

Cultivating A Sustainable Agricultural Workplace

PROCEEDINGS

2004 Western Regional Agricultural Health and Safety Conference

Sponsored by:

Pacific Northwest Agricultural Safety and Health Center
Western Center for Agricultural Health and Safety
Northwest Center for Occupational Health and Safety
National Institute for Occupational Safety and Health
Centers for Disease Control and Prevention

Planning Committee:

Chuck Benbrook, Benbrook Consulting Services
Chris Feise, WSU Center for Sustaining Agricultural and Natural Resources
Richard Fenske, Pacific Northwest Agricultural Safety and Health Center
Marcy Harrington, Pacific Northwest Agricultural Safety and Health Center
Steve Hecker, University of Oregon, Labor Education & Research Center
Ketty Mobed, Western Center for Agricultural Health and Safety
Ron Strohlich, California Institute for Rural Studies
Eric Swenson, Pacific Northwest Agricultural Safety and Health Center
Jennifer Weber, University of California Statewide IPM Project

McMenamins Edgefield Troutdale, Oregon
September 12-14, 2004

Cultivating a Sustainable Agricultural Workplace

PROGRAM

Sunday, September 12

2:00 Tour of Columbia Gorge

Blackberry Hall

3:30 Registration and poster set-up

7:00 Poster reception with light dinner fare



Monday, September 13

Blackberry Hall

7:00 Registration

8:30 **Welcome**

Richard Fenske, PNASH
Marc Schenker, Western Center

8:45 Keynote

Making the Workplace Safe, Healthy, and Sustainable

Karla Chambers, Stahlbush Island Farms, Inc.

9:30 ***Sustaining the Worker***

Richard Fenske, PNASH

10:00 Break

10:30 ***Sustainable Agriculture: Global, National, and Regional Trends***

David Granatstein, Washington State University

Key Issues

11:00 ***Current Workplace Practices and Challenges***

Jim Cochran, Swanton Berry Farm
Ann Thrupp, Fetzner Vineyards
Lon Inaba, Inaba Produce Farms
Eric Swenson, PNASH, *moderator*

12:15 Lunch

Thematic Table Discussions

1:30 ***Organic vs. Conventional Farming and Worker Safety and Health***

Paul Jepson, Oregon State University
Rupali Das, California Department of Health Services
Dain Craver, DAC Consulting
Helen Murphy, PNASH, *moderator*

2:45 ***International Standards and Certification and Sustainable Practices***

Aimee Shreck, University of California, Davis

3:15 Break

3:45 ***Stoop Posture and its Effects on Workers***

Fadi Fathallah, Western Center

4:15 ***Developing Worker Health Standards in Sustainable Agriculture***

Chuck Benbrook, Benbrook Consultant Services
Scott Exo, Food Alliance
Mike Gempler, Washington Growers League
Erik Nicholson, United Farm Workers of America, AFL CIO
Chris Feise, Washington State University, *moderator*

5:30 Adjourn

6:00 Hors d'oeuvres and Dinner
 7:15 ***Sustainability through Native American Eyes***
 Judy BlueHorse Skelton, herbalist, educator, writer



Tuesday, September 14

Blackberry Hall

7:00 Registration

Emerging Issues

8:30 ***Health, Safety, and Mega-Dairy/
Cattle Farms***
 Frank Mitloehner, University of California,
 Davis

9:00 ***Zoonotic Diseases and Worker Health***
 Bruno Chomel, University of California,
 Davis

9:30 ***Aquaculture: Worker, Public, and
Environmental Health Issues***
 Brad Warren, *Pacific Fishing* magazine

Supporting Sustainability

10:00 ***Sustainability and Rural Development***
 Martin Goebel, Oregon Sustainability Board

10:30 Break (*Hotel Checkout*)

11:00 ***Establishing a Research and Outreach
Agenda to Integrate Safety and Health
into the Sustainable Ag Workplace***
 Helen Murphy, PNASH

12:30 Lunch

2:00 ***Research and Outreach Agenda Report***
 Helen Murphy, PNASH



Research Showcase

2:15 Concurrent Sessions
 (*Blackberry Hall divided*)

Track I:

Characterizing Injuries and Illness

- ***Injuries in Northwest Orchards***
 Matthew Keifer, PNASH
- ***Health among Farmer and Farm
Worker Populations***
 Marc Schenker, Western Center
- ***Survey of Adolescent Injuries on
California Farms***
 Steve McCurdy, Western Center

Track II:

Prevention of Injuries and Illness

- ***Pesticide Take-home Pathway
Interventions***
 Kit Galvin, PNASH
- ***Safety Training for Employers
and Supervisors of Adolescent
Farm Workers***
 Barbara Lee, National Children's
 Center for Rural and Agricultural
 Health and Safety
- ***Hygiene Activities to Reduce
Farm Worker Home Dust
Pesticide Levels***
 Linda McCauley, University of
 Pennsylvania

3:45 **Closing Remarks**

Richard Fenske, PNASH

4:00 Adjourn

SPEAKER AND MODERATOR BIOS

Charles Benbrook, Proprietor
Benbrook Consultant Services

Dr. Benbrook worked in Washington, DC on agricultural policy, science, and regulatory issues from 1979 through 1997. He began as the agricultural staff expert on the Council for Environmental Quality. Then he served as Executive Director of the subcommittee of the House Committee on Agriculture, with jurisdiction over pesticide regulation, research, trade and foreign agricultural issues, and oversight of the USDA. He became Executive Director of the Board on Agriculture of the National Academy of Sciences in 1984 and in the next seven years helped to establish the Board as a major voice on agricultural science and regulatory policy. He formed Benbrook Consultant Services in 1990 to address pesticide regulatory and other agricultural biotechnology issues. In 1998 he developed Ag BioTech InfoNet (<http://www.biotech-info.net>) as an independent source of information about biotechnology. Benbrook has an MA and a PhD in agricultural economics from the University of Wisconsin Madison.

Karla Chambers, Co-owner
Stahlbush Island Farms

A fifth-generation Oregon farmer, Chambers oversees administration, marketing, and sales for a 2,200-acre intensive farming operation and vertically integrated food processing company in Corvallis, Oregon. Stahlbush Island Farms employs up to 150 people seasonally and grows more than 15 agricultural crops using sustainable and organic farming practices. These crops are further processed and shipped to 16 countries and 42 states into industrial, retail, food service, and export markets. Chambers has an MA from Oregon State University, where she studied Agricultural and Resource Economics, Political Science, and Finance. She is on the board of directors for the Ford Family Foundation and chairs the Portland Branch Board, Federal Reserve Bank of San Francisco. The Board's seven members bring the region's economic perspective to the Federal Reserve's district and national offices.

Bruno Chomel, Coordinator
WHO Collaborating Center for New and Emerging Zoonoses
Professor, Population Health & Reproduction
University of California, Davis

Dr. Chomel received his DVM from Lyons' Veterinary School, Lyons, France, in 1978. He earned masters degrees in Microbiology from the Pasteur Institute in Paris and in Immunology from the University Claude Bernard-Lyon, where he also received his PhD and Research Director's degree. At Davis, Dr. Chomel has served as the director of the Master in Preventive Veterinary Medicine program, and his interest in the Graduate Group in Epidemiology coincides with his major academic study, the epidemiology of the zoonoses.

Jim Cochran, Owner
Swanton Berry Farm

A farmer for 30 years, Cochran founded Swanton Berry Farm in 1983 with the goal of providing flavorful strawberries that were not grown at the expense of farm workers' health or dignity. He currently farms 60 acres of strawberries, blackberries, olallieberries, kiwis, artichokes, broccoli, and cauliflower, grown organically and with a United Farm Workers contract.

Dain Craver, Owner
DAC Consulting

Craver has been a horticulture consultant for 18 years in Central Washington. He works with many diversified conventional and organic operations covering more than 4,000 acres. Since 1989, he has been General Manager of KS Orchards, a 600-acre multi-fruit production in Grant County, consisting of three managers, 25 full-time employees, and up to 200 part-time workers during peak harvest. Craver also owns a 125-acre organic orchard growing apples, Asian pears, cherries, pluots, and nectarines, employing a full-time manager and eight full-time employees. Craver is also a Washington State Treefruit Research Commissioner, chairing the Entomology Committee; Vice Chair of the Washington State Organic Advisory Board; and a member of the Washington Horticulture Agricultural Chemical Committee.

Rupali Das, Public Health Medical Officer
Occupational Health Branch
California Department of Health Services

Dr. Das received her MD from the University of Illinois. After her residency in internal medicine, she completed a fellowship in occupational and environmental medicine at the University of California, San Francisco, where she is now an Assistant Clinical Professor of Medicine, and obtained an MPH from the University of California Berkeley. For five years at the California Environmental Protection Agency, she studied the effects of air pollutants on respiratory health and methods to reduce the health impacts of accidental chemical releases. For the past four years, she has been with the California Department of Health Services, working primarily on pesticide-related illness. She is Principal Investigator and Co-Investigator on several studies that assess the impact of pesticides on health, including statewide surveillance of pesticide illness and county-specific farm worker surveys.

Scott Exo, Executive Director
Food Alliance

Exo has more than 15 years of non-profit and program management experience. Before joining Food Alliance in 1999, he served six years as the director of the Grassroots Leadership Project at 1000 Friends of Oregon, a land use planning and advocacy organization. In addition to his work in Oregon, Exo has managed overseas rural development and study abroad programs and done organizational consulting. He earned masters degrees in Geography and in Urban and Regional Planning from the University of Hawaii at Manoa in 1989.

Fadi Fathallah, Director
Occupational Biomechanics Laboratory
Assistant Professor, Biological and Agricultural Engineering
University of California, Davis

Dr. Fathallah's research interests include occupational biomechanics and ergonomics, with special emphasis on agricultural environments; musculo-skeletal problems, especially low-back and cumulative trauma disorders; and human factors engineering. He recently helped to develop the NIOSH Ag Centers National Agricultural Tractor Safety Initiative. Dr. Fathallah has an MS from Virginia Tech in Industrial Engineering and Operations Research and a PhD from Ohio State University in Industrial and Systems Engineering.

Chris Feise, Director
Center for Sustaining Agriculture and Natural Resources
Washington State University

As Director of the WSU Center for Sustaining Agriculture and Natural Resources, Dr. Feise helps to develop and foster agriculture and natural resource management that is economically viable, environmentally sound, and socially acceptable. He has been a WSU Extension faculty member since 1980, working in agriculture development, water quality, environmental protection, and sustainable agriculture. Dr. Feise was Cooperative Extension Liaison to EPA Region X for six years. He received his BA from Johns Hopkins University and a PhD in Agricultural Economics from WSU. In between, he served as a Peace Corps volunteer in the Philippines, where he taught mathematics and did experimental rice and vegetable farming with Filipino farmers as part of the "Green Revolution." Dr. Feise is a Food Alliance board member and a member of the Agriculture of the Middle project to save family farms.

Richard Fenske, Director
Pacific Northwest Agricultural Safety and Health Center
Professor, Environmental and Occupational Health Sciences
University of Washington

Dr. Fenske has earned an international reputation for his research on occupational skin exposure and agricultural hygiene. One of his significant achievements is the development of a video imaging technique that allows visualization and quantification of dermal exposure to hazardous chemicals. His work over the last several years has focused on children's exposure to pesticides in agricultural communities. Dr. Fenske serves on the Advisory Committee of NCI's Agricultural Health Study, a prospective epidemiological study of pesticide applicators and their families, and has been a member of the Agriculture Committee of the American Conference of Governmental Industrial Hygienists since 1993. He also served as an Outside Reviewer for the initial NIOSH-sponsored Farm Family Health Hazard Surveillance proposals and is currently a member of the NORA Allergic and Irritant Dermatitis team. Dr. Fenske holds an MPH and a PhD in Environmental Health Sciences from the University of California, Berkeley.

Kit Galvin, Research Industrial Hygienist
Pacific Northwest Agricultural Safety and Health Center
Environmental and Occupational Health Sciences
University of Washington

Galvin's interests focus on the determinants of exposure and the solutions to workplace hazards that affect employees, their families, and surrounding communities. Before joining PNASH, she evaluated the implementation of Washington state's ergonomics rule as part of the Policy and Program Evaluation Initiative in the UW Department of Environmental and Occupational Health Sciences. Earlier Galvin provided industrial hygiene services for 10 years at an occupational health clinic in Winnipeg, Canada. There she fostered the participation of employers and workers in addressing a wide range of workplace health concerns. She has an MS from the University of California, Berkeley in Environmental Health Sciences, Industrial Hygiene.

Michael Gempler, Executive Director
Washington Growers League

The Growers League provides education and assistance to more than 500 member growers, packers, and processors on labor management and represents agricultural employers on labor issues in state government, to the public, and the media. It was formed in 1987, and Gempler has been Executive Director since its inception. His industry activities include serving as Treasurer of the National Council of Agricultural Employers (NCAE), which represents the industry on labor issues at the national level. He also chairs the NCAE OSHA/EPA committee, which works on occupational safety and health issues in agriculture. Gempler is a member of the Stewardship Council of the Food Alliance, the Pacific Northwest Agricultural Safety and Health Center Outreach Advisory Committee, and the Washington State Farmworker Housing Trust Board of Directors. He has an MS in agricultural economics from the University of Wyoming and is a graduate of the Washington Agriculture and Forestry Leadership Program.

Martin Goebel, President
Sustainable Northwest; Member, Oregon Sustainability Board

Goebel is the founding President of Sustainable Northwest, a Portland-based non-profit dedicated to building partnerships that promote environmentally sound economic development in Pacific Northwest communities. He is responsible for initiating its community/field-based sustainability partnerships in Wallowa and Lake counties and with designing and establishing the regional Healthy Forests, Healthy Communities Partnership. Goebel received a BS in Forestry at Oregon State University, and an MA in Natural Resources Conservation and Development at Texas A&M University. He has worked for the forest service of Mexico in community forestry and in international conservation and development with The Nature Conservancy, Conservation International (which he helped found), and the World Wildlife Fund. Goebel serves on the Oregon Sustainability Board, Oregon Solutions Network, and on the advisory board of OSU's College of Forestry/Forest Research Laboratory and as a trustee of the Summit Foundation.

David Granatstein, State Coordinator
Center for Sustaining Agriculture and Natural Resources
Washington State University

Since joining the Center for Sustaining Agriculture and Natural Resources in 1993, Granatstein has worked on many educational and research projects, including introduction of polyacrylamide for soil erosion control, formation of The Food Alliance and development of its stewardship program, on-farm research of biosolids and compost, integrated fruit production, and soil quality studies. He spends a significant portion of his time supporting the expanding organic farming sector in the state and is helping to develop the CSANR's Biologically Intensive and Organic Agriculture program. Before coming to WSU, Granatstein managed an organic farm for seven years, worked in forest management, spent a year in southern Africa with an agricultural development project, and was research director for the Land Stewardship Project in Minnesota, where he wrote *Reshaping the Bottom Line*, an early sustainable agriculture book for farmers. He has conducted sustainable agriculture training in Russia, Argentina, and Canada.

Lon Inaba, Co-owner, President, and Operations Manager
Inaba Produce Farms

Inaba is the third generation of his family to farm the Yakima Valley. Inaba Produce Farms is a grower, packer, and shipper of top quality vegetables throughout the Western US and to Japan. The Inabas farm around 1,200 acres using both conventional and organic farming practices for more than 20 crops with a peak-of-season workforce of 200. The operation practices cover cropping, composting, and drip irrigation and provides model housing to its workers. Inaba earned a BS in Agricultural Engineering from Washington State University, then worked as a research engineer at Battelle Northwest Laboratories before returning to the family farm. He currently serves on the Yakima County Planning Commission, the Washington Growers League, the Yakama Reservation Irrigation District's board of directors, and as a state committee member for the Farm Service Agency. He is also a member of the American Society of Agricultural Engineers, the Institute of Food Technologists, and the Washington Agriculture and Forestry Education Foundation.

Paul Jepson, Director
Integrated Plant Protection Center
Professor, Environmental and Molecular Toxicology
Oregon State University

Dr. Jepson took his PhD in Insect Ecology at Cambridge University and was co-founder and co-director (sole director 1992-1995) of the Agrochemical Evaluation Unit at Southampton University from 1984 to 1995. That year he was named professor and head of the OSU Entomology Department, a position he held until moving to the Integrated Plant Protection Center in 2000. Dr. Jepson's research interests focus on integrated pest management, including pesticide application, efficacy, drift management, and ecological risk management; the use of aquatic and terrestrial insects as models for ecotoxicological research; population-level risk assessment, particularly the importance of scale, landscape factors, and long-term population processes; and applications of basic ecology and ecological theory to ecotoxicology and ecological risk assessment.

Matthew Keifer, Associate Director
Pacific Northwest Agricultural Safety and Health Center
Associate Professor, Environmental and Occupational Health Sciences
University of Washington

Dr. Keifer's work at PNASH is directed toward prevention and intervention and has included a skin disease prevention program for farm workers and orchard owners, prevention of ladder injuries among orchard workers, and a survey of data sources in the region. He is an internist and occupational medical specialist with an MD from the University of Illinois and an MPH from the University of Washington. He practices and teaches occupational and internal medicine at the Harborview Medical Center and conducts monthly occupational medicine clinics at the Yakima Valley Farm Workers Clinic. Dr. Keifer came to the UW in 1992 after serving two years in Nicaragua as a consulting epidemiologist for the Nicaraguan Ministry of Health, with support from the CARE International Safe Use Pesticide Program. He continues to pursue research in health effects of pesticides and is currently the Director of the UW Fogarty International Scholars Program.

Barbara Lee, Director
National Children's Center for Rural and Agricultural Health and Safety

Dr. Lee has been involved in childhood injury prevention issues since 1987. She is principal investigator of the National Children's Center, the North American Guidelines for Children's Agricultural Tasks, and a comprehensive evaluation of the National FFA's Partners for a Safer Community project. Dr. Lee is also a senior scientist with the Marshfield Clinic Research Foundation. She received an MS in Nursing from UW-Eau Claire, a PhD from UW-Milwaukee, and has authored journal publications and numerous reports related to children and farm safety. She chaired two major efforts to plan and update the national agenda for childhood agricultural injury prevention; the most recent report was released in May 2002. She is a past president of the National Institute for Farm Safety.

Linda McCauley, Associate Dean for Research
Nightingale Professor of Nursing
School of Nursing
University of Pennsylvania

Until 2004, Dr. McCauley was a Scientist at the Center for Research on Occupational and Environmental Toxicology at Oregon Health Sciences University. She is a national leader in environmental and occupational exposures and health research, using participatory research models to study disproportionate pesticide exposures among immigrant communities. Her current work includes a community-based intervention project with immigrant workers that aims to identify culturally-appropriate interventions to decrease the pesticide exposures of farm workers and their children. A major goal of this project is to disseminate the findings in ways that are understandable and meaningful to clinicians and immigrant populations. Dr. McCauley received her PhD in environmental health and epidemiology from the University of Cincinnati.

Steve McCurdy, Associate Director
Western Center for Agricultural Health and Safety
Associate Professor, Epidemiology and Preventive Medicine
University of California, Davis

Dr. McCurdy has an MD from the University of California, San Diego and an MPH in Epidemiology from the University of California Berkeley. His work has focused on general occupational and environmental medicine, epidemiology, occupational hazards for farm and semiconductor workers, toxicology, pesticides, and heavy metals.

Frank Mitloehner, Air Quality Extension Specialist
Department of Animal Science
University of California, Davis

Mitloehner earned an MS in Agricultural Engineering and Animal Science from the University of Leipzig, Germany, and a PhD in Animal Science at Texas Tech University. His previous research was conducted in air quality (dust emission and microbial sampling in feedlot cattle and pigs), environmental physiology (heat stress in cattle and pigs), and ethology. His current research focuses on environmental physiology, especially the effects of air emissions on animal health and welfare, and air quality related to livestock production, especially quantification of ammonia, dust, and odor emissions in dairies, beef feedlots, and poultry operations. The research is aimed at helping to establish environmentally benign livestock systems. Dr. Mitloehner chairs the beef cattle subcommittee and is a member of the Federation of Animal Science Societies Committee on Animal Care, Use, and Standards.

Helen Murphy, Research Outreach Director
Pacific Northwest Agricultural Safety and Health Center
University of Washington

Murphy's specialties include participatory epidemiology, outreach and education research, training, and health education materials development. She has 21 years of experience working in public health, the last 10 of which have been in environmental health. She spent six years with the United Nations Food and Agriculture Organization, first conducting research on the short and long-term effects of pesticides among women farmers in Indonesia. Before joining PNASH, Murphy worked for the Washington State Department of Health as an epidemiologist, where she conducted a statewide study of mercury in canned tuna fish. Her international research includes a three-year field trial on a cereal-based oral rehydration solution to prevent dehydration among Afghan children. Murphy also practiced clinically for 10 years as a Family Nurse Practitioner in Washington state with the US Public Health Service and in private practice.

Erik Nicholson, Pacific Northwest Regional Director
United Farm Workers of America, AFL-CIO

Nicholson oversees the union's organizing, political, and contract administration duties for Oregon and Washington. Since 2002, he has served as one of two national farm worker representatives to the Environmental Protection Agency's national pesticide advisory committee. Before joining the UFW, he worked for 12 years with PCUN, a farm worker union in the Willamette Valley. He has worked extensively on child labor, consumer outreach and education, legislative issues, and pesticide use and its effects on farm workers and their families. In the late 1980s, Nicholson worked for two years in Central America documenting human rights abuses. He has a BA from Duke University.

Marc Schenker, Director
Western Center for Agricultural Health and Safety
Professor and Chair, Epidemiology and Preventive Medicine
University of California, Davis

Dr. Schenker received his MD from the University of California at San Francisco. He completed his residency in internal medicine and training in pulmonary disease in Boston. He studied epidemiology and occupational medicine at the Harvard School of Public Health and the Channing Laboratory, receiving an MPH in 1980. After serving on the faculty of Harvard Medical School and the Brigham and Women's Hospital, he moved to Davis in 1983 to begin the occupational medicine program there. Dr. Schenker's research has focused on a wide range of occupational and environmental health hazards. He has studied many causes of respiratory disease and lung cancer. Most recently, Dr. Schenker investigated numerous health hazards in the agricultural environment, including respiratory disease, injuries, reproductive hazards, and toxic effects of pesticides and other agricultural chemicals. Dr. Schenker has (co) authored more than 140 scientific publications and co-edited two major textbooks: *Occupational and Environmental Respiratory Disease* and *Environmental Medicine, Concepts and Practice*.

Aimee Shreck, Instructor
Department of Sociology
University of California, Davis

In addition to her position at Davis, Dr. Schreck is a postdoctoral researcher with the Division of Society and Environment at UC Berkeley. Her research interests include social justice and sustainable agriculture, alternative agriculture initiatives, and the global agro-food system. Her dissertation research was conducted in the Dominican Republic and considered the implications of the Dominican Fair Trade banana initiative for small-scale farmers. She is currently studying the intersection of social sustainability and organic agriculture in California.

Judy BlueHorse Skelton

Herbalist, educator, and writer

Judy BlueHorse Skelton is of Nez Perce, Cherokee, and Chickasaw descent. She shares her knowledge of medicinal plants and healing at conferences, educational institutions, and workshops throughout the Northwest. A Student Support Specialist with Portland Public School's Title VII Indian Education program, she creates curricula and leads cultural activities focusing on the traditional and contemporary uses of native plants for food, medicine, ceremony, and health. At Portland State University, Skelton co-teaches the course, Environmental Education "Through Native American Lenses". She also guest lectures at the National College of Naturopathic Medicine and works in their clinic's medicinary. She has been a member of the American Indian Science and Engineering Society and serves as co-chair on the Native American Community Advisory board. For the past six years she has written about Native American culture and health for *The Oregonian* newspaper. Skelton also recently worked with Wisdom of the Elders, Inc. to record health segments for a weekly radio program sponsored by the Corporation for Public Broadcasting.

Eric Swenson, Public Information Specialist

Pacific Northwest Agricultural Safety and Health Center
University of Washington

Since 1985, Eric Swenson has written or co-authored six books and more than 500 articles, specializing in health, technical, scientific, environmental, and regulatory issues; commercial fishing; new technologies; and sports and exercise. He has also coordinated numerous conferences and edited several publications, most recently the guidelines for pesticide monitoring in Washington state. Before that, he taught English in the Washington state community college system and at Oregon State University. There, he was also director of the Global Studies Center and spearheaded establishment of the Oregon Governors Commission on Foreign Language and International Studies, the first in the nation. Swenson also served as the Principal Editor for Ernst & Young's interactive network, as Documentation Manager and User Education Writer for Microsoft, and as Editorial Director for Puget Sound's largest Internet developer. Before coming to PNASH, Swenson was Communications Director for Genelex, a genetics testing laboratory.

Ann Thrupp, Manager of Organic Development

Fetzer Vineyards

Dr. Thrupp's sole focus at Fetzer is to help keep the winery on track toward meeting its goal of having all estate and contracted vineyards farmed organically before the end of this decade. A noted researcher, consultant, and published expert on sustainable agriculture, food and environmental policy, and land use issues in rural development, she has two decades of both practical and academic experience. She was the Director of Sustainable Agriculture at the World Resources Institute, which involved her in research, educational, and development projects in Latin America, Africa, and Asia. Most recently, Dr. Thrupp served as a scientist and policy specialist with the United States Environmental Protection Agency, where she was part of the Agriculture Initiative program, providing grants and education on sustainable agriculture practices. Earlier, she apprenticed in organic viticulture at Frogs Leap Vineyards in Napa and helped Robert Mondavi Winery refine its natural farming program based on sustainable concepts. Dr. Thrupp is a Fellow in the California Agriculture Leadership Program. She was a Marshall and a Fulbright scholar at Sussex University in England, where she earned her MS and PhD.

Brad Warren, Editor/Associate Publisher
Pacific Fishing Magazine

Warren was an incisive feature writer for both *National Fisherman* and *Pacific Fishing* before becoming the latter's editor in 1994. He is a leading and widely respected voice in and for the fishing community. An authority on such issues as bycatch and marine conservation, Warren is the founder of the National Fisheries Conservation Center and a trustee of the Northwest Fisheries Association, which represents the region's seafood companies.

POSTER PRESENTERS AND ABSTRACTS

Comparing Cholinesterase Assays Used to Detect Pesticide Exposure and Chemical Terrorism

Daniel Arrieta, University of California, Davis

The cholinesterase (ChE) reference laboratory (CRL) at CHPPM monitors 16,000 personnel involved with chemical nerve agent and demilitarization operations. CRL uses a modification of the delta pH method of Michel. We collaborated with CRL to derive a conversion factor between the delta pH and the Ellman ChE assays and to estimate a range of normal human blood acetylcholinesterase (AChE) levels. Human red blood cells (RBCs) were assayed at UCD by delta pH and Ellman methods according to standard procedures. Both assays were carried out at 25 °C, using optimal final substrate concentrations of 10 mM acetylcholine bromide for the delta pH assay and 1 mM acetylthiocholine iodide for the Ellman assay. We treated RBCs with diisopropylfluorophosphate at UCD to include inhibited ChE samples in our comparison. This yielded a conversion equation: delta pH activity = (0.079) Ellman activity – 0.054 with an r² of 0.98. This approach permits comparison of results produced by the CRL method with those of the more recent colorimetric method used to detect pesticide exposures and chemical terrorism episodes.

Identification and Prevention of Injuries in Northwest Orchards: Analysis of Survey-Based Worker Interviews on Risks and Hazards

Heather Barr, University of Washington

The descriptive, exploratory study described in this poster is the second phase of a two-part study examining injuries and near misses among orchard workers. The purpose of the study is to understand the day-to-day experiences of orchard workers, to explore and characterize workers' injury episodes and near misses, and to examine workers' perceptions of risk. The first phase of the study consisted of in-depth interviews among 25 orchard workers. The findings indicated three categories of factors that affected injury occurrence: 1) beliefs, attitudes, and perceptions; 2) work-related circumstances; and 3) external conditions. Information from the interviews was used to develop a written survey designed to gain more in-depth information about injuries and near misses and to determine the prevalence of the factors identified in phase 1. The second phase, which is in process, consists of structured interviews administered by trained interviewers using the written survey. The goal is to conduct approximately 300 interviews in Eastern Washington, primarily in the Yakima and Wenatchee Valleys. The poster will present preliminary results assessing trends reflected in the data.

Farm Work and Preterm Low Birthweight Delivery Among Hispanic Women

Jeffrey Bethel, University of California, Davis

The objectives of this study were to: 1) examine the effect of farm work on PTLBW deliveries and 2) evaluate health characteristics of female Hispanic farm workers and non-farm workers receiving prenatal care in California. 1,024 Hispanic women receiving prenatal care services through prenatal clinics in Stockton, California were interviewed for a study investigating the risk factors for adverse pregnancy outcomes and the effects of immigration on risk factor profiles and pregnancy outcome. The women represented the spectrum of Hispanic immigrants from recent arrivals to Hispanics born in the US. Upon delivery, birth outcome data was abstracted from medical records. Baseline and birth outcome data were analyzed after classifying the women into three occupational groups: no work, non-farm work, and farm work during pregnancy. Incidence of PTLBW delivery was 8.40%, 8.21%, 7.25% for non-workers, non-farm workers, and farm workers, respectively (p-value 0.945). Age, education, gravidity, smoking, drinking, and drug use during pregnancy varied significantly by work status. Women who worked in agriculture during their pregnancy were older, less educated, had a higher gravidity, and had a lower prevalence of smoking, drinking, and drug use during pregnancy than non-workers and non-farm workers. Incidence of PTLBW delivery did not vary significantly by work status. However, these results identify Hispanic women in non-agricultural occupations as a group that is at a higher risk of engaging in less healthy behaviors that may affect birth outcomes, and therefore should be considered as a target group for public health interventions.

An Initial Investigation into Issues of Environmental and Occupational Concerns of Yakima Valley Residents

Noe Cardenas, Marisela Velazquez, Maria Valencia, ConneX Program, Northwest Community Action Center

Matthew Keifer, PNASH, University of Washington

This poster describes a community survey that was conducted by undergraduate students as part of a community-based participatory research project called El Proyecto Bienestar. This project seeks to develop strategies for improving environmental and occupational health among Hispanic agricultural workers and their families in the Yakima Valley. Partners in the project include the Yakima Valley Farmworkers Clinic, Heritage University, Northwest Community Education Center/Radio KDNA, Pacific Northwest Agricultural Safety and Health Center at the University of Washington. The student investigators were participants in the Connecting Students to Health Careers (ConneX) program, which is federally-funded through the Health Careers Opportunity Program. In addition to learning about community-based research methods, ConneX students participated in research design, field work, and data analysis. This year, the ConneX students conducted a survey of 206 Yakima Valley community members that characterized perceptions of environmental and occupational risks. Data gathered by these students will guide future steps in El Proyecto Bienestar. This poster outlines the methodology and presents preliminary findings for this survey.

Smart Engineered Ladders for Targeted Interventions to Prevent Injuries

Qianmei Feng, University of Washington

Ladder injuries appear to be one of the major contributors to the high rates of injuries in orchards. The objective of this project is to develop two sensor-based devices for ladders that can monitor the occurrence of risk conditions, warn workers of the condition, and evaluate the effectiveness and the cost-benefit of the interventions. The study begins with the development of intervention concepts. Then prototypes will be developed and field-tested, followed by intervention evaluation and cost benefit analysis. The project will develop:

strain gauges for

- location of the person and the direction the person is facing
- approximate determination of the signals related to the weight
- up or down movement based on the very recent signal history
- after-the-fact determination of whether or not the person skipped a rung

load cells for

- measurement of the load
- measurement of the center of gravity
- developing measures of stability of the ladder

In addition, these devices have potential use in training programs for ladder safety.

What Does The Institute of Medicine Gulf War and Health Panel Report (Volume 2) Suggest with Regard to Future Investigations of Pesticide Chemicals?

David Goldsmith, George Washington University

In 2003 the Institute of Medicine completed a second volume assessing the degree of causal evidence for several insecticides related to their use during the first Gulf War. Evidence was placed into five categories—sufficient evidence of a causal association; sufficient evidence of an association; limited/suggestive evidence of an association; inadequate/insufficient evidence to determine whether an association exists; limited/suggestive evidence of no association. Limited/suggestive evidence of an association was found for OP insecticides—non-Hodgkin’s lymphoma and adult leukemia; for carbamates—non-Hodgkin’s lymphoma; OPs and long-term neurobehavioral effects among those with OP poisoning; and a variety of insecticides and allergic contact dermatitis. These findings and others suggest future epidemiology and toxicology studies should be undertaken to evaluate OPs and carbamates for their cancer potential. OPs should be assessed for their long-term neurological effects, and pesticides should be evaluated for their dermatology risks. Furthermore, increased efforts should be made to protect workers exposed to these chemicals, as well as seeking safer, less toxic substitutes.

***Pesticide Health and Prevention, Collaboration with Native American Communities:
The EPA-Supported Tribal Medicine Program***

David Goldsmith, George Washington University

The tribal Pesticide Program Committee (TPPC) and US Environmental Protection Agency (EPA) defined the need for enhanced prevention and collaborative training on pesticides during 2000-2001. Training was sought for tribal health care providers, tribal members, and non-tribal health care providers who collaborated with tribes in production agriculture and environmental protection of traditional and sacred plants. In addition, there was a desire for enhanced training about pesticides because many tribes had regional EPA pesticide enforcement programs in place or wanted to initiate those programs. EPA awarded George Washington University (GWU) small grants, and GWU collaborated with tribal members on 1- or 2-day training programs. From 2001 to 2003 TMP/GWU offered 11 training workshops hosted by 10 nations in Arizona, California, Washington, Idaho, Montana, Oklahoma, and Maine. GWU strove for mutually agreed-upon agendas with issues such as diagnosing pesticide intoxication and clinical management; basic pesticide safety and health; listing of common pesticides applied to tribal lands; knowledge of repatriation pesticide hazards; prevention of herbicide application to traditional plants; knowledge of pesticide labels; proper use of personal protective equipment; disposal of containers; and dialogue between regional EPA, state enforcement, and tribal sovereignty in managing pesticides applied to their lands. This model of tribal-university collaboration worked best in a climate of professional trust and cultural sensitivity to common issues. Support by TPPC and regional and national EPA staff was crucial to providing dialogue and prevention expertise. Future work on tribal issues such as homeland security, rural air pollution, indoor air quality, and children's health and injuries could follow a similar model.

Pesticides, Genetics and Risk of Parkinson's Disease – Pilot Study Update

Anne Greenlee, Marshfield Clinic Research Foundation

Epidemiology, animal, and *in vitro* studies suggest exposure to agents such as pesticides, heavy metals, and solvents may play a role in late-onset Parkinson's disease (PD). Genetics may also contribute to risk. Few studies have examined interactions between genes and environment to determine if individuals harboring gene mutations may be more-or-less susceptible to environmental exposures. Here we present results from a two-year pilot case-control study aimed at determining interaction between host factors, environmental exposures, and risk of PD in rural Wisconsin. Notable highlights include:

- Survey developed to characterize occupational and residential risk factors.
- Strategy refined to maximize recruitment of cases and controls.
- System developed to collect, store, and track DNA and serum samples.
- Methods developed to analyze genomic and mitochondrial DNA polymorphisms.
- Pilot data analyzed.

A total of 60 participants (36 PD cases, 24 controls) were recruited to the study using three strategies. Highest rates of case-control participation, 46% (11/24) and 44% (11/25) respectively, were achieved for the approach that offered a variety of enrollment options for participants (at Marshfield Clinic, at-home, or via Telehealth technology). Combined (cases and controls) exposure rates for rural residence, solvents, heavy metals, pesticides and farming were 82% (49/60), 77% (46/60), 45% (27/60), 73% (44/60) and 40% (24/60), respectively. Laboratory methods were developed for haplogrouping mitochondrial DNA and for identifying mutations in genes coding pesticide-metabolizing enzymes. Pilot study findings should assist with full-scale efforts to overlay specific exposures and genetic factors to identify populations at greatest risk of developing Parkinson's disease.

Agricultural Work, Migration, and Acculturation In Female Mexican Migrants

Tamara Hennessy, University of California, Davis

The major goal of this study is to describe changes in health risks and associated disease among female Mexican migrants to California. It has been observed that many health risk behaviors and outcomes worsen among Mexican women after coming to the US, but the role that the migration process plays has not been fully investigated. Our aim is to examine the association of agricultural work with migration patterns and acculturation. 100 women born in Chavinda, in the Mexican state of Michoacán, and who currently reside in Madera, California were interviewed using a standardized questionnaire. This questionnaire gathered information related to migration patterns; acculturation; occupational history; women's health and reproductive issues; tobacco, alcohol, and drug use; dietary patterns; physical activity; use of preventive services; and respiratory and mental health outcomes. The mean age of participants was 34 years (SD=7.4), and the mean years living in the US was 17.1 (SD=9.7). 66.7% of the women were married, and the mean years of education was 9.7 (SD=3.4). 78% of women had done agricultural work while in the US and worked a mean of 6.0 years (SD=4.7) in agriculture. There were no differences between women who had worked in agriculture and those who had not in terms of age (35 vs. 30 years), number of years in the US (20.0 vs. 7.0 years) and acculturation scores (-1.72 vs. -2.58). The study concludes that understanding the relationship between acculturation, migration patterns, and agricultural work among female Mexican immigrants is important in designing programs to improve the overall health of these women.

Health and Safety Awareness for Working Teens in Agriculture:

A New Curriculum for Agricultural Educators in Washington State

Darren Linker, University of Washington

The *Health and Safety Awareness for Working Teens in Agriculture* (HSAWT-AG) curriculum was developed to teach high school students in grades 9-12 introductory information about workplace health and safety in an agriculture work environment. The curriculum is targeting students in Washington high schools who are participating in an agriculture education program. The HSAWT-AG curriculum was designed to help Washington agriculture educators meet the health and safety training requirement of the Washington State Office of the Superintendent of Public Instruction's Worksite Learning Standards. This flexible five-unit curriculum addresses the unique job hazards found in an agriculture work setting. The curriculum is composed of interactive lessons and activities that help engage students in learning about topics such as identifying hazards, information about the child labor regulations that govern agricultural employment, sexual harassment in the workplace, developing solutions to reduce and eliminate hazards, and appropriate ways to communicate with a supervisor when a safety issue occurs. Completed in the summer of 2004, the curriculum was first introduced to teachers at the Washington Association of Agriculture Educators annual conference. Future dissemination and training on how to use the curriculum will occur at select teacher conferences and at regional Future Farmers of America supervisor meetings. The curriculum will also be available by mail upon request, or via download through our program Web site.

***Agromedicine and Sustainable Agriculture—A Fertile Field for Collaboration:
Nutritional Gardens, Engineering Healthier Implements***
Carol Maxwell, North Carolina Agromedicine Institute;
Bryan Green, Center For Environmental Farming Systems

The North Carolina Agromedicine Institute (NCAI) is a consortium combining the scientific and administrative expertise of three universities within the North Carolina system (East Carolina University, NC State University, and North Carolina A & T). The Center for Environmental Farming Systems (CEFS), affiliated with NC State University, operates a 2,000-acre research farm, a substantial portion of which focuses on organic practices. NCAI and CEFS are working together to design and implement collaborative projects intended to wed NCAI's interest in agricultural health and safety and CEFS research on farming practices and principles. For example, this summer we launched a project aimed at designing home gardens based on the nutritional value of their produce rather than on its market value. This fall, ECU will induct the first cohort of students into its newly formed engineering program. CEFS and NCAI have established an ongoing collaborative program that will engage engineering students in solving real-life problems for the organic farming community. We hope that by presenting these two examples we will encourage further collaboration.

University of California, Davis Farmer Health Study: Third Survey of the Cohort
Diane Mitchell, University of California, Davis

The Farmer Health Study was established in 1993 with the aim of identifying and analyzing longitudinally the risk factors associated with morbidity and mortality in farm operators and subsequently providing strategies to reduce harmful exposures. The baseline cohort consisted of 1,947 full and part-time farm operators randomly contacted and eligible from a sample frame of 55,000 California farms. A computer assisted telephone interview (CATI) was used to collect information on demographics, farm tasks, environmental exposures, and health status. Follow-up CATIs were completed in 1998 [n=1349] and 2004 [n=866].

- The mean age of the cohort in 1993 was 54.5 years (sd = 13.4); in 2004 the mean was 64.3 years (sd = 12.1), and the range 36-94 years.
- 26.7% of the members participating in the follow-up study were retired from agricultural work. The major reasons cited for retirement were economic (38.8%), and health concerns (31.5%).
- Current versus lifetime self-reported exposure to agricultural dusts decreased by an average of 1.7 points on a 10 point scale (lifetime mean = 4.7 vs. last year = 3.0), self-reported exposure to fumes/gases decreased by 0.8 points, and pesticide exposure decreased by 1.0 points, [all paired changes significant: p value <0.0001].
- Respiratory symptoms such as chronic cough, chronic bronchitis, persistent wheeze and asthma increased in prevalence, by 4.5%, 5.2%, 2.5% and 3.5% respectively.

Issues of aging are intertwined with any effect of occupational exposures.

A View From The Field: How Communities Members Feel About The Research Done In Their Communities

Maria Negrete and Helen Murphy, PNASH, University of Washington.

Often researchers are not aware of the impact they are having on the communities from which they are extracting data. Maria Negrete, herself once a farmworker, has been collecting data from both growers and farmworkers since 1998 as the PNASH research field coordinator. From her unique perspective she will share the stories she hears from the community on how they feel, positively and negatively, about research. These attitudes have a profound effect on subject recruitment and the potential of future research. If we take these vignettes to heart, we should be able to design research projects that are more mutually beneficial for community members and their representative agencies.

Evaluating the Communication of Farm Safety Information Through Community Theater

Kathy Pitts, Eastern Washington University

The EWU Center for Farm Health and Safety developed an intervention project to provide health education and farm safety training for Hispanic agricultural workers in the Columbia Basin. Based on data gathered from health and safety literature, key informant interviews, and a farm worker focus group, it was apparent that health and safety education must be sensitive to the literacy and language constraints of this worker population. Theater was selected as a method of providing farm health and safety education because it does not require a high level of literacy. The most urgent health and safety needs of Hispanic farm workers and their families were identified through a series of focus groups. The information gathered in the needs assessment was used to develop four one-act plays written and presented in Spanish.

Social Sustainability, Farm Labor, and Organic Agriculture:

Findings From an Exploratory Analysis

Aimee Shreck, University of California Sustainable Agriculture Research and Education Program & Department of Environmental Science, Policy, and Management, University of California, Berkeley

Much of the attention by social scientists to the rapidly growing organic agriculture sector focuses on the benefits it provides to consumers (in the form of pesticide-free foods) and to farmers (in the form of price premiums). By contrast, there has been little discussion or research about the implications of the boom in organic agriculture for the farm workers who work on these farms. This exploratory study considers some of these implications. We present initial findings from a mail questionnaire sent to a random sample of organic growers in California during the spring of 2004. We find that perceptions of social sustainability and organic agriculture vary widely and imply new challenges and opportunities for the organic movement.

Agricultural Fatalities: The Washington State Fatality Assessment & Control Evaluation (FACE) Program

Tom Sjostrom, Washington State Department of Labor & Industries / SHARP

Agricultural workers are exposed to a variety of hazards and hazardous work environments. The fatality rate for the agriculture, forestry, and fishing industries in Washington state in the years 1997 to 1999 was 17.3 fatalities/100,000 workers, one of the highest of any major industry division. From 1998 to 2001, there were 40 agricultural work-related fatalities in Washington state. The poster describes the NIOSH/L&I/SHARP/FACE Surveillance Program and some of the FACE studies, data, and information about circumstances connected with farm-related deaths in Washington state. Identifying common elements associated with these deaths may provide insight into what might be done to most effectively prevent future fatalities.

Northeast Spanish-Speaking Dairy Workforce Study

Suzanne Stack, New York Center for Agricultural Medicine & Health

Hiring trends in the Northeast dairy industry suggest an increase in native Spanish-speaking workers. These Spanish-speaking dairy workers may be at higher injury risk due to language, social isolation, and dairy work inexperience. This study followed dairy farm hiring patterns and injuries to define: 1) the prevalence of Spanish-speaking workers; 2) the hiring trends of these workers; 3) their work experience; and 4) the injury rates of Hispanic versus non-Hispanic workers. This data will help determine whether the hiring of such workers represents a new agricultural safety and health challenge. Three hundred dairy farms from New York, Pennsylvania, and Vermont, stratified by size, were recruited and are followed for two-years. An initial phone call collected farm and worker demographic data. Subsequent quarterly phone calls, over a two-year period (eight calls per farm), provided information from farm owners on hiring changes and worker injuries. Final data collection is ongoing. Preliminary results indicate a substantial and growing population of native Spanish-speaking workers on Northeastern dairy farms, particularly larger ones (300 or more milk cows). The majority of Spanish-speaking employees work single tasks (primarily milking). The injury incidence is non-significantly higher in English-speaking workers compared with Spanish-speaking workers, possibly because the latter's tasks are currently limited to milking. The final results will be used to inform New York Center for Agricultural Medicine and Health and rural health agency safety and health outreach and education activities.

Modeling Deposition from an Aerial Spray Application

Michael Yost, PNASH, University of Washington

Pesticide spray drift continues to be a concern in farming communities. Understanding how different exposure pathways contribute to pesticide body burden is important for preventing exposures. In 2002, we monitored an aerial application of an organophosphate pesticide (methamidophos) to a potato crop in Eastern Washington (Weppner et al., 2004). Deposition and air concentration samples were collected and modeled with a Gaussian dispersion model. The modeling of the spray deposition accounted for over 70% of the variance explained by the model. Total deposition over a large community area was low, typically on the order of 0.1 ug/cm². The observed variation in deposition by location suggests that only a few areas had significant drift, and that modeling is necessary for an accurate exposure assessment. The observation that deposition occurs at distinct time periods, mainly due to shifting meteorology, may require a reassessment of spraying guidelines.