



DEPARTMENT OF ENVIRONMENTAL AND OCCUPATIONAL HEALTH SCIENCES

ENVIRONMENTAL HEALTH

News

SCHOOL OF PUBLIC HEALTH AND COMMUNITY MEDICINE ■ UNIVERSITY OF WASHINGTON ■ AUTUMN 2008

EMERGING ISSUES

In this edition, we focus on emerging issues important to Washington state business and labor. We describe research and activities related to nanotechnology, training underserved populations, measuring exposures in large animal feeding operations, and drug-resistant bacteria.

NANOTECHNOLOGY

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As of August 2008, there were more than 800 consumer products made with nanomaterials available worldwide, according to the Project on Emerging Nanotechnologies. Nanotechnology is the process of or material produced by manipulating particles 100 nanometers or smaller. It can be found in a wide range of items, such as stain-resistant fabrics, breathable bed sheets, and lighter, stronger bicycle frames. A nanometer is one billionth of a meter; the diameter of a human hair is 100,000 times larger.

Many companies and agencies support continued development of nanotechnologies in diverse applications, including biomedical, thermal, and electronic. Supporters point to the enormous advantages offered by nanotechnology in meeting societal needs. Take, for example, antimicrobial bandages or methods being developed to improve

detection of biological agents such as *E. coli* on food or cancer at its earliest stages in the body.

Nanotechnology will significantly change business practices. The Washington Nanotechnology Initiative's 2004 report estimates that in the next decade, the industries affected will account for more than 400,000 jobs in Washington state alone, and world-wide, the market for nano-based products will top one trillion dollars.

Still, many recognize that gaps exist in our understanding of the effect nanomaterials may have on human health and the environment. At stake in this continuing dialogue are potential harms to workers manufacturing products made with nanomaterials as well as consumers who use them. But ambivalence about nanotechnology may stall what many say is a vital industry with enormous benefits.

The National Institute for Occupational Safety and Health and others stand behind the responsible development and safe use of nanotechnology. Our researchers are looking at whether materials that

—continued on page 2



l to r: Professors Michael Yost, David Eaton, and Terry Kavanagh were featured speakers at an ethics forum on nanoscience in June 2008.

Jon Sharpe

NANOTECHNOLOGY —continued from page 1

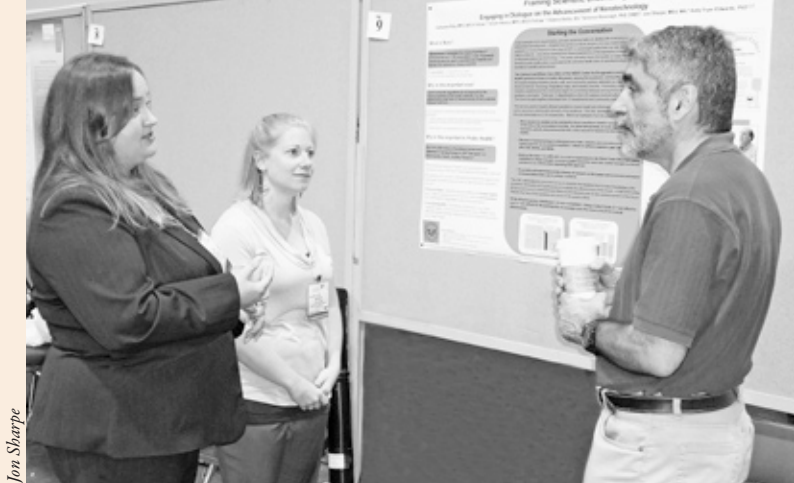
incorporate nanotechnology pose unique work-related health risks and how employees might be exposed to nanomaterials in manufacture and use.

In 2006, Professor Michael Yost participated in an investigative experiment with a group of researchers convened by the Washington Technology Center to see what kind of special handling practices might need to be employed if carbon nanotubes, a kind of nanomaterial, were added to the composite materials being tested for possible use on airplanes. Would workers be exposed to the carbon nanomaterials during typical manufacturing processes such as sanding, drilling, or cutting into the composite? Yost worked with UW researchers, the Pacific Northwest National Laboratory, and The Boeing Company to design and monitor a controlled simulation of the plastic resin being sanded. Results of the study showed that sanding released more nano-sized particles in the composite impregnated with carbon nanotubes than the composite without them.

“Dealing with risks upfront and identifying what they might be is a critical part of any new technology,” said Professor David Eaton, who is Director of the UW Center for Ecogenetics & Environmental Health (CEEH) and UW Associate Vice Provost for Research. Eaton chaired a committee that reviewed the government’s strategic plan for research on potential health and environmental risks posed by nanomaterials. A fundamental question in setting a research strategy is “How can we gather the science necessary to have informed regulation?” said Eaton. Also important, he added, is “to identify ways to control exposure or produce nanotechnologies in such a way to minimize risk.” The committee recommended that the government’s plan should determine the financial and technical resources needed to address identified research gaps.

Juxtaposing rapid scientific and technological advancement with unknown health risks may lead to divisive positions. Recent history provides telling examples of what can happen, such as the backlash to genetically modified foods in Europe.

Because the public ultimately bears the burden or reaps the benefits of scientific advancement, it is better to engage and educate from the beginning and reduce the burden of uncertainty that leads to worry, even misgivings, reported UW graduate student Catharine Riley at the American Public Health Association (APHA) conference. She cited a June 2008 ethics forum on nanoscience as one way to foster discussion. Sponsored by the Ethics and Outreach Core of the CEEH, the forum addressed nanotechnology issues related to toxicity, safety, and regulation and featured Professors Eaton, Yost, and Terry Kavanagh.



Jon Sharpe

At the 2008 APHA conference, graduate students Catharine Riley (left) and Kristin Beima explain the importance of engaging the public on an emerging issue like nanotechnology.

Part of the problem in assuring the public of the technology’s safety lies in how little experts know about the toxicity of some of these miniscule particles. Kavanagh endorses ongoing efforts to develop a nanotoxicity database that would be able to predict and score nanomaterials on their toxicity in various applications. Integrated and available information on these materials will be invaluable to “the development of safer-by-design nanoproducts,” wrote Kavanagh and DEOHS colleagues in a recent report.

Kavanagh, Research Scientist Dianne Botta, and others in Kavanagh’s lab are studying quantum dots (Qdots) for their biocompatibility in medical applications. Qdots are fluorescing, semiconductor nanoparticles. With their colleague, Professor Xiaohu Gao (Department of Bioengineering), they are examining different structures of a nanomaterial core and varying the coating used around the core. Funded by the National Institute of Environmental Health Sciences, the project aims to determine different combinations that are stable and relatively non-toxic and to identify those properties of the Qdot that may be responsible for inducing adverse effects in the body.

Some say there’s nothing novel about nanotechnology. Nanomaterials are just manufactured at a different size than the same chemicals we already know about. “But those of us who work in the area think that’s probably not true,” said Kavanagh. Nano-sized particles of these chemicals have unique properties, and that’s part of their attraction and their challenge.

FOR FURTHER READING

NIOSH and CDC on nanotechnology

<http://www.cdc.gov/niosh/topics/nanotech/safenano/control.html>

Review of Federal Strategy for Nanotechnology-Related Environmental, Health, and Safety Research

http://www.nap.edu/catalog.php?record_id=12559 ■

NEW WORKFORCE, NEW ISSUES

Even while employers and occupational health trainers strive to adequately equip and communicate information about health and safety to workers, the changing demographic of who makes up the workforce creates new challenges.

At the November 2008 “Health and Safety in Western Agriculture—New Paths” conference, keynote speaker, Professor Matt Keifer, spoke about the “new travelers” to the Pacific Northwest, drawn here by the availability of seasonal jobs and the responsibility to families left behind in their respective countries.

In Western Washington, nearly 23% of farmworkers identified themselves as Indigenous Mexican, according to the Washington State Farmworker Housing Trust’s report published in July 2008. And on the Northwest Olympic Peninsula, it is roughly estimated that 55–65% of the forest product workers who gather salal and cut blocks out of salvage cedar stumps are Indigenous Guatemalan and Indigenous Mexican, as reflected in a community-based research project that includes interaction with local workers. There are at least four different indigenous languages spoken in this area.

Researchers, public health agencies, and employers seek solutions to work with, train, and protect this population from occupational hazards. Using community-based participatory research (CBPR) and with the help of *promotores*, UW researchers are working with underserved populations to better understand and overcome barriers such as language and cultural differences.

Characteristic of CBPR is the active involvement of the research team, study participants, and their advocates. The needs of the community are not only collectively recognized, but the aims of the research include interventions designed to address those needs and improve the health of the population. Research Coordinator Lesley Hoare and graduate student Joseph Campe spoke at the New Paths conference about a project led by Keifer that uses CBPR with forest product worker communities to identify and address occupational work hazards and sustainable harvest issues.

Promotores are community health workers, peer educators, or community health representatives who are often key to reaching and building trust between traditionally underserved populations and the health care system. In order to translate educational principles, culturally appropriate messages are used, and *promotores* often serve as the best means of delivering those messages.

HEAT-RELATED ILLNESS

According to a written statement by the Washington State Department of Labor & Industries (L&I), health-related illness



Cedar block cutter on Olympic Peninsula, Washington.

caused the deaths of three workers in the past three years and the filing of 580 workers’ claims between 1995 and 2007. In order to better protect workers, L&I filed a new permanent workplace rule (effective July 5, 2008), which requires training about heat stress or heat-related illness to “be provided to employees and supervisors, in a language the employee or supervisor understands, prior to outdoor work.”

Helen Murphy, Director of Outreach and Education at our Pacific Northwest Agricultural Safety and Health (PNASH) Center, has worked with *promotores* to develop innovative training strategies for workers and employers to learn about heat-related illnesses, such as *novelas* (short soap operas) broadcast in Spanish on a local radio station. Murphy led a discussion at the New Paths conference to discuss cultural barriers that may prevent workers from adequately protecting themselves and to brainstorm practical solutions. These solutions included culturally appropriate training, delivering training through community-based organizations and *promotores* who understand how best to address these cultural barriers, and working with local radio stations to offer public service announcements on heat-related illnesses in Spanish. ■



According to the Washington State Department of Agriculture, Washington has over 100 dairy operations with more than 700 cows.

MEASURING EXPOSURE

Among issues discussed at the November 2008 “Health and Safety in Western Agriculture—New Paths” conference, organized by the Pacific Northwest Agricultural Safety and Health Center (PNASH), was the expansion of large-scale agricultural operations and the subsequent potential health risks that pose an emergent concern. For example, growing numbers of large animal feeding operations in the United States have some worried about occupational health hazards not necessarily seen in smaller scale farm operations.

DEOHS researchers, in collaboration with researchers at other universities, are studying large-scale dairy operations. One pilot project being led by Assistant Professor Scott Meschke, with federal funding through PNASH, aims to determine the levels of bioaerosols present in the air of a dairy facility in Yakima County, Washington.

Bioaerosols include microorganisms such as fungi or bacteria from cattle waste, feed, and bedding. Suspended in the air and often attached to organic dust or other particulate matter, bioaerosols can also be allergens, pollen, and bacterial endotoxins. When certain kinds of bacteria break down, endotoxins found on the outer layer of the cell are released. High levels of exposure to endotoxin-containing bioaerosols may put dairy workers at risk for respiratory illness and allergic reactions, as well as other long-term harmful effects.

In air samples taken in one dairy barn, Meschke and his research team found varied levels of bacteria and endotoxins, some as high as 12,500 colony-forming units of bacteria per cubic meter and 3,590 endotoxin units per cubic meter.

While there is no set regulatory level of exposure in occupational health, experts have proposed exposure limits of 500 endotoxin units per cubic meter. Worker exposure varies by length of time in a location, work environment, and what role the worker plays in the dairy operation, among other factors. So, the bioaerosol levels that Meschke’s team found can’t be compared to those experienced by actual workers.

An aerodynamic lens aerosol concentrator in development at Enertechnix in Seattle may help researchers better understand dairy-worker exposures. The patented technology used in the concentrator was originally designed to collect samples of aerosols in large amounts of air, anything from dust to pollen. Then, with the concentrator’s potential to sample air at discrete time intervals and to measure variable levels of exposure, DEOHS researchers foresaw another application.

With a team of graduate assistants, Meschke and Professors Mike Yost and Terry Kavanagh have been working with Enertechnix’s Director of Research and Development Peter Ariessohn, Senior Research Scientist Igor Novosselov, and Engineer Evan Dengler to design and develop an all-in-one personal air sampler. It will include an endotoxin reader that can analyze and identify bioaerosolized particulates and pathogens in real time. The plastic one-ounce sampler can be worn with a hip-pack battery half the size of a Walkman radio and be able to collect samples continuously for eight hours. With a tool to more accurately measure individual exposure in place and time, Meschke says it may be able to help researchers pinpoint appropriate interventions. ■

Photos: this page: Scott Bauer, USDA; opposite page: CDC/Janice Haney Carr; J. Martin Grassley

DRUG-RESISTANT BACTERIA FOUND ON PUBLIC BEACHES

Vancomycin-resistant *Enterococci* (VRE), bacteria rarely seen outside of a health care setting in North America, has been found on Washington and California public marine beaches and in coastal waters.

In October, Professor Marilyn Roberts and Assistant Professor Scott Meschke presented this finding at the “Interscience Conference on Antimicrobial Agents and Chemotherapy and the Infectious Diseases Society of America” in Washington, DC. Their study was the first to isolate and identify strains of VRE from an environmental source in North America.

Enterococci live in the gastrointestinal tract of humans and animals and are part of the normal flora. They usually do not cause disease unless they escape from the gut. *Enterococci* can be spread through fecal contamination, on hands or surfaces, and potentially cause infections in the urinary tract or in open wounds. Vancomycin, an antibiotic, is often used to treat infections caused by *Enterococci*. The emergence of VRE lies in the bacteria’s insidious ability to acquire new genes that confer resistance to multiple antibiotics.

VRE were first reported in the United Kingdom in 1988, and since 1993, have been identified in wastewater, farm settings, and surrounding communities in multiple European countries and other parts of the world. The isolation of VRE from municipal, hospital, and agricultural wastewater has raised concerns over

the possible transmission of VRE to the general public by an environmental and waterborne route.

It’s a “hearty bug,” said Roberts. VRE can survive on floors, on sinks, in water, and even in sand. So, if VRE is in the sand and water at public beaches, then these sources could be possible routes of transmission to beach visitors who may inadvertently carry VRE home on contaminated towels, bags, or clothing.

Roberts and Meschke found strains of VRE in samples taken from four of six Western Washington sites and from one of two California locations, a discovery that suggests other North American beaches could also be reservoirs.

The results presented from the current study are unlikely to be unique, and further studies are needed to determine the current environmental distribution of VRE in North American marine and fresh water beaches. The level of risk to the public for acquiring VRE, when visiting public beaches where VRE can be isolated, is unknown at this time. Thus the public should be aware of the potential of contamination of their food, clothes, and other items when visiting public beaches.

It’s a “hearty bug.” VRE can survive on floors, on sinks, in water, and even in sand.

FOR FURTHER READING

Vancomycin-resistant *Enterococci* (VRE)

http://www.cdc.gov/ncidod/dbq/ar_vre.html ■





PEOPLE & PLACES

Researchers, including Professors **Elaine Faustman** and **Tom Burbacher**, received approximately \$40 million from the National Institutes of Health (NIH) to fund the Pacific Northwest Center for the National Children's Study.

A new National Institute of Environmental Health Sciences-funded center, Disease Investigation Through Specialized Clinically Oriented Ventures in Environmental Research (DISCOVER), will examine links between air pollution and cardiovascular disease. Researchers include Professors **Joel Kaufman**, **Michael Rosenfeld**, **Sverre Vedal**, **Terry Kavanagh**, and Research Professor **Lianne Sheppard**.

Research scientist **Marina Guizzetti** was awarded an NIH grant to investigate possible ethanol exposure in the developing brain *in utero* and the connection to selected neurodevelopmental effects observed in fetal alcohol spectrum disorders.

Associate Professor **Pete Johnson** received funding from the National Institute for Occupational Safety and Health for two studies. One study will evaluate the computer mouse and keyboards as exposure assessment tools. The second project, a collaboration with Harvard University and Vrije University in The Netherlands, will assess the interactions of biomechanics and psychosocial stressors on work-related musculoskeletal disorders.

Safety and Health Investment Program (SHIP) grants funded through the Washington Department of Labor and Industries were awarded to: **Field Research and Consultation Group** (development and dissemination of a training video for welders, targeting hexavalent chromium exposures); **Continuing Education** (OSHA courses for teen workers); **Environmental Health Lab** (best practices in production, testing, and sampling of breathing air used in fire departments and commercial dive companies); and Clinical Professor **Michael Silverstein** (aging workforce issues and training). **Steve Hecker**, Director of Continuing Education and Outreach, is contributing to an SEIU project funded by SHIP on safe patient handling. **Darren Linker**, manager of the School-to-Work program, is assisting the Washington Restaurant Association with a SHIP-funded project to develop curriculum on restaurant safety and young professionals.

At the Washington State Governor's Industrial Safety and Health Conference, **Silverstein** introduced the Aging Workforce curriculum that he developed with **Hecker** and Curriculum Developer **Ken Scott**. At the same conference, **Linker** organized an interactive workshop for high school students. Linker also received the 2008 Outstanding Service Award from the



Clarita Lefthand



Emily Cane

Washington Association for Career and Technical Education.

Clarita Lefthand, a doctoral student working with Assistant Professor Scott Meschke, was awarded the second annual Bullitt Environmental Prize.

Undergraduate **Emily Cane** received the 2008 Cind M. Treser Memorial Undergraduate Student Scholarship. Named in memory of the late wife of faculty member Chuck Treser, the scholarship is awarded by the Washington State Environmental Health Association.

Graduate student **Ryan Blood** won the Best Poster award at the National Safety Council Congress and Exposition in Anaheim, CA. The poster highlighted research on whole body vibration exposures among transit workers in King County.

In October, the **Center for Ecogenetics and Environmental Health** sponsored an "Uncorking Ethics" forum: "Pregnancy, Prescriptions, and Pharmacodynamics: Researching the Risks."

In July, Professor **Richard Fenske** participated in a workshop exploring how engineering approaches can help address challenges in specialty crop production.

Jon Hofmann (MPH, Environmental and Occupational Health, 2004) won Best Poster for "Biomarkers of Sensitivity and Exposure in WA State Pesticide Handlers" at the "Health and Safety in Western Agriculture—New Paths" conference in November.

The Northwest Center for Occupational Health and Safety organized a professional development course, "Emerging Technologies in Occupational and Environmental Health," at the Northwest Occupational Health conference in October in Seattle. Session organizers included Research Industrial Hygienist **Venetia Runnion**, Senior Lecturer Emeritus **Lee Monteith**, and Lecturer **Rick Gleason**.



Darren Linker



Joel Kaufman

In July, **Gleason** presented on mold, lead, and asbestos hazards in construction to the Associated General Contractors, Seattle-Edifice Construction. He spoke on heat-related illness prevention at the Puget Sound Safety Summit in August. In November, he gave a presentation on preventing injury and illnesses to the Utility Contractors Association of Washington.

In October, Research Professor **Gary Franklin** presented “Opioids for Chronic, Non-cancer Pain: A Public Policy in Flux” at Dartmouth Hitchcock Medical Center in Lebanon, NH.

Matt Keifer and **Evan Gallagher** were promoted to Professor, effective July 1.

In November, an OSHA 10 course training was given in Spanish to 24 day workers from Centro de Ayuda Solidaria a los Amigos (CASA) Latina, a community-based organization in Seattle. **Hecker**, Professor **Noah Seixas**, and Research Coordinator **Carlos Dominguez** participated.

GLOBAL REACH

At the June Society for Risk Analysis Second World Congress in Guadalajara, Mexico, **Faustman** organized a mini-symposium, “Risk Assessment, Risk Management & Indigenous People: Legal, Scientific, Social & Cultural Contexts,” and presented “WHO’s Mandate on Indigenous Peoples: Promoting Health and Human Rights.”

A Japanese delegation of scientists representing the automobile industry met with NIH-funded Multi-Ethnic Study of Atherosclerosis and Air Pollution researchers, Professors **Kaufman**, **Kavanagh**, **Vedal**, and Adjunct Professor **Tim Larson**, to discuss air pollution’s health impacts, air quality standards, and policy implications.

In October, the **Pacific Northwest OSHA Education Center** hosted a signing ceremony with South Korea-based Samsung Engineering Co. Ltd., recognizing an agreement to deliver OSHA-certified health and safety training in its training facility in Saudi Arabia.

In October, Professor **Keifer**, Chair **Dave Kalman**, Associate Professor **Bill Daniell**, and Adjunct Assistant Professor **Catherine Karr** participated in the Third International Scientific Conference on Occupational and Environmental Health in Hanoi, Vietnam. The conference addressed occupational and environmental health challenges in Southeast Asia and was sponsored through the Fogarty International Center and NIH-funded Collaborative Center for Healthy Work and Environment.



Samsung Engineering (SECL) Signing Ceremony: (l to r) Pacific Northwest OSHA Education Center Director Mike Willis, SECL General Manager of Quality Health Safety & Environment (HSE) Team K. S. Choi, UW Assistant Vice Provost for Research & Director of Sponsored Programs Lynne Chronister, DEOHS Chair Dave Kalman, SECL Vice President S. J. Hong, and SECL Vice President of HSE Team Roger Wagstaff



CONFERENCE PRESENTATIONS

Departmental researchers or alumni are in bold-faced type

48th Annual Meeting of the Teratology Society

June 28–July 2, Monterey, CA

Scherer AC, Tsuchiya A, Monsivais P, Griffith WC, Faustman EM, Drewnowski A. Development of a composite toxicological-nutrient profiling model for pregnant women consuming seafood

EPA's Region X Air Toxics Summit

August 6, Boise, ID

Neitzel R, Naeher LP, Paulsen M, Dunn K, Stock A, Barr D, **Simpson CD**. Biomarkers of woodsmoke exposure among wildland firefighters

43rd UK Congress on Human Response to Vibration

September 12–14, Leicester, England

Blood R. Measuring hand arm vibration exposure with a wrist mounted actigraph

Blood R. Whole body vibration exposure among transit workers in King County, Washington

Johnson P. Whole body vibration exposures in forklift operators: Comparison of a mechanical and air-ride seat

Columbia University Conference on Mass Transit Noise

September 19, New York City, NY

Neitzel R, Gershon RRM, Zeltser M, Canton A, Akram M. NYC Mass Transit noise levels

Pacific Northwest Society of Toxicology

September 19–20, Corvallis, OR

Mohar I, White C, Kavanagh T. Gender-mediated determinants of acetaminophen-induced liver damage in mice

Smith W, Tracy J, White C, Bammler T, Kavanagh T, Eaton D. Uptake of quantum dots by HEPG2 cells

Youngblood L, Chakraverty D, Scherer A, Krogstad F, Tsuchiya A, Faustman E. Domoic acid risk assessment: Neurobehavioral implications for fetuses exposed *in utero* and neonates exposed via breastmilk

Governor's Industrial Safety and Health Conference

September 24–25, Spokane, WA

Gleason R. Comparing trucker worker compensation injuries to other Washington workers

Runnion V. The new hexavalent chromium rule & what it means for welders

Washington State Medical Association Annual Meeting

September 26–28, Spokane, WA

Franklin G. Washington opioid dosing guidelines: The one year follow-up

Acoustics Week in Canada

October 6, Vancouver, British Columbia

Neitzel R, Daniell WE, Meschke H, Sheppard L, Davies H, Seixas NS. Comparison of perceived and quantitative measures of occupational noise exposure

9th Annual WorkSafeBC Physician Education Conference

October 11, Kelowna, British Columbia

Franklin G. Opioids for chronic, non-cancer pain: A rapidly changing landscape

International Society for Environmental Epidemiology and

International Society of Exposure Analysis Conference

October 12–16, Pasadena, CA

Adar SD, Klein R, Klein B, Cotch M, Wong T, O'Neill MS, Shrager S, Siscovick D, Daviglus M, **Kaufman J**. Long-term exposures to air pollution and retinal micro-vascular caliber: The Multi-Ethnic Study of Atherosclerosis and Air Pollution (MESA)

Allen R, Leckie S, Millar G, Jackson P, Brauer M. The impact of wood-stove technology upgrades on air quality in British Columbia homes

Clark NA, Demers P, **Karr C**, Koehoorn M, Lencar C, Tamburic L, Brauer M. Childhood asthma and early life exposure to air pollution

Curl CL, Adar SD, Cohen MA, Hincely Stukovsky K, Allen R, Mancera-Cuevas K, Nunn CL, Castro C, Christman C, Dwight C, **Kaufman JD**. An evaluation of time-location data: The Multi-Ethnic Study of Atherosclerosis and Air Pollution (MESA Air)

De Roos AJ, Davis S, Colt JS, Blair A, Airola M, Severson RK, Cozen W, Cerhan JR, Hartge P, Nuckols JR, Ward MH. Residential proximity to industrial facilities and risk of non-Hodgkin lymphoma

Hoare L. A community environmental health assessment in a Latino farm worker community

Jensen SS, Larson T, **Kaufman J**, KC D. Modeling intra-urban concentrations of traffic-related air pollution in New York City for the US Multi-Ethnic Study of Atherosclerosis

Kaufman J. The Multi-Ethnic Study of Atherosclerosis and Air Pollution: An update

Kim S, Sheppard L. Health effect estimates from kriged exposures depend on spatial structure

Liu L, Adar SD, Hallstrand T. Respiratory effects of exposures to diesel exhaust among children bus riders before and after the diesel bus engine retrofit

Miller-Schulze JP, Toriba A, Tang N, Hayakawa K, Tamura K, Dong L, Zhang X, **Simpson CD**. Nitro-polycyclic aromatic hydrocarbon concentrations in urban air particulate matter and their implications for source apportionment in Shenyang, China

Noonan CW, Ward TJ, Navidi W, **Sheppard L**. Changes in respiratory symptoms and health conditions among children during wood stove changeout program

Phuleria HC, **Larson TV**, Zielinska B, Ireson RG, Davey ME, Weaver CS, Ondov JM, Hesterberg TW, Liu LJS. Assessment of self-pollution of school buses with various retrofit technologies

Simpson CD, **Miller-Schulze J**, **Paulsen M**, **Kameda T**, Cassidy B, Aguilar-Villalobos M, Naeher LP. 1-Nitropyrene exposures in air and biomarker levels in urine amongst workers exposed to traffic-related air pollution in Trujillo, Peru

Stamper EE, **Adar SD**, Auchincloss A, **Pearson AL**, Diez Roux A, **Yi M**, **Kaufman JD**. Characterizing the spatial accuracy of geocoding for exposure assessment: The Multi-Ethnic Study of Atherosclerosis and Air Pollution (MESA Air)

Strand MJ, Hopke PK, Zhao W, **Vedal S**, Gelfand EW, Rabinovitch N. An examination of methods to estimate personal exposures to ambient PM_{2.5} through data analysis

Stumbaugh KL, **Shirai JH**, **Kissel JC**. Estimation of skin permeability coefficients for aqueous chloroform from the Gordon et al. *in vivo* human trials: Impact on estimated relative contribution of dermal exposure

Szpiro AA, Sampson PD, **Sheppard L**, **Wilton D**, **Larson T**, Lumley T, **Adar SD**, **Kaufman J**. Spatio-temporal modeling to predict intra-urban variation in air pollution levels

Van Hee VC, **Adar SD**, **Szpiro AA**, Barr RG, Diez Roux A, Bluemke DA, **Sheppard L**, Gill EA, Bahrami H, Wassel-Fyr C, Sale MM, Mychaleckyj JC, Rich SS, Rotter JI, **Kaufman JD**. Genetic polymorphisms, proximity to traffic, and left ventricular mass: The Multi-Ethnic Study of Atherosclerosis and Air Pollution

Wilson WE, **Mar TF**, **Koenig JQ**. The use of zip code level mortality data in community, time-series epidemiology yields higher and more significant associations of daily deaths with daily PM_{2.5} and demonstrates effect modifications from income level, proximity to roads, and distance from the monitor

Wilton D, **Larson T**, **Gould T**, **Szpiro A**. Including caline3 dispersion model predictions into a land use regression model for NO_x in Los Angeles, California and Seattle, Washington

Northwest Occupational Health Conference
October 15-17, Seattle, WA

Antonchuck O. Evaluation of local exhaust ventilation for welding

Camp J. MRSA exposure and emergency response personnel

Camp J. Professional excellence: News from the American Board of Industrial Hygiene

Ceballos D. Development of a permeation test panel for the evaluation of protective gloves against aliphatic polyisocyanate paints used in the collision repair industry

Croteau G. Occupational hazards in the metal and glass arts

Croteau G, Reinhardt T, **Dills R**. Assessing exposure risk in the absence of a PEL or TLV

Firestone J. Harborview's Center of Occupational Health Education—Improving care for catastrophically injured workers

Hecker S. An investigation of cabin air quality and flight attendant health

Monteith L. Recent developments with diffusive samplers

Parrette D. Particle size distribution and bioavailability of hexavalent chromium

Runnion V, **Dills R**. Potential metal exposures in an electronic recycling facility

Runnion V, McCarthy K, Johnson D, Kampa O, John-Andersch L, Peters P, Christenson C. Hexavalent chromium roundtable: An update

Smith-Weller T. Health service coordinators in Labor and Industries Centers for Occupational Health and Education (COHEs)

APHA Annual Meeting and Exposition
October 25-29, San Diego, CA

Beima K, **Riley C**, **Sharpe J**, **Hofmann J**, **Keifer M**, **Fryer-Edwards K**. Decision making under uncertainty: A case study in returning individual genetic test results in a research context

Blecker HS, **Seixas NS**, **Camp J**, **Hecker S**, **Lowry S**, **De Castro B**. Development of a work health and safety curriculum for day laborers

Campe J, **Hoare L**, **Keifer M**. Occupational health and safety of Latino immigrant cedar block cutters on the Olympic Peninsula: An exploratory pilot study

Delp L, **Silverstein M**, **Flynn E**, **Vossenas P**, **Silverstein BA**. Ergonomics policy—looking back, moving forward

Fulton-Kehoe D, **Egan K**, **Gluck JV**, **Zerr D**, **Franklin GM**. MRSA trends in Washington State Workers' Compensation

Fulton-Kehoe D, **Franklin GM**, **Wickizer TM**, **Turner JA**, **Mootz R**. Prevention of long-term disability in back injuries: Screening and intervention

Hecker S. Occupational health and safety training in the US: Is it effective? How would we know?

Hofmann J, **Keifer M**. Risk factors for cholinesterase inhibition among agricultural pesticide handlers in Washington state

Keifer M, **Garcia R**, **Ybarra V**, **Hoare L**, **Wells S**. Prodding awake a sleeping giant: The challenge of responding to a farmworker community's many needs

Riley C, **Beima K**, **Botta D**, **Kavanagh T**, **Sharpe J**, **Fryer-Edwards K**. Framing scientific uncertainty: The importance of engaging in public dialogue regarding the advancement of nanotechnology

Sanchez YA, **Silverstein M**. Neglect in agricultural safety and health regulations: Separate and unequal

Silverstein M, **Howard J**, **Murray LR**. Future of occupational safety and health; A conversation with leadership

Sutherland LL, **Weiler DM**, **Pregaman M**, **Keifer M**, **Hoare L**. A grass-roots approach to develop a Hispanic wellness curriculum in rural Idaho

—continued on page 10

**Health and Safety in Western Agriculture—New Paths
November 11-13, Cle Elum, WA (organized by PNASH)**

- Dunbar L, Gordor R, Novosselov I, Meschke JS.** Collection efficiency and viability of aerosolized *E. coli* with a liquid impinger compared to agar impaction
- Fenske R, Yost M.** Community exposures to airborne pesticides—Public concerns and known risks
- Galvin K.** Fluorescent tracers manual: Pesticide safety education tool hands-on workshop
- Hoare L, Campe J, Bocanegra JJ.** Using community-based participatory research to identify and address occupational work hazards among contract forest workers
- Hofmann J.** Determinants of cholinesterase inhibition in pesticide handlers
- Hofmann J.** Risk factors for pesticide overexposure among agricultural pesticide handlers
- Hofmann JN, Stevens R, MacCoss M, Goodlett D, Sherl AC, Keifer MC, Checkoway H, Kim JH, Richter RJ, Suzuki SM, Farin FM, De Roos JD, Furlong CE.** Biomarkers of sensitivity and exposure in Washington state pesticide handlers
- Johnson PW, Cheng H, Blood R, Studhalter M.** Tools for ergonomic assessment of agricultural work
- Johnson PW, Keifer M.** Traumatic and musculoskeletal injuries—Workplace solutions
- Kaufman J.** Fine particulates and cardiovascular disease
- Karr CJ, Postma J.** Asthma and environmental factors in farmworker children: Current evidence, intervention strategies, and research needs
- Keifer M.** Biomonitoring phase II: A discussion of existing and potential technologies
- Keifer M.** New paths, New travelers
- Krenz J, Fenske RA, Yost MG, Galvin K, Tchon-French M, Palmández P, Negrete M, Fitzpatrick C, Tsai MY, Crampton R.** Pilot organophosphorus pesticide air monitoring project
- Lee JK, Rohlik C, Ray L, Meschke JS.** Validation of microbial recovery from surfaces by various sampling methods
- Lewis K, Beaudreau M.** New technologies in tree fruit production—Labor efficiency and safety—Mechanized fruit thinning, over-the-row platforms for harvesting
- Murphy H.** Educating through games
- Murphy H.** How can we overcome the economic and cultural barriers to preventing and treating heat illnesses
- Murphy H, Gee S, Keifer M, Simpson C.** Biomonitoring state of the science: Where is new technology going?
- Palmández P, Galvin K, Tchon-French M, Fenske R.** Interventions to minimize worker and family pesticide exposure
- Paulsen M, Simpson C.** Development of a sensitive and specific exposure biomarker assay for organophosphate pesticides using HPLC and tandem mass spectrometry

- Pinkerton K, Meschke S, Reynolds S, Schenker M.** Bioaerosols in dairy barns
- Rohlik C, Lee JK, Ray L, Meschke JS.** Characterization of bioaerosols and bacterial surface contamination at a large Washington dairy operation
- Studhalter M, Blood R, Johnson PW.** Project to assess seats and whole body vibration in tractor drivers
- Tchon-French M, Galvin K, Kibogy J, Fenske R.** Assessment of chlorpyrifos exposure in agricultural workers during airblast applications
- Treadwell R.** Introduction of a portable cholinesterase monitoring kit in a clinical setting using a normalization process approach



A FOND FAREWELL TO KATHY HALL

Former Communication Director Kathy Hall left the department in July to take a position as managing editor of *Northwest Public Health*, a biannual journal for public health practitioners published by the School's Northwest Center for Public Health Practice.

She leaves behind a trail of awards, including a 2003 international Best of Show for the department's biennial report and a 2008 Puget Sound regional Best of Show for the department calendar, which she received in competitions sponsored by the Society for Technical Communication. Chair Dave Kalman said these awards reflect Hall's ability to communicate science in innovative ways. "We are very proud of the work she did and the impact her efforts have made," he said.



CONTINUING EDUCATION & EVENTS

To confirm this schedule or find more information about these courses, call 206-543-1069 or visit the Continuing Education website at <http://depts.washington.edu/ehce>. Courses are in Seattle unless noted.

PACIFIC NORTHWEST OSHA EDUCATION CENTER*

Not for OSHA rules only! All classes offer training that meets WISHA, OR-OSHA, or Alaska state standards, as appropriate.

| | |
|-----------|--|
| Jan 5-8 | OSHA 510: Standards for the Construction Industry |
| Jan 5-8 | OSHA 500: Trainer Course for Construction Industry (<i>Portland</i>) |
| Jan 5-8 | OSHA 521: Guide to Industrial Hygiene (<i>Portland</i>) |
| Jan 12-15 | OSHA 511: General Industry Standards (<i>Anchorage</i>) |
| Jan 12-15 | OSHA 2045: Machinery & Machine Guarding Standards (<i>Portland</i>) |
| Jan 12-15 | OSHA 6000: Collateral Duty Course for Other Federal Agencies (<i>Portland</i>) |
| Jan 19-21 | OSHA 2264: Permit-Required Confined Space Entry (<i>Boise</i>) |
| Jan 20-22 | OSHA 3095: Electrical Standards |
| Jan 26-29 | OSHA 2015: Hazardous Materials |
| Feb 2-4 | OSHA 2225: Respiratory Protection |
| Feb 2-5 | OSHA 501: Trainer Course in Standards for General Industry (<i>Portland</i>) |
| Feb 3-5 | OSHA 3110: Fall Arrest Systems (<i>Portland</i>) |
| Feb 9-12 | OSHA 5400: Maritime Train-the-Trainer (<i>Portland</i>) NEW! |
| Feb 9-12 | OSHA 5600: Disaster Site Worker Train-the-Trainer |
| Feb 9-12 | OSHA 500: Trainer Course for Construction Industry |
| Feb 9-12 | OSHA 510: OSHA Standards for the Construction Industry (<i>Portland</i>) |
| Feb 17-19 | OSHA 3110: Fall Arrest Systems (<i>Anchorage</i>) |
| Feb 17-19 | OSHA 2250: Principles of Ergonomics |
| Feb 23-26 | OSHA 511: General Industry Standards |
| Mar 2-5 | OSHA 2015: Hazardous Materials (<i>Portland</i>) |
| Mar 2-5 | OSHA 501: Trainer Course in Standards for General Industry |
| Mar 2-5 | OSHA 511: General Industry Standards (<i>Portland</i>) |

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|--------------|--|
| Mar 9-12 | OSHA 500: Trainer Course for Construction Industry (<i>Portland</i>) |
| Mar 9-12 | OSHA 6000: Collateral Duty Course for Other Federal Agencies (<i>Portland</i>) |
| Mar 10-12 | OSHA 3010: Excavation, Trenching, and Soil Mechanics |
| Mar 16-18 | OSHA 3095: Electrical Standards (<i>Boise</i>) |
| Mar 16-19 | OSHA 521: OSHA Guide to Industrial Hygiene |
| Mar 23-25 | OSHA 2264: Permit-Required Confined Space Entry |
| Mar 30-Apr 2 | OSHA 510: OSHA Standards for the Construction Industry |

* If Seattle course is full; please call (206) 685-3089 to be placed on a waiting list.

NORTHWEST CENTER FOR OCCUPATIONAL HEALTH & SAFETY

| | |
|----------|--|
| Jan 12 | Annual Hazardous Waste Refresher |
| Jan 13 | Annual Hazardous Waste Refresher (<i>Olympia</i>) |
| Jan 14 | Annual Hazardous Waste Refresher |
| Jan 15 | Annual Hazardous Waste Refresher |
| Jan 16 | Annual Hazardous Waste Refresher |
| Feb 5 | Puget Sound Occupational and Environmental Medicine (OEM) Grand Rounds: <i>Occupational Medicine in the Construction Industry: Intersection of Work with Chronic Disease and Aging</i> |
| Feb 25 | Accident & Incident Investigation |
| Mar 5 | Puget Sound OEM Grand Rounds: Does Air Pollution Cause Cardiovascular Disease? |
| Mar 9-12 | 3rd National Healthcare Ergonomics Conference (<i>Portland</i>) |

2009 DEPARTMENT CALENDAR

Fresh off the press, the 2009 department calendar features stunning photographs taken by department staff, students, faculty, and friends. It also highlights many of our department's centers and programs. You can order a free copy: email ehadmin@u.washington.edu or call 206-543-6991.



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