collaboration among the investigators. The benefits of these efforts are summarized below.

- In the days immediately following the WTC disaster, scientists from the University of Medicine and Dentistry of New Jersey and the New York University School of Medicine collected air and dust samples. They conducted microscopic evaluations to determine the composition and structure of the dust particles; chemical analyses to examine dust characteristics and identify dust constituents. Detailed particle size analyses were conducted to determine what would be trapped in the nose/throat, deposited in the lungs' upper airways, or breathed into the deepest regions of the lungs. Analyses of WTC dust samples provide valuable information on the initial composition and the immediate human health and ecosystem health concerns, and are critical to our understanding of on-going and future health impacts.
- Investigators from Johns Hopkins and Columbia have taken the lead in creating a public database that includes pre- and post-September 11 ambient air data collected by the USEPA, exposure data collected from other federal sources, and exposure data collected by NIEHS-supported WTC investigators. This project will be the first user-friendly relational database constructed, which is a comprehensive compilation of collected exposure data, that will be available to the general public.
- Investigators at New York University School of Medicine, Columbia University, Lamont-Doherty Earth Observatory, the University of Rochester, and the Mount Sinai School of Medicine are conducting clinical and epidemiology studies with WTC-exposed populations such as New York City firefighters, ironworkers and community residents to investigate respiratory abnormalities and Post-Traumatic Stress.

Researchers identified the “World Trade Center Cough”, its associated symptoms and duration of the condition. They conducted analyses of samples of WTC dust and determined a clear relationship between the physical and chemical characteristics of the dust and the commonly observed symptoms. They found that less than 95% of the particles were large enough that they would not penetrate deep into the lungs; they also noted that the dust was very caustic. These characteristics explain many of the WTC Cough symptoms – severe persistent cough and airway reactivity.

- Researchers from the Mount Sinai School of Medicine and Columbia University are conducting epidemiological studies to evaluate acute/cumulative air pollutant exposures on pregnancy outcomes, and relationships to fetal/child development. The researchers will evaluate birth outcomes and will conduct follow-on studies of the impact of prenatal hazardous exposures released during the WTC event on the longer-term health and well-being of infants who were exposed in utero.

In addition, each of the grantees has been involved in town meetings in New York City and surrounding areas. These forums let the public know in a timely manner what results have been obtained and what studies are being conducted, in addition to giving the public a voice by encouraging them to ask questions and express their concerns.

WORKER TRAINING

Since September 11, 2001, our nation has been forced to take a closer look at how agencies respond to federal disasters, how to protect the health and safety of the workers and volunteers who do respond to these emergencies, and how to better prepare our nation in the event of future disasters. The NIEHS WETP and its cooperative agreement awardees have responded to these challenges, providing environmental training resources and expertise on the front lines of the country's disaster response. These experts were able to quickly mobilize sustained resources to provide information, equipment and training resources to high-risk worker populations engaged in WMD response. Training courses and curricula include classroom, hands-on and on-line health and safety training for workers, supervisors and professionals focused on hazardous waste operations and emergency response. For example:

- Among the 11,336 firefighters employed by the New York City Fire Department, 343 died at the WTC. All of the HazMat Specialists and most of the Department's hazardous materials response personnel were among the victims, including the command structure. Since September 2001, NIEHS support has enabled the International Association of Fire Fighters to retrain almost the entire cadre of skilled HazMat technicians, and to reestablish the hazardous materials management capability of the New York City Fire Department.
- The Center to Protect Workers' Rights and International Union of Operating Engineers collaborated to develop a worker training program that includes a three-hour WTC site safety and health orientation and a train-the-trainer program. The program has been used by 55 unions, employers, and governmental representatives to train approximately 1,300 construction workers at Ground Zero, including most of the building and construction trade workers who worked from mid-September, 2001 through June, 2002.
- Laborers-AGC (L-AGC) conducted anthrax remediation training for environmental laborers in New York City and New Jersey. Short modules were immediately created to provide training for the L-AGC who were actively involved in the anthrax remediation at the U.S. Postal facilities in Washington, DC and New Jersey, as well as the NBC building in New York City. The L-AGC is translating the anthrax worker course into Spanish and Polish, and is developing two new course modules on other WMD to begin the process of creating a comprehensive Chemical/Biological Agent Remediation Worker course.
- L-AGC developed and provided special Hazardous Waste/Anthrax response training to several law enforcement agencies. In December 2001, L-AGC provided two 50-hour HW Operations/Anthrax Awareness courses to the DC Metropolitan Police SWAT teams. In January 2002, a similar course was provided to a group of US Marshals who are tasked with protecting various judicial buildings and personnel throughout the United States. The U.S. Marshals have had approximately 150 more marshals take this specialized HW Worker course. Requests for training are also in process from the Capitol Police, the US National Park Service Park Police and the FBI.

The NIEHS response to the WTC disaster brought appropriate scientific expertise and environmental health resources to bear on a situation fraught with potential environmental peril. These efforts demonstrated that minimization of injuries and further loss of life through public health prevention are critical tools to assure that our nation does not experience secondary disasters and other potential collateral damage.

NIEHS grantees are supporting efforts to address immediate and long-term worker and community health issues arising from the World Trade Center attacks. The information below identifies the grantees engaged in this endeavor and outlines their on-going projects:

RESEARCH

Columbia University

- Chemical assessment of WTC emissions—air and sediments
- Pollution database development
- Prospective study of pregnant women and infants exposed *in utero* to WTC air pollution
- Public dissemination of information

Johns Hopkins University

- Health assessment and monitoring of truckers, heavy equipment operators and laborers
- Long-term effects of clean up at the WTC site

Mount Sinai School of Medicine

- Studies of WTC ironworkers for respiratory abnormalities
- Study of pregnant women and children near WTC
- Remote sensing imagery of the dust plume combined with ground measurements
- Outreach to children and families

- Analysis of organochlorines in NY and Hudson River

New York University (NYU)

- Assessment of heart and lung effects of NYC firefighters
- Checking of Lower Manhattan residents' respiratory (lung) health
- Collection and analysis of indoor and outdoor settled dust samples
- Analyses of the characteristics of particle air pollution in Lower Manhattan during September thru December 2001
- Toxicity tests of WTC dust
- Conducting community forums to inform the public of the latest scientific progress and plans

University of Medicine and Dentistry of New Jersey (Rutgers)

- Comparison of perceived (expected) vs. actual risks
- Study of possible psychological effects (e.g. stress) of WTC disaster
- Analysis of indoor settled dust/smoke samples

- Develop mathematical tools for assessing contaminant release on air quality
- Study time trends for adverse reproductive outcomes
- Assessment of NJ, NY and CT department of health personnel's environmental public health capacity
- Implementation of community forums for New Jersey commuters
- Development of case study for students to study WTC dust and possibly related "WTC cough"
- Development of website featuring WTC environmental health research and information

University of North Carolina, Chapel Hill

- Community air quality exposures
- Modeling using geographic information systems (GIS)

University of Rochester (Collaborating with NYU)

- Assessment of very small (ultrafine) WTC dust
- Community Outreach

WORKER TRAINING

Center to Protect Workers' Rights

- Development/delivery of a 3-hour WTC site safety and health orientation training program
- Development/delivery of a train-the-trainer program

International Association of Fire Fighters

- Direct delivery of classes to rebuild the HazMat instructor losses to the Fire Department of New York (FDNY)

International Union of Operating Engineers

- Development/delivery of training to prepare skilled support personnel and skilled construction personnel for response at mass destruction sites

- Development of lessons learned report on distribution/fit testing of protective equipment at the WTC site
- Development of training programs for emergency response and remediation of biochemical agents

Laborers-AGC Education and Training Fund

- Development/delivery of training for non-English speaking workers in NY and NJ involved in anthrax remediation sites

National Puerto Rican Forum, Inc.

- Development/delivery of weapons of mass destruction training for the HazMat workforce

University of Medicine and Dentistry of New Jersey

- Development/delivery of hazardous material technician training for Transit Union workers
- Development/delivery of health and safety training for WTC site clean up
- Development/delivery for police and hospital workers in emergency response to weapons of mass destruction
- Development and delivery of fact sheets and links to additional information including the following topics: asbestos, compensation, government resources, news, occupational safety and health resources, and psychological trauma