



# Bridges

JANUARY/FEBRUARY 2007

## UC DAVIS RESEARCHERS REVEAL HOW SECONDHAND SMOKE DAMAGES INFANT LUNGS



Photo: Tom Adriaenssen

Scientists have long known that secondhand smoke harms babies' lungs, but recent findings from research using animals at UC Davis are beginning to explain how. Research led by Davis professor of veterinary and pediatric medicine and director of the UC Davis Center for Health and the Environment, Kent Pinkerton, shows in unprecedented detail the physical changes that most likely occur in the lungs of infants and children exposed to secondhand smoke.

"Smoke exposure causes significant damage and lasting consequences in newborns," Pinkerton said. "This research has a message for every parent: Do not smoke or breathe secondhand smoke while you are pregnant. Do not let your children breathe secondhand smoke after they are born."

Pinkerton's research group is one of a few in the nation equipped to study the effects of environmental contaminants on unborn and newborn animals. Their 15 years of studies on mice and rats have yielded greater understanding of how air pollution affects

*continued on page 5*

PAGE 5



PAGE 11



## FEATURES

- 2 Letter from the Director
- 3 Adjustable Chairs Reduce Pain in Workers
- 7 Rossana Segovia-Bain at UCSF
- 8 Steve Rappaport Rejoins Berkeley Colleagues
- 9 How Everyday Products Make People Sick
- 10 What Do You Do with Students with Big Ideas?
- 11 Research to the Extreme By Lia Marshall

# California Leads the Nation with Biomonitoring



John Balmes

An important environmental health issue got a major boost in public awareness last fall when Governor Schwarzenegger signed Senate Bill 1379, creating the nation's first state biomonitoring program. Monitoring biological samples such as blood, urine, and breast milk can be a valuable tool for assessing exposures to harmful chemicals. Data collected through biomonitoring can be used to identify chemicals for which more research or policy measures are needed.

A recent example of how biomonitoring can be used in support of policy involved polybrominated diphenyl ethers (PBDEs). These environmentally persistent chemicals are added to computer plastics, foam products, and commercial textiles as fire retardants. Concentrations of PBDEs were initially shown to be increasing exponentially over time in the breast milk of Swedish women and then in the breast tissue of women in the San Francisco Bay area. These biomonitoring data were sufficiently alarming to

the public that California Assembly Bill 301 was passed. This bill prohibits manufacturing, processing, or distributing any product containing two types of PBDEs (penta and octaBDE) from June 1, 2006 forward.

While the PBDE ban in California can be viewed as a biomonitoring success story, multiple challenges remain concerning the implementation of SB 1379 and the interpretation of biomonitoring data. Multiple members of COEH have been working to meet these challenges.

Amy Kyle has been a leader in the public dialogue about the role of biomonitoring in public health surveillance and policy. She has been working with Martyn Smith and the UC Berkeley Superfund Center to develop methods for translating biomonitoring research findings for policy and stakeholder audiences.

Dr. Smith has been applying new technologies referred to as "omics" (genomic, proteomic, metabolomic) to identify early biological changes that can serve as sensitive indicators of potential health effects resulting from chemical exposures. Combining such biomonitoring of *effect* with biomonitoring of *environmental exposures* could improve our understanding of exposure-response relationships.

Steve Rappaport has long been conducting biomonitoring studies of workers regarding exposures to chemicals such as benzene and polycyclic aromatic hydrocarbons. His collaborations with Martyn Smith have provided a model of how biomonitoring of benzene exposures in occupational settings can be integrated with assessment of sensitive biomarkers of effect

and genetic risk factors to yield a more complete understanding of exposure-response. The challenge is to apply this model to environmental exposures.

Tom McKone has been working to better understand what biomonitoring data mean--what does a given concentration measurement actually tell us about likely exposures to the chemical or risk of adverse health outcomes?

Nina Holland was a member of the National Academy of Sciences Committee on Human Biomonitoring for Environmental Chemicals that issued a report in July 2006, which emphasized the need for both a "consistent rationale for selecting chemicals to be studied based on exposure and public health concerns" and communication of results of biomonitoring studies to the participants. SB 1379 requires that the data collected be made available to the individuals tested. The incorporation of this "right to know" was critical to the proponents of the legislation.

Senate Bill 1379 mandates that the Governor and the legislative leadership appoint a Scientific Guidance Council to advise the Department of Health Services and the California Environmental Protection Agency on how to conduct the biomonitoring program. I hope that COEH's expertise will be represented on this panel by one or more of our members.

John R. Balmes, MD

#### Editor's Note:

Press releases, reports, and other articles on both reports can be found at: <http://coeh.berkeley.edu>

## Adjustable Chairs Reduce Pain in Garment Workers

Garment workers are the focus of a five-year study led by professor David Rempel, colleagues at the University of California at San Francisco, and professor Beate Ritz at COEH's southern California sister center at the University of California at Los Angeles. The group's recent findings suggest that adjustable height chairs with curved, two-part seat pans can significantly reduce neck and shoulder pain in sewing machine operators—and possibly in all laborers engaged in visually intensive manufacturing work.

Garment workers have not been the focus of many studies, despite the fact that they face significant occupational health risks, Rempel explained. “Their work is physically demanding, especially on the upper extremities and neck.”

They typically work in a seated position for hours, using their hands to manipulate cloth or do fine-motor tasks. The work is visually intensive, so workers often lean forward and hold their arms and shoulders up.



Garment worker working in non-adjustable chair

Socio-economic factors also affect their plight, Rempel said. “They are a particularly vulnerable group to help because they are largely an immigrant population without access to health care or workers’ compensation.”

In a pilot study conducted earlier in Oakland, Rempel's group tested several interventions, including a chair they designed, and found that the chair reduced risk factors for shoulder and neck pain better than the other interventions. In addition to being height adjustable, the chair (produced by a local firm) was designed without wheels so that the garment workers could stay seated firmly in place; was upholstered with a breathable cloth over foam, appropriate for the high-temperature environment of the garment shop floor; had no arm supports to interfere with movements; and had a seat pan that slanted slightly downward to support forward-leaning postures.

Because Los Angeles is now the most productive garment producing region in the US, Rempel's team decided to conduct a larger, randomized controlled trial there to verify that the custom-designed chair is better than a conventionally adjustable task chair with a flat seat.

The researchers recruited 277 sewing machine operators with neck and shoulder pain who worked at least twenty hours a week in one of 13 garment shops. All subjects were given miscellaneous items, including tabletop storage boxes for work tools, side tables to manage cloth, and task lamps and reading glasses, all of which they could use or reject at will. They were then randomly assigned to three groups, one with the curved seat chair, one with the flat-seated chair (control group), and one with only the miscellaneous items (placebo group).



The curved seat chair (right) shown next to the flat seat.

Prior to the intervention, the workers provided demographic information, details on their work duties, and an assessment of their current pain. Follow-up questionnaires were administered every month for the duration of the four-month intervention.

“Both adjustable chairs significantly decreased neck pain among the garment workers,” Rempel said. “But the curved chair provided more benefit than the flat chair.” The effect was more prominent in thin workers and those whose workloads involved more hand and arm work. The other investigators on the study were PinChieh Wang, Ira Janowitz, Robert Harrison and Fei Yu.

To evaluate the chair design in other industrial settings, the research group is currently looking for other workplaces with hand intensive manufacturing jobs to study. The chair design studied is not patentable so it can easily be produced by other chair manufactures. 🔄

*David M. Rempel, PinChieh Wang, Ira Janowitz, Robert J. Harrison, Fei Yu, Beate R. Ritz. A Randomized Controlled Trial Evaluating the Effects of New Task Chairs on Shoulders and Neck Pain Among Sewing Machine Operators: Los Angeles Garment Workers Study, "Spine, in press.*

## IARC Working Group Ranks Carcinogenicity of Household Fuel, Frying Emissions

Last October a Working Group of scientists from eight countries, chaired by Berkeley environmental health professor Kirk Smith, met at the International Agency for Research on Cancer (IARC) in France to assess the carcinogenicity of household solid fuel combustion and high-temperature frying. The panel concluded that emissions from household coal combustion are “carcinogenic to humans (Group 1)” and emissions from household wood combustion and high-temperature frying are each “probably carcinogenic to humans (Group 2A).”

About half of the world’s population, mostly in poor countries, use solid fuels for cooking or heating, often in poorly ventilated spaces. Products of incomplete combustion contain respirable particles and many volatile and nonvolatile organic compounds, including carcinogens.

Based on epidemiologic studies, exposure to the combustion products of coal in the workplace is known to cause lung cancer, and now many studies, mostly from China, show similar effects from burning coal in the home, which is backed by animal experiments.

Health effects from exposure to burning biomass fuel have been less well studied, although studies have shown that woodsmoke is mutagenic. Human and animal studies also provide evidence of increased lung cancer risk in people who burn wood or other biomass for cooking, but were insufficient in quality and quantity to put biomass smoke into the highest risk category.

Cooking with oil heated to high temperatures is practiced worldwide. Rapeseed oil heated to high temperatures (>260°C) is carcinogenic in mice and rats. Studies from China and elsewhere in Asia show a positive associ-



Guatemalan woman cooking with a Plancha stove

ation between frying frequency and lung cancer risk. In epidemiologic studies, however, it was not possible to distinguish differences in risk between types of high-temperature frying or types of cooking oil.

The Group’s findings will be published in 2007 as volume 95 of the IARC Monographs.

## Ergonomics Graduate Student Co-Edits Book Medical Instrumentation: Accessibility and Usability Considerations

Doctoral student Molly Follette Story gives new meaning to multi-tasking. In addition to pursuing a PhD in COEH’s Ergonomics Program, she is president of Human Spectrum Design, LLC (which she founded in Santa Rosa in 2002) and co-director of the Rehabilitation Engineering Research Center on Accessible Medical Instrumentation (RERC-AMI), based at Marquette University in Milwaukee. One of 25 national projects funded by the U.S. Department of Education’s National Institute on Dis-

ability and Rehabilitation Research, the mission of the center is to make medical instrumentation more accessible for patients and health care providers who have disabilities.

Now, CRC Press has just released a book she co-edited with RERC-AMI co-director, Jack M. Winters (PhD Bioengineering ’85, UC-Berkeley), which was developed in parallel with a workshop that RERC held at the offices of and in collaboration with the U.S. Food and Drug Administration in October 2005. Authored by authorities from academia, industry, and government, the book describes problems associated with inaccessible medical equipment, presents tools for analyzing equipment usability and accessibility, and discusses considerations for the future. The final section of the book outlines key challenges and knowledge gaps



Molly Follette-Story

identified and recommendations developed by participants of the workshop.

A description of the book is available at CRC Press Online: <http://www.crcpress.com/>

## Davis Researchers Reveal How Secondhand Smoke Damages Infant Lungs (from page 1)

human lungs and health through experiments that attempt to reproduce true exposure conditions to environmental air pollutants.

Pinkerton's group has previously shown that rats exposed to secondhand smoke while in the womb and after birth developed hyper-reactive, or "ticklish," airways, a condition that typically occurs in children and adults with asthma. The rodents' airways remained hyper-reactive even when secondhand smoke exposure stopped—indicating that early exposure created a long-lasting, and perhaps permanent, asthma-like condition.

In the new study reported in the *American Journal of Respiratory and Critical Care Medicine*, the researchers exposed pregnant rhesus macaque monkeys to smoke levels equivalent to those a pregnant woman would be exposed to if someone in her home or workplace smoked. Newborn macaques were exposed to secondhand smoke levels similar to those a human baby would breathe if it was cared for by a moderate-to-heavy smoker.

The researchers found environmental tobacco smoke wreaks havoc in babies at a critical time in the development of lungs, when millions of the alveoli they'll need as adults are being formed. Human infants are born with only about a fifth of the 300 million alveoli they will need as adults; they construct virtually all remaining alveoli between birth and age 8.

In analyzing how alveolar cells react to cigarette smoke, the researchers found the normal process of apoptosis (programmed cell death) had gone haywire. When baby monkeys were exposed to cigarette smoke before and after birth, apoptosis no longer occurred on schedule. Critical cellular controls regulating cell death turned off, and alveolar cells died twice as fast as they should have.

"If you are killing cells at a higher rate during a critical developmental stage, when they are supposed to be proliferating in order to create new alveoli, the lungs may never be able to recover," Pinkerton said.

"The results from this study are further proof that secondhand smoke's effects on children are not minor, temporary or reversible. This is the missed message about secondhand smoke and children," Pinkerton stated. "Parents need to understand that these effects will not go away. If children do not grow healthy lungs when they are supposed to, they likely never will. The process is not forgiving and the children are not going to be able to make up this loss later in life."

The 2006 Surgeon General's Report on secondhand smoke estimates that more than 126 million residents of the United States age 3 or older are exposed to secondhand smoke. Among children younger than 18 years of age, an estimated 22 percent are exposed to secondhand smoke in their home; estimates range from 11.7 percent in Utah to 34.2 percent in Kentucky.

To get the word out to parents about the dangers of secondhand smoke, two states, Arkansas and Louisiana, have made it illegal to smoke in a car with young passengers. In California, a similar bill, AB 379, is currently under consideration in the state Legislature.

Pinkerton's study was funded by the National Institute of Environmental Health Sciences and California's Tobacco-Related Disease Research Program. 🐼

*Cai-Yun Zhong, Ya Mei Zhou, Jesse P. Joad, Kent E. Pinkerton, "Environmental Tobacco Smoke Suppresses Nuclear Factor Kappa B Signaling to Increase Apoptosis in Infant Monkey Lungs," American Journal of Respiratory and Critical Care Medicine, 174:428-436, 2006.*

## UCSF Nursing Centennial: Celebrating 100 Years of Excellence

Nursing at UCSF began in the spirit of renewal after San Francisco's 1906 earthquake. The first teaching hospital of the University of California opened its doors on April 11, 1907, and that same year the Regents approved the University's first nursing education program. In 1939 the Regents established the first autonomous School of Nursing in any state university. "The achievements of the UCSF School of Nursing - our national and world leadership in nursing education, research, and community service, our distinguished faculty and the remarkable accomplishments of our alumni - rose from the ashes of the 1906 earthquake and fire," says Dean Kathleen Dracup, RN, FNP, DNSc. The Nursing Centennial celebrations will honor the school's history, the accomplishments of alumni and faculty, and the leadership of UCSF nurses throughout the world. On Alumni Day, April 28, 2007, UCSF Nursing Press will release *Promise on Parnassus*, the first complete history of the School, authored by associate dean emerita Marilyn Flood. The Centennial celebrations will culminate in June, 2007 with graduation day, a doctoral graduate reunion and symposia, and a black-tie gala at the historic St. Francis Hotel, featuring Rita Moreno.

For updates on the UCSF Nursing Centennial, visit: <http://nurseweb.ucsf.edu/centennial.html>



Photo courtesy of UCSF archives

## Ergonomics Team Recognized for Research Leading to Pain Reduction

### 2006 IEA Liberty Mutual Prize in Occupational Safety and Ergonomics

The International Ergonomics Association and the Liberty Mutual Group selected a scientific paper on a simple workstation modification to receive one of two annual prizes awarded in 2006. Recipients of the award include COEH faculty members David Rempel, Niklas Krause and Robert Goldberg, UCB researchers Mark Hudes and Gary Urbiel Goldner, and Kaiser Permanente collaborator Douglas Benner.

The modification reduced upper body pain and prevented musculoskeletal disorders among customer service workers who use a computer.

The IEA Liberty Mutual Prize recognizes outstanding, original research in the field of occupational safety and health with a cash award of \$5,000. An independent IEA-appointed review committee evaluated all submissions for their contributions to the prevention or mitigation of occupational ac-

cidents or the facilitation of return to work.

“Our findings indicate that employers should consider forearm support and training for workers who use computers for customer service work,” said Dr. Rempel, professor of medicine at the University of California, San Francisco and Berkeley. “We also found that employers could see a full return on the cost of providing arm boards to all employees within 11 months of the investment.”

For more details on the study see the April 2006 issue of Bridges at the COEH web site: [coeh.berkeley.edu](http://coeh.berkeley.edu) (Research/Bridges/Ergonomics).

*D. Rempel, N. Krause, R. Goldberg et al. “A Randomized Controlled Trial Evaluating the Effects of Two Workstation Interventions on Upper Body Pain and Incident Musculoskeletal Disorders among Computer Operators.” Occupational and Environmental Medicine, April 2006.*

## Schistosomiasis Treatments Alone Fail to Stop Reemergence

### Eradication Requires Comprehensive Strategy

In a letter to Science magazine (11/17/06) Robert Spear and his research colleagues present a case for more than treatment to eradicate schistosomiasis and other serious waterborne infectious diseases. They respond to A. Fenwick’s perspective published in an earlier issue of Science (8/25/06) that these diseases can be effectively controlled in the developing world relying principally on drug effectiveness and distribution. “Although treatment is an effective first step,” states Spear’s group, “we is-

sue a cautionary note regarding drug based strategies as the sole means to eradicate transmission or even to suppress it sustainably to levels below the threshold of concern.”

They point out that schistosomiasis has reemerged in formerly endemic areas where transmission had earlier been terminated with chemotherapeutic treatment. They stress that their analysis does not “diminish the importance of drug therapy,” but rather underscores the importance of prevention through environmental controls and the desire to avoid a large increase in drug use that could lead to drug resistance. “In the case of waterborne infections, prevention often begins with clean water and improved sanitation. It is essential that policy-makers remain committed to these traditional public health measures and not rely solely on

#### About the IEA

The International Ergonomics Association ([www.iea.cc](http://www.iea.cc)) is a federation of ergonomics and human factors societies from around the world. IEA maintains international contacts among those active in the field, cooperates with international organizations to facilitate the practical application of ergonomics, and encourages scientific research by qualified persons in the field of study and practice. At present, there are 42 member societies representing about 18,000 ergonomists worldwide.

#### About the Liberty Mutual Research Institute for Safety

Owned and operated by Liberty Mutual Group, the Liberty Mutual Research Institute for Safety is an occupational safety and ergonomics research facility in Hopkinton, Massachusetts focused on reducing workplace injury and illness and work-related disability ([www.libertymutual.com/researchinstitute](http://www.libertymutual.com/researchinstitute))

the promise of vaccines and inexpensive drugs.”

Co-authors of the letter include UC Berkeley researchers Edmund Seto and Justin Remais, UCB doctoral student Elizabeth Carlton; Professor George Davis of George Washington University; Dongchuan Qiu of the Institute of Parasitic Disease, Sichuan Center for Disease Control and Prevention, Chengdu, China; Xiaonong Zhou of the National Institute of Parasitic Diseases, Chinese Center for Disease Control and Prevention in Shanghai; and Professor Song Liang of Ohio State University in Columbus.

*Science* 17 November 2006:  
Vol. 314, no. 5802, pp. 1081 - 1083  
DOI: 10.1126/science.314.5802.1081c

# Rossana Segovia-Bain

## From Midwifery in Paraguay to a Faculty Position at UCSF

Segovia-Bain was halfway through a midwifery training program in her native Paraguay when she immigrated to the United States in 1990. She soon found herself starting from scratch because she had to learn English, and friends advised her that nursing was a better way to go in the United States.

But her native Spanish language skills came in handy during the transition. She began translating Environmental Protection Agency documents for Spanish-speaking communities affected by a Superfund site in southern California. This work was Segovia-Bain's introduction to the field of environmental health, and she soon decided to pursue an occupational and environmental health focus in nursing.

In 1997, Segovia-Bain completed her bachelor's degree in nursing at San Francisco State University. Five years later, she completed a master's degree in COEH's Occupational and Environmental Health Nursing program at UCSF.

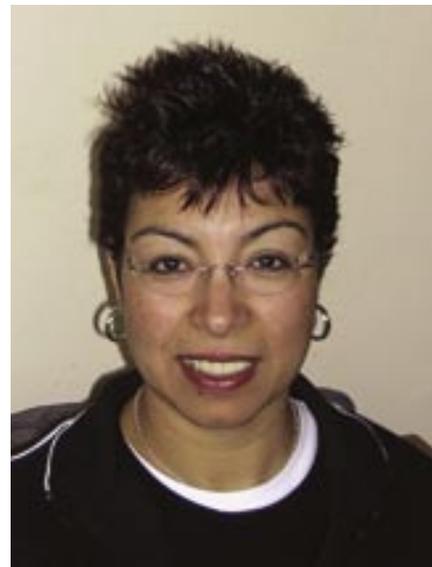
For three years after she finished her degree, Segovia-Bain worked at the Employee Health division of Alta Bates Summit Medical Center, assessing and treating work-related injuries. At the same time, she volunteered her time to develop an asbestos awareness and training curriculum for COEH's Community Occupational Health Project. She also worked as a contract clinical specialist for COEH's Epidemiology and Preventive Medicine Program at UC Davis, performing respiratory medical evaluation clearance and training for California Prison employees who needed fit testing for respirator use.

In 2005, Segovia-Bain became assistant clinical professor in the School of Nursing at UCSF. She currently divides her time between UCSF and the San Francisco Department of Public Health, where she works as an emergency preparedness nurse practitioner. She provides medical clearance and respiratory protection training for city employees under a federal Homeland Security grant to prepare for a public health emergency, such as pandemic flu, avian flu, or a bio-terrorism event.

At UCSF, Segovia-Bain teaches an advanced health assessment seminar and skills lab and a seminar on issues in occupational health and program planning with a focus on the role of nursing. She has also been developing a rotation for the occupational health nurse practitioner students at Glide Memorial Church's health clinic in the Tenderloin District of San Francisco, where they will be developing programs for high-risk, low-wage and youth workers.

"I have yet to focus on my primary area of interest in musculoskeletal injuries and environmental health issues," she said, "but I hope to soon. I want to continue my studies toward a doctoral degree in occupational health in the near future."

In the meantime, she is hoping to have opportunities for interdisciplinary collaborations with others in COEH. "I want to contribute to a strong nursing role within COEH," she said. "We all have something to learn from each other." 🙏



Rossana Segovia-Bain

## Steve Rappaport Rejoins Berkeley Colleagues



Stephen Rappaport

For over thirty years, Steve Rappaport has focused his work on environmental and biological monitoring, developing biomarkers for assessing toxic chemical exposures and exploring how genetic and environmental factors affect metabolism of such chemicals.

Rappaport completed his doctorate in Environmental Sciences and Engineering at the University of North Carolina in 1974 and went on to work at the Los Alamos National Laboratory in New Mexico, where he developed methods to sample and analyze organic carcinogens in air. Following two years in the high desert, Rappaport took a position as assistant professor in Berkeley's School of Public Health, where he eventually became a full professor of occupational health in 1989.

Family matters drew Rappaport back east in 1990, where he took a position as professor of occupational and environmental health in the School of Public Health at his alma mater, the University of North Carolina in Chapel Hill. At UNC, Rappaport's research focused on the relationship between chemical exposure and the development of cancer and other diseases, as well as novel methods for assessing such exposures. He also maintained active collaborations with colleagues at Berkeley, particularly environmental health professor Martyn Smith and epidemiology professor Patricia Buffler. Those collaborations are ongoing, and have become logistically easier since he rejoined his Berkeley colleagues last summer, as an adjunct professor of environmental health.

Continuing work he began at UNC, Rappaport's research focuses on the

development and application of biomarkers of exposure to toxic chemicals, including benzene and polycyclic aromatic hydrocarbons. He is currently measuring biomarkers in blood obtained from the mothers of children in a case-control study of childhood leukemia led by Buffler and Smith.

Rappaport and Buffler are also proposing to assess children's exposures to a host of known or suspected carcinogens in indoor air and household dust and then to determine the risks that these exposures pose for the development of childhood leukemia. "Most epidemiology studies of childhood cancers assess exposures based on parents' memory of their children's activities, which they report in interviews or questionnaires," Rappaport explained. "In this study, we want to actually measure exposures to some probable carcinogens and then see how well the questionnaire data predict these true exposures."

Shortly after Rappaport arrived at Berkeley, the National Institute for Environmental Health Sciences published a request for applications for new Exposure Biology Centers. The purpose of these centers would be to develop and apply biomarkers of response to toxic chemicals as well as biosensors that might be used in epidemiology studies. Since this research area perfectly fits Rappaport's interests, he organized a team of scientists from the Berkeley campus to respond to the request.

"This is an exciting project with big goals," Rappaport said, "and fortunately, Berkeley is the perfect place to achieve big goals." 🙏

# How Everyday Products Make People Sick

Seemingly harmless products – a tube of glue, a bottle of bleach, a rayon scarf, a brass knob, a wooden plank – have caused severe illness over not just recent decades, but, in fact, two hundred years or more. Even in our own time, governmental regulation has time and again been insufficient. In his first book, *How Everyday Products Make People Sick: Toxins at Home and in the Workplace*, UCSF Professor and Chief of the Division of Occupational and Environmental Medicine, Paul D. Blanc, demonstrates "...a reoccurring pattern where a novel technology would be introduced, and then a new illness would emerge. Although scientists would identify the connection, public health authorities did not sufficiently control the hazard."

One such example, carbon disulfide, has proven to cause mental derangement and a myriad of other health problems. In the 19th century, the chemical was a byproduct of vulcanizing rubber. Although this technology was changed by the turn of the last century, rayon manufacturing, which began around the same time, led to the very same diseases once again. Blanc points out that carbon disulfide remains a problem in developing countries, where there is ongoing occupational exposure.

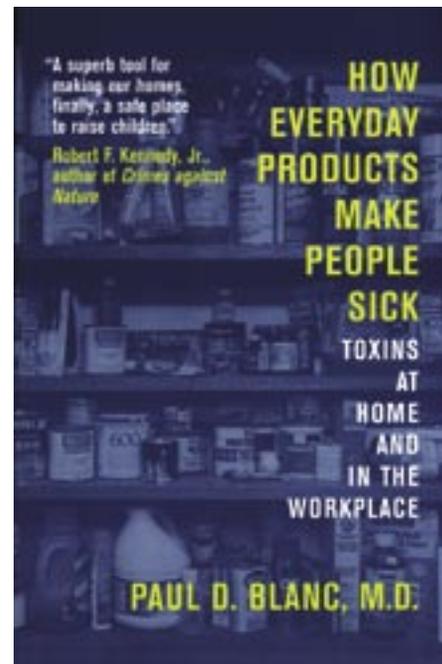
Blanc addresses a gamut of other hazards, such as mercury poisoning, inhaling dust and fumes, water and air pollution, and asbestos, manganese and lead exposure. He also highlights the links between gasoline fuel additives and Parkinson's disease and discusses infectious agents juxtaposed with emerging, chemically-caused diseases.

Ongoing hazards for US consumers include glues, artificial nail chemicals and the misuse of chlorine bleach, which can lead to household release of chlorine gas. Blanc references popular culture throughout the book to engage the reader while driving home his point regarding the dangers of chlorine bleach.

"We are all heirs to more than two millennia of a collective need to bleach everything in sight as white as driven snow. Once the airwaves carried a sing-songy commercial for a laundry detergent in which an irritating voice repeatedly recited, 'Ring around the collar, ring around the collar.' The commercial's darker echoes of 'Ring around the rosie,' originally a rhyme of the plague years, may have been unintended, but nonetheless it should give us all pause."

Rather than blowing the whistle on a few selected corporations, Blanc's goal is to increase the public's awareness of the severity of toxins in everyday products. He hopes to inspire readers to work with environmental and labor groups and elected officials to put pressure on public health regulators, such as the Occupational Safety and Health Administration, the Food and Drug Administration, the Consumer Product Safety Commission, and the Environmental Protection Agency, to adequately protect consumers.

"This book is a call to action for people to demand appropriate control of hazards by public health regulators," says Blanc. "I am a big believer that the problems exist at a societal level and that we have been failed by the existing regulatory apparatus." 🙏



Adapted from story by Sharon Brock  
UCSF Today, 11/14/06

More information on the book is available  
through UC Press: <http://www.ucpress.edu/books/pages/10650.html>

## What Do You Do with Students with Big Ideas?

You give them money. And that's exactly what COEH did to help a group of Berkeley undergraduates realize their dream to make a difference in the lives of Shuar indigenous villagers in Ecuador. The dream was born when Lia Marshall, now a junior majoring in public health, volunteered in the province of Pastaza and was asked by the local people to continue collaborating with them on development projects.

Undaunted by the enormity of the request, she mobilized a multi-disciplinary team through the Cal Undergraduate Public Health Coalition in fall 2005. They designed a proposal for the COEH Student Award program to address malnutrition, safe water, sanitation, and other health needs of the Shuar community. COEH faculty reviewing their project were enthusiastic, but let the students know that they were trying to accomplish too much in their summer field work.

Three months later, after successfully shepherding a scaled back project focused on water and sanitation through the rigorous human subjects protocol process, five students, (Lia Marshall, Karis Miyake, Timothy Morrison, David Reynoso and Celeste Wong), set off for Amazonian Ecuador. Buoyed with excitement and their \$5,000 award to pay for travel and project expenses, they set off not knowing they were in for a physical, mental, and emotional marathon.

Working with local health officials, they hiked from village to village (10 in all), conducting surveys to assess current water usage and sanitation practices. On the way they slogged through knee deep mud, spent a day lost in the jungle, played and danced with the children, revised their methodology to overcome the initial distrust of the villagers, and learned that providing clean water would both meet an expressed need of the villagers and have the most impact on community health. The students promised to come back with prac-

tical interventions for improving their water.

Since their return to Berkeley, the students have been analyzing their data, making multi-media presentations, and seeking more funding for the next phase of their project -- to adapt, test, and implement appropriate technologies to reduce wide-spread water-related illnesses among the 1,000 villagers in the Shuar communities.

Their receipt of another \$5,000 award, as one of the first 25 winners of a new initiative by UC Berkeley aimed at helping students with "Big Ideas," has enabled them to make a second trip to extend their previous work. In this follow-up project, the students will first communicate to the communities the results of last summer's needs assessment and environmental health survey. They will then work with community members to conduct pilot studies to assess the feasibility of six different methods for decontaminating water. Finally, they will evaluate the efficacy of these methods by measuring levels of E. coli bacteria as an indicator of the quality of the primary water source in each community.

The campus put up \$100,000 in seed money for the Big Ideas initiative and posted the winning projects on their new web site: Big Ideas @ Berkeley Marketplace where alumni, friends, foundations, and corporations interested in the ideas can donate to the projects. The aim is to mobilize additional financial and in-kind resources to support student ideas.

The COEH-funded Ecuador project has not only attracted more funding, but also more students, now working on two projects. One will continue their focus on safe water for the Shuar communities, and the other will tackle the nutritional issues they originally proposed, but had to postpone. They hope to raise \$20,000 and attract donations of frequent flyer miles so that as many of the students as possible can travel to Ecuador to contribute to their goal of empowering the Shuar people with the skills and knowledge needed to achieve and sustain a reduction in morbidity and mortality from waterborne diseases. 🙄

*More information on the projects can be found at the Big Ideas web site: [bigideas.berkeley.edu](http://bigideas.berkeley.edu)*



*Lia Marshall and colleagues in Ecuador*

# Research to the Extreme

By Lia Marshall

Children with swollen bellies and skin rashes from parasites bathe in the Amazonian river. Their mother stands next to them washing the family's clothes while the two youngest kids of 11 fill their poma (plastic bottle) with water for drinking and cooking. Twenty meters upstream sits the community's one letrina (outhouse), which consists of a hole through which feces and urine flow directly into the river. Witnessing scenes such as these the prior summer first inspired our Cal Undergraduate Public Health Coalition (Cal UPHC) to further investigate the water usage and sanitation practices of these Shuar communities and to conduct a needs assessment to determine the communities' other environmental health concerns.

After an eight hour trip from Quito, our technical assistant tells us to get off the bus; there are no signs - just a small path that leads up to a house in the jungle where his mother and 10 siblings live. This will be our home for the next seven weeks.

In the first 10 days, we conduct pilot studies with the nearby community of San Ramon. Making many five hour round-trips to the nearest city, Puyo, we revise our surveys and prepare for an intense five weeks of research. Working with the Director of Health for the District of FENASH, we plan our route to ten Shuar communities within the district.

The mud sucks our black rubber boots as we make our first trip into the interior. Five hours later while entering Shakap, we see this community's primary "water source". A trickle leads into a large puddle, which is surrounded by rocks with detergent marks and a wooden board for bathing. This site foreshadows what we will later find in other communities - most people use one water source for everything - drinking, cooking, bathing, and washing.

Our time in the communities had been packed with challenges and obstacles to overcome, which ranged from dealing with community politics, working in extreme environmental conditions, to adapting to a new culture. However, from these experiences we also learned an incredible amount, including how to design, revise, and conduct culturally appropriate surveys and research. We gained practical experience in earning the confidence of communities, respecting cultural practices without compromising research

methods/results, and working around local conflicts.

We also enjoyed an amazing cultural exchange. From attending graduations, baptisms, and clausuras (end of school year ceremonies) to drinking chicha (fermented yucca) and eating mainly yucca, platanos and papa china (starchy "vegetables"), we were fully immersed in the culture. Playing soccer with each community and dancing with the Shuar in their many community celebrations brought us even closer to the people. 🙌



*UCB students hiking to a Shuar community*



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

**COEH** CENTER FOR OCCUPATIONAL & ENVIRONMENTAL HEALTH  
University of California at Berkeley, San Francisco, and Davis

**Director:** John R. Balmes  
Program Directors  
**Public Health, UCB:** Robert C. Spear  
**Occupational and Environmental Health Nursing, UCSF:** Julia Faucett  
**Occupational and Environmental Medicine, UCSF:** John R. Balmes  
**Public Health Sciences, UCD:** Marc B. Schenker  
**Biological and Agricultural Engineering, UCD:** Fadi Fathallah  
**International Occupational and Environmental Health:** Kirk R. Smith  
**Ergonomics:** David Rempel  
**COEH Community Services/LOHP:** Robin Baker  
**Continuing Education:** Barbara Plog

Bridges is published quarterly

**Editorial Board:**  
Suzanne Llewellyn  
Robert Spear  
John Balmes  
Marion Gillen

**Managing Editor:**  
Suzanne Llewellyn  
**Design:** John Minardi  
**Writer:** Elena Conis

**Contact:**  
Phone: (510) 643-4421  
Fax: (510) 642-5815  
minardi@berkeley.edu  
<http://coeh.berkeley.edu>

The Northern California Center for Occupational and Environmental Health (COEH), a multidisciplinary program of the University of California at Berkeley, Davis, and San Francisco, promotes health and safety in workplaces and communities by:

- 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.

COEH is an Education and Research Center (ERC) of the National Institute for Occupational Safety and Health (NIOSH).

♻️ Printed on paper that is 100% recycled, 50% post-consumer waste, and processed chlorine free, using soy-based inks.

University of California  
CENTER FOR OCCUPATIONAL  
& ENVIRONMENTAL HEALTH  
School of Public Health  
Berkeley, CA 94720-7360

Nonprofit  
Organization  
U.S. Postage PAID  
University of  
California

**ADDRESS SERVICE REQUESTED**