

**SOUTHERN CALIFORNIA  
EDUCATION AND RESEARCH CENTER  
FOR  
OCCUPATIONAL SAFETY AND  
HEALTH**

**ANNUAL REPORT  
July 1, 2005 – June 30, 2006**

**SUBMITTED BY: WILLIAM C. HINDS  
CENTER DIRECTOR**

**UCLA, Los Angeles, CA 90095-1772**

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## Southern California Education and Research Center

### II. Introduction and Executive Summary

#### CENTER OVERVIEW

**Composition of the Center** - The Region IX NIOSH ERC for Southern California is directed by Dr. William Hinds of UCLA. The Associate Director is Dr. Dean Baker of UC Irvine. The Center is composed of four core academic programs, five correlated programs, and Center Administration. The core programs are one each in industrial hygiene and occupational health nursing and two in occupational medicine. The correlated programs are Continuing Education that cuts across the four core programs, Hazardous Substances Training, Hazardous Substances Academic Training Program, Pilot Project Research Training Program, and NORA Research Support Program that also involves the four core programs.

Degree(s)

Institution	Program	Program Director	Offered
UCLA	Industrial Hygiene Includes: Hazardous Substance Academic Training	Dr. William Hinds	MPH/MS/PhD
UCLA	Occupational and Env. Health Nursing	Dr. Wendie Robbins	MS
UCI	Occupational Medicine	Dr. Dean Baker	MS/certificate
UCLA	Occupational Medicine	Dr. Philip Harber	MPH/certificate
UCLA	Center Administration	Dr. William Hinds	-
UCLA	Continuing Education/Outreach Includes: Hazardous Substances Training	Ms. Cass Ben-Levi	-
UCI/UCLA	NORA Research Support	Dr. Dean Baker Dr. William Hinds	-
UCLA/UCI	Pilot Project Research Training	Dr. William Hinds Dr. Dean Baker	-

### **SCERC Values and Vision**

The SCERC has as its **core values** a commitment to worker health, scientific integrity, and excellence in teaching.

The **core purpose** of the SCERC is to improve worker health through education, research, and service.

The **mission** of the SCERC is to accomplish our core purpose by educating professionals in the fields of occupational medicine, industrial hygiene, and occupational health nursing through academic programs and continuing education; conducting research in occupational and environmental health and related areas; and providing outreach and resources to educational and professional organizations.

The **vision** of the SCERC is to be recognized as a leader in education and research in occupational and environmental health.

**Center Goals and Objectives** - The goals of our Southern California Region IX Educational Resource (ERC) Center are:

1. To educate professionals in the disciplines of occupational and environmental medicine, industrial hygiene and occupational health nursing. We believe the biggest impact our ERC can have is to attract and train bright, energetic leaders in the primary occupational health fields.
2. To provide continuing education for professionals in the field or other person with responsibilities in the occupational safety and health area. We believe that it is extremely important to provide stimulation, updates of information, promotion of interdisciplinary activities and training of professionals and non professionals on occupational health and safety issues.
3. To proliferate occupational safety and health activities through outreach to other educational institutions, other parts of universities and to organizations in a position to influence positively the occupational safety and health area.
4. To provide a focus for research activities in occupational safety and health. The results of this research can be disseminated to organizations and agencies in a position to implement preventive action.
5. To be an occupational safety and health resource to organizations (such as companies and unions) and agencies that need the expertise on occupational safety and health that our ERC possesses.

6. To act as a focus to marshal all types of community resources in occupational safety and health to identify and solve problems in the work setting and environment.
7. To respond to the changing nature of occupational health and safety problems and to develop educational programs to deal with emerging problems and issues.

### **Trainees**

The selection criteria for trainees are described in the individual programs. We believe that we can characterize our trainee population as academically well qualified with high potential for professional and research leadership. We currently have 39 students in our four core academic programs. Thirty-three students are ERC supported trainees. Nineteen of the 39 (49%) are minority students as defined by the EEOC.

### **Center Environment**

Southern California has many petroleum refineries, aerospace industries, service industries, and a large manufacturing base of small and medium-sized companies that represents more than 60% of the manufacturing in California. The workforce is very diverse with many immigrant and non-English-speaking groups. This large concentration of industries in Southern California provides an ideal environment for occupational health education and many opportunities for field trips and internships.

The ERC also has close ties to the **UCLA Labor Occupational Health Program (LOSH)** with its close connection to organized labor in Southern California. The UCLA-Labor Occupational Safety and Health (LOSH) Program is a nationally recognized center in Southern California for worker health and safety training, educational materials development, technical assistance and policy information in the area of workplace health and safety. The ERC is also closely connected with the **UCLA and UCI Centers for Occupational and Environmental Health (COEH)**. These are state supported centers for research and teaching in occupational safety and health. Together the ERC and COEHs represent a unique and effective partnership between state and federal funding.

**Advisory Committee** - We have selected a distinguished and experienced set of advisors to assist us on a continuing basis. During the reporting period the committee consisted of 12 members representing each of the core disciplines of our ERC plus labor and continuing education. The committee is charged with reviewing the educational programs and activities of the Center and advising on modifications that would enhance the impact of the Center in achieving its goals and objectives in Region IX. Annette Haag, RN, COHN is Chair of the committee. The committee is convened at least once a year.

**Administrative Procedures** - Five persons constitute our executive committee. They are the four academic program directors plus the director of continuing education and outreach. The executive committee meets regularly. General problems are considered at each meeting. Usually one program is reviewed in depth at each meeting so that the executive committee will have the opportunity of examining each Center component. Interdisciplinary activities are planned by the executive committee. Members of the external advisory committee are consulted and/or invited to the executive committee meetings as needed. The pilot project program is discussed at nearly every meeting. Community views have been sought to guide the ERC toward new or improved educational programs for both professional training and continuing education.

## A. MAJOR ACCOMPLISHMENTS

- Center Administration coordinated our annual interdisciplinary dinner meeting on November 16, 2005 and an interdisciplinary plant visit and workshop for all ERC Trainees and Faculty at Trojan Battery Company on May 11, 2006.
- Center Administration continued to foster the development of the ERC-wide initiative on psychosocial stress in the work environment. The program includes three elements. (1) The development of educational materials and presenting three lectures on this topic in the required curriculum of the IH, OEHN, and OM programs. (2) Giving three elective courses for ERC students, including Work and Health (CHS 278), an introductory course of the psychosocial aspects of the work environment; Psychosocial Intervention in the Workplace; and Occupational Cardiology. (3) Providing field practicum experiences for interested ERC students involving workplace psychosocial surveillance to identify psychosocial exposures and the need for intervention. We have a surveillance project underway at the DaimlerChrysler Los Angeles Parts Distribution Center funded by the DaimlerChrysler/UAW. ERC student participation is included in the project.
- The six Industrial Hygiene doctoral students are focusing their research in the following areas: A study of the ergonomics of glove wearing; an intervention study of computer terminal users; a laboratory study of permeation of Captan formulations through gloves; a study of ultrafine particles from welding in the occupational environment; a study of secondary contamination by respirators; and a study of improved measurement of nanoparticles in occupational exposure settings.
- We added classes on behavioral-based safety and litigation prevention to 250D IH Practice.
  - In 2005/06 the HST program was successful in spending the entire allocation of student stipends including the funds carried over from the prior year. This was achieved, in part, by creating a new Confined Space Awareness for Managers class and marketing it aggressively to state and local government.
  - Nearly 50 health and safety professionals attended the Confined Space Awareness for Managers class from Cal-OSHA, Los Angeles Unified School District, Los Angeles County, City of Long Beach, UCLA, County of Riverside, Los Angeles County Sheriff's Department and other agencies.
  - The CHMM Review course was revamped by an alliance with the Academy of Certified Hazardous Materials Managers (ACHMM) with which we now collaborate in offering the National Overview Course. It is offered twice a year when before it had been once.
  - As a result of our partnership with the OSHA Training Institute (OTI) at the University of California, San Diego, the following new courses were offered: OSHA 511 – OSHA Standards for General Industry; OSHA 501 – Trainer Course for General Industry; OSHA 510 – OSHA Standards for the Construction Industry. The first 4-day OSHA course was offered in January 2006 and was well attended. This was followed by two additional 4-day OSHA courses in May, both of which had very good attendance and excellent evaluations.
  - The CE/O program has introduced several new courses: Red Cross Workplace Training, Ethics for Health and Safety Professionals, Indoor Air Quality, Sampling and Instrumentation, most of which had been identified by various needs assessment as needed topics.

- The 5-day Comprehensive Industrial Hygiene Review, which had not been offered by the Program since 2002, was overhauled and offered in 2005-06.
- In another successful partnership, the CE/O Program, with the University of Michigan ERC (Center for Occupational Health and Safety Engineering), held a 2-day Ergonomics Conference at UCLA attended by more than 60 ergonomics experts including physicians and researchers.
- The SCERC was awarded a Grant from the California Wellness Foundation to train 1) health care practitioners in ambulatory care facilities about occupational health and safety and 2) owners and supervisors of businesses and agencies involved in the tourism industry about health and safety for low wage service workers. The grant began July, 2006. These activities will involve trainees from all academic programs in our ERC.
- The UCI program continued to provide national and international leadership in the field of work organization and cardiovascular disease. Dr. Schnall serves as president of the committee on work and cardiovascular disease of the International Commission on Occupational Health.
- Over the past year, trainees in the UCLA Occupational Medicine Residency have received several honors including scholarships to attend the Western Occupational Health Conference.
- In addition to participation in faculty research, UCI OM residents contribute significantly to both research and research to practice. For example, one resident had a primary role in investigating and preparing a publication of ten heat stress related deaths in California, working closely with Cal OSHA. Another resident played a central role in investigating diacetyl induced bronchiolitis obliterans, working with both Cal OSHA and the UCLA clinical program. Such activities have directly facilitated the implementation of OSHA, NIOSH, and state health department activities in California.
- Faculty members provide very significant service. Dr. Paul Papanek and Dr. Craig Conlon are prominent officers of the Western Occupational and Environmental Medical Association. Dr. Harber served as chair of the Safety and Occupational Health IRG (SOH study section), vice chair of the ACGME Preventive Medicine RRC, and in several leadership roles in ACOEM.
- This year's application pool for our pilot projects (PPRT) consisted of nine impressive proposals covering a broad array of topics. Applicant organizations included University of Arizona, University of California – Irvine, and University of California – Los Angeles. Of the five funded projects awarded during the 05-06 cycle, two were awarded to trainees, one to a junior faculty member, and two to new investigators.
- OEHN students were elected President of the Graduate Student Nurses Association 2005-2006, and Secretary of the Graduate Student Nurses Association 2005-2006
- An OEHN student was elected President of the California Harbor Association of Occupational Health Nurses and the Board of the California State Association of Occupational Health Nurses
- Three OEHN students were inducted into Sigma Theta Tau Honor Society of Nursing.
- Wendie Robbins was appointed as Adrienne Mosley Endowed Chair of Biological Nursing Science

- Wendie Robbins was selected for the national Public Health Leadership Workgroup supported through the ASPH/HRSA to develop a plan for the nation related to the educational preparation and leadership development of public health nurses of which OEHNs are a subset
- Wendie Robbins participated in the CDC/NIOSH special review Panel: Occupational Exposure Risk on Reproductive Development
- Donna McNeese-Smith was awarded a Fogarty International Research Fellowship to study in India
- The Dean of the UCLA School of Nursing committed an additional faculty FTE for Occupational and Environmental Health Program. The School began recruitment for this FTE.
- The UCLA OEHN Program, with funding from the UCLA Center for Occupational and Environmental Health, hosted the 2006 ERC OHN Directors meeting in Albuquerque, New Mexico. Occupational Health Nursing Program Directors and Deputy Directors attended from eleven different ERCs. Agenda items included discussion of the future of occupational health nursing training programs and training needs assessments and resulted in identification of key focus areas for ERC OHN Programs for the future.
  - The NRS Program provided full or partial stipend support and technical support to four doctoral students in the Industrial Hygiene research training program.
  - The NRS Program and CE/O Program collaborated in organizing a regional NIOSH Town Hall meeting to obtain input on the NORA strategic plan.

## **B. SIGNIFICANT CHANGES**

The Southern California ERC has a stable faculty and trainee population so there were few significant changes.

- ERC Administrator D.T. Evans was recruited to her current position and started on July 1, 2005.
- The UCI occupational medicine program recruited Wayne Chang, MD, MS, as an assistant clinical professor. Dr. Chang is board certified in internal medicine and occupational medicine. He teaches in the residency seminar and precepts residents in our residency program clinics.
- The OEHN Program will add a new ladder track faculty member who will be supported by the UCLA School of Nursing but contribute 50% time to the Occupational and Environmental Health Nursing Program. This is part of the strategic plan to increase research training in the program by providing additional academic faculty to complement the existing clinical faculty. The goal is to attract and support doctoral students in nursing who wish to develop occupational health and safety programs of research.
- Dr. Linda Searle Leach, a newly hired tenure track faculty member in the UCLA School of Nursing, will replace Dr. Cardin as OEHN Administration faculty because Dr. Cardin has been appointed as Associate Dean for Student Affairs. Dr. Leach will take over the role of supervising practicum experiences for the OEHN Administration students.



## C. ERC WEBSITES

### ERC Website

The ERC website (<http://www.ph.ucla.edu/erc/>) was revamped and relaunched in October 2005.

The site includes links to pages for each program:

- Industrial Hygiene (<http://www.ph.ucla.edu/erc/indhyg.html>)
- Occupational Health Nursing (<http://www.ph.ucla.edu/erc/ohn.html>)
- Occupational and Environmental Medicine at UCLA (<http://www.ph.ucla.edu/erc/om-ucla.html>)
- Occupational and Environmental Medicine at UC Irvine (<http://www.ph.ucla.edu/erc/om-uci.html>)  
[www.ucihs.uci.edu/som/oem/residency/overview.htm](http://www.ucihs.uci.edu/som/oem/residency/overview.htm)
- Continuing Education/Outreach (<http://www.ph.ucla.edu/erc/ced.html>).

The link to the faculty directory (<http://www.coeh.ucla.edu/faculty.html>) is the same as the faculty directory of the Center for Occupational and Environmental Health (COEH) with which there is a great deal of overlap. UC Irvine Center for Occupational and Environmental Health (COEH) web address is: [www.coeh.uci.edu/](http://www.coeh.uci.edu/)

In addition to Center programs, the website also links to:

- COEH at UCLA
- COEH at UC Irvine
- UCLA School of Public Health
- UCLA School of Nursing
- UCLA Department of Environmental Health Sciences
- UCLA Institute of the Environment
- UCLA Environmental Science and Engineering
- UCLA Mednet
- UCI School of Medicine

[National Institute for Occupational Safety and Health](#)

[Centers for Disease Control and Prevention](#)

[Occupational Safety and Health Administration](#)

[National Institute of Environmental Health Sciences](#)

[Environmental Protection Agency](#)

[Cal/OSHA](#)

[CalEPA](#)

The Continuing Education site includes web pages for the CE Schedule, Hazardous Substance Training, OSHA Training, Hazardous Substance Subsidies, On-Site Training, and On-Line Training (in development).

Some time after the relaunch of the website, a hit counter was installed on the Continuing Education page. To date there have been more than 4,800 hits, an average of about 18 per day.

# Center Wide Programs

### III. Program Progress Report

**A. Program Title:** Center Administration

**B. Program Director:** William C. Hinds, ScD  
UCLA School of Public Health

**C. Program Description:**

**1. Goals and Objectives**

The objectives of the Southern California ERC Center Administration are (1) the financial management and reporting for the ERC, (2) coordination of activities within the Center, (3) coordination of Center activities with NIOSH OEP, (4) interaction with the SCERC external advisory committee, and (5) responding to information requests from the public.

Center Administration consists of Professor William Hinds, ERC Director; Professor Dean Baker, ERC Deputy Director; and D.T. Evans, ERC Administrator. Center Administration is housed in an office suite on the fifth floor of the UCLA School of Public Health.

**2. Core Values, Purpose, Mission, and Vision of the Southern California ERC**

The SCERC has as its **core values** a commitment to worker health, scientific integrity, and excellence in teaching.

The **core purpose** of the SCERC is to improve worker health through education, research, and service.

The **mission** of the SCERC is to accomplish our core purpose by educating professionals in the fields of occupational medicine, industrial hygiene, and occupational health nursing through academic programs and continuing education; conducting research in occupational and environmental health and related areas; and providing outreach and resources to educational and professional organizations.

The **vision** of the SCERC is to be recognized as a leader in education and research in occupational and environmental health.

Our ERC is composed of four core academic programs: two in occupational medicine (OM) (one at UCLA and one at UC Irvine), one in industrial hygiene (IH) at UCLA, and one in Occupational and Environmental Health Nursing (OEHN) at UCLA. The Center also includes a continuing education/outreach (CE/O) program, Center Administration, Hazardous Substances Academic Training Program (HSAT), a Pilot Project Research Training Program (PPRT), and a Hazardous Substances Training (HST) Program and a NORA Research Support (NRS) program.

Our Advisory Committee consists of 12 members representing each of the core disciplines of our ERC plus labor and continuing education.

#### **D. Activities and Accomplishments**

During the reporting period, July 1, 2005 to June 30, 2006 Center Administration had the following accomplishments and activities.

ERC Administrator D.T. Evans was recruited to her current position and started on July 1, 2005.

Center Administration personnel and Program Directors met with the ERC External Advisory Committee on November 16, 2005.

Center Administration coordinated an interdisciplinary dinner meeting for all ERC Trainees and Faculty, November 16, 2005.

Center Administration coordinated an interdisciplinary plant visit and workshop for all ERC Trainees and Faculty at Trojan Battery Company on May 11, 2006.

Center Administration held two formal meetings with ERC Program Directors and numerous phone and e-mail meetings and exchanges.

Center Administration continued to foster the development of the ERC-wide initiative on psychosocial stress in the work environment. The program includes three elements. (1) The development of educational materials and presenting three lectures on this topic in the required curriculum of the IH, OEHN, and OM programs. (2) Giving three elective courses for ERC students (Work and Health (CHS 278), an introductory course of the psychosocial aspects of the work environment; Psychosocial Intervention in the Workplace; and Occupational Cardiology). (3) Providing field practicum experiences for interested ERC students involving workplace psychosocial surveillance to identify psychosocial exposures and the need for intervention.

#### **E. Program Products**

We submitted all financial and progress reports on time for 2005-06.

Meetings are outlined in Activities and Accomplishments Section.

#### **F. Future Plans**

We plan to continue the development of the ERC-wide initiative on psychosocial stress in the work environment.

We plan to become proficient in electronic submission of grants through SF 424 and grants.gov workshops.

#### **IV. Specific Improvements in OS&H**

Impact of the ERC Programs is given in the annual reports for individual programs.

### **III. Program Progress Report**

**A. Program Title:** Outreach Activities of the Southern California ERC

**B. Program Director:** Cass Ben-Levi, M.A. (Director, CE/O)  
UCLA School of Public Health

**C. Program Description:** Outreach activities for the ERC program, organized by program, are provided for the following five programs:

1. Industrial Hygiene
2. Occupational and Environmental Health Nursing
3. Occupational Medicine Program – UC Irvine
4. Occupational Medicine Program – UCLA
5. Continuing Education/Outreach Program (CE/O)

#### **1. INDUSTRIAL HYGIENE PROGRAM**

Given below are the outreach activities for the faculty of the Industrial Hygiene Program for the period 7/1/05 to 6/30/06. Except where noted activities are extramural activities.

##### **EDUCATIONAL DEVELOPMENT**

###### ***Dr. Hinds***

Served on the Interdepartmental Committee for the UCLA Environmental Science and Engineering Program.

Met with representatives from Japanese Ministry of Labor to discuss occupational health and safety educational programs, February 24, 2006.

Member of the Educational Policy and Curriculum Committee for the School of Public Health.

##### **PRESENTATIONS, LECTURES, AND AWARENESS SEMINARS**

###### ***Dr. Hinds***

Gave a tutorial on Fundamentals of Aerosol Mechanics – October 3, 2005 at the Nanotoxicology and Occupational Health Conference in Minneapolis, MN;

Gave two tutorial on Fundamentals of Aerosol Mechanics (I and II) – October 17, 2005 at the American Association for Aerosol Research in Austin, TX; and

Gave a tutorial on an Introduction to Aerosol Mechanics – December 13, 2005 at the Asian Aerosol Conference in Mumbai, India.

Made local arrangements for NORA town Hall meeting, February 21, 2006.

Interview with Andrew Silva, reporter for San Bernardino Sun, on exposure in housing near freeways, March 15, 2006

###### ***Dr. Froines***

August 25, 2005 – Presentation at the Fogarty Meeting in Mexico, *Ambient Particles, their Toxic Components, Sources and how They Impact Health*, Mexico City, Mexico.

September 19, 2005 – Presentation at the Ramazzini Conference, *The Role of Oxidative Stress in the Mechanism of Particulate Matter Toxicity*, Bologna, Italy.

October 28, 2005 – Presentation at the COEH Statewide Symposium, *Occupational and Environmental Health in the Developing World: Making a Difference*, Berkeley, CA.

May 5, 2005 – Presentation at the Goods Movement Task Force Meeting, *Health Effects of Ultrafine Particles*, Los Angeles, CA.

November 30, 2005 – Presentation at the EPA Particulate Centers Kick-off Meeting, *The Southern California Particle Center*, Washington D.C.

April 30, 2006 – Presentation at the AQMD Ultrafine Particles conference, *Ultrafine Particle Health Effects*, Los Angeles, CA.

### **Dr. Kennedy**

Continuing Education instructor in the following courses:

CHMM Review Course (Industrial Hygiene, Toxicology, Ionizing Radiation, IH in HAZWOPER; Jan 06 and July 06),

CIH Review Course (Ventilation, Ionizing Radiation, History of IH, Noise; August 06),

Noise Exposure Assessment for Occupational Health Nurses (March 06 and September 06).

### **Dr. Que Hee**

Roundtables/Forums Organized:

*Biological Monitoring and Government Agencies: Past, Present, and Future*, American Industrial Hygiene Conference and Exposition, Anaheim, CA, May 21-26, 2005.

Instructor in PDC 115, *Recognition, Evaluation, and Control of Dermal Exposures in the Workplace*, American Industrial Hygiene Conference and Exposition, Anaheim, CA, May 21, 2005. Topic: "Biological Monitoring and Skin Exposure".

### **Doctoral Student J. Birkner**

Presentation to National Academy of Science, Institute of Medicine on the Reuse of Disposable Respirators

Presentation to National Academy of Science, Institute of Medicine on Evaluating a New Anthropometric Fit Test Panel developed by NIOSH

## **CONSULTATIONS**

### **Dr. Froines**

Consultant – ALCOA USA

## **OTHER**

### **Dr. Hinds**

Briefing California congressional legislators on ERCs, February 1-2, 2006

### **Dr. Froines**

October 12, 2005 – Testimony/Presentation to the Assembly Transportation Committee, *The Human Side of Goods Movement: Responding to the Health Effects; Focusing in on Health Studies*, Los Angeles, CA.

September 29, 2005 – Interview with Dateline (Susan Liebowitz), *California Declares Secondhand Smoke a Pollutant*, Los Angeles, CA.

September 29, 2005 – Interview with KFVB (Chris Ames), *Health Effects of Environmental Tobacco Smoke*, Los Angeles, CA.

April 20, 2006 – Testimony at the Santa Monica Airport Panel meeting, Los Angeles, CA.

May 12, 2006 – Interview with Randy Paige, CBS, *Ultrafine Particles*, Los Angeles, CA

May 17, 2006 – Testimony at the Goods Movement Task Force meeting, *Health Effects of Ultrafine Particles*, Los Angeles, CA.

May 19, 2006 – Interview with NPR: Living on Earth (Ingrid Lobet), *Health Effects of Perchloroethylene*, Los Angeles, CA.

**Dr. Que Hee**

Popular Press Articles: Shane Que Hee, Gayle DeBord, John Cocker, and Peter Flessel. "Biological Monitoring and Government Agencies: Past, Present and Future," *The Synergist* 17(2): 50-53, 2006.

## **2. OCCUPATIONAL AND ENVIRONMENTAL HEALTH NURSING PROGRAM**

Given below are the outreach activities for the UCLA Occupational and Environmental Health Nursing Program for the period 7/1/05 to 6/30/06. Except where noted activities are extramural activities.

### **EDUCATIONAL DEVELOPMENT**

- Faculty Advisory Committee, Interdepartmental Program in Molecular Toxicology

### **PRESENTATIONS, LECTURES, AND AWARENESS SEMINARS**

Robbins WA (2005) Metal effects on human sperm aneuploidy and the X:Y ratio, 3<sup>rd</sup> International Congress on Male-Mediated Developmental Toxicity, University of Bradford, West Yorkshire, UK.

Invitational Genetic Symposium funded by NIEHS and National Institute for Human Genome Research: "Genes in the Workplace: The Right Fit?" Paper II: Rischitelli, G:New Frontiers in Preventing Disease in the Workplace; Implications for Occupational Health, panel discussants: W. A. Robbins and A.E. Gutmacher, at Georgetown University Law Center in Washington, D.C., March 2006.

### **CONSULTATIONS**

- University of Arizona College of Nursing, Center for Mechanisms in Injury Repair
- 

### **OTHER**

- Southern California Environmental Health Sciences Center, Community Outreach and Education Program, UCLA representative 2000-present
- Recruitment and Outreach Activities to schools and colleges
- **Recruitment and Outreach Activities to the following schools colleges, and programs:**
  - Seven Associate Degree Nursing Programs
  - Seven Community College Fairs
  - Nine Conventions/Conferences
  - Seven Graduate/Professional Fairs
  - Twenty-five High Schools
  - One Hospital
  - Six Job Fairs
  - Six Other



### 3. UC, IRVINE, OCCUPATIONAL MEDICINE PROGRAM

*Ralph E. Allan, CIH, MS, JD*

#### EDUCATIONAL DEVELOPMENT

##### A. University Extension Program

With oversight from the Occupational Safety and Health Advisory Committee, the Occupational Safety and Health certificate program continues to provide related educational opportunities for occupational safety and health practitioners in the Orange County area of Southern California. The three Certificate Programs in 1) Occupational Safety and Health, 2) Environmental Management and 3) Facilities Management continue to be involved in varying intensity with occupational safety and health educational offerings. Specific occupational safety and health course content of the UCI Certificate Programs follow:

#### **OCCUPATIONAL SAFETY AND HEALTH CERTIFICATE PROGRAM STATUS**

The present course content includes the following courses offered on an annual basis depending upon the student need and demand for the subject matter.

**All courses included in this certificate program relate to occupational safety and health subject matter.**

#### **Prerequisite Courses**

Basic Math and Science Review

#### **Required Courses**

Fundamentals of Safety and Health in the Workplace  
Occupational Health and Safety Regulations and Law  
Fundamentals of Industrial Hygiene  
Principles of Occupational Safety and Environmental Health Management

#### **Elective Courses**

The Occupational Safety and Health Auditing Process  
Emergency Preparedness: Principles and Practices  
Emergency Preparedness: Business Continuity Planning  
Management of Indoor Air Quality (N)  
Risk Management for the Safety and Health Professional (N)  
Ergonomics and the Management of Cumulative Trauma  
Basic Workers Compensation Law of California  
Introduction to Industrial and Commercial Fire Protection

(N) Course introduced since last reporting

#### **ENVIRONMENTAL MANAGEMENT CERTIFICATE PROGRAM STATUS**

The following courses (highlighted in **bold print**) include some occupational health and safety related material in the Environmental Management curriculum:

#### PREREQUISITE COURSES

**Introductory Chemistry of Hazardous Materials**

#### REQUIRED COURSES

Legal and Regulatory Framework of Environmental Management  
**Chemical and Physical Principles of Environmental Management**  
**Biological Principles of Environmental Management**

#### ELECTIVE COURSES

Industrial Waste Management  
**Assessment and Remediation of Environmental Contamination**  
**Environmental Sampling and Analysis**  
Computer Modeling Laboratory: Environmental Applications of Air,  
Water and GIS Programs  
Fundamentals of GIS Data Development and Analysis  
Watershed Regulations and Management  
Stormwater Regulations and Management  
Environmental Land Planning and Management  
Environmental Application of Risk Assessment (N)  
Introduction to Environmental Assessment and Auditing  
Air Quality Permitting and Compliance  
**Principles of Occupational Safety and Environmental Health**  
**Management**

(N) Course introduced since last reporting

#### **FACILITIES MANAGEMENT CERTIFICATE PROGRAM STATUS**

The following courses (highlighted in **bold print**) include occupational safety and health material in the Facilities Management Certificate Program:

#### REQUIRED COURSES

Fundamentals of Facilities Management  
Facilities Design and Space Planning  
Supervision for Facilities Professionals

#### ELECTIVE COURSES

Principles of Heat, Ventilation and Air Conditioning  
Fundamentals of Energy Management\*  
Interpreting and Analyzing Blueprints  
Uniform Building Codes  
**Facility Environmental Compliance**  
Real Estate for Facilities Managers  
Emergency Preparedness: Principles and Practices  
Emergency Preparedness: Business Continuity Planning  
**Managing Indoor Air Quality**  
**Introduction to Industrial and Commercial Fire Protection**  
**Fundamentals of Safety and Health in the Workplace**  
Introduction to Communications and Networking

B. Department of Medicine

1. Miscellaneous Consultations

Typical types of telephone inquiries included: education opportunities; employment opportunities; consultant availability; program improvement or implementation issues; indoor air issues; and various miscellaneous occupational and environmental health and safety legal issues.

***Dean Baker, MD, MPH***

**EDUCATIONAL DEVELOPMENT**

Participated in campus-wide committee to develop proposal for masters of public health degree program at UC Irvine. This degree will have an environmental health sciences concentration that will provide courses on occupational health for graduate and professional students outside of the occupational medicine residency program.

Participated in planning for new PRIME-LC (Program in Medical Education-Latino Culture) program that will provide combined MD-MS degree programs with emphasis on Latino culture. Contributed information on epidemiology and environmental health curriculum.

Developed new lectures on occupational and environmental epidemiology in medical students core course; gave lectures.

Co-editor for development of a textbook on Environmental Epidemiology for Oxford University Press.

Developed symposium on "Work Organization and Cardiovascular Disease" for the American College of Occupational and Environmental Medicine

**PRESENTATIONS, LECTURES, AND AWARENESS SEMINARS**

Invited Lecture: Evaluation and Management of Lead Exposure, Department of Family Medicine Grand Rounds, Olive View Medical Center, Los Angeles, CA – August 2005

Invited Lecture: Effects of Heptachlor Epoxide, Graduate Program in Toxicology, University of California, Irvine – May 2006

**CONSULTATIONS/COMMITTEES**

First Five LA (county commission) – on development of a children's environmental health initiative for Orange County, CA

**OTHER**

Provided visiting professorship to Ta-Chen Su, MD, PhD, of the National Taiwan University (6 months)

Secretary-Treasurer, International Society for Environmental Epidemiology, 2001-2006

Media interviews and stories (LA Times, Orange County Register, KOCE public television) on medical problems associated with hazardous waste, lead, and mold.

Media interviews and stories internationally on work organization research.

Weekly occupational medicine clinical training for residents in primary care internal medicine through the UCI COEH occupational and environmental medicine clinic.

Member, Health and Environment Program Committee, Physicians for Social Responsibility, Los Angeles

Reviewed manuscripts for American Journal of Industrial Medicine, Environmental Health Perspectives, American Journal of Public Health, and Epidemiology

Presentation (testimony) at NIOSH regional township meeting for NORA 2 on the health effects of work organization

***Stephen Bondy, PhD***

#### **EDUCATIONAL DEVELOPMENT**

Reviewed proposals for NIH, NSF, US Civilian Research and Development Foundation, The Alzheimer Foundation, Phillip Morris External Research Program and South Dakota. Program to Stimulate Competitive Research, Biotechnology and Biological Sciences Research Council, U. K

Reviewed manuscripts for: Brain Research, Toxicology and Industrial Health, J. Pharmacology and Experimental Therapeutics, Biochimica et Biophysica Acta, Neurotoxicology, Free Radicals in Biology and Medicine, Neurochemistry International, Neuroscience Letters, Journal of neurochemistry, Neuroscience Research, Toxicology and Applied Pharmacology, Journal of Alzheimer's Disease.

#### **PRESENTATIONS, LECTURES, AND AWARENESS SEMINARS**

Chair, 8<sup>th</sup> International Conference on Free Radicals in Health and Disease, Vancouver, Canada, August, 2005.

#### **CONSULTATIONS/COMMITTEES**

1998-present: National Institutes of Health, Study Section on Brain Disorders and Clinical Neurosciences (BCDN I)

1999-2002: National Institute for Environmental Health Sciences, Special Emphasis Panel

1999-present: National Institute for Environmental Health Sciences. Superfund Study Section

2000-2003: Vice Chair, Library Committee, UCI College of Medicine

***M. Joseph Fedoruk, M.D., C.I.H.***

#### **EDUCATIONAL DEVELOPMENT**

Lead Faculty, COEH Clinical Case Conference (weekly)

Preceptor, COEH Occupational and Environmental Medicine Clinic (weekly)

## **PRESENTATIONS, LECTURES, AND AWARENESS SEMINARS**

Fedoruk M. Presentation on "Determining Medical Causation." Harris Martin Benzene Conference, Marina del Rey, California. September 30<sup>th</sup>, 2005.

Fedoruk et al. Modeling residential exposure to xylenes and ethyl benzenes from window sealant application. Presented at the International Society of Exposure Analysis meeting. Tucson Arizona, November 2005.

Fedoruk, M Indoor air and building related health issues: the 2006 perspective presented at a Scientific Meeting.

***Leslie Israel, DO, MPH***

## **EDUCATIONAL DEVELOPMENT**

Associate Residency Program Director:

Ongoing evaluation of resident journal club, case conference and didactic sessions. Review and expansion of rotation sites. Biannual evaluations of each resident's educational plan and their progress.

Preceptor: COEH Occupational and Environmental Medicine Clinic and UCI Medical Center Occupational Health Clinic - residents in Family Practice, Internal Medicine and Occupational Medicine.

Preceptor: COEH/Occupational Medicine Resident "Rotating On-Call" Services - Telephone Consult Service, Radiographic/Laboratory Result Review Service, and Respirator Questionnaire Review.

## **PRESENTATIONS, LECTURES, AND AWARENESS SEMINARS**

"Zoonosis: Medical Surveillance of Animal Care Handlers" 7/5/05

"Introduction to Occupational Medicine" 8/02/05

"Cardiopulmonary evaluations by the occupational medicine physician" 10/25/06

"Hearing Loss" 11/08/06

"Hepatitis C" 11/15/06

Special Lecture:

UCI Noon lectures for Internal Medicine Residents 12/05

## **OTHER**

Supervision of wellness and fitness medical evaluations for the Orange County Fire Authority Wellness and Fitness (WEFIT) Program.

Establishing COEH, UC, Irvine location as one of two AOEC sites for National Asbestos Program, an ATSDR Study. Plan to start screening evaluations in late November 2005.

Implemented the clinic protocol for evaluation of diacetyl exposed employees in the Food Flavoring Businesses located in Orange County. Supervise and perform the medical surveillance evaluations. Communicate with CDHS, CAL-OSHA, employers and employees.

**Elliott Kornhauser, MD, MBA, MPH**

**EDUCATIONAL DEVELOPMENT**

Preceptor, UCI Medical Center Occupational Health Clinic; and COEH Occupational and Environmental Medicine Clinic - residents in Family Practice, Internal Medicine and Occupational Medicine. Family Medicine residents 2 half days per week. Internal Medicine residents in 2 to 4 week blocks 3 to 4 per year. Occupational Medicine residents half day per week.

**OTHER**

Serves under UCIMC Medical Center, Safety Committee and Infection Control Committee

**Ulrike Luderer, MD, PhD, MPH**

**EDUCATIONAL DEVELOPMENT**

Updated course material for graduate Target Organ Toxicology course on (1) endocrine toxicology, (2) reproductive toxicology, and (3) developmental toxicology.

Completed 72 hours of CME credit in Internal Medicine for Board recertification

**PRESENTATIONS, LECTURES, AND AWARENESS SEMINARS**

A. Lectures

Series of six lectures totaling 15 hours on reproductive, developmental, and endocrine toxicology in *Target Organ Toxicology*, UC Irvine, Winter quarter 2005-06.

Endocrinology Grand Rounds, University of California Irvine Medical Center, April 26, 2006. "Oxidative Stress, Ovarian Follicular Apoptosis, and the Protective Role of Glutathione."

B. Presentations

Tsai-Turton M, Luderer U. Oxidative Stress and Glutathione in Ovarian Follicular Apoptosis. 2005 UC Irvine Chao Family Comprehensive Cancer Center Conference, Palm Springs, CA, November 2005.

Tsai-Turton M, Luderer U. Opposing Effects of Glutathione (GSH) Depletion and Follicle Stimulating Hormone (FSH) on Apoptosis and Reactive Oxygen Species (ROS) in Cultured Antral Follicles. Oral presentation at the 45th annual meeting of the Society of Toxicology, San Diego, CA, March 2006. *Toxicol Sci* 90: 317

Tsai-Turton M, Luderer U. 7,12-Dimethylbenz(a)anthracene (DMBA) induces apoptosis in Cultured Antral Rat Follicles: Potentiation by Glutathione (GSH) Depletion. Accepted for presentation at the annual meeting of the Society for the Study of Reproduction. #P1-271, July 2006.

Luong B, Tsai-Turton M, Luderer U. Induction of Apoptosis by 4-Hydroperoxycyclophosphamide (4HC) and Glutathione Depletion in Human COV434 Granulosa Cells. Accepted for presentation at the annual meeting of the Society for the Study of Reproduction. #P3-712, July 2006.

University of California Irvine, Dept of Pharmacology, "Oxidative Stress, Ovarian Damage, and the Protective Role of Glutathione." 13 February 2006.

University of California Irvine, Dept of Community and Environmental Medicine, "Apoptotic Destruction of Ovarian Follicles and Glutathione." 17 March 2006.

### **CONSULTATIONS/COMMITTEES**

U.S. Environmental Protection Agency Science Advisory Board Environmental Health Committee, Oct 00-Sept 06

World Health Organization, International Programme on Chemical Safety, Chapter coordinator for an Environmental Health Criteria document on "Principles for Evaluating Health Risks to Children Associated with Exposure to Chemicals." July 2003-July 2006

### **OTHER**

Mentor, UCI Minority Science Programs/ Minority Biomedical Researchers Program, 2000-present

External peer reviewer of Agency for Toxic Substances and Diseases Registry (ATSDR) Case Studies in Environmental Medicine Toluene Case Study, 2006

Reviewer of manuscripts for Journal of Occupational and Environmental Hygiene, Experimental and Clinical Endocrinology and Diabetes, International Life Sciences Institute.

***Robert Phalen, PhD***

### **EDUCATIONAL DEVELOPMENT**

Co-taught TOX 207, "Experimental Design & Interpretation", to UCI graduate program.

Co-taught TOX 208, "Target Organ Toxicology", for UCI graduate program.

Co-taught CEMX 492.41 (University Extension) Biological Principles of Environmental Management

### **PRESENTATIONS, LECTURES, AND AWARENESS SEMINARS**

Lecture on Animal Studies/Particles on Air & Waste Management Association

Provided training on ethics for high school honors science students for So. Calif. Jr. Academy of Science.

Lecture on Methods/Aerosol Models for National Academy of Sciences.

Lecture on Particulate Air Pollution and Ethics for residents.

Presented talk on In-Vitro Dosing of Particles at Dosimetry Conference.

### **CONSULTATIONS/COMMITTEES**

National Academy of Sciences – Member on Committee for Bioterrorism.

Society of Toxicology – Prepared educational exhibit for students at annual meeting.

TSE Corporation – Planned project to validate a new particle exposure system.

Cal State University of Long Beach participated in reviewing & editing

Undergraduate textbook on Environmental Epidemiology.

CDC/NIOSH – participated in planning a conference on inhaled particles.

## **OTHER**

American Association for Aerosol Research, Plan, and Conduct and guide peer review publication for PM Conference, Organizer, and Executive Committee Member

Southern California Jr. Academy of Sciences, Chair, Judging at Annual Meeting

Chair – Conference on “Frontiers in Aerosol Dosimetry Research”

Guest editor – Dedicated peer-reviewed issue of Journal Inhalation Toxicology

Co-author – National Research Council report “Overcoming Challenges to Develop Countermeasures Against Aerosolized Bioterrorism Agents”

***Peter Schnall, MD, MPH***

## **EDUCATIONAL DEVELOPMENT**

Revised course in “Work and Health” for UCLA SPH Spring 2006.

Prepared and delivered (3) 2 hours lectures to the ERC (education Research Center) students in Industrial Hygiene, Occupational Medicine and Occupational Health Nursing 2003-2004.

Convener and Organizer FIFTH INTERNATIONAL CONFERENCE ON WORK ENVIRONMENT AND CARDIOVASCULAR DISEASES – May 29-31, 2008

## **PRESENTATIONS, LECTURES, AND AWARENESS SEMINARS**

Presenter: APA NIOSH Conference, Future of NORA, Washington, DC April 2006

Presenter APA NIOSH Conference Work and Health, Miami, Fla March 2006

Invited Keynote Speaker INTERNATIONAL CONGRESS ON OCCUPATIONAL HEALTH: Milan, June 2006

Participant INSTITUTE FOR PSYCHOSOCIAL MEDICINE Sponsored Conference : FROM HEALTHY WORK TO HEALTHY SOCIETY: Stockholm, May 2006

## **CONSULTATIONS/COMMITTEES**

Consultant: Southern California STEP Project (STEP Program: Surveillance, Treatment and Early Prevention). A UCLA/UCI university centered initiative for a public health approach to the surveillance and early detection, treatment and prevention of workplace related injury and cardiovascular disease.

Consultant: University of California, Berkeley-COEH “San Francisco Hotel Workers, focused on the role of psychosocial factors and cardiovascular disease

Consultant to the Portland State U. research project - Workplace, Family Health and Well-being Network, funded by the National Institute of Occupational Safety and Health.

Co-Investigator with Dr. Paul Landsbergis (PI) 9/6/01-9/30/06 - UAW-DaimlerChrysler National Safety and Health Committee Job Stress, Hypertension and Cardiovascular Disease Risk. This study is designed to characterize the sources of stress in the work environment of autoworkers, and to determine their possible association with hypertension and CVD risk.



**OTHER**

Maintain a web site ([www.workhealth.org](http://www.workhealth.org)) dedicated to the education of the public on health risk associated with work.

#### **4. UCLA OCCUPATIONAL MEDICINE PROGRAM**

##### **EDUCATIONAL DEVELOPMENT**

UCLA occupational-environmental (preventive) medicine has been very active in the area of educational policy and curricular development. Highlights include the following:

##### ***Integrating general prevention and hazard control:***

Our program actively seeks to implement such an integrated approach. To do so, we have developed several special lectures and encouraged our trainees to view themselves as preventive medicine practitioners. For example, we added formal lectures & discussions on health promotion, control of lipid disorders, exercise and related matters.

##### ***National Policy:***

Professor Harber is active in developing national policy concerning occupational-environmental medicine education. He serves as vice chair of the Accreditation Council for Graduate Medical Education's Residency Review Committee. This committee has responsibility for establishing criteria for proving training programs as well as reviewing every preventive medicine program for certification purposes (including those focused and occupational medicine).

He has also served in several capacities with the American College of Occupational & Environmental Medicine, dealing directly with educational policy in this field. Such activities include:

- Vice Chair, Academic Council
- Member, Committee on Competencies
- Member, Committee on the Future of Occupational Medicine Training
- Speaker, National Conference on Future of Occupational Medicine Training

Professor Harber also served as first author for a peer reviewed published paper the overall structure of educational programs in the field of occupational medicine (Harber P, Ducatman A. Training pathways for occupational medicine. J Occup Environ Med. 2006 Apr;48(4):366-75).

##### ***Regional educational development:***

Two of our faculty members have served central roles in developing and implementing the Western Occupational Health Conference. Dr. Paul Papanek and Dr. Craig Conlon are prominent officers of the Western Occupational and Environmental Medical Association. In their roles as president and program chair, they had major responsibility for developing and implementing this very successful for day conference.

##### ***National educational programs:***

Dr. Harber served as a member of the program committee for the American College of Occupational & Environmental Medicine. In that capacity, responsibilities included helping guide the overall program development, facilitating local implementation logistics, and working with individual session chairs. In particular, he directly fostered the involvement of others associated with the ERC; this included helping arrange a half-day symposium session through the annual meeting presented by the UCI component as well as

facilitating several sessions presented by Kaiser permanently faculty members and/or Los Angeles County occupational medicine employees.

Dr. Harber was appointed as "Webmaster" for environmental and occupational health for the American thoracic society, which has a very widely used web site.

***Local (University) educational program development:***

Our faculty has been active in developing new courses. Dr. Harber and Dr. Conlon served as codirectors of the ERC CE ergonomics program. In addition, Dr. Harber has worked with the site medical school in developing educational endeavors in preventive medicine specially such as occupational medicine for medical students and postgraduate trainees.

***Educational outreach***

Faculty members serve as members of the American thoracic society committee on work exacerbated asthma, which is preparing a major educational document. In addition, faculty members serve on the American College of Chest Physicians committee on occupational asthma, also preparing a major educational document. Finally, four faculty members include service on the American thoracic society committee on non-malignant respiratory disease, which has prepared a follow-up publication to its original guidance document; oriented to a more general audience.

We have also worked with and the state Department of Health services (Dr. Robert Harrison) in preparing a very widely distributed report about diacetyl induced bronchiolitis obliterans as an educational endeavor to alert physicians and other care providers throughout the state of California.

Our trainees are actively involved in educational outreach. They played a central role in interacting with primary care trainees. They also but despite actively in the Western Occupational Health Conference, presenting research posters and serving as session facilitators.

**PRESENTATIONS, LECTURES, AND AWARENESS SEMINARS**

Faculty members have provided many lectures and presentations. Dr. Conlon and Dr. Papanek speak at regional national meetings. Dr. Harber has presented at national meetings including:

- American occupational health conference (ACOEM)
- American thoracic society
- Council of state and territorial epidemiologists
- Residency directors' group
- Longitudinal data analysis workshop (NIOSH)

Regional presentations include:

- West Los Angeles Veterans Administration medical center
- Olive view medical center
- Kaiser Permanente

In addition, we have contributed significantly to prominent newspaper articles including the Baltimore Sun, the Los Angeles times, and the Sacramento Bee articles concerning flavoring induced disease. Furthermore, we have done media interviews on a wide range of topics.

We sponsor and manage a weekly seminar program in occupational-environmental health.

**CONSULTATIONS/COMMITTEES**

We have a very extensive set of consulting activities, including work done directly to UCLA and by its affiliated faculty members.

## **5. CONTINUING EDUCATION/OUTREACH PROGRAM (CE/O)**

### **EDUCATIONAL DEVELOPMENT**

#### ***Occupational Medicine***

- Working with The UCLA and UC Irvine Schools of Medicine, American College of Occupational and Environmental Medicine (ACOEM) and the California Medical Association to be able to provide courses with CME credits. Having CME credits will allow us to attract physicians more effectively to our courses.
- Working with executive directors and medical directors of community clinics, the Community Clinic Association of Los Angeles County, County primary care and emergency clinics and other primary care sites to develop program of on-site occupational health training for physicians, nurses and physicians assistants working in primary care settings.
- Established relationship with Los Angeles County Emergency Medical Services Agency in development of courses.

#### ***Occupational Health Nursing***

- Outreach to Occupational Health nursing associations and nursing schools with courses previously identified as meeting their needs and interests.
- The Occupational Health Nursing program and Occupational Medicine Program will provide skills-based occupational health and safety training to physicians and nurses in the community providing episodic care. First and second-year student will be involved in curriculum development and as on-site training facilitators.
- The Occupational Health Nursing program and Occupational Medicine Program will assist in providing training to owners and supervisors of businesses and agencies involved in tourism to prevent injuries and illness to low wage service workers.
- Partnering with California Department of Health Services and UC Berkeley's ERC to host two Sharps conferences in Fall 2006, one at Berkeley and one at UCLA.

#### ***Safety***

- A part-time consultant continues to contact state and local government agencies and businesses to make them familiar with our offerings and to find out what courses they would like us to offer.
- Continued relationship with Cal-CUPA (Certified Unified Program Agency) to promote courses and other SCERC activities and solicit needs assessments.
- Expanded partnership with OSHA Training Institute at UC San Diego to include California State University, Dominguez Hills in order to offer a variety of OSHA courses including on-site courses that may be given throughout Southern California.
- Expanded partnership with University of Michigan's Center for Occupational Health and Safety Engineering to host a conference on ergonomics with the goal of establishing an ergonomic resource network with the goal of better providing ergonomics training and consultation.

### ***Industrial Hygiene***

- Developed series of courses previously identified through needs assessments sent to AIHA members as high need and interest for this program area: Ethics, Indoor Air Quality, Sampling and Instrumentation
- Reinstated CIH Review course with new faculty and curriculum after sending out an interest survey to members of AIHA within Region IX.
- Sought and received co-sponsorship of courses from local sections of AIHA
- Offered special discount for Ethics for Health and Safety Professionals course to Southern California AIHA members attending their monthly dinner the same day.
- Industrial Hygiene students will be involved in curriculum development and facilitating courses for businesses owners and supervisors in tourism industry.

### ***General***

- In the process of establishing relationship with Extended Studies Program at California State University, Dominguez Hills to jointly develop and present courses.
- Continued to outreach to local associations – several local AIHA, AAOHN, ASSE and ACHMM sections in courses development, including AIHA section in Hawaii.
- Established relationship with Los Angeles Office of Housing and Urban Development to present course in Orientation to Environmental Assessment.
- Redesigned website to make it more accessible. Improving on-line registration processing.
- As a result of hosting the NIOSH Town Hall (listed below) the Program has outreached to many sectors of the community including business leaders, labor, occupational health professionals, academics, and community based organizations, particularly those involved in the Ports and Transportation, Special Populations and Psycho-Social Factors.
- Improved relationship with UCLA-LOSH: obtained their sponsorship and assistance with NORA Town Hall; will continue to work on co-sponsoring HST courses and providing subsidies to eligible course participants.
- Developing series of on-line web seminars on ergonomics.

### **PRESENTATIONS, LECTURES, AND AWARENESS SEMINARS**

- AIHA Technical Symposium, Long Beach, CA
- Organized and hosted NIOSH Town Hall for public input on NORA – coordinating morning speakers on subjects including Special Populations, Ports/Transportation, Psycho-Social Factors. Facilitating the assistance and sponsorship of UCLA – LOSH (Labor Occupational Safety and Health); providing logistical support for Town Hall and assistance with afternoon session.

#### **• Consultations**

n/a

#### **• Other**

n/a

### **III. Progress Report**

**A. Program Title:** Interdisciplinary Coordination

**B. Program Director:** William C. Hinds, Sc.D.  
UCLA School of Public Health

**C. Program Description:**

The SCERC has continued its program of specific activities designed to foster interaction among occupational health disciplines. This is in addition to trainees taking courses together with trainees from other disciplines and trainees working as a team on projects and reports. The specific activities include an annual dinner meeting and an annual plant visit with an interdisciplinary workshop.

**D. Program Activities and Accomplishments:**

During the reporting period the dinner meeting was held in November 16, 2005. At the meeting an overview of the ERC, UCLA COEH, and LOSH programs were presented. Professor Joseph LaDou from UCSF was the featured speaker. He spoke on the challenges of international environmental and occupational health.

The SCERC annual plant visit and interdisciplinary workshop was held at the Trojan Battery Company in Santa Fe Springs, California. This was an all-day affair in which students toured the facility and then were divided into four teams each missing one of the core academic disciplines. The teams discuss and develop what the role of the missing discipline should be; critique the plant in that area; and present their critique to whole group. This activity requires students to work on a problem as an interdisciplinary team and to think seriously about the roles of disciplines other than their own. Both the interdisciplinary dinner meeting and the interdisciplinary plant visit and workshop are required for all ERC students and faculty. Non-supported students in ERC Programs are encouraged to attend and participate in these activities.

The UCLA occupational medicine residents take their MPH course work at UCLA School of Public Health with industrial hygiene and occupational health nursing students. Many of the courses at UCLA have multi-disciplinary focus. Fourteen courses are required for at least two disciplines and four courses are required for all three disciplines in our ERC. While this is important, what is more important is that the trainees in our Center are taking courses, making field trips, solving problems, and writing reports with trainees in other disciplines.

As an example, EHS 259A Occupational Safety and Ergonomics is a required course for all IH, OEHN, and OM/UCLA students. It includes a final project where students from each of the disciplines work together as interdisciplinary teams to solve problems and prepare a report. Another example, an occupational nurse supervises the CalOSHA internship and residency rotation where nursing, medicine, industrial hygiene, and safety students and professionals address real problems as a team.

**E. Program Products:**

We believe our trainees finish our programs with excellent appreciation for the roles and contributions of all the disciplines in occupational health and safety and the value of working with other disciplines.

**F. Future Plans:**

We plan to continue our interdisciplinary activities in much the same way as we have done in the past. We vary the type of facility we conduct the interdisciplinary workshop each year. We plan to have two team field trip reports in EHS 454 Health Hazards of Industrial Processes. We plan to involve all OH disciplines in our California Wellness grant to train health care practitioners in ambulatory care facilities about occupational health and safety.



### III. Program Progress Report

#### A. Program Title – Pilot Project Research Training (PPRT)

**B. Program Directors -** William C. Hinds, Sc.D.  
UCLA School of Public Health

Dean Baker, M.D., MPH, Department of Medicine  
School of Medicine, University of California, Irvine

#### C. Program Description:

- **Goals and objectives** – To enhance the research training opportunities for ERC and TPG trainees, junior faculty and young investigators in Region IX – ideally within one or more of the designated NORA subject areas. –

#### D. Program Activities and Accomplishments:

- **Selection of pilot project research projects**

In August 2005, proposals were solicited through a Request for Applications (RFA) disseminated to institutions throughout northern and southern California involved in occupational health research, and to key faculty members at research training institutions within Region IX (e.g., University of Arizona, University of Hawaii, USC, UC San Francisco, UC Berkeley, UC Davis). This year's application pool consisted of nine impressive proposals covering a broad array of topics. Applicant organizations included University of Arizona, University of California – Irvine, and University of California – Los Angeles.

These proposals were assessed by at least two independent reviewers, in accordance with the "Guidelines for Reviewers," and were ranked in six different categories to derive a final score on an NIH scale from 1 to 5, with 1 being outstanding and 5 being acceptable. Based on this confidential, peer-review, proposals were rank ordered and we funded the top five applicants.

At the end of this section you will find the solicitation document, Attachment A – Request for Application announcement.

- **Funded pilot project research activities**

Of the five funded projects awarded during the 05-06 cycle, two were awarded to trainees, one to a junior faculty member, and two to new investigators.

This FY05-06 award recipients were:

<u>Name</u>	<u>Report Title</u>
Jeffrey Birkner	Release of Particles from Commonly Used Respirators Filters
Robert Phalen	Influence of Biomechanical Work Factors on the Permeation of Captan through Nitrile Gloves using Robotic Hands
Wenhai Xu	Permeation of Metal Working Fluids through Disposable Gloves
Graduate Student Environmental Health Sciences/ Molecular Toxicology	The Effects of Occupational Nickel Exposure on Human Sperm DNA Integrity
Yifang Zhu	Exposure to Manufactured Nanoparticles in the Workplace

At the end of this section you will find:

- an expanded chart presenting data for all nine submissions including applicant institution, NORA area, budgetary requests
  - poster summaries for three of the five project
  - current progress reports for all award recipients
- At the annual **ERC Interdisciplinary Dinner** on November 16, 2005, two Pilot Project awardees presented posters from the prior, FY 03-04, pilot project cycle:
    - Graduate Student, UC San Francisco
      - project title: "Changes in Gene Expression in Flexor Tendons due to Cyclic Loading: An in vitro Animal Model Experiment" (See poster graphic at the end of this section.)
    - Graduate Student, UC Berkeley
      - project title: Validating a Model for the Fate and Transport of Particles in Room Air

**E. Program Products (include in summary form):**

• **Publications resulting from Pilot Projects**

The research activities of Robert Phalen, PPRT award recipient, resulted in three different peer-reviewed journals (one in press). An additional two manuscripts have been submitted to peer-reviewed journals. He also delivered five presentations at the American Industrial Hygiene Conference (AIHce).

**F. Future Plans (Include in summary form plans for the next budget period.)**

We plan to continue the PPRT program as we have done in the past by sending out the RFA in May or June, soliciting proposal in July or August, and making awards in September or October. In the 06-07 cycle, we have received five proposals and plan to make awards to four of them.

**IV. Report on Specific Improvements in OS&H Resulting from ERC Programs (Include any specific project or activity that demonstrated a specific impact on worker safety and health.)**

One doctoral student whose thesis work was supported in part by a PPRT pilot project graduated and received a tenure track appointment with an IH emphasis at a CSU-based health sciences and human ecology department.

#	Institution	Title	NORA Area(s)	Direct Costs Requested	Human Subjects	Funded
1.	UCLA/ School of Public Health- Environmental Health Sciences	“Influence of Biomechanical Work Factors on the Permeation of Captan through Nitrile Gloves using Robotic Hands”	Personal protective equipment and control technologies	\$19,000	No	Yes
2.	UCLA/ SPH-EHS	“Exposure to Manufactured Nanoparticles in the Workplace”	Exposure assessment/ Emerging technologies	\$18,993	No	Yes
3.	UCLA/ SPH-EHS	“Permeation of Metal Working Fluids through Disposable Gloves”	Control technology and personal protective equipment	\$19,000	No	Yes
4.	UCLA/ SPH-EHS	“Release of Particles from Commonly Used Respirators Filters”	Control technology and personal protective equipment	\$21,150	No	Yes
5.	UCLA/School of Public Health- Molecular Toxicology	“The Effects of Occupational Nickel Exposure on Human Sperm DNA Integrity”	Fertility and pregnancy abnormalities	\$19,000	Yes	Yes
6.		“Estimating Aerobic Capacity in Firefighters and Police Officers”	Intervention effectiveness research	\$17,553	Yes	No
7.		“Impact of Facial Features on Particle Inhalability”	Exposure assessment methods	\$ 18,998	No	No
8.		“Piloting Health Promotion and Health Protection in the Workplace: The Case for Small Employers”	Organization of work	\$15,024	Yes	No
9.		“Day Laborers: Occupational Health and Access to Care”	Special populations at risk; health services research	\$16,000	Yes	No

EFFECTS OF PEAK STRAIN DURING CYCLIC LOADING OF FLEXOR TENDONS



Asundi, K. and Rempel, D. M.  
Bioengineering Graduate Group, University of California, San Francisco



**INTRODUCTION**  
Repetitive finger loading can cause overuse disorders, such as tendinitis in humans and inflammatory changes in flexor tendons in rats [1]. However, little is known about the early effects of the different biomechanical characteristics of cyclical loading (e.g., strain, strain rate, peak force, duty cycle) on the expression of inflammatory and degradative genes. Examining the effects of repetitive loading on the expression of genes associated with matrix formation, degradation and tendon healing can provide valuable information about the initial physiologic response to such loading, which may provide an explanation for the injury mechanism.

**OBJECTIVE**  
Examine the effect of peak strain on the expression of type III collagen (COL 3), matrix metallo-proteinase 1 (MMP-1), interleukin 1b (IL-1b), vascular endothelial growth factor (VEGF) and biomechanical properties of tendons after 24 hours of cyclic loading in an in vitro system.

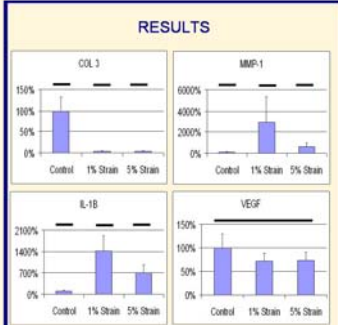
**METHODS**

**Loading Apparatus**

Ultra-precision actuator (accuracy = 0.2µm, speed range: 0.02µm - 25mm/sec)  
load cell (accuracy = 0.1N, force range: 0 - 44.5N)  
tube with saline or media  
ridged clamps

**METHODS**

- Tendons harvested from 8 New Zealand White Rabbits
- Assigned to one of three groups
- Snap frozen in liquid nitrogen (control)
- 1% Peak clamp-to-clamp strain
- 5% Peak clamp-to-clamp strain
- Loaded tissue cultured in DMEM at 37°C for 24 hours
- Saw-tooth wave form at 1Hz, 50% DC and 20%/s strain rate
- RNA isolated from central 4mm sections of each tendon
- Gene expression measured by qRT-PCR



**Figure 1.** Gene Expression levels normalized to GAPDH and expressed as a percentage of fresh frozen control (100%). Horizontal bars identify significantly different groups (p<0.05); the bars span similar groups. Vertical bars represent 1 SE (n=8).

**RESULTS**

Peak Strain	Δ Stiffness (SD)	Creep (SD)
1%	1.29 (0.56) MPa	1.01 (0.13) %
5%	3.99 (0.80) MPa*	4.53 (0.30) %*

**Table 1.** Change in stiffness and percent creep after 24 hours of loading to 1% or 5% peak clamp-to-clamp strain \* (p<0.05) n=8

**DISCUSSION**  
Unexpectedly, stiffness increased after 24 hours of cyclic loading at higher peak strain. A previous fatigue study reported cyclic loading decreased stiffness [2] although the peak loads and frequencies were greater than ours (25 MPa, 50 Hz). A peak strain of 5% lowered the expression of MMP-1 and IL-1B compared to 1% peak strain, a difference that may be due to stress deprivation at the 1% strain level. There is no difference in VEGF expression for any of the groups. COL 3 expression at 1% is statistically greater than 5%, but this difference is small, so they appear the same on the graph.

**CONCLUSIONS AND SIGNIFICANCE**

- Loading to 1% or 5% peak strain for 24 hrs in our model may not damage collagen fibrils and decrease tendon stiffness.
- Expression of COL 3, MMP-1 and IL-1B in rabbit flexor tendons is modulated by peak strain, while VEGF is not.
- Short term loading can alter the expression of several genes involved in matrix remodeling and tendon healing.

**REFERENCES**

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**Release of Particles from Commonly Used Respirator Filters**  
 Jeffrey S. Birkner, MS, CIH  
 Advisors: Dr. Kennedy, Dr. Hinds

**Background**

- It has been believed that adhesion forces on particulate filters will not allow the release, resuspension and/or re-aerosolization of a significant number of particles under typical respiratory flows.
- Handling and Disposal of respirators with release in mind has generally not been addressed by users except in the nuclear industry and by some respirator manufacturers in their instructions.
- A pilot study performed by Hinds and Kennedy showed that particles may be released from respirator filters when dropped.
- Release of particles from filters are of particular interest in light of pandemic flu, terrorism (such as the anthrax scare) and highly toxic particles.

**Hypothesis:**

- Particles are released from fibrous filters in concentrations that could have significant health effects on individuals exposed to these contaminants if these devices are not properly handled.
- Particles may be released by fibrous filters under various handling scenarios including dropping from various heights, typical doffing procedures.
- Differences in particle release may be effected by factors including particle size, drop height, filter loading and type of handling.

**Objectives:**

- Laboratory based study to quantify fractional release of particles from respirators dropped on a hard surface, flexed in a way that simulates respirator removal.
- Determine if differences exist between respirator types
- Investigate the mechanisms behind particle release.

**Preliminary Results-Mean Percent of Particles (S.D.) Released for 20million Particles Load Condition**

Respirator Type	Particle Size (µm)	Drop Height (ft)		
		1	3	5
A	0.6	0.003 (.002)	0.011 (.007)	0.016 (.008)
	1.0	0.001 (.0006)	0.029 (.02)	0.048 (.02)
	2.0	0.002 (.002)	0.106 (.07)	0.338 (.18)
B	0.6	0.002 (.002)	0.005 (.002)	0.004 (.002)
	1.0	0.001 (.0007)	0.013 (.006)	0.013 (.008)
	2.0	0.002 (.002)	0.079 (.038)	0.065 (.030)

**Experimental Setup/Respirators Investigated:**



**Methods:**

- 0.6, 1.0 and 2.0 micrometer particles used to load filters
- Respirators are loaded to 10, 20 or 40 million particles
- Respirators are Dropped from a height of 1, 3 and 5 feet
- Respirators are loaded with 1.0 micrometer particles and then flexed to simulate respirator removal after use
- Respirators are analyzed for different characteristics to attempt to explain release differences amongst respirators
- Aerosol Particle Sizer (APS) is used to count particles for loading and during various treatments
- Breathing machine is utilized to simulate the loading of respirator filters in work environment

**Conclusions to Date**

- There appears to be a significant difference between particles release and respirator type.
- Differences appear to be related to the type coverstock used on each mask and possibly other characteristics some of which have not yet been identified or quantified.
- Other respirators will be tested to attempt to determine if this theory is correct.
- Although particles are released from respirators, calculations show that the amounts released under normal use conditions will never exceed a PEL based on the fact that you may use half mask respirators up to 10x the PEL.
- Consideration may have to be given to the proper handling of respirators in health care environments.

**Further Testing/Analysis**

- Test Two More Models for a total of Four Models
- Characterize Differences in Masks
- Begin Tests on Flexing of Respirators
- Begin Multivariate Analysis
- Begin Dissertation and Plan to Defend in Spring of 2007

Community  
Environmental  
Health Stars  
Project

# Permeation of a Straight Oil Metalworking Fluids Through Four Disposable Gloves

UCLA

Wenhai Xu Advisor: Dr. Shane Que Hee

Department of Environmental Health Sciences and Center for Occupational and Environmental Health, UCLA School of Public Health, 650 Charles Young Jr. Drive South, Los Angeles, CA 90095-1772

## Abstract

The hypothesis is disposable nitrile gloves provide adequate dermal protection for workers in contact with metalworking fluids (MWFs) in Los Angeles workplaces. MWFs are widely used and MWF exposures are associated many adverse health outcomes including asthma and dermatitis. Available data on glove performance against MWFs are limited. In this study, the permeation of a representative straight oil MWF through four types of disposable gloves was tested using the American Society for Testing and Materials F739-99a method with perfluorohexane and hexane as the collection solvent. Thickness and weight changes of gloves were also used as the screening parameters. The results showed that among the tested gloves, nitrile was the best for the straight oil MWF, but further studies are needed for other types of MWFs. Field studies are still ongoing.

## Background

### What are Metalworking Fluids (MWFs)?

- Lubricants and coolants
- Improve machining performance, prolong tool life
- More than 6,700 metalworking businesses in California
- Mineral oils, alkalineamines, and polyglycol ethers commonly in Material Safety Data Sheets (MSDS)

### Health Outcomes from MWF Exposures

- Asthma, acute airway irritation, chronic bronchitis
- Cancer concern
- Irritant or allergic contact dermatitis (14% to 67%)

### Protective Gloves

- Minimize dermal absorption
- Prevent the development and relapse of dermatitis
- Less chemical resistance, but better dexterity and user comfort of disposable gloves

- Only one previous study on glove performance against MWFs was published in peer-reviewed English literature.

## Methods

- Nitrile, chloroprene, vinyl, and latex disposable glove
- Challenge: straight oil MWF D4 (no challenge for controls)
- Collection solvent: hexane and perfluorohexane
- Duration: 8 hours
- Used the standard American Society for Testing and Materials (ASTM) F739-99a permeation method, with 1 inch permeation cells from Pesco Lab
  - Temperature 35 ± 0.5°C
  - Average horizontal shaking speed of 70 ± 5 cycles per minute at 10.24 cm cycle
- Thickness and weight changes measured
- Evaporate final collection solutions in Vials at 35 ± 3°C under nitrogen flow (Evaporation method validated)
- Permeated D4 mass (m) determined after correcting for controls
- The time weighted permeation rate  $Pa = \frac{m}{At}$ , where  $A$  is the exposed permeation area of the glove, and  $t$  is the duration of the permeation tests.

## Results

### Thickness and Weight Changes

- Minimal for nitrile and vinyl due to D4 after correcting for controls
- Chloroprene thickness increased 8.8% for perfluorohexane collection and 9.0% for hexane collection. Weight increased 12% for perfluorohexane collection and 12% for hexane collection.
- Latex thickness increased 28% for perfluorohexane collection and 32% for hexane collection. Weight increased 55% for perfluorohexane collection and 72% for hexane collection.
- Non-significant or less than 2.0% thickness and weight changes for control gloves except for vinyl, whose thickness and weight decreased due to collection solvents
- Vinyl extractables (glutaralizer phthalates) have caused much health concern

### Amount of Glove Extractables by the Two Collection Solvents, Note the Different Mass Scales

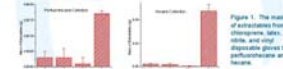


Figure 1. The masses of extractables from chloroprene, nitrile, and vinyl disposable gloves by perfluorohexane and hexane.

### Permeated Amounts of D4 Through the Gloves, Note the Different Mass Scales

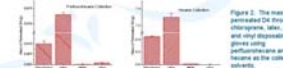


Figure 2. The masses of permeated D4 through chloroprene, nitrile, and vinyl disposable gloves using perfluorohexane and hexane as the collection solvents.

With perfluorohexane collection,  $Pa$  at 8 hours:

•  $>0.4$  ± 0.58 µg/cm<sup>2</sup>min through nitrile (around detection limits)

•  $>4.1$  ± 0.5 µg/cm<sup>2</sup>min through chloroprene

•  $>13.6$  ± 0.3 µg/cm<sup>2</sup>min through latex

•  $Pa$  with hexane collection was generally larger

• The ranking of glove performance with either solvent was the same.

## Conclusions

- The straight oil MWF significantly increased the weight and thickness of chloroprene and latex gloves
- Hexane extracted more glove components than did perfluorohexane, and increased the amounts and rates of D4 permeating all gloves
- The ranking of performance of these four types of gloves were the same for both collection solvents
- Nitrile was the best glove for the straight oil MWF
- Further studies for other types of MWFs and field studies are needed

Field studies are continuing.

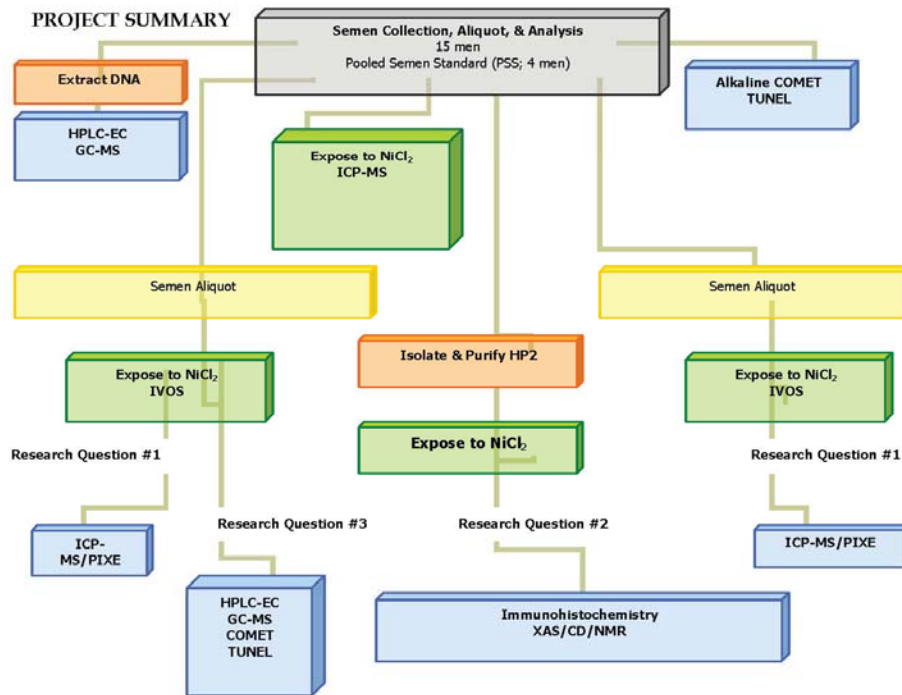
## References:

1. Xu W, Que Hee S. Occupational Health. *Journal of Occupational Health*. 2010; 12(1): 21-31.

2. Xu W, Que Hee S. Occupational Health. *Journal of Occupational Health*. 2010; 12(1): 21-31.



FY 05-06 PPRT Progress Report- Graduate Student  
 October 2006



**PPRT-RELATED DISTINCTIONS**

The Principal Investigator was awarded a grant (\$5000.00) from the Community Environmental Health Stars Summer Program to investigate and identify greater Los Angeles communities at risk of exposure to metal contaminants.



## **ABSTRACTS AND PROGRESS REPORTS FOR PPRT AWARD RECIPIENTS FY 05-06**

1. Jeffrey Birkner – Ph.D. student -

Project title - Release of Particles from Commonly Used Respirator Filters

**Thesis Advisors: Drs. Nola Kennedy and William Hinds**

Abstract –The goal of this research is to better understand and characterize whether or not particles are released from respirator filters. Particulates are captured by filters through five mechanisms. There are interception, impaction sedimentation, diffusion, and electrostatic charge. It has always been assumed that once particles are captured by filters there is little risk of their subsequent release. Preliminary data suggests that particles may be released from filters under typical handling scenarios. It is important to determine if particles can be released from particulate respirator filters, under what conditions, and to what extent. The present work will attempt to quantify the release of particle from filters from several different types of respirators under various conditions including particle size, drop heights, and different loading conditions. If preliminary results are validated, recommendations may be made to the public and to regulatory agencies to modify the handling and disposal procedures of respirators under both common use as well as during terrorist scenarios

Progress report – The spring and summer of 2006 was spent collecting data on two disposable respirators and two reusable respirators. Currently, two more brands of disposable respirators have been added to the test protocol and are being run under the varying conditions described above. Further handling conditions of the 4 disposable respirators will be investigated. Additionally, an investigation has been initiated which studies the characteristics and nature of the coverstocks used on disposable respirators, as it appear that coverstock characteristics may be related to the particles being release from the various disposable respirators. Of the \$19,000 allotted for this project approximately \$8,000 has been spent. Remaining resources will be spent on further equipment as necessary to finish this project. Additionally, some monies will be spent on statistical software, statistical support and student assistance to help to complete this project.

**NOTE:** This Pilot Projects was partially supported by NORA funds.

2. Robert Phalen – Ph.D. candidate/2006 graduate

Project title – Influence of Biomechanical Work Factors on the permeation of Captan through Nitrile Gloves using Robotic Hands

**Thesis Advisor: Dr. Shane Que Hee**

Abstract - The primary objective was to develop a new Attenuated Total Reflectance Fourier Transform Infrared (ATR-FTIR) spectroscopy and whole-glove permeation method to detect breakthrough and permeation of a pesticide through glove materials. The specific aims were to: (1) develop a reliable and sensitive gas chromatographic method for the analysis of captan in formulations, (2) conduct American Society for Testing and Materials Method F 739 permeation testing for captan through gloves, (3) develop an ATR-FTIR method for the analysis of captan on the inner and outer surfaces of a glove, and (4) develop a whole-glove permeation method to improve analytical sensitivity and account for hand movement and regional variations in glove thickness.

2. Robert Phalen – Ph.D. candidate/2006 graduate (continued)

Progress report - All four of the above aims were completed and resulted in (a) five presentations at the American Industrial Hygiene Conference (AIHce), (b) publication in three different peer-reviewed journals (one in press), and (c) an additional two manuscripts submitted to peer-reviewed journals. These accomplishments are detailed in Appendix C

3. Wenhai Xu – Ph.D. student

Project title – Permeation of Metal Working Fluids through Disposable Gloves

**Thesis Advisors: Dr. Shane Que Hee**

Abstract – Metal working fluids (MWF), also cutting fluids or cutting oils, improve machining performance and prolong cutting tool life. Millions of US workers, many in Southern California, are potentially exposed to MWFs, and they often report skin problems and respiratory symptoms or disorders. Based on limited data, NIOSH has recommended chemically protective Nitrile gloves for workers handling MWFs. Disposable gloves are often preferred by workers as they provide better dexterity and user comfort. The hypothesis of the present study is that disposable Nitrile gloves protect better than other disposable gloves (latex, chloroprene and vinyl). The specific aims are to: 1) select representative disposable gloves for study; 2) select representative MWFs for permeation testing; 3) develop analysis methods for quantification of permeated MWFs; 4) perform permeation testing with the representative MWF and gloves using ASTM method F739-99a; 5) characterize the permeation properties (the breakthrough times and permeation rates). This study will recommend gloves for each type of MWF. The research relates to the NORA priority research areas of control technology and personal protective equipment, mixed exposures, and allergic and irritant dermatitis. The analysis method developed in this study may be able to be applied to characterize MWF aerosol exposure and exposure to other complex mixtures.

Progress report - The four major types of Metalworking fluids (MWFs) are straight oil, soluble oil, semisynthetic, and synthetic. Over 1 million US workers were potentially exposed to MWFs. MWF exposure cause respiratory disorders. 14-67% of exposed workers develop dermatitis. There are also concerns about carcinogenicity. Only one MWF permeation study has been published in the peer-reviewed literature. Based on that research, NIOSH recommended chemically protective nitrile gloves for workers handling MWFs. Disposable gloves are preferred by workers as they provide better dexterity and user comfort. The hypothesis of the study was that disposable nitrile gloves protect better than other disposable gloves against MWFs. The nitrile disposable glove was found to be the best glove for the straight oil MWFs. Perfluorohexane was a better collection solvent for non-polar MWFs than hexane. Hexane increased the permeation of the straight oil MWF and DOD through gloves. However, the ranking of glove performances were the same for both collection solvents. Using glove swelling as a quick screening parameter, it was shown that the use of nitrile against water-based MWFs should be cautioned. More work need to be done on the analysis of water-based MWFs and their permeation through gloves. Field studies also need to be performed.

4. Graduate Student – Ph.D. candidate  
Project Title - The Effects of Occupational Nickel Exposure on Human Sperm  
DNA Integrity  
**Thesis Advisor: Dr. Wendie Robbins**

Abstract - Previous research studies have suggested that occupational exposure to metals may damage the sperm cells in some men and may increase cancer incidence in their offspring. No single metal has been identified, but metal particulates and fumes generated during welding, minting, mining, and electroplating such as nickel, lead, chromium, and manganese are implicated. In this research study, we will investigate whether exposing mature ejaculated sperm cells to nickel *in vitro* will induce sperm DNA damage. No one has measured sperm cell damage from nickel exposure. Nickel is a carcinogenic transition metal that may target sperm DNA (Liang et al, 1999). The specific aims of this study are to: 1) determine if nickel enters the nucleus of spermatozoa; 2) assess the ability of nickel to bind DNA and proteins, particularly human protamine 2, a protein formed during spermiogenesis thought to aid in the compaction and packing of sperm DNA; and 3) evaluate sperm DNA damage in the form of breakage and modifications of chromosome structure. We hypothesize that ejaculated human sperm cells exposed to nickel *in vitro* will yield quantifiable damage to sperm DNA. This research study is the first step in assessing the potential for adverse reproductive health effects in men occupationally exposed to nickel. If we demonstrate that sperm DNA damage does occur after exposure to nickel, then it would be important to conduct epidemiologic studies in men occupationally exposed to nickel.

Progress report - The literature suggests that metal exposure around the time of conception may put a man at increased risk of producing damaged sperm DNA, but the mechanism has yet to be elucidated. It may be possible that exposure to metals in the workplace may mutate or fragment DNA and if not repaired, damage may be transmitted to the child through an abnormal sperm cell. We are currently enrolling 15 men for the purpose of semen donation to conduct preliminary *in vitro* experiments in collaboration with the Lawrence Livermore National Laboratory (LLNL) to assess the effects of nickel on human sperm DNA. Initial results using inductively coupled plasma mass spectrometry (ICP-MS) showed exposure of whole semen to 0.5 mM Ni resulted in 0.1% Ni uptake into the cells (i.e.,  $4.62 \times 10^{-4}$  mM Ni was found in the pellet fraction after 8-hour exposure). We conclude that nickel is not significantly transported into an ejaculated sperm cell. ICP-MS results for other metals important in sperm development yielded mixed results and will be verified via particle induced X-ray emission (PIXE). If present during spermiogenesis, nickel may displace zinc bound to human protamine 2 (HP2), a protein thought to aid in the compaction and packing of sperm DNA. To investigate whether nickel will bind HP2 and/or displace zinc, the Principal Investigator will travel to LLNL to isolate and purify HP2 in the laboratory of Rod Balhorn, PhD. Purified HP2 will then be used for immunohistochemistry experiments to assess binding. Since nickel is not significantly transported into ejaculated cells, we are looking to identify men who are occupationally exposed to nickel and thus may have nickel present throughout sperm cell development and packaging in order to study effects on sperm DNA. This study is the first step in

assessing the potential for adverse reproductive health effects in men occupationally exposed to nickel.

5. Yifang Zhu, Ph.D. – Asst. Prof. in Residence, Environmental Health Sciences  
Project Title - Exposure to Manufactured Nanoparticles in the Workplace  
Co-Investigators: Arantza Eiguren-Fernandez, Ph.D., Assistant Researcher  
Nancy Jennerjohn, M.S., Graduate Student

Abstract - The emergency of nanotechnology is likely to introduce tons of nanomaterial into the United States over the next decade. While these novel materials are prized for their strength, low weight, large surface area, and reactivity, they may have a negative impact on the health of our workforce and the environment through unintended consequence. According to the US Department of Labor, 2 million workers are potentially exposed to uniquely engineered nanomaterials on a regular basis. The most potent occupational health risk due to manufactured Nanoparticles could be inhalation. However, there is limited information on how and to what degree workers inhale, and are exposed in other ways, to nanoparticles. It is not even known whether exposure levels should be assessed based on mass, volume, number, or surface area.

The objectives of this project are: 1) to develop methods to quickly and specifically identify airborne carbon nanotubes and characterize human exposure while handling them; and 2) to measure the effectiveness of an exposure reduction practice. The long-term aims of this pilot study are to determine the characteristics of workplace nanoparticle exposure and provide data that can be used by epidemiologists and toxicologists to evaluate occupational health risks. We also seek to provide information for policy makers and/or occupational health authorities to make judgments on enforcing direct precautionary measures that help protect workers in the nanotechnology industry.

Progress report - This project examines the ability of existing air monitoring methods to characterize airborne carbon nanotube exposure in the workplace. Nanotubes are likely to be used in manufacturing in increasing amounts in the near future because of their strength, reactivity and other desirable properties, and workplace exposure to them will vary. It is important to anticipate which air monitoring techniques will be effective detecting them.

Therefore, over the past year, a university research laboratory where nanotubes are in use, was used as a test bed for trying out instruments and techniques. The three most promising methods turned out to be 1.) detection of EC (elemental carbon) and metals, both originating from nanotubes, found on filters after air sampling, 2.) particle counting devices such as the CPC (condensation particle counter) although only at extremely high agitation levels, and 3.) TEM (transmission electron microscope) imaging of particulates in air samples and room swipes. We derived an estimate of the level of airborne nanotubes in the air in the research laboratory (330 ng/m<sup>3</sup> of ambient air). We also aerosolized nanotubes, and the resulting TEM images revealed morphology that will help in the understanding of how nanotubes might interact with the human lung.

## ATTACHMENT A

### SOUTHERN CALIFORNIA EDUCATION AND RESEARCH CENTER

• University of California, Los Angeles • University of California, Irvine •

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#### ANNOUNCEMENT

##### **\$19,000 Occupational Health and Safety Research Training Pilot Project Grants**

The Southern California NIOSH Education and Research Center (ERC) announces the availability of awards for one year pilot projects **to support research training for occupational health and safety students, including ERC and TPG trainees; new investigators; and new faculty members** (within four years of initial appointment). The goal of this program is provide pilot funding for projects to explore feasibility, to collect preliminary data, and to enable investigators to seek external, longer-term funding. Awards are not intended to support activities already funded by research grants. Awards are contingent on receipt of funds from NIOSH.

The program anticipates making four new awards of up to \$19,000 (direct cost) each.

Students and young investigators are particularly encouraged to apply, and with all other factors equal, will receive funding priority. Non-faculty must have a full-time faculty member to sponsor their project. Faculty sponsors and students must be identified as such in the proposal. All pilot project grantees are required to submit an annual/final progress report and to present their research results at a poster session in the fall of the following year.

##### **Letter of Intent and Applications:**

By **July 14, 2006** applicants should submit a one-page Letter of Intent describing their proposed project. This will allow us to select appropriate reviewers for the applications. Please e-mail your letter to D.T. Evans at [dtevens@ph.ucla.edu](mailto:dtevens@ph.ucla.edu).

By **July 31, 2006** applicants should submit their application. Please submit the original and 7 copies (without appendices) to the address given below. Applications should include:

- a brief abstract of the proposal,
- a description of project (3-5 pages, single-spaced),
- a budget,
- a budget justification,
- a bio-sketch.

Applications will be reviewed by a multidisciplinary panel of scientists. Awardees will be selected following review, with funding to begin as early as September 2006, or if human subjects are involved when IRB approval is obtained. The primary review criteria are:

- 1) relevance to occupational health and safety and to NORA objectives  
(see: <http://www2a.cdc.gov/nora/nora-1.html> or <http://www.cdc.gov/niosh/nora/default.html>)
- 2) scientific quality
- 3) stimulation of interdisciplinary activity
- 4) likelihood that the project will lead to ROI or other external funding
- 5) novelty of ideas
- 6) likelihood that the project would foster long-term research interests and attract new or young scientists to the field
- 7) evidence that the proposed project is not already funded by a research grant.

For further information, Contact D.T. Evans at 310-825-7104 or [dtevens@ph.ucla.edu](mailto:dtevens@ph.ucla.edu).  
650 Young Drive South, Los Angeles, CA 90095-1772

*Please post and distribute to eligible individuals at your institution.*

### **III. Program Progress Report**

#### **A. Program Title**

National Occupational Research Agenda (NORA) Research Support Program

#### **B. Program Director**

Dean Baker, MD, MPH, Professor, Department of Medicine  
School of Medicine, University of California, Irvine

#### **C. Program Description**

Goals and Objectives. The Program's goal is to support implementation of the National Occupational Research Agenda (NORA) by encouraging and facilitating research training in NORA priority areas. Specific objectives are (1) to raise awareness about NORA within the universities in the region; (2) to facilitate interdisciplinary research training on NORA priority areas; (3) to support research training of graduate students in ERC programs; and (4) to organize outreach and education programs to disseminate information about NORA and NORA research topics. The program has developed and implemented several strategies in each of these areas.

The Program has raised awareness about NORA and encouraged SCERC faculty and trainees to conduct pilot projects, doctoral research projects, and investigator initiated research projects in NORA priority areas. During the 2005-06 reporting period, we began to plan for a follow-up mail-back to survey assess awareness of NORA that will be conducted next year. In addition, the Program developed outreach materials on NORA that have been distributed to the ERC programs and trainees. We also downloaded and printed the NORA posters that were developed by the NIOSH working groups. The posters have been displayed at the Southern California ERC events, such as our interdisciplinary dinners and at ERC CE/O conferences.

The NRS Program has facilitated research training using several strategies. First, the Program has provided limited support for faculty to provide research training in ERC core courses. The faculty have provided lectures in required courses of each of the core programs on the SCERC research initiatives in ergonomics and in work organization. The program faculty also developed new courses in work organization and cardiovascular disease (Occupational Health Psychology) and in occupational cardiology that have been offered at the UCLA School of Public Health and at the UCI School of Medicine. Second, the Program has provided technical support by purchasing shared research equipment and supplies for use by ERC faculty and trainees who are involved in NORA-related research. Third, the Program has provided some technical support to the Pilot Project program in reviewing proposals and has provided supplemental funding for a pilot project that addressed a NORA priority area. The program will continue to use these strategies to encourage and facilitated NORA research training within the ERC.

The Program has supported research training in the ERC programs by providing stipend and technical support to doctoral students in the Industrial Hygiene program. The Industrial Hygiene program is the only approved doctoral degree program in the SCERC. The NRS provided stipend support for four Industrial Hygiene doctoral students during the reporting period. In addition, the Program has purchased research equipment and supplies and provided limited support for research assistants, statistical consulting, and machine shop services. Some of the Industrial Hygiene doctoral students have also received support through the Industrial Hygiene core program or the Pilot Project program, but the ERC coordinates these programs so there is no duplication of support across the programs.

The program encourages NORA research in other SCERC core programs and across the two universities, but the program does not provide stipends support to trainees in other ERC core programs or related programs at our universities (e.g., occupational epidemiology, toxicology) because of program restrictions on providing stipends to trainees in programs other than the NIOSH approved doctoral training program. Our long-term strategy is for the SCERC to expand the number of approved doctoral degree training programs within the ERC.

The NRS Program has collaborated with the CE/O Program to organize outreach and education programs to disseminate information about NORA and NORA research topics. The Program has organized and sponsored at least one outreach event per training year that has a focus on a NORA priority area. These events have targeted occupational health professionals of all disciplines to raise awareness about NORA and to present research findings on NORA research. During the reporting period, the Program collaborated with the CE/O program to organize a regional NIOSH Town Hall meeting to provide input on the NORA strategic planning process.

#### **D. Program Activities and Accomplishments**

The Program's specific objectives during the reporting period were (1) to provide technical support for NORA research within the ERC by purchasing shared laboratory research equipment; (2) to provide stipend and technical support to ERC trainees in the Industrial Hygiene core program to undertake research in NORA areas; (3) to provide research training in the core programs with an emphasis on health effects of work organization; and (4) to organize a NIOSH Town Hall meeting to raise awareness about NORA and provide input to NIOSH on the NORA strategic plan.

##### *1) Shared Research Equipment and Supplies*

NRS Program funds were used during the reporting period to purchase an Aerodynamic Particle Size Monitor. This equipment is being used by doctoral students in the Industrial Hygiene program and by SCERC faculty in research projects. It is also being used for research training in the UCLA Department of Environmental Health Sciences.

##### *2) ERC doctoral student support*

The Program provided full stipend support to two doctoral students and partial stipend support to two doctoral students in the Industrial Hygiene research training program. The research activities of the four trainees are summarized below. In addition, the Program

provided partial support for a student research assistant for one of the research projects, research supplies (e.g., respirators, latex spheres, and laboratory supplies), and machine shop services. This support enabled the doctoral students to make substantial progress on their dissertation research.

James Hollingshead: Ultrafine Particle Generation during Welding Operations

In response to the increased awareness of the health effects of ultrafine particles, this project involves the study of ultrafine particle generation during gas metal arc welding (GMAC) or metal inert gas welding (MIG) operations. The project will quantify and correlate ultrafine particles generated to existing fume formation rates (FFR). In order to achieve this objective, a welding chamber is being designed and built that is intended to enclose the welding operation, capture the fume generated under specific sets of conditions, and at the same time measure the ultrafine particle concentrations within the chamber. After the UFP concentrations are measured the total fume will be collected and the FFR determined. The next step will be to remove the fume collection assembly from the chamber and attach an assembly that allows the plume to rise and expand without external interference. Within the plume UFP concentration will also be measured and again correlated to the FFR for the particle welding parameters. Fume samples are to be collected at various levels in the plume and fume composition and morphology studied.

Jeff Birkner: Release of Particles from Commonly Used Respirator Filters

The objective of this study is to quantify the number of particles that may be released from respirator filters under varying handling and loading conditions. These conditions include 3 particle sizes, 3 drop heights, 3 loading conditions and 4 respirator types.

The spring of 2006 was spent collecting data on two disposable respirators and two reusable respirators. The disposable respirators indicate that there are a significant number of particles released from filters and that there may be significant differences between the brands of respirators. Reusable respirators were also tested, but data indicates that the amount of particles that may be released from these respirators is not discernable from the blanks. As a result it was decided that it would be more useful to pursue collection of data of other disposable respirators.

Currently, two more brands of disposable respirators have been added to the test protocol and are being run under the conditions described above.

Further handling conditions of the 4 disposable respirators will be investigated.

Respirators will be loaded with 1 micrometer particles and then flexed in such a way as to simulate doffing of the masks. This is being performed to determine if certain common handling conditions will cause a significant number of particles to be released.

Additionally, an investigation has been initiated which studies the characteristics and nature of the coverstocks used on disposable respirators, as it appear that coverstock characteristics may be related to the particles being release from the various disposable respirators. Further studies may also be conducted to further characterize differences of the respirators and attempt to explain why these differences occur.



Robert Phalen: Quantitative Surface Analysis for the Permeation of Captan through Gloves and Contaminated Surfaces

The primary objective was to develop a new Attenuated Total Reflectance Fourier Transform Infrared (ATR-FTIR) spectroscopy and whole-glove permeation method to detect breakthrough and permeation of a pesticide through glove materials. The specific aims were to: (1) develop a reliable and sensitive gas chromatographic method for the analysis of captan in formulations, (2) conduct American Society for Testing and Materials Method F 739 permeation testing for captan through gloves, (3) develop an ATR-FTIR method for the analysis of captan on the inner and outer surfaces of a glove, and (4) develop a whole-glove permeation method to improve analytical sensitivity and account for hand movement and regional variations in glove thickness.

All four of the above aims were completed and resulted in (a) five presentations at the American Industrial Hygiene Conference (AIHce), (b) publication in three different peer-reviewed journals (one in press), and (c) an additional two manuscripts submitted to peer-reviewed journals.

Nancy Jennerjohn: Exposure Assessment of Airborne Carbon Nanotubes in the Workplace

This project begins to examine the ability of existing air monitoring methods to characterize airborne carbon nanotube exposure in the workplace. Nanotubes are likely to be used in increasing amounts in the near future because of their remarkable strength, reactivity and other properties. Workplace exposure will vary depending on many factors, including whether the company uses already-manufactured nanotubes or generates their own. It is important to understand before requesting access to such a worksite which air monitoring techniques will be effective at nanotube detection. Therefore, a university research laboratory where nanotubes are in use but not generated was used as a test bed for monitoring ambient air, both when the lab was unoccupied and during nanotube handling activities.

The three techniques that look most promising so far are 1) detection of elemental carbon and metals, both originating from nanotubes, found on filters after air sampling; 2) particle counting devices such as the condensation particle counter although only at extremely high agitation levels; and 3) TEM (transmission electron microscope) imaging of particulates in air samples and room swipes. We derived a first estimate of the level of airborne nanotubes in the air in the nanotube research laboratory. We gained insight into how workers handle this material and can already suggest improvements in personal protective equipment and engineering controls. Finally, we aerosolized nanotubes, though not yet in a stable manner, and the resulting TEM images revealed morphology that will help in the understanding of how aerosolized nanotubes might interact with the human lung.

3) *Research Training in the SCERC Core Programs*

The NORARS program has provided research training in ERC courses. A focus of the training has been the SC ERC initiative in work organization and workplace psychosocial factors. Dr. Schnall and Dr. Baker provided lectures to the graduate students from Industrial Hygiene program, Occupational Health Nursing program, and Occupational

Medicine Residents at UCLA and UCI. At UCLA, CHS 278 – Occupational Health Psychology was developed by Dr. Schnall. Another course in Occupational Cardiology was developed by Dr. Schnall for the occupational medicine residents. This course offered training in clinical research methods related to assessing work stressors and cardiovascular function.

4) *NORA-related Continuing Education and Outreach*

The Program has been used to increase awareness about the NORA priority areas within the region by providing limited support for outreach and research symposia on NORA related topics. A major activity during the reporting period was to collaborate with the SCERC leadership and the CE/O program to organize a regional NIOSH Town Hall meeting to provide scientific and public comment on the NIOSH propose strategic plan for NORA.

The NORA Town Hall meeting was held in February 2006. Over 100 people attended the meeting and more than 60 people presented their views about important research needs. The morning session focused on three occupational safety and health issues important to Southern California -- Special Populations, the Port of Los Angeles, and Workplace Psycho-social Factors. The afternoon session focused on the Services Sector. On behalf of the NRS Program, Dr. Dean Baker and Dr. Peter Schnall organized the panel presentation on work organization and workplace psychosocial factors. This panel highlighted the SCERC research initiative in this area and pointed out the need for research training and funding in this area.

**E. Program Products**

The research projects with significant trainee involvement are listed in the previous section. The publications and presentations of these trainees are listed in Appendix C under the Industrial Hygiene program.

The transcript for the NORA Town Hall meeting at Los Angeles in February 2006 can be found at the following address:

[http://www.cdc.gov/niosh/nora/townhall/pdfs/trans\\_LA\\_022106.pdf](http://www.cdc.gov/niosh/nora/townhall/pdfs/trans_LA_022106.pdf)

**F. Future Plans**

The NRS Program objectives will remain essentially the same during the next training year. As mentioned above, the SCERC will conduct a follow-up regional needs and impact assessment survey. This survey will emphasize topics related to NORA and continuing education and outreach of the SCERC. The NRS Program will also continue to provide technical and stipend support for research training in the Industrial Hygiene program. In addition, administrative and technical support may be provided for research training in the areas of work organization and occupational health nursing. However, NRS funds will not be used to provide stipends for trainees in these areas because of the NIOSH restriction on use of NRS funds for research training outside of the industrial hygiene program. The NRS Program will also continue to support NORA-related research training in the SCERC core programs and to support continuing education and outreach activities to disseminate NORA research findings

# **Core Academic Programs**

### **III. Program Progress Report**

**A. Program Title:** Industrial Hygiene Program

**B. Program Director:** William C. Hinds, ScD, CIH,  
UCLA School of Public Health

**C. Program Description:**

The primary academic objective of the UCLA Industrial Hygiene Program is the training of professional industrial hygienists at the MPH and MS level and advanced training of researchers at the PhD level. Other objectives include conducting research to extend knowledge in the areas of anticipation, recognition, evaluation and control of environmental hazards in the workplace; collaborating and supporting other research in the general area of occupational health; and providing service to the local, state and national occupational health communities in support of the broad objective of improving worker health and safety. The program is accredited by the Accreditation Board for Engineering and Technology/ Applied Science Accreditation Commission (ABET/ASAC)

**Core Values**

The Industrial Hygiene Program has as its core values a commitment to worker health, scientific integrity, and excellence in education (teaching, mentoring, and continuing education)

**Core Purpose**

The core purpose of the Industrial Hygiene Program is to improve worker health through education, research, and service.

**Mission**

The mission of the Industrial Hygiene Program is to accomplish our core purpose by educating professionals in the field of industrial hygiene through academic programs and continuing education, and conducting research in industrial hygiene and related areas.

**Vision**

The vision of the Industrial Hygiene Program is to be recognized as a leader in education and research in industrial hygiene.

**Educational Objectives**

The educational objectives of the UCLA Industrial Hygiene Program are:

1. To equip program graduates with the underlying technical and scientific knowledge required for the professional practice of industrial hygiene.
2. To equip program graduates with specialized, practical, and experiential knowledge and skills necessary for the practice of industrial hygiene.

3. To equip program graduates with the communication skills necessary for the practice of industrial hygiene.
4. To appreciate the need to work as part of an interdisciplinary team in addressing occupational health problems.
5. To understand that the practice of industrial hygiene involves ongoing learning and self-criticism.

#### Responsible Conduct of Research

Currently all IH students have two hours of Professional Ethics in EHS 200B Fundamentals of Environmental Health. This covers aspects of conflict of interest. We plan to expand the coverage of this lecture to include responsible authorship, scientific misconduct and data confidentiality. We plan to require MS students and doctoral students to complete an on-line course on human subject policies and procedures.

#### Faculty

The IH Program has four core faculty members and five supporting members. Their area of expertise are given in the following Table.

Faculty Member	Rank	Core/Sup.	Area
Froines	Professor	Core	Toxicology, Policy
Hinds	Professor	Core	Control Tech., Exposure Assessment
Kennedy	Assistant Professor IR	Core	Exposure Assessment, Physical Agents, IH Practice
Que Hee	Professor	Core	Analytical. Chemistry, Biological Monitoring, Hazardous Waste
Delp	Lecturer	Supporting	Occupational Health Education
Harber	Professor	Supporting	Occupational Medicine
Liu	Lecturer	Supporting	Ergonomics, Safety
Paul	Health Physicist	Supporting	Health Physics
Ritz	Associate Professor	Supporting	Occupational Epidemiology

#### Curriculum

The full curricula for the MS and MPH degrees are given in Appendix A. The curriculum includes courses covering the properties, measurement, health effects, exposure prevention, and control technology for all types of harmful chemical, physical, and biological agents, ergonomic, and psychosocial factors. Also included are courses on toxicology, biostatistics, epidemiology, industrial hygiene

chemistry, occupational safety, hazardous waste, industrial hygiene standards and regulations, environmental management, and risk assessment. The MS program includes a research-based thesis or report/comprehensive examination, and the Ph.D. program includes a research thesis. The MPH program includes a summer internship in industry or related area that results in an internship report. The internship is optional for MS candidates.

The IH faculty and our advisory committee believe **verbal communications skills** are important for all industrial hygienists. To develop these skills six courses, five required and one elective, either require an oral presentation or have oral exams. The faculty also believes that writing skills are important. Many courses require reports or papers and some involve literature searching.

#### **D. Activities and Accomplishments**

During the reporting period, July 1, 2005 to June 30, 2006 the Industrial Hygiene Program had the following accomplishments and activities.

- During the reporting period we had 16 students in the program, seven PhD, six MPH and three MS students.
- During the reporting period 13 students were supported by the ERC grant.
- During the reporting period eight students graduated.
- We submitted our ABET/ASAC self-study for reaccreditation of our IH Program. We had a ABET reaccreditation site visit on December 4 – 6, 2005.
- IH faculty and students participated in the ERC interdisciplinary dinner meeting November 16, 2005.
- IH faculty and students participated in the ERC interdisciplinary plant visit and workshop at Trojan Battery Company on May 11, 2006.
- Four students were placed in internships in a range of settings, including UCLA campus E,H&S, MWH Global, Shell Oil Refinery, and Forensic Analytical.
- We continue to offer the HSAT as a minor concentration for IH students. Four IH students did the minor including the 40-hour HAZWOPER program.
- The six doctoral students are focusing their research in the following areas: A study of the ergonomics of glove wearing; an intervention study of computer terminal users; a laboratory study of permeation of Captan formulations through gloves; a study of ultrafine particles from welding in the occupational environment; a study of secondary contamination by respirators; and a study of improved measurement of nanoparticles in occupational exposure settings.
- We added classes on behavioral-based safety and litigation prevention to 250D IH Practice.

### **E. Program Products**

- Publications by program faculty and trainees are given in Appendix C. Trainee authors are underlined. During the reporting period core IH faculty published or submitted 26 papers. Nine papers included trainee authors.
- Dr. Hinds gave three tutorials on Fundamentals of Aerosol Mechanics – October 3, 2005 at the Nanotoxicology and Occupational Health Conference in Minneapolis, MN; October 17, 2005 at the American Association for Aerosol Research in Austin, TX; and December 13, 2005 at the Asian Aerosol Conference in Mumbai, India.
- During the reporting period eight students graduated from our IH Program. Five entered the labor market as industrial hygienists and three went on to advanced degrees. One doctoral student graduated and is now directing an IH Program at CSU San Bernardino.

### **F. Future Plans**

- We plan to continue our ABET/ASAC accreditation. We plan to submit a progress report by July 1, 2007 on our accreditation activities.
- We are planning to develop a combined exposure assessment, air quality, and industrial hygiene program. There is considerable overlap between these programs and there would be greater efficiency overall if they were combined.
- We plan to make 40-hour HAZWOPER training required for all IH students not just those doing the HSAT minor.

**Occupational and Environmental Health Nursing  
ERC Annual Report  
July 1, 2005 - June 30, 2006**

**III. Program Progress Report**

**A. Program Title:** Occupational and Environmental Health Nursing  
(OEHN)

**B. Program Director:** Wendie Robbins, PhD, RN, FAAN,  
UCLA School of Nursing

**C. Program Description**

**Goals and Objectives**

The Occupational and Environmental Health Nursing Program provides graduate education for nurses in order to prepare them for specialty nursing practice as part of interdisciplinary occupational health and safety teams in increasingly complex and diverse occupational and environmental health settings. The goal of the program is to respond to the national and regional need for qualified nursing specialists, researchers, managers and leaders in occupational health and safety.

**Faculty Participation**

The 2005-2006 core faculty for the OEHN program remained unchanged from the 2004-2005 faculty. They remain: Dr. Wendie Robbins who taught OEHN role and theory courses plus research and research ethics; Gayle Early, MSN, FNP, who taught OEHN clinical courses and supervised clinical placements for the Adult Nurse Practitioner students; Drs. Donna McNeese-Smith and Suzette Cardin who taught administration theory and supervised the practicum placements for OEHN students in the administration track; Drs. Nola Kennedy, William Hinds and Shane Que Hee who taught physical agents theory and the industrial hazards plant visit course to OEHN students; Dr. Phil Harbor who taught a seminar on occupational diseases.

In addition to these OEH faculty, students in the OEHN program take nursing coursework toward the MSN degree and nursing faculty taught these including: Drs. Hahn (teaching-learning principles), Gylys/ Fongwa (research theory), Keenan/ Fitzgerald/ Woo (biobehavioral foundations of acute and chronic illness), Berg (biobehavioral theory), Keenan (diagnostic reasoning), Lewis (professional issues, ethics, responsible practice).



## **Curricula**

The curriculum spans several Schools (School of Public Health, School of Medicine, School of Nursing) and Departments (Environmental Health Sciences, Epidemiology, Primary Care) at UCLA and includes courses and content in industrial hygiene, safety, ergonomics, psychosocial factors in workplace health, research, epidemiology, toxicology, occupational medicine, and ethics. Students choose a concentration in either nursing administration of occupational health programs (minimum of 69 units) or advanced practice adult nurse practitioner (minimum of 85 units). Graduates of the nurse practitioner concentration are certified to practice as Adult Nurse Practitioners in the state of California and are eligible to sit for national Adult Nurse Practitioner (A.N.P.) certifying boards. The UCLA School of Nursing degree programs have been approved by the California Board of Registered Nursing and the University Academic Senate (Western Association of Schools and Colleges), and are accredited by the National League for Nursing (NLN) and the Commission on Collegiate Nursing Education (CCNE). All graduates of the program have a foundation for future doctoral study. Responsible Conduct of Science topics are covered in N213B and the new course Dr. Robbins is developing, "Genes, Work, and Environment." (See Future Plans.)

## **D. Program Activities and Accomplishments**

### **Trainee Honors, Awards, Appointments:**

OEHN students were elected President of the Graduate Student Nurses Association 2005-2006, and Secretary of the Graduate Student Nurses Association 2005-2006

An OEHN student was elected President of the California Harbor Association of Occupational Health Nurses and the Board of the California State Association of Occupational Health Nurses

Three OEHN students were inducted into Sigma Theta Tau Honor Society of Nursing.

### **Faculty Honors, Awards, Appointments:**

Wendie Robbins was appointed as Adrienne Mosley Endowed Chair of Biological Nursing Science

Wendie Robbins was selected for the national Public Health Leadership Workgroup supported through the ASPH/HRSA to develop a plan for the nation related to the educational preparation and leadership development of public health nurses of which OEHNs are a subset

Wendie Robbins participated in the CDC/NIOSH special review Panel:  
Occupational Exposure Risk on Reproductive Development

Suzette Cardin was appointed Associate Dean for Student Affairs, UCLA School of Nursing

Donna McNeese-Smith was awarded a Fogarty International Research Fellowship to study in India

Dean of the UCLA School of Nursing committed to an additional FTE for Occupational and Environmental Health Nursing Faculty. The School began recruitment for this FTE.

### **E. Program Products**

The program graduated six OEHN students in June, 2006. Five of these students were OEHN Adult Nurse Practitioners and one was OEHN Administration.

A NIOSH supported trainee developed "Healthy Backs: A Back Injury Prevention Program" for the Anaheim Marriott Hotel.

The UCLA OEHN Program, with funding from the UCLA Center for Occupational and Environmental Health, hosted the 2006 ERC OHN Directors meeting in Albuquerque, New Mexico. Occupational Health Nursing Program Directors and Deputy Directors attended from eleven different ERCs. Agenda items included discussion of the future of occupational health nursing training programs and training needs assessments and resulted in identification of key focus areas for ERC OHN Programs for the future.

Dr. Robbins presented to the 2005 California State Association of Occupational Health Nurses on the topic "Environmental Health and the OHN"

### **F. Future Plans (Include in summary form plans for the next budget period.)**

Plans for the coming year include adding a new ladder track faculty member who will be supported by the UCLA School of Nursing but contribute 50% time to the Occupational and Environmental Health Nursing Program. This is part of the strategic plan to increase research training in the program by providing additional academic faculty to complement the existing clinical faculty. The goal is to attract and support doctoral students in nursing who wish to develop occupational health and safety programs of research.

Dr. Linda Searle Leach, a newly hired tenure track faculty member in the UCLA School of Nursing, will replace Dr. Cardin as OEHN Administration faculty because Dr. Cardin has been appointed as Associate Dean for Student Affairs. Dr. Leach

will take over the role of supervising practicum experiences for the OEHN Administration students.

At the ERC OHN Program Directors meeting in May 2006 (hosted by UCLA ERC OEHN Program) one area of training need identified by most Directors was genetics and the future of genetics in occupational health. Based on this identified need, Dr. Robbins is developing a course that will be cross-listed between the UCLA School of Public Health and UCLA School of Nursing that covers issues in "Genes, Work, and Environment". Ethical issues surrounding genetic testing in the workplace and population genetic screening will be included in the course content.

Dr. Robbins plans to utilize funding from her Endowed Chair to encourage growth of a research arm to the Occupational and Environmental Health Nursing Program. Plans are to first, advertise for a post-doctoral nurse researcher in the area of toxicology or environmental health. Next, based on expansion of the UCLA School of Nursing programs to include a B.S.N. four year program, an undergraduate nursing student will be funded to work in the research laboratory with Dr. Robbins in the area of toxicology or environmental health. It is hoped the student would continue on to doctoral study. Finally, with the expansion of the UCLA School of Nursing programs to include a Masters Entry Clinical Nurse (M.E.C.N.) degree program, a student in the M.E.C.N. program who already has a B.S. degree in the biological or natural sciences will be supported to work in the laboratory with Dr. Robbins in the area of toxicology or environmental health. It is hoped this M.E.C.N. student would eventually return for doctoral study. Providing research opportunities for the undergraduate and masters students will provide a pipeline of future occupational and environmental health nurse researchers.

### **III. Progress Report**

**A. Program Title:** Occupational & Environmental Medicine

**B. Program Director:** Philip Harber, MD, MPH,  
Division of Occupational Medicine,  
Department of Family Medicine/UCLA School of  
Medicine

#### **C. Program Description**

##### 1. Goals and Objectives

The major goals and objectives of the UCLA Occupational-Environmental Medicine Training Program include the following:

- Educate physicians who will specialize in the field of occupational-environmental preventive medicine and become eligible for certification by the American Board of Preventive Medicine.
- Educate other physicians and other health care providers in occupational medicine.
- Develop, implement, and evaluate novel strategies to improve occupational medicine education.
- Contribute to the education of other occupational health professionals in ERC and non ERC related academic programs.
- Educate occupational medicine and other practitioners in our region, nationally, and internationally.

##### 2. Faculty

The program faculty includes one full-time tenured faculty member, many clinical faculty members, affiliated faculty in the school of public health and elsewhere. Further, the program benefits significantly from the many interactions with the extensive UCLA faculty in the schools of medicine, public health, and public policy.

##### 3. Training

Training in responsible conduct of research is included in required IRB and HIPAA courses. In addition, our trainees are involved in research activities and learn considerably about the proper conduct of science.

##### 4. Curricula

Curricular changes include expanding the scope and course credit for our program's course in school of public health-Prevention of Disease in Workers and Workplaces (EHS 251). This course serves a multidisciplinary student group. In addition, there is a weekly seminar conference sponsored by our program.

During the past year, the first year, which traditionally focused largely on degree related courses, now includes extensive practical experience. For example, during the summer prior to the start of the academic year, the trainees spent extensive time in an occupational health setting. Furthermore, each continued clinical practice (averaging 2-3 sessions a week) during the "academic year," as well as participating in the seminar programs.

#### **D. Program Activities and Accomplishments**

Over the past year, our trainees have received several Honors including scholarships to attend the Western Occupational Health Conference.

In addition to faculty research, residents contribute significantly to both research and research to practice. For example, one resident had a primary role in investigating and preparing publication of ten heat stress related deaths in California, working closely with Cal OSHA. Another resident plays a central role in investigating diacetyl induced bronchiolitis obliterans, working with both Cal OSHA and the UCLA clinical program. Such activities have directly facilitated the implementation OSHA, NIOSH, and state health department activities in California.

The program has a diverse group of trainees: for example, the "graduating class" included two women and one Latino.

Faculty members provide very significant service. Dr. Paul Papanek and Dr. Craig Conlon are prominent officers of the Western Occupational and Environmental Medical Association. Dr. Harber served as chair of the Safety and Occupational Health IRG (SOH study section), vice chair of the ACGME Preventive Medicine RRC, and in several leadership roles in ACOEM.

Closer relationship with Kaiser, including expanded on-site conferences, clinical training, and financial support. The Kaiser rotation has become a major partner. For example, Kaiser (Dr. Papanek and associates) provided a 20 session introduction to OM during the summer. In addition, this has afforded trainees the opportunity to gain administrative insight into health services delivery. We also initiated a practical didactic series of lectures at the start of the program. Under the direction of Dr. Paul Papanek, residents received formal instruction at the start of the program.

## **E. Program Products**

First year trainees are encouraged to substantively participate in their creative/research project.

Our residents are active in educational outreach. Last year, one served as a member of the planning committee for an ERC CE activity. A resident also moderated and spoke at the ERC CE Ergonomics program.

The UCLA occupational-environmental preventive medicine program played a major role in identifying diacetyl induced bronchiolitis obliterans and fostering a public health response. Our clinical program and outreach found the initial 2 CA cases, and we worked closely with Cal-OSHA and NIOSH to facilitate investigations. We also worked closely with the media on this matter.

In addition to the role through UCLA clinics, residents are involved through OSHA activities. Residents have participated in several public meetings through OSHA.

The program does extensive work with the maritime industry and ILWU union dealing with ADA issues. This included site visits to observe work in the ports as well as assessment of individual roles.

The program is also active in ERC related continuing education, including serving as co-director of the Ergonomics Course. We are also working closely with the director of CE in an innovative approach including video presentations and speakers in order to increase the role of primary care physicians.

A particularly unique program track allows mid-career physicians in one of our closely affiliated institutions (Kaiser Permanente) to obtain formal training in occupational medicine.

## **Presentations**

Faculty members are active in continuing education. Doctors Papanek and Conlon served as directors of the annual Western Occupational Health Conference. Dr. Harber served as planning committee member and speaker at the annual American Occupational Health Conference of ACOEM. In addition, he presented at other national meetings such as the American Thoracic Society and the Council of State and Territorial Epidemiologists.

## **F. Future Plans**

Goals for next year include:

1. Continue the current program.
2. Further integrate the occupational primary care and the university-based programs.
3. Significantly increase the research / creative project component of residency training. We believe this is essential for future practice of population medicine, including occupational-environmental preventive medicine. Whether in an actual research setting or in an applied practice setting, the ability to conceptualize, plan, implement, and report a significant project is an essential skill.
4. More specifically define and implement evaluation techniques for competencies

### **III. Program Progress Report - UC Irvine Occupational Medicine Program**

**A. Program Title:** University of California, Irvine, Occupational Medicine Program

**B. Program Director:** Dean Baker, MD, MPH  
Department of Medicine, School of Medicine, UC Irvine

#### **C. Program Description**

Occupational medicine training at UCI is designed to impact on the full range of trainees and physicians, including medical students, primary care residents, graduate students in toxicology and epidemiology, safety and health professionals through the UCI Certificate Programs, and practicing physicians through the UCI COEH continuing medical education program. The occupational medicine residency serves as the cornerstone of these training programs.

The UCI Occupational Medicine Residency Program is sponsored by the UC Irvine Center for Occupational and Environmental Health (COEH) and is based in the Division of Occupational and Environmental Medicine, Department of Medicine, School of Medicine. The residency is fully accredited by the ACGME and offers the academic and practicum years.

Goals and objectives. The goal of the residency is to prepare residents for the comprehensive practice of occupational medicine in a variety of settings including clinical practices, corporate medical departments, academia, and public health programs. The program provides a range of training opportunities so the residents can tailor their training to address their educational objectives, while ensuring that each resident receives solid training in the core areas. The residency program emphasizes training and competency in clinical occupational medicine.

Faculty. The program leadership and faculty have remained the same during the reporting period. Dr. Dean Baker continues as the program director and Dr. Leslie Israel functions as the associate director. The following list shows the UCI occupational medicine program faculty.

#### Core faculty:

- Dean Baker, MD, MPH - Residency Director - environmental epidemiology, occupational stress, indoor air quality, pesticides
- Leslie Israel, DO, MPH - Residency Associate Director – occupational medicine, QME
- M. Joseph Fedoruk, MD, CIH - Clinical preceptor, directs clinical case conference - toxicology, medical surveillance, industrial hygiene, reproductive toxicology



- Ulrike Luderer, MD, PhD, MPH - Clinical and research preceptor - occupational medicine, reproductive toxicology, developmental toxicology
- Peter Schnall, MD, MPH - Didactics and research preceptor – work organization, occupational stress, occupational cardiology
- Elliott Kornhauser, MD, MBA, MPH - Clinical preceptor and didactics - ergonomics, occupational medicine
- Wayne Chang, MD, MS – Clinical preceptor and didactics
- Ralph E. Allan, JD, CIH - Industrial hygienist, legal aspects occupational medicine, ADA
- Stephen Bondy, PhD - Neuro-toxicology, research preceptor - mechanisms of neurotoxicity
- Robert Phalen, PhD - Respiratory toxicology, research preceptor - laboratory characterization of airborne pollutants, especially particles

Support faculty:

- Hoda Anton-Culver, PhD - MS degree program - cancer epidemiology, genetic factors in breast, prostate, and colorectal cancer
- Ralph Delfino, MD, PhD - MS degree program - asthma, cancer epidemiology
- Michael Kleinman, PhD - Toxicology, industrial hygiene, research preceptor
- Oladele Ogunseitan, PhD - Environmental health sciences, ecology
- Kathryn Osann, PhD - Epidemiology, biostatistics
- Ronald Shank, PhD - Toxicology MS degree program director - hepatotoxicity

Voluntary faculty:

- Richard Clark, MD - Regional Poison Control System - clinical toxicology
- Frederick Fung, MD, MS -Sharp-Rees Stealey Clinic - toxicology, occupational medicine
- Constantine Gean, MD, MS, MBA - UnumProvident – disability management, program management
- Loretta Lee, MD, MPH - County of Orange - program administration, return to work, development of modified duty programs
- Ellyn McIntosh, MD, MPH - Exxon-Mobil – corporate occupational medicine
- Richard Pitts, DO, MPH - Kaiser Permanente - occupational medicine, ergonomics
- Mary Kochie, RN - Cal-OSHA – occupational health regulation, worksite hazard assessment, occupational health nursing
- Lester Sacks, MD, PhD - Steelcase - occupational medicine, ergonomics
- Saralyn Williams, MD - Regional Poison Control System - clinical toxicology

Curriculum. There were no changes in the curriculum during the reporting period. Residents in the academic phase enroll in a Master of Science degree program in environmental toxicology or in environmental health science and policy at UCI.

During the degree programs, residents complete the MPH-equivalent course requirements for board certification. The required courses for the degree programs and the “MPH-equivalent” preventive medicine courses remain the same as previously reported. Residents must complete a formal research project. Residents are provided instruction in the **responsible conduct of research** in the degree program required seminars and in sessions of the core residency program seminar. All residents who undertake research that involves clinical data, human subjects, or animals are required to take UCI training programs in the relevant areas.

During the practicum phase, residents spend much of their time in field site rotations in settings which reflect the broad range of practice opportunities. The residency provides practicum training in corporate occupational medicine programs, as well as in comprehensive occupational medical practices and in public health regulatory agencies. The field training rotations remain the same. The core rotations continue to be Exxon-Mobil Oil, Steelcase, Cal-OSHA, Kaiser Permanente, Sharp-Rees Stealey Medical Group, and the UCI Medical Center Occupational Health clinic – providing corporate, regulatory/governmental, and clinical training experiences. The program also offers a number of elective rotations.

Throughout the academic and practicum phases, residents receive ongoing training at the UCI COEH. The core residency training activities – occupational medicine clinic rotations, clinical case conference, didactic seminars, and journal club – remained the same. The COEH operates two full-time comprehensive and consulting occupational medicine clinics which provides substantial clinical training opportunities for the residents.

#### **D. Program Activities and Accomplishments**

The UCI occupational medicine program had substantial accomplishments during the reporting period. The program faculty has continue to grow. No faculty left the program. The program recruited Wayne Chang, MD, MS, as an assistant clinical professor. Dr. Chang is board certified in internal medicine and occupational medicine. He teaches in the residency seminar and precepts residents in our residency program clinics.

Training. During the year, the UCI occupational medicine residency program recruited four well qualified residents and had two continuing residents, for a total of six trainees. One entering resident already completed a MPH degree program and general preventive medicine residency program; he participated in the residency program for a one year practicum phase. Therefore, the program had three academic phase and three practicum phase residents. The program was successful in conducting outreach recruitment to minority physicians. The program identified several well qualified minority applicants and offered entering positions to three minority applicants, all of whom joined the program. The races

of the four entering residents were White, African American, Asian (Chinese), and Pacific Islander (Filipino).

The two continuing practicum phase residents completed research projects and obtained the Master of Science in Environmental Toxicology degree. The program graduated three residents (technically completed program in July 2006, since our training year goes from August 1 to July 31), all of whom obtained full-time positions as occupational medicine specialists in California.

The UCI program offered a monthly continuing medical education (CME) program on occupational medicine practice for occupational medicine physicians and nurses in the region.

Research. The UCI program continued to provide national and international leadership in the field of work organization and cardiovascular disease. Dr. Schnall serves as president of the committee on work and cardiovascular disease of the International Commission on Occupational Health.

The UCI program faculty established collaborations with faculty in the Department of Pediatrics; Division of Epidemiology; and Department of Environmental Health, Science, and Policy; and Environmental Toxicology Program to successfully compete and be designated as a Vanguard Center for the National Children's Study. This study will provide research opportunities for program trainees who are interested in environmental health research.

## **E. Program Products**

The UCI Occupational Medicine program faculty and trainees were productive in conducting research and providing presentations, education and outreach related to the program's goals and objectives. The program publications are listed in Appendix C. The program faculty's presentations and outreach are listed in the continuing education and outreach section.

Residency research projects: Three residents completed research projects during the reporting period. The following list shows the titles:

- "Exposure to Particulate Matter and Biomarkers of CNS Inflammation in Mice" (MS thesis)
- "Comparison of Serum Versus Lipid-Adjusted Concentrations of Organochlorine Pesticides in the Evaluation of Associations with Exposure Variables and Health Effects in a Community-based Environmental Health Study" (MS thesis)
- "Evaluation of the Quantiferon-TB Gold Blood Test Instead of the Tuberculin Skin Test"

Symposia: Drs. Dean Baker and Peter Schnall organized a symposium at the American Occupational Health Conference on “Effects and Management of Workplace Psychosocial Stressors.” This symposium was attended by more than 100 occupational medicine physicians and nurses.

Continuing Education: The UCI program offered a monthly continuing medical education (CME) program on occupational medicine practice for occupational medicine physicians and nurses in the region.

NORA 2 Planning: The program faculty collaborated with the Continuing Education/Outreach program staff to contribute to a regional Town hall meeting on NORA. Our faculty organized a panel on the relevance of conducting research on the health effects of work organization and work-related psychosocial factors. We hope this panel will be considered by NIOSH in developing the NORA 2 program priorities.

## **F. Future Plans**

The UCI Occupational Medicine program anticipates that the faculty, facilities, and curriculum will be stable during the next project period. The program has enrolled residents for the 2006-07 training year, so the program currently has four occupational medicine residents. The program is currently evaluating applicants for the 2007-08 training year. We have developed new outreach materials, which have been distributed to third year UC Irvine internal medicine residents and family medicine residents.

The program faculty member (Dr. Baker) has been appointed to a campus-wide committee to develop a Master of Public Health (MPH) degree program at UC Irvine. This process typically takes two years for full university approval. Our program faculty will develop an environmental health sciences-occupational health concentration within this degree program, so our residents will be able to select the MPH as their degree program for the academic phase.

# **Allied OS&H Programs**

### III. Program Progress Report

**A. Program Title:** Hazardous Substances Academic Training Program

**B. Program Director:** William C. Hinds, ScD, CIH,  
UCLA School of Public Health

**C. Program Description:**

The HSAT Program is offered as a minor concentration in our Industrial Hygiene Program.

**Goals and Objectives**

The primary academic objective of the UCLA Hazardous Substances Academic Training (HSAT) Program is to provide broad, high-level training in the area of hazardous substances at the Masters and PhD levels in conjunction with industrial hygiene training.

Currently fifteen courses are available to industrial hygiene masters students that address aspects of handling and disposal of hazardous substances or the underlying science necessary to understand and control the hazard associated with these materials. Nine of these courses are required of all industrial hygiene students, three are menu options, and three are electives.

Students doing the HSAT minor must complete the following courses in addition to the required courses of the IH curriculum:

- EHS 252G Industrial and Environmental Hygiene Assessment
- EHS 257 Risk Assessment and Standard Setting (now required for all IH masters students)
- EHS 258 Identification and Analysis of Hazardous Wastes

Students are required to take the 40-hour Hazardous Worker Training Program (HAZWOPER) usually given by UCLA Labor Occupational Safety and Health Program (LOSH) or ERC Continuing Education/Outreach Program during second-year Spring break. Course fee is paid by the training grant.

Thesis or masters report for MS students must be related to hazardous substances. MPH internships (EHS 400) must be related to hazardous substances. A GPA of 3.0 or better must be maintained in the HSAT program. ERC supported students doing the HSAT minor receive a one-time stipend supplement of \$600 in December of their second year.

**Courses required for the HSAT minor**

EHS 252G Industrial and Environmental Exposure Assessment (required for HSAT minor, elective for other IH students). The course includes practical experience in environmental exposure assessment. It includes a segment on exposure assessment at a hazardous materials handling site.

EHS 257 Risk assessment and Standard Setting (required for HSAT minor, now required for all IH masters students) focuses on occupational health standards for toxic and hazardous substances and the role of risk assessment in setting these standards.

EHS 258 Identification and Analysis of Hazardous Waste (required for HSAT minor, elective for other IH students). This course is directed to the recognition of hazardous waste, protection of workers at hazardous waste sites, and to the special sampling and analytical chemistry considerations for hazardous waste.

40-hour HAZWOPER worker training course. This is usually offered during Spring break by the UCLA Labor Occupational Safety & Health (LOSH) or ERC CE/O Program. During Spring break 2005 five IH students took the 40-hour HAZWOPER training course as part of our HSAT program. Three are doing the HSAT minor, and received partial support by the HSAT program.

- **Responsible Conduct of Science**

Responsible conduct of science is covered in EHS 200B Fundamentals of Environmental Health Science. Professional ethics is also covered in another 2-hour class in EHS 250D Industrial Hygiene Practice. We plan to require MS and doctoral students to complete an on-line course on human subject policies and procedures.

- **Plans for coming year**

We plan to continue the HSAT program in much the same way as we are currently doing. This includes recruiting students from the IH Program, conducting HSAT classes, and organizing HAZWOPER classes. Also we will continue the development and implementation of EHS 250D Industrial Hygiene Practice and EHS 251 Occupational Disease: Recognition and Prevention. We plan to require MS and doctoral students to complete an on-line course on human subject policies and procedures.

## **Core Values**

The Industrial Hygiene Program, including the HSAT minor, has as its core values a commitment to worker health, scientific integrity, and excellence in education (teaching, mentoring, and continuing education)

## **Core Purpose**

The core purpose of the Industrial Hygiene Program, including the HSAT minor, is to improve worker health through education, research, and service.

## **Mission**

The mission of the Industrial Hygiene Program, including the HSAT minor, is to accomplish our core purpose by educating professionals in the field of industrial hygiene through academic programs and continuing education, and conducting research in industrial hygiene and related areas.

## **Vision**

The vision of the Industrial Hygiene Program, including the HSAT minor, is to be recognized as a leader in education and research in industrial hygiene.

## **Educational Objectives**

The educational objectives of the UCLA Industrial Hygiene Program, including the HSAT minor, are:

1. To equip program graduates with the underlying technical and scientific knowledge required for the professional practice of industrial hygiene.
2. To equip program graduates with specialized, practical, and experiential knowledge and skills necessary for the practice of industrial hygiene.
3. To equip program graduates with the communication skills necessary for the practice of industrial hygiene.
4. To appreciate the need to work as part of an interdisciplinary team in addressing occupational health problems.
5. To understand that the practice of industrial hygiene involves ongoing learning and self-criticism.

#### Faculty

The IH Program has four core faculty members and five supporting members. Their area of expertise are given in the following Table.

Faculty Member	Rank	Core/Sup.	Area
Froines	Professor	Core	Toxicology, Policy
Hinds	Professor	Core	Control Tech., Exposure Assessment
Kennedy	Assistant Professor IR	Core	Exposure Assessment, Physical Agents, IH Practice
Que Hee	Professor	Core	Analytical. Chemistry, Biological Monitoring, Hazardous Waste
Delp	Lecturer	Supporting	Occupational Health Education
Harber	Professor	Supporting	Occupational Medicine
Liu	Lecturer	Supporting	Ergonomics, Safety
Paul	Health Physicist	Supporting	Health Physics
Ritz	Associate Professor	Supporting	Occupational Epidemiology

#### Curriculum

The full curricula for the MS and MPH degrees are given in Appendix A. The additional electives required of the HSAT minor are indicated by an asterisk. The curriculum includes courses covering the properties, measurement, health effects, exposure prevention, and control technology for all types of harmful chemical, physical, and biological agents, and ergonomic and psychosocial factors. Also included are courses on toxicology, biostatistics, epidemiology, industrial hygiene chemistry, occupational safety, hazardous waste, industrial hygiene standards and



regulations, environmental management, and risk assessment. The MS program includes a research-based thesis or report/comprehensive examination, and the Ph.D. program includes a research thesis. The MPH program includes a summer internship in industry or related area that results in an internship report. The internship is optional for MS candidates.

The IH faculty and our advisory committee believe **verbal communications skills** are important for all industrial hygienists. To develop these skills six courses, five required and one elective, either require an oral presentation or have oral exams. The faculty also believes that writing skills are important. Many courses require reports or papers and some involve literature searching.

### **Activities and Accomplishments**

During the reporting period, July 1, 2005 to June 30, 2006 the Industrial Hygiene and HSAT Programs had the following accomplishments and activities.

- During the reporting period we had 16 students in the IH program, seven PhD, six MPH and three MS students. Four of the 16 did the HSAT minor.
- During the reporting period 13 students were supported by the ERC grant, including four supported by the HSAT program.
- During the reporting period eight students graduated, including three students who did the HSAT minor.
- We submitted our ABET/ASAC self-study for reaccreditation of our IH Program. We had a ABET reaccreditation site visit on December 4 – 6, 2005.
- HSAT students participated in the ERC interdisciplinary dinner meeting November 16, 2005.
- HSAT students participated in the ERC interdisciplinary plant visit and workshop at Trojan Battery Company on May 11, 2006.
- Placed four students in internships in a range of settings, including UCLA campus E,H&S, MWH Global, Shell Oil Refinery, and Forensic Analytical.
- Four IH students did the HSAT minor including the 40-hour HAZWOPER program.
- The six doctoral students are focusing their research in the following areas: A study of the ergonomics of glove wearing; an intervention study of computer terminal users; a laboratory study of permeation of Captan formulations through gloves; a study of ultrafine particles from welding in the occupational environment; a study of secondary contamination by respirators; and a study of improved measurement of nanoparticles in occupational exposure settings.
- We added behavioral-based safety and litigation prevention to 250D IH Practice.

### **Program Products**

- Publications by program faculty and trainees are given in Appendix Trainee authors are underlined. During the reporting period core IH faculty published or submitted 26 papers. Nine papers included trainee authors.
- Dr. Hinds gave three tutorials on Fundamentals of Aerosol Mechanics – October 3, 2005 at the Nanotoxicology and Occupational Health Conference in Minneapolis, MN; October 17, 2005 at the American Association for Aerosol Research in Austin, TX; and December 13, 2005 at the Asian Aerosol Conference in Mumbai, India.
- During the reporting period three HSAT supported students graduated from our IH Program. Two entered the labor market as industrial hygienists and one went on to an advanced degree program.

### **Future Plans**

- We plan to continue our ABET/ASAC accreditation. We plan to submit a progress report by July 1, 2007 on our accreditation activities.
- We are planning to develop a combined exposure assessment, air quality, and industrial hygiene program. There is considerable overlap between these programs and there would be greater efficiency overall if they were combined.
- We plan to make 40-hour HAZWOPER training required for all IH students not just those doing the HSAT minor. This is another example of the success of the HSAT program in improving the overall quality of our education programs.

# **Continuing Education Programs**

### **III. Program Progress Reports**

#### **A. Program Title – Continuing Education/Outreach**

#### **B. Program Director – Cass Ben-Levi**

#### **C. Program Description**

##### Goals –

1. Provide multi-disciplinary continuing education to assist professionals, paraprofessionals, labor and management with responsibilities in the ever-broadening field of occupational health and safety to keep up to date on new developments, research and procedures in their field.
2. Provide courses required for health and safety professionals to become certified in their field.
3. Expand training opportunities in environmental health and safety to new sectors.
4. Build and strengthen relationships with other university-based training programs.
5. Respond to the changing range of occupational health and safety problems and develop educational programs to deal with emerging problems and issues.
6. Develop distance learning alternatives in continuing education.

#### **D. Program Activities and Accomplishments**

- In 2004/05 the Continuing Education program established a successful partnership with the OSHA Training Institute (OTI) at the University of California, San Diego. OTI had been unsuccessful in attracting sufficient participants to courses that had been offered in Los Angeles County and was no longer scheduling classes there. The first 4-day OSHA course was offered in January 2006 and was well attended. This was followed by two additional 4-day OSHA courses in May, both of which had very good attendance and excellent evaluations. As a result of this partnership, the following new courses were offered: OSHA 511 – OSHA Standards for General Industry; OSHA 501 – Trainer Course for General Industry; OSHA 510 – OSHA Standards for the Construction Industry. (Goals 1, 2, 3, 4, 5)
- The program itself also introduced several new courses: Red Cross Workplace Training, Ethics for Health and Safety Professionals, Indoor Air Quality, Sampling and Instrumentation, most of which had been identified by various needs assessment as needed topics. (Goals 1, 2, 4, 5)
- The 5-day Comprehensive Industrial Hygiene Review, which had not been offered by the Program since 2002, was overhauled and

brought back. (Goals 1, 2, 4, 5)

- In another successful partnership, the Program, with the University of Michigan ERC Center (Center for Occupational Health and Safety Engineering), held a 2-day Ergonomics Conference at UCLA attended by more than 60 ergonomics experts including physicians and researchers. (Goals 1, 3, 4, 5)
- After initially beginning as a partnership with the University of Illinois, Chicago in 2005, the Program took over full sponsorship of the course "Orientation to Environmental Assessment." (Goals 1, 3, 4, 5)
- Began to develop series of Web Seminars on Ergonomics to be given in 2006/07) (Goal 6)
- Awarded Grant from the California Wellness Foundation to train 1) health care practitioners in ambulatory care facilities about occupational health and safety and 2) owners and supervisors of businesses and agencies involved in the tourism industry about health and safety for low wage service workers. The grant began July, 2006.

**E. Program Products – CE Courses presented** (by specialty area)

***Occupational Health Nursing***

Pulmonary Function Testing - 2 days (3 times)

Pulmonary Function Testing Refresher – 1 day (2 times)

Workers Comp Review – 2 days (2 times)

Occ. Health Nursing Review – 3 days (2 times)

Hearing Conservation – 2.5 days (2 times)

Hearing Conservation Recertification – 1 day (2 times)

***Industrial Hygiene***

Ethics – 1 day (new)

Indoor Air Quality – 1 day (new)

Sampling & Instrumentation – 1 day (new)

Occupational Ergonomics – 3 days

Ergonomics Job Analysis – 2 days

CIH Review – 5 days

Ergonomics Conference – 2 days (new)

***Occupational Medicine***

UCI Grand Rounds

UCLA Occupational Health Seminar

***Safety***

Red Cross – 1 day (new)

OSHA 511 – 4 days (new)

OSHA 501 – 4 days (new)

OSHA 510 – 4 days (new)

***Other***

Orientation to Environmental Assessment – once 5 days, once 3 days (2 times)

Other CE events organized: SCERC annual interdisciplinary dinner;  
SCERC interdisciplinary Site Visit to Trojan Battery Company.

#### **F. Future Plans**

- New courses in development:  
Mold symposium – 3 days  
Train-the-Trainer for Workplace Health& Safety – 2 days  
Critical Cleaning and Contamination Control for Effective Manufacturing
- New courses in partnership with OTI and California State University, Dominguez Hills  
Respiratory Protection  
Electrical Hazard  
Fall Hazard
- Web Seminar Series on seven Ergonomics topics
- Offering classes with CME accreditation – The Program expects to offer courses with CME accreditation for the first time. The courses expected to be accredited are “Mold: State of the Medical and Environmental Science” and the 2<sup>nd</sup> Annual Ergonomics Conference.
- More courses will be offered at locations outside Los Angeles County.

### III. **Program Progress Reports**

**A. Program Title** – Hazardous Substance Training

**B. Program Director** – Cass Ben-Levi, M.A.

UCLA School of Public Health,

#### **C. Program Description**

Goals –

1. Respond to the changing range of HST-related occupational safety and health problems and develop educational programs to deal with emerging problems and issues.
2. Increase the number of state and local government agencies sending participants to HST courses.
3. Use all stipend funds to support the training of state and local government health and safety professionals.
4. Provide courses required for health and safety professionals to become certified in their field.

#### **D. Program Activities and Accomplishments**

- a. In the years before 2004/05 the program had not been successful in spending its \$10,000 stipend funding. For the first time, in 2004/05, after an intensive ramping up of the program, most of the funds were spent. The remaining funds were carried over to 2005/06. In 2005/06 the program was successful in spending the entire allocation including the funds carried over from the prior year. This was achieved, in part, by creating a new Confined Space Awareness for Managers class and marketing it aggressively to state and local government. (Goals 1, 2, 3)
- b. Nearly 50 health and safety professionals attended the Confined Space Awareness for Managers class from Cal-OSHA, Los Angeles Unified School District, Los Angeles County, City of Long Beach, UCLA, County of Riverside, Los Angeles County Sheriff's Department and other agencies. (Goals 1, 2, 3)
- c. The CHMM Review course had been offered for several years, but was not satisfactory. The course was revamped by an alliance with the Academy of Certified Hazardous Materials Managers (ACHMM) with which we now collaborate in offering the National Overview Course. It is offered twice a year when before it had been once. (Goals 1, 4)
- d. After experiencing a significant decline in the demand for 40-hour and 24-hour HAZWOPER, it was necessary to offer other courses with HST topics. New courses included Risk Communications and Confined Space Awareness for Managers. (Goals 1, 4)

**E. Program Products**

CHMM Review – 3 days (2 times)  
CHMM Exam (4 times)  
Risk Communication – 2 days  
Risk Assessment – 3 days  
Confined Space for Managers (2 times)  
OSHA 7200 – Bloodborne Pathogens – cancelled  
Hazard Communication for Professionals - cancelled

**F. Future Plans**

Plans for 2006/07 include:

- a. offering courses that, for the first time, are accredited for Continuing Medical Education (CME) – Decontamination of Health Care Facilities and Personnel
- b. offering new courses that expand the repertoire, e.g. Confined Space Awareness – Level 1; Permit Required Confined Space – Level 3 (2 days)
- c. expanding the sites at which courses are offered
- d. providing partial scholarships/discounts for participants unable to pay the full amount



# **Specific Improvements in OS&H**

## IV. Specific Improvements in OS&H Resulting from ERC Programs

- Nine program graduates now work for CalOSHA. We expect one more to join CalOSHA, a 2006 graduate who ranked third in the State in the CalOSHA qualifying examination.
  - Follow-up contact with participants who completed the CHMM Review Courses and then took the CHMM exam indicate that more than 90% of participants passed the exam.
  - Beginning with CE classes offered in 2006, the CE/O Program began to send out on-line impact surveys to course participants 90 days after the completion of most courses. Below are examples of impacts cited by respondents to the question "Is there a specific occasion in which you have been called upon to use your new knowledge/skills?"

### **Confined Space Awareness for Managers**

Of the 7 responses received:

- 2 agreed that they have changed their work practices since receiving training
  - "I learned to look at some areas more carefully as confined spaces can exist and not appear to be confined spaces at first glance."
  - "Increased awareness"
- 2 stated that there was a specific occasion for using their new knowledge/skills
- 2 agreed that they are more like to approach their supervisor concerning employee rights and/or health and safety issues because of their training
- 1 said that they had often looked up information in or referred to the course materials provided; 5 others said they had looked up information at least once; one other said they had not yet looked up information, but expected to.

### **OSHA 511 –**

"Laser Safety Officer not previously identified; required based on classification of lasers being used."

"During safety inspections and offering clients sound solutions for safety violations."

"Open wall space training, and machine guarding. I got my company to order interlocks for all our cardboard compactors."

### **Indoor Air Quality –**

"Requested to assess office area due to possible poor air quality and a roof leak and possible mold. Interviewed all office personnel, got history of C/O 'bad air' in office and what had been done re roof leak. Arranged for

multifunction inspection with Bio, PH, & Facility Maintenance/HVAC personnel. Work order for leak repairs, air exchange assessments and realignment of intake & exhaust ducts submitted. Will reassess 4-6 months after repairs completed.”

**OSHA 501 –**

“Machine guarding, fall protection, flashpoint samples.”

**OSHA 510 –**

“Every day with scaffold inspection and training.”

Of the 29 responses received:

13 agreed that they have changed their work practices since receiving training

10 stated that there was a specific occasion for using their new knowledge/skills

16 agreed that they are more likely to approach their supervisor concerning employee rights and/or health and safety issues because of their training

6 said that they had often looked up information in or referred to the course materials provided ; 13 others said they had looked up information at least once.

The UCI Occupational Medicine program provides medical surveillance, health assessments and fitness evaluations for firefighters in the Orange County Fire Authority. These evaluations are conducted by program physician faculty at the COEH OEM clinic with the participation of the occupational medicine residents. The program is related to the national Wellness-Fitness Initiative of the International Association of Fire Chiefs (IAFC) and International Association of Fire Fighters (IAFF). This program has had a positive impact on increasing awareness of workplace safety and cardiovascular fitness among the OCFA fire fighters. The program is now tracking cardiovascular fitness indicators and will be able to report on quantitative impact measures during the next annual report.

The resident research project “Evaluation of the Quantiferon-TB Gold Blood Test Instead of the Tuberculin Skin Test,” was submitted as a Orange County Health Care Agency (county health department) Process Improvement Project. The findings have been used by the County of Orange Employee Health program to revise their program for screening and treating latent tuberculosis among Orange County employees.

One doctoral student whose thesis work was supported in part by a PPRT pilot project graduated and received a tenure track appointment and is directing an IH and Safety Program at a CSU-based health sciences and human ecology department.

A NIOSH supported trainee in our OEHN Program developed “Healthy Backs: A Back Injury Prevention Program” for the Anaheim Marriott Hotel.

# Appendices

## Appendix A – Industrial Hygiene

Industrial Hygiene curriculum for MPH and MS programs. All IH students are required to take the courses given in the model curriculum. Additional HSAT courses are indicated by an asterisk.

### Curriculum for MPH

#### MPH PROGRAM IN INDUSTRIAL HYGIENE 2005-2006

Department of Environmental Health Sciences  
UCLA School of Public Health

You must take the courses listed below and satisfy the elective requirement on page 3.

#### FIRST YEAR

Fall	BIO 100A	Introduction to Biostatistics (4 units)
	EHS 200A	Foundations of Environmental Health Sciences I (6) Staff
	EHS 256	Bio. & Hlth. Surveil. Monitoring in Occ./Env. Health (4) Que Hee
	<b>[odd yrs only]</b>	
	EHS M411	Environmental Health Sciences Seminar (2) Staff
Wntr	BIO 100B	Introduction to Biostatistics (4)
	EHS 200B	Foundations of Environmental Health Sciences II (6) Staff
	EHS 251A	Occupational Diseases: Recognition and Prevention (1) Harber
	EPI 100	Principles of Epidemiology (4)
Sprg	EHS 252D	Properties & Measurement of Airborne Particles (4) Hinds
	EHS 252E	Identification & Measurement of Gases & Vapors (4) Que Hee
	EHS 252F	Industrial Hygiene Measurements Laboratory (3) Kennedy, Que Hee, Hinds
	EHS 251B	Occupational Diseases: Recognition and Prevention (1) Harber
Sumr	EHS 400	Field Studies in Env. Health Sciences (summer internship) (4) Staff

#### SECOND YEAR

Fall	EHS 201	Seminar: Health Effects of Environmental Contaminants (2) Eckhert
	EHS 255	Control of Airborne Contaminants in Industry (4) Hinds
	EHS 256	Bio. & Hlth. Surveil. Monitoring in Occ./Env. Health (4) Que Hee
	<b>[odd yrs only]</b>	
Wntr	EHS 454	Health Hazards of Industrial Processes (4) Kennedy, Hinds, Que Hee,
	CHS 100	Behavioral Science and Health Education (4)
	EHS 253A	Physical Agents (2) Kennedy
	EHS 253B	Physical Agents Laboratory (2) Kennedy
	EHS 240	Fundamentals of Toxicology (4) Collins
Sprg	EHS M411	Environmental Health Sciences Seminar (2) Staff

EHS 250D	Industrial Hygiene Practice (2) Kennedy
EHS 257	Risk Assessment and Standard Setting (4) Froines
EHS 259A	Occupational Safety and Ergonomics (4) Liu
HS 100	Health Services Organization (4)

Note: Electives may be taken each quarter provided total units do not exceed 18 units/quarter.

Note: **[odd years only]** Courses given only on odd **calendar** years. Take first or second year, as appropriate.

Curriculum for **MS**

**MS PROGRAM IN INDUSTRIAL HYGIENE  
2005-2006**

Department of Environmental Health Sciences  
UCLA School of Public Health

**You must take the courses listed below and satisfy the elective requirement on page 3.**

**FIRST YEAR**

Fall BIO 100A Introduction to Biostatistics (4 units)  
EHS 200A Foundations of Environmental Health Sciences I (6) Staff  
EHS 256 Bio. & Hlth. Surveil. Monitoring in Occ./Env. Health (4) Que Hee

**[odd yrs only]**

EHS M411 Environmental Health Sciences Seminar (2) Staff

Wntr BIO 100B Introduction to Biostatistics (4)  
EHS 200B Foundations of Environmental Health Sciences II (6) Staff  
EHS 251A Occupational Diseases: Recognition and Prevention (1) Harber  
(pending approval)  
EPI 100 Principles of Epidemiology (4)

Sprg EHS 252D Properties & Measurement of Airborne Particles (4) Hinds  
EHS 252E Identification & Measurement of Gases & Vapors (4) Que Hee  
EHS 252F Industrial Hygiene Measurements Laboratory (3) Kennedy, Que  
Hee, Hinds  
EHS 251B Occupational Diseases: Recognition and Prevention (1) Harber  
(pending approval)

**SECOND YEAR**

Fall EHS 201 Seminar: Health Effects of Environmental Contaminants (2) Eckhert  
EHS 255 Control of Airborne Contaminants in Industry (4) Hinds  
EHS 256 Bio. & Hlth. Surveil. Monitoring in Occ./Env. Health (4) Que Hee

**[odd yrs only]**

EHS 598<sup>#</sup> Master's Thesis Research (4) Staff

Wntr EHS 454 Health Hazards Industrial Processes (4) Kennedy, Hinds, Que Hee  
EHS 410A Instrumental Methods in Environmental Sciences (4) Que Hee,

**Suffet**

EHS 253A Physical Agents (2) Kennedy  
EHS 253B Physical Agents Laboratory (2) Kennedy  
EHS 240 Fundamentals of Toxicology (4) Collins  
EHS 598<sup>#</sup> Master's Thesis Research (4) Staff

Sprg EHS M411 Environmental Health Sciences Seminar (2) Staff  
EHS 250D<sup>α</sup> Industrial Hygiene Practice (2) Kennedy  
EHS 257 Risk Assessment and Standard Setting (4) Froines  
EHS 259A Occupational Safety and Ergonomics (4) Liu  
EHS 598<sup>#</sup> Master's Thesis Research (4) Staff



# Students doing the MS Report Option may take EHS 597 (EHS 596 in final quarter) instead of EHS 598.

Note: Electives may be taken each quarter provided total units do not exceed 18 units/quarter.

Note: **[odd years only]** Courses given only on odd **calendar** years. Take first or second year, as appropriate.

## MPH AND MS PROGRAM IN INDUSTRIAL HYGIENE

### REQUIRED MENU COURSE

**You must take at least one of the following courses:**

EHS 252G* [Spr]	Industrial and Env. Hygiene Assessment (4) Hinds, Que Hee
EHS 258* [Win]	Identification and Analysis of Hazardous Wastes (4) Que Hee [odd yrs only]
EPI 261 [Win]	Occupational Epidemiology (4) Ritz
EHS 410B [Win]	Instrumental Methods Laboratory in Environ. Health Sciences (4) Que Hee
CHS M470 [Spr]	Introduction to Occupational Health Education (4) Delp

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### Recommended Alternative to Biostatistics 100A and 100B

BIO 110A	Basic Biostatistics (4)
BIO 110B	Basic Biostatistics (4)

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### RECOMMENDED ELECTIVES (not required)

**Note, courses listed above as required menu courses are also recommended electives.**

#### Fall Quarter

LAW 290	Environmental Law (4) Freeman (Fall semester)
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#### Winter Quarter

EHS 225	Atmospheric Transport and Transformations of Airborne Chem. (4) Winer
EPI 201A	Epidemiologic Methods I (6)
EPI 263	Exposure Assessment in Occup.& Environ. Epidemiology (2) Ritz

#### Spring Quarter

EHS 202	Seminar: Environmental Chemistry (2) Que Hee
EPI 260	Environmental Epidemiology (2)/(4)
EHS 264	Fate and Transport of Organic Chemicals in the Aquatic Environment (4) Suffet
EPI 201B	Epidemiologic Methods II (6)
CHS M278	Work and Health (cross listed as EHS 270) (4) Siegel, Schnall, Repetti

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\*Indicates course qualifies for Hazardous Substances Minor

UCLA  
School of Nursing  
July 7, 2006  
Master of Nursing Program

**OCCUPATIONAL AND ENVIRONMENTAL HEALTH NURSING  
ADULT NURSE PRACTITIONER SPECIALTY -- FALL 2005 ADMISSION  
SAMPLE COURSE SEQUENCE – SUBJECT TO REVISION**

This course sequence is provided as an example only. An individual student's program may differ from this sample according to his/her background and educational goals. Each student must meet with his/her faculty advisor every quarter to review progress in the program and plan coursework for future quarters. A minimum of 81 units is required preparation as an occupational health adult nurse practitioner. Students receiving funding from the Graduate Division must enroll in 12 units each quarter.

**First Year**

<u>FALL</u>	Units	<u>WINTER</u>	Units	<u>SPRING</u>	Units
N200	4	N230	2	N230	2
N204 *	4	N225	2	N225	2
N213A	4	N440	2	N239A	4
N220	3	EHS/EPI	4	N439A	0-4
EHS/EPI	0-6			EHS/EPI	
<b>Total</b>	<b>15+</b>				<b>12+</b>
		<b>Total</b>	<b>10</b>	<b>Total</b>	

**Second Year**

<u>FALL</u>	Units	<u>WINTER</u>	Units	<u>SPRING</u>	Units
N213B	3	N264	3	N439D	8
N239B	4	N439C	6	N597	4
N439B	6	N239C			
EHS/EPI	0-6	OR EHS 454	4		
<b>Total</b>	<b>13+</b>	<b>Total</b>	<b>13</b>	<b>Total</b>	<b>12</b>

**Nursing Core**

N204	Research Design and Critique
N220	Theories of Instruction and Learning in Nursing
N264	Professional Issues in Nursing

### ***Primary Care/Occupational Health Specialty***

N200	Biobehavioral Theoretical Foundations of Health Assessment
N213A	Occupational Health Nursing Role and Theory
N213B	Health Assessment, Research, and Health Promotion in Occupational Health
N225	Pharmacology for Advanced Practice Nurses
N230	Advanced Pathophysiology
N239A,B,C	Biobehavioral Foundations of Acuity and Chronicity in Illness
N439A,B,C	Advanced Practice Nursing: Clinical Practicum
N439D	Advanced Practice Nursing: Residency
N440	Advanced Assessment and Clinical Diagnosis Practicum
N597	Individual Study for Comprehensive Examination

### **Public Health Courses**

Students are required to complete at least 10 units of course work in the School of Public Health covering content inclusive of the following areas: Epidemiology, Industrial Hygiene/Physical Agents, Ergonomics and Occupational Safety. Some example courses for this and other content relevant to OEHN include, but are not limited to, courses listed on the back.

**\*Recommend completion of N204 during summer prior to entering program.**

+Students are expected to carry a minimum course load of 8 units per quarter. Students receiving funding from the Graduate Division must enroll in 12 units each quarter.

### **Epidemiology**

100	Principles of Epidemiology (4) Summer, Spring
226	Public Health Responses to Bioterrorism (4) Spring
251	Epidemiology of Non-intentional Injuries (4) Fall
253	Acute Traumatic and Chronic Repetitive Injuries from Work Related Exposures (2) Off years Spring
260	Environmental Epidemiology (2 or 4) Spring
261	Occupational Epidemiology (4) Winter
263	Exposure Assessment in Occupational and Environmental Epidemiology (2) Winter

### **Environmental Health - Ergonomics**

259A	Occupational Safety and Ergonomics (4) Spring
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### **Environmental Health - Industrial Hygiene and Physical Agents**

200A	Foundations of Environmental Health Sciences (6) Fall
250D	Industrial Hygiene Practice Seminar (2) Spring, S/U grading only
253A	Physical Agents in the Work Environment (2) Winter S/U Grading
454	Health Hazards of Industrial Processes (4) Winter – May substitute for N239C for OEHNP students.

### **Environmental Health - Occupational Medicine**

251A	Occupational Diseases: Recognition and Prevention (1) Winter, Spring
251B	Occupational Diseases: Recognition and Prevention (1) Winter, Spring

**Environmental Health - Occupational Safety**

- 259A Occupational Safety and Ergonomics (4) Spring
- 200A Foundations of Environmental Health Sciences (6) Fall

**Environmental Health -Toxicology**

- M240 [Fundamentals of Toxicology \(4\) Winter](#)
- M242 Toxicodynamics (4) [Spring](#)
- 257 Risk Assessment and Standard Setting (4) Fall
- 240 Fundamentals of Toxicology (4) Spring
- 243 Embryology and Teratology (4) Spring
- 256 Biological and Health Surveillance Monitoring in Occupational and Environmental Health (4) Fall

**Public Policy: Industrial Policy**

- CM230 Labor Markets and Public Policy (4) Spring
- 233 Employment Issues in California (4) Winter
- 242 Regional Development, Urbanization, and Industrial Policy (4) Fall, Winter
- 271 Urban Poverty, Workforce Development, and Public Policy (4) Spring

UCLA  
School of Nursing  
July 7, 2006  
Master of Science in Nursing Program

**NURSING ADMINISTRATION/OCCUPATIONAL AND ENVIRONMENTAL  
HEALTH SPECIALTY -- FALL 2005 ADMISSION**

**SAMPLE COURSE SEQUENCE –SUBJECT TO REVISION**

This course sequence is provided as an example only. An individual student's program may differ from this sample according to his/her background and educational goals. Each student must meet with his/her faculty advisor every quarter to review progress in the program and plan coursework for future quarters. A minimum of 69 units is required for this specialty.

**First Year**

<u>Fall</u>	Units	<u>Winter</u>	Units	<u>Spring</u>
Units				
N204 *	4	N219B	4	N218A
4				
N213A	4	EHS/EPI	4-8	N418A
3				
N219A	4			EHS/EPI
2-6				
N220	3			
EHS/EPI	0-6			
<b>Total</b>	<b>15+</b>	<b>Total</b>	<b>8+</b>	<b>Total</b>
<b>8+</b>				

**Second Year**

<u>Fall</u>	Units	<u>Winter</u>	Units	<u>Spring</u>
Units				
N213B	3	N218C	4	N218D
4				
N218B	4	N418C	3	N418D
12				
N418B	3	EHS/EPI	2-4	N597
4				
EHS/EPI	0-6			
<b>Total</b>	<b>10+</b>	<b>Total</b>	<b>8+</b>	<b>Total</b>
<b>20+</b>				

### **Nursing Core Courses**

N204	Research Design and Critique
N220	Instruction and Learning in Nursing

### **Nursing Administration Specialty, Occupational Health and Master's Courses**

N213A	Occupational Health Nursing Role and Theory
N213B	Health Assessment, Research, and Health Promotion in Occupational Health
N218A,B,C,D	Nursing Administration Theory
N219A	Essentials of Accounting and Budgeting in Health Care Organizations
N219B	Operations Planning and Control for Nurse Administrators
N418A,B,C	Nursing Administration Practicum
N418D	Nursing Administration Residency
N597	Individual Study for Comprehensive Examination

### **Public Health Courses**

Students are required to complete at least 10 units of course work in the School of Public Health covering content inclusive of the following areas: Epidemiology, Industrial Hygiene/Physical Agents, Ergonomics and Occupational Safety. Some example courses for this and other content relevant to OEHN include, but are not limited to, courses listed on the back.

**\*Recommend completion of N204 during summer prior to entering program.**

+Students are expected to carry a minimum course load of 8 units per quarter. Students receiving funding from the Graduate Division must enroll in 12 units each quarter.

### **Epidemiology**

100	Principles of Epidemiology (4) Summer, Spring
226	Public Health Responses to Bioterrorism (4) Spring
251	Epidemiology of Non-intentional Injuries (4) Fall
254	Acute Traumatic and Chronic Repetitive Injuries from Work Related Exposures (2) Off years Spring
262	Environmental Epidemiology (2 or 4) Spring
263	Occupational Epidemiology (4) Winter
263	Exposure Assessment in Occupational and Environmental Epidemiology (2) Winter

### **Environmental Health - Ergonomics**

259A	Occupational Safety and Ergonomics (4) Spring
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### **Environmental Health - Industrial Hygiene and Physical Agents**

200A	Foundations of Environmental Health Sciences (6) Fall
250D	Industrial Hygiene Practice Seminar (2) Spring, S/U grading only
253A	Physical Agents in the Work Environment (2) Winter S/U Grading
454	Health Hazards of Industrial Processes (4) Winter – May substitute for N239C for OEHNP students.

### **Environmental Health - Occupational Medicine**

251A	Occupational Diseases: Recognition and Prevention (1) Winter,
251B	Occupational Diseases: Recognition and Prevention (1) Spring

**Environmental Health - Occupational Safety**

259A Occupational Safety and Ergonomics (4) Spring

200A Foundations of Environmental Health Sciences (6) Fall

**Environmental Health -Toxicology**

M240 [Fundamentals of Toxicology \(4\) Winter](#)

M242 Toxicodynamics (4) Spring

257 Risk Assessment and Standard Setting (4) Fall

240 Fundamentals of Toxicology (4) Spring

243 Embryology and Teratology (4) Spring

256 Biological and Health Surveillance Monitoring in Occupational and Environmental Health (4) Fall

**Public Policy: Industrial Policy**

CM230 Labor Markets and Public Policy (4) Spring

233 Employment Issues in California (4) Winter

242 Regional Development, Urbanization, and Industrial Policy (4) Fall, Winter

271 Urban Poverty, Workforce Development, and Public Policy (4) Spring



Appendix A  
UC Los Angeles Occupational Medicine Program:  
**Program curricula, course requirements, and sample curricula**

In the past, training programs in the preventive medicine specialties were rigidly divided into and "academic year" (MPH study) and a "practicum year". We have continued progress towards developing a program with unique characteristics including:

Seamless continuum between first and second years: (1). The core curriculum spans both years. (2). Trainees begin projects in year 1 and continue in the second year. (3). Starting this year, first-year trainees also have clinical activity.

Practicum experience based upon a small number of well-designed, comprehensive rotations rather than a large number of electives: Unlike some programs, our program uses a limited number of rotations through which trainees obtain a comprehensive experience in occupational medicine, working with faculty members who are regularly and consistently involved in education rather than on an intermittent basis. The major rotations are designed to be complementary (clinical/nonclinical; frontline versus "tertiary referral"; governmental versus private).

Emphasis on effective project management: Each resident must complete a successful meaningful project. From this they learn project management as well as the specific topics. Many lead to publications (one resident has two papers published [fatal rat bite fever; carbon black]; another has one in press [impact of training upon practice patterns]; another has one under review [epidemiologic study of dental hygienists]).

Residents who do not have an acceptable MPH spend much of the first-year in classroom related work. However, they do considerable clinical work before the fall quarter begins. In addition, this year, we have instituted incorporating them into clinical settings during the first-year (typically a few clinic sessions a week at Kaiser). During the second year, the residents have a major focus on one of the "major rotations" for several months each (i.e., Kaiser, UCLA academic, OSHA, "corporate"). To achieve longitudinal experience in "frontline clinical occupational medicine", they continue at Kaiser throughout the second year. In addition, the second year residents both come to the UCLA clinic on a regular basis (generally, each comes on alternate weeks). The "minor rotations" (Pacific Occupational Medical and Long Beach Clinic) are scheduled during open days (typically about one or two a month). The "corporate management" experience is currently being revised-due to changes in personnel in the City of Los Angeles Human Resources Department, the primary preceptors have left. We are therefore in the process of establishing a comparable corporate management rotation with Exxon Mobil Corp.

## **ROTATION CURRICULAR GOALS**

### **Kaiser Permanente**

Diagnosis and treatment of common occupational illnesses and injuries  
Communication with employers and workers  
Understanding of the workers' compensation system, including report preparation as treating physician and as QME.  
Improved understanding of operation of an employee health service focused in the health care sector

### **Exxon-Mobil Corporation** (Under development)

Obtain factual knowledge and strengthen judgment about fitness for duty and placement decisions  
Participate in the evaluation of worksite hazards.  
Understand functional interrelationships among managers, health care providers, occupational hygienists, and regulators.  
Implement disaster preparedness and emergency response methods. Understand critical incident management.  
Understand corporate health management procedures.  
Understand the ethical concepts of public health in a corporate setting.

### **Pacific Occupational Medical Associates**

Understand workplace medical surveillance procedures. These include the following stages:  
    Design  
    Conduct  
    Interpreting results  
    Communication of results to workers and employers  
Interpretation of audiometry, spirometry, and ILO-radiography.  
Implementation of OSHA related medical surveillance programs.

### **Long Beach Medical Clinic**

Become familiar with methods of implementing occupational health programs in worksites.  
Understand methods of managing off-site occupational health programs.  
Understand major methods of the quality assurance for occupational health services.  
Understand the maritime industry and oil refining as particular examples.

### **Cal-OSHA**

Understand functioning of a public health regulatory agency  
Understand OSHA- the primary regulatory basis for workplace health and safety  
Learn to prepare comprehensive site and program evaluation reports  
Understand compliance evaluation  
Evaluate occupational hazards, using methods including in-site inspections  
Improve understanding of the standards development process

**UCLA (Academic Center)**

- Diagnose and treat toxic related exposure health problems.
- Diagnose occupational lung disease.
- Effective communication to groups
- Project planning
- Assessment of workplace exposures
- Design of prevention programs
- Clinical preventive medicine practices
- Americans with Disabilities Act principles and practice.
- Critically review published scientific and medical literature
- Effective written communication

Individual Goals are linked to the 6 competencies as follows:

**6 COMPETENCY EMPHASIS BY ACTIVITY AND GOAL**

Please see codes at end of table (i.e., page 101)

**Kaiser Permanente**

- Diagnosis and treatment of common occupational illnesses and injuries
- Communication with employers and workers
- Understanding of the workers' compensation system, including report preparation as treating physician and as QME.
- Improved understanding of operation of an employee health service focused in the health care sector

**Exxon-Mobil Corporation (Under development)**

- Obtain factual knowledge and strengthen judgment about fitness for duty and placement decisions
- Participate in the evaluation of worksite hazards.
- Understand functional interrelationships among managers, health care providers, occupational hygienists, and regulators.
- Implement disaster preparedness and emergency response methods.
- Understand critical incident management.
- Understand corporate health management procedures.
- Understand the ethical concepts of public health in a corporate setting.

	PC	MK	IPCS	PR	PBLI	SBP
Diagnosis and treatment of common occupational illnesses and injuries	P	P		S		
Communication with employers and workers	P	P				P
Understanding of the workers' compensation system, including report preparation as treating physician and as QME.		P	P	P		P
Improved understanding of operation of an employee health service focused in the health care sector	S	S				P
Obtain factual knowledge and strengthen judgment about fitness for duty and placement decisions	P	P				
Participate in the evaluation of worksite hazards.	P	P			P	P
Understand functional interrelationships among managers, health care providers, occupational hygienists, and regulators.						P
Implement disaster preparedness and emergency response methods.		S				P
Understand critical incident management.						P
Understand corporate health management procedures.			P	P		P
Understand the ethical concepts of public health in a corporate setting.				P		

**Pacific Occupational Medical Associates**

Understand workplace medical surveillance procedures. These include the following stages:

	P			P
Design				P
Conduct	P	P	S	
Interpreting results	P			S
Communication of results to workers and employers			P	
Interpretation of audiometry, spirometry, and ILO-radiography.	P	P	S	
Implementation of OSHA related medical surveillance programs.			S	P

**Long Beach Medical Clinic**

- Become familiar with methods of implementing occupational health programs in worksites.
- Understand methods of managing off-site occupational health programs.
- Understand major methods of the quality assurance for occupational health services.
- Understand the maritime industry and oil refining as particular examples.

				P
			P	P
		P		P
	S			

**Cal-OSHA**

- Understand functioning of a public health regulatory agency
- Understand OSHA- the primary regulatory basis for workplace health and safety
- Learn to prepare comprehensive site and program evaluation reports
- Understand compliance evaluation
- Evaluate occupational hazards, using methods including in-site inspections
- Improve understanding of the standards development process

	P			P
			S	P
		P		S
		P		P
	P		S	
	P			P

**UCLA (Academic Center)**

- Diagnose and treat toxic related exposure health problems.
- Diagnose occupational lung disease.
- Effective communication to groups
- Project planning
- Assessment of workplace exposures
- Design of prevention programs
- Clinical preventive medicine practices
- Americans with Disabilities Act principles and practice.
- Critically review published scientific and medical literature
- Effective written communication

P	P			P
P	P			P
		P	S	
			P	P
	P		S	P
			S	S
P				P
		P	P	P
	P			P
		P	S	

**COMPETENCY**

Patient carePC

Medical knowledgeMK

Interpersonal and communication skillsIPCS

ProfessionalismPR

Practice-based learning/ ImprovementPBLI

Systems-based practice.SBP

**Emphasis**

PrimaryP

SecondaryS

**MPH COURSE STRUCTURE**

<b>SCHOOL REQUIREMENTS</b>				
<i>Course no.</i>	<i>Course Title</i>	<i>Units</i>	<i>Quarter Offered</i>	<i>4</i>
BIOST 100A	Introduction to Biostatistics	4	Fall, Spring	
CHS 100	Behavioral Sciences & Health Education	4	Winter, Spring	
EPID 100	Principles of Epidemiology	4	Winter, Spring	
HS 100	Health Services Organizations	4	Fall, Spring	
EHS 400	Field Studies in Environmental Health Sciences	4	Fall, Wtr, Spr	

<b>DEPARTMENT REQUIREMENTS</b>				
<i>Course no.</i>	<i>Course Title</i>	<i>Units</i>	<i>Quarter Offered</i>	<i>4</i>
BIOST 100B	Introduction to Biostatistics	4	Winter	
EHS 200A	Foundations of Environmental Health Sciences	6	Fall	
EHS 200B	Foundations of Environmental Health Sciences	6	Winter	
EHS 240	Fundamentals of Toxicology	4	Winter	
EHS 254	Health Hazards of Industrial Processes	4	Winter	
EHS 257	Risk Assessment and Standard Setting	4	Fall	
EHS 259A	Occupational Safety and Ergonomics	4	Spring	
EHS 400	Field Studies in Environmental Health Sciences	4	Fall, Wtr, Spr	
EHS M411	EHS Seminar	2	Fall, Spring	
EHS 251	Occup Dis	2	Winter	

**TOTAL NO. of UNITS--58**

## **Appendix A**

### UC Irvine Occupational Medicine Program:

#### **A. Program curricula, course requirements, and sample curricula**

The UC Irvine Occupational Medicine Residency Program is structured as a two-year training program with integrated academic and practicum phases. Entering residents who have completed a MPH degree or equivalent may join the program for a one-year practicum phase.

The residency program begins with an intensive 7 week orientation period, during which the residents complete courses in industrial hygiene and occupational safety. They also are oriented to the UCI occupational and environmental medicine clinics and begin their clinic schedules. They also make several work site visits and meet with the future field training site preceptors.

Residents in the academic phase enroll in a Master of Science degree program in environmental toxicology or in environmental health science and policy at UCI. During the degree programs, residents complete the MPH-equivalent course requirements for board certification. Residents must complete a formal research project. Residents are provide instruction in the responsible conduct of research in the degree program required seminars and in sessions of the core residency program seminar. All residents who undertake research that involves clinical data, human subjects, or animals are required to take UCI training programs in the relevant areas.

During the practicum phase, residents spend much of their time in field site rotations in settings which reflect the broad range of practice opportunities. The residency provides practicum training in corporate occupational medicine programs, as well as in comprehensive occupational medical practices and in public health regulatory agencies. The field training rotations remained the same. The core rotations continue to be Exxon-Mobil Oil, Steelcase, Cal-OSHA, Kaiser Permanente, Sharp-Rees Stealey Medical Group, and the UCI Medical Center Occupational Health clinic – providing corporate, regulatory/governmental, and clinical training experiences. Residents are required to complete a minimum of 3 months in a work place-based occupational medicine program, 2 months in an external occupational medicine specialty clinical program, and 1 month public health-regulatory agency. The program also offers a number of elective rotations.

Throughout the academic and practicum phases, residents receive ongoing training at the UCI COEH. The core residency training activities – occupational medicine clinic rotations, clinical case conference, didactic seminars, and journal club – remained the same. The COEH operates two full-time comprehensive and consulting occupational medicine clinics which provides substantial clinical training opportunities for the residents.

Master of Science course requirements. Most of the residents participate in the Master of Sciences in Environmental Toxicology degree program. The following lists show the required courses for residents in this degree program:

*Required courses for degree program:*

TOX 201	Principles of Toxicology	4 units
TOX 206A-B	Target Organ Toxicology	12 units
TOX 207	Experimental Design & Interpretation of Toxicology Studies	2 units
TOX 298	Environmental Toxicology Seminar	2
units/qtr.		
TOX 299	Research Problems	2-4units/qtr.

*Additional required course for residency program:*

Residents are required to complete at least one course in each of the following areas: epidemiology, biostatistics, health services organization and administration, environmental and occupational health, and social and behavioral influences on health. The courses must be approved by the director of the occupational medicine residency program.

E 227	Biostatistics	4 units
E 226	Epidemiology	4 units
TOX 202	Environmental Toxicology	4 units
M 266	Economics of Health Care Services	4 units
or M 267	Management of Health Care Organizations	
or U 226	Public Health Cost-Effectiveness Analysis	
P 258	Health Psychology	4 units
or P 262	Interpersonal Processes and Health	

Approved toxicology elective courses

TOX 204	Neurotoxicology	4 units
TOX 205	Toxins and Cellular Injury	4 units
TOX 212	Inhalation Toxicology	4 units
TOX 220	Industrial Toxicology	4 units
TOX 230	Chemical Mutagenesis & Carcinogenesis	4 units
TOX 297	Advanced Topics in Occupational Toxicology	2
units/qr.		

Additional approved elective courses

SE 264B	Data Analysis II (statistics)	4 units
E 244	Toxic Substances in the Environment	4 units
E 249	Environmental Epidemiology	4 units
E 250	Cancer Epidemiology	4 units
E 283	Environmental Health and Quality	4 units
E 293	Lead in the Environment and Society	4 units
M 200	Management of Complex Organizations	4 units
P 211	Attitude Theory and Research	4 units



A sample curriculum for a resident who took the Master of Science in Toxicology degree option is shown below:

**Sample Curriculum for UC Irvine Occupational Medicine Resident (Dr. Alan Hsu)**

8/04	9/04	10/04	11/04	12/04	1/05	2/05	3/05	4/05	5/05	6/05	7/05
Orientation		Academic phase, MS courses, UCI Environmental Toxicology									Exxon-Mobil – field site
Workplace Visits	T202 - Environmental Toxicology T206A -Target Organ Toxicology T207 - Design of Toxicology Study			T206B - Target Organ Toxicology T220 - Industrial Toxicology T297 - Advanced Topics in Occupational Toxicology			P262 – Interpersonal Processes & Health T201 - Principles of Toxicology T212 - Inhalation Toxicology				
Industrial Hygiene	E275 - Epidemiology & Biostatistics T298A - Toxicology Seminar			M266 - Economics of Health Care Services T298B - Toxicology Seminar			H508 - Statistical Methods in Health Science T298C - Toxicology Seminar				
Occupational Safety											
COEH clinic, case conference, journal club, didactics - 1 day/week											

8/05	9/05	10/05	11/05	12/05	1/06	2/06	3/06	4/06	5/06	6/06	7/06
Exxon Mobil field site		Academic & Research training			Vacation	Kaiser Occupational Medicine - field site			Ophthalmology		
		T297 – Advanced Topics in Occupational Medicine T298 – Toxicology Seminar T299 – Thesis Research							Orthopedics		
						Cal-OSHA - field site			Residency Project		
COEH clinic, case conference, journal club, didactics - 1 day/week											

## Appendix A – Hazardous Substance Academic Training

Industrial Hygiene curriculum for MPH and MS programs. All IH students are required to take the courses given in the model curriculum. Additional HSAT courses are indicated by an asterisk.

### Curriculum for MPH

#### MPH PROGRAM IN INDUSTRIAL HYGIENE 2005-2006

Department of Environmental Health Sciences  
UCLA School of Public Health

You must take the courses listed below and satisfy the elective requirement on page 3.

#### FIRST YEAR

Fall	BIO 100A	Introduction to Biostatistics (4 units)
	EHS 200A	Foundations of Environmental Health Sciences I (6) Staff
	EHS 256	Bio. & Hlth. Surveil. Monitoring in Occ./Env. Health (4) Que Hee
	<b>[odd yrs only]</b>	
	EHS M411	Environmental Health Sciences Seminar (2) Staff
Wntr	BIO 100B	Introduction to Biostatistics (4)
	EHS 200B	Foundations of Environmental Health Sciences II (6) Staff
	EHS 251A	Occupational Diseases: Recognition and Prevention (1) Harber
	EPI 100	Principles of Epidemiology (4)
Sprg	EHS 252D	Properties & Measurement of Airborne Particles (4) Hinds
	EHS 252E	Identification & Measurement of Gases & Vapors (4) Que Hee
	EHS 252F	Industrial Hygiene Measurements Laboratory (3) Kennedy, Que Hee, Hinds
	EHS 251B	Occupational Diseases: Recognition and Prevention (1) Harber
Sumr	EHS 400	Field Studies in Env. Health Sciences (summer internship) (4) Staff

#### SECOND YEAR

Fall	EHS 201	Seminar: Health Effects of Environmental Contaminants (2) Eckhert
	EHS 255	Control of Airborne Contaminants in Industry (4) Hinds
	EHS 256	Bio. & Hlth. Surveil. Monitoring in Occ./Env. Health (4) Que Hee
	<b>[odd yrs only]</b>	
Wntr	EHS 454	Health Hazards of Industrial Processes (4) Kennedy, Hinds, Que Hee,
	CHS 100	Behavioral Science and Health Education (4)
	EHS 253A	Physical Agents (2) Kennedy
	EHS 253B	Physical Agents Laboratory (2) Kennedy
	EHS 240	Fundamentals of Toxicology (4) Collins
Sprg	EHS M411	Environmental Health Sciences Seminar (2) Staff

EHS 250D	Industrial Hygiene Practice (2) Kennedy
EHS 257	Risk Assessment and Standard Setting (4) Froines
EHS 259A	Occupational Safety and Ergonomics (4) Liu
HS 100	Health Services Organization (4)

Note: Electives may be taken each quarter provided total units do not exceed 18 units/quarter.

Note: **[odd years only]** Courses given only on odd **calendar** years. Take first or second year, as appropriate.

Curriculum for **MS**

**MS PROGRAM IN INDUSTRIAL HYGIENE  
2005-2006**

Department of Environmental Health Sciences  
UCLA School of Public Health

**You must take the courses listed below and satisfy the elective requirement on page 3.**

**FIRST YEAR**

Fall BIO 100A Introduction to Biostatistics (4 units)  
EHS 200A Foundations of Environmental Health Sciences I (6) Staff  
EHS 256 Bio. & Hlth. Surveil. Monitoring in Occ./Env. Health (4) Que Hee

**[odd yrs only]**

EHS M411 Environmental Health Sciences Seminar (2) Staff

Wntr BIO 100B Introduction to Biostatistics (4)  
EHS 200B Foundations of Environmental Health Sciences II (6) Staff  
EHS 251A Occupational Diseases: Recognition and Prevention (1) Harber  
(pending approval)  
EPI 100 Principles of Epidemiology (4)

Sprg EHS 252D Properties & Measurement of Airborne Particles (4) Hinds  
EHS 252E Identification & Measurement of Gases & Vapors (4) Que Hee  
EHS 252F Industrial Hygiene Measurements Laboratory (3) Kennedy, Que  
Hee, Hinds  
EHS 251B Occupational Diseases: Recognition and Prevention (1) Harber  
(pending approval)

**SECOND YEAR**

Fall EHS 201 Seminar: Health Effects of Environmental Contaminants (2) Eckhert  
EHS 255 Control of Airborne Contaminants in Industry (4) Hinds  
EHS 256 Bio. & Hlth. Surveil. Monitoring in Occ./Env. Health (4) Que Hee

**[odd yrs only]**

EHS 598<sup>#</sup> Master's Thesis Research (4) Staff

Wntr EHS 454 Health Hazards Industrial Processes (4) Kennedy, Hinds, Que Hee  
EHS 410A Instrumental Methods in Environmental Sciences (4) Que Hee,

**Suffet**

EHS 253A Physical Agents (2) Kennedy  
EHS 253B Physical Agents Laboratory (2) Kennedy  
EHS 240 Fundamentals of Toxicology (4) Collins  
EHS 598<sup>#</sup> Master's Thesis Research (4) Staff

Sprg EHS M411 Environmental Health Sciences Seminar (2) Staff  
EHS 250D<sup>α</sup> Industrial Hygiene Practice (2) Kennedy  
EHS 257 Risk Assessment and Standard Setting (4) Froines  
EHS 259A Occupational Safety and Ergonomics (4) Liu  
EHS 598<sup>#</sup> Master's Thesis Research (4) Staff

# Students doing the MS Report Option may take EHS 597 (EHS 596 in final quarter) instead of EHS 598.

Note: Electives may be taken each quarter provided total units do not exceed 18 units/quarter.

Note: **[odd years only]** Courses given only on odd **calendar** years. Take first or second year, as appropriate.

## MPH AND MS PROGRAM IN INDUSTRIAL HYGIENE

### REQUIRED MENU COURSE

**You must take at least one of the following courses:**

EHS 252G* [Spr]	Industrial and Env. Hygiene Assessment (4) Hinds, Que Hee
EHS 258* [Win]	Identification and Analysis of Hazardous Wastes (4) Que Hee [odd yrs only]
EPI 261 [Win]	Occupational Epidemiology (4) Ritz
EHS 410B [Win]	Instrumental Methods Laboratory in Environ. Health Sciences (4) Que Hee
CHS M470 [Spr]	Introduction to Occupational Health Education (4) Delp

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### Recommended Alternative to Biostatistics 100A and 100B

BIO 110A	Basic Biostatistics (4)
BIO 110B	Basic Biostatistics (4)

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### RECOMMENDED ELECTIVES (not required)

**Note, courses listed above as required menu courses are also recommended electives.**

#### Fall Quarter

LAW 290	Environmental Law (4) Freeman (Fall semester)
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#### Winter Quarter

EHS 225	Atmospheric Transport and Transformations of Airborne Chem. (4) Winer
EPI 201A	Epidemiologic Methods I (6)
EPI 263	Exposure Assessment in Occup.& Environ. Epidemiology (2) Ritz

#### Spring Quarter

EHS 202	Seminar: Environmental Chemistry (2) Que Hee
EPI 260	Environmental Epidemiology (2)/(4)
EHS 264	Fate and Transport of Organic Chemicals in the Aquatic Environment (4) Suffet
EPI 201B	Epidemiologic Methods II (6)
CHS M278	Work and Health (cross listed as EHS 270) (4) Siegel, Schnall, Repetti

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\*Indicates course qualifies for Hazardous Substances Minor

# Appendix B

Tables 4a, 12a, 12b and 13 are included as separate Excel files.

## Appendix C

### Industrial Hygiene

Publications by Industrial Hygiene Core faculty members for 05-06. Student authors are underlined.

Dr. Froines

Kuhn T, Zhu Y, Hinds W, Krudysz M, Fine PM, Froines J, Sioutas C. Volatility of indoor and outdoor ultrafine particulate matter near a freeway. Journal of Aerosol Science, **36(3)**: 291-303, 2005.

Hiyoshi, K, Takano H, Inoue K, Ichonose T, Yanagisawa R, Tomura S, Cho A, Froines J, Kumagai Y. Effects of a Single Intratracheal Administration of Phenanthraquinone on Murine Lung. Journal of Applied Toxicology, **25**:47-51, 2005.

Rodriguez, C, Fukuto JM, Taguchi K, Froines J, Cho A. The interactions of 9,10-phenanthrenequinone with glyceraldehydes-3-phosphate dehydrogenase (GAPDH), a potential site for toxic actions, **155**: 97-110, 2005.

Cho, AK, Sioutas, C, Miguel AH, Kumagai Y, Schmitz DA, Misra C, Singh M, Eiguren-Fernandez A, Froines JR. Redox Activity of Airborne Particulate Matter (PM) at different sites in the Los Angeles Basin. Environmental Research, **99(1)**:40-7, 2005.

Kleinman, M.T., Sioutas C, Stram D, Froines JR, Cho AK, Chakrabarti B, Hamade A, Meacher D, Oldham M. Inhalation of Concentrated Ambient Particulate Matter Near a Heavily Trafficked Road Stimulates Antigen-Induced Airway Responses in Mice. Journal of Air and Waste Management Association, **55(9)**:1277-88. 2005.

Kikuno S, Taguchi K, Iwamoto N, Yamano S, Cho AK, Froines JR, Kumagai Y. 1,2-Naphthoquinone Activates Vanilloid Receptor 1 Through Increased Protein Tyrosine Phosphorylation, leading to Contraction of Guinea Pig Trachea. Toxicology and Applied Pharmacology. **210(1-2)**:47-54, 2006.

Geller, M. D., Ntziachristos L, Mamakos A, Samaras Z, Schmitz D, Froines JR, Sioutas C. (2006). "Physicochemical and Redox Characteristics of Particulate Matter (PM) Emitted from Gasoline and Passenger Cars." Atmospheric Environment **In press**: doi: 10.1016/j.atmosenv.2006.06.018.

August 25, 2005 – Presentation at the Fogarty Meeting in Mexico, *Ambient Particles, their Toxic Components, Sources and how They Impact Health*, Mexico City, Mexico.

September 19, 2005 – Presentation at the Ramazzini Conference, *The Role of Oxidative Stress in the Mechanism of Particulate Matter Toxicity*, Bologna, Italy.

October 28, 2005 – Presentation at the COEH Statewide Symposium, *Occupational and Environmental Health in the Developing World: Making a Difference*, Berkeley, CA.

May 5, 2005 – Presentation at the Goods Movement Task Force Meeting, *Health Effects of Ultrafine Particles*, Los Angeles, CA.



November 30, 2005 – Presentation at the EPA Particulate Centers Kick-off Meeting, *The Southern California Particle Center*, Washington D.C.

April 30, 2006 – Presentation at the AQMD Ultrafine Particles conference, *Ultrafine Particle Health Effects*, Los Angeles, CA.

Dr. Hinds:

Zhang, K.M., Wexler, A.S., Niemeier, D.A., Zhu, Y., Hinds, W.C., Sioutas, C. "Evolution of particle number distribution near roadways. Part III: traffic analysis and on-road size resolved particulate emission factors," *Atm. Env.*, 39, 4155-4166 (2005).

Zhu, Y.F., Kuhn, T., Mayo, P., and Hinds, W., "Comparison of Daytime and Nighttime Concentration Profiles and Size Distributions of Ultrafine particles near a Major Highway." *Environ. Sci. & Technol.*, 40, 2531-2536 (2006).

Yifang Zhu, Nu Yu, Thomas Kuhn, and William C. Hinds, "Field Comparison of P-trak and condensation particle counters" 2006, *Aerosol Science and Technology* 40: 422-430.

Hinds, W. 2006. Session Chair's Commentary on Session 1: Inhaled Aerosols. In *Frontiers in Aerosol Dosimetry Research: Proceedings of a Conference*. eds. R. F. Phalen, M.J. Oldham, S.W. Akhavan, M.D. Hoover, and K. Asotra, pp. 3-1 to 3-2. APHEL Report No. 06-01, University of California, Irvine, CA, USA.

Dr. Kennedy

Zeidler, M.R., Goldin, J., Kim, H.J., Truong, D., Sayre, J., Kleerup, E., Kennedy, N., Newman, K., Tashkin, D.P., Silverman, J., and Corren, J.C.: Small Airways Response to Naturalistic Cat Allergen Exposure in Subjects with Asthma. *In press, accepted by Am J Resp and Critical Care Med, June 2006.*

Zhao, Y., Krishnadasan, A., Kennedy, N., Morgenstern, H., and Ritz, B.: Estimated Effects of Solvents and Mineral Oils on Cancer Incidence and Mortality in a Cohort of Aerospace Workers. *Am. J. Ind. Med.* 48(4):249-258, Oct 2005.

Dr. Que Hee:

Zhong, W. and Que Hee, S.S., "Comparison of UV, Fluorescence, and Electrochemical Detectors for the Analysis of Formaldehyde-Induced DNA Adducts", *J. Anal. Toxicol.*, 29: 182-187, 2005.

Phalen, R.N. and Que Hee, S.S., "Analysis of Captan on Nitrile Glove Surfaces using a Portable ATR-FTIR", *Applied Spectroscopy*, 59: 724-731, 2005.

Zainal, H. and Que Hee, S.S., "Permeation of Telone EC Through Protective Gloves", *J. Hazard. Mater.* B124: 81-87, 2005.

Xu, W. and Que Hee, S.S., "Gas Chromatography-Mass Spectrometry Analysis of Di-n-Octyl Disulfide in a Straight Oil Metalworking Fluid. Application of Differential Permeation and Box-Cox Transformation", *J. Chromatography A*, 1101: 25-31, 2006.

Zainal, H. and Que Hee, S.S., "Permeation of Telone C-35 EC™ and Chloropicrin Through Protective Gloves", J. Appl. Polymer Science, 100: 18-25, 2006.

Zainal, H. and Que Hee, S.S., "Permeation of Benomyl of Benlate WP50 through Nitrile Gloves and Utility of a Infrared Reflectance Technique", Arch Environ Contam Toxicol., 50: 429-436, 2006.

Kim, D.H., Que Hee, S.S., Norris, A.J., Faull, K.F. and Eckhert, C.E., "Boric Acid Inhibits ADP-Ribosyl Cyclase Non-Competitively", J. Chromatogr A., 1115: 246-252, 2006.

Xu, W. and Que Hee, S.S., "Permeation of a Straight Oil Metalworking Fluid Through Nitrile Gloves", J. Hazardous Materials, In Press.

Zainal, H. and Que Hee, S.S., "Permeation of Comite Through Protective Gloves", J. Hazardous Materials, In Press.

Phalen R.N., Que Hee, S.S., Xu, W., and Wong, W.K. "Acrylonitrile content as predictor of Captan permeation resistance for disposable nitrile gloves," J. Appl. Polymer Sci., Accepted.

Que Hee, S.S. "Biologically-Based Environmental Exposure Levels (BEELs): The Case for 4,4'-Methylene Dianiline (MDA)," International Conference on Occupational and Environmental Exposures of Skin to Chemicals: Science and Policy, Crystal City, September 8-11, 2002. <http://www.cdc.gov/niosh/>. Look for conference extended abstracts under skin in search and then "conferences", and then under name in "authors". Also Reg Toxicol Pharmacol 41: 150-158, 2005.:

Que Hee, S.S. "Biological Monitoring", Chapter 16 in: *The Occupational Environment: its Evaluation and Control*, 2<sup>nd</sup> Ed., Ed. DiNardi, S.R., Am. Ind. Hyg. Assoc., Fairfax, VA, 2003, pp. 304-327.

Shane Que Hee, Gayle DeBord, John Cocker, and Peter Flessel. "Biological Monitoring and Government Agencies: Past, Present and Future," The Synergist 17(2): 50-53, 2006.

**B. Roundtables/Forums Organized:**

*Biological Monitoring and Government Agencies: Past, Present, and Future*, American Industrial Hygiene Conference and Exposition, Anaheim, CA, May 21-26, 2005. Roundtable.

**C. Courses/Seminars/Training Classes Taught:**

1.. Instructor in PDC 115, *Recognition, Evaluation, and Control of Dermal Exposures in the Workplace*, American Industrial Hygiene Conference and Exposition, Anaheim, CA, May 21, 2005.

Topic: "Biological Monitoring and Skin Exposure".

**D. Presentations At Professional Conferences**

1. Phalen, R., Que Hee, S.S., "Acrylonitrile Content as a Predictor of Captan Permeation Resistance for Disposable Nitrile Gloves," American Industrial Hygiene Conference and Exposition, Anaheim, CA, May 21-26, 2005. Abstract 167.

2. Xu, W., Que Hee, S.S., " Permeation of a Straight Oil Metalworking Fluid Through Nitrile Gloves," American Industrial Hygiene Conference and Exposition, Anaheim, CA, May 21-26, 2005. Abstract 171.
3. Phalen,R., Que Hee, S.S., "Development of a Robotic Hand Exposure System to Test Captan Permeation Through a Nitrile Glove and To Assess the Influence of Hand Movement,"American Industrial Hygiene Conference and Exposition, Chicago, IL, May 14-16, 2006. Abstract 139.
4. Xu, W., Que Hee, S.S., "Gas Chromatography-Mass Spectrometry Analysis of Di-n-Octyl Disulfide in a Straight Oil Metalworking Fluid. Application of Differential Permeation and Box-Cox Transformation", American Industrial Hygiene Conference and Exposition, Chicago, IL, May 14-16, 2006. Abstract 84.

## **Appendix C – Occupational and Environmental Health Nursing**

### **Publications**

Robbins WA (2005) Adverse effects of exposure to phthalates – communicating risks to workers, *American Association of Occupational Health Nurses Journal*, 53:59-62.

Robbins WA, Elashoff DA, Xun L, Jia J, Li N Wu G, Wei F (2005) Effect of lifestyle exposures on sperm aneuploidy, *Cytogenetics and Genome Research*, 111:371-377.

Rubes J, Selevan SG, Evenson DP, Zudova D, Vozdova M, Zudova Z, Robbins WA, Perreault SD (2005) Episodic air pollution is associated with increased DNA fragmentation in human sperm without other changes in semen quality, *Human Reproduction* 20:2776-2783.

Lawson CC, Grajewski B, Daston GP, Frazier L, Lynch D, McDiarmid M, Muroso E, Perreault SD, Robbins WA, Shelby M, Whelan EA (2006) Implementing a National Occupational Reproductive Research Agenda: Decade one and beyond, *Environmental Health Perspectives*, 114:435-441.

Chang BL, Robbins WA, Wei F, Xun L, Wu G, Li N, Elashoff DA (2006) Work place protection and life styles of boron workers in China, *AAOHN Journal* 54:435-443

## Appendix C – OMR, Los Angeles

### Publications:

1. Marchevsky AM, Harber P, Crawford L, Wick MR. Mesothelioma in patients with nonoccupational asbestos exposure: An evidence-based approach to causation assessment. *Ann Diagn Pathol.* 2006; 10(4): 241-50.
2. Hnizdo E, Yan T, Sircar K, Harber P, Glindmeyer H. Limit of Normal Decline for FEV1. *Am J Resp Crit Care Med.* 2006; 173:A618.
3. Harrison R, Gelb A, Harber P. Food flavoring workers with bronchiolitis obliterans following exposure to diacetyl, California. Berkeley: Department of Health Services, State of California.; 2006.
4. Harber P, Ducatman A. Training pathways for occupational medicine. *J Occup Environ Med.* 2006;48(4):366-75.
5. Harber P, Tashkin D, Simmons M, Crawford S, Hnizdo E, Connett J. Occupational Dust and Fume Exposure Effect on Lung Function in Early COPD. (In review). 2006.
6. Harber P, Crawford L, Cheema A, Schachter L. Computer Algorithm for Automated Work Group Classification from Free Text: the DREAM Technique. (submitted). 2006.
7. Yee T, Crawford L, Harber P. Work environment of dental hygienists. *J Occup Environ Med.* 2005; 47(6): 633-9.
8. Nuckols T, Wynn B, Lim Y, et al. Evaluating medical treatment guideline sets for injured workers in California Santa Monica, CA: RAND Corporation; 2005.
9. Kominski GF, Heslin KC, Morgenstern H, Hurwitz EL, Harber PI. Economic Evaluation of Four Treatments for Low-Back Pain: Results From a Randomized Controlled Trial. *Med Care.* 2005;43(5):428-435.
10. Harber P, DP Tashkin D, Simmons M, Crawford L, Hnizdo E, Connett J. Effect of Occupational Fume Exposure on the Rate of Decline of Lung Function in Early COPD. (In Preparation). 2005.
11. Harber P, Gee J. Clinicians' approach to mesothelioma. In: Pass HI, Vogelzang N, Carbone M, eds. *Malignant mesothelioma : advances in pathogenesis, diagnosis, and translational therapies.* New York: Springer; 2005:xxv, 854 p.
12. Harber P. Impairment and Disability. In: Rosenstock L, ed. *Textbook of clinical occupational and environmental medicine.* 2nd ed. Philadelphia: Elsevier Saunders; 2005:xviii, 1338 p.
13. Harber P, Tashkin D, Simmons M, Crawford S, Connett J. Predictors of Disability and Employment Status in COPD. (In Preparation). 2005.
14. Harber P, Tashkin D, Simmons M, Crawford L, Hnizdo E, Connett J. Comparison of 3 methods for assigning exposure metrics for evaluating occupation effect upon COPD. *Am J Resp Crit Care Med.* 2005;(abstract).
15. Harber P, Crawford L, Liu K, Schacter L. Working words: real-life lexicon of North American workers. *J Occup Environ Med.* 2005; 47(8): 859-64.
16. Harber P, Mummaneni S, Crawford L. Influence of residency training on occupational medicine practice patterns. *J Occup Environ Med.* 2005; 47(2): 161-7.
17. Harber P. Prevention in OEM: Possible Structures in Enhancing prevention (2/2/05) (<http://www.cdc.gov/niosh/steps/pdfs/Steps%20Session%20C-1.pdf>).

Occupational Health: Implications for Academic Programs:. Vol. 2005: NIOSH; 2005.

18. Guidotti TL, Brodtkin CA, Christiani D, et al. Diagnosis and initial management of nonmalignant diseases related to asbestos. *Am J Respir Crit Care Med.* 2005; 171(6): 666-7.

19. Guidotti TL, Brodtkin CA, Christiani D, et al. Diagnosis and initial management of nonmalignant diseases related to asbestos. *Am J Respir Crit Care Med.* 2005;171(5):528-30.

20. Crawford L, Gutierrez G, Harber P. Work environment and occupational health of dental hygienists: a qualitative assessment. *J Occup Environ Med.* 2005;47(6):623-32.

21. Ducatman AM, Vanderploeg JM, Johnson M, et al. Residency training in preventive medicine: challenges and opportunities. *Am J Prev Med.* 2005;28(4):403-12.

## Appendix C – OMR, Irvine

### Publications by program area of faculty and trainees during the reporting period:

- Aliyu OA, Cullen MR, Barnett MJ, Balmes JR, Cartmel B, Redlich CA, Brodtkin CA, Barnhart S, Rosenstock L, Israel L, Goodman GE, Thornquist MD, Omenn GS. Evidence for excess colorectal cancer incidence among asbestos-exposed men in the Beta-Carotene and Retinol Efficacy Trial. *Am J Epidemiol*. 2005 Nov 1;162(9):868-78. Epub 2005 Sep 21. PMID: 16177148
- Becaria, A., Lahiri, D., Bondy, S.C., Chen, D., Hamadeh, A., Li, H., Taylor, R. and Campbell, A. Independence of inflammatory and oxidative events after exposure to metals in drinking water *J. Neuroimmunology*. 176: 16-23, 2006.
- Buo, X, Oldman, MJ, Kleinman, MT, Phalen, RF, and Kassab, GS. Effect of cigarette smoking on nitric oxide, structural and mechanical properties of mouse arteries. *Am J Physiol Heart Circ Physiol* 2006 (in press)
- Campbell, A., Oldham, M., Bacaria, A., Bondy, S.C., Meacher, D., Sioutas, C., Misra, C., Mendez, L. B., and Kleinman, M. Particulate matter in polluted air may increase biomarkers of inflammation in mouse brain. *Neurotoxicology* 26: 133-140, 2005.
- Davidson, CI, Phalen RF and Solomon, PA Airborne particulate matter and human health review. *Aerosol Sci Technol* 39:737-749, 2005.
- Dwight RH, Fernandez L, Baker DB, Semenza JC, Olson BH. Estimating the Economic Burden from Illnesses Associated with Recreational Coastal Water Pollution – a Case Study in Orange County, California. *Journal of Environmental Management*, 76:95-103, 2005.
- Bondy, S. C. and Campbell, A. Developmental Neurotoxicology. *J. Neurosci. Res*. 81: 605-612, 2005.
- Fedoruk MJ, Bronstein R, Kerger BD. Ammonia exposure and hazard assessment for selected household cleaning product uses. *J Expo Anal Environ Epidemiol*. 2005 Nov;15(6):534-44.
- HaMai, D., Rinderknecht, A. L., Sharman, K. Z., Kleinman, M. T., and Bondy, S. C. decreased expression of genes involved with inflammation following inhalation exposure to Mn. *Neurotoxicology* 26:133-140 2005.
- Hoang YD, Avakian AP, Luderer U. 2006 Minimal Ovarian Upregulation of Glutamate Cysteine Ligase Expression in Response to Suppression of Glutathione by Buthionine Sulfoximine. *Reproductive Toxicology*. 21: 186-196.
- Hobbs, CH, Dorman, DC, Griffin, DE, Harkema, JR, Laobs, BL, Lenz, DE, Morse, SS and Phalen, RF. Overcoming challenges to develop counter measures against aerosolized bioterrorism agents, National Research Council, Washington, DC, 2006.
- Israel L. Book Review: Preventing Occupational Disease and Injury by JL Weeks, BS Levy, and GR Wagner, eds. *JOEM* 2006 June;48(6):650.
- Israel L., Cadmium. In: Olsen, editor. *Poisoning & Drug Overdose*, 5th edition., 2006 McGraw-Hill

- Kleinman, MT and Phalen, RF, Toxicological interactions in the respiratory system after inhalation of ozone and sulfuric acid aerosol mixtures. *Inhal Toxicol* 18:295-303, 2006.
- Lahiri, D. K., Chen, D. M., Lahiri, P., Bondy, S., and Greig, N. H. Amyloid, cholinesterase, melatonin and metals, and their roles in aging and neurodegenerative diseases. *Ann. N. Y. Acad. Sci.* 1035:216-30, 2005.
- Luderer U, Collins TFX, Daston GP, Fisher LJ, Gray RH, Mirer F, Olshan AF, Setzer RW, Treinen KA, Vermeulen R. 2006 NTP-CERHR Expert Panel Report on the Reproductive and Developmental Toxicity of Styrene. *Birth Defects Research Part B.* 77:110-193
- Luderer U, Cullen MR. 2005 Endocrine Disorders. In: L Rosenstock, M Cullen, CA Brodtkin, C Redlich (Eds), *Textbook of Clinical Occupational and Environmental Medicine*. New York: Harcourt Brace Jovanovich, pp 609-617.
- Luderer U, Cullen MR. Mattison DR. 2005 Disorders of Reproduction and Development. In: L Rosenstock, M Cullen, CA Brodtkin, C Redlich (Eds), *Textbook of Clinical Occupational and Environmental Medicine*, New York: Harcourt Brace Jovanovich, pp 618-645.
- Phalen, RF and Hoover, MD, Aerosol dosimetry research needs. *Inhal Toxicol* 18:841-893, 2006.
- Phalen, RF and Oldman, MJ, Aerosol Dosimetry considerations. *Clinics Occup Enir Med* 2006.
- Phalen, Rf, Oldman, MJ and Asotra, K Preface. *Inhal Toxicol* 18: 707 2006.
- Phalen, RF, Oldman, MJ and Nel, AE. Tracheobronchial particle dose considerations for In-vitro toxicology studies. *Tox Sci* 92:126-132, 2006.
- Tsai-Turton M, Luderer U. 2005 Gonadotropin Regulation of Glutamate Cysteine Ligase Catalytic and Modifier Subunit Expression in the Rat Ovary is Subunit and Follicle Stage-Specific. *American Journal of Physiology Endocrinology and Metabolism.* 289:E391-E402.
- Tsai-Turton M, Luderer U. 2006 Opposing Effects of Glutathione Depletion and FSH on Reactive Oxygen Species and Apoptosis in Cultured Preovulatory Rat Follicles. *Endocrinology.* 147:1224-1236.



## **Appendix C**

### **Hazardous Substance Academic Training**

HSAT publications given as part of Industrial Hygiene Program

ERC Applicant Institution: Southern California ERC  
 Program Director: William Hinds  
 Discipline: Industrial Hygiene

**Table 4a**  
**Academic Training Report**  
**Previous Budget Period: July 1, 2005 to June 30, 2006**

Degree Awarded	How Does Degree Read?	# Full-Time Trainees Enrolled <sup>1</sup>	# Full-Time NIOSH-Supported Trainees	# Part-Time Trainees Enrolled	# Part-Time NIOSH-Supported Trainees	# Other Trainees Taking OS&H Courses <sup>2</sup>	# Trainees Graduated
Baccalaureate/associate degree							
Master's degree							
MPH	Master of Public Health	6 (3)	6 (3)	0	0	69	4
MS	Master of Science in Environmental Health Sciences	3 (1)	3 (1)	0	0	"	2
Doctorate degree							
PhD	PhD in Environmental Health Sciences	7	4	0	0		2
Post-doctoral (Include formally registered Occupational Medicine residents in all years of the residency.) <sup>3</sup>							
Other (specify, e.g., undergraduate Certificate program trainees)							

Page

Refer to: Supplemental Instructions, page 8.  
<sup>1</sup> Trainee counts include all students in the approved programs.  
<sup>2</sup> Does not include trainees counted in any of the full-time or part-time categories  
<sup>3</sup> In this case, there may be double counting between the subset of Doctorate degree and Post-doctoral categories.  
 Note: Numbers in parentheses indicate trainees who receive partial support from HSAT Program.

ERC Applicant Institution: Southern California ERC Program Director: William Hinds Discipline: Industrial Hygiene						
<b>Table 13</b> <b>Minority Recruitment Data<sup>1</sup></b> <b>Previous Budget Period: July 1, 2005 to June 30, 2006</b>						
<b>GROUP DATA</b>			<b>INDIVIDUAL DATA</b>			
# of Minorities Applied	# of Minorities Offered Admission	# of Minorities Entered Program	For those who entered program: Identify by sequential #	Current Status (in training, graduated, left the program, etc.)	Sources of Support	Subsequent Career Development/ Employment
38*	12*	6*				
			01 Asian	in-training	ERC	n/a
			02 Asian	graduated	ERC, work	IH insurance company
			03 Asian	graduated	ERC	IH CalOSHA
			04 Asian	graduated	ERC, work	IH doctoral
			05 Hispanic or	graduated	ERC, work	Epidemiology doctoral

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Refer to: Supplemental Instructions, page 11.

<sup>1</sup> First three columns are a group total; last four columns refer to individual trainees.

\* Numbers apply to entire EHS Department. Not available broken down by program.

ERC Applicant Institution: Southern California ERC Program Director: Wendie Robbins Discipline: Occupational and Environmental Health Nursing (OEHN)							
<b>Table 4a</b> <b>Academic Training Report</b> <b>Previous Budget Period: July 1, 2005 to June 30, 2006</b>							
Degree Awarded	How Does Degree Read?	# Full-Time Trainees Enrolled <sup>1</sup>	# Full-Time NIOSH-Supported Trainees	# Part-Time Trainees Enrolled	# Part-Time NIOSH-Supported Trainees	# Other Trainees Taking OS&H Courses <sup>2</sup>	# Trainees Graduated
Baccalaureate/associate degree							
Master's degree							
	6 MSN OEHN Specialty	12	12	0	0	17	6
Doctorate degree							
Post-doctoral (Include formally registered Occupational Medicine residents in all years of the residency.) <sup>3</sup>							
Other (specify, e.g., undergraduate Certificate program trainees)							

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Refer to: Supplemental Instructions, page 8.

<sup>1</sup> Trainee counts include all students in the approved programs.

<sup>2</sup> Does not include trainees counted in any of the full-time or part-time categories

<sup>3</sup> In this case, there may be double counting between Doctorate degree and Post-doctoral categories.

ERC Applicant Institution: Southern California ERC Program Director: Wendie Robbins Discipline: OEH Nursing						
<b>Table 13</b> <b>Minority Recruitment Data<sup>1</sup></b> <b>Previous Budget Period: July 1, 2005 to June 30, 2006</b>						
GROUP DATA			INDIVIDUAL DATA			
# of Minorities Applied	# of Minorities Offered Admission	# of Minorities Entered Program	For those who entered program: Identify by sequential #	Current Status (in training, graduated, left the program, etc.)	Sources of Support	Subsequent Career Development/ Employment
11	11	10	1	in training	NIOSH	
			2	in training	NIOSH	
			3	in training	NIOSH	
			4	in training	NIOSH	
			5	left OEH specialty		
			6	graduated	NIOSH	
			7	in training	NIOSH	
			8	graduated		Program Director, Worker Health Grant UCLA
			9	graduated		ANP Northrup
			10	graduated		ANP FP Clinic
			11	left UCLA		Self-employed Home Health Care

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Refer to: Supplemental Instructions, page 11.  
<sup>1</sup> First three columns are a group total; last four columns refer to individual trainees.

ERC Applicant Institution: Southern California ERC Program Director: Philip Harber, MD, MPH Discipline: Occupational Medicine - UCLA							
<b>Table 4a</b> <b>Academic Training Report</b> <b>Previous Budget Period: July 1, 2005 to June 30, 2006</b>							
Degree Awarded	How Does Degree Read?	# Full-Time Trainees Enrolled <sup>1</sup>	# Full-Time NIOSH-Supported Trainees	# Part-Time Trainees Enrolled	# Part-Time NIOSH-Supported Trainees	# Other Trainees Taking OS&H Courses <sup>2</sup>	# Trainees Graduated
Baccalaureate/associate degree							
Master's degree							
	Masters of Public Health	3	2	1		20	3
Doctorate degree							
Post-doctoral (Include formally registered Occupational Medicine residents in all years of the residency.) <sup>3</sup>							
		5	3	1		20	3
Other (specify, e.g., undergraduate Certificate program trainees)							

Page

Refer to: Supplemental Instructions, page 8.

<sup>1</sup> Trainee counts include all students in the approved programs.

<sup>2</sup> Does not include trainees counted in any of the full-time or part-time categories

<sup>3</sup> In this case, there may be double counting between Doctorate degree and Post-doctoral categories.

ERC Applicant Institution: Southern California ERC						
Program Director: Philip Harber, MD, MPH						
Discipline: Occupational Medicine - UCLA						
<b>Table 13</b>						
<b>Minority Recruitment Data<sup>1</sup></b>						
<b>Previous Budget Period: July 1, 2005 to June 30, 2006</b>						
<b>GROUP DATA</b>			<b>INDIVIDUAL DATA</b>			
<b># of Minorities Applied</b>	<b># of Minorities Offered Admission</b>	<b># of Minorities Entered Program</b>	<b>For those who entered program: Identify by sequential #</b>	<b>Current Status (in training, graduated, left the program, etc.)</b>	<b>Sources of Support</b>	<b>Subsequent Career Development/ Employment</b>
Unknown	0	0	0	n/a	n/a	n/a

Refer to: Supplemental Instructions, page 11.  
<sup>1</sup> First three columns are a group total; last four columns refer to individual trainees.

ERC Applicant Institution: Southern California ERC  
 Program Director: Dean Baker, MD, MPH  
 Discipline: Occupational Medicine - UC Irvine

**Table 4a**  
**Academic Training Report**  
**Previous Budget Period: July 1, 2005 to June 30, 2006**

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<b>Degree Awarded</b>	<b>How Does Degree Read?</b>	<b># Full-Time Trainees Enrolled<sup>1</sup></b>	<b># Full-Time NIOSH-Supported Trainees</b>	<b># Part-Time Trainees Enrolled</b>	<b># Part-Time NIOSH-Supported Trainees</b>	<b># Other Trainees Taking OS&amp;H Courses<sup>2</sup></b>	<b># Trainees Graduated</b>
<b>Baccalaureate/associate degree</b>							
<b>Master's degree</b>							
Master of Science	Environ. Health Science & Policy	1	1	0	0		0
Master of Science	Environmental Toxicology (occup. med. residents)	4	3				2
<b>Doctorate degree</b>							
<b>Post-doctoral (Include formally registered Occupational Medicine residents in all years of the residency.)<sup>3</sup></b>							
	Occupational Medicine Residency	6	5	0	0		3
<b>Other (specify, e.g., undergraduate Certificate program trainees)</b>							

Refer to: Supplemental Instructions, page 8.

<sup>1</sup> Trainee counts include all students in the approved programs.

<sup>2</sup> Does not include trainees counted in any of the full-time or part-time categories

<sup>3</sup> In this case, there may be double counting between Doctorate degree and Post-doctoral categories.



ERC Applicant Institution: Southern California ERC  
 Program Director: Dean Baker, MD, MPH  
 Discipline: Occupational Medicine - UC Irvine

**Table 13**  
**Minority Recruitment Data<sup>1</sup>**  
**Previous Budget Period: July 1, 2005 to June 30, 2006**

GROUP DATA			INDIVIDUAL DATA			
# of Minorities Applied	# of Minorities Offered Admission	# of Minorities Entered Program	For those who entered program: Identify by sequential #	Current Status (in training, graduated, left the program, etc.)	Sources of Support	Subsequent Career Development/ Employment
8	3	3	91985736	in training	NIOSH	N/A
			91498983	in training	NIOSH	N/A
				in training	NIOSH	N/A

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Refer to: Supplemental Instructions, page 11.  
<sup>1</sup> First three columns are a group total; last four columns refer to individual trainees.

ERC Applicant Institution: Southern California ERC  
 Program Director: William Hinds  
 Discipline: HSAT

**Table 4a**  
**Academic Training Report**  
**Previous Budget Period: July 1, 2005 to June 30, 2006**

Degree Awarded	How Does Degree Read?	# Full-Time Trainees Enrolled <sup>1</sup>	# Full-Time NIOSH-Supported Trainees	# Part-Time Trainees Enrolled	# Part-Time NIOSH-Supported Trainees	# Other Trainees Taking OS&H Courses <sup>2</sup>	# Trainees Graduated
Baccalaureate/associate degree							
Master's degree							
MPH	Master of Public Health	3	3	0	0		2
MS	Master of Science in Environmental Health Sciences	1	1	0	0		1
Doctorate degree							
PhD	PhD in Environmental Health Sciences	0	0	0	0		0
Post-doctoral (Include formally registered Occupational Medicine residents in all years of the residency.) <sup>3</sup>							
Other (specify, e.g., undergraduate Certificate program trainees)							

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Refer to: Supplemental Instructions, page 8.  
<sup>1</sup> Trainee counts include all students in the approved programs.  
<sup>2</sup> Does not include trainees counted in any of the full-time or part-time categories  
<sup>3</sup> In this case, there may be double counting between Doctorate degree and Post-doctoral categories.  
 Note: Numbers indicate trainees who receive partial support from HSAT Program.

ERC Applicant Institution: Southern California ERC Program Director: William Hinds Discipline: HSAT						
<b>Table 13</b> <b>Minority Recruitment Data<sup>1</sup></b> <b>Previous Budget Period: July 1, 2005 to June 30, 2006</b>						
GROUP DATA			INDIVIDUAL DATA			
# of Minorities Applied	# of Minorities Offered Admission	# of Minorities Entered Program	For those who entered program: Identify by sequential #	Current Status (in training, graduated, left the program, etc.)	Sources of Support	Subsequent Career Development/ Employment
38*	12*	6*				
			03 Asian	graduated	ERC	IH CalOSHA

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Refer to: Supplemental Instructions, page 11.  
<sup>1</sup> First three columns are a group total; last four columns refer to individual trainees.  
 \* Numbers apply to entire EHS Department. Not available broken down by program.

ERC Applicant Institution: Southern California ERC  
 Program Director: Cass Ben-Levi

**Table 12a**  
**CE Course Offerings by Program Area**  
**Previous Budget Period: July 1, 2005 to June 30, 2006**

**Program Area: Industrial Hygiene**

Course/Seminar Title <sup>1</sup>	Program Area	Total Trainees	Length of Course	Total Pers Days	# Trainees by Profession					# Trainees by Employer						
					MD	NURS	HYG	SAFETY	OTHER	Private Industry	Fed Gov	State Gov	Local Gov	Foreign Country	Acad emic	Other
Comprehensive Industrial Hygiene Review	IH	21	5	105	1	0	11	5	4	14	4	0	1	1	1	0
Ergonomics Conference	IH	67	2	132	6	1	14	12	34	29	1	5	4	0	15	13
Ergonomic Job Analysis 2/06	IH	25	2	50	0	1	5	10	9	12	1	7	0	1	3	1
Ethics for Health and Safety Professionals	IH	6	1	6	0	1	4	1	0	4	0	0	1	0	0	1
Indoor Air Quality 2/06	IH	27	1	27	0	1	11	13	2	11	2	4	4	0	6	0
Occupational Ergonomics 2/06	IH	31	3	93	1	1	4	11	14	19	1	5	2	1	3	0
Sampling & Instrumentation	IH	14	1	14	0	0	10	4	0	6	0	2	1	0	5	0
<b>Subtotal [Program]</b>	<b>[e.g. IH]</b>	<b>191</b>	<b>15</b>	<b>427</b>	<b>8</b>	<b>5</b>	<b>59</b>	<b>56</b>	<b>63</b>	<b>95</b>	<b>9</b>	<b>23</b>	<b>13</b>	<b>3</b>	<b>33</b>	<b>15</b>

Refer to: Supplemental Instructions, page 10.

<sup>1</sup> Group together by Program Area and provide sub-totals for each Program Area in Table 12b. Add or delete rows as necessary.

Program Area: Occupational Health Nursing																
Course/Seminar Title <sup>1</sup>	Program Area	Total Trainees	Length of Course	Total Pers Days	# Trainees by Profession					# Trainees by Employer						
					MD	NURS	HYG	SAFETY	OTHER	Private Industry	Fed Gov	State Gov	Local Gov	Foreign Country	Academic	Other
Occ. Health Nursing Review 07/05	OHN	36	3	108	0	36	0	0	0	11	3	1	2	0	3	0
PFT 07/15-16/05	OHN	11	2	22	0	0	0	0	11	0	0	0	0	0	0	11
Workers Comp Review 07/05	OHN	20	2	40	0	20	0	0	0	12	5	3	0	0	0	0
Hearing Conservation 9/05	OHN	12	2.5	30	0	2	0	0	10	11	0	0	0	0	1	0
PFT 09/05 Refresher	OHN	1	1	1	0	1	0	0	0	1	0	0	0	0	0	0
PFT 09/05	OHN	12	2	24	0	2	0	0	10	11	0	0	0	0	1	0
PFT 10/05	OHN	17	2	34	0	0	0	0	17	0	0	0	0	0	0	17
Hearing Conservation 10/05	OHN	19	2.5	47.5	0	0	0	0	19	0	0	0	0	0	0	19
PFT 1/06	OHN	6	2	12	0	0	0	0	6	0	0	0	0	0	0	6
Hearing Conservation 1/06	OHN	8	2.5	20	0	0	0	0	8	0	0	0	0	0	0	8
Hearing Conservation Recertification 9/05	OHN	4	1	4	0	1	0	0	3	4	0	0	0	0	0	0
Hearing Conservation Recertification 3/06	OHN	2	1	2	0	2	0	0	0	2	0	0	0	0	0	0
Hearing Conservation 3/06	OHN	11	1	27.5	0	9	0	0	2	10	0	0	1	0	0	0
Occ. Health Nursing Review 03/06	OHN	16	3	48	0	16	0	0	0	12	4	0	0	0	0	0
PFT 03/06 Refresher	OHN	5	1	5	0	2	0	0	3	5	0	0	0	0	0	0
PFT 03/06	OHN	12	2	24	0	4	0	0	8	10	0	0	0	0	0	2
Workers Comp Review 03/06	OHN	9	2	18	0	9	0	0	0	8	0	0	0	0	1	0
<b>Subtotal (Program)</b>	<b>[e.g., JH]</b>	<b>201</b>	<b>33</b>	<b>467</b>	<b>0</b>	<b>104</b>	<b>0</b>	<b>0</b>	<b>97</b>	<b>97</b>	<b>12</b>	<b>4</b>	<b>3</b>	<b>0</b>	<b>6</b>	<b>63</b>

Program Area: Occupational Medicine

Course/Seminar Title <sup>1</sup>	Program Area	Total Trainees	Length of Course	Total Pers Days	# Trainees by Profession					# Trainees by Employer						
					MD	NURS	HYG	SAFETY	OTHER	Private Industry	Fed Gov	State Gov	Local Gov	Foreign Country	Academic	Other
UCI Grand Rounds 7/05	Occ Med	17	0.25	4.3	17	0	0	0	0	0	0	0	0	0	17	0
UCI Grand Rounds 8/05	Occ Med	21	0.25	5.3	21	0	0	0	0	0	0	0	0	0	21	0
UCI Grand Rounds 9/05	Occ Med	13	0.25	3.3	13	0	0	0	0	0	0	0	0	0	13	0
UCI Grand Rounds 10/05	Occ Med	17	0.25	4.3	17	0	0	0	0	0	0	0	0	0	17	0
UCI Grand Rounds 11/22/05	Occ Med	18	0.25	4.5	18	0	0	0	0	0	0	0	0	0	18	0
UCLA Occ Med Series 1/1/06	Occ Med	18	0.25	4.5	10	1	6	0	1	0	0	0	0	0	18	0
UCLA Occ Med Series 1/17/06	Occ Med	18	0.25	4.5	10	1	6	0	1	0	0	0	0	0	18	0
UCI Grand Rounds 1/24/06	Occ Med	15	0.25	3.8	15	0	0	0	0	0	0	0	0	0	15	0
UCLA Occ Med Series 1/24/06	Occ Med	18	0.25	4.5	10	1	6	0	1	0	0	0	0	0	18	0
UCLA Occ Med Series 1/31/06	Occ Med	18	0.25	4.5	10	1	6	0	1	0	0	0	0	0	18	0
UCLA Occ Med Series 2/6/06	Occ Med	18	0.25	4.5	10	1	6	0	1	0	0	0	0	0	18	0
UCLA Occ Med Series 2/14/06	Occ Med	18	0.25	4.5	10	1	6	0	1	0	0	0	0	0	18	0
UCLA Occ Med Series 2/21/06	Occ Med	18	0.25	4.5	10	1	6	0	1	0	0	0	0	0	18	0
UCLA Occ Med Series 2/28/06	Occ Med	18	0.25	4.5	10	1	6	0	1	0	0	0	0	0	18	0
UCI Grand Rounds 2/06	Occ Med	11	0.25	2.8	11	0	0	0	0	0	0	0	0	0	11	0
UCLA Occ Med Series 3/7/06	Occ Med	18	0.25	4.5	10	1	6	0	1	0	0	0	0	0	18	0
UCLA Occ Med Series 3/11/06	Occ Med	18	0.25	4.5	10	1	6	0	1	0	0	0	0	0	18	0
UCLA Occ Med Series 4/4/06	Occ Med	18	0.25	4.5	10	1	6	0	1	0	0	0	0	0	18	0
UCLA Occ Med Series 4/11/06	Occ Med	18	0.25	4.5	10	1	6	0	1	0	0	0	0	0	18	0
UCLA Occ Med Series 4/18/06	Occ Med	18	0.25	4.5	10	1	6	0	1	0	0	0	0	0	18	0
UCLA Occ Med Series 4/25/06	Occ Med	18	0.25	4.5	10	1	6	0	1	0	0	0	0	0	18	0
UCLA Occ Med Series 5/2/06	Occ Med	18	0.25	4.5	10	1	6	0	1	0	0	0	0	0	18	0
UCLA Occ Med Series 5/30/06	Occ Med	18	0.25	4.5	10	1	6	0	1	0	0	0	0	0	18	0
UCI Grand Rounds 3/06	Occ Med	15	0.25	3.8	15	0	0	0	0	0	0	0	0	0	15	0
UCI Grand Rounds 4/06	Occ Med	19	0.25	4.8	19	0	0	0	0	0	0	0	0	0	19	0
UCI Grand Rounds 5/06	Occ Med	18	0.25	4.5	18	0	0	0	0	0	0	0	0	0	18	0
UCI Grand Rounds 6/06	Occ Med	17	0.25	4.3	17	0	0	0	0	0	0	0	0	0	17	0
<b>Subtotal (Program)</b>	<b>(Total)</b>	<b>489</b>	<b>7</b>	<b>117</b>	<b>343</b>	<b>16</b>	<b>96</b>	<b>0</b>	<b>16</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>470</b>	<b>0</b>

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**Program Area: Occupational Safety**

Course/Seminar Title <sup>1</sup>	Program Area	Total Trainees	Length of Course	Total Pers Days	# Trainees by Profession					# Trainees by Employer						
					MD	NURS	HYG	SAFETY	OTHER	Private Industry	Fed Gov	State Gov	Local Gov	Foreign Country	Academic	Other
OSHA 501 5/06	OS	17	4	68	0	0	1	11	5	13	3	1	0	0	0	0
OSHA 510 5/06	OS	30	4	120	0	0	0	17	13	24	1	0	4	0	1	0
OSHA 511 02/06	OS	21	4	84	0	0	1	12	8	15	3	0	3	0	0	0
Red Cross Workplace Safety 1/06	OS	6	1	6	0	1	0	0	5	1	0	0	1	0	4	0
CET Board Exam 1/06	OS	1	0.5	1	0	0	0	1	0	1	0	0	0	0	0	0
CET Board Exam 5/06	OS	1	0.5	1	0	0	0	1	0	1	0	0	0	0	0	0
<b>Subtotal (Program)</b>	<b>(e.g., IH)</b>	<b>76</b>	<b>14</b>	<b>280</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>42</b>	<b>31</b>	<b>55</b>	<b>7</b>	<b>1</b>	<b>8</b>	<b>0</b>	<b>5</b>	<b>0</b>

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Table 12a

Program Area: Other

Course/Seminar Title <sup>1</sup>	Program Area	Total Trainees	Length of Course	Total Pers Days	# Trainees by Profession					# Trainees by Employer						
					MD	NURS	HYG	SAFETY	OTHER	Private Industry	Fed Gov	State Gov	Local Gov	Foreign Country	Academic	Other
					Orientation to Environmental Assessment 9/05	Other	16	5	80	0	0	0	0	16	0	0
Orientation to Environmental Assessment 3/06	Other	24	3	72	0	0	0	0	24	0	0	0	24	0	0	0
Nora Town Hall Meeting	Other	66	1	66	1	0	8	3	54	22	3	6	4	0	18	13
<b>Subtotal [Program]</b>	[e.g., IH]	106	9	218	1	0	8	3	94	22	3	6	44	0	18	13

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ERC Applicant Institution: Southern California ERC  
 Program Director: Cass Ben-Levi

**Table 12b**  
**Summary of CE Course Offerings by Program Area**  
**Previous Budget Period: July 1, 2005 to June 30, 2006**

Course/Seminar Title	Program Area	Total Trainees	Total # of Courses	Total Pers Days	# Trainees by Profession					# Trainees by Employer						
					MD	NURS	HYG	SAFETY	OTHER	Private Industry	Fed Gov	State Gov	Local Gov	Foreign Country	Acad emic	Other
Subtotal IH	IH	191	7	427	8	5	59	56	63	95	9	23	13	3	33	15
Subtotal OHN	OHN	201	17	467	0	104	0	0	97	97	12	4	3	0	6	63
Subtotal OMR	OM	469	27	117	341	16	96	0	16	0	0	0	0	0	470	0
Subtotal OS	OS	76	6	280	0	1	2	42	31	55	7	1	8	0	5	0
Subtotal HST	HST	120	10	179	0	0	27	42	35	48	3	20	13	0	18	19
Subtotal Ag S&H	Ag S&H	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal Other Category	OT	106	3	218	1	0	8	3	94	22	3	6	44	0	18	13
<b>GRAND TOTALS (All Program Areas)</b>		<b>1,163</b>	<b>70</b>	<b>1,688</b>	<b>350</b>	<b>126</b>	<b>192</b>	<b>143</b>	<b>336</b>	<b>317</b>	<b>34</b>	<b>54</b>	<b>81</b>	<b>3</b>	<b>550</b>	<b>110</b>