



DEPARTMENT OF ENVIRONMENTAL HEALTH

ENVIRONMENTAL HEALTH

News

SCHOOL OF PUBLIC HEALTH AND COMMUNITY MEDICINE ■ UNIVERSITY OF WASHINGTON ■ SPRING—SUMMER 1999

Solving Workplace & Environmental Health Problems

The Department of Environmental Health has a long history of helping employers, workers, and the general public solve workplace and environmental health problems. These work-related services are supported in part by money appropriated from state workers' compensation funds.

In addition to the more traditional academic role of conducting research to identify hazards and describe their disease mechanisms, the Department's mission includes developing strategies to prevent these hazards and working with those in a position to implement suggested changes.

This issue of Environmental Health News reviews recent examples of how departmental faculty, staff, and students have worked with others to solve emerging problems in the construction, timber, and agricultural industries—plus an unusual problem in a tribal community.

ANCIENT TRADITIONS—NEW SOLUTIONS



Mary Ellen Flanagan

FIRE AND SMOKE CARRY SPIRITUAL significance for the Swinomish Tribal Community. But when a new ceremonial smokehouse proved too smoky, the tribe turned to the Field Research and Consultation Group for a solution.

Mary Ellen Flanagan, a Certified industrial Hygienist, found it a particularly challenging indoor air quality problem. She needed to find a culturally sensitive way to reduce carbon monoxide and particulates in a ceremonial room with two open fires. Other challenges were duration (ceremonies could last 12 hours), dust (dancers on a dirt floor), and exposure (hundreds of people on bleachers in the smokiest part of the room).

Flanagan worked with the tribe, other UW departments, and federal, state, and regional agencies to solve the problem and

develop a model for other tribes to follow. "This was a rare example of cooperation between academia and other agencies," said Nick Zaferatos, the tribe's general manager. "We limited Mary Ellen to approaches that would be largely invisible to the naked eye and sensitive to our cultural practices. This is a wonderful case study for solving a problem while respecting the federally protected practice of Indian religions."

THE PROBLEM

The building's architects designed a new, code-compliant structure to replicate a traditional longhouse. They hid modern features behind rough-sawn cedar boards. But they knew ventilation would be a problem—ceremonial practices required several open-air fire pits. The problem was



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immediately obvious when the smokehouse was dedicated in 1996. Elders had to wear white filter masks and guests complained of the smoke.

The tribe, located near LaConner, contacted the Northwest Air Pollution Authority and the state Department of Labor and Industries (L&I) Everett office. The tribal smokehouse organization allowed unobtrusive air monitoring during a March 1997 ceremony.

Results were alarming. Carbon monoxide levels were 67 parts per million for a four-hour time-weighted average and 87 ppm for a 15-minute peak. The US Environmental Protection Agency (EPA) standard is 9 ppm for ambient or outdoor air and L&I's occupational standard is 35 ppm for an 8-hour average. Carbon monoxide is a colorless, odorless gas formed when a carbon-containing fuel is not burned completely. It can decrease the oxygen-carrying capacity of the blood.

Levels of respirable particulates and total particulates also were above EPA standards. Particulates, especially the fine ones that can be breathed deep into the lungs, can cause or aggravate a variety of diseases. Children and the elderly are at particular risk.

SEEKING A SOLUTION

"It seemed like common sense that the fire needed a fresh air supply," said Lauren Rich, tribal environmental planner. "We went to Mary Ellen's program to see if common sense would play out."

Flanagan went to Associate Professor Steven Guffey, a Department of Environmental Health researcher specializing in ventilation design. He suggested a duct system that would make the fire burn hotter and more efficiently. The heat from the fire would create suction and pull air from the outside. Tribal members knew other tribes had used similar designs.

The next step was to put theory into practice. Flanagan contacted Professor Richard Corlett of the UW Mechanical Engineering Department to develop a prototype venting system. She also asked Professor James Agee of the UW College of Forest Resources for recommendations on firewood. The researchers built a test fire pit with a 12-inch-diameter underground duct running to an outside vent. One vented and two unvented fires were tested in September 1997.

The vented fire burned clear and hot; its smoke rose quickly to the roof peak. By comparison, the unvented fires were smokier and

the smoke moved lethargically. With the venting, carbon monoxide concentrations dropped dramatically from those measured during the March 1997 ceremony. The time-weighted average went from 67 parts per million to 2.7. Particulate levels dropped about tenfold.

MAKING THE CHANGE

The tests convinced the tribe to install permanent venting and operable shutters in the roof peak, financed with a federal Clean Air Act grant. The system has been in place for two seasons and works well, Zaferatos said. Inconspicuous floor grates at the ends of the building provide the only clue that the fires are different from those that have burned for centuries on Fidalgo Island. The tribe also incorporated Flanagan's recommendation of a dry storage area for wood.

The tribe hasn't yet implemented another recommendation, a fan system to pull clean, warm air into the bleachers and exhaust the smoke plume, but is pursuing funding. "We were most concerned about reducing carbon monoxide," Zaferatos said. "Smoke is the secondary problem—it doesn't present the same type of public health risk."

FOR FURTHER READING

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An 11-person cedar canoe with LaConner in the background in the 1930s



Edmond S. Meany, Special Collections Division, UW Libraries, Negative # 1229



Mary Ellen Flanagan

Top: Potlatch house on the Swinomish reservation circa 1905
Bottom: Longhouse-style smokehouse built in 1996; note the roof vents

LONGHOUSE *keeps cultural fires burning*

Since before written language, the longhouse helped Swinomish culture pass from generation to generation. Historically, the Swinomish tribe was known for salmon fishing and cedar longhouses. Ancestors spent summers traveling Puget Sound in cedar canoes, gathering fish, berries, and meat for winter. “When the fish quit running, we would turn our attention back to the longhouse for ceremonies,” said Larry Campbell, tribal member and community liaison.

Life changed after Puget Sound tribes signed the 1855 Treaty of Point Elliott. The Bureau of Indian Affairs banned spirit dancing and the ceremonial giving of goods. Old longhouses fell into disuse. As a public health precaution, some were burned during smallpox epidemics. The last one burned or fell down in the 1940s, Campbell said.

June McCormick Collins, a UW researcher who studied the tribe in the 1940s, recalled the old longhouse. “Nails and modern tools were used in the construction, but the general plan of the building and the placement of the huge hearths were said to be pre-European,” she wrote.

Without a longhouse, ceremonies moved to newer public buildings or to people’s houses or garages. “Our culture never went away,” Campbell said. “It has ebbed and flowed.” The tribe began longing for a new longhouse in the 1980s. About the same time, cultural mitigation money became available through the Federal Energy Regulatory Commission (FERC). The City of Seattle, as part of the environmental review needed to license its Skagit River dams, was required by FERC to compensate three Skagit tribes whose cultural sites were flooded. The Swinomish tribe used its share for a longhouse-style smokehouse. After years of planning, the new building was dedicated in 1996.

“Good things can happen when we make sure our decisions are based on our tribal traditions,” Campbell said. For example, planning for the smokehouse prompted one family to take up carving, a lost art among the Swinomish.

As the carvers turn cedar logs into story poles, they sometimes receive visions. Those visions enter the pole and are passed along to others through stories, spirit dances, and other smokehouse ceremonies—that is—in the old ways.

LOOKING AT RISKS *from a tribal perspective*

The Department’s risk assessment team has been helping bridge the cultural gap between agencies and tribes as they assess and clean up contaminated sites. Twenty-three tribes and tribal organizations and 14 federal and state agency representatives participated in a three-day risk roundtable last year, cosponsored by the Consortium for Risk Evaluation with Stakeholder Participation (CRESP) program and the Confederated Tribes of the Umatilla Indian Reservation.

Tribes need to recognize that agencies base many regulatory decisions on risk evaluation, said CRESP Principle Investigator Elaine Faustman, while agencies need to understand how Native American values shape the discussion. To view the roundtable report on-line, go to <http://cresp.sphcm.washington.edu/roundtable/>.

CRESP continues seeking ways to introduce tribal perspectives into mainstream policy making. As part of the Hanford Openness Workshop series, a special tribal workshop was scheduled for June 2 in Spokane. Agencies had a chance to hear tribal priorities for decision-making at the Hanford nuclear site in eastern Washington.

For more information, contact Michael Kern at (206) 616-3719 or mkern@u.washington.edu.

THE UNIVERSITY AS CORPORATE MEDICAL DIRECTOR

Four years ago, the Weyerhaeuser Company took a proactive approach to protecting and improving the health and safety of its 36,000 employees. Instead of replacing a departing medical director with another doctor, the diversified international forest products company took the unusual step of contracting with the University of Washington for its medical director services.

The contract includes UW's School of Medicine and School of Public Health and Community Medicine. Through the partnership, a public health perspective is mixed with a business approach, said Paula Stewart, director of health and safety at Weyerhaeuser. The contract places Jeffery Thompson, MD, an assistant clinical professor, in the role of corporate medical director of the Weyerhaeuser Company. Dr. Thompson works with 70 Weyerhaeuser safety and health professional across the country, developing policy, consulting, and managing projects that affect employees in 46 states and 12 countries, including about 12,000 in the Pacific Northwest.

The contract has generated a number of studies, such as:

- An ergonomics review of Weyerhaeuser's 49 box production plants. The team hopes to identify high-risk jobs and use public health tools to address issues such as ergonomics, absenteeism, and employee turnover.
- A review of lumber graders—inspectors who judge the quality of thousands of board feet of wood every day. They face injuries ranging from repetitive motion, splinters, and specks of sawdust in the eyes to more serious injuries. This study showed how short breaks, job rotation, and mechanically assisted grading allow the production line to move faster with decreased fatigue and arm and leg problems.
- A risk communication process involving Weyerhaeuser's pulp and paper mill in Longview and the Washington State Poison Center. As part of a Risk Management Plan mandated under the US Environmental Protection Agency, the partnership will develop a risk communication plan that will inform Longview citizens, company workers, and the local medical community of any health issues resulting from a spill.
- A federal grant awarded to Weyerhaeuser in 1997 with subcontracts to the University of Washington. The grant funds worker training in prevention and early interven-



Weyerhaeuser

A sawmill employee feeds lumber into an edger

tion of impairment issues. Researchers hope to find a link between health and safety resources and the new peer-helping activities.

- A University of Washington travel medicine clinic at Weyerhaeuser corporate headquarters to assist expatriates and families traveling overseas.

The corporate environment provides a good laboratory for graduate students. "This presents a unique opportunity to bring students into the real world experience," said Dr. Thompson. The partnership also allows UW to expand its outreach efforts—Dr. Thompson brings continuing education courses to physicians across the US. In recent months, he has lectured in smaller communities and presented grand rounds in the UW Department of Psychiatry, discussing topics such as disability management, aging in the work force, and medical surveillance.

"Our partnership with Weyerhaeuser has a synergistic effect," said Dr. Scott Barnhart, director of the Occupational and Environmental Medicine program, jointly operated by the Department of Environmental Health and the Department of Medicine. The partnership provides perspectives on problems from the viewpoint of management, labor, and academia, he said. The partnership gives UW researchers a unique glimpse into the needs of business and the challenges of implementing solutions in a manufacturing environment. It also gives Weyerhaeuser professionals access to the most current scientific information. ■■■

GLOWING EVIDENCE OF PESTICIDE EXPOSURE

The farmworker had already taken required pesticide applicator training courses. But stepping under Dr. Richard Fenske's black light dramatically showed him what no amount of classroom training could—how much exposure he gets from his own application techniques. His hands, neck, and ears glowed an eerie blue, highlighting skin that had been exposed to pesticides. Heavy splashes and spills glowed as hot spots.

Dr. Fenske hopes the blacklight reality check will lead this farmworker and others to use safer methods when they mix and apply pesticides.

Dr. Fenske, director of the Pacific Northwest Agricultural Safety and Health Center, first used the fluorescent tracer technique about 20 years ago. The technique is so simple it can be used in developing countries or rural work sites. A nontoxic fluorescent chemical is added to the pesticide mixing tank. After a day's work, investigators shine long-wave ultraviolet light onto the worker's skin to illuminate dermal exposures to the pesticide.

Long-wave ultraviolet light isn't the type that causes sunburn, but it makes fluorescent materials glow in the dark. The dermal exposure route has been recognized for decades to be a major pathway for pesticides to enter the bodies of farmworkers.

The Pacific Northwest Center is developing a trainers' manual directed at professionals such as agricultural extension agents and enforcement staff. Myron Shenk, pesticide extension agent with Oregon State University in Corvallis, uses a classroom version of the tracer technique in his pesti-

cide applicator training and certification courses, which he says is "extremely effective" as a teaching tool. Shenk coats an apple with a thin residue of fluorescent tracer, passes the apple around the room, then illuminates the hands of trainees with the black light. Their reaction is often one of surprise, he says.

Dr. Fenske and Dr. Matt Keifer of the Occupational and Environmental Medicine program traveled to Vietnam in March to teach a five-day course on prevention of pesticide poisoning for that country's National Institute for Occupational and Environmental Health. Most of the 30 students were preventive medicine physicians from provinces throughout northern Vietnam.

This spring, Dr. Fenske and Project Coordinator Emily Allen launched a study of licensed pesticide applicators who work with turf and ornamental plants in the Puget Sound area. They will survey workers before and after the fluorescent demonstration to test their knowledge, attitudes, beliefs, and practices related to chemical exposure and protective clothing. At the end of the growing season, a follow-up questionnaire will determine any sustained changes in workers' attitudes, beliefs, or practices.

Responses to the follow-up questionnaire will be compared with the baseline test to determine the impact of the teaching technique. "We have found that the tracer technique can be a powerful educational tool, and that it is well received by applicators, extension agents, and growers," Dr. Fenske said. "Where we have demonstrated the technique, we have seen a lot of enthusiasm for it." ■

This farmworker was using personal protective equipment (hat, goggles, respirator), yet the ultraviolet photograph at the right shows skin that was exposed to pesticides



Richard Fenske; Courtesy of the Pacific Northwest Agricultural Safety and Health Center

Seattle's boom in construction and remodeling has exposed a new population to one of the oldest known occupational hazards—silica.

A cottage industry has sprung up to custom-make stone countertops for high-end kitchens. Industrial Hygienist Nancy Simcox of the Field Research and Consultation Group has been working with countertop makers and the Washington State Department of Labor and Industries' (L&I) compliance and consultation groups to help small businesses control exposures to silica.

The UW and the two branches of L&I have been working in parallel on the emerging hazard in the stone countertop industry. They pooled their knowledge and will soon publish their research findings. The collaboration helped make Washington one of the first states with an emphasis program targeting specific industries such as countertop makers.

COMMON BUT DANGEROUS

Silica is as common as rock and sand. People who work in its dust may be unaware of the hazard, according to the Occupational Safety and Health Administration's Special Emphasis Program (SEP). Silica dust can be so fine that particles reach the deepest parts of the lung. Lung tissue reacts to the trapped particles by developing fibrosis, a scarring that makes breathing difficult and increases the risk of tuberculosis. The lung damage is irreversible.

The disease is entirely preventable, yet compliance inspectors found workers in some shops shaping stone with little—if any—control, said Jeff Leons, industrial hygiene compliance supervisor for the Washington Industrial Safety and Health Act (WISHA) division of L&I.

Education was needed. When L&I did a series of workshops on silica a year and a half ago, Leons said, the agency found a significant variation in knowledge of the hazards of silica among exposed individuals and employers. "Some were very well informed and some didn't know anything."

SAFER METHODS

Between them, the Field Group and WISHA

worked with six stone fabrication companies. Their sampling found that craftsmen who worked the granite dry routinely exceeded the state's permissible personal exposure levels for silica. In shops that cut granite wet, exposures were significantly lower. Wet processes are a well-known control method for silica dust, yet conversion isn't always easy for small businesses.

Skilled workers told researchers that it was harder to make precision cuts because they couldn't see the stone as well through spraying water. They were concerned about working in rain suits, rubber boots, and gloves. Some shops needed to be retrofitted with floor drains and properly grounded electrical equipment to allow wet cutting. Several wet methods were tried, depending on the needs of the business.

Leons said he would rather train stonecutters to use wet methods than try to protect them from the dust generated by dry cutting. He said wet-cutting retrofits would be less costly than the type of ventilation system needed to remove the high-velocity dry particles generated by power saws and grinders. "In industrial hygiene, it is always best to control exposure at the source," he said. "Personal protective devices such as respirators should be the last—not first—line of defense. We know that wet methods work to significantly reduce silica exposure in this industry."

A COOPERATIVE VENTURE

The Field Group and L&I will share their work with peers when their paper is published in September in a national journal, *Applied Occupational and Environmental Hygiene*. Simcox was pleased with the way the Field Group and the two WISHA branches joined to address an immediate hazard. Team members were able to work with individual businesses on solutions tailored to their situation. "We were able to explore several different wet control methods," she said. The Field Group's research was incorporated into WISHA's hazard alert, which went to workers and employers throughout the state. The result was early warning—and potentially early prevention—for Washington State stonecutters.



Workers who cut granite dry routinely exceeded the state's permissible personal exposure levels for silica



Photos: Nancy Simcox

Wet cutting methods significantly reduce silica exposure

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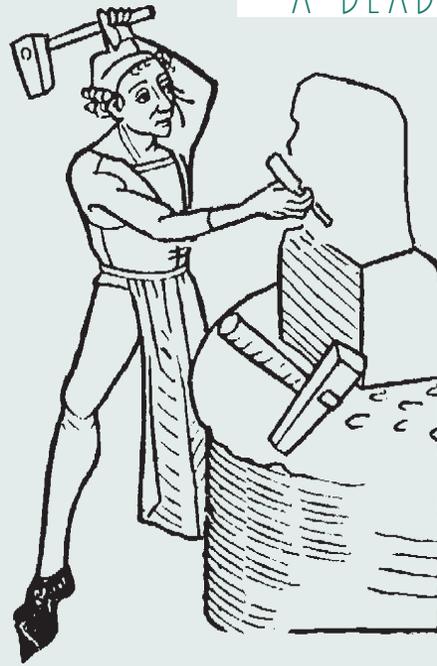
FIELD GROUP SOLVES PROBLEMS

Solving problems is a big part of the job for the Field Research and Consultation Group, one of the Department's service units. The Field Group is available to provide information, measure exposures, and recommend and evaluate solutions to workplace health and safety problems. Small or underserved businesses are a high priority.

The services are provided without charge through funding from the state's Industrial Insurance Medical Aid and Accident funds.

To contact the Field Group, call (206) 543-9711 or e-mail frcg@u.washington.edu. The web site is <http://weber.u.washington.edu/~frcg/>.

A DEADLY HISTORY



Ancient Greek stonecutters got it. So did Baroque and Renaissance sculptors. Silicosis is one of the oldest known occupational diseases. Recorded cases date back before Christ. Hippocrates, Pliny, Agricola, and Paracelsus described it. At various times it has been called dust or grit consumption, ganister disease,

grinders' asthma, miner's phthisis, potter's rot, and stonemason's disease.

In 1713, Bernardino Ramazzini, considered the founder of occupational medicine, wrote, "We must not underestimate the maladies that attack stonecutters, sculptors, quarrymen, and other such workers. When they hew and cut marble underground or chisel it to make statues and other objects, they often breathe in the rough, sharp, jagged splinters that glance off." Ramazzini cited the work of an earlier medical scholar, Isbrand van Diemerbroeck, who said autopsied lungs of stonecutters contained "so much sand that cutting through the pulmonary vesicles felt like cutting a body of sand."

Research in the 19th and early 20th centuries found that silica disease was caused by the smallest quartz particles—sharp-edged, insoluble, and less than a micron in diameter. Several incidents in the 1930s—most notoriously a tunnel construction project at Gauley Bridge, West Virginia, that killed 476 workers—prompted federal standards and education. Public awareness was so high that a 1938 Hollywood movie, *The Citadel*, used silicosis as a plotline.

Since then, silicosis has faded from the headlines and today many people are unaware of the hazards of working with granite. "There is no reason at all for any workers to suffer from silicosis," then-Secretary of Labor Robert Reich said at the beginning of a 1996 educational campaign. "Sixty years ago, Labor Secretary Frances Perkins launched a nationwide effort to tackle the problem of silicosis," he said. "I am determined to finish the job she started."

Today, UW and federal and state agencies are trying to bring public awareness of silica hazards back to where it was 60—or even 2,000—years ago.

University of Washington faculty played leading roles at the annual meeting of the Society of Toxicology, held in March in New Orleans.

Professor *David Eaton* was elected vice president-elect of the Society. He is on track to become vice president next year and president the following year. Dr. Eaton addressed the Undergraduate Education Program for Minority Students and Science Advisors with a special toxicology lecture, "How Chemicals Interact in the Body" and participated in a program for educators, "Paracelsus Goes to the K-12 Classroom."

Marina Cofer-Wildsmith, program coordinator of the *HERE@UW* program, also assisted in planning the conference's program for educators. She and Information Specialist *Anne Harrington* staffed an exhibit that demonstrated education projects from around the country, including curricula developed at the UW.

Research Coordinator *Julie Hill* also participated in the Paracelsus program, demonstrating environmental health sciences curricula funded by the National Institute for Environmental Health Services.

William (Robbie) Robertson, MD, of the UW medical faculty was awarded one of two honorary memberships in the Society this year. Founder and director of the Washington Poison Control Center, he has been president of the American Society of Poison Control Centers. He is board certified in medical toxicology as well as pediatrics.

The following Department of Environmental Health faculty and graduate students presented papers at the conference:



Professor Dave Eaton

W.F. LI, L.G. COSTA, D.M. SHIH, A.J. LUIS AND C. E. FURLONG PON1-Knockout Mice are Highly Sensitive to Chlorpyrifos-oxon and Diazoxon Toxicity.

H. LU, M. GUIZZETTI AND L.G. COSTA Role of Protein Kinase C Activation in Lead Acetate-induced DNA Synthesis in 132 1N1 Human Astrocytoma Cells.

E.J. KELLY, C. SENGSTAG AND D.L. EATON Expression of Human Microsomal Epoxide Hydrolase Protects Against Aflatoxin B1-Induced Genotoxicity in Yeast Co-Expressing Human CYP1A Enzymes.

T.K. BAMMLER, S.J. THOMPSON, E.P. GALLAGHER, C. SENGSTAG, D.H. SLONE, R.L. HAINING, A.E. RETTIE AND D.L. EATON Aflatoxin B1 Oxidation by Human Cytochromes P450 CYP1A1, 2A6, 2C8, 2C9, 2C18 and 2C19.

C-H WANG, T.K. BAMMLER, E.J. KELLY AND D.L. EATON A MU-class Glutathione S-Transferase (GST) is Responsible for Hepatic Cytosolic Aflatoxin B1-8, 9-Eoixude (AFBO) Conjugating Activity in the Non-Human Primate.

D. BOTTA, C.C. WHITE, C.M. KREJSA, R.H. PIERCE, N. FAUSTO, D.L. EASTON AND T.J. KAVANAGH Effect of Overexpression of Glutamate-cysteine Ligase on TNF and Actinomycin-D-Induced Apoptosis in HEPA-1 Mouse Liver Cells.

T.A. LEWANDOWSKI, J.L. SCHROEDER, R.A. PONCE, S.M. BARTELL AND E.M. FAUSTMAN *In Vivo* Determination of Cell Cycling Rates in Embryonic Rat Neural Cells: Development of a Biologically-Based Toxicodynamic Model for Methyl Mercury Risk Assessment.

S. LU, S. KIRCHNER AND E.M. FAUSTMAN MEHG-Induced Changes in Mitochondrial Transmembrane Potential and Mitochondrial Mass in Rat Embryonic CNS Cells.

M.R. GARRY, M. VREDEVOOGD AND E.M. FAUSTMAN Gene Expression as a Potential Biomarker of Inorganic Mercury Exposure in Terrestrial Ecosystems.

J.W. YAGER, S.C. KIRCHNER, T.J. KAVANAGH AND E.M. FAUSTMAN Gene Expression Analyses in Uroepithelial Cells from an Arsenate Exposed Worker Population.

M.A.C. MENDOZA, Y.C. OU, S. HONG AND E.M. FAUSTMAN A P53-Independent Methylmercury Induced G2/M Arrest.

A.J. JABBOUR, J.A. HILL, R.A. PONCE, K.B. ERTLE, T.J. KAVANAGH, L.S. NEWMAN, T.K. TAKARO AND E.M. FAUSTMAN A Flow Cytometric Method to Screen for Beryllium Sensitization.

U. LUDERER, T.J. KAVANAGH, C.C. WHITE AND E.M. FAUSTMAN Gamma Glutamate Cysteine Ligase (G1C1) Activity and Expression During the Estrous Cycle in the Rat Ovary.

S. SHI, S. LU, D. BOTTA AND T.J. KAVANAGH Growth Rate and Effects of Methyl Mercury on Survival Rate and Mitochondrial Transmembrane Potential in HEPA-1 Cells Overexpressing Glutamate-Cysteine Ligase.

B.C. KROVAT, J.H. TRACY AND C.J. OMIECINSKI Fingerprinting Cytochrome P450 and mEH Gene Expression in Human Leukemia Cell Lines.

F.M. FARIN, S. QUIGLEY, Y. HITOSIS, C.L. KEENER, J.R. WALKER AND C.J. OMIECINSKI ELISA-Based Oligonucleotide Ligation Assays for the Detection of Single Nucleotide Polymorphisms (SNPs) in Biotransformation Enzymes.

J.S. SIDHU AND C.J. OMIECINSKI Insulin-Mediated Modulation of Cytochrome P450 Gene Induction Profiles in Primary Rat Hepatocyte Cultures.

N.B. BECK AND C.J. OMIECINSKI Lack of Involvement of cAMP and PKA in the Phenobarbital (PB) Mediated Induction of the Rat Cytochrome P450 (CYP) CYP2B Genes in Primary Hepatocyte Cultures.

B.G. NICHOLS, J.Q. KOENIG, J.S. WOODS AND D.L. LUCHTEL Effects of Ozone Exposure on Cytokine Expression in Human Nasal Epithelial Cells.

K.T. RUMMEL, B.M. ADAIR, G.P. COBB, J.S. WOODS AND M.J. HOOPER Porphyrin Profiles and Chelator Challenge Response after Methyl Mercury Exposure in Voles.

S.D. PINGREE, P.L. SIMMONDS AND J.S. WOODS Effects of 2,3-dimercapto-1-propane-sulfonate (DMPS) on Tissue and Urine Mercury (Hg) and Porphyrin Levels in Methyl Mercury-Exposed Rats.

F.J. DIEGUEZ-ACUNA AND J.S. WOODS Inhibition of NF-k B-DNA Binding by Mercuric Ion (Hg²⁺): Effects of Thiol *versus* Non-Thiol Reductants on Hg²⁺ Inhibitory Capacity.



Associate Professor *Tom Burbacher* has been asked to be a member of a National Academy of Science review of methylmercury.

Former Editor *Pat Coburn* had a poem chosen for Metro Transit's Poetry Bus Project. The theme of this year's competition was "Paint Me a Poem: A Canvas of Words." Pat's poem, "The Cut-Outs of Henri Matisse," can be viewed on-line at <http://transit.metrokc.gov/bus/poetry/matisse.html> and will appear in the advertising space on selected Metro buses.

Professor *Dave Eaton* is part of the new leadership team for the School of Public Health and Community Medicine. Dean *Patricia Wahl* appointed him associate dean for research. Wahl, a biostatistics professor and associate dean since 1985, was named in February to succeed *Gilbert S. Omenn*, now executive vice president for medical affairs at the University of Michigan. Wahl created two associate dean positions to expand the services provided by her office. Professor *Fred Connell* of the Department of Health Services was named associate dean for academic affairs.

Public Information Specialist *Kris Freeman* received a media fellowship from the Institute for Science Training and Research, Inc., to attend a course in "Biotechnology for Professionals." She also has been accepted to the Master of Science program in Technical Communications (College of Engineering) and will begin classes part-time this fall.

Norm Herdrich, Pacific Northwest Agricultural Safety and Health (PNASH) Center's outreach coordinator for farming, has been appointed to a three-year term on the board of the Spokane Ag Expo, a yearly trade show. Herdrich and Program Coordinator *Marcy White* represented PNASH at the 64th annual Logging Safety Conference in Reno, Nevada, in early May, emphasizing PNASH's involvement with the health and safety problems of woodlands and sawmills.

Research Scientist *Thomas Moate* recently returned from Mexico City where he taught a 40-hour short course on pesticide chemistry. Most students were from Mexico, but some came from Nicaragua, Costa Rica, and Ecuador. They included medical students, state health officials, and public health researchers.

Assistant Professor *Zhengui Xia* received the prestigious Burroughs Wellcome New Investigator Award in

Toxicology. The award recognizes new toxicology researchers of exceptional promise and will provide three years of additional support for her research. Dr. Xia is one of only five faculty members in the nation so honored.

FIRST GRADUATES

This spring, the Occupational Safety and Health Administration (OSHA) Education Center graduated its first class in the Safety & Health Specialist Certificate Program. Graduates came from companies and agencies throughout Washington and Oregon: *Scott S. Buley*, High-Tech Turf, Boring, Ore.; *Lee Burki*, Tacoma Public Utilities; *Charles L. Byrd III*, Department of the Air Force, Portland, Ore.; *Donna Hoskins*, Immunex Corp. Seattle, Wash.; *Timothy J. Matthews*, Good Samaritan Hospital, Spanaway, Wash.; *Elaine Parks*, Enumclaw, Wash.; *Rebecca L. Repp*, Physician's Insurance, Seattle, Wash.; and *Paris Um*, Tacoma Public Utilities.

GOODBYE PAT HELLO KATHY

With regret we announce that *Pat Coburn* will no longer be writing and editing *Environmental Health News*. She has left us and moved to Port Townsend. In her short tenure as editor, Pat enlivened the newsletter with her clear writing, compelling photographs, and essays on the literary and historical aspects of environmental and occupational exposures. We wish her well.

The new senior writer and editor, *Kathy Hall*, took Environmental Health and Epidemiology courses in the mid-1980s as part of her graduate studies in the School of Communications. She received her master's degree with a specialty in Environmental Health.

Since then, she has been technical editor for an environmental consulting firm and, most recently, senior editor at the King County Department of Transportation. In addition to editing *Environmental Health News*, she coordinates the Department's web site.



Q & A

Q. I glanced at the article in the winter 1999 issue about mercury associated with dentistry. It reminded me of a question that came up recently here in Lewis County: Is there any known problem for either teeth or bones associated with the drinking of distilled water?

—James Goode, Chehalis, WA

A. Here are the issues I can think of:

- Reduced intake of minerals such as calcium and magnesium. This is unlikely to be a problem unless diet is deficient.
- Lack of fluoride. Potential increase in dental caries, especially in children.
- There is an unexplained statistical association between softened water and heart disease. This may have something to do with substitution of sodium for calcium and magnesium, lack of the latter, or some other factor, such as leaching of plumbing materials by the relatively “aggressive” softened water. Since distillation removes minerals, but does not add sodium, and distilled water is delivered in bottles, not pipes, the effect may or may not be germane.
- Boring taste.
- As far as leaching of teeth and fillings goes—the basic idea sounds plausible, but I have never heard of a study of such phenomena and can’t tell you whether contact time is adequate to have a significant effect.

—John C. Kissel, PhD, PE

Associate Professor,

Department of Environmental Health

University of Washington

Another suggestion is for parents to tell the dentist if the child drinks deionized water, so fluoride treatments can be done in the dentist’s office.



STUDENTS CONTRIBUTE TO SOLUTIONS

Student Research Day on May 21 introduced the research being done by the Department’s graduate students. The topics were as varied as the department’s programs and featured several solution-based approaches. Here is a sampling:

CHILDREN’S EXPOSURES TO PESTICIDES

Denise Koch, MS in Technology, conducted a yearlong biological monitoring study of pesticide exposure among children at a clinic in the farming community of Wenatchee, Washington. She monitored levels of pesticide metabolites in children’s urine. Preliminary results show higher concentrations in winter and spring for some metabolites and suggest higher concentrations among boys.

Dianne Knutson, MS in Industrial Hygiene, surveyed pesticide exposure among children in nonagricultural communities. About 100 children 2 to 5 years old were recruited through medical clinics in the Seattle suburbs of Tukwila and Woodinville. Urine samples were collected from each child in spring and fall of 1998 and parents were interviewed about home pesticide use. In Tukwila, pesticide levels were higher in the fall and, in Woodinville, in the spring. She found little age correlation.

OCCUPATIONAL NOISE EXPOSURE

Kyle Ren, MS in Industrial Hygiene, studied noise exposure among electricians in the construction industry. He collected 174 samples over four months. More than 24% of the samples exceeded the state’s allowed personal exposure level of 85 dBA; 5.2% exceeded the more lenient federal standard of 90 dBA. Pneumatic power tools, power-actuated tools, and the hand hammer produced the highest exposures. The electricians knew their environment was noisy, yet they used hearing protection only 14.5% of the time. Results indicate electricians are at risk of developing noise-induced hearing loss, their exposures are affected by adjacent activity, and engineering controls can reduce exposure levels. Younger workers had the highest exposures.

AIR SAFETY

David Canton, a Coast Guard commander and flight surgeon, and MPH candidate in Occupational and Environmental Medicine, analyzed Coast Guard aircraft accidents between 1993 and 1997 for potential risk factors. The two types of flights with the highest accident risk were night flights and flights whose mission was to resupply lighthouses or other remote sites.



STUDENT RESEARCH DAY—21 MAY 1999

ARNOLD BUNYAVIROCH	The Relative Influence of Hearing Impairment Determination Parameters (<i>Occ Med, William Daniell</i>)
DAVE CANTON	An Analysis of United States Coast Guard Aircraft Mishaps Between 1993 and 1997 for Potential Risk Factors (<i>Occ Med, Matthew Keifer</i>)
SANDERS CHAI	Perceptions on Pediatric Environmental Health: A Needs Assessment Survey Questionnaire (<i>Occ Med, Scott Barnhart</i>)
GOLAN KEDAN	Comparison of Estimated Aggregate Exposure to Organophosphate Pesticides with Biomonitoring for Urinary Dialkylphosphate Metabolites Among Children (<i>Tech, Richard Fenske</i>)
DIANNE KNUTSON	Surveillance of Organophosphate Pesticide Exposure Among Children Living in Non-Agricultural Communities Using Urinary Dialkylphosphate Measurements (<i>IHS, Richard Fenske</i>)
DENISE KOCH	Longitudinal Biological Monitoring Study of Organophosphate Pesticide Exposure Among Central Washington State Children (<i>Tech, Richard Fenske</i>)
DAVID MAYFIELD	<i>In Utero</i> Effects of Methylmercury on Vision and Hearing in Non-human Primates, <i>Macaca fascicularis</i> (<i>Tox, Thomas Burbacher</i>)
MARIA AILEEN MENDOZA	Effect of p21 and p53 Expression on Cell Cycle in Methylmercury-treated Mouse Embryonic Fibroblasts (<i>Tox, Elaine Faustman</i>)
BRIAN NICHOLS	Effects of Ozone Exposure on NF-kB and TNF- α Expression in Human Nasal Epithelial Cells (<i>Tox, Jane Koenig</i>)
STEPHANIE PINGREE	Effects of 2,3-Dimercapto-1-Propane-Sulfonate (DMPS) on Tissue and Urine Mercury (Hg) and Porphyrin Levels in Methylmercury-Exposed Rats (<i>Tox, James Woods</i>)
JOSH PORTON	The Effects of Temperature on the Permeation Behavior of Selected Glove Materials by Mixtures of Methyl Ethyl Ketone and Toluene (<i>IHS, Michael Morgan</i>)
KYLE REN	Noise Exposure to Electricians in the Construction Industry (<i>IHS, Noah Seixas</i>)
MICHAEL ROSATO	Multiparameter Analysis of Surface Receptor Expression and Cell Cycle Progression in Peripheral Blood Lymphocytes (<i>Tox, Elaine Faustman</i>)
SHENGLI SHI	Effect of Increasing GSH Synthesis on Growth Rates and Resistance of HEPA-1 Cells to Oxidants (<i>Tox, Terrance Kavanagh</i>)
SUE SWAN	Noise Monitoring and Hearing Conservation Program Assessment for a Pilot Project Study (<i>IHS, William Daniell</i>)
DEBRA WINTERTON	Polymorphisms as Biomarkers of Sensitivity to Inhaled Sulfur Dioxide in Subjects With Asthma (<i>Tech, Jane Koenig</i>)
EVA WONG	Use of Children's Activity Patterns in Dermal Soil Exposure Assessment (<i>Tech, John Kissel</i>)
GRADUATE PROGRAMS	Industrial Hygiene and Safety (<i>IHS</i>), Environmental Health Technology (<i>Tech</i>), Toxicology (<i>Tox</i>), Occupational and Environmental Medicine (<i>Occ Med</i>). Faculty preceptors are in parentheses.

To confirm this schedule or find more information about these courses, call (206) 543-1069, or visit the Continuing Education home page on the Web at <http://depts.washington.edu/envhlth/conted.html>. Courses are in Seattle unless noted.

NW CENTER—OCCUPATIONAL HEALTH & SAFETY

- July 19-26 Hazardous Substance Summer Institute
- Sept 13-15 Non-Ionizing Radiation (*Portland*)
- Sept 20-22 Hazardous Materials Incidents: Improving Inter-agency Response (*Bellingham*)
- Sept 24-25 Children and the Environment: Parental Concerns
- Oct 13-14 Making a Business Case for Health & Safety (*Portland*)
- Oct 19 Improving Safety & Health: Learning from Programs that Work
- Nov 1 Radiation Risk Communication: Implications of New Thyroid Disease and Fallout Data (*Richland*)
- Nov 17 Workplace Violence

OSHA TRAINING INSTITUTE EDUCATION CENTER

- June 21-24 OSHA 521: OSHA Guide to Industrial Hygiene (*Portland*)
- July 12-15 OSHA 600: Collateral Duty Course for Other Federal Agencies
- July 19-22 OSHA 500: Trainer Course in OSHA Standards for the Construction Industry (*Portland*)
- Aug 16-19 OSHA 204A: Machinery and Machine Guarding Standards (*Portland*)
- Aug 23-26 OSHA 501: Trainer Course in OSHA Standards for General Industry (*Portland*)
- Sept 15-17 OSHA 502: Update for Construction Industry Outreach Trainers
- Sept 20-22 OSHA 503: Update for General Industry Outreach Trainers
- Sept 27-30 OSHA 501: Trainer Course in OSHA Standards for General Industry
- Oct 11-14 OSHA 521: OSHA Guide to Industrial Hygiene
- Nov 15-18 OSHA 510: Standards for the Construction Industry (*Portland*)

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