



Bridges

JUNE 2009

URBAN PLANNING MEETS PUBLIC HEALTH



Photo courtesy of Seto Research Group

Developers in the San Francisco Bay Area face a new planning review process gaining favor among local government agencies: Health Impact Assessment (HIA).

With roots in traditional environmental impact assessment, HIA is a collaborative approach to decision-making where government, academics and community groups study the cumulative health impacts of proposed policies, plans or projects to improve individual and community-level health and decrease health disparities. It offers a broader and more participatory approach to considering health impacts than traditional risk assessment.

Edmund Seto, COEH researcher and lecturer in Environmental Health Sciences at UC Berkeley, says HIA is well recognized internationally, but the discipline has existed for only five years in the U.S.

In 2006, Seto and COEH alumnus **Rajiv Bhatia** co-founded the UC Berkeley Health Impact Group to practice and teach HIA methods. The Group is now a part of the larger San Francisco Bay Area HIA Collaborative that includes leaders from City and Regional Planning at UC Berkeley, San Francisco's Department of Public Health and a non-profit community organization called Human Impact Partners. "We've come together to promote the practice through research, education, mentorship and collaboration on case studies," said Seto.

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Science and Policy Revisited



John R. Balmes

In 2007, I wrote in *Bridges* about how science was being ignored by top policymakers in the Bush administration. Now the role of science in public health policy is again at risk. In California, the Office of Environmental Health Hazard Assessment (OEHHA) has been slated for elimination. I'll share more details later. The specific example I cited in 2007 was how the Bush administration had changed the U.S. Environmental Protection Agency's (EPA) approach to the setting of national ambient air quality standards to try to marginalize the recommendations of the Clean Air Scientific Advisory Committee (CASAC), a panel of air pollution scientists charged with reviewing the knowledge base on the health and welfare effects of criteria air pollutants.

In the past, CASAC had always had the opportunity to review the final recommendations of EPA staff to the EPA Administrator about how any given air quality standard should be set. Bush's last EPA Administrator, Stephen Johnson, ignored the advice of CASAC on setting a new, more health-protective annual particulate matter (PM) air quality standard on the grounds of "scientific uncertainty." He did this despite the fact that CASAC had reviewed the published literature, as was its charge, and concluded that the data strongly supported a lowering of the permissible concentration of PM to pre-

vent deaths and hospitalizations due to cardiopulmonary disease. Administrator Johnson again ignored CASAC's advice when he set a new air quality standard for ozone.

The politically appointed management of U.S. EPA decided to eliminate the so-called Staff Paper that CASAC had traditionally reviewed as part of the standard setting process, which was designed to ensure that final policy recommendations to the Administrator were soundly based on scientific evidence. The Bush "politicos" eliminated the Staff Paper in favor of an Advance Notice of Proposed Rulemaking (ANPR) that was released for public comments before the Administrator made his decision. In effect, the ANPR marginalized scientific input to air quality standard setting by giving anti-regulatory industry groups as much influence on the final recommendations as what a review of the scientific evidence showed.

I am happy to report that the new EPA Administrator, Lisa Jackson, has decided to eliminate the ANPR and return to the traditional Staff Paper approach to implementation of the Clean Air Act, thereby restoring scientific integrity to the process. She is also expected to grant the waiver that California has been seeking under the Clean Air Act to implement the provisions of Assembly Bill 1493, authored by Fran Pavley, which limits greenhouse gas emissions in automobile exhaust. The Bush administration had refused to grant this waiver based in part on the argument that California had failed to demonstrate "extraordinary and compelling" circumstances to justify stricter carbon emission rules than those created on the federal level (despite the absence of federal greenhouse gas standards). Not only is the waiver for the Pavley rules expected to be issued, but the Obama administration recently announced that it has brokered a deal with California, 14 other states, and major car manufacturers to move toward a national approach to the reduction of automobile greenhouse gas emissions that would extend the impact of the Pavley rules.

It is amazing to see this policy movement now that the scientific evidence for greenhouse gases is accepted by administration leaders rather than rejected or ignored. The science policy leadership team that President Obama has appointed—John Holdren as director of the Whitehouse Office of Science and Technology Policy, Jane Lubchenco as administrator of the National Oceanic and Atmospheric Administration, Steven Chu as Energy Secretary, and Nancy Sutley as head of the White House Council on Environmental Quality—has been called a "dream team" and seems to reflect our new President's desire to make environmental policy based on science rather than ideology.

While good news has been coming from Washington, D.C., about the increased role of science in environmental policymaking, this has not been the case here in California. Because of the state's fiscal crisis, the Office of Environmental Health Hazard Assessment (OEHHA) is on the chopping block. OEHHA, a part of Cal/EPA, is home to a number of top toxicologists and epidemiologists whose mission is to protect public health and the environment by scientific evaluation of risks posed by hazardous substances. The scientists of OEHHA are nationally renowned for their careful reviews of the toxicity of specific chemicals. Because California often leads the nation on environmental policy issues, OEHHA's work has tremendous impact. California is again poised to lead the nation in advancing chemicals policies that hold the promise of a greener and more sustainable chemicals economy through Governor Schwarzenegger's Green Chemistry Initiative. Losing OEHHA would be devastating to this initiative since the state government would then no longer have an objective and expert source of technical information on the toxicity of chemicals to guide critical policy decisions.

I urge all of you who know the high-quality work of OEHHA to support its retention as an independent entity within Cal/EPA.

Pam Tau Lee Honored by San Francisco Board of Supervisors

In March 2009, The San Francisco Board of Supervisors and the Commission of the Status of Women granted **Pam Tau Lee** its Certificate of Honor at a special awards ceremony at City Hall called, Women Making History. Lee, coordinator of public programs at the Labor Occupational Health Program (LOHP), UC Berkeley, was one of 15 women honored for her outstanding service to the people of the City and County of San Francisco.

The Commission recognized Lee for her role in developing the Principles of Environmental Justice drafted at the First People of Color Environmental Leadership Summit in Washington, D.C., and her appointment to the Environmental Justice Advisory Council of the U.S. Environmental Protection Agency.

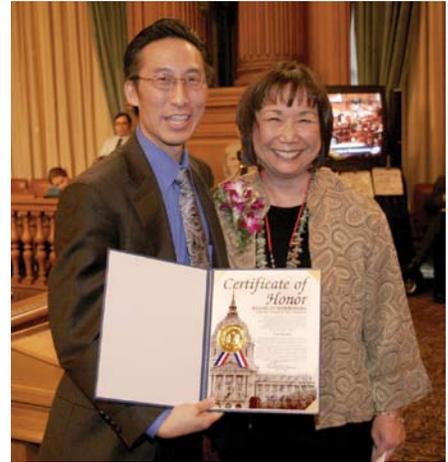
Supervisor **Eric Mar** of the Richmond District said, "You helped lay the groundwork for the Asian Pacific Islander environmental justice movement. Through your work at UC Berkeley's LOHP, you have protected countless immigrant

workers from occupational hazards. You are a role model in the social justice movement. The Board of Supervisors of the City and County of San Francisco extends its highest commendation."

Lee contributed a chapter to a book called, "Asian American Communities and Health: Context, Research, Policy and Action." Her work focuses on historical and cultural influences that helped shaped the roles of Asian Americans in the workforce. It also reviews significant occupational and environmental health hazards that create disparities for Asian Americans in the United States.

Lee is a founding member of the Asian Pacific Environmental Network and a board member for the Alliance of Forest Workers and Harvesters and Just Transition Alliance.

LOHP colleagues **Krishna Corbo**, **Linda Lee**, **Suzanne Teran**, **Valeria Velazquez** and **Elaine El-Askari** were on hand at City Hall to pay tribute to Lee. 🙏



Supervisor Eric Mar with Pam Tau Lee

Paul Leigh Receives NIOSH Director's Award

The National Institute for Safety and Health (NIOSH) awarded COEH faculty member **Paul Leigh** the 2007 Director's Award in October 2008 for his work on developing estimates of the national costs of occupational injury and illness, and his efforts to promote the use of these figures to improve worker safety and health.

Leigh, a professor with the Center for Healthcare Policy and Research at UC Davis, provided testimony on his work to the U.S. House Appropriations Subcommittee on Labor, Health and Human Services, Education and Related Agencies in February 2008. Others have cited his research on the federal government's undercount of nonfatal occupational injuries in congressional testimony, and published in the *Journal of Occupational and Environmental Medicine*¹.

"We are pleased to recognize Dr. Leigh for his work on establishing a scientific method for estimating the true costs of occupational injuries and illnesses to our nation's workers," said NIOSH Acting Director **Christine M. Branche**. "This project highlights the important work being conducted by NIOSH and NIOSH-funded researchers to further the understanding of the hazards faced in the workplace that will help us to focus our work to address the highest research priorities."

The NIOSH Director's Award began in 2005 and is awarded annually to a NIOSH grantee to recognize outstanding scientific research achievement in the field of occupational safety and health that has made a major impact or has the potential of making a major impact on working conditions. The

winner receives an administrative supplement to their NIOSH grant and is invited to share scientific ideas with NIOSH senior leadership and other intramural and extramural scientists. 🙏

Story adapted from NIOSH press release

¹ Leigh JP, Marcin JP, Miller TR. An estimate of the U.S. Government's undercount of nonfatal occupational injuries. *J Occup Environ Med.* 2004 Jan;46(1):10-8.

Urban Planning (continued from cover)

Bhatia, director of Occupational and Environmental Health for the San Francisco Department of Public Health said, “HIA has great promise in the movement for ‘health in all policies.’ What we have been able to do in San Francisco, in collaboration with researchers at UC Berkeley and our local community partners, is to use HIA to shape the design and implementation of land use, transportation and labor standards policy.”

“I don’t think you’ll get any argument that health should be considered in decision-making,” said Seto, “but how should it be considered? Because HIA is relatively new, there are a lot of questions about how to institutionalize the practice.”

“Members of the Collaborative have been developing quantitative and qualitative measurement tools to inform these development decisions,” added Seto. For example, San Francisco developed the Healthy Development Measurement Tool to assess urban planning impacts, employed an air quality dispersion model to assess roadway air pollution hotspots and validated a forecasting model to assess vehicle-related pedestrian injuries. Seto developed the first citywide noise models in the U.S. for the City of San Francisco. They are now being used within the Building Department to decide when new development must undergo an acoustical review.

HIA is more than just tools. Seto identifies two principle values HIA supports. First, public decisions should be health protective and precautionary. Second, decisions should be based on transparent information and be open to public participation. Seto noted that HIA has been a great boon to community groups who have latched on to it as a new way to have input into decision-making.

Seto, along with Bhatia and **Jason Corburn** from the School of Urban Planning, currently offers an inter-disciplinary graduate course in HIA, the only one of its kind in the U.S. In the Spring of 2009, the students analyzed the health



The study team logging air quality measurements throughout San Francisco.

impacts of alternate mitigation strategies to achieve the goals of the 2006 Global Warming Solutions Act, AB32.

Students also conducted a HIA of a highly controversial land-use plan in the Bay Area called the Oak to 9th Ave Project. The City of Oakland addressed issues raised in the student’s report as public comments on draft environmental impact assessment. Oakland has subsequently taken steps to integrate health consideration in neighborhood planning. “I think our students made a difference, in particular, to noise and air quality,” said Seto.

The Centers for Disease Control and Prevention (CDC) awarded UC Berkeley and the Collaborative a grant to train community groups that want to participate in HIA. With their funding, the collaborative is addressing one of the most challenging social, environmental and land use issues in the U.S.—public housing.

They are working with residents from two public housing communities recently redeveloped with federal funds in San Francisco: North Beach Place and Bernal Dwellings. “We wanted to

identify those aspects of redevelopment that either improved or hurt health to develop an evidence base for future redevelopment,” said Seto.

Researchers are investigating displacement, social cohesion, access to youth services, safety and crime, behavioral health issues like physical activity and access to food and green space. They are also considering traditional environmental health issues related to indoor and outdoor air quality and noise.

“The Mayor’s office is coming up with design guidelines for future public housing redevelopment projects,” said Seto. “We want to inform this process with some of the evidence gathered from the two earlier projects.”

“HIA has had a range of direct impacts on projects and policies,” said Bhatia. “Yet more importantly, HIA has been a vehicle for social learning and has led to the day-to-day participation of environmental health staff and the use of cutting-edge environmental health assessment and forecasting tools in land use planning, development project review, street design standards, park and public housing rehabilitation.” 

The Science Behind Catching the Flu

Scientists have yet to prove the most effective non-pharmaceutical method to avoid the flu. However, a new study discovered that four pathways contribute substantially to virus transmission, suggesting effective prevention measures must account for each exposure route.

COEH faculty member **Mark Nicas** from UC Berkeley and alumna **Rachael Jones**, postdoctoral fellow at the School of Public Health, University of Illinois, Chicago, developed a mathematical model to estimate the relative importance of four pathways to the risk of influenza infection: direct contact of cough spray to the mouth, nose, and eyes; the inhalation of small cough particles followed by deposition in the pulmonary region; the inhalation of large cough particles followed by deposition within the bronchial region and upper respiratory airways; and contaminated hand-face touching.

To determine the relative contributions,

the team analyzed a hypothetical scenario where a susceptible person attends to a bed-ridden family member. In the patient's room, the attendant becomes exposed to influenza by touching contaminated surfaces, by breathing virus particles, and by droplet spray.

In 2008, other scientists concluded that the inhalation of respirable cough particles was the dominant form of virus transmission. In contrast, Nicas and Jones found the relative contribution of each pathway is situation-specific and depends on a set of unknown factors, for example, the virus concentration in cough aerosol, the distance airborne particles travel, and the study subject's pre-existing immunity. The article by Nicas and Jones, in press in the journal *Risk Analysis*, noted that several of their input values differed from those assumed in previous studies.

The World Health Organization estimates the cost of influenza epidemics



A high speed photo capturing a sneeze in progress. Photo by Brian Judd, CDC.

to the U.S. economy at over \$70 billion per year. Despite influenza's sizable financial and health implications, the primary route of transmission remains unresolved. "Given the current state of uncertainty," said Nicas, "public health agencies should account for all pathways of exposure and plan accordingly for future pandemics." 🧐

Hookah Smoking: a Dangerous Tobacco Trend

Hookahs, a type of waterpipe originating from India, have long held a place in counter-culture. Hookahs using tobacco have made a recent comeback on university campuses partly because of their perceived safety compared to cigarettes. But a new study has found that, after one hour of smoking, hookah smokers exhale greater amounts of hazardous carbon monoxide (CO) than cigarette smokers with a pack-a-day habit.

Katharine Hammond, COEH faculty member and chair of Environmental Health Sciences at UC Berkeley, conducted the study published in the *Journal of the American Medical Association* with **Wael Noor El-Nachef**, an undergraduate majoring in public health at UC Berkeley.

The team recruited 32 university students from campus organizations associated with hookah smoking. Over three sessions, participants smoked at their usual pace for an hour in a 100-meter square common room. Each hookah contained

10 grams of tobacco and 30 grams of charcoal. Researchers measured the participant's exhaled CO immediately before and after the session and found hookah smokers averaged 42 parts per million (ppm), more than double the amount (17 ppm) reported for pack-a-day smokers.

Despite a decline in cigarette use in the U.S., an estimated 15% of university freshmen currently smoke with a hookah. A random survey of almost 650 students found more than 50% believed hookah smoking was less harmful than cigarette smoking.

"We know that tobacco smoke contains thousands of chemicals," said Hammond. "This study captures one—CO. It is a red flag that tells you there are all kinds of other chemicals going into people's bodies from hookah smoking that we haven't measured."

Hammond and her collaborators from the World Health Organization's Study Group for Tobacco Product Regulation is-

sued an advisory warning against hookah smoking.

Hammond continued her work on this issue with **Sophia Song**, another former undergraduate public health major and a former intern with the COEH Short-Term Educational Experiences in Research in the Environmental Health Sciences (STEER) program, an NIEHS-funded research training program for undergraduate and high school students. They investigated air contaminants in hookah cafes.

"Part of why I wanted to do this work is to get people to pay attention," said Hammond, who calls hookah smoking a 'gateway' drug that can lead to nicotine addiction and cigarette use. The study underscores the need to investigate the health risks of an emerging trend in global tobacco use. 🧐

El-Nachef WN, Hammond SK. Exhaled carbon monoxide with waterpipe use in U.S. students. *JAMA*. 2008; 299(1): 36-a-38.

Health Effects of Traffic-Related Air Pollution

Can traffic-related air pollution play a significant role in your health? The answer is a resounding ‘yes’ according to three compelling studies that suggest occupational exposure, or living near a road with heavy traffic, can worsen chronic illness, contribute to disease onset and lead to premature death.

John Balmes, director of COEH and professor at UCSF and Berkeley, published the first study to explore the link between traffic related air pollution and lung function in adults with diagnosed airway disease in the January issue of the *Journal of Allergy and Clinical Immunology*.

Researchers tested lung function in 176 adults who participated in a larger study of asthma and rhinitis patients living in Northern California. Subjects were interviewed by phone to obtain information about smoking, functional status, family income and other important factors to the study. Body mass index and lung function were measured by nurses at the subjects’ homes. The team also mapped the distance from each subject’s home to the nearest road and highway. Most participants lived closest to a local road or minor collector—the type that leads local traffic to city centers or the freeway.

After controlling for confounding variables, Balmes and colleagues concluded that participants living closest to a roadway had the lowest lung function. The study found a beneficial 2.2% to 2.9% increase in FEV₁% (forced expiratory volume in 1 second) for asthmatics living farthest away from any roadway or highway compared to those living the closest.¹

“People with asthma already have lower lung function,” said Balmes. “Subjects living closest to a road had less than 80% of predicted values for FEV₁, meaning their lung function was below the lower limit of normal. A 3% difference in FEV₁ could put asthmatics at greater risk during an acute attack, which drops lung function another 15% to 20%, because they have a lower reserve.”

In a second study co-authored by COEH faculty member **Ellen Eisen** of Environ-

mental Health Sciences at UC Berkeley, researchers reported a link between lung cancer and vehicle exhaust in trucking industry workers.

Beginning in 1985, the team obtained work records for more than 30,000 unionized truckers from four nationalized companies. They compared these records through the year 2000 to National Death Index mortality data, which lists pre-existing conditions and cause of death.

Adjusting for age, smoking and a healthy-worker survivor effect, researchers found elevated hazard ratios for lung cancer in workers with regular exposure to vehicle exhaust. Further, the longer the trucking career, the greater the risk.

“While we have research that points to traffic-related air pollution leading to asthma onset in kids, our study shows that adults with pre-existing asthma are at risk for chronic respiratory effects. The two mortality studies suggest there is also an increased risk for lung cancer and cardiovascular death.”

John Balmes

The results were similar across the several specific job categories with exposure to traffic, despite different patterns of exposure.

Over 20 years of work, the study reported a 40% increase in the risk of lung cancer for long-haul drivers compared to others in the cohort. For pick-up and delivery drivers and dockworkers, or workers who performed a combination of trucking-related jobs during their career, the risk of death during the 20-year follow-up more than doubled.²

The study, published in the journal *Environmental Health Perspectives*, addressed criticisms of previous research into the association between lung cancer and occupational exposure to vehicle exhaust by better characterizing job profile to the

type of particulate exposure and length of employment in each job.

Job categories included long-haul drivers who travel extended distances between cities, pick-up and deliver drivers who spend time in and out of the truck on local city streets, and mechanics who work with the vehicle engine off and are thereby exposed to less fresh diesel exhaust.

Eisen noted the results were based on job classification and time spent in each job, not on personal monitoring. “Although the results are consistent with the hypothesis that diesel exhaust causes lung cancer, what the jobs with excess risk have in common is exposure to traffic-related air pollution.”

A third study by COEH faculty member **Michael Jerrett** of Environmental Health Sciences at UC Berkeley reported a positive association between NO₂, a marker for traffic-related air pollution, and premature death.

The study included over 2,300 patients from a pulmonary disease clinic in Toronto, Canada. The team placed monitors at 150 locations throughout the city using a geographic model that accounted for pollution variability within the city and population density. They collected air pollution samples for two weeks in the fall of 2002 and spring of 2004. Researchers used the monitored data to estimate exposures and matched participant’s addresses to modeled estimates of NO₂ exposure.

UCSF Opens New OEM Clinical Facility at Mount Zion Campus

After adjusting for age, smoking, neighborhood income, and clinical confounders such as body mass index and FEV₁, Jerrett and colleagues found a 17% increase in the risk of death from all causes and a 40% increase in the risk of circulatory mortality for subjects living in the highest 25th percentile compared to those in the lowest 25th percentile of exposure during ten years of follow-up.³

In December 2008, the California Air Resources Board (ARB) approved a new regulation to significantly reduce emissions from existing on-road diesel vehicles operating in California. The regulation requires affected trucks and buses to meet performance requirements between 2011 and 2023. By January 1, 2023 all vehicles must have a 2010 model year engine or equivalent.

Balmes reported that the diesel regulation will protect public health by reducing the traffic pollution mix, but noted the biggest contributor to traffic-related air pollution remains personal vehicles.

“Bottom line,” said Balmes, “Reducing pollution exposures means driving less and using cleaner burning fuels, which could mean electric vehicles in addition to lower emission combustion engine vehicles.” 🌍

¹Balmes JR, Earnest G, Katz PP, Yelin EH, Eisner MD, Chen H, Trupin L, Lurmann F, Blanc P. Exposure to traffic: Lung function and health status in adults with asthma. *Journal of Allergy and Clinical Immunol.* 2009 Mar;123(3):626-31.

²Garshick E, Laden F, Hart JE, Rosner B, Davis ME, Eisen EA, Smith TJ. Lung Cancer and Vehicle Exhaust in Trucking Industry Workers. *Environ Health Persp.* 2008, 116(10): 1327-1332.

³Jerrett M, Finkelstein MM, Brook JR, Arain MA, Kanaroglou P, Stieb DM, Gilbert NL, Verma D, Finkelstein N, Chapman KR, Sears MR. A Cohort Study of Traffic-related Air Pollution and Mortality in Toronto, Canada. *Environ Health Persp.* Online 2009, doi:10.1289/ehp11533.



The UCSF Medical Center at Mount Zion

Medical Director **Robert Kosnik** is pleased to announce the opening of a new Employee and Occupational Health Services clinic at Mount Zion campus, University of California, San Francisco (UCSF). In February 2009, the clinic moved to the larger facility to expand services to approximately 20,000 employees campus-wide.

Occupational Health Services shares its new space with the UCSF Occupational and Environmental Medicine Multidisciplinary Clinic. OEM faculty physicians, along with a faculty industrial hygienist, diagnose and treat work-related injuries and illnesses. The multidisciplinary clinic provides in-depth evaluations of exposure and disease including a review of the scientific literature, investigation of records, site-visits and testing to evaluate patient health issues.

The medical team offers expertise in toxicology (acute and chronic poisoning); lead, mercury and other heavy metal exposures; pesticide, solvent or other chemical exposures; occupational or en-

vironmental respiratory disease; indoor air quality; drinking water contamination; reproductive toxicants; complex musculoskeletal disease; and pediatric environmental health.

UCSF students receive valuable cross-disciplinary training in occupational and environmental medicine and nursing, industrial hygiene and the Pediatric Environmental Health Specialty Unit.

The expanded site includes additional examination rooms, according to Kosnik, which allow physicians to assist more patients each day. “The bright and modern facility helps us create a positive atmosphere for the care of employees and referred patients,” said Kosnik.

UCSF invites employees and others needing in-depth assessment of occupational or environmental health concerns to call Linda John at 415-885-7580 or email linda.john@ucsf.edu to schedule an appointment. The clinic is located at the UCSF Mount Zion campus, 2330 Post Street, Suite 460, San Francisco. 🌍

Port of Oakland Event Raises Awareness of Diesel Truck Emissions

Physicians, nurses health educators, and graduate students from COEH and the Labor Occupational Health Program (LOHP) joined the Coalition for Clean and Safe Ports to address health risks related to diesel exhaust among Port workers and families living near the Port.

They provided free asthma screening and education at a public health fair organized by the Coalition in February 2009 aiding West Oakland residents and Port of Oakland workers and truck drivers.

The health fair was organized in response to the release of a report by the Pacific Institute and the East Bay Alliance for a Sustainable Economy that said there is an elevated cancer risk among truck drivers, and that one in five West Oakland children living near the Port have asthma.

Truck diesel exhaust pollutes neighborhoods surrounding the Port of Oakland, according to the report, and contributes to premature death, asthma exacerbation, increased cancer risk, and other diseases in the Bay Area at an estimated cost of \$153 million annually to the regional economy.

COEH faculty member **Robert Harrison** spearheaded the Center's effort to help the disadvantaged community.

In addition to Harrison, COEH faculty volunteers from UCSF included **Barbara Burgel, Sarah Jewell, and Gina Solomon. Rachel Roisman**, public health medical officer with the California Environmental Protection Agency, and **Gail Bateson** from the California Department of Public Health, Occupational Health Branch, joined the medical team from UCSF.

Occupational and environmental health nursing graduate students included **Rasheda Jones, Kate Papadopoulos, Lea Glick, Lisa Hartmayer, Christine Gilmore, Maya Armenta and Jen Borden**, along with **Heather Miyashiro** from UCSF's Adult Nurse Practitioner Program, and occupational and environmental medicine fellow **Sherman Jew**.



Gina Solomon, UCSF, addresses media and community members

The students managed patient intake, reviewed health histories and spirometry results, made health care referrals, and offered risk reduction and smoking cessation counseling to approximately 40 workers and residents.

Project manager **Lorraine Martinez** from the Medical Surveillance Program at UC Davis brought the COEH mobile clinic onsite. In addition to donating medical equipment and supplies, Martinez administered pulmonary function tests. Her colleague **Aimee Douillard** managed the flow of patients during the screening.

Pam Tau Lee, Laura Stock, Dinorah Barton-Antonio, Elaine El-Askari and Valeria Velazquez from LOHP, the outreach and education arm of COEH, staffed a booth with educational games designed to raise awareness about health risks drivers and residents may face near the Port.

Representatives from the Alameda County Department of Public Health, Natural Resources Defense Council and Worksafe were also among the volunteers.

The event attracted widespread media coverage in the Bay Area. Stories ran in

the Oakland Tribune and San Francisco Chronicle, and on KQED public radio and NBC 11 and ABC 7 television, among others.

Following the asthma screening, Harrison and Burgel issued a letter to Victor Uno, President of the Board of Port Commission, urging him to move quickly to reduce diesel truck emissions.

In May, the Commission announced plans to develop a comprehensive truck management program, along with stakeholders, to reduce diesel pollution and improve the quality of life for people living and working in and around the Port. 🌱

To contact UC Davis for occupational health services, call 530-752-1281 or visit their website at <http://phs.ucdavis.edu>.

For UCSF's occupational health clinic, call 415-885-7580, or email Linda.John@ucsf.edu.

Taking a Toll: The high cost of health, environmental, and worker impacts of the Oakland Port tucking system. Authors Jennifer Lin, Research Director, East Bay Alliance for a Sustainable Economy and Swati Prakash, Senior Research Associate, Pacific Institute. (www.workingeastbay.org/takingatoll)

Lisa Thompson – Making a Difference

As a family nurse practitioner specializing in asthma care at La Clínica de la Raza in Oakland, California, COEH faculty member **Lisa Thompson** gained insight into the environmental context of illness during home visits to her pediatric patients. Her observations sparked Thompson to begin an investigative journey that led to her PhD in Environmental Health Sciences at UC Berkeley, then to her position as assistant professor in the School of Nursing at UCSF.

While a graduate student, Thompson won COEH's Llewellyn Student Award. She used her \$5,000 to travel to Guatemala where she conducted a pilot project measuring lung function in communities where 90% of households use wood stoves for cooking.

"I knew the ills of tobacco smoke," said Thompson, "but I had never heard of the issue of wood stove particulate matter and how widely it impacts children around the world."

Thompson's skills as a family nurse practitioner and fluency in Spanish helped make her a principal member of RE-SPIRE—a five-year randomized trial in Guatemala led by COEH faculty member **Kirk Smith** from UC Berkeley—that examined the respiratory health of children exposed to high levels of indoor air pollution emitted from biomass cooking stoves.

"Her energy and compassion markedly shaped the direction of the research," said Smith. "It was her ideas, and creativity in implementing them, that allowed the project to expand beyond child pneumonia to include birth outcomes."

Thompson led one of the first longitudinal studies using personal exposure assessment to measure the effects of high CO exposures from biomass smoke on fetal and child growth.

The study enrolled 500 households—half received improved wood stoves and the other half continued to cook with

biomass stoves. Thompson detected an 83-gram increase in birth weight among study infants born to women who used an improved stove during pregnancy.

Carolina Romero Orellana, a project member from Guatemala, describes Thompson as a natural leader. "She always finds ways to support the most affected study communities. She is a person that can make the difference."

In 2008, Thompson received the Henrik L. Blum Award for Distinguished Social Action from the School of Public Health at UC Berkeley for her contribution to two underserved populations—the Latin American immigrant community in the Bay Area and the Native American community in Central America and Peru.

Reports Thompson, "From the beginning, my plan was to return to the field of nursing to educate nurses, both in the U.S. and internationally, about environmental health issues." Her integration of environmental health research and family health made her the top choice for a faculty position in the School of Nursing, which she started in the fall of 2008.

Thompson was recently selected from a UCSF campus-wide competitive search as one of two recipients of the Burke Family Global Health Faculty Award¹, which provides three years of salary and research support. The award, administered through the Global Health Sciences program, will allow Thompson to participate as a faculty member in the GHS graduate program.

Oisaeng Hong, COEH faculty member and director of the Occupational and Environmental Health Nursing Program (OEHN) at UCSF said, "I am excited about Thompson coming to the UCSF School of Nursing. Although she is on the faculty in the Department of Family Health Care Nursing, she contributes to the OEHN program by guest lecturing in the Environmental Health Seminar class, presenting her research at our doctoral research seminar and by participating in our upcoming grant-funded 'Nursing



Lisa Thompson

Faculty Development Workshop in Environmental Health.' I strongly believe the OEHN program will benefit from her solid environmental health expertise."

With funding from an intramural award from the School of Nursing, Thompson will travel to Guatemala this summer to train traditional birth attendants to weigh and measure newborns and assess gestational age. She also plans to conduct community-based, participatory research at La Clínica to address asthma disparities in disadvantaged neighborhoods. 🌱

¹ http://globalhealthsciences.ucsf.edu/news/burke_faculty_award/index.aspx

Wildfire Particulate May Cause More Lung Damage than Other Types of Air Pollution

A series of lightning strikes in June 2008 set off twelve hundred forest fires in Central and Northern California. Asthmatics in the region felt their symptoms worsen as concentrations of particulate matter (PM), the byproduct of burning wood, far surpassed national air quality standards. Now a new study from UC Davis suggests what asthmatics in the region already suspected—wildfire PM may be more toxic than other kinds of air pollution.

COEH faculty member Professor **Kent Pinkerton**, graduate student **Teresa Wegesser** and UC Davis School of Medicine member **Jerold Last** took advantage of the wildfires in June to investigate the relationship between abnormally high levels of wildfire air pollution and its acute health effects.

The team collected coarse (PM_{10-2.5}) and fine (PM_{2.5}) particle samples from a heavily impacted air pollution-monitoring site in Tracy, California, 50 miles east of the Bay Area.

Researchers found particulate measurements peaked during their two-day study period at 381 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$), more than ten times the U.S. EPA's 24-hour PM_{2.5} standard of 35 $\mu\text{g}/\text{m}^3$.

Using mice as a subject model, researchers instilled emulsions of wildfire particulate into the lungs of one group—another group received identical doses of normal ambient air stored from the same monitoring site a year earlier. Each dose was the equivalent of inhaling airborne particulate over a period of two weeks. Researchers analyzed lung tissue samples 24 hours later to see if wildfire particulate triggered a different health outcome.

The lungs of mice exposed to wildfire PM_{10-2.5} or PM_{2.5} showed significant damage compared to mice exposed to 10-fold higher doses of normal ambient air particulate from the same area. According to the study, a hypothetical mouse exposed to wildfire particulate had a relative risk of lung inflammation that was 30 times greater than the risk of inflammation from breathing normal air in the same region.¹



Flames of the Simi Valley fire ravage a Southern California mountain side. Photo by Sgt. Dennis Goff, U.S. Air Force

Wildfire particulate induced changes to the lung's airways and alveoli, the small air spaces in the lungs where oxygen enters the blood. An examination of fluid from the lungs showed an increase in neutrophils and protein as well as other indicators such as edema and a higher number of inflammatory cells.

"Our findings suggest there is something unique about the particles generated from the wildfire that makes them more toxic than ambient air particles that normally arise from multiple sources," said Pinkerton.

The acute inflammatory response to wildfire particulate resolves over time, according to Pinkerton. The body recruits cells into the lungs long enough to clear the particles. Once these cells are absorbed, lung inflammation decreases. "The only problem is if those particles are toxic, they can irreversibly damage those cells that are released in the lungs," added Pinkerton. "With such an event you could potentially have a sustained inflammatory response that may lead to more lasting damage with remodeling of the lung."

A previous health study of the October 2003 wildfires in Southern California found exposure to wildfire smoke was associated with increased eye and respiratory symptoms, medication use and physician visits. While subjects with asthma were heavily affected, those

without asthma experienced high rates of symptoms as well.²

Study author and UC Berkeley alumnus **Nino Künzli**, chair of Social and Preventive Medicine at the University of Basel said, "While results in animals are not easily translated to humans, the novel findings of Pinkerton et al. are in line with the chronic respiratory effects observed among women who use wood fuel for cooking, which results in very high smoke levels indoors." Künzli noted that the study confirms that particles of various sizes and origins have toxicologic properties; therefore, none of the epidemiologic findings on air pollution should be exclusively assigned to one pollutant.

The results of the study emphasize the significance of both the source and composition of toxic air pollution and show wildfire particulate matter has unique health effects. 🌀

¹ Wegesser TC, Pinkerton KE, Last JA, *California Wildfires of 2008: Coarse and Fine Particulate Matter Toxicity. Environ Health Perspec. 2009 June; 117(6): 893–897.*

² Künzli N, Avol E, Wu J, Gauderman WJ, Rappaport E, Millstein J, Bennion J, McConnell R, Gilliland FD, Berhane K, Lurmann F, Winer A, Peters JM, *Health Effects of the 2003 Southern California Wildfires on Children, Am J Respir Crit Care Med, 2006 Dec; 174(11):1221-1228.*

Remembering Gene Darling

The desk of a giant sits empty in the Labor and Occupational Health Program (LOHP). Founding member **Eugene Darling** died unexpectedly on December 7, 2008. His loss resonates in the hearts of friends and colleagues who knew him.

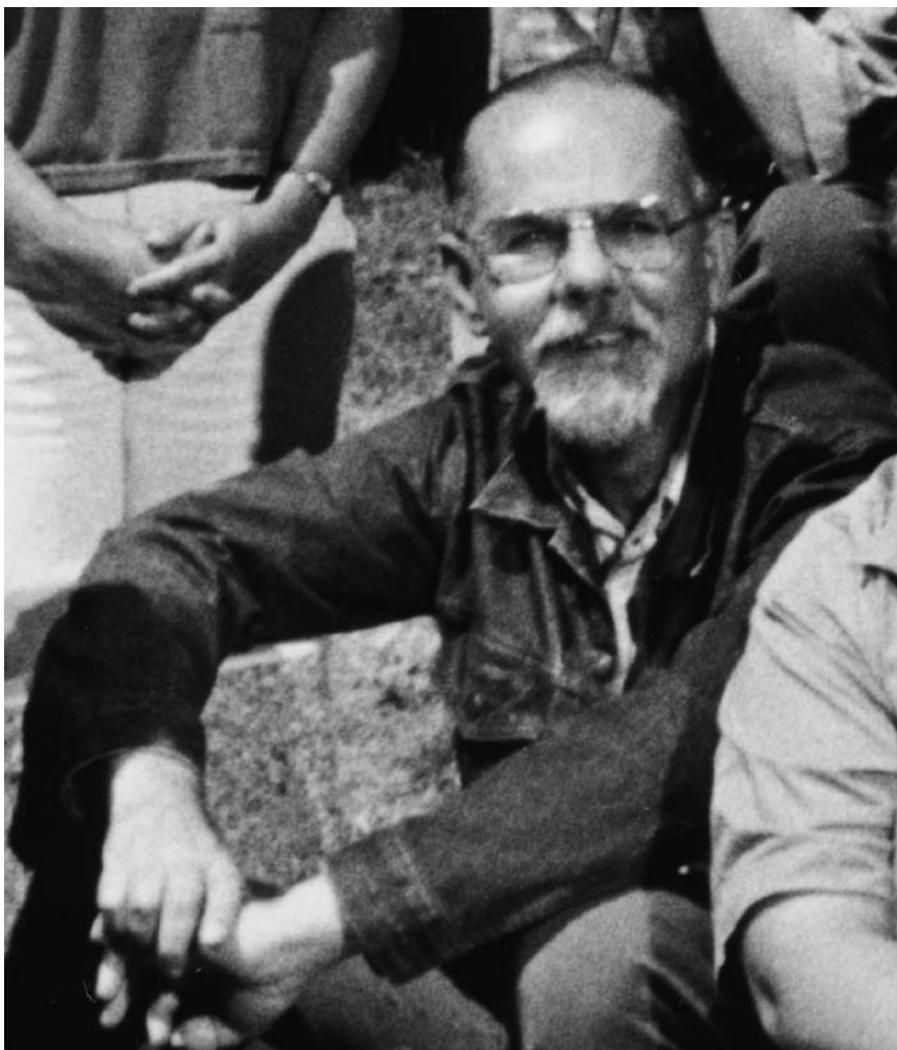
Robin Baker, director of LOHP, described Darling as a renaissance man who was “an integral part of every aspect of the organization.” From the ground up, Darling played a central role in building LOHP into a community outreach program that addresses the health and safety needs of almost every industry in California. LOHP is a critical component of the Center for Occupational and Environmental Health.

Darling began working for the University of California, Berkeley, in 1967. He joined LOHP when its doors first opened in 1974. Hired in a clerical role, he advanced to Principal Editor. Baker credits Darling with creating LOHP’s publications program, authoring resources that became classics for union activists in health and safety including the collective bargaining guide and health and safety committee guide.

Some of Darling’s most valuable skills were self-taught. “He built a personal computer before any of us knew about technology,” said Baker. Darling pioneered LOHP’s first website. “As our tech guru, he modernized the organization every step of the way.”

Darling wore many hats at LOHP, but he excelled best in his final career as Principal Editor. He always knew how to rewrite a phrase with fewer words and was brilliant at translating technical communications into plain language. “He made good copy great,” said **Darryl Alexander**, program director, Health and Safety, American Federation of Teachers.

“We thought we kept him busy pretty much around the clock,” said Baker.



Gene Darling

“Then at his memorial, we found there was a whole other world of people who were dependent on him. It is hard to imagine how he found enough hours in the day to do what he did.”

Darling was a longtime union steward. **Joan Lichterman**, director, Systemwide Health and Safety, UPTE-CWA9119, noted that no matter how busy Darling was at LOHP, he always made time to help University of California unions.

His colleagues remember him as quiet, unassuming, and generous. He was the

go-to person who knew how everything worked at LOHP. “Gene was a walking encyclopedia. His knowledge is irreplaceable,” said his colleague **Cyndi Dunn**. “What I will miss most about ‘Geno’ was his unchanging persona. Anyone who came in contact with him was always welcomed and made to feel accepted.”

The faculty, staff, and students of COEH express their condolence to the friends and family of Gene Darling and the members of LOHP for their loss. 🙏



Protecting workers and communities from occupational and environmental health hazards through teaching, research, and service

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- Educating health professionals in epidemiology, ergonomics, industrial hygiene, medicine, nursing, toxicology, and related fields to be leaders in occupational and environmental health.
- Developing new knowledge through an interdisciplinary research agenda focused on preventing illness and injury.
- Responding to the needs of people affected by hazards in their workplaces or communities, with special attention to vulnerable populations.

Through these activities COEH supports federal, state, and local agencies, health and safety professionals, industry, labor, and community-based organizations in their efforts to prevent occupational and environmental disease and injury.

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