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Western Center for Agricultural Health and Safety • University of California, Davis

## Accountability research at the UC Davis Air Quality Research Center challenges current air quality regulations

By Keith Bein

**E**pidemiological and toxicological studies have consistently associated exposure to air pollution with numerous adverse pulmonary and cardiovascular health im-

will impact the agricultural community still remains to be seen. Air quality accountability research is concerned with studying this new state of emissions to evaluate the impact of these regulations or efficacy of the mitigation strategies.

Investigators at the UC Davis Air Quality Research Center are studying the health effects of air pollution with the aim of identifying whether different sources (e.g., agricultural, industrial and mobile emissions) elicit differential toxicity to evaluate the appropriateness of current regulations, which treat all emissions equally, or whether a source-oriented, risk-based strategy to managing air quality may be more effective.

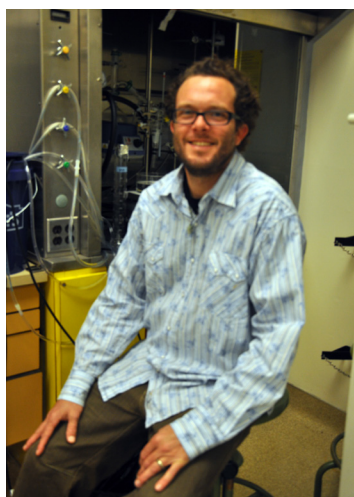
The fundamental question is whether some sources of air pollution are more toxic than others, and thus pose a greater risk. For example, do sea spray and diesel exhaust have the same toxicity? Most likely not, but the current mass-based NAAQS treats them the same. If possible, wouldn't it be a more efficient and appropriate strategy to regulate sources based on the toxicity of their emissions? This would certainly

reduce costs to both industry and the consumer. These are questions our research is trying to answer and our work is aimed largely at assessing the feasibility of a paradigm shift to a source- or risk-based regulatory strategy.

Conventional wisdom holds that the atmosphere is too well mixed to isolate and directly sample source-specific, or

source-oriented, particulate matter (PM). It turns out, however, that on small enough spatiotemporal scales, this is not always the case. Consider the analogy of mixing creamer into a cup of coffee. It takes a certain amount of stirring before those relatively pure bands of swirling creamer fully disappear. In the case

*Air quality continued on page 4*



Keith Bein, Ph.D.

pacts, including agricultural settings. Results from these studies have motivated local, state and federal agencies to adopt policies to either regulate or mitigate these effects, such as the Environmental Protection Agency's National Ambient Air Quality Standards (NAAQS). These regulations and/or mitigation strategies are then applied to public, industrial and commercial practices and this changes the emissions landscape. How this

## New paradigms to improve agricultural health and safety

By Marc Schenker, M.D., MPH

**T**he agricultural workplace is changing and approaches to improve the health and safety in agriculture need to change as well. In California more than 85 percent of farm work is done by immigrant, primarily Latino, farmworkers. In addition, the majority of workers are hired through farm labor contractors. Approaches to improving health and safety need to reflect these two major changes in the agricultural workplace. In addition, health and safety strategies need to include engagement of farmworkers in the communities in which they live, with educators they trust. These efforts are not meant to replace training on the job, but to supplement workplace activities with community-based programs. The major advantage of community-based programs is that the messenger can be trusted, a situation that may not always exist in the workplace setting. In addition, community-based programs can address general health and environment issues as well as specific workplace hazards. For example, programs can be given on diabetes

*New paradigms continued on page 3*

## Western Center for Agricultural Health and Safety outreach highlights

This past May, Jose Gutierrez, WCAHS Community Health Program representative, spoke to more than 200 American-Hmong farmers about what they can do to prevent heat illness during hot summers. Jose was an invited speaker during the Annual American Hmong Farmers Conference that took place in Fresno, Calif. During the conference, WCAHS had a table with information on the NIOSH Agriculture, Forestry and Fishing outreach, prevention, intervention and research projects, in addition to bilingual training and educational materials.

Noting the prevalence of mobile phones and mobile Internet access even among poor, migrant farm workers, the California Department of Pesticide Regulation (CDPR) is helping the largest poison-control agency in the country to use technology to reduce human exposure to pesticides in California.

The California Poison Control System (CPCS) has introduced the Pesticide Safety Project, a mobile, bilingual effort to encourage reporting of pesticide exposure and to reduce pesticide usage in the home. The Pesticide Safety Project has produced informational videos for distribution through community health workers and directly to farm workers. Funded by the California Department of Pesticide Regulation in collaboration with WCAHS, the project consists of a mobile-optimized website featuring five Spanish-language videos using cinematic storytelling to relay key messages along with illustrated tips and links to resources. There are also 30-second public service announcements. Insights from research with farm workers and community members guided the decision to create mobile-first, visually rich tools and compelling how-to videos. Please visit the Pesticide Safety Project at: <http://www.thesafetyofyourfamily.com/>

On July 21, the Napa Valley Grape Growers hosted the *Festival de la Familia*. More than 900 farmworkers and their families attended the cultural event, supported again this year by WCAHS outreach staff who provided bilingual materials created in collaboration with CalOSHA, CalDIR (WOSHTEP). Information included Heat Illness Prevention, Dairy Worker Safety Guidelines Manual and bi-lingual photonovelas. Participants enjoyed turning the WCAHS prize wheel and answering agricultural health and safety questions in exchange for small prizes. A popular raffle was organized by the host organization and the prizes included: videos, lunch for four at local restaurants, body massages, among other useful items.

Funding for *Día de la Familia*, a model project, comes from the Napa Valley Grapegrowers' Farmworker Foundation, established in 2011 to support and enrich the lives of Napa

County vineyard workers and their families by providing educational opportunities, advanced training programs, and by promoting a safe and healthy working environment. For more information, visit [napagrowers.org](http://napagrowers.org)

WCAHS Student Assistant, Carina Segoviano-Perez, and rotating WCAHS staff participate in the Sacramento Mexican Consulate's "Ventanilla de Salud/Health Window" an on-going Friday morning summer service program, funded by the California Endowment. Carina conducted a brief presentation about heat illness prevention strategies and how/where to report issues, and then was available to respond to questions. The Consulate's annual event since 2004, the "Week of Occupational Health and Safety" is scheduled for August 26-30, 2013. In addition to government agencies, local non-profits, professional association representatives, community volunteers, caregivers, and medical and dental professionals, hundreds of Mexican immigrants and their families attend these fairs for basic dental exams, and lung screenings, etc.



Carina Segoviano-Perez (left) at Sacramento Mexican Consulate's "Ventanilla de Salud/Health Window."

The Consulate General of Mexico in Sacramento, California, was opened as a Career Consulate in 1942, with a direct constituency in nine counties of northeastern California and Nevada. After that its constituency was extended to twenty-four counties in northwestern California and the State of Nevada except the Clark County, which includes the City of Las Vegas. In 1997 its status was upgraded to Consulate General category, keeping the same consular district. However, in late 2001, because of the establishment of the Consulate in Las Vegas, Nevada, the constituency was reduced to twenty-four counties in California.

You are invited to visit the Mexican Consulate in Sacramento, 2093 Arena Blvd., Sacramento. Website: <http://consulmex.sre.gob.mx/sacramento/en/>



and obesity prevention, cardiovascular health, nutrition and oral health. Many of these topics directly relate to workplace health, and occupational illness and injury prevention.



Participants at the 2013 Promotores Conference in Oakland, CA.

The Western Center for Agricultural Health and Safety has worked with the Health Initiative of the Americas to bring information about agricultural health and safety to farmworkers and their families in communities. This past year the Binational Health Week event included sessions on occupational health of agricultural workers. This annual event involves more than 10,000 volunteers in 40 states, plus three provinces of Canada and seven countries in Latin America. The entire program reaches an audience of more than 500,000 people. It is truly a wonderful multiplier effect to disseminate the work of the Western Center through this enormous mobilization effort.

More recently we have worked with the Health Initiative of the Americas and the Binational Zacatecas Health Initiative (IBIZA, for its Spanish acronym) to disseminate our health and safety message via *promotores*. *Promotoras/es* are health outreach workers who strive to improve the overall health of underserved communities through health education. They are both paid and volunteer, but the common element is that they come from the communities in which they work to educate people about health and disease prevention. With healthcare reform taking

place in the United States, *Promotoras/es* are more vital than ever. *Promotoras/es* understand the needs and desires of the public, and can find ways to make legislators, policymakers and political leaders aware of community needs. More than 250 *promotores* were present at the recent 14<sup>th</sup> Binational Conference of *Promotores* held in Oakland, California. The attendees came from several states in the U.S. as well as from Mexico. Half of the program was devoted to training these local health workers about health and safety among agricultural workers. The training was facilitated by a new manual of occupational health and prevention in agriculture called “*Historias Del Iry Venir*.” (Stories of Going and Coming.) This manual, available on the Internet (<http://hia.berkeley.edu/>), covers a breadth of topics pertinent to health of agricultural workers. It includes chapters on respiratory illnesses, heat stress illness and pesticides. It was truly gratifying to see the *promotores* learning about agricultural health and safety, and knowing that they will go out to their communities to teach farmworkers in a setting that is trusted and supportive.

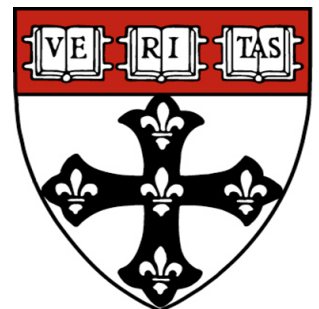
***“It was truly gratifying to see the *promotores* learning about agricultural health and safety, and knowing that they will go out to their communities to teach farmworkers in a setting that is trusted and supportive.”***

Agricultural health and safety programs need to explore other creative means to get the messages out to the people who do farm work. Just as agriculture has changed and evolved, our efforts to improve the health and safety in the agricultural workplace also need to change and evolve. I am pleased that the team of faculty and staff of the Western Center for Agricultural Health and Safety are doing just that.

Marc Schenker, M.D., MPH, is director of the Western Center for Agricultural Health and Safety at UC Davis.

## Schenker receives prestigious Harvard alumni award

Congratulations to WCAHS Director Marc Schenker, M.D., MPH, who is a recipient of the 2013 Harvard School of Public Health Alumni Award of Merit. This award is the highest honor that the school can bestow upon a graduate of the Harvard School of Public Health, recognizing a significant career and professional excellence in the field of public health. Other 2013 Alumni Award recipients are Dr. Debra Silverman and Dr. Eiji Yano. The award presentations will take place on Saturday, November 2, 2013, during the Alumni Centennial Dinner to be held at the Institute of Contemporary Art, Harvard.



of the atmosphere, fresh emissions, or creamer, are constantly being poured into the atmosphere and the stability of the atmosphere, or degree of mixing in the coffee, determines the rate of dilution. If we can measure the

atmosphere on small enough spatiotemporal scales, then we can pick out those bands of unmixed emissions and directly sample sources from the ambient atmosphere.

We have developed and successfully deployed a novel

sampling technique that allows us to collect source-oriented PM from the ambient mixture. The technique is based on our ability to measure the size and composition of particles one-by-one in real-time with large measurement frequencies coupled with the fact that particle size and composition are the most reliable indicators of source. We conducted two experiments in Fresno, Calif., during the winter and summer seasons. We were able to isolate several different sources, including vehicular emissions, cooking emissions, residential heating emissions and the highly processed regional background, which is largely influenced by agricultural emissions and photochemical processing. We extracted the source-oriented

samples from the collection substrates and performed toxicological testing using a variety of pulmonary and cardiovascular endpoints.

Not only were we able to show that different sources do, in fact, elicit different toxicities but also that similar sources are more or less toxic depending on season and particle size, different sources are toxic in different ways, and some sources elicited no toxicity at all. Our study demonstrated that source-oriented or risk-based regulations are feasible and has laid the foundation for future research.

*Keith Bein, PhD, (kjbein@ucdavis.edu) is an assistant research scientist at the UC Davis Air Quality Research Center*



*This is a picture of our instrument, called Rapid Single-ultrafine-particle Mass Spectrometer (RSMS), housed inside of our mobile trailer. It is the ability of RSMS to measure the size and composition of particles one-by-one in real-time that facilitates the air quality accountability research that we do.*



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## Calendar

**Monday, October 7, 2013, 4:00 – 5:00 p.m., C.H.E.**

“The Case of Methyl Bromide Alternatives: Progress Towards a Fumigation Independent Future,”

**Daniel Kluepfel, PhD**, Crops Pathology and Genetics Research Unit, USDA ARS, Davis, CA

**Monday, November 4, 2013, 4:00 – 5:00 p.m., C.H.E.**

“How much does government undercount nonfatal occupational injuries and illnesses in agriculture?”

**J. Paul Leigh**, professor, Center for Healthcare Policy & Research, Public Health Sciences, UC Davis

**Monday, December 2, 2013, 4:00 – 5:00 p.m., C.H.E.**

“Benchmarking of Environmental Impacts of Global Livestock Sector,” **Frank Mitloehner**, professor of animal science UC Davis and WCAHS Investigator

**WCAHS Seminars are held in C.H.E. on Old Davis Road**

## Join the AgHealth e-mail listserver

The Western Center for Agricultural Health and Safety's AgHealth e-mail discussion group is open to anyone interested in agricultural health and safety. We welcome and encourage participation by posting comments or questions about agricultural health and safety. Subscribe at the WCAHS homepage: <http://agcenter.ucdavis.edu>, click on “AgHealth email List.”



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