

Miller delivers keynote at international conference on occupational health

By Pamela Kidron

NIEHS Senior Medical Advisor [Aubrey Miller, M.D.](#), gave the keynote presentation Sept. 12 at the 17th National Congress of Occupational Health in Mexico City. As a medical epidemiologist and a captain in the U.S. Public Health Service, Miller understands the importance of transdisciplinary collaboration when disasters strike.

"Disasters and emerging health threats are intensifying the need for occupational and environmental health professionals to work together," Miller said. "Both areas of expertise are critical to understanding the aftereffects."

Environmental and occupational health crossovers

According to Miller, the 2010 Gulf oil spill is a perfect example of occupational and environmental experts working together. These specialists joined forces to form the Deep Water Horizon Research Consortia, a trans-NIH effort with university and community partners, to assess both the health of Gulf Coast residents and thousands of workers involved in the cleanup, as part of the [GuLF STUDY](#).

(<https://gulfstudy.nih.gov/en/index.html>)

Disasters also have taught researchers that crossovers between occupational and environmental health are inevitable, Miller said. He recalled the 1990s asbestos situation in Libby, Mont., in which exposure to asbestos endangered the mining workers, and resulted in widespread contamination and disease in the community, as well as the distribution of contaminated vermiculite insulation from the mine into millions of homes across the United States.

Testing chemicals with high-throughput technology

Miller mentioned that high-throughput screening (HTS) is one of the newest advances in environmental health. HTS is a new way to evaluate chemicals, aided by robotics and computers, to help determine potential toxicity and possible health effects. Currently, there are 80,000 chemicals in food and other products, with 1,500 new chemicals released every year. Yet, there is no toxicological or safety information for most of them.

Advances in HTS may soon allow researchers to become less dependent on slow, costly, and tedious methods, such as human and animal studies, in the effort to better understand the risks associated with new and existing chemicals in the workplace and environment.

New advances in epigenetics

Miller also discussed the conceptual shift in the environmental health sciences in recent studies. The old dogma stated that chemicals act by overwhelming the body's defenses by brute force at very high doses. But, new advances in epigenetics demonstrate that even low exposures to chemicals can cause disease, and that susceptibility to disease can persist long after exposure.

This new doctrine says that chemicals can act like hormones and drugs to disrupt, even at low doses, the control of body functions and development. It is especially true of chemicals that are endocrine disruptors, which interfere with hormone action. Small amounts of hormones may have profound effects on developmental processes and normal health. There is growing evidence that some prenatal and early-life exposure can disrupt the endocrine system, leading to changes in development or risk for diseases in adulthood.

For example, there is concern that exposure to the chemical bisphenol A can result in changes during critical periods of development, and may even increase the risk for obesity later in life. Also, most cases of asthma now are thought to originate in early life, during gestation and early childhood, through exposure to contaminants in the environment, such as tobacco smoke, dust mites, and traffic-related pollutants.



Miller is the NIEHS liaison to the U.S. Department of Health and Human Services, coordinating disaster response with sister agencies. "More and more, there is a growing need for occupational and environmental health expertise to conquer the disciplinary divides, and to join forces to perform needed research and advance the understanding of exposures, risks, and diseases related to toxic substances," he said. (Photo courtesy of Steve McCaw)

Environmental exposure in Mexico

Miller also discussed ongoing environmental research now being conducted in Mexico and Latin America. Currently, NIEHS researchers and collaborators are looking at the relationship between childhood asthma and air pollution in Mexico City, which has one of the highest ozone levels in North America. Also, in another study, early exposure to arsenic in drinking water has been linked to later development of COPD and lung cancer in Chile.

Additionally, several cases of malignant mesothelioma have been associated with erionite-rich areas in the Mexican state of Jalisco. Exposure to erionite, an asbestos-like mineral fiber, has previously been linked to very high rates of mesothelioma in Turkey, and was recently found along roads made from erionite-contaminated gravel in Dunn County, N.D.

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