

**Table 1: List of Funded Pilot Project Research Training Projects  
Occupational and Environmental Health and Safety Education and Research Center at the  
University of Illinois at Chicago (Illinois ERC)**

<b>Project Title</b>	<b>Principal Investigator</b>	<b>Institution</b>	<b>Project Period</b>	<b>Award amount</b>	<b>Primary NORA Topic</b>
<b>Teacher Assaults: Risk Factors and Compensation Costs</b>	<b>Pamela Levin, Faculty</b>	<b>University of Illinois at Chicago Dept. of Public Health, Mental Health, and Administrative Nursing</b>	<b>FY00</b>	<b>\$13,697.00</b>	<b>Traumatic Occupational Injuries</b>
<p>Although school violence has received much attention, little is known about factors that precipitate an assault, the nature of resulting injuries, or consequences of the assault. The purpose of the study is to describe the magnitude and costs of assaults to a high-risk group of workers, teachers in Chicago Public Schools (CPS). Project objectives include: 1) describe the frequency, cost, outcome, and nature of injuries associated with teacher assaults; 2) identify contributing factors in terms of teacher, school, and environmental/community characteristics; 3) identify predictors of teacher assault. The sample will consist of all cases of intentional assaults that occurred to CPS teachers over the last three years (n ~ 225). Existing data will be used and sources include CPS internal reports, police and health department records. The data collection instrument will be refined during the study and reliability established. Descriptive statistics, analysis of variance, chi-square analysis, and logistic regression procedures will be used. This study will increase knowledge about contributing factors of assault in an understudied population, as well as provide initial data about claim costs. Knowledge gained from this study will serve as a basis to develop interventions to reduce the incidence and severity of assault-related injuries to teachers.</p>					
<b>An Exposure Assessment Method to Simulate Coughing in a Workplace</b>	<b>John Franke, Faculty</b>	<b>University of Illinois at Chicago Environmental &amp; Occupational Health Sciences</b>	<b>FY00</b>	<b>\$13,550.00</b>	<b>Exposure Assessment Methods; Infectious Diseases; Indoor Environment</b>
<p>The project will develop an exposure assessment method for a burst source of air contaminants, namely an infectious cough, using tracer particles that are detectable at very low concentrations in a room. The research product is an exposure assessment method that can be applied in work environments to simulate the hazard of viable or non-viable aerosol sources. The method is needed (1) to validate exposure assessment models of particle emissions in workplaces, (2) to evaluate sources and pathways of airborne infection in healthcare settings and to augment ventilation control strategies, and (3) to trace suspected sources of particulate air contaminants in other indoor environments. A portable device that simulates the expulsive phase of a human cough will be built to emit a burst of droplet nuclei. It will use respirable-size fluorescent microspheres propelled by a pressurized air and tracer gas mixture to simulate the hazard. The device will be tested in a wind tunnel using an air sampling strategy to characterize the dispersion and residence time of the tracer particles and gas. The particles will be collected on filters and counted with epi-fluorescent microscopy. The cough simulation device and air sampling array experiments will determine the limits of quantitation and detection for the new method.</p>					
<b>An Analysis of the Prevalence, Cause, and Cost of Injury to Fire Fighters</b>	<b>Surrey Walton, Faculty</b>	<b>University of Illinois at Chicago College of Pharmacy</b>	<b>FY00</b>	<b>\$8,400.00</b>	<b>Social &amp; Economic Consequences of Workplace Illness &amp; Injury</b>
<p>The objective of the project is to study the prevalence, costs, and causes of occupational injuries among fire fighters. The analysis will take advantage of a unique data set provided by IRMA that contains detailed information regarding type, cause, and complete workman's compensation costs of injury to fire fighters in Northeastern Illinois. Changes in the prevalence, costs, and causes of injury will be examined across demographic characteristics of the workers and time. Costs of injury will also be examined across common types and causes of injury. The data will also be used to distinguish injuries that may be preventable through improved physical fitness. Total workman's compensation costs for fitness related injuries will be analyzed to evaluate potential economic benefits from programs designed to improve fitness levels. The cost of injury to firefighters has not been studied beyond single department analyses. Hence, the main contribution to improved work safety will be a detailed analysis of the costs of injury to fire fighters across type and cause as well as demographic characteristics and time. More generally, this analysis will help inform policies and programs designed to prevent injury, and help to efficiently allocate resources for reducing injury.</p>					
<b>Intelligent Safety Sensing and Controls for Off-road Equipment</b>	<b>Qin Zhang, Faculty</b>	<b>University of Illinois - Urbana/Champaign Department of Agricultural Engineering</b>	<b>FY00</b>	<b>\$8,193.00</b>	<b>Control Technology &amp; PPE</b>

<p>This research will address the specific topic of intelligent safety sensing and control technology for off-road equipment. Off-road equipment is designed to perform operations while in moving. This often results in an unsafe working environment around the equipment for human-machine interaction while in operation. The long-term goal of this research is the development of an intelligent safety sensing and control technology to provide an automated safety assurance for off-road equipment. The principal objectives are to develop an intelligent safety sensing technology for detecting human presence and to develop a safety measure method for identifying safety index around the operating equipment. The information of human presence in area with different safety indexes will be used to support automated safety assurance function for off-road equipment. Interest exists at the commercial level in developing technologies along the line of this proposal. This proposal will cover the initial phase of developing intelligent safety sensing and control technology for off-road equipment. Funding to complete the final phases of the project will be sought from Federal agencies and industry. A project advisory committee, including experts from both agricultural safety and equipment automation areas, will be established to provide advice in conducting this research.</p>					
<b>Human Exposure to a Mixture of Dust and Ammonia</b>	<b>Patrick T. Shaughnessy, Faculty</b>	<b>University of Iowa, Dept. of Occupational and Environmental Health</b>	<b>FY01</b>	<b>\$15,518.00</b>	<b>Asthma &amp; Chronic Pulmonary Disease</b>
<p>Through the National Occupational Research Agenda (NORA), the National Institute for Occupational Safety and Health (NIOSH) has emphasized the need for research related to occupationally-related airway diseases such as asthma and chronic obstructive pulmonary disease (COPD). With that agenda as its primary emphasis, this research will investigate the health hazards associated with both airborne dust and ammonia gas concentrations typically found in modern swine confinement buildings by clinical trial. To that end, a novel human exposure apparatus will be tested for its ability to provide consistent, and easily monitored, levels of dust and ammonia to human subjects without constraining the subject's ability to breath normally through the nose and mouth. The apparatus consists of a small air-blower that moves air through a steel drum and into a hood worn over the subject's head. An aerosol and/or gas is injected into the drum where it is mixed with the main air supplied by the blower. Sample ports are available to measure aerosol and gas concentrations. Human subjects will be recruited and initially given a standard histamine challenge test. Subjects will then be exposed to low and high levels of an organically-derived dust (ground corn plant), ammonia, and a combination of the two. Results from this study will be used as preliminary data in support of a larger grant developed to determine threshold levels of airborne contaminant concentration levels in swine confinements.</p>					
<b>Intelligent Safety Sensing and Controls for Off-road Equipment</b>	<b>Qin Zhang, Faculty</b>	<b>University of Illinois - Urbana/Champaign Department of Agricultural Engineering</b>	<b>FY01</b>	<b>\$11,950.00</b>	<b>Control Technology &amp; PPE</b>
See above					
<b>Occupational Lung Disease in Ukrainian Coal Miners</b>	<b>Robert Cohen, Faculty</b>	<b>University of Illinois at Chicago Environmental &amp; Occupational Health Sciences</b>	<b>FY01</b>	<b>\$16,000.00</b>	<b>Surveillance, Occupational Chronic Obstructive Lung Disease</b>
<p>This pilot surveillance project will study occupational lung disease among Ukrainian coal miners. This population is ideal since they undergo a mandatory annual physical examination with 97% participation rates. Work, smoking, and clinical history will be obtained by face to face interview. Spirometry will be performed according to ATS guidelines. Lung function results will be compared to exposure and smoking history. Chest radiographs will be taken using Ukrainian equipment and the films read by NIOSH certified B-readers using ILO 1980 standards. Data on concentrations of coal mine dust will be obtained from MSHA sampling studies obtained in Ukraine as well as pilot dust samples from the specific mines where the study population works. Data will be analyzed for relationships between dust and tobacco smoke exposure and indicators of occupational lung disease. This study will aid evaluation of lung function measurements in medical surveillance as recommended by NIOSH in the 1995 Criteria Document. The results of this study would have important implications for our domestic coal industry since spirometry surveillance has yet to be implemented. Outcomes for this project will be: presence of respiratory symptoms, category of pneumoconiosis on CXR, and lung function impairment.</p>					
<b>Occupational Lung Disease in Ukrainian Coal Miners</b>	<b>Robert Cohen, Faculty</b>	<b>University of Illinois at Chicago Environmental &amp; Occupational Health Sciences</b>	<b>FY02</b>	<b>\$16,000.00</b>	<b>Surveillance, Occupational Chronic Obstructive Lung Disease</b>
See above					
<b>Immunologic Risk Factor for Laboratory Animal Allergy</b>	<b>Samuel Dorevitch, Faculty</b>	<b>University of Illinois at Chicago Environmental &amp; Occupational Health Sciences</b>	<b>FY02</b>	<b>\$15,844.00</b>	<b>Allergic &amp; Irritant Dermatitis; Asthma &amp; Chronic Obstructive Pulmonary Disease</b>

<p>This project seeks to prevent occupational asthma, allergic dermatitis (such as contact urticaria), and allergic rhino-conjunctivitis. Laboratory animal allergy (LAA) affects about 30% of all laboratory animal workers. The proposed study seeks to identify risk factors for LAA. The risks we will study are those of the "hygiene hypothesis" of allergic diseases, which postulates that the risk of allergic diseases increases as childhood exposure to infectious agents decreases. Information regarding these risk factors will be obtained by questionnaire and blood testing. A cross-sectional study of current laboratory animal workers, with and without LAA, will be performed as will a prospective cohort study. In the cohort study we will obtain baseline historical and immunologic profiles of new workers with laboratory animals. Over time and we will identify variables that predict the development of LAA. This work has the potential to make several contributions to occupational health. Occupational allergic diseases are common yet there are currently no variables that consistently identify workers as being high risk for the development of these illnesses. The identification of such variables would allow greater protection of these workers in the workplace control measures that may otherwise not be implemented.</p>					
<b>Enhancing the Detection of PAH Metabolites</b>	<b>An Li, Faculty</b>	<b>University of Illinois at Chicago Environmental &amp; Occupational Health Sciences</b>	<b>FY02</b>	<b>\$15,975.00</b>	<b>Exposure Assessment Methods</b>
<p>The overall objective of this proposed work is to enhance the detection of PAH metabolites in urine samples. Compared with the methods published previously, improvement will be made regarding the number of PAH metabolites to be analyzed, and the detection limits. Both GC/MS and HPLC/FLD will be used, and compared for their sensitivity, accuracy, precision, and reproducibility. The method will be validated using raw or spiked urine samples. The urine will be obtained from the study team, and other characteristics of the urine will not be studied. The identity of the metabolites detected will be confirmed using MS spectrum matching, and, if needed, by nuclear magnetic resonance spectroscopy (NMR). This work will establish our expertise at UIC SPH in analyzing PAH metabolites in urine and probably other biological samples as well. Realizing the high research priority of various funding agencies on cancer and risk assessment of PAHs, such expertise will enhance our ability in competing for external funding on occupational safety and environmental exposure to PAHs. It may also enhance our collaboration with other UIC units with research on the health effect of PAHs. This pilot project addresses a fundamental need in exposure assessment. Because of the state-of-the-art feature of our instruments, it is possible that the detection limits obtained from this work be the lowest ever achieved. This work has the potential to contribute significantly to the occupational safety and environmental exposure and risk assessments. With what we have established here at UIC during the past years, it is my desire to expand our capability and contribute to the progress in this challenging field.</p>					
<b>Investigation of Sampling Performance of Thoracic Size-selective Sampling</b>	<b>Serap Erdal, Faculty</b>	<b>University of Illinois at Chicago Environmental &amp; Occupational Health Sciences</b>	<b>FY02</b>	<b>\$15,621.00</b>	<b>Exposure Assessment Methods</b>
<p>Improved criteria for sampling biologically-relevant aerosol in the inhalable, thoracic, and respirable size ranges have achieved international acceptance, and have been established in the U.S. by the ACGIH. The focus of this study, the thoracic size fraction, is intended to provide a conservative estimate of particles capable of reaching the portion of the respiratory system below the larynx, i.e., the lungs, during the mouth breathing. The thoracic fraction is biologically-relevant in the case of substances having a local effect on the conductive respiratory airways, like irritation, or in the case of toxic substances, which can slowly diffuse into the blood through the tracheo-bronchial walls. In recent years, a few thoracic samplers have been constructed and made commercially available but no extensive evaluation or field measurements with these samplers have been reported in the literature to date. The purpose of this study is to test the performance of commercially available thoracic samplers against commonly used 37-mm sample for wood dust exposure; and to determine how well each thoracic sampler mimics the ACGIH thoracic convention. The results of this study will serve to advance our understanding of thoracic dust exposure assessment methods, and eventually facilitate practical implementation of the ACGIH standards.</p>					
<b>Characterization and Modeling of Dust Exposures at an Agricultural Facility</b>	<b>Steve Lacey, Research Trainee, PhD candidate</b>	<b>University of Illinois at Chicago Environmental &amp; Occupational Health Sciences</b>	<b>FY02</b>	<b>\$11,093.00</b>	<b>Special Populations/Exposure Assessment Methods</b>
<p>The overall objective of this proposed study is to examine dust exposure in an agricultural produce sorting and packing operation in an ultimate effort to control such exposures, thereby reducing eye and respiratory injuries and illnesses. Specifically, the proposed study intends to: 1) To quantify exposure to total and respirable dust; 2) To develop emission factors for sorting/packing operations; 3) To characterize the composition of the dust samples, including: Particle size distribution, Allergens, Metals, Pesticide residue, Percent silica, Percent plant fiber. Basic exposure data are limited, and there are no emission factors for any agricultural processes noted in the literature. This proposed study is to develop an emission factor for dust exposure in a produce sorting and packing facility. Development of such a factor will permit proximate estimation of exposures in similar facilities, will provide exposure estimates for historical epidemiological studies, and will allow for better design in the control of agricultural dust hazards. By characterizing the composition of dust, we will better understand possible health implications from such exposures in agriculture, specific to the Midwest region of the United States.</p>					
<b>Source Apportionment of PAHs in Chicago Residence Homes</b>	<b>An Li, Faculty</b>	<b>University of Illinois at Chicago Environmental &amp; Occupational Health Sciences</b>	<b>FY03</b>	<b>\$14,246.00</b>	<b>Indoor Environment</b>

<p>The overall objective of this work is to quantitatively apportion the sources of polycyclic aromatic hydrocarbons (PAHs) found in urban homes. This objective will be achieved by applying a chemical mass balance (CMB) to measured PAH concentrations in residential indoor air. Major indoor sources will be sampled and characterized for their molecular profiles, or fingerprints, of PAHs. The proposed study will take the advantage of a large database obtained from our recently completed indoor PAH study. All data sets contain PAH concentrations in indoor and outdoor air samples collected simultaneously from non-smoker homes, and detailed information on other air quality parameters and household activities. Using this data base and other data obtained from the literature, the CMB model will be evaluated for its performance on indoor PAHs source identification and apportionment. The computer software CMB8.2 developed by USEPA will be used as the major computation tool. Source identification and apportionment are important components of exposure assessment, and key steps in the development of intervention strategies. Such efforts will foster our ability to assess human exposure and risk without the need of costly measurement, and provide scientific guidelines for intervention plans.</p>					
<p><b>Study of the Effect of Welding Processing Parameters on Fume Composition and Emission Rate</b></p>	<p><b>Serap Erdal, Faculty</b></p>	<p><b>University of Illinois at Chicago Environmental &amp; Occupational Health Sciences</b></p>	<p><b>FY03</b></p>	<p><b>\$17,806.00</b></p>	<p><b>Exposure Assessment Methods and Mixed Exposures</b></p>
<p>Our objective is to evaluate and establish the relationships between the welding processing parameters such as composition of base metal, composition of the filler material (i.e., electrode), current, voltage, weld travel speed on welding emissions (composition, particle size, and morphology) and consequently on welding exposures. Welding emissions are complex mixtures of various elemental compounds (e.g., Mn, Ni, Cr, Si, Mo, V), gaseous compounds (ozone, nitrogen dioxide), and hydrocarbons (e.g., dioxins, PAHs). The complexity of evaluating welding exposures is partly due to many different welding processing employing various base and filler materials, shielding gases for materials and metallurgical processing applications. By selecting two welding processes, which build on top of another, we will be able to isolate filler emissions from base metal emissions, which has not been reported in the literature to our knowledge. Construction of semi-empirical relationships for the emissions of elements as a function of welding processing variables (our literature review did not reveal such relationships already established) will be very beneficial in predicting emissions from other base and filler materials used in the same two welding processes and under various welding processing conditions.</p>					
<p><b>Mechanisms of Lung Epithelial Cytotoxicity due to Metal Exposure</b></p>	<p><b>Daniel Tessier, Faculty</b></p>	<p><b>University of Illinois at Chicago Environmental &amp; Occupational Health Sciences</b></p>	<p><b>FY03</b></p>	<p><b>\$17,277.00</b></p>	<p><b>Asthma and COPD</b></p>
<p>Occupational asthma occurs as a result of exposure to specific respiratory hazards in the workplace, and is currently the most common form of work-related lung disease. Welding is a common job function in many workplace settings, and is a significant risk factor in the development of occupational asthma. Condensed metal vapors of chromium and manganese stand out as putative causes of welding-associated occupational asthma, based on epidemiological studies. Current understanding of the biochemical mechanisms by which metal vapors cause occupational asthma is very limited. Toxicologic rather than immunologic processes may be primarily responsible for the development of occupational asthma following exposure to metal vapors. Epithelial damage is common to all forms of asthma, so the direct toxic effects of respiratory hazards to lung epithelium are significant. Chromium and manganese are cytotoxic to lung epithelial cells in vitro. The current proposal will determine the mode of cellular death following exposure to these metals (i.e., apoptosis vs. necrosis), and the initiation of toxic stress responses in epithelial cells. This mechanistic information may help explain individual susceptibilities to the development of occupational asthma, provide a rationale for workplace prevention and clinical treatment options, and provide an experimental framework for the characterization of other respiratory toxicants.</p>					
<p><b>Immunologic Risk Factor for Laboratory Animal Allergy</b></p>	<p><b>Samuel Dorevitch, Faculty</b></p>	<p><b>University of Illinois at Chicago Environmental &amp; Occupational Health Sciences</b></p>	<p><b>FY03</b></p>	<p><b>\$16,982.00</b></p>	<p><b>Allergic &amp; Irritant Dermatitis; Asthma &amp; Chronic Obstructive Pulmonary Disease</b></p>
<p>See above</p>					
<p><b>Adaptive Tractor Overturn Prediction System (ATOPS)</b></p>	<p><b>Tony Griff, Faculty</b></p>	<p><b>University of Illinois - Urbana/Champaign Department of Agricultural Engineering</b></p>	<p><b>FY04</b></p>	<p><b>\$15,686.12</b></p>	<p><b>Traumatic Injuries</b></p>
<p>It is proposed to fit a _ scale tractor with load cells that indicate the forces on all wheels in real time. The tractor will also be modeled in a mechanical systems simulation tool called ADAMS. The tractor and model will be used to run classical tractor overturn scenario's such as 1) gradual lateral overturn on a hill slope, 2) gradual backward overturn on a hill slope, 3) high draft force backward overturn. The results will be used to show that the proposed method is superior compared to alternative sensors such as tilt or acceleration sensors. These sensors can only detect an overturn as it is happening, whereas the proposed force measurement sensor can give an indication of the proximity of the overturn occurrence. The objectives are to 1) develop the instrumented tractor, 2) to model the overturn behavior in mechanical systems simulation software (ADAMS) and to 3) validate the model using the _ scale tractor.</p>					

<b>Laboratory Animal Allergen Production and Transport in a Working Animal Research Facility</b>	<b>James Artwohl, Academic Staff</b>	<b>University of Illinois at Chicago Biological Resources Laboratory</b>	<b>FY04</b>	<b>\$15,049.38</b>	<b>Asthma and Chronic Obstructive Pulmonary Disease; Indoor Environment; Mixed Exposures; Control Technology and Personal Protective Equipment; Exposure Assessment Methods</b>
<p>Allergy to laboratory animals is a common problem in research facilities and can cause rhinoconjunctivitis, contact urticaria or occupational asthma. Controlling allergen exposure is key to preventing the development of allergies and reducing disease severity among those sensitized. Prior research has described allergen concentrations in animal rooms of research facilities but little is known about the transport of allergens within the facility, which is useful in planning control measures to reduce allergen exposures of all workers, both sensitized and non-sensitized. We propose a study that has two components: 1) allergen production and transport modeling within the facility, and 2) an intervention to reduce exposure. Mouse allergen concentrations will be measured over a twelve hour period daily for five consecutive days, both inside a mouse room, in the adjacent corridor, and in an administrative office where animals are not present. This will be repeated following the implementation of micro-isolator cage cover use. Measures of ventilation and real-time particle counts will be obtained throughout the study. Samples will also be obtained in the rooms, corridor and office for endotoxin analysis. We expect to model the production and transport of the allergen and to measure the effectiveness of the intervention.</p>					
<b>Pesticide Toxicity to Lung Epithelium as a Factor in Chemically-Induced Asthma</b>	<b>Daniel Tessier, Faculty</b>	<b>University of Illinois at Chicago Environmental &amp; Occupational Health Sciences</b>	<b>FY04</b>	<b>\$13,069.94</b>	<b>Asthma &amp; COPD</b>
<p>Exposure to chemical sensitizers in the home, school and workplace contributes to the steady increase in asthma incidence observed over the last twenty years. Exposure to pesticides in both occupational and home settings has been associated with asthma. Toxicologic, rather than immunologic, mechanisms may be most important in the induction of asthma via low molecular weight chemical agents such as pesticides, but the nature of these toxicologic mechanisms is unknown. We hypothesize that chronic, low level exposure to certain pesticides results in toxicity to lung epithelium, and that this in turn leads to the initiation of cellular signaling and inflammatory mediator release to effect further responses in the lung, one manifestation of which is asthma. Lung epithelial cells <i>in vitro</i> will be used to study the mechanisms of toxicity of pesticides associated with chemically induced asthma. Pesticide treated epithelial cell cultures will be used to determine: 1) direct toxic effects; 2) the initiation of cellular signaling cascades; and 3) the release of inflammatory mediators (i.e., GM-CSF, IL-6, IL-8, IL-10, TNF-<math>\alpha</math>). Understanding pesticide toxicity in lung epithelium will clarify the mechanisms through which these and other low molecular weight chemicals act in the lung, ultimately enabling better prevention and treatment strategies for chemically-induced asthma and other respiratory diseases.</p>					
<b>Effectiveness of Standing Conditions in Reducing Fatigue &amp; Discomfort</b>	<b>Stephanie Opel, Graduate Research Student</b>	<b>University of Wisconsin, Milwaukee</b>	<b>FY04</b>	<b>\$8,994.91</b>	<b>Intervention Effectiveness</b>
<p>The objectives of this study are:</p> <ol style="list-style-type: none"> <li>1) Compare the effects of wearing safety shoes, standing on a floor mat, and wearing shoe in-soles on workers' perceptions of tiredness, fatigue and discomfort following eight-hours a day of standing for two weeks of exposure to each condition.</li> <li>2) Determine the strength of the relationships between age, gender, height, weight, and job tenure and fatigue and discomfort experiences when exposed to each of the three different standing conditions.</li> </ol> <p>Thirty workers from a manufacturing company will be divided into three groups of ten, stratified by age. Each will be exposed to the three standing conditions for two weeks and rotated by a Latin square design. After each eight-hour shift, the worker will fill out a questionnaire, which rates the standing condition used.</p> <p>Determining the influence of flooring conditions on discomfort and fatigue, and correlating these conditions with age, gender and job tenure addresses one of NORA's top research priority areas: intervention effectiveness. The findings of this research will advance efforts in determining the most effective interventions to reduce fatigue and discomfort from prolonged standing in the workplace.</p>					
<b>Enhancing the Detection of PAH Metabolites</b>	<b>An Li, Faculty</b>	<b>University of Illinois at Chicago Environmental &amp; Occupational Health Sciences</b>	<b>FY04</b>	<b>\$10,443.36</b>	<b>Exposure Assessment Methods</b>
See above					
<b>Comparison of the prevalence of sensitization to common allergens in workers exposed and unexposed to animal allergens</b>	<b>Leslie M. Tharenos, Resident Physician</b>	<b>University of Illinois at Chicago School of Public Health</b>	<b>FY05</b>	<b>\$7,894.00</b>	<b>Allergic and Irritant Dermatitis, Asthma and COPD, Mixed Exposures, Indoor Environment</b>

<p><b>Background:</b> It is known that exposure to high molecular weight occupational allergens is associated with a high prevalence of sensitization to these allergens. Preliminary work suggests that sensitization to occupational allergens may promote sensitization to common, non-occupational allergens.</p> <p><b>Goal/Objective:</b> To compare the prevalence of allergy to common aeroallergens among laboratory animal workers to that of a demographically similar worker group unexposed to high molecular weight sensitizing agents.</p> <p><b>Design:</b> Cross-Sectional Study</p> <p><b>Methods:</b> Questionnaire to determine demographic, occupational and medical variables; skin prick testing for laboratory animal allergens and common aeroallergens (mold, ragweed, dust mite, etc.). Selection bias and confounding will be addressed in subject recruitment and data analysis.</p> <p><b>Potential for improving safety/health in work environment.</b> If exposure to high molecular weight sensitizing agents in the workplace puts individuals at risk for becoming sensitized to common allergens (such as ragweed or mold), the implications and costs of occupational allergies are not limited to those directly related to the workplace. This would imply that greater emphasis should be placed on controlling occupational exposures to sensitizing agents.</p>					
<b>Assessment of Exposure of Artist Welders to Welding Fumes</b>	<b>Laurel Berman, PhD candidate</b>	<b>University of Illinois at Chicago Environmental &amp; Occupational Health Sciences</b>	<b>FY05</b>	<b>\$11,583.00</b>	<b>Mixed Exposures; Special Populations at Risk; Exposure Assessment Methods</b>
<p>We intend to characterize the exposure profile of artists exposed to welding fumes through three research goals:</p> <ol style="list-style-type: none"> <li>1. <i>Assessment of Isolated Personal Exposures of Artist Welders to Respirable Particles in Welding Fumes in Field Conditions</i></li> <li>2. <i>Assessment of Isolated Personal Exposures of Artist Welders to Elemental Compounds in Welding Fumes in Field Conditions</i></li> <li>3. <i>Development of Emission Factors Unique to Artist Welders' Practices under Laboratory-controlled conditions</i></li> </ol> <p>These goals will be reached through this process:</p> <ul style="list-style-type: none"> <li>• Administration of a questionnaire to artist welders leading to selection of two or three Illinois artists to overall represent the respondents.</li> <li>• Personal exposure monitoring of the two to three selected artists. Samples will be analyzed for total mass and elemental composition of welding fume.</li> <li>• Use of experimental data from welding exposure chamber experiments to develop emission factors unique to artist welders.</li> </ul> <p>This study may help to assess the need to control welding fume exposures by process and materials. In particular, we can link specific welding processes and welding materials with our experimentally derived emission factors. The results of the personal exposure monitoring may also yield total mass and elemental concentrations of welding fume that may indicate the need to assess current exposure standards.</p>					
<b>Risk factors associated with trunk musculoskeletal disorders in female flight attendants</b>	<b>Hyeonkyeong Lee, PhD candidate, MS, RN</b>	<b>University of Illinois at Chicago College of Nursing Public Health, Mental Health, and Administrative Nursing</b>	<b>FY05</b>	<b>\$15,418.94</b>	<b>Low back disorders/ musculoskeletal disorders of the upper extremities</b>
<p>The purpose of the study is to examine the relationships among risk factors (workplace [job tasks, organizational factors, and physical environmental factors], external environmental, and personal factors) for trunk work-related musculoskeletal disorders (WMSDs) in female flight attendants. Two focus groups (6 flight attendants per group) will be conducted to identify flight attendants' job tasks, associated perceived exertion and pain/discomfort, and to evaluate the applicability of measures of organizational and environmental factors for use with this occupational group. Focus groups will be transcribed and a transcript-based analysis conducted.</p> <p>This will be followed by a mailed survey to 530 female flight attendants randomly selected from the membership list of the Association of Flight Attendants. Two follow-up mailings will occur (1 and 2 months). Expected response rate is 75% (n=398). Measures include: Job Task (Borg's CR-10, Pain Intensity Number Scale), Karasek's Job Content Questionnaire, Physical Work Environment, BMI, years of employment, age, and Nordic/NIOSH Symptom survey. Descriptive statistics will be calculated. Bi-variate and multiple logistic regression will be performed to examine the relationships among risk factors and trunk WMSDs. Findings will provide workplace (job tasks, organizational, physical environmental factors), external environmental factors, and personal factors be targeted for interventions to decrease flight attendants' risk for WMSDs.</p>					
<b>Non-Cholinergic Effects of Chlorpyrifos on Lung Epithelium</b>	<b>Daniel M. Tessier, Assistant Professor</b>	<b>University of Illinois at Chicago Environmental &amp; Occupational Health Sciences</b>	<b>FY05</b>	<b>\$15,998.53</b>	<b>Asthma &amp; COPD</b>
<p>Organophosphate insecticides such as chlorpyrifos (CPF) have been associated with asthma. The principle mode of action of these neurotoxicants is the inhibition of acetylcholinesterase. It has been proposed that these cholinergic effects result in hyperresponsiveness in the lung and explains the association of these compounds with asthma. Recent interest has developed in non-cholinergic effects of organophosphates that may have wide-ranging implications for exposure-related health effects such as asthma and neurodegenerative diseases. The hypothesis of this proposal is that chlorpyrifos (CPF) and its major metabolite chlorpyrifos-oxon (CPF-oxon) initiate intracellular signaling cascades associated with stress responses in lung epithelial cells, and that these non-cholinergic effects occur either through action at specific receptors or through oxidative stress. This hypothesis will be tested in lung epithelial cells <i>in vitro</i> through a proteomic analysis of membrane, cytosolic and nuclear proteins involved in cellular responses to CPF and CPF-oxon exposure. This will describe completely the extent of cellular signaling events initiated as a result of exposure to these compounds. We will further attempt to distinguish oxidative stress or interaction with specific receptor proteins as the mechanism of action of CPF and CPF-oxon in initiating cellular signaling.</p>					
<b>Welding Fume Exposure</b>	<b>Todd</b>	<b>University of Illinois at</b>	<b>FY06</b>	<b>\$15,972.80</b>	<b>Exposure Assessment /</b>

<b>Characterization Methods</b>	<b>Schoonover</b>	<b>Chicago Environmental &amp; Occupational Health Sciences</b>			<b>Mixed Exposures</b>
<p>The goal of the project is to investigate newly formed (NFF) and aged (AF) welding fume characteristics and the hypothesis that differences may have implications on welder exposure and related health effects. Underlying this welder health related hypothesis is the fact that welding fume is reported to change in terms of particle size distribution as a function of time (Zimmer, 2001) and that NFF is more biologically reactive and produces more lung inflammation in rats than AF (Antonini, 1998). This hypothesis will be investigated by designing and constructing a dilution system that will complement the existing welding fume chamber and allow for sampling of NFF and AF simultaneously from the same welding source. The system will facilitate isokinetic sampling to obtain representative samples of NFF and AF. Samples of NFF and AF will be collected and analyzed for mass concentrations, constituent metals concentrations, and particle size distributions. Investigation will be done with two types of shielded metal arc welding electrodes, NFF and AF, and three types of sample analysis. Welding electrodes will be common SMAW classified by the American Welding Society in terms of reference number and diameter. NFF will be sampled closest to the welding source and AF sampled at system residence times corresponding to ten and one hundred times dilution ratios. Samples will be collected on 37 mm filters and analyzed for gravimetric and metals analysis and by impaction method and analyzed gravimetrically for particle size distributions. Samples collected via impinger will also be investigated for applicability in in-vitro lung epithelial cell toxicity research. By obtaining the requisite sample sizes and maintaining tight quality control, this research will yield answers about NFF and AF with a high degree of statistical certainty.</p>					
<b>Exposure to ergonomic risk factors in physical therapy</b>	<b>Kathleen Rockefeller, PT, ScD, MPH, MS</b>	<b>University of Illinois at Chicago College of Applied Health Sciences</b>	<b>FY06</b>	<b>\$15,308.57</b>	<b>musculoskeletal disorders; exposure assessment; health care</b>
<p>The overall goal of the project is to characterize exposure to risk factors for work-related musculoskeletal disorders in the practice of physical therapy. The primary objective is to use a work-sampling methodology to observe physical therapists at work and collect data on the frequency of exposure to specific risk factors. The PATH (Posture, Activities, Tools, Handling) method of ergonomic work sampling observations will be utilized for data collection. Therapists will be observed in a variety of practice settings at UIC. Observations will provide an estimate to the frequency of exposure to tasks and risk factors. The data collected will provide the first estimate of exposure to ergonomic risk factors in physical therapy practice. This pilot data can be used for a number of purposes. The study might be expanded to include other settings and other methods of characterizing exposure. The information might be utilized to design, implement, and evaluate interventions to decrease the risks of work-related musculoskeletal disorders among physical therapy practitioners.</p>					
<b>Risk Assessment of health outcomes in workers with past exposure to dioxins in UFA Russian Federation (pilot phase)</b>	<b>Irina Dardynskaia</b>	<b>University of Illinois at Chicago Environmental &amp; Occupational Health Sciences</b>	<b>FY06</b>	<b>\$15,986.67</b>	<b>Risk assessment</b>
<p>Goals:</p> <ol style="list-style-type: none"> <li>To collect and process health outcomes data among workers exposed to chlorinated dioxin and dibenzofuran contaminants at the Khimprom plant in Ufa.</li> <li>To assess the risk for development of diabetes in the exposed and comparison population.</li> <li>To assess prevalence of chloracne in the exposed population.</li> </ol> <p>Aims:</p> <ol style="list-style-type: none"> <li>Recruit a cohort of workers with occupational exposure to CDDs and CDFs contaminants at the Khimprom plant.</li> <li>Assess the degree of occupational exposure to CDDs and CDFs by reviewing length and type of exposure, plant industrial hygiene records, and chloracne data.</li> <li>Identify and recruit a comparison group of working neighbor controls.</li> <li>Develop and administer a health outcomes questionnaire to the study and comparison groups.</li> <li>Perform statistical analyses of pilot data collected.</li> </ol> <p>The health outcomes for the workers will be compared to that of an unexposed cohort, matched to the exposed cohort on gender, nationality and age. Exposure will be ascertained through plant employee records, the chloracne registry and exposure questionnaire. Health outcomes will be assessed through administration of health outcomes questionnaire. The Ufa cohort gives us the rare opportunity to study association of adverse health outcomes with occupational exposure to CDDs and CDFs.</p>					
<b>Workers' Centers Role in Accessing Occupational Health Services</b>	<b>Leslie Nickels</b>	<b>University of Illinois at Chicago Environmental &amp; Occupational Health Sciences</b>	<b>FY06</b>	<b>\$15,879.00</b>	<b>Intervention Effectiveness Research and Special Populations</b>

<p>The focus of this project is on understanding staff perceptions, at four Chicago workers' centers, of how they currently address work environment issues and what interventions are needed to enable workers to develop and implement solutions for creating safe working environments. The centers are "community-based mediating institutions that provide support to low-wage immigrant [workers]...and have some features that are suggestive of earlier U.S. Civic institutions, including settlement houses, fraternal organizations, local civil rights organizations and unions." (Fine) This case study of four workers' centers in Chicago will use a framework that draws upon workers' center organizational structure theory; basic occupational health services policy; and participatory action research methodology. Data collection methods include interviews, observations, daily logs and records for documenting workers' center staff perspectives of exposure to hazards, hazard avoidance, and occupational health resources available to workers. The proposed methodology will use a participatory action research model for the collection and analysis of data over a 6-month period. The results from this project will be used to inform the development of a model for intervention research to increase immigrant workers access to occupational health and safety information and services. Results from this project will be used as data for the development an intervention effectiveness proposal.</p>					
<b>Quantification of Musculoskeletal Loading and its Subjective Perception in the Health Care Profession</b>	<b>John Dzissah PhD</b>	<b>Department of Industrial Management, University of Wisconsin-Stout</b>	<b>FY06</b>	<b>\$15,991.91</b>	<b>Musculoskeletal, Subjective perception, Work characteristics</b>
<p>Musculoskeletal disorders (MSD) are injuries and disorders of the muscles, nerves, tendons, ligaments, joints, cartilage and spinal discs. MSD hazards are physical work activities and/or physical work conditions, in which ergonomic risk factors are present. Work related musculoskeletal injuries or disorders, currently account for one third of all occupational injuries and illnesses reported by employers each year. Also low back injuries and other musculoskeletal disorders continue to be the leading and most costly problems affecting nurses (ANA 2001).</p> <p>This study will involve conducting surveys on work factors, work characteristics, individual work effects and musculoskeletal symptoms targeting registered nurses, licensed practical nurses, nursing aides, nursing technicians, and nursing managers. The purpose of the study is to examine the interaction of work factors and their risk related musculoskeletal complaints in nursing personnel. The results of the finding will be used for competitive extramural funding opportunities such as OSHA to further the research in conducting biomechanical studies on tasks performed by health care professionals at health care organizations in continuous time frame in order to increase the understanding of quantification of musculoskeletal loading and the chance of developing methodology to detect early symptoms of work related injuries and their prevention. This will improve the health and performance of the health care professional thereby minimizing the cost of compensation paid due to work related injuries.</p>					
<b>Evaluate Occupational Exposure to Contaminants in Truck Cabins</b>	<b>Xinlei Wang, Assistant Professor</b>	<b>University of Illinois at Urbana-Champaign Ag. and Bio. Engineering</b>	<b>FY07</b>	<b>\$9,890.00</b>	<b>Indoor Environmental Quality, Transportation (Injury)</b>
<p>The goal of this proposed project is to study the air quality in truck cabins to improve the understanding of a major occupational health and safety issue confronting truck drivers. The objectives of this project are: 1) to quantify the air quality in the truck cabin by measuring various airborne contaminants in city delivery and long distance trip; 2) to evaluate the existing HVAC system in the truck cabin; and 3) to make recommendations to improve air quality and the safety and health in truck cabins.</p> <p>Methods: Firstly, a questionnaire survey will be designed and will be conducted to collect the opinions of truck drivers regarding the air quality and its impact on their health and safety. These data will be helpful to understand the drivers' attitude to the cabin air quality and how they try to keep the air fresh. A portable air quality monitoring system will be developed in the laboratory. The air quality in the truck cabin will be evaluated by measuring various airborne contaminants (CO, CO2, NO2, and PM) in city and long distance driving. Data will be analyzed and potential useful recommendations for improving safety and health in the cabin will be made.</p>					
<b>Shift rotation and risk of acute injury among healthcare workers</b>	<b>Douglas J. Myers, Postdoctoral Research Fellow</b>	<b>Duke University, Division of Occupational and Environmental Medicine</b>	<b>FY07</b>	<b>\$5,452.92</b>	<b>Organization of Work, Traumatic Injuries</b>

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The purpose of this proposed exploratory epidemiologic study is to investigate the hypothesis that shift rotation among healthcare workers creates fatigue and increases the risk of acute work-related injury. While little is known about exactly what shift patterns may cause fatigue-related injuries, sudden changes in stable work schedule patterns as well as highly variable work schedules are hypothesized to disrupt circadian rhythms, cause fatigue and interfere with workers' ability to perform job tasks safely. These patterns will be analyzed using previously gathered staff schedule records for all nurses and nurse aides working in a long-term care facility to explore whether work schedules that precede injury events predict risk.

Sixteen months of previously gathered staff schedule records for all nurses and aides working in a dual diagnosis (psychiatric and medical) long-term care facility data offer an opportunity to explore which patterns may increase risk to workers in the healthcare setting. These daily shift records offer a unique opportunity to investigate this hypothesis as these are very precise records of work patterns and may be used to explore the impact of this aspect of work organization on the risk of workplace injuries. These data will be merged with data previously gathered including injury reports, demographic data such as age and job title, and physical exposure data in the form of patient lifting.

Logistic regression will be used to test the hypotheses that shift rotation measured in the staff schedule records is associated with the risk of injury among the healthcare workers. This technique will allow for the effect of confounding variables to be controlled.

Results of this study will be useful for additional research as well as for healthcare administrators. Researchers may use patterns observed to increase risk as a guide to additional work on shift rotation in other workplaces and other industries. Healthcare administrators may use these results to better staff and schedule their workers to prevent fatigue related injuries.

<b>Demonstrating Effectiveness of Informed Informal Interaction</b>	<b>Joseph Zanoni, PhD Student</b>	<b>University of Illinois at Chicago College of Education, Curriculum and Instruction</b>	<b>FY07</b>	<b>\$15,976.44</b>	<b>Special Populations at Risk, Vulnerable Immigrant Workers, Intervention Effectiveness</b>
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The hypothesis of this proposal is: Interaction between informed informal dialogue of a first-language Spanish labor/health specialist, worker leaders and workers, worker leadership development and worker problem-solving of hazardous exposures demonstrates prevention of workplace injury and illness of immigrant workers associated with workers' centers. The objectives for the proposal utilize the findings of Nickels' 2005 pilot:

- Continue community-based participatory research (CBPR) relationships of the previous pilot, to plan, implement and validate findings,
- Provide financial and curriculum resources on health and safety to workers' centers,
- develop an interactive model of "informed informal" dialogue of a first-language Spanish labor/health specialist, worker leaders and workers, worker leadership development and worker problem-solving,
- Establish a planning and reflection cycle between worker leaders and first language Spanish labor/health specialist based on Gramscian curriculum,
- Schedule and document periodic "informed informal" sessions at workers' centers,
- Qualitatively analyze interactive discourse of specialist and leaders in terms of a train-the-trainer and Gramscian curriculum, and
- Disseminate findings and create future proposals.

We will build upon the relationships developed in our 2005 project to cooperatively explore our model as a type of workplace intervention effectiveness research.

<b>Occupational Surveillance in Illinois: A Pilot Project Using Work Comp Data</b>	<b>Lee Friedman PhD Candidate</b>	<b>University of Illinois at Chicago Environmental &amp; Occupational Health Sciences</b>	<b>FY07</b>	<b>\$15,415.49</b>	<b>Disease and injury, exposure assessment methods, surveillance methods, intervention effectiveness</b>
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The purpose of occupational surveillance is to gain knowledge of the pattern of workplace injury and illness in order to control and prevent fatalities, injuries, and diseases related to work. The Illinois Workers Compensation Commission collects injury and illness reports from employers according to State law. The overall goal of this project is to prevent fatal and non-fatal occupational illnesses and injuries in the State of Illinois and to contribute information that will inform preventive activities across the U.S. To this end, the Illinois Workers Compensation Commission's First Reports of Injury (IL Form 45) will be evaluated for use in statewide occupational surveillance.

- Specific aims are:
- To develop a scheme for sorting, computerizing, and merging paper-based Illinois First Report of Injury Form 45s (45% of total) with the electronic dataset (55% of total);
  - To compare the distribution of injury types among the electronic and hard copy Form 45s, in order to assess the accuracy, completeness and representativeness of the electronic form dataset.
  - To develop a weighting protocol for samples from the merged dataset (contingent on objective #2);

This pilot project will provide us critical information about the IWCC dataset to subsequently develop extramural research applications and conduct research analyses on the basis of the findings from this project.

<b>Association of H. pylori IgG antibodies and allergic sensitization</b>	<b>Linda Rosul, PhD Student</b>	<b>University of Illinois at Chicago School of Public Health Epidemiology and Biostatistics</b>	<b>FY07</b>	<b>\$5,972.40</b>	<b>Infectious Disease, Allergies, Asthma and COPD, Mixed Exposures, Indoor Environment</b>
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*Background:*  
Workers in animal research facilities are at risk for occupational allergies and may be at risk for occupational transmission of *Helicobacter pylori*.

<p><i>H. pylori</i> infection can lead to serious health consequences. The hygiene hypothesis suggests that a lack of such exposures, including to <i>H. pylori</i> infection, may lead to increased risk of laboratory animal sensitization (LAS).</p> <p><i>Goals/Objectives:</i> To characterize the association between <i>H. pylori</i> IgG seroprevalence and prevalence of LAS, compare <i>H. pylori</i> IgG antibody seroprevalence among laboratory animal workers to that of a similar worker group unexposed to laboratory animals, and evaluate prior <i>H. pylori</i> infection relative to the demographic variables identified in this cohort as associated with LAS.</p> <p><i>Design/Methods:</i> A cross-sectional epidemiological study of the association of the seroprevalence of Helicobacter pylori antibodies and sensitization to common allergens in an occupational cohort. Risk factors related to <i>H. pylori</i> infection will be assessed by questionnaire. <i>H. pylori</i> IgG seroprevalence will be assessed.</p> <p><i>Potential for improving safety/health in work environment:</i> Contributions to prevention strategies for LAS by identifying those who might be at increased risk under the hygiene hypothesis. If results suggest that occupational transmission of <i>H. pylori</i> occurs, control measures will need to be instituted.</p>					