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Biomonitoring

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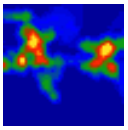
NIOSH-HSE International Symposium Scopes Nanotechnology Research Needs



By plane, train, bus, and car, some 130 leading international experts from industrial hygiene, toxicology, medicine, chemical engineering, and other diverse disciplines converged on Buxton, England, on October 12-14.

The expert group gathered for the first-ever *International Symposium on Occupational Health Implications of Nanomaterials*, sponsored by NIOSH and the Health and Safety Executive (HSE), the United Kingdom's counterpart to the Occupational Safety and Health Administration in the U.S. (HSE's Health and Safety Laboratory, NIOSH's research counterpart in the U.K., is located in Buxton.)

NIOSH and HSE convened the research summit to examine occupational health issues related to the production and use of nanomaterials: What is currently known about potential exposures to nanoparticles in such processes? What more do scientists and policy makers need to know, in order to understand the potential occupational health impacts of this 21 st Century technology?

Nanotechnology "could be the next industrial revolution across the world," John Ewins, head of the science strategy and statistics division of HSE, said in opening the conference.

In the United States, NIOSH is part of a multi-agency program to advance U.S. leadership in this dynamically growing field by facilitating technology transfer and coordinating research to promote wise stewardship. Through the manipulation of materials at atomic, molecular, and macromolecular levels, nanotechnology makes it possible to create new structures and systems with unique properties and benefits. These include new tools to improve medical diagnosis and treatment, clearer and more efficient energy sources, more powerful computers, and stronger building materials.

'Kick-Started This Process'

Never before had leading researchers from the U.S., Europe, and Asia met strategically to share their latest findings related to the occupational health aspects of nanotechnology, and to lay out the areas of study needed to fill critical gaps. "We got together a really effective group of people with an immense amount of knowledge, and we kick-started this process," HSE's Brian Fullam said October 14 in closing remarks.

From three days of scientific presentations and workshop deliberations, several consistent themes emerged:

- In themselves, studies to date do not provide all the information needed for determining, with confidence, whether nanomaterials have occupational health effects. However, they provide a good springboard for designing new research that will move scientific understanding significantly forward. "I came here thinking there were really major gaps in our knowledge," Dr. Fullam remarked. "I go home thinking, 'That's true, but it's not true. ' "
- To fill existing gaps, collaborative research is needed across different scientific disciplines. For example, studies are needed to better define the properties and behavior of nanoparticles; develop a "metric" for measuring exposure to nanoparticles in ways that correlate with potential health factors; assess the adequacy of personal protective equipment; and better assess the relevance of data from laboratory animal studies for predicting potential human effects.
- While further research is planned and conducted, makers and users of nanomaterials can take precautionary steps to control exposures, using the traditional risk assessment/risk management approach and instituting controls as appropriate.

- Tools to measure, assess, and control exposures need to be standardized internationally, to avoid confusion and to promote scientific collaboration.

- Scientists and policy makers should maintain open communication with the public as research, development, and application of nanotechnology advances. It is important to engage discussion “not only among you as experts in the field,” Mr. Ewins of the HSE told the participants, “but [also to secure] the involvement and the confidence of the public. If we lose the public’s trust about anything, then we are in an uphill battle to recover it.”

2005 Nanotechnology Research Symposium Planned

In partnership with the University of Minnesota, NIOSH will sponsor a *Second International Symposium on Nanotechnology and Occupational Health* on October 4-6, 2005 in Minneapolis, Minn.http://www.cce.umn.edu/nanotechnology. That conference “is going to be, if anything, more important [than the 2004 symposium] as we look back, see where we have gotten and see gaps we’ve started to plug, and take another big step forward,” Dr. Fullam commented.

Under the National Nanotechnology Initiative and other partnerships, including membership on the Nanostructed Science, Engineering and Technology subcommittee of the National Science and Technology Council committee on technology, NIOSH conducts a robust program of research on nanotechnology and occupational health. More information is available on the NIOSH nanotechnology topic page at http://www.cdc.gov/niosh/topics/nanotech. Presentations and proceedings from the symposium will be posted on the web page as soon as they become available.

NIOSH Partnerships in Economic-Evaluation Research

Data from a NIOSH-funded study estimate that the costs of occupational illness in America total more than $171 billion per year, an amount five times greater than the costs of AIDS and equal to the economic costs of all cancers. Such findings point to the importance of quantifying the costs of occupational illnesses and injuries more precisely, and of advancing the methodologies needed to do so. Through collaborations with industry, government and global partners, NIOSH is engaged in several activities specifically related to characterizing the costs associated with workplace illness and injury. Below are examples of those partnerships.

Exploring Economic Evaluation of Interventions at the Company Level

In partnership with the World Health Organization, NIOSH organized a conference on Nov. 3-5 in Washington , D.C. , of invited, diverse research partners from the global community. The conference focuses on the economic evaluation of occupational safety and health interventions at the company level. Co-sponsored by the NORA Team on Social and Economic Consequences of Workplace Illness and Injury, the NORA Team on Intervention Effectiveness Research, the International Labor Organization, and the International Commission on Occupational Health, the meeting provides a forum for sharing experiences, offering recommendations on evaluating health and safety interventions in an economic context, and providing examples of key economic evaluation tools currently used by companies. More information on the conference and next steps can be obtained from Elyce Biddle, NIOSH Division of Safety Research, at EBiddle@cdc.gov .

Economic Research Groups

There are three working groups comprised of experts interested in economics research both within the Institute and among NIOSH and its partners.

- The NORA Social and Economic Consequences of Workplace Illness and Injury Team includes NIOSH researchers and representatives from academia and private research organizations. In addition to cosponsoring the economic evaluation conference, the team is finalizing a research agenda for future economic focused intramural and extramural funded projects. More information on the team is available at http://www2a.cdc.gov/nora/noratopictemp.asp?rscharea=sec.

- The intramural NIOSH Economics Interest Group provides collegial collaboration across the Institute and is in the final stages of developing a NIOSH Economic Compendium capturing both intramural and extramural economic-evaluation research projects.

- Through a collaboration under the CDC Health Economics Research Group, NIOSH has joined with the CDC National Center for Injury Prevention and Control to conduct an economic evaluation of safety and health interventions designed to decrease intimate partner violence.

NIOSH has increased its investment in economic evaluation research, and its capacity to conduct such research, by hosting two Fellows under the CDC Prevention Effectiveness Fellowship program. The two Fellows are post-doctoral economists, Kwame Owusu-Edusei (hosted by the NIOSH Division of Safety Research) and Tapas Ray (hosted by the NIOSH Division of Applied Research and Technology).

Coming in the December issue of NIOSH eNews: more coverage of NIOSH's economic- evaluation research, surveying examples of research projects within NIOSH, as well as examples of outside studies funded by NIOSH, that will further advance the measurement of economic costs associated with occupational illnesses and injuries.

Medical Errors Declined with Work Schedule Changes, NIOSH-Funded Studies Find

The rate of serious medical errors committed by first-year doctors in training (interns) in two intensive care units (ICUs) at a Boston hospital fell significantly when traditional 30-hour-in-a-row extended work shifts were eliminated and when interns' continuous work schedule was limited to 16 hours, according to two complimentary studies funded by NIOSH and the Agency for Healthcare Research (AHRQ). The studies were published in the October 28, 2004 issue of the New England Journal of Medicine. http://workhours.bwh.harvard.edu. "As NIOSH works with hospital administrators, physicians, nurses, and other partners to assess the impact of long working hours on health and performance, studies such as these will help us better identify steps to promote the health and well-being of health professionals, as well as the health and well-being of their patients," said John Howard, M.D., NIOSH Director. A further summary of the studies is available at http://www.cdc.gov/niosh/updates/upd-10-28-04.html.

U.S. and Mexican Experts Meet to Improve the Health of Mexican Workers

NIOSH participated in the Binational Health Conference held in Leon, Mexico on October 11-12. The conference, sponsored by the Mexican Ministry of Health, focused on "families in action for health." Realizing that the health of one family member affects the health of all and that 40 percent of Mexicans have a family member living and working in the U.S. , experts from both countries converged to share information and strategize ways of improving communication with these workers and their families. Conference speakers included former migrant farm workers, former undocumented workers, U.S. Health and Human Services Secretary Tommy Thompson and Mexican President Vicente Fox.

New Leaders at NIOSH

Mary Lynn Woebkenberg Named New DART Director

Mary Lynn Woebkenberg was named director of the NIOSH Division of Applied Research and Technology (DART), effective Nov. 1. Mary Lynn previously served as DART's Deputy Director beginning in 2001 and as Interim Director following the retirement of her predecessor, Douglas Sharpnack, in early 2004. Her prominence and expertise in the area of portable, direct-reading instruments has been nationally recognized by numerous professional societies. She also oversees the development for NIOSH of a cross-Institute center of excellence in nanotechnology research, which is already playing a role in the U.S. National Nanotechnology Initiative. Mary Lynn, who began her career with NIOSH in 1976, holds a Bachelor of Science degree in Chemistry from the University of Cincinnati, a Master of Science degree in Chemistry from Xavier University, and a Doctorate of Philosophy degree in Analytical Chemistry from the University of Cincinnati.

Interim Director of Spokane Research Laboratory Named

Ros Hill, Director of the NIOSH Spokane Research Laboratory (SRL) in Spokane, Wash., has been appointed to the faculty of the University of Arizona in Tucson, Ariz., departing NIOSH effective Nov. 5, 2004. Ros began his career at the Spokane Laboratory in 1971 when the Laboratory was a part of the Bureau of Mines in the Department of the Interior. In 1998, he was named the first permanent Director of the new NIOSH Spokane Research Laboratory. During his term, Ros moved the Laboratory's research program into several new areas to take advantage of the engineering expertise available in the Laboratory and has expanded the safety program to address surface mining and construction. A national search for the next SRL Director is currently underway. Until a permanent director is selected, George Conway, Chief of the NIOSH Alaska Field Station, will assume Acting SRL Director duties.

NIOSH Names Associate Director and Deputy Associate Director for Science

James Stephens has been newly appointed as the NIOSH Associate Director for Science. Dr. Stephens holds a Bachelor of Science degree in Chemistry from the University of Georgia and a Doctor of Philosophy degree in Chemistry from Rice University. He began his career at NIOSH in 1992 as a research physical chemist in the Division of Respiratory Disease Studies. In 1999, he became a Senior Scientist in the NIOSH Office of the Director. In his new position, Dr. Stephens will coordinate three important functions-science program planning, science program performance evaluation and science publication review. Anita Schill will serve as the NIOSH Deputy Associate Director for Science. Dr. Schill holds a Bachelor of Science degree in Nursing from Russell Sage College, a Master of Arts degree in Occupational Safety and Health from New York University, and a Master of Public Health degree and a Doctor of Philosophy in Occupational Health degree from The Johns Hopkins University School of Hygiene and Public Health. Dr. Schill joined NIOSH in 2000 as a Senior Scientist in the Office of the Director.

In Memoriam: John Odencrantz

NIOSH mourns the loss of John Odencrantz, who died on Sept. 24 after being struck by an automobile. John had been with NIOSH in the Division of Respiratory Disease Studies for 13 years, most recently as a Senior Statistician in the Field Studies Branch. In addition to his work in the prevention of occupational lung disease, he was active with the CDC Statistical Advisory Group in planning several symposia and with the Statistical Science Award Committee. John was well known in the Morgantown community for his care and concern for homeless animals.

Look for the NIOSH Exhibit Booth at these upcoming conferences.

The Northwest Mining Convention presents the 110th Annual Meeting, Exposition and Short Courses on December 6-10 in Spokane , Wash. More information on this event can be obtained from Elaine Cullen at ecullen@cdc.gov or by visiting the web site http://www.nwma.org/pdf/04broch3.pdf.

The Ninth Safety Seminar for Underground Stone Mines on December 7-8 at the Executive Inn in Louisville, Ky. The seminar is sponsored by NIOSH, the Mine Safety and Health Administration, the National Stone, Sand and Gravel Association, and the Kentucky Crushed Stone Association. More information can be obtained by contacting Lou Prosser at LProsser@cdc.gov.

r2p: Research to Practice

NIOSH and EPA Partner to Reduce Work-Induced Hearing Loss

As a result of work conducted by NIOSH and industry partners, the U.S. Environmental Protection Agency (EPA) has proposed to revise its regulation on hearing protector labeling. A public meeting was held in 2003 where NIOSH provided technical expertise. Since the original rule in 1978, the development of miniaturized electronics and new acoustic technologies has created several additional classes of hearing protectors not covered in the existing regulation. Among these are communication headsets, active noise reduction headsets, sound restoration hearing protectors, and nonlinear acoustic devices. NIOSH's active research program has assisted in the development of specialized test methods to assess the attenuation performance of these newer protectors. EPA proposes to use those methods in its revised regulation. More information on NIOSH's participation can be obtained from Bill Murphy at WMurphy@cdc.gov. More information on NIOSH hearing loss prevention activities can be found at http://www.cdc.gov/niosh/topics/noise.

Training for Healthcare Workers on the Dangers of Bloodborne Pathogens

With funding from NIOSH, researchers at the Columbia University Mailman School of Public Health have developed a Web-based innovative learning program for healthcare workers about bloodborne pathogens. This simulation-training program is based on the premise that adults learn best when they actively participate in the learning process. Participants have an opportunity to read a simulated story based on a true event, make decisions, and come to conclusions on their own. Nurses who complete the training will receive up to three continuing education credits. For more information, visit the Bloodborne Pathogen Training for Nurses Web site at http://www.bbp-nursetraining.hs.columbia.edu/.

National Occupational Research Agenda (NORA)

NORA's Control Technology and Personal Protective Equipment Team (CTPPE) understands the power of collaboration. A unique partnership between CTPPE team and the NORA Reproductive Effects Research team (profiled in the October issue of eNews) has resulted in new recommendations to protect the more than 5.5 million healthcare workers who may be occupationally exposed to hazardous drugs in the United States. During this four year effort, the NORA teams worked with healthcare workers, researchers, government officials, and pharmaceutical companies to review existing literature and support new research on how to best protect workers who handle drugs that are known or suspected to cause adverse health effects from exposures in the workplace.

A new NIOSH Alert titled "Preventing Occupational Exposures to Antineoplastic and Other Hazardous Drugs in Health Care Settings" summarizes the group's findings, and experts recently met in San Antonio, Texas to discuss strategies for implementing the teams' recommendations. This project continues the team's history of collaboration with groups such as the American Industrial Hygiene Association and the American Society of Safety Engineers. The team also funds nearly 60 projects aimed at developing new technologies to protect workers. For more information about these projects and the team's

accomplishments, please visit their web site at http://www2a.cdc.gov/nora/noratopictemp.asp?rscharea=ctppe.

News From Our Partners

The U.S. Bureau of Labor Statistics reported that Latino workers have a much higher injury and fatality rate than non-Latinos. Prompted by this trend, the American Society of Safety Engineers Los Angeles Chapter, along with the newly formed Safety Professionals and Latinos in the Workplace, will convene the “Safety for Latinos in the Workplace” conference Nov. 18 in Commerce, Calif. NIOSH Director John Howard, M.D., will provide an update on NIOSH activities related to Latino workplace safety and health. The conference is designed to offer practical insight and tips into the Latino workforce including safety problems and ways to communicate information to this population, the latest resources available to the Latino workforce, and up-to-date information from NIOSH and OSHA. More information on the conference is available at http://www.assela.org.

Communication Products

NIOSH Health Hazard Evaluation Report. HETA #2003-0328-2935

HHE

This report describes an evaluation of potential exposure to chromium (Cr) during production of polyethylene. Investigators conducted employee interviews and air sampling and surface wipe sampling for hexavalent chromium (CrVI). No symptoms of effects from exposure to CrVI were found, and air samples were below OSHA and NIOSH limits. The full report can be accessed at http://www.cdc.gov/niosh/hhe/reports/pdfs/2003-0328-2935.pdf.

From NIOSH, Cal/OSHA: Easy Ergonomics in Hand Tool Selection

Easy-to-use guidance for evaluating and selecting ergonomically designed, non-powered hand tools to reduce risks of injuries from repetitive movements is provided in a new publication jointly issued by NIOSH and the Cal/OSHA (California Occupational Safety and Health Administration) Consultation Service, “Easy Ergonomics: A Guide to Selecting Non-Powered Hand Tools.” The guide includes user-friendly, illustrated discussions and a checklist for deciding whether to stay with traditional tool designs, evaluating the effectiveness of different designs for reducing risks of musculoskeletal injuries while accomplishing a given task, and choosing a tool of the right size and shape for the task and the user. The guide, DHHS (NIOSH) Publication No. 2004-164, is available at http://www.cdc.gov/niosh/docs/2004-164/.

NIOSH Fire Fighter Fatality Investigation and Prevention Program Reports

NIOSH Fire Fighter Fatality Investigation and Prevention Program

Six recently issued reports from the NIOSH Fire Fighter Fatality Investigation and Prevention Program are now accessible on the web site http://www.cdc.gov/niosh/firehome.html.

- F2003-27: Fire captain suffers sudden cardiac death during a live-fire training exercise-North Carolina
- F2003-18: Partial roof collapse in commercial structure fire claims the lives of two career fire fighters-Tennessee
- F2003-20: Junior volunteer fire fighter is killed while responding to a brush fire with an intoxicated driver-Wyoming
- F2004-08: Fire fighter suffers sudden cardiac death after emergency recall-Massachusetts
- F2004-12: Fire fighter-paramedic dies after performing physical fitness training-Florida

- F2004-13: Fire fighter suffers fatal pulmonary embolism after knee surgery for a work-related injury-North Carolina

NIOSH Respirator Selection Logic 2004

This document provides guidance to respirator program administrators on respirator selection, reflecting changes and advancements since 1987, when NIOSH published the first *NIOSH Respirator Decision Logic*. Since that time the Occupational Safety and Health Administration has revised its respirator use regulation, and NIOSH has revised the NIOSH respirator testing and certification criteria. *NIOSH Respirator Selection Logic 2004*, DHHS (NIOSH) Publication No. 2005-100, can be accessed at http://www.cdc.gov/niosh/docs/2005-100/.

Technology News: *NIOSH Safety Talk: The Emergency Communication Triangle*

The “Emergency Communication Triangle” is a short 15 minute safety talk intended to educate miners in the six categories of critical information that should be provided during emergency communication: Who, Where, What, Miners, Event, and Response. The pre-and post-intervention study design showed a considerable improvement in the percentage of miners who accurately report three emergency warning message components after the intervention , compared with pre-intervention. The full report can be accessed at http://www.cdc.gov/niosh/mining/pubs/pdfs/tn507.pdf and the NIOSH safety talk can be downloaded from the NIOSH web site http://www.cdc.gov/niosh/pdfs/99-157.pdf.

Upcoming Events

Developing Experimental Approaches for Evaluation of Toxicological Interactions of Nanoscale Materials

Developing Experimental Approaches for Evaluation of Toxicological Interactions of Nanoscale Materials will be held Nov. 3-4 in Gainesville, Florida. The workshop will address the challenges of conducting and interpreting studies of potential toxic effects of nanoscale materials and lay the foundation for developing a set of best experimental practices for future studies. More information on the workshop can be found at http://www.nanotoxicology.ufl.edu.

Partnering in Workplace Violence Prevention: Translating Research to Practice

NIOSH will convene for the first time a conference on workplace violence prevention. *Partnering in Workplace Violence Prevention: Translating Research to Practice* will be held on Nov. 15-17 in Baltimore, Md. Expert panel presentations and working sessions will be organized around four categories of workplace violence: 1) violence associated with criminal intent, 2) customer and client violence, 3) employee-on-employee violence, and 4) violence associated with personal relationships. The discussions will help guide the development of a strategic plan for workplace violence research and prevention. Further information on the conference, including on-line registration, is available at http://www.cdc.gov/niosh/conferences/work-violence.

Fourth International Conference on Work Environment and Cardiovascular Diseases

The *Fourth International Conference on Work Environment and Cardiovascular Diseases* will be held on March 9-11, 2005, in Newport Beach, Calif. The conference is presented under the auspices of the International Commission of Occupational Health, Scientific Committee on Cardiology in Occupational Health. NIOSH along with the UC Irvine, Center for Occupational and Environmental Health, the UCLA Center for Occupational and Environmental Health, the Center for Social Epidemiology, the Mt. Sinai School of Medicine, the American Psychological Association and the Japan Association of Job Stress Research will cosponsor the event focusing on characterizing the changes occurring in work in both industrialized and developing nations. The role of globalization and the importance of social movements, including unions, will be explored. More information on the conference is available at http://www.coeh.uci edu/ICOH.

Fifth International Symposium on Modern Principles of Air Monitoring

NIOSH along with the National Institute for Working Life, Sweden , and the National Institute of Occupational Health, Norway will cosponsor the *Fifth International Symposium on Modern Principles of Air Monitoring* on June 12-16, 2005 in Loen, Norway . The scientific program will feature the latest developments in exposure assessment and strategies as well as analytical air sampling and measurement/ monitoring methodologies. New for the Fifth Symposium, the topic of biomonitoring will be addressed. More information on the symposium can be found at http://www.airmon.org or by contacting Martin Harper at MHarper@cdc.gov.

Word of the Month

Biomonitoring is the science of using biological changes within the human body as the marker of exposure or health effect. These changes can be at the level of cells, tissues, or organs, or even the whole body (e.g. balance as an indicator of chemical intoxication).

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NIOSH eNews is Brought to You By:

Director	John Howard, M.D.
Editor in Chief	Max Lum
Story Editor	Tara Williams
Public Affairs Officer	Fred Blosser
Technical Lead	Glenn Doyle
Technical Support	Joseph Cauley

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