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From the Director's Desk

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The 9/11 Responder Health Literature: Recent Additions

The images are indelibly fixed in our collective memory. More than 8 years have passed, but we vividly remember the terrible plume of pulverized materials-the dust cloud-that billowed through Lower Manhattan as the twin towers of the World Trade Center (WTC) collapsed in the September 11, 2001, terrorist attack. We remember the lingering pall of smoke, dust, and ash that confronted rescue and recovery workers at the Ground Zero site. For the responders, adverse health effects associated with exposures to those contaminants continue to impose a heavy burden.

Since these tragic events, more than 51,000 responders and 2,000 residents of Lower Manhattan have been served through multiscenario clinical programs made available with federal funding administered by the National Institute for Occupational Safety and Health (NIOSH) (see <https://www.cdc.gov/wtcr/>). For responders, the multiscenario occupational health programs provide standardized exposure assessment, medical and mental health assessments, occupational health education, and targeted treatment and support services. Medical examinations include a physical exam, pre- and post-bronchodilator spirometry, blood cell counts and chemistry, urinalysis, and chest radiography. The monitoring program continues to inform our scientific understanding of the health impacts associated with working the 9/11 WTC disaster site (<https://www.cdc.gov/wtcr/>).

Recently published studies from these programs highlight persistent changes in responders' lung functions and explore the pathophysiology - that is, the nature and processes - of lung disease in those who served the nation in this heroic response and recovery effort. Two most recently published articles are the following:

Lung Function in Rescue Workers at the World Trade Center After 7 years [Aldrich et al. 2010].

Case Report: Lung Disease in World Trade Center Responders Exposed to Dust and Smoke: Carbon Nanotubes Found in the Lungs of World Trade Center Patients and Dust Samples [Wu et al. 2010].

In the study by Aldrich et al. [2010], pre-9/11 occupational health records were available to study the impacts of the WTC exposures on responders from the Fire Department of New York City (FDNY). In the first year after those responders' service in 9/11 duties, FDNY fire fighters expelled 439 ml less air in the first second of forced exhalation than they had in baseline medical tests of lung function preceding 9/11. Emergency medical service workers at FDNY showed a loss of 267 ml. Those included in the analyses had never smoked. These declines in lung function persisted 7 years later, with little or no recovery.

A recent study by Wu et al. [2010] describes clinical, pathologic, and mineralogic findings in seven previously healthy responders who developed severe respiratory impairment, or unexplained changes in the lungs that were identified on x-rays, after being exposed to WTC dust on either September 11 or September 12, 2001. Pathologic evaluations showed interstitial and small airways disease. Mineralogical studies of lung tissues demonstrated the presence of aluminum and magnesium silicates in unusual platy (sheet) structures, chrysotile asbestos, calcium phosphate, calcium sulfate, small shards of glass, and carbon nanotubes of various sizes and lengths. Platy silicates and carbon nanotubes were not found in lung tissue samples from people not exposed to WTC dust. Carbon nanotubes were also unexpectedly found in WTC dust samples. The authors suggest that the carbon nanotubes found in dust samples and lung biopsy specimens were generated as incidental contaminants during the disaster by combustion and high temperatures in the presence of carbon and metals. For NIOSH and others who research occupational exposures to engineered carbon nanotubes, the implications of those findings are unclear. The study by Wu et al. does not attempt to address the complex question of possible causality-that is, what individual contaminants in WTC dust might have been linked with specific health effects?

A critical element in the occupational health monitoring of the 9/11 responders is an assessment of lung function using spirometry. Spirometry is an unusual medical test in that doing the test requires the active participation of patients. Thus, accuracy depends not only on quality control of spirometry equipment, but also on the training and consistent performance proficiency of spirometry technicians in coaching patients to do the test. NIOSH provides training materials and certifies spirometry training courses for those doing the test (see <https://www.cdc.gov/niosh/topics/spirometry/training.html>). A recent publication, Quality of Spirometry Performed by 13,599 Participants in the World Trade Center Worker and Volunteer Medical Screening Program [Enright 2010], describes the intensive efforts of the WTC Worker and Volunteer Medical Screening Program to obtain spirometry tests of the highest possible quality.

These WTC medical monitoring centers are also looking for additional health burdens that might emerge over time. Environmental monitoring identified airborne and settled dust containing toxic combustion products and pulverized building materials, including asbestos, silica, and polyaromatic hydrocarbons (PAH)-agents that may cause cancer or pneumoconiosis over the long term. Last year, eight cases of multiple myeloma were detected in one of the clinical centers, with four cases in law enforcement officers under the age of 45. Those findings were reported in Multiple Myeloma in World Trade Center Responders: A Case Series [Moline 2009].

Unfortunately, actual WTC occupational exposures were not well characterized, many cancers have multiple contributing factors, and these rare events occur with varying latency-all of which will challenge epidemiological study. While we await the numbers, responders may be enduring disease that will be difficult to scientifically attribute to exposure using Austin Bradford Hill's criteria for causation, a standard reference [Hill 1967]. As such, legislative efforts continue to advocate for long-term funding to support the clinical programs and extend the care needed by those afflicted [James Zadroga 9/11 Health and Compensation Act of 2009 (H.R. 847)]. NIOSH has encouraged its partners to publish peer-reviewed studies that will provide a scientific basis for decision-making. For the sake of the 9/11 responders and all who are working diligently to address their health needs, we are pleased that this literature continues to grow. (I want to thank Dori Reissman, M.D., Senior Medical Advisor, NIOSH Office of the Director, for her assistance in preparing this month's column.)

References

Aldrich TK, Gustave J, Hall CB, Cohen HW, Webber MP, Zeig-Owens R, Cosenza K, Christodoulou V, Glass L, Al-Othman F, Weiden MD, Kelly KJ, Prentz DJ [2010]. Lung function in rescue workers at the World Trade Center after 7 years. *N Engl J Med* 362(14):1263-1272.

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Moline JM, Herbert R, Crowley L, Troy K, Hodgman E, Shukla G, Udasin I, Luft B, Waldstein S, Landrigan P, Savitz DA [2009]. Multiple myeloma in World Trade Center responders: a case series. *J Occup Environ Med* 51(8):896-902.

Wu M, Gordon RE, Herbert R, Padilla M, Moline J, Mendelson D, Little V, Travis WD, Gil J [2010]. Case report: lung disease in world trade center responders exposed to dust and smoke: carbon nanotubes found in the lungs of World Trade Center patients and dust samples. *Environ Health Perspect* 118(4):499-504.

NIOSH Offers Resources for Oil Spill Responder Safety

As federal, state, and local governments mobilize efforts to assist in the containment and cleanup of the Deepwater Horizon oil spill in the Gulf of Mexico, NIOSH posts a web page with resources for protecting response workers from potential safety and health risks. <https://www.cdc.gov/niosh/topics/oilspillresponse/>

Workers Memorial Day: A Day to Mourn, a Day to Honor, a Day to Rededicate

On Workers Memorial Day, April 28, the nation honored men and women who have suffered job-related injury, illness, and death. In a Workers Memorial Day 2010 statement, NIOSH Director John Howard, MD, reflected on the toll of workers' pain, impairment, and death; the role of NIOSH in national efforts to prevent such tragedies; and the challenges of occupational safety and health in today's world (<http://www.cdc.gov/niosh/updates/upd-04-22-10.html>). NIOSH's commemoration of Workers Memorial Day was highlighted in a recent MMWR article (<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5915a1.htm>), supplemented with a NIOSH research article on risk of occupational injury and death for young workers (<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5915a2.htm>).

Safe and Sound Radio Highlights Exposomes

NIOSH researchers Gayle DeBord and Paul Middendorf were interviewed about the exposome by the American Industrial Hygiene Association's (AIHA) Safe and Sound radio program on April 21. The exposome is addressed by a new NIOSH initiative that focuses on the lifetime exposures of an individual and their relationship to disease. The broadcast is available through AIHA's Web site (<http://www.aiha.org/>) or directly at <http://www.aiha.org/podcasts/safe/Episode12Exposome.mp3> .

NIOSH Announces Associate Director, Deputy Associate Director for Emergency Preparedness

Congratulations to Jim Spahr and Lisa Delaney. Jim was appointed Associate Director for Emergency Preparedness and Response in the NIOSH Office of the Director, effective April 28, and Lisa was appointed Deputy Associate Director for Emergency Preparedness and Response. Both have served in interim capacities since February. The Office of Emergency Preparedness and Response in the Office of the Director provides rapid on-site support to protect emergency response providers and others in the event of a disaster and advances research to support such efforts.

News Coverage Highlights NIOSH Mine Safety Research

Recent news articles in the wake of the Upper Big Branch Mine disaster highlighted NIOSH's research and technical resources for mining safety and health.

USA Today, April 27: NIOSH researcher Patrick Coleman notes lost-workday data as a gauge of mine safety. http://www.usatoday.com/news/nation/2010-04-27-miners_N.htm?oc=interstitialskip

New York Times, April 23: Technical information from Thomas Nytko, NIOSH deputy associate director for mine safety and health research, contributes to a diagram of mine safety features. <http://www.nytimes.com/imagepages/2010/04/23/us/23mine-graphic1.html?ref=us>

National Public Radio, April 16: NIOSH public health analyst Anita Wolfe and NIOSH epidemiologist Mike Attfield discuss efforts to prevent coal workers pneumoconiosis, also known as black lung. <http://www.npr.org/templates/story/story.php?storyId=126021059>

Download a NIOSH Chemical Hazards App for your iPad

The NIOSH Chemical Hazard Guide application, or App as they are sometimes called, is now available for iPad (a version of the iPhone application of the same name).

National Nanotechnology Initiative Review Results Released

On March 25, the President's Council of Advisors on Science and Technology released its review of the National Nanotechnology Initiative, noting the importance of health, safety, and environmental research to the success of nanotechnology and NIOSH's role in that research.

Project Seeks to Increase Adoption of the NIOSH E-Stop Among Commercial Fishermen

Researchers from NIOSH's Alaska Pacific Regional Office will gather information at ports in Alaska this spring to assess barriers to the adoption of an innovative safety device. In 2007, NIOSH licensed the device, the emergency stop or E-Stop for capstan winches, to Emerald Marine of Seattle, WA. Since that time the system has been used by commercial fishermen in Alaska and Washington to reduce the likelihood of injury from entanglement in their deck winches, though adoption of the technology has been slower than anticipated. NIOSH researchers will engage fishermen and ascertain what barriers remain to the adoption of what has been shown to be a reliable and useful safety technology for fishermen on purse seine vessels. Information gathered in the field will be used to develop a social marketing and traditional marketing program in partnership with the licensee to address fishermen's concerns about the E-Stop. For more information on the product go to <http://www.kodiakdailymirror.com/?pid=19&id=8701> or contact Ted Teske at tteske@cdc.gov or 509-354-8070.

Journal Posts Research Paper on Biodegradation of Carbon Nanotubes

Dr. Anna Shvedova of NIOSH and outside colleagues reported on the discovery that carbon nanotubes were biodegraded by an enzyme found in white blood cells-nanophils. The results, published in *Nature Nanotechnology*, are important for scientists in evaluating the biological effects of carbon nanotubes, particularly their fate and role in inflammation. More research is needed for determining the applicability of the findings in assessing potential risk in occupational exposures. <http://www.nature.com/nnano/journal/iaop/current/abs/nnano.2010.44.html>

NIOSH and USAF Initiate Study of Cancer Among Firefighters

NIOSH and the United States Fire Administration (USFA) are entering into a study to evaluate the potential for increased risk of cancer among firefighters due to exposures from smoke, soot, and other contaminants in the line of duty. <https://www.cdc.gov/niosh/updates/upd-04-23-10.html>

NIOSH Acknowledgments

Congratulations to Doug Evans for receiving the 2010 Federal Service Excellence Award in the Professional/Scientific category. The award is given by the Cincinnati Federal Executive Board. Doug was recognized for his work in ultrafine aerosols and contributions to the nanotechnology program. Dawn Farwick, Jerry Kratzer, Thais Morata, Ron Hall, Doug Evans, and Jim Grosch were also recognized by the board at this ceremony.

NIOSH salutes Leslie MacDonald and Jennifer Hornsby-Myers, for dedicated service during deployment by the U.S. Department of Health and Human Services (HHS) to Haiti as commissioned officers of the U.S. Public Health Service as part of the U.S. relief effort in earthquake-ravaged Haiti. The two provided technical assistance on reducing health risks from air pollution, asbestos, silica dust, and psychological stressors.

NIOSH Seeks Assistance from Pesticide Handlers

NIOSH is seeking assistance from pesticide handlers in the agriculture sector to learn about potential barriers to the proper selection and use of PPE by agricultural pesticide handlers and their employers. Additional information is available under "Spotlights" at <https://www.cdc.gov/niosh/nppt/> or email KEaulkner@cdc.gov.

NIOSH Requests Comments on the Following:

Ten-Year Review of the NIOSH Radiation Dose Reconstruction Program NIOSH Docket 194. Comments will be accepted through June 4. <https://www.cdc.gov/niosh/docket/archive/docket194.html>

Proposed Rule on Total Inward Leakage Requirements for Respirators. The proposed rule establishes total inward leakage requirements under 42 CFR Part 84 for half-mask air-purifying particulate respirators, including both elastomeric facepiece and filtering facepiece types. Comment period extended through September 30. <https://www.cdc.gov/niosh/docket/archive/docket137.html>

HHE Program News

John Gibbins and Scott Brueck from the NIOSH HHE Program collaborated on a paper titled "Epidemiologic Investigation of Immune-Mediated Polyradiculoneuropathy among Abattoir Workers Exposed to Porcine Brain." This paper is based on an investigation conducted with the Minnesota Department of Health when the department was notified that some employees involved in the removal of brain tissue from severed pig heads were experiencing neurological symptoms that resulted in weakness and partial paralysis in their legs and arms. Symptoms of patients were unlike previously described occupational illnesses. The novel disease was associated with removing porcine brains using compressed air. This outbreak highlights the potential for respiratory or mucosal exposure to foreign neurological tissue causing an immune-mediated illness in an occupational setting. It also highlights the importance of health care providers obtaining a careful workplace exposure history and the benefits of close cooperation between state and federal agencies. <http://dx.plos.org/10.1371/journal.pone.0009782>



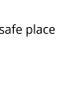
New Health Hazard Evaluation Report Now Available

Evaluation of Methicillin-resistant *Staphylococcus Aureus* (MRSA) Cases Among Employees at a Working Manufacturing Facility. HETA 2009-0098-3103

Evaluation of Exposures to Healthcare Personnel from Cisplatin During a Mock Interperitoneal Operation. HETA 2009-0121-3106

Evaluation of Isocyanate Exposure during Polyurethane Foam Application and Silica Exposure during Rock Dusting at an Underground Coal Mine. HETA 2009-0085-3107

[View HHE reports](#)



News from Our Partners

Child Ag Safety Resources from NIOSH Partner

The National Children's Center for Rural and Agricultural Health and Safety offers two versatile resources for preventing injury or death of children living or working on farms:

North American Guidelines for Children's Agricultural Tasks, a searchable format for accessing information that can help parents match a child's growth and development with the requirements of different farm chores. <http://www.nagcat.org/nagcat/>

Creating Safe Play Areas on Farms, 2009 mini-edition, in English and Spanish, a booklet summarizing key elements to creating a safe place for children to play on farms. http://www.marshfieldclinic.org/nccrahs/default.aspx?page=nfmc_nccrahs_safe_play_welcome

EPA Launches Website With Safety Information on Spray Polyurethane Foam (SPF)

The Environmental Protection Agency released a new Web site aimed at helping to ensure the safe use of spray polyurethane foam (SPF) by workers and for building occupants where SPF is installed (<https://www.epa.gov/saferchoice/>) and provides safety and scientific information to professionals in business, nongovernmental organizations, academic institutions, and regulatory agencies. As a supplemental resource, the page also refers site visitors to the NIOSH Alert: Preventing Asthma and Death From MDI Exposure During Spray-on Truck Bed Liner and Related Application (<https://www.cdc.gov/niosh/docs/2006-149/>).

NORA

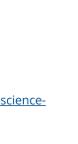
Collaboration at the Intersection of the "Three Safeties" in Healthcare

The NORA Healthcare and Social Assistance Sector Council has undertaken a number of activities to implement the sector's National Agenda (<https://www.cdc.gov/nora/>). One activity is the collaboration with a global effort integrating the "three safeties" (patient, worker and environmental safety and health). A report by the Health Care Without Harm/Global Health and Safety Initiative (HCWH/GHSI) Research Collaborative identifies research priorities at the intersection of the three safeties, including the NORA priorities. (www.noharm.org/us_canada/reports/2009/oct/rep2009-10-22.php). Continued collaboration between the NORA Council and the HCWH/GHSI Research Collaborative is likely to bring increased visibility for worker safety issues in this important and growing sector of the economy.

r2p Corner

NIOSH Announces Bullard-Sherwood r2p Award Winners

On April 28, NIOSH recognized significant contributions made by NIOSH researchers and their partners to occupational safety and health over the past year.



The Alice Hamilton Award for scientific excellence of NIOSH technical and instructional materials <https://www.cdc.gov/niosh/awards/shamilton/>

The Bullard-Sherwood Research to Practice (r2p) Award <https://www.cdc.gov/niosh/awards/bullard-sherwood/>

The James P. Keogh Award for Outstanding Service in Occupational Safety and Health <https://www.cdc.gov/niosh/awards/keogh/>

The Director's Award for Extraordinary Intramural Science, presented this year for the first time <https://www.cdc.gov/niosh/awards/DIA>

What's new on the NIOSH Science Blog?

Safe and Health for Young Workers

NIOSH invites you to share your experiences and suggestions for keeping our young workers safe. <https://blogs.cdc.gov/niosh-science-blog/2010/05/04/youth-2/>

Strains and Sprains and Home Healthcare Workers

Strains, sprains, and other musculoskeletal injuries from lifting and moving patients are painful and potentially disabling occupational hazards for home healthcare workers. The science of designing and using safe lifting practices is discussed in the most recent NIOSH Science Blog. <https://blogs.cdc.gov/niosh-science-blog/2010/04/16/homehealthcare/>

New Communication Products

Are You a Safe Farmer?

NIOSH just released Worker Safety on the Farm, a trifold brochure of valuable information on various aspects of farm safety, such as tractors, machinery, animal, etc. The brochure is available for printing at <https://www.cdc.gov/niosh/docs/2010-137/>

NIOSH Recently Released the Following Fire Fighter Fatality Investigation Reports:

Lieutenant suffers sudden cardiac death at scene of a brush fire-Missouri. <https://www.cdc.gov/niosh/fire/reports/face201001.html>

Fire fighter suffers cardiac death following structural fire suppression-Kansas. <https://www.cdc.gov/niosh/fire/reports/face201002.html>

More...

To see other new NIOSH communication products, including documents and new and updated topic pages, go to the NIOSH "What's New" page. <https://www.cdc.gov/niosh/whatsnew/>

Look For Us

VISIT our new interactive NIOSH exhibit (Booth No. 531) at AIHCe in Colorado May 24-26. Learn about the latest NIOSH research projects and our e-promotion health communication activities. Find out what happening as it happens. Follow our tweets from the booth via NIOSH Twitter. ATTEND the NIOSH Luncheon Discussion - "Implementing NORA Strategic Plans" on Tuesday, May 25 from 12:30 p.m.-1:30 p.m.

Upcoming Conferences & Workshops

Global Regulation of Nanotechnologies Conference
Hosted by Northeastern University School of Law, May 7-8 in Boston, MA.

Workshop on Personal Protective Equipment for Healthcare Workers
Institute of Medicine, June 3 in Washington, DC.

Respirator Manufacturers Meeting
July 14 in Pittsburgh, PA. <https://www.cdc.gov/niosh/nppt/resources/pressrel/letters/ltr-07142010.html>

Nanomaterials and Worker Health: Medical Surveillance, Exposure Registries, and Epidemiologic Research
Co-hosted by NIOSH and the Mountain and Plains Education and Research Center, July 21-23 in Keystone, CO. <https://www.cdc.gov/niosh/topics/nanotech/>

National Conference on Health Communication, Marketing, and Media, Centers for Disease Control and Prevention
August 17-19 in Atlanta, GA. <https://www.cdc.gov/healthmarketing/NCHCMM2009/>

Respirator Manufacturers Meeting
Co-hosted by NIOSH National Personal Protective Technology Laboratory and China Medical University, August 24-26 in Taichung, Taiwan. <https://www.cdc.gov/niosh/nppt/resources/pressrel/letters/ltr-08242010.html>

A comprehensive list of upcoming conferences can be found at niosh.exhibits.html.

Word of the Month

App — App is short for application, which is software made for or running on a computer, a mobile device, or other platform (for example, an iPhone or Facebook).

Please send your comments and suggestions to us at nioshnews@cdc.gov.

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