

this monitoring program. Approximately 300 handlers will be recruited for this study. Risk of ChE depression will be evaluated with respect to workplace, behavioral, and genetic characteristics (paraoxonase or PON1 status). A recently developed computer-based survey instrument is being used to collect information about potential OP/CB exposures and other factors that may be related to ChE activity. This survey instrument features audio-recorded questions and icon-based responses that are displayed on a touch screen Tablet PC. The poster also addresses efforts to validate reported exposures through worksite visits for a subset of participants, and analyses of blood specimens for determination of PON1 status for each participant. The overall goal of this study is to characterize potential mechanisms of pesticide overexposure, and determine how such exposures can be prevented among handlers. This study will also provide epidemiologic evidence to determine whether findings from animal-based studies that PON1 status is associated with susceptibility to OP pesticides are consistent in humans.

Support for this project was provided by the following grants: Center for Ecogenetics and Environmental Health Pilot Project Program (NIEHS Award # P30ES07033); Environmental and Molecular Epidemiology Training Grant (NIEHS Award # T32 ES07262); Northwest Center for Occupational Health and Safety (CDC/NIOSH Award # 1 T42 OH008433-01); and the Pacific Northwest Agricultural Safety and Health Center (CDC/NIOSH Award # 1 U50 OH07544-04).

## Poster #7

### **Pesticide Effects: Integration into Health Care Provider Curricula**

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This multidisciplinary project is designed to introduce the National Pesticide Competencies for Medical and Nursing Education\* into the primary curricula of health care providers. These competencies cover concepts that are key to the understanding of the human health effects of pesticides, with a focus on the occupational setting. The project includes participants from the University of Washington, Schools of Medicine, Nursing, Public Health, and Physician Assistants, Seattle Pacific University, Heritage University and the National Pesticide Information Network.

Goals:

- Develop pesticide related curriculum materials on core competencies for integration in the primary training of health care professionals
- Enlist committed students in the material development
- Identify topics, phases and processes in the curricula of health care professionals that provide insertion points for these materials
- Enroll key faculty in Seattle area and WWAMI institutions to develop strategies to integrate materials into existing curricula
- Evaluate strategy effectiveness and the impact of the insertion of material through classical pedagogical measurement methods
- Develop a dissemination plan for national distribution of successful curricular materials and strategies for integration into curriculum.

Expected Products:

- Tested modules designed for introduction into curricular formats
- Tested strategies for module introduction into health care provider training
- A cadre of young pesticide champions.

Examples of modules developed to date and project strategy will be shared. Funding provided by the US EPA, Grant#: 83273201.

\*National Pesticide Competency Guidelines for Medical and Nursing Education, 2003. NEETF, [www.neetf.org/health/providers/index.shtm](http://www.neetf.org/health/providers/index.shtm)

## Poster #8

### **Research to Practice Feasibility Study of an Ergonomic Apple Harvest Bucket**

**Amanda Jones**, Giulia Earle-Richardson, Suzanne G. Stack, Paul L. Jenkins, John J. May, Northeast Center for Agricultural Health, NYCAMH, Bassett Healthcare, Cooperstown, New York

Introduction: Previous research has demonstrated that an ergonomic apple picking bucket and belt is accepted by orchard workers, does not adversely interfere with productivity, and significantly reduces muscle recruitment in a number of key back muscles in the laboratory.

Objective: To evaluate the intervention's effect on muscle load in the orchard with actual harvest workers using electromyography (EMG).

Methods: Mean amplitude measurements on five muscles were taken from 10 farm worker volunteers who were working an ordinary day in the apple orchard. The subjects wore the intervention belt one day and no belt the other day. These measurements were taken for five different postures common to apple harvest work.

Results: Favorable results were seen for the belt condition in the orchard, relative to muscle recruitment, for the lower erector spinae, the muscle for which greatest benefits were seen in the laboratory.

Conclusion: Results in the orchard were similar, but less dramatic than laboratory results. This is likely due to the greater level of physical conditioning among actual harvest workers. This suggests that ergonomic apple bucket benefits will be greatest at the beginning of the season and among less seasoned workers. NIOSH grant 1 R01 OH008153-01.

### **Poster #9**

#### **Pesticide Drift: How Much Is Too Much? How Little Is OK?**

**Robert Krieger** and Helen Vega, Personal Chemical Exposure Program, Department of Entomology, University of California, Riverside, 92521

Advanced drip irrigation of chloropicrin (CP;  $\text{CCl}_3\text{NO}_2$ ) reduces pesticide drift during preplant soil fumigation of strawberries. Chemigation near Salinas on October 5, 2005, resulted in CP drift when the fields were accidentally sealed with water containing some residual CP. Fifteen 911 calls requested information or reported eye irritation, shortness of breath, and nausea. Emergency responders were unable to detect CP over treated fields or at residences where illness had been reported. No persons were hospitalized. The episode occurred in a small area over several hours. Ambient CP levels were likely at the sensory threshold (or much more commonly less than that). Intensive follow-up investigation revealed a spectrum of responses reported by persons in proximity to the field and among persons at the same residence. Medical evaluations of the health significance of the episode are lacking. Available investigations are useful to gauge the nature and extent of CP exposure and to guide future exposure mitigation measures.

Drift is an undeniable consequence of the Laws of Conservation of Matter. All pesticide applications are associated with drift if sufficient analytical power is applied. Existing regulations intended to prohibit drift

are archaic. Major reform is past due (perhaps using a food residue risk assessment model). Regulations are unevenly administered. Chemicals like CP with exposure warning odors and sensory effects have become self-incriminating in the present drive for no risk pest management technologies.

### **Poster #10**

#### **Risk of Depression in a Cohort of Older Working Californian Farmers 2004.**

Adeyemo, MA, Mitchell, DC Schenker, MB, Department of Public Health Sciences, University of California, Davis.

Background: Male agricultural workers have been reported to have the highest level of depression of all occupational groups.

Objective: To assess the risk of depression in older working Californian farmers.

Methods: The UC Davis Farmer Health Study cohort were asked an 8-item measure to predict depression as part of the 2004 survey. Of the 866 participants, the 623 still actively working were included in this cross-sectional study. Associations between likely depression and environmental or occupational exposures were assessed using SAS 9.1 programming. Univariate associations with depression were assessed using t-tests for continuous variables, and Chi-square tests for categorical. Multivariate associations were assessed using multiple logistic regression.

Results: 4.65% (29 of 623) working farmers, mean age 62.3 years (11.6sd), were at risk for depression. In a multivariate logistic regression model, adjusting for age and gender, depression was significantly associated with all of the following: water damage to the home [OR, 3.91(95% CI 1.40 – 10.89)], hand harvesting [OR, 2.63(1.11 – 6.22)], and BMI [OR, 1.13(1.04 – 1.22)]. Work ability [OR, 0.72(0.59 – 0.88)] and tractor driving [OR, 0.224(0.09 – 0.57)] were protective.

Conclusion: The rate of depression in older working farmers of 4.65% closely mirrors the rate of depression in all older Americans of 5.71% according to the NIMH. Risk of depression in older working farmers is associated with both farm tasks and personal characteristics. Longitudinal studies are needed to tease out what factors lead to depression and which are a result of being depressed.

NIOSH 1U50 OH07550

# **HEALTH & SAFETY IN WESTERN AGRICULTURE: Research to Practice**



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