

## **Personal Chemical Exposure Program**

Chemical technologies including pesticides in integrated pest management are critical parts of many day-to-day activities. Each chemical use is associated with human chemical exposures at some level. Increasingly they are measurable and of general or regulatory interest. Exposures are usually benign. We classify them as they occur in our personal, occupational, community and global environments. Measurements of exposure are critical to gauging their possible environmental and health significance. It is axiomatic that “Dose determines a poison” after Paracelsus (1483-1541). Exposure assessment can be used to demonstrate the all-important, corollary that, “There is a safe level of everything!”

The Personal Chemical Exposure Program in the Department of Entomology conducts human and environmental studies intended to clarify and define important chemical exposure issues. Concepts in chemical exposure assessment related to our research include risk assessment, mitigation, perception and regulation.

### **Human Exposure Assessment in Risk Perception and Risk Management**

Identification and movement of pesticides and other chemical residues from the environmental to children and adults. Indoor, turf, and agricultural settings have been included in our program. Findings to date contribute to generalized knowledge of contact-transfer processes that determine human chemical exposure.

### **Agricultural Pesticide Use**

In agriculture the Personal Chemical Exposure Program research has supported development of exposure-based field entry times. Expert opinion dominated toxicity-based entry times that were extensively used prior to implementation of the risk assessment process in the 1980s. Effective field entry times require knowledge of available surface residues, accurate human pesticide exposure data, and clear definition of work tasks. Short-term, seasonal, and long-term exposures need to be considered. We continue to investigate the relationship between surface chemical residues including dislodgeable foliar and surface residues on turf or agricultural crops or indoor pesticide residues in homes and potential human chemical exposure.

Transfer and human bioavailability of residues are evaluated and validated using urine biomonitoring. We explore chemical transferability of chemical residues with respect to chemical (active ingredients as well as spray adjuvants) as well as from physical characteristics (absorption, particularly cuticular waxiness in the case of plants and nylon carpets). New laboratory and field methods are being developed to better understand some critical human chemical exposure issues. Whenever possible PCEP researchers seek to link environmental chemicals and human biomarkers of exposure. Concentration (dose) and time relationships are continually being defined, clarified, and evaluated using biomonitoring.

### **Home Pesticide Use**

Studies of indoor exposure potential of insecticides are a second major initiative of the Personal Chemical Exposure Program. Agriculture exposure assessment and indoor studies share much in common. Physical and chemical methods of determining chemical deposition and availability are under study. Indoor studies also permit close evaluation of environmental sampling devices (dosimeters) to assess potential exposure of adults and children. Family based studies have been a prominent part of work with organophosphorous, N-methyl carbamate, and

pyrethroid insecticides. Since environmental measurements are especially critical for indoor studies, these activities continue to represent important scientific challenges that have considerable regulatory importance.

### **Protection of Human Subjects**

Program Staff have completed the "Tutorial on the Protection of Human Subjects Used in Research" The tutorial can be found at <http://www.ora.ucr.edu/appTutorial/TutorialClient/Introduction.asp>. Human studies are reviewed by the UC Riverside Institutional Review Board and California Environmental Protection Agency Committees.

