Southern California Education and Research Center

CDC/NIOSH Grant Number T42/OH008412

Final Progress Report

Reporting period July 2004 to June 30, 2009

Programs:
Center Administration
Industrial Hygiene Program
Occupational Health Nursing Program
Occupational Medicine Program (UCI)
Occupational Medicine Program (UCLA)
Pilot Project Research Training Program
NORA Research Training
Hazardous Substance Academic Training
Hazardous Substance Training
Continuing Education/Outreach

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ABSTRACT

The Region IX NIOSH ERC for Southern California has been composed of four core academic programs, five correlated programs, and Center Administration. The core programs are one each in industrial hygiene (IH) and occupational health nursing (OEHN) and two in occupational medicine (OM) (UCLA) and OM (UCI). The correlated programs are Continuing Education and Outreach (CE/O), Hazardous Substances Training (HST), Hazardous Substances Academic Training Program (HSAT), Pilot Project Research Training Program (PPRT), and NORA Research Support Program (NORA/RS). All ten of these programs (the four academic programs, the five correlated programs, and Center Administration) are included in this Final Progress Report.

Dr. William Hinds, Center Director since taking over from Dr. John Peters on July 1, 2000 (incorrect 2, retired effective June 30, 2009. A national search for Dr. Hinds permanent successor began early in 2009. Until the position is filled, Dr. John Froines will serve as Interim Center Director through the successful completion of the recruitment effort.

The IH, OEHN, and OM (UCI) programs continue as well-established programs with stable student enrollment and core faculty. A new ERC Center website http://www.ph.ucla.edu/erc/. established in the previous cycle has been enhanced to include: 1) linkages to websites of our home department Environmental Health Sciences within the School of Public Health, and the school itself; 2) on-line enrollment for Continuing Education courses.

The complexion of the field of occupational health and safety is continually changing with the growing recognition of new occupational health and safety problems, such as ergonomics, repetitive trauma, homeland security and disaster response, and the expansion of occupational health and safety to include more environmental issues. We have continued the curriculum modifications implemented during the prior five-year reporting period (i.e., introduction of more than 14 new or modified courses in our core academic programs). The impact of psychosocial stressors in the work environment that leads to cardiovascular disease, hypertension, musculoskeletal disorders and psychological problems are of increasing concern. Thus the ERC-wide offerings of courses, field practicum, and research in the area of psychosocial stresses in the workplace continue to engage our students.

Through these efforts the Southern California ERC continues to fulfill its mission of protecting and improving worker health through education, research, and service.

Center Administration

2004-2009 Center Director: William Hinds

after 7/1/09
Interim Center Director: John Froines

A. Center Administration
(Administration and Planning)

The Region IX NIOSH ERC for Southern California SCERC is currently of three academic programs: one each in occupational medicine (OM), industrial hygiene (IH), and Occupational and environmental health nursing (OEHN). The occupational medicine program is located at University of California Irvine (UCI); all other programs are at University of California, Los Angeles (UCLA). The occupational medicine program at UCLA is being phased out. Other programs are a Continuing Education program (CE), an Outreach (OR) program, Center Administration (CA), a Hazardous Substances Academic Training program (HSAT), (add HST) a Pilot Project Research Training program (PPRT) and NORA Research Support Program. Center administration is located at UCLA in the Department of Environmental Health Science in the School of Public Health. The UC Irvine campus is about 60 miles south of UCLA.

The educational programs that have been offered, their directors and the degrees offered are:

Institution	Program	Program Director	Degree(s) Offered
UCLA/UCI	Administration and planning	Dr. William Hinds Dr. John Froines (eff. 7/1/09) -	2004-2009
UCLA	Industrial Hygiene (Hinds succeeded by :	Dr. Shane Que Hee	MPH/MS/PhD
UCLA	Occupational and Env. Health Nursing	Dr. Wendie Robbins	MSN
UCI	Occupational Medicine	Dr. Dean Baker	MPH/MS/certificate
UCLA	Occupational Medicine (phase out)	Dr. Philip Harber	MPH/certificate
UCLA (Insert HST)	Hazardous Substance Academic Training	Dr. Nola Kennedy	MPH/MS/PhD
UCLA	Continuing Education/Outreach	Ms. Cass Ben-Levi	-
UCLA	Pilot Project Research Training	Dr. William Hinds Dr. John Froines (eff. 7/1/09) -	2004-2009
UCI	NORA Research Training Program	Dr. Dean Baker	-

1. Coordination and Integration of ERC Programs

Currently the Southern California ERC is directed by Dr. William Hinds of UCLA. The Associate Director is Dr. Dean Baker of UC Irvine and the ERC Administrator is DT Evans. Dr. Hinds retired effective July 1, 2009. A search is underway for a FTE faculty member to replace Dr. Hinds. Effective July 1, 2009, Dr. John Froines serves as ERC Director until the position is filled. . Dr Hinds will continue his involvement with the ERC as a part-time faculty member. He will serve in an advisory capacity to the new Director and conduct teaching and research. Six people constitute our executive committee. They are the six Directors of the ongoing programs listed above. The executive committee meets regularly. General problems and issues that affect all programs are considered at each meeting. Interdisciplinary activities are planned. Members of the external advisory committee are consulted or invited to the executive committee meetings as needed. The pilot project program is discussed at nearly every meeting. Outreach activities are discussed and planned rather than left to individual initiative. Community views have been sought to guide the ERC toward new or improved educational programs for both professional training and continuing education.

2. Assessment of Productivity and Need

The primary productivity assessment is the number of graduates and the number of publications for each academic program. For CE/O it is the number of courses offered and the number of attendees. Information for these metrics is given in the program plan and progress report for each program.

A comprehensive needs assessment survey of occupational health professionals in Region IX was conducted by the Southern California ERC in the winter of 2008. The survey used the Zoomerang web site to conduct the assessment. There were 412 valid responses, 75 were industrial hygienists, 29 were occupational health nurses, 110 were occupational medicine doctors, and 198 were occupational safety specialists. Three subject areas, "oral communications", "written communications", and "professional ethics," were ranked in the top 10 for each of the four disciplines with more than 77% saying they were important or very important (score of 4 or 5 out of 5). IH, Safety, and OHN felt "standards and guidelines" and "laws and regulations" were important with more than 86% finding these areas important or very important. We have increased coverage in these areas over the past five years and they are now well covered in our programs.

3. Strategic Planning

The Southern California ERC undertook the following strategic planning process starting in 2008, a collaborative effort with internal and external input following the steps given below.

1. We used our Mission and Vision statement, given below, as a starting point for the development of focus areas for our strategic plan.
2. We combined input from Southern California ERC Program Directors with external input from our needs assessment survey to produce a straw man draft, which was circulated to all Program Directors for comment and input.
3. We prepared a final document, which was circulated it to all Program Directors for further discussion and adoption.

Southern California ERC Mission and Vision Statement, adopted March 2004

Core Values: The Southern California ERC has as its core values a commitment to worker health and safety, scientific integrity, and excellence in teaching.

Core Purpose and Mission: The mission of the Southern California ERC is to protect the health of workers through education, research, and service 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.

Vision: The vision of the Southern California ERC is to be recognized as a leader in education and research in occupational and environmental health.

SCERC Advisory Committee:

During the last five years, our Advisory Committee aptly bolstered our strategic plan, ensuring that we:

A. provided quality professional training at the masters level and research training at the Ph.D. level

B. modified our individual academic programs to reflect changes in the field of occupational health and safety.

C. Offered Continuing Education and Outreach Programs that:

1. enabled occupational safety and helath professionals to reliably maintain their credentials
2. responded to needs assessment data by creating new courses
3. obtained major grants that expanded the OH&S knowledge bases of supervisors, health and safety committees and workers (Refer to page 59 of CE/O section of this document)

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We hselected a distinguished and experienced set of advisors to assist us on a continuing basis. The committee consists of ten members representing each of the core disciplines of our ERC plus labor and continuing education. The advisory committee members are:

Name	Committee Status	Discipline	Organization
Mary Kochie, RN	Chair	Occ. Health Nursing	CalOSHA
Glenn Azevedo, MS, CSP	Member	Ergonomics, Safety	Steelcase, Inc.
Thomas S. Butler, Jr., CSP, CHMM	Member	Safety	Water District
Linda Delp, MPH, PhD	Member	Labor, Worker Trng	UCLA LOSH
Marjorie Drucker, MS, CIH, CSP	Member	Industrial Hygiene	Consulting Co.
Annette Haag, MS, RN, COHN	Member	Occ. Health Nursing	Consultant
Paul Papanek, MD, MPH	Member	Occup. Med.	KaiserPermanente
Mary Gene Ryan, MPH, COHN-S	Member	Continuing Education	MCRyan & Co.
Howard Spielman, CIH, CSP, PE, REHS	Member	IH/Safety	Health Sci. Assoc
Pamela, Hymel, MD	Member	Occup. Med.	Cisco Systems
Richard M. Warner, MS, CIH, CSP	Member	CE/Ind. Hyg/ Safety	Consultant
Leslie Simon	Member	Labor	Attorney

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 has been chair for the five years and rotated off as Chair in 2008, but will continue as a member. At that time Mary Kochie took over as Chair of the committee. The committee is convened at least once a year.

5. Records

Records of meetings are maintained by the ERC Administrator, DT Evans.

6. Interactions with Stakeholders

The SCERC through its program Directors and Faculty interact directly with stakeholders such as UCLA Labor Occupational Safety and Health (LOSH), Center for Occupational and Environmental Health (COEH), California Wellness Foundation, CalOSHA, the School of Public Health. We interact with the Northern California ERC by Direct communication between Directors and through our CE/O programs. We interact with NIOSH OEP staff by email and telephone.

PROGRESS/ACCOMPLISHMENTS REPORT

Response to previous program evaluation.

The most recent summary statement was issued by the Special Emphasis Panel on February 22-24, 2004. The report identifies Center Administration as a "one of the many strengths of the Center."

Among the concerns raised was the lack of a clear role for the Deputy Director. For ERC-wide research programs, PPRT (now known as PSPP) and TRT, the Director and Deputy Director share responsibility with the Deputy Director taking the lead for TRT and the Director taking the lead for PPRT. The Deputy Director and the Director alternate representation at AUPOHS meetings. The Deputy Director provides a 10% effort for these activities. In our Center Administration budget we have budgeted 3% salary for the Deputy Director for administration and 2% salary for TRT and PSPP .

In response to recommendations in the report we expanded our External Advisory Committee by adding three new members in the area of occupational medicine: Leslie Simon, Labor expert, Paul Papanek, MD, MPH, Kaiser Permanente and Pamela Hymel, MD, Cisco Systems. The charge to the committee continues to be to review the educational programs and activities of the Center and advise on modifications that enhance the Center's ability to achieve its goals and objectives. Other than their advisory capacity, none of the current advisory committee members have any other direct affiliation with the ERC.

As described in the CE/O section , our CE program is considerably stronger than it was five years ago. This is due to the new CE/O Program Director, Ms Cass Ben-Levi, who has increased the number of courses, the range of courses, independent funding through grants and contracts, and staff. She has also put the CE/O program on a secure financial footing. Also she has put on courses jointly with the CE program at UC Irvine and the Northern California ERC.

Accomplishments

We have increased the number of doctoral students in the IH program from six to eight and increased the number of ERC supported doctoral students from zero to five. We are developing a doctoral program in the OEHN and OM-UCI programs and expect to submit proposals for such programs in one to two years.

Our Director of CE/O, Cass Ben-Levi, started on October 1, 2004. She replaced Claudia Molina and has greatly improved the number and quality of courses. Details of her accomplishments are given in the section on for CE/O.

DT Evans took over as Center Administrator on July 1, 2005 replacing Rachel Kim who had served in that role for five years. .

We have continued to organize our annual ERC interdisciplinary plant visit and workshop. Trainees tour an industrial facility and use it as a case study to understand the role of the different OH disciplines. For the 2004-08 period plant visits were held at US Borax - Wilmington Operations facility in the Port of Los Angeles on May 11, 2005; Trojan Battery Company on May 11, 2006; Northrop Grumman Company on May 10, 2007; the MTA Central Repair and Maintenance Facility on May 30, 2008; and Exide Technologies, May 29, 2009. This continues to be a popular activity with students.

We continue to organize the annual interdisciplinary dinner meeting at the UCLA faculty Center with an outside speaker. During the reporting period featured speakers at these functions were:

Dr. John Howard the Director of NIOSH; Dr. Joe LaDou International OH consultant; Dr. Anthony Robbins, Professor in the Department of Public Health and Family Medicine, Tufts University and former Director of NIOSH; and Professor Tee Guidotti, chair of the Department of Environmental and Occupational Health at George Washington University Medical Center.

Center Administration continues to foster the development of the ERC-wide initiative on psychosocial stress in the work environment. The program includes :. (1) The development of educational materials and presenting three lectures on this topic in the required curriculum of the IH, OEHN, and OM programs;and (2) Giving an elective course for ERC students (Work and Health -CHS 278), an introductory course of the psychosocial aspects of the work environment.

We submitted all financial and progress reports on time for 2004-08, except for the FSR report, which was delayed twice by administrative problems outside of our control.

Either the Center Director or the Deputy Center Director has attended all NIOSH Center Director meetings and all AUPOHS meetings and all conference calls.

Center Administration has organized and conducted at least one meeting of the External Advisory Committee each year. Center Administration has organized and conducted all Executive Committee meetings. This usually includes two or three physical meetings and one or two conference calls each year.

Diversity Recruitment Plan

All academic programs in our ERC have been very successful in recruiting very diverse student populations. We currently recruit largely from Southern California, an area of great population diversity.

In the four years since our last competing renewal our academic programs have recruited 86 new students. The race and ethnicity of this group breaks down as follows: Asian-Americans 25, African Americans 5, Hispanic 9, Hawaii and Pacific Island 2, White 36, and 9 foreign student. The gender distribution in this group is 55% females and 45% males. As shown in Table 1, the race/ethnic distribution of ERC trainees during the past four years demonstrates our programs' success in attracting and admitting a highly diverse pool of well qualified trainees. Because of these successes our diversity recruiting plan is to continuing our recruiting activities. These activities include, faculty and student visits and presentations at other universities.

Table 1. Race and Ethnicity Profile of Students Enrolled in ERC Academic Programs 7/1/04 to 6/30/09

Program	All	Foreign	Minority	Asian	African-Am	Hispanic	Pac Island	White	Male	Female
IH + HSAT	32	4	16	10	2	4	0	12	14	18
OEHN	39	0	20	12	3	4	1	19	6	33
OMR-UCI	17	0	11	4	2	4	1	6	10	7
OMR-UCLA	12	5	3	2	1	0	0	4	10	2
Total	100	9	50	28	8	12	2	41	40	60

Specific diversity recruitment plans differ by academic program and are given below for each of the core academic programs.

Industrial Hygiene and HSAT programs

We plan to continue recruiting from feeder schools in Southern California, including UCLA, Cal State System, and UC Irvine. All have diverse student bodies. Other activities include, (1) IH students undertaking recruiting trips to nearby universities to meet with science clubs or other similar organizations. As an example, two IH masters students went to UC Irvine and made a presentation at a career development seminar in the Chemistry Department and met with undergraduates during Spring Quarter 2008. (2) The UCLA School of Public Health has created a new position, Assistant Dean for Students Affairs, to improve recruiting, including diversity recruiting. Dave Clark the new Assistant Dean has increased the Schools outreach activities five fold over the course of the Fall 2009 recruiting season with a goal to increase the number of qualified applications by 50% within the first year and ensure that those applications reflect the diversity of the applicant pool. Plans are to strategically target historically underrepresented groups to insure they possess the knowledge and skills needed to successfully apply to the School of Public Health. The majority of the new recruiting calendar includes site visits to colleges and universities that are Hispanic serving institutions, historically African American institution of higher education, or schools with extremely diverse undergraduate populations. (3) We have opened certain courses, such as EHS 252D and EHS 257, to undergraduates majoring in environmental science in the Institute of the Environment. IH faculty members have participated in the LEADS program to provide Latino undergraduates summer internship in our research laboratories. These activities are conducted in part to recruit well-qualified students to the IH Program.

Occupational and Environmental Health Nursing
The School supports a full time staff recruitment specialist, Ms. Rhonda Flenoy, an African-American, in the Student Affairs office. She conducts general recruitment activities for all academic programs, including the OEHN program that includes over 100 presentations annually at Southern California venues. She also participates in an annual 2-week recruitment tour of East Coast colleges and universities specifically aimed at recruiting nursing undergraduates to California for graduate work. This tour includes Howard University, which is a Historically Black College. The Pan African Nurses Advisory Committee and the Latino Nurses Advisory Committee hold targeted forums for potential graduate students in multiethnic communities of Los Angeles.

The staff recruitment specialist conducts a Summer Preparatory Program annually where interested applicants come to UCLA for workshops on the application process, formulating the statement of purpose, financial aid, study skills and time management.
Drs. Robbins and Leach and Ms. Adams-Renteria also devote time to recruiting from the diverse group of pre-licensure students in the new BS and MECN programs that began in fall 2006 at the UCLA School of Nursing.

UCLA SON participates in the 8-week Summer Program of Undergraduate Research (SPUR), a national program for university students to work closely with faculty projects and be mentored by the faculty. Applicants from groups historically underrepresented in higher education are encouraged to apply for this program. As part of our planned PhD in OEHN, Dr. Robbins will act as a research mentor to interested students in the SPUR program with the long-term goal of expanding the diversity of young scholars committed to careers in university teaching and research in the area of OEHN.

Occupational Medicine
The UCI occupational medicine residency program has been able to attract outstanding quality trainees without having to advertise. The program is listed on the websites for the SCERC, UCI COEH, ACOEM, AOEC, and ACPM. During each of the past four years, the program has received 8-15 completed applications from qualified candidates for an average of 2-3 positions. We have filled every position each year, almost always with our top choices. The diversity distribution during this period is three Asians, two African-Americans, two Hispanic, one Pacific Islander, and three Whites.

The program does not have a formal outreach program for recruitment because we already receive many more applicants than the program can accommodate each year. The race/ethnic distribution of UCI occupational medicine residents during the past few years demonstrates our program's success in attracting and admitting a highly diverse pool of well qualified trainees. We closely monitor our recruitment pool each year and will take active steps to conduct outreach to primary care training programs in the region if the applicant pool or the diversity of the applicant pool begins to decrease from our recent experiences.

Southern California ERC
Based on our 2004-2009 experience, we developed the following plan for Instruction in Responsible Conduct of Research

All academic programs in the Southern California ERC take Professional ethics, including responsible conduct of research, seriously and directly address it as part of their curriculum. We view responsible conduct of research as an important and integral part of professional ethics. It is also viewed as important by practicing professionals in the OH field. In our recent needs assessment there were 412 valid responses, 75 were industrial hygienists, 29 were occupational health nurses, 110 were occupational medicine doctors, and 198 were occupational safety specialists. Professional ethics was ranked 4 or 5 in importance (on a scale of 1 to 5) by 96% of IH, 100% OHN, 84.5 of OM, and 94% of OS professionals. In each group it ranked first, second or third in importance out of up to 83 subjects areas. Because each program approaches this kind of instruction somewhat differently, a summary of each program's instruction is given below.

IH
We plan to continue instruction in Professional Ethics and Responsible Conduct of Research as we have done for the past few years. All first year Environmental Health Science students, including all first year IH students, receive four hours of instruction in Professional Ethics and Responsible Conduct of Research as part of the required course EHS 200B Fundamentals of Environmental Health Sciences. These classes include lecture and discussion, and are given by Professor Ian Coulter of the UCLA Dental School where he teaches a full four-unit course on professional ethics. Topics covered include: ethical principles; ethical issue analysis; human subjects in research; HIPAA; responsibilities of researchers; ownership, access, and publishing of data; conflict of interest; authorship; scientific integrity; and scientific misconduct. . Syllabus for the Professional Ethics and Responsible Conduct of Research classes in EHS 200B is given in the Appendix, Section C.2.

OEHN
Ethics is one of the core concepts in the philosophy of the UCLA School of Nursing and the School will continue to keep this important topic in their philosophy statement. During early 2008, the faculty in the School participated in concept mapping of all courses across all programs. For OEHN trainees in the Masters program, ethics in research mapped to the N204 Research Design and Critique course and both occupational health nursing core courses N213A and N213B. In particular, in N213B where students write a research proposal targeted to a NORA priority area, the subject of responsible conduct of research is covered in depth including relevant case studies. Ethics in research also mapped to N264 Professional Issues In Nursing course. The Director of the OEHN program sits on one of the UCLA IRB Committees and is competent ~~comfortable~~ teaching this topic to NIOSH trainees.

OMR-UCLA
All trainees took the UCLA online course in protection of human subjects and in the research aspects of HIPAA. In addition, those who did research at the Veterans Administration took comparable courses there. Also residents and other trainees who conducted vertebrate animal research took the appropriate courses. In addition, residents and other trainees who conducted research obtain direct experience with this topic by virtue of their work and close contact with faculty mentors.

OMR-UCI
The Program provides instruction and seminars on the ethical practice of occupational medicine and on ethical issues in public health practice, such as balancing public versus private interest, confidentiality, conflict of interest, and the legal basis for mandatory reporting of conditions (e.g., workers having elevated blood lead concentrations). We have also offered an Introduction to Occupational and Environmental Health Laws and Regulations course that explains the legal basis for these issues. Our COEH OEM clinic is a member clinic of the Association of Occupational and Environmental Clinics (AOEC), which has a statement of ethical principles to be followed by member clinics. This statement and a statement of patient rights are prominently posted in our clinic and, during the orientation period, Dr. Baker and Dr. Israel go over these statements with the new residents. We also provide an orientation to the ACOEM principles for the ethical practice of occupational medicine. Our in-coming residents are required along with new residents in all programs to participate in the UCI Program Office orientation programs that include training on the ethical practice of medicine, HIPAA and confidentiality, and human subjects protection in clinical research.

As part of providing instructions and seminars on the ethical practice of occupational medicine, the program specifically provides instruction on the ethical conduct of research. These activities have expanded during the past few years as this issue has received more emphasis by the NIH and University of California. An important foundation for training residents in the responsible conduct of research is for our faculty to be thoroughly knowledgeable about and committed to these principles. For the past five years, the university and UCI School of Medicine have implemented a rigorous training program for faculty on clinical practice, HIPAA, patient confidentiality, responsible conduct of research, human subjects protection, and appropriate animal use and care. Faculty are assigned to specific training modules based on their appointments, roles, and activities. Completion of the modules is required and tracked by the university. The following is a link to the University website that describes the research policies: http://www.ucop.edu/research/policies/welcome.html.

As previously noted, our residents receive training on clinical confidentiality, HIPAA protections, clinical research principles, and human subjects protection during their required residency orientation sessions. The program faculty also address these issues in the journal club when discussing publications on research projects. All of our residents must complete a research project and most of these projects involve analysis or collection of clinical or epidemiological data, or conducting laboratory research with animals. Before undertaking these projects, the Program and the university require the residents to take on-line courses on ethical practices for research, human subjects protection (for those doing human research), and animal use and care (for those doing animal research). The following is a link to the UCI Office of Research Training and Education webpage that shows the required electronic research tutorials: http://www.research.uci.edu/ora/trainingeducation.htm. Every resident completes at least the HIPAA Research Tutorial and the Human Research Tutorial and those doing laboratory research complete the Animal Care & Use Tutorial. All research projects are submitted for the appropriate human subjects or animal use and care approvals through the University Office of Research Administration.

. We have incorporated more sessions on these topics during the orientation period curriculum and seminar series. The subject matter follows the content areas recommended by the NIH and the Responsible Conduct of Research Educational Committee (RCREC) and includes: research misconduct, data management, use of human subjects, animal use and care, conflicts of interest, publication and peer review, and collaboration in research. All residents are required to participate in these orientation and residency seminar sessions.

In addition to using the university training resources, we use training materials that are available through the NIH (http://www.nih.gov/sigs/bioethics), CDC, ASPH, and other universities. An example of teaching materials we have collected is the "Ethics and Public Health: Model Curriculum" published by the ASPH and the Hastings Center (2003). This curriculum has modules on "research ethics" and on "ethical issues in environmental and occupational health." We have also gathered teaching materials from the ASPH's website on Ethics and Public Health: http://www.asph.org/document.cfm page=723 and have used materials from the publication "Guidelines for Responsible Conduct of Research" published by the University of Pittsburgh (2007).

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Industrial Hygiene

Program Director: Shane Que Hee

INDUSTRIAL HYGIENE PROGRAM-ERC Final Report for 2004-09

Abstract
The UCLA Industrial Hygiene Program (IHP) is a research-based program designed to train practitioners and researchers at a high professional level. The program emphasizes the basic science of the workplace environment as well as epidemiology, toxicology, ergonomics, and control technology. The IHP is an established program with an average student population of about 8. There were four full-time core faculty. It is a proven comprehensive and effective program. The IHP is accredited with the Accreditation Board for Engineering and Technology (ABET)/Applied Science Accreditation Commission (ASAC) until 2012. The IHP represents one component of the UCLA Center for Occupational & Environmental Health (COEH), a comprehensive research and training center established by the California legislature

Significant Findings
Academic Training

- The UCLA IHP is a well-established program with continuing numbers of students and core faculty.
- The UCLA IHP, through its training and research activities, is a comprehensive and effective program
- The IHP is ABET/ASAC-accredited to 2012.
- The IHP has an excellent track record in teaching and research

Research Training

- Developed a model for predicting concentration of ultrafine particles in vicinity of a freeway.
- Developed a model for predicting emission factors and the particle size distribution time course in the vicinity of a freeway.
- Found that nighttime concentrations of ultrafine particles can be greater than daytime concentrations even though traffic is one-fourth that in the daytime.
- Developed guidelines for comparing number concentrations from P-Trak and CPC instruments near sources.
- Found a significant increase of atrial arrhythmias following exposure to two hours of freeway air as compared to filtered freeway air.
- Determined the rate of permeation of many pesticides (Benomyl, Captan, Chloropicrin, Comite, Dichlobenil and Telone) through disposable and chemically protective glove materials (nitrile, butyl, natural rubber,viton, laminated, Neox, and polyvinylchloride) for the first time, and recommended the appropriate gloves for these pesticides
- Developed a model to predict glove permeation from acrylonitrile content
- Determined the permeation of many metal working fluids (representative examples of the 4 major types) through disposable and chemically protective glove materials (nitrile, butyl, natural rubber, viton, laminated, polyvinylchloride, and Neox) for the first time
- Developed infrared reflectance direct reading methods to detect pesticides and metal working fluids on glove materials for the first time
- Modeled collection solvent effects during the permeation of pesticides and metal working fluids through glove materials for the first time
- Developed new gas chromatographic-mass spectrometry analytical methods to allow determination of permeation of pesticides and metal working fluids through glove materials
- Developed procedures to separate nanodiamonds generated from extraterrestrial collisions with the earth from nanodiamonds formed by earth surface combustion/pressure processes

- Showed that borate does not compete with the ATP-binding site on the enzyme, ADP-ribosyl cyclase
- Determined optimum arm/wrist placement for use of computer mouses
- Investigated particle release from respirators
- Developed a aerosol generator for nanoparticle aerosols
- Participated in a nested case-control study of occupational physical activity and prostate cancer among workers
- Investigated cancer incidence in hydrazine workers
- Discovered biomarkers of borax exposure to workers
- Found the relationship of cat allergens to asthma
- Determined how formaldehyde interacted with nasal tissue in-vitro
- Investigated the relationship between metalworking fluid air concentration and lung cancer
- Doctoral research activities included Field and Laboratory Methods for Evaluating Glove Permeation of Captan; Glove Permeation Studies with Cutting Oils; Particle Release from Respirators; DNA Adducts of Formaldehyde as a Biological Monitoring Marker; Electrospray Aerosol Generator for Nanoscale Carbon Nanotube Aerosols; Measurement of Ultrafine Particles during Welding; Ultrafine Particle Exposure during Cooking; and Ergonomic Intervention of Computer Keyboards.

Program Report
Major Accomplishments and Changes
Academic Training

The primary academic objective of the UCLA IHP is the training of professional industrial hygienists at the Master's level and advanced training of researchers at the PhD level. Other objectives include: doing research to extend our knowledge in the basic areas of identification, recognition, control, and prevention of environmental hazards in the workplace; to collaborate and support other research in the general area of occupational health; and to provide service to the local, Region IX, state, and national occupational health communities in support of the broad objective of improving worker health and safety.

The core faculty members were William Hinds, John Froines, Nola Kennedy, and Shane Que Hee. William Hinds was the IH Program Director and Professor in the Department of Environmental Health Sciences. He carried full responsibility for courses in Industrial Ventilation and Control Technology and in Aerosol Technology. He retired from UCLA on June 29 2009 and as IH Program (after 26 years) and ERC Director. John Froines is a Professor in the Department of Environmental Health Sciences. He had full responsibility for Risk Assessment Standard Setting. Nola Kennedy switched from being Adjunct Assistant Professor to Research Assistant Professor. She had full responsibility for Physical Agents, Physical Agents Laboratory, and IH Practice. Shane Que Hee is a Professor in the Department of Environmental Health Sciences. He had full responsibility for Biological Monitoring, Identification and Measurement of Gases and Vapors, and Identification and Analysis of Hazardous Waste. He is now the Director of the IHP.

Other personnel who contributed to teaching included Victor Liu, now an IH Consultant after leaving his position at California State University Northridge, assisted by George Brogmus, a current doctoral student and by Craig Conlon M.D., currently Dean of a Kaiser Permanente clinic and doctoral graduate of the IHP, responsible for Occupational Safety and Ergonomics; and Philip Harber, M.D.

Industrial Hygiene core faculty members also researched in different fields (Hinds- Aerosol science and control technology; Froines - risk assessment, toxicology, and air pollution; Que Hee—environmental and industrial hygiene chemistry, biological monitoring, gas/vapor sampling and analysis, and hazardous substances; Kennedy- exposure assessment) that complemented one another to give the IHP breadth and depth. Additional breadth is provided by supporting faculty members in occupational medicine, safety, ergonomics, reproductive toxicology, toxicology, occupational health education, occupational epidemiology, epidemiology, biostatistics, community health, and health services.

The IH Program Completed its fourteenth year as a fully accredited ABET/ASAC program. The UCLA IHP is one of about 40 ASAC accredited programs in the U.S. It was reaccredited for two years in 2006. We submitted an interim report on our progress on July 1, 2007. All concerns have now been resolved. The IH Program's accreditation has been extended to 2012. As a result, we have started a process which will indirectly evaluate the impact of our program on the professional IH community. We are surveying our graduates two and three years after graduating from our program as to the value of our 17 program outcomes and their proficiency in those outcomes at the time of their graduation.

The Program has acquired a Dri-Cal Flow meter; a Photovac Petrochem portable photoionization gas chromatograph for field analysis of benzene, ethyl benzene, toluene, and xylenes; and a PhD Plus gas meter to simultaneously detect explosive and oxygen deficient atmospheres, carbon monoxide, and hydrogen sulfide.

Twenty-seven industrial hygiene students were placed in IH internship positions during the reporting period.

The program has had a NIOSH Hazardous Substances Academic Training (HSAT) program grant since July 1994. This was renewed for three more years starting in July 2002. The HSAT program is now in sync with the IHP. The hazardous substances training is provided as a minor concentration for our IH students. Four courses were modified or enlarged to include coverage of hazardous substances. Students take two additional courses in addition to the IH curriculum to fulfill the minor. Sixteen students have been supported by the HSAT training grant since 1999. Twenty-five IH students have taken the 40-hour or 8-hour HAZWOPER training courses as part of this program, including 14 supported by the HSAT grant.

In the past four years 30 IH students have attended the American Industrial Hygiene Conference and Exhibition (AIHCE), the national meeting of the AIHA and the ACGIH. These students presented 15 research papers (11 for SQH students). The IH faculty participated in 12 papers at these conferences.

We received a donation of surplus equipment from The State Compensation Insurance Fund, and from the Texaco Petroleum Refinery.

We provided the one-year course work program for UCLA Occupational Medicine Residents as part of their training program.
IH students have continued the Industrial Hygiene Student Association (IHSA) with elected officers and formal recognition by the UCLA campus. The Association represents the industrial hygiene students for various School and Program issues. The IHSA has been formally recognized as a Local Student Section Affiliate by the national AIHA. In conjunction with IHSA we have continued the series of informal Industrial Hygiene Student-Faculty meetings for outside seminar speakers and student opinion on curricula and other issues.

A new nanotechnology ~~i~~institute, the California NanoSystems Institute, has been built on the UCLA campus and IHP faculty and students have already availed themselves of its resources. The School of Public Health is also building a new Infectious Disease facility in which bioaerosols are to be generated. There are potentially many interesting developments ahead for IHP Faculty and students.

We have established ongoing internship opportunities with Cal/OSHA and UCLA Campus Environment, Health, and Safety. One or two industrial hygiene students participated in each internship each year since 1996. The IH Program provides financial assistance for students doing unpaid internships

Honors and Awards
Khadeeja Abdullah won a California Wellness grant in 2006, the Tony Norton Award in 2007, and the AIHF Liberty Mutual Award in 2007. Karen Hirakawa won the AIHF Liberty Mutual Award in 2008. Sayaka Takaku received the Tibbetts award from the School of Public Health in 2008. Airek Mathews received the Outstanding Graduate Student Award from the Southern California and Orange County Sections of the American Industrial Hygiene Association in 2009. Recent graduates Yu Feng Zu was awarded an HEI New Investigators Grant, and Robert Phalen was awarded a R21 NIOSH grant.

For IHP Faculty, William Hinds was appointed to the Nominating Committee of the American Association for Aerosol Research. He was awarded the AIHA Cummings Memorial Award on June 1, 2009 at the Toronto AIHCE.

IH Faculty member Shane Que Hee and IHP graduate Robert Phalen were awarded best industrial hygiene research journal paper of 2008 by the Michigan Industrial Hygiene Society at the 2009 Toronto AIHCE. Shane Que Hee also won the following awards: American Industrial Hygiene Association Biological Monitoring Committee Award for Outstanding Leadership, Dedication and Contributions to the Practice of Industrial Hygiene and the Biological Monitoring Committee (2004); American Industrial Hygiene Association, 2004 Critics Choice for *Biological Monitoring: A Practical Field Manual*, 7th Annual AIHA Publications Award (2005); The Biological Monitoring Service Award in Recognition of Exemplary Contribution to the Committee and the BEELs Project Team, Biological Monitoring Committee, American Industrial Hygiene Association (2007); and AIHA Outstanding Project Team Award as member of the EASC Dermal Project Team (2008). He has served on the Report on Carcinogens Expert Registry, National Institute of Environmental Health Sciences since 2005. He was Treasurer of the AIHA Biological Monitoring Committee in 2006, Vice-Chair in 2007, and Chairperson in 2008/9. He formed the Biological Environmental Exposure Limit ad hoc Committee in 2000 that was approved and funded by the AIHA Board in 2007 with him as Chairperson and the body renamed the Biological Environmental Exposure Level Project Team within the Biological Monitoring Committee. He organized 5 Roundtables for the AIHCE during the 5 year period, and also spoke in each one.

Curriculum Changes
Since the last review, we introduced only minor changes to the IH curriculum.
EHS 254 Health Hazards of Industrial Processes (4 units) was renumbered as EHS 454 to better fulfill UCLA's Master of Science degree requirements. It is a capstone course involving a plant visit each week.

With the retirement of Professor Hinds who will teach only his Aerosol course in the future, the curriculum may undergo further changes. This may be an opportunity to decrease the required course load on students, and allow more electives.

Research Training (Doctoral Level) (progress Report Summary)
The focus of our research training program is the training of expert researchers at the PhD level. Primary research areas are occupational toxicology, occupational health surveillance, aerosol technology, exposure assessment, industrial hygiene control technology, respiratory protection, industrial hygiene analytical chemistry, air sampling and analysis, biological monitoring, ergonomics, and hazardous waste research.

Funding for the research training program is used to support students and student research conducted under the supervision of an industrial hygiene faculty member. We plan to continue to develop specialized research laboratories. These includes the Inhalable Particle Test Facility, which has capabilities to measure inhalability with a mannequin in the 10 to 150 µm particle size range, and measure the performance of personal samplers under simulated industrial conditions. The facility has been modified so that it can evaluate samplers with wind velocity up to 14 mph. Because of space changes in the Department, it has been moved to be part of the EPA Particle Center facility headed by John Froines. The latter is a unique resource that has its own analytical chemistry capability.

The mass spectrometer facility in the Department of Environmental Health Sciences has a GC/MSD, a LC/MS, and a ICP-MS. Dr. Que Hee is the director of this facility. It provides an opportunity for research students to use state of the art equipment for the analysis of workplace environmental contaminants and toxic waste contamination.

Enrollment
The program encourages the enrollment of engineers and people from industry and government.

During the 2004-2009 academic years, an average of 20.4 students were enrolled in the IHP each year. Of these an average of 12 per year were supported by the ERC, 8.6 by IHP, and 3.6 by HSAT.

There was a trend to lower annual enrollments relative to the previous 5 year period.

Graduates
Twenty-four out of the 27 graduates of our program from 2004 to 2009 are working in the field of IH (21)or Environmental Health (1) or pursuing advanced degrees in related fields (2).

The placement of graduates breaks down as follows: three placed with Cal OSHA, nine with private industry, three with consulting companies, three went on to graduate school, five with local health departments or other government agencies (including two in the military and two in state universities), and three in research or education positions.

Conclusions
The UCLA Industrial Hygiene Program is a well-established program with a continuing student enrollment and core faculty. Curriculum and research training activities have developed into a comprehensive and effective program. The Program has a good track record of training and graduates and an active research program. This record and the accomplishments outlined above auger well for continued excellent performance.

Publications
Publications by core faculty and trainees are given in the final section of this progress report.

Occupational and Environmental Health Nursing

Program Director: Wendie Robbins

Occupational and Environmental Health Nursing Program

Abstract
The occupational health nursing specialty has been in existence in the UCLA School of Nursing since 1980. Following a period of difficulty, it was re-vitalized in the late-1990s with new leadership and has since grown to be a distinguished, respected, masters level academic training program consistently graduating nurses qualified to meet occupational health and safety needs unique to Southern California and beyond. Currently, only UCLA and UCSF are approved by the California State Board of Nursing to provide graduate level academic degree programs in the occupational health nursing specialty within the state. California is in the midst of a regional nursing shortage that compounds the shortages of nurses available for occupational health settings; only 0.3% of registered California nurses practice in this specialty area. Thus California faces a problem providing adequate occupational health nursing care for its 15 million workers. Over the past five years our program has successfully performed up to its funding level graduating California nurses in the occupational health specialty. Our graduates carry out the purposes of the OSH Act through clinical practice specializing in occupational health and safety, administration of mandated worker health and safety programs, and health promotion and accident/disease prevention activities that improve worker health and safety. We have initiated a research training component and have begun laying the groundwork to graduate PhD nurses specialized in occupational and environmental health to help meet the shortage of faculty for this specialty. All nursing graduates have a unique perspective on worker health framed within the interdisciplinary academic structure of our Southern California ERC.

Program Report

Major Accomplishments and Changes

Academic Training:

There are two tracks in the OEHN program: administration and adult nurse practitioner. Students enter the OEHN specialty with a B.S.N. and take their general nursing core courses (research, health promotion, health teaching) with students from all graduate level academic specialties in the UCLA School of Nursing. OEHN adult nurse practitioner students take core nurse practitioner courses (symptom management, diagnostic reasoning, pharmacology, patho-physiology) with other adult nurse practitioner specialty students in the School (Family, Gerontology, Oncology, Acute Care). Additionally, the OEHN administration students take core administration courses (budgeting and finance, nursing administration theory) with the general administration students in the School. Combining selected courses across the specialties allows the School of Nursing to leverage resources and take full advantage of the unique strengths and capabilities of particular faculty who are renown experts, for example in the areas of health promotion, diagnostics, patho-physiology, or budget and finance.

A highlight of the program during this funding period has been enhanced enrollment of students in the OEHN specialty from the 'Bridge Program' which is a program of accelerated advancement for Nursing Associate Degree students through to the Masters Degree. Given that the majority of nurses practicing in California are Associate Degree prepared and little specific occupational health nursing content is given in Associate Degree curricula, this is an important portal for improving specialty worker health and safety training for nurses. The increased enrollment of Bridge program students in the OEHN Program of ~10% per year was achieved through concentrated efforts of OEHN faculty who recruited these students while teaching their basic epidemiology course and guest lecturing on worker health issues at least once a year in Bridge student classes. Bridge students enter UCLA from community colleges and contribute in an important way to the economic and racial diversity of the UCLA student body. NIOSH funding is not requested for Bridge students until they formally enter the Masters program.

Another highlight during this funding cycle has been the OEHN program interface with an educational program in the School of Nursing recently funded by a HRSA grant (L. Phillips, PI). The HRSA grant supports fast track BS to PhD for gerontology scholars who integrate gerontology content throughout their academic preparation. OEHN program faculty have become responsible for content on older workers and the aging workforce in this fast track and this provides us a pipeline for recruiting PhD students interested in the aging workforce. Currently we have one HRSA Gerontology Scholar working with our OEHN program faculty and this student is conducting intervention research with older shift-workers.

Changes during this funding period include adding a focus on "organization of work." We have added content on organization of work to the core courses in occupational health nursing and have funded students to attend seminars and workshops on this topic. We added a new faculty member to lead the Nursing Administration track, Dr. Linda Searle-Leach, who conducts research in the area of organization of work in the healthcare industry. Dr. Searle-Leach has taken over from Dr. Donna McNeese-Smith, who retired during this funding cycle.

Another change during the funding period was an enhanced focus on research for the Masters level students. They are now required to write a research proposal during their second year where before they could do a health promotion project *or* research proposal but most chose to do a health promotion project because it was more familiar to them. Second, the comprehensive exam for graduation that was previously based on writing a paper on symptom management for the nurse practitioner students is now a paper based on review of the research literature to address evidence-based practice for a specified worker population and problem.

Research Training:

During the past funding cycle we began laying the foundation to add doctoral level training for nurses within the SC NIOSH ERC. Two students were enrolled in the School of Nursing PhD program in Fall 2008 who have a specific interest in conducting research with worker populations and both have successfully advanced through their written doctoral qualifying exams.

Enrollment:

There have been 27 graduates from the OEHN specialty over the previous funding cycle out of 29 admitted to the program. Two students dropped out after exhaustive efforts failed to help the first student juggle family and work issues in order to pass didactic courses; and to help the second student achieve clinical competence. All OEHN students who sat for the final Masters level comprehensive exam in the School of Nursing during this funding period passed. All students who graduated during this funding period and sat for the national certification exam passed.

Graduates:

Eighty percent of the working graduates during this funding cycle are employed in traditional occupational health settings spanning transportation, general industry, and the entertainment industry; hospital employee health; risk management; and case management. Our current program trainees graduate at the Masters level and not the PhD level, thus graduates primarily focus on practice roles rather than research roles. None-the-less, three OEHN trainees of this project period have co-authored on research publications and three have submitted research pilot training project proposals to the SC NIOSH ERC. Three graduates currently hold leadership Board positions in the California State Association of Occupational Health Nurses, two additional hold Board positions of their local professional chapters.

Conclusion:
The goal of the OEHN program within the SC NIOSH ERC is to respond to the national and regional need for qualified occupational and environmental health nursing specialists, researchers, managers, and leaders in occupational health and safety. Our program continues to meet this goal in terms of the number and caliber of Masters level graduates placed in occupational health settings throughout Southern California and beyond. We now are moving to help meet the dire need for qualified nursing faculty to teach in the occupational health specialty by initiating a doctoral level research training program. Two nursing PhD students were admitted in 2008 and are successfully moving through the curriculum. Our goal is to ask for NIOSH support for a PhD program once we have established our success with these students.

Occupational Medicine Residency-UCI

Program Director: Dean Baker

Abstract

The UCI Occupational Medicine Residency Program was established in 1976 and has trained over 69 physicians. The program graduates include a core of the occupational medicine specialists in the Southern California region, as well as leaders in corporate occupational medicine and public health practice. The program's purpose is to prepare physicians for the comprehensive practice of occupational medicine in a variety of settings, including clinical practices, corporate medical departments, and public health programs. The program provides a range of training opportunities so residents can tailor their training to address their educational objectives, while ensuring that each resident receives training in the core areas.

Residents in the academic phase enroll in the Master of Science in Environmental Toxicology degree program at UC Irvine. During their degree programs, residents complete the MPH-equivalent course requirements for board certification. 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 industrial and service sector occupational medicine programs, as well as in comprehensive occupational medicine practices and in regulatory agencies. Within the rotations, the residents are exposed to all aspects of occupational medicine practice. Throughout the academic and practicum phases, the residents receive ongoing training at the UCI Center for Occupational and Environmental Health (COEH) consisting of clinic sessions, clinical case conference, didactic seminars, journal club, and work site visits. Residents must complete a research project during the residency.

The program trained an average of four residents per year during the reporting period; graduating 12 residents. The residency was able to fill all of the positions we offered, which is determined primarily by the availability of resident stipend support. All of our graduates have become board certified in occupational medicine and obtained desirable positions in occupational medicine practices or academics.

The occupational medicine program faculty also provided occupational medicine training to medical students and primary care residents at UCI. The program offered a monthly continuing education course for practicing physicians and nurses in the region, and the faculty developed and actively participated in the ERC outreach and continuing education programs.

At the same time, the program enhanced field training experiences by adding additional workplace-based rotations and new rotations with occupational medicine consulting practices. The program continued to expand its training initiative in work organization and psychosocial stress, including the recruitment of a post-doctoral researcher who teaches in the ERC interdisciplinary courses and occupational medicine seminar. Another positive development during the project period is that the campus established a new public health program and recently began to offer a master of public health (MPH) degree. The campus has recruited several new faculty in the public health program, which has increased the MPH-equivalent course offerings and research opportunities. In summary, the program continued to grow and all aspects of the program were enhanced during the reporting period.

Program Report

A. Significance

The UCI occupational medicine program continued to make a significant contribution to the Southern California Education and Research Center (ERC) during the reporting period. The supply of trained occupational medicine specialists is inadequate in Southern California. Orange County with total population of more than three million and an employed population of more than 1.4 million persons has only about 25 board-certified occupational medicine physicians, of whom more than half graduated from our program or are on the faculty. The UCI program has also trained almost half of the board certified occupational medicine specialists in San Diego County and substantial proportion in Los Angeles County, as well as some in Northern California and Hawaii. The program graduated 12 residents during the reporting period – all of whom became board certified in occupational medicine and practice in the field. Therefore, the UCI program has made a significant contribution to the regional supply of board certified occupational medicine specialists.

The UCI occupational medicine program faculty also provided occupational medicine training to medical students and primary care residents at UCI. The program provided Occupational Medicine Grand Rounds three times a year for the UCI Department of Medicine and provided four noon conference lectures per year for the Internal Medicine residents. These presentations have increased awareness about occupational medicine in the UCI School of Medicine. The program offers one month occupational medicine elective rotations for both internal medicine and family medicine residents. Three of the residents who took these rotations subsequently joined our program as occupational medicine residents, so these rotations have proven to be a successful recruitment strategy. The program offered a monthly continuing education course for practicing physicians and nurses in the region.

The UCI occupational medicine program has significantly enhanced the Southern California ERC by augmenting the ERC's capacity to function as a regional resource for education and research in occupational safety and health. The program's location in Orange County is an important asset because the program extends the ERC to serve Orange County and San Diego County, which have no other occupational medicine training programs. During the reporting period, the UCI Occupational Medicine program collaborated with the ERC Continuing Education and Outreach program to develop continuing education programs. The programs have been offered both at UCLA and at UC Irvine, serving both Los Angeles and Orange counties. The program also has offered occupational medicine clinical rotations that have been taken by trainees in the UCLA Occupational and Environmental Health nursing program. The ERC has had a greater regional impact because of the participation of the UCI occupational medicine program.

B. Outcomes and Impact

The program's objectives, structure, and curriculum have been maintained, with substantial enhancements because of growth in the faculty, expanded training initiatives in workplace psychosocial stressors and workplace preparedness, and additional field training sites for practicum training. The program has maintained full ACGME accreditation.

Trainees and Graduates. The residency program trained an average of four residents per year, graduating 12 residents during the reporting period. The graduate degrees obtained by the residents include: MS in environmental toxicology – 8; MS in environmental health science and policy – 1. All of the graduates passed the occupational medicine board certification examination on the first attempt. The graduates practice occupational medicine in the following settings: clinical occupational medicine – 8; consulting occupational medicine – 2; public sector occupational medicine – 1; and academic occupational medicine –1.

Some of the program's graduates have begun to take leadership roles in occupational medicine professional associations. For example, earlier program graduates include Dr. John Howard, the Director of NIOSH, Dr. Pamela Hymel, the president of ACOEM. A recent graduate, Dr. Ellyn McIntosh, was program chair of the 2008 annual American Occupational Health Conference.

C. Technical Report

Background. The UCI Occupational Medicine Residency Program was established in 1976 and has trained over 69 physicians. The program's purpose is to prepare physicians for the comprehensive practice of occupational medicine in a variety of settings, including clinical practices, corporate medical departments, and public health programs. The program provides a range of training opportunities so residents can tailor their training to address their educational objectives, while ensuring that each resident receives training in the core areas.

Residents in the academic phase enroll in the Master of Science in Environmental Toxicology degree program at UC Irvine. During their degree programs, residents complete the MPH-equivalent course requirements for board certification. 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 industrial and service sector occupational medicine programs, as well as in comprehensive occupational medicine practices and in regulatory agencies. Within the rotations, the residents are exposed to all aspects of occupational medicine practice. Throughout the academic and practicum phases, the residents receive ongoing training at the UCI Center for Occupational and Environmental Health (COEH) consisting of clinic sessions, clinical case conference, didactic seminars, journal club, and work site visits. Residents must complete a research project during the residency.

Accreditation. The residency program maintained full accreditation by the American Council on Graduate Medical Education (ACGME) during the reporting period. .

Faculty. Dr. Dean Baker continued as the residency program director and Leslie Israel, DO, MPH, serves as the Associate Residency Program Director. M. Joseph Fedoruk, MD, CIH; Peter Schnall, MD, MPH; Elliott Kornhauser, MD, MPH, MBA; Wayne Chang, MD, MS; Ulrike Luderer, MD, PhD, MPH continued as core faculty. Haiou Yang, PhD, continued as research faculty. Scott Hardy, MD, became a part-time clinical faculty member and BongKyoo Choi, D.Sc. joined the program as a researcher in the area of work organization. The voluntary clinical faculty remained a cornerstone of the training program by providing outstanding training opportunities in the affiliated field training sites, and by participating in the residency didactic seminar. There were no major changes in the voluntary faculty during the reporting period.

Training Facilities. The program is based in the facilities of the UCI Center for Occupational and Environmental Health and the UCI Medical Center Occupational Health clinic. The Center has excellent resources for training including an active occupational medicine clinic; offices for faculty, clinical and research staff, and trainees; conference rooms; and library with all standard occupational safety and health textbooks and periodicals as well as extensive computer and on-line search capabilities.

During the academic phases, residents enroll in the accredited master of science in environmental toxicology degree program at UCI, which is a major university with excellent facilities. Field training sites available during the practicum phases include Exxon-Mobil, the County of Orange Employee Health Service, Cal-OSHA, Kaiser-Permanente Occupational Medicine, Sharp Rees-Stealey Medical Groups, UCSD Center for Occupational and Environmental Medicine, Southern California Regional Poison Control Program, and UCI Medical Center ambulatory care clinics. During the reporting period, the program added field training sites at the United States Postal Service (August 2004); WorkCare, Inc. (June 2007); Total Healthcare Management, Inc. (April 2008); and the Naval Medical Center in San Diego (April 2009). Therefore, the opportunities for practicum training have been expanded.

Educational Program and Curriculum. There were no major changes in the program goals and objectives during the reporting period. The structure of the curriculum has been maintained. Since the last review, the program fully implemented the core courses in industrial hygiene and occupational health law. We also initiated a new core course on occupational safety that replaced the previously required course offered through the UCI Extension Program. We developed two new rotations at UCI to facilitate interdisciplinary interactions with ERC trainees. We also developed new training initiatives in work organization and workplace psychosocial stress, and in workplace preparedness for terror and disaster.

The degree options for the academic phase were maintained through the reporting period; however, the program is no longer offering the MPH degree program at UCLA after the reporting period.
The number and range of field training rotations was increased during the reporting period, and are listed in the previous section. The program offers practicum in four core areas of occupational medicine practice: worksite-based or corporate occupational medicine, public sector and regulatory occupational medicine, clinical occupational medicine specialty practice, and occupational medicine consulting practices. The program also offers a number of elective clinical rotations, including clinical toxicology, ambulatory orthopedics, and physical medicine and rehabilitation..

Interdisciplinary interaction was enhanced during the reporting period. Although the UCI Occupational Medicine Program is the only core program based at UCI, the Continuing Education and Outreach, Pilot Projects, and NORA Research Support programs all function across the two campuses, as does the training initiative in workplace psychosocial stressors. The ERC provides multiple opportunities for interdisciplinary interactions of the trainees.

Trainees and Graduates. The residency program trained an average of four residents per year, graduating 12 residents during the reporting period. The graduate degrees obtained by the residents include: MS in environmental toxicology – 8; MS in environmental health science and policy – 1. All of the graduates passed the occupational medicine board certification examination on the first attempt. The graduates practice occupational medicine in the following settings: clinical occupational medicine – 8; consulting occupational medicine – 2; public sector occupational medicine – 1; and academic occupational medicine –1.

Resident	Degree	Start	Complete
Tack Lam, MD, PhD	MS	08-2003	07-2005
Alan Hsu, MD	MS	08-2004	07-2006
Richard Campbell, MD	MS	08-2004	07-2006
Michael Collins, DO, MPH	*	07-2005	07-2006
John Kim, MD	MS	08-2005	07-2007
Elaine Tonel, DO	MS	08-2005	07-2007
Gerald West, MD	MS	08-2005	07-2007
Julie Fuller, MD	MS	08-2006	07-2008
Roger Hinkson, MD, MPH	*	08-2007	07-2008
Carmen Arriola, MD	MS	08-2007	07-2009
Thieuha Hoang, MD	MS	08-2007	07-2009
Stephen Kumar, MD, MPH	*	07-2008	07-2009

* Practicum year only

Occupational Medicine Residency-UCLA

Program Director: Philip Harber

Abstract.
The program trained physicians and others in occupational medicine, conducted research, provided direct clinical and workplace services, and contributed to educational policy. It also supported education of trainees in other disciplines.

OM training was provided for resident physicians in a 2 year program. This included obtaining an MPH degree for those who had not previously accomplished this. Residents were trained in both clinical (single-patient oriented), population based, and managerial aspects of the field.

A unique agreement was implemented between Kaiser Permanente and UCLA OM for collaborative education. Kaiser established a specific primary care OM oriented curriculum and developed a continuity clinic which the residents attend over two years, having greater responsibility as their skills develop. In addition, Kaiser provided significant funding for the program.

Physicians and others participate in research activities, working closely with faculty members.

Clinical services were provided in two settings: UCLA OM clinic and at Kaiser facilities. The UCLA clinic serves as a regional resource for complex cases and novel problems. It has particular expertise in occupational lung disease, toxicology, and ADA issues. The clinical operation is self-supporting. In addition to in-clinic care, it has provided special examinations in locations such as offshore oil platforms and diacetyl using facilities. The Kaiser facilities emphasize front-line clinical care of injured/ ill workers. Residents are afforded progressively greater responsibility in this multiyear continuity clinic location.

The UCLA OM program identified the first two diacetyl (flavoring agent) obliterative bronchiolitis cases in California, which were also the first outside popcorn facilities. Working closely with Cal-OSHA and DRDS/NIOSH, this led to national attention on the problem and OSHA actions in California. The clinic also is central to the DOE beryllium program. Residents also worked closely with Cal-OSHA on other special instigations, including occupational MRSA infections and heat related deaths. In addition, the program works with the LA County Dept of Health, particularly through the Olive View facility, where UCLA OM also has space and affiliations.

The UCLA OM program also contributed to OM educational policy at the national level. For example, the PD served as vice-chair of the Preventive Medicine Review Committee for ACGME. The program also began a NIOSH funded research activity to empirically identify activities and skills actually employed by OM physicians.

The UCLA OM program sponsored several CE courses. The “Health effects of Surface Goods Movement” symposium was a multiperspective approach, ranging from toxicology to urban planning to economics. A resident was intimately involved in organizing this effort. UCLA OM also serves to sponsor continuing medical education (CME) credits for multiple ERC programs. The faculty and residents worked closely with the ERC CE program in many ways, including appearing in videos produced.

UCLA OM also has provided courses, lectures, etc for trainees in other areas of medicine. It also regularly taught a course in the school of public health.

During this project period, the UCLA OM residency was reviewed by ACGME and awarded full 5 year recertification.

Institutional support was limited, creating obstacles to program operation. In the ’07-8 year, most of the OM ERC funds were reallocated to other ERC activities, and the following year also saw similar redirection. UCLA closed its longstanding general preventive medicine residency in 2003, and the Family Medicine Dept declined to take any new OM residents. Similarly, the ERC decided to focus OM in the UC, Irvine program in Orange County. The UCLA OM program proposed working with the ERC to develop plans to replace ERC related OM functions in Los Angeles County in the future. The UCLA OM residency program has been terminated.

Highlights/Significant Results.

The program trained resident physicians and others. The residency was reviewed by ACGME and given full 5 year approval.

In addition, it provided regional and national service. The linkage of public health and clinical approaches permitted generalization from clinical cases (e.g., the first diacetyl disease cases or beryllium exposed workers) into public health and/ or research activities.

Program faculty have been active in regional and national service. The associate residency director, Dr. Papanek, is president-elect of the Western Occupational- Environmental Medical Assn. The PD, Dr Harber, served as chair of the CDC/NIOSH Study Section (SOH), vice chair of the ACGME Preventive Medicine Review Committee, on the ACOEM board, member or chair of several Special Emphasis Panels and similar committees, member of the IOM Depleted Uranium Committee and in other roles.

The Dept of Family Medicine and the ERC agreed to close the OM residency effective 6/30/10.

Outcomes/Relevance/Impact.

UCLA Occupational Medicine, which joined the ERC in 2001, has educated trainees in several fields, served as a regional and national resource, conducted research, and contributed to educational policy. Faculty and trainees have worked closely with governmental and other organizations in southern California. The program contributed significantly to continuing education via the SCERC and other organizations.

Pilot Project Research Training (PPRT)

2004-2009 Program Director: William Hinds

After 7/1/09 John Froines

Pilot Project Research Training

Introduction

This report on the Pilot Project Research Training (PPRT) of the Southern California ERC spans the four year period of 2005-2009 as this program was renewed on July 1, 2005. Our PRRT Program has been very successful in supporting high quality pilot projects from a wide range of disciplines and institutions. Support was provided to trainees, junior faculty, and new investigators in the field of occupational health. During the period 05-09, supported research projects covered eleven NORA areas with four areas covered by at least two projects. Pilot projects were supported at ERCs, TPGs, and other occupational health programs in Region IX.

V. Detailed Description of Training Program

1. Program plan

The objective of the Southern California ERC Pilot Project Research Training Program is to enhance the research training opportunities for ERC and TPG trainees, junior faculty, and new investigators in Region IX by providing funding for pilot research projects. These pilot research projects may be small studies or short-term research projects to explore feasibility, to collect preliminary data, or to develop plans for more extensive research projects supported by other more long-term funding. For the purposes of the PPRT Program, junior faculty members are defined as faculty members within four years of their initial faculty appointment. New investigators are students or faculty members in related areas of science who choose to shift their research focus to an area of occupational health and safety. Another objective is to address NORA related topics and to establish new areas of research in occupational health and safety.

Procedures. A Request for Applications (RFA) for pilot project research training proposals is sent out to all relevant units of the Southern California ERC, the Northern California ERC; and to contact other faculty members in Region IX University of Arizona, USC, UC Davis, Loma Linda University, and Cal State Northridge. . The contact list is given in Section 3. The RFA is sent out each year in the Spring for funding in Summer or Fall of that year. The ERC (or TPG) trainees, junior faculty, or new investigators submit a letter of intent followed by an application approximately one month later. The letters of intent that were received between 2005-2009 were reviewed by then Program Director, W. Hinds (retired July 1, 2009), and by the Program Co-Director, D. Baker, to determine if they met the requirements as to type of investigator and the subject area for the peer review process. The Program Director and Co-Director conferred and determined who should review the proposals. They identified persons with appropriate expertise to review each proposal from the ERC Executive Committee, and assured the absence of any conflict of interest on the part of faculty colleagues at UCLA, UCI, USC, or other universities that participate in the PPRT program. Standard NIH Initial Review Group procedures to avoid conflict of interest were followed in selecting reviewers.. For the 2005-09 cycles we used 39 external reviewers, from throughout Region IX, and beyond as required to obviate any conflict of interest. .

. Proposals were reviewed by at least two independent reviewers and ranked on an NIH scale from 1 to 5. The major review criteria have been:

1) Relevance to occupational health and safety and potential to identify solutions.
2) Scientific quality.
3) Stimulation of interdisciplinary activity.
4) Likelihood that the project will lead to ROl or other external funding.
5) Novelty of ideas and relevance to NORA objectives.
6) Likelihood that the project will foster long-term research interests and attract new or young scientists to the field.

Each reviewer evaluated his or her assigned proposals using the evaluation form, prepared written comments, and assigned an overall score based on the NIH point scale of 1 to 5 in 0.1 increments, with 1 being outstanding and 5 being acceptable. The median and mean scores were calculated for each proposal.

The PPRT review committee, which had consisted of the ERC Executive Committee members determined the priority order. The ERC Executive Committee then determined the cutoff score and the dollar amount for each recommended proposal. In 2005-09 cycles, the cutoff score was a mean of 2.2 (with the exception of 2008 year with the mean of 3.0). Final decisions on recommendation for funding were made by the ERC Executive Committee. Appropriate human or animal subjects institutional approvals were received before projects were funded. Records were maintained of all applications and final decisions. A summary table of the proposals evaluated in the 2005-09 cycles is also included in Section 6. Applicants were informed of the funding decisions with any budget changes and were sent the reviewers' comments. The award approval letters included a clear notification that the release of funds for the project would not be requested until the IRB approval from the awardee's institution was received by the Program Director's office. When all approvals were received the Program Director and Program Administrator submitted a request for release of funds to NIOSH to approve funding after verifying IRB approval, until the final year of this reporting period, 08-09, when NIOSH delegated this authority and responsibility to individual centers. .

Records were maintained of all applications, reviewer's scores, and final decisions. . Award recipients were contacted periodically during each project period to monitor progress, and at the conclusion of their projects to keep track of publications, grant applications, or funded grants arising from their projects, and subsequently for a minimum of three years. .

2. Faculty reputation and strength

The Southern California ERC program directors and other ERC faculty are established experts in their respective fields. Specific areas for Interim Center Director and ERC Program Directors are:

John Froines, PhD	Industrial Hygiene, Chemical Toxicology, Exposure Assessment, and Alternative Analyses
Dean Baker, MD, MPH	Occupational Medicine, Epidemiology, Work Organization
William Hinds, ScD (Emeritus)	Industrial Hygiene, Aerosol Science, Control Technology, Respiratory Protection
Nola Kennedy	Exposure Assessment
Wendie Robbins, PhD, RN	Occupational Nursing, Toxicology, Reproductive Toxicology
Shane Que Hee, PhD	Industrial Hygiene, Biological Monitoring, Environmental Chemistry

UCLA and UCI have State-funded centers, called the Center for Occupational and Environmental Health, with additional faculty and programs in epidemiology, toxicology, work organization, policy and law. Other participating universities, such as UCSF, UC Berkeley, and USC have outstanding research faculty and educational programs in relevant occupational safety and health areas. The combined faculty strength of the participating universities in the PPRT is extensive and outstanding.

3. Collaboration with regional research training institutions, including TPG's

Since this program is focused on research training support for occupational health trainees, junior faculty, and new investigators funding was open to all in these categories in the Southern California and Northern California ERCs, all TPG's in Region IX (currently none), and USC, UC Davis, Loma Linda University, and Cal State Northridge (CSUN). Contacts at each of these institutions

have been identified. They and the Southern California ERC Program Directors were notified of the RFA in the Spring of each year by email and regular mail. The program directors for each program in the ERCs along with key faculty and staff at the other institutions disseminated the RFA to students, new investigators and facultyin their units.

4. Program evaluation

The pilot project program is reviewed regularly by the ERC Executive Committee and changes are implemented as necessary to best fulfill the objectives of the program. The Pilot Project Program is on the agenda for all Executive Committee meetings. The criteria for program review are whether the program is meeting its objective, that is, enhancing the research training opportunities for ERC and TPG trainees, junior faculty, and young investigators in Region IX by providing funding for pilot research projects.

As noted above, the Program Director and Program Administrator conduct a follow-up assessment for each funded project by contacting the project investigator annually for a minimum of three years after the project period has been completed.

As with all other aspects of the ERC, the pilot project program was reviewed regularly by the ERC Advisory Board. The board focused on the pilot projects' relevance and program impact from their perspective as leading practitioners from multiple occupational safety and health disciplines.

Measures of Effectiveness

Based on the objectives of the program as stated above we have formulated the following short and long-term measures of effectiveness.

Short-term measures of effectiveness include:

1. Receive at least three qualified proposals in response to our RFA each year.
2. Recommend for funding at least two projects each year.

Long-term measures of effectiveness include:

1. Provide pilot project support to each of the three categories of recipients, ERC and TPG trainees, junior faculty, and new investigators.
2. Provide pilot project support that leads to publications in peer-reviewed journals.
3. Provide pilot project support that facilitates the obtaining of more permanent funding from other sources.

During 2005-09 we received 34 proposals and recommended 22 be funded and thus met our short-term measures of effectiveness. Since the beginning of the PPRT in 1999 through the 07-08 cycle we have recommended for funding 40 projects that have included 24 Trainees, including ERC and TPG, 9 junior faculty, and 2 new investigators. Since the last review, nine peer-reviewed articles and two chapters have been accepted or published. Eleven research presentations were made by trainees as a result of the PPRT funded projects. Seven grants, totaling more than $1.3 Million have been obtained as a result of PPRT projects.

Three pertinent updates that highlight the success of our PPRT program during the past five years include:

One R21 proposal has been funded and a submitted for consideration. One recently funded R21, we reported in August 2008 in the ERC competing renewal application as resubmitted to CDC following a favorable score of 200. This R21 grant submitted by a 05-06 PPRT awardee was approved and started 9/1/09. Its title is "Whole-glove integrity and chemical resistance of disposable Nitrile gloves." A second R21 proposal was submitted this October 2009 by a PPRT awardee from our most recent 08-09 cycle in response to NIOSH PAR-09-139. This R21 proposal focusing on occupational EMF, electric shocks and ALS was submitted using data collected from the pilot project as preliminary studies.

Additionally, a PPRT project, from the 06-07 cycle led to a 4-year NIOSH RO-1 grant. The new project is entitled: "Implementing Risk Management Strategies to Prevent Injuries among Firefighters" (SPIFi, for short). This project will implement a version of the risk management paradigm previously applied in the Australian coal industry in an effort to reduce injury rates in three specific operations identified through the pilot project -- fireground, physical exercise/training, patient transport.

Thus, we have met our long term measures of effectiveness.

Awards

Jennerjohn, N., awarded $13,000, academic year 2006-07 from Nanotox-Toxic Substance Research and Training Grant (TSR&TP) for project title: Exposure Assessment of Airborne Carbon Nanotubes in the Workplace."

Phalen, R., awarded $15,000, 2008-2009 from College of Natural Sciences at CSUSB to conduct further glove research on the effect of simulated hand movement on chemical permeation. Three undergraduate students are working on this project.

Phalen, R., awarded $10,000 from NIH/Extramural Associates Research Development Award (EARDA)

Pilot Project Grant on the development of a sensitive and quantitative method for detecting holes in disposable gloves. Final administration pending.

Phalen, R., awarded $275,000 (direct cost only), from CDC/NIOSH, award no. 1R21 OH009327-01A2, project period 9/2009-8/2011, "Whole-glove integrity and chemical resistance of disposable Nitrile gloves."

Poplin, G., Burgess, Jefferey, awarded $1,280,000, from CDC/NIOSH, award no. 1R01OH009469-01, project period 09/01/09-08/31/13, "Implementing Risk Management Strategies to Prevent Injuries among Firefighters."

Young, K.E., awarded $5,000, Summer 2006 from the Community Environmental Health Stars Summer Project, project titled: Identifying Community Groups in the Greater Los Angeles Area Risk of exposure to Metal Contaminants.

Zhu, Yifang, awarded the Walter A. Rosenblith New Investigator award, 2007 by The Health Effects Institute.

Grant Submission:
Vergara, Ximena, "Development of Job Exposure Matrix for EMF-ALS Epidemiologic Studies Using Publicly-Accessible Data", R21 proposal Submitted October 16, 2009 to NIOSH.

5. Program support from other sources
The pilot project program receives no other direct financial support. It benefits significantly by the involvement of key faculty members in two other centers, the NIEHS Environmental Health Sciences Center and the EPA Southern California Particle Center and Supersite (SCPCS). This collaboration provides resources for reviewing proposals and technical guidance. The UCLA and UCI Centers for Occupational and Environmental Health (COEHs) provide academic year support for the Program Directors and other faculty members of the academic programs of the ERC. UCLA and UCI provide laboratory space and some funds for laboratory equipment.

6. Current and past pilot project training record
The Pilot Project training record for the reporting period (05-09) is summarized in Table 1. We have completed a total of nine years of our Pilot Project Research Training program. Since the beginning of the PPRT in 1999 through the 08-09 cycle we have recommended for funding 45 projects that have included 29 Trainees, including ERC and TPG, 9 junior faculty, and 3 new investigators.

For the 2005-09 cycles, 34 applications were received and 22 were recommended for funding. Seventeen recipients were trainees, two were new investigators and three were junior faculty. The principal investigator name and institution, project title, awarded amount, investigator category and NORA areas are given in Table 1.

Gender and minority issues. Because of the high level of diversity in the research communities in California and Region IX no specific plan is needed to increase participation in the PPRT by women and minorities. Our track record bears this out. During the reporting period 11(57%) of funded projects went to women and 9 (45%) went to minorities as defined by the EEOC.

NORA Research Training Program

Program Director: Dean Baker

Abstract

The National Occupational Research Agenda Research Support (NORARS) program is a joint program of UCLA and UC Irvine within the Southern California Education and Research Center (SC ERC). The NORARS program faculty included the IH program, the UCI Occupational Medicine program, and the SCERC research training initiative on work organization.

The program's goal has been to support implementation of NORA through (1) conducting regional needs and impact assessments; (2) providing administrative and technical research support within the ERC; (3) facilitating and coordinating interdisciplinary research on NORA priority areas; (4) supporting research training of graduate students in ERC programs; and (5) organizing outreach and education programs to disseminate information about NORA and NORA research topics.

The program collaborated with the SC ERC Continuing Education/Outreach program to conduct regional needs and impact assessments in 2004 and 2009 in conjunction with the ERC needs assessment and outcome survey. The needs assessment confirmed impressions about the need to enhance awareness about NORA and the importance of NORA research support.

During the reporting period, the NORARS program provided administrative support to the ERC pilot project program and research infrastructure support through the purchase of shared equipment used by industrial hygiene (IH) doctoral students to conduct NORA-related research.

The NORARS program provided stipends to doctoral students in the Industrial Hygiene program, which is the only SC ERC program approved for doctoral research training. In conformance with the NIOSH program guidelines, the NORA trainee support did not duplicate trainee support provided by the core programs. Five doctoral students received stipend support during the reporting period.

The program has also supported interdisciplinary research training in work organization and psychosocial stress, which is a SCERC training initiative area. Lectures on this topic were provided to the graduate students in the SCERC core courses at UCLA and UCI. A new course on Work Organization was developed and offered every year except one at UCLA. The program also developed a course on Occupational Cardiology that has been taught in the occupational medicine programs.

The program collaborated with the Continuing Education/Outreach program to develop continuing education conferences related to the NORA research findings. Some of the topics included Work Organization and Cardiovascular Disease, and Health Effects and Assessment of Mold Exposure. The program also organized a regional NIOSH Town Hall meeting to provide scientific and public comment on NORA.

The program's research training and outreach activities have substantially enhanced the impact of the NORA initiative in the region.

Program Report

A. Significance

The National Occupational Research Agenda Research Support (NORARS) program has substantially enhanced the impact of the NIOSH NORA initiative in the region by implementing multiple strategies to assess regional need for research training, to provide administrative and technical research training support with the SCERC, to provide support to doctoral students in the Industrial Hygiene program, to develop and teach courses in work organization and psychosocial factors as a training initiative of the SCERC, and to offer continuing education and outreach programs on NORA topic areas.

B. Outcomes and Impact

During the reporting period, the NORARS program collaborated with the Continuing Education/ Outreach program to conduct two regional needs and impact assessments on occupational health training. The survey findings are being used by the SCERC to revise the professional and research training programs to be responsive to regional needs.

The NORARS program facilitated research training in the Industrial Hygiene program by providing shared research equipment and supplies for the program. The NORARS program provided stipend support to five doctoral students for their doctoral research training.

Faculty supported by the program in the area of work organization and psychosocial factors provided lectures on this topic in core courses for each of the SCERC core programs. In addition, the faculty developed and have regularly offered two new courses on Work Organization and on Occupational Cardiology at UCLA and at UC Irvine.

The NORARS program has collaborated with the Continuing Education/Outreach program to develop and offer several continuing education and research symposia on NORA related topics. Examples include a 2002 course on Workplace Psychosocial Stress and Cardiovascular Disease; a public forum on Work Organization during Spring 2003; and continuing education conferences on the evaluation, health effects, and management of mold that were held in 2007 and 2008. The program also provided technical support for an international research conference on the Work Environment and Cardiovascular Disease held in March 2005, and for a NIOSH Town Hall meeting to provide scientific input on the NIOSH strategic plan for NORA held in 2006.

Examples of outreach meetings include presentations at the California Work and Health Study Group and meetings with community groups, such as the Orange County Asian and Pacific Islander Community Association, to present NORA-related research on work organization and psychosocial factors.

C. Technical Report

Goals and Objectives

The program's goal has been to support implementation of the National Occupational Research Agenda (NORA) through (1) conducting regional needs and impact assessments ; (2) providing administrative and technical research support within the ERC; (3) facilitating and coordinating interdisciplinary research on NORA priority areas; (4) supporting research training of graduate students in ERC programs; and (5) organizing outreach and education programs to disseminate information about NORA and NORA research topics.

Program Administration

The NORARS Program was directed by Dean Baker (UCI), the SCERC Deputy Director, in collaboration with William Hinds (UCLA), the SCERC director during the reporting period. Dr. Baker collaborated with the directors of the research training programs in each of the targeted areas. The IH doctoral training program was directed by Dr. Hinds in collaboration with Dr. Nola Kennedy and Dr. Shane Que Hee. The research training initiative in work organization and psychosocial stress has been directed by Dr. Peter Schnall in collaboration with Dr. Baker. Dr. Baker also interacted with Ms. Cass Ben-Levi (UCLA) of the CE/O program, who is responsible for coordinating outreach programs to disseminate the findings of SCERC research related to NORA-priority areas, especially the research projects of the trainees who are supported by the TRT Program.

The ERC Advisory Committee, along with the directors of the ERC core programs, served as the TRT Program's advisory committee. The committee met twice a year to evaluate the program. The committee includes representatives from ERC programs, business, government, and labor.

Program Faculty

The primary NORARS Program faculty included the IH program, the UCI Occupational Medicine (OM) program, and the research training initiative on work organization and psychosocial stressors.

IH Doctoral Research Training. William Hinds was a Professor in the Department of EHS and the IH Program Director during the reporting period. His teaching responsibilities included courses in Industrial Ventilation and Control Technology, and Aerosol Technology; and co-teaching responsibility for courses in Health Hazards of Industrial Processes, Physical Agents, IH Measurement Laboratory, Industrial and Environmental Hygiene Assessment, and Fundamentals of Environmental Health Sciences.

John Froines, Professor in the Department of EHS, was the director of the UCLA COEH and Director of the EPA Southern California Particle Center during the reporting period, and current Interim Director of the SC ERC. His teaching included responsibility for Risk Assessment and Standard Setting, and co-teaching responsibility for Fundamentals of Environmental Health Sciences.

Nola Kennedy is Assistant Professor in Residence in the Department of EHS. Her teaching included full responsibility for Physical Agents, Physical Agents Laboratory, IH Practice, and Introduction to GIS, and

co-teaching responsibility for Health Hazards of Industrial Processes, IH Measurement Laboratory, Industrial and Environmental Hygiene Assessment, and Control of Airborne Contaminants in Industry.

Shane Que Hee is Professor in the Department of EHS and current director of the IH program. His teaching includes responsibility for Instrumental Methods in Environmental Sciences, Biological Monitoring, Properties and Measurements of Gases and Vapors, Environmental Chemistry Seminar, and Identification and Analysis of Hazardous Waste, and co-teaching responsibility for Health Hazards of Industrial Processes, IH Measurement Laboratory, and Industrial and Environmental Hygiene Assessment.

Work Organization and Psychosocial Stress Training Initiative. The primary faculty in this research training initiative are Drs. Peter Schnall and Dean Baker. Dr. Schnall is a Clinical Professor in the Division of Occupational and Environmental Medicine, Department of Medicine, UCI School of Medicine, and an Adjunct Professor of Public Health in the Department of Environmental Health Sciences, UCLA School of Public Health. Dr. Schnall is an internationally recognized researcher in the field of work organization and psychosocial stress. His research uses epidemiological methods to evaluate associations between workplace psychosocial stressors and cardiovascular disease risk. He has made major contributions to research methods to assess work place stressors, to conduct workplace studies of ambulatory blood pressure, and to the design of workplace surveillance programs for cardiovascular disease risk.

Training Program Accomplishments

During the reporting period, the NORARS has provided support to industrial hygiene (IH) doctoral students to conduct NORA-related research for their doctoral dissertations. The program has also supported interdisciplinary research training in work organization and psychosocial stress, which is a SCERC training initiative area. The program also provided administrative support to the ERC pilot project program, research infrastructure support through the purchase of shared equipment, and outreach to raise awareness about NORA and NORA-related research findings to occupational health professionals in the region.

As noted above, the primary objectives during the reporting period were to conduct regional needs and impact assessments; (2) provide administrative and technical research support within the ERC; (3) coordinate interdisciplinary research on NORA priority areas; (4) support research training of graduate students in ERC programs; and (5) organize outreach and education programs to disseminate information about NORA and NORA research topics.

1. NORA Regional Needs and Impact Assessment Surveys

An initial program activity was to conduct a regional needs assessment to evaluate awareness about NORA and perceived need for NORA research and research training. This activity was conducted in conjunction with an ERC needs assessment survey. The ERC needs assessment was distributed to a wide range of occupational health professionals and organizations, employers, and worker groups in the region. The NORA needs assessment confirmed initial impressions about the need to enhance awareness about NORA and the importance of NORA research support.

A follow-up ERC and NORA needs and impact assessment survey was planned during 2007-08 and conducted during 2008-09.

2. Provide Administrative and Technical Research Support

The NORARS program has provided administrative and technical research support. The program purchased shared research equipment and supplies to support NORA-related research training. The program also provided technical support in conducting the peer reviews for the ERC pilot project program, since many of the projects related to NORA priority topics, which was one of the evaluation criteria for funding pilot projects.

Shared Research Equipment and Supplies. The NORARS program provided technical support for NORA research training for doctoral students in the Industrial Hygiene core program through the purchase of supplies that are being used for NORA research training. One piece of equipment was a CEM Microwave oven, which allows for extraction and digestion studies of glove materials to ascertain why different nitrile glove materials of the same lot from the same manufacturer, and gloves of the same material and thickness from different manufacturers, differ in their glove permeation characteristics to challenge chemicals. Program funds were also used to purchase 3025A-S Condensation Particle Counter (CPC), which is used to count and size ultrafine particle from 6 to 1000 nm. This system is essential for the conduct of the doctoral research for two industrial hygiene trainees. Program funds were also used 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.

Pilot Project program. The NORARS program also provided support to the Administrative Core in conducting the peer review of the pilot project proposals.

3. Coordinate Interdisciplinary Research

An early program strategy was to raise awareness about NORA in order to encourage more faculty and students to consider undertaking research and research training in the NORA priority areas. The program also has provided research training in ERC courses. A focus of the research training has been the ERC initiative in work organization and workplace psychosocial factors.

NORA Workgroup Posters. In order to raise awareness about NORA within the universities and at outreach meetings, the program downloaded and printed on durable plastic the posters developed by the NIOSH NORA workgroups. These posters were displayed at the UCLA School of Public Health and at the UCI Center for Occupational and Environmental Health. In addition, the posters were displayed at various ERC-related meetings and conferences. At these meetings, Dr. Hinds or Dr. Baker described the NORA program and the objectives and activities of the NORARS program. Displaying these posters appeared to be a very effective method to raise awareness about NORA research training opportunities.

Research Training on Work Organization and Psychosocial Factors. 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 the Industrial Hygiene program, Occupational Health Nursing program, and

Occupational Medicine Residents at UCLA and UCI. At UCLA, CHS 278 – Occupational Health Psychology (later re-named Work Organization) was developed by Dr. Schnall. This course has been offered each year except one during the reporting period. 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. Train Graduate Students with NORA Focus

The NORARS program provided technical support for NORA research training for doctoral students in the Industrial Hygiene core program, which is the only SC ERC program approved for doctoral research training, through the purchase of equipment that is being used for research training as described above and by providing stipends to the doctoral students. In conformance with the NIOSH program guidelines, the NORA trainee support did not duplicate trainee support provided by the core programs. In addition, the program provided partial support for a student research assistant for some of the research projects, and machine shop services. This support enabled the doctoral students to make substantial progress on their dissertation research. The following doctoral students received support during the reporting period:

Robert Phalen, 2003-07: Quantitative Surface Analysis For The Permeation Of Captan Through Gloves And Contaminated Surfaces.

In this research, the breakthrough and permeation of captan wettable-powder formulations were measured through common glove materials using American Society for Testing and Materials (ASTM) and attenuated total reflectance Fourier transform infrared (ATR-FTIR) methods. The primary aim was to develop and compare a new ATR-FTIR spectroscopy method with the standard ASTM method.

Jeffrey Birkner, 2003-07: Release of Particles from Commonly Used Respirator Filters.

The objective of this study was to quantify the number of particles that may be released from respirator filters under varying handling and loading conditions.

James Hollingshead, 2004-06, 2007-09: Ultrafine Particle Generation during Welding Operations

This project involved the study of ultrafine particle generation during gas metal arc welding (GMAC) or metal inert gas welding (MIG) operations. The objective was to quantify and correlate ultrafine particles generated to existing fume formation rates.

Nancy Jennerjohn, 2004-2009: Airborne Manufactured Nanoparticles in the Workplace

The main objective has been the identification of reliable aerosol measuring methods and instruments for determining the risk of adverse health effects due to manufactured nanoparticles in the air in the work environment. The goal is the advancement of safe work practices in nanoparticle manufacturing.

David Fung, 2007-09: Ultrafine Particles and Cooking Stoves.

The objective of the project was characterizing the physical characteristics of ultrafine particles (UFP) generated from cooking stoves

5. Organize Continuing Education and Outreach Programs related to NORA Research

The NORARS 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. An example of an continuing education and outreach meeting was the program organized in fall 2002 on workplace psychosocial stress and cardiovascular disease. This program was offered at the UCLA conference center and attended by researchers, employers, and occupational health professionals from the region. The NORARS and Continuing Education/Outreach programs also sponsored a public forum on Work Organization during Spring 2003. The program also provided some support for a research conference on the Work Environment and Cardiovascular Disease that was held in March 2005.

A major activity during 2005-06 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 proposed 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 program also provided support for a continuing education conference on the evaluation, health effects, and management of mold that was held at UC Irvine in 2007 and at UCLA in March 2008. This program was organized by the ERC CE/O program in collaboration with the NORARS program.

Examples of outreach meetings include presentations at the California Work and Health Study Group and meetings with community groups, such as the Orange County Asian and Pacific Islander Community Association, to present NORA-related research on work organization and psychosocial factors.

D. Publications

The major research training has related to the doctoral program in Industrial Hygiene and to the SC ERC initiative in work organization and psychosocial stress. Publications in these areas are shown in the List of Publications and Theses by Program Area - Industrial Hygiene and for the UCI Occupational Medicine program (for Drs. Baker and Dr. Schnall).

Hazardous Substance Academic Training

Program Director: Nola Kennedy

UCLA Hazardous Substances Academic Training Program, 2004-2009

Abstract
The UCLA Hazardous Substances Academic Training (HSAT) Program is offered as a minor specialization for students enrolled in the UCLA Industrial Hygiene (IH) Program. It is a training program with a focus on the management and control of chemical and radiation hazards that arise from commercial and industrial enterprises. This is accomplished through additional course work, field experience, and hands-on training in the hazards, measurement, control, and regulation of hazardous substances. The HSAT Program has successfully met its training goal since it was established with 2 to 5 students included each academic year. The Program was started in 1994 and, in 2002, was brought in sync with the review cycle for the UCLA IH Program. The UCLA HSAT Program is allied with the UCLA Center for Occupational and Environmental Health (COEH) and the UCLA Labor Occupational Safety and Health (LOSH) Program, which provide support for the program in the form of courses and faculty advising. The UCLA IH Program, which houses the courses and core faculty for the UCLA HSAT Program, is accredited by the Accreditation Board of Engineering Technology (ABET)/Applied Science Accreditation Commission (ASAC) until 2012.

Significant Findings
Academic Training
- The UCLA HSAT Program is a well-established program with continuing numbers of students and core faculty.
- The UCLA HSAT, through its training activities, is a comprehensive and effective program.

Program Report
The primary academic objective of the UCLA HSAT Program is the training of Master's level professional industrial hygienists with specialized knowledge and competence in the management and control of hazardous substances. The program is especially sensitive to the needs of the local community and Region IX in developing and refining course curricula with the overarching goal of improving worker health and safety and the prevention and remediation of environmental hazards. The core faculty members for the UCLA HSAT Program are the same as those listed for the UCLA IH Program and include William Hinds, John Froines, Nola Kennedy, and Shane Que Hee. As of June 30 (as noted else where in the report) , 2009, William Hinds retired, though remains on faculty as Professor Emeritus. John Froines, Professor in the Department of Environmental Health Sciences, has full responsibility for the Risk Assessment Standard Setting course and is serving as Interim Director of the ERC until a new Director can be recruited. In 2005, Nola Kennedy changed position from Assistant Researcher and Adjunct Assistant Professor to Assistant Professor in Residence. In 2007, she became Director of the HSAT Program. Shane Que Hee, Professor in the Department of Environmental Health Sciences, became Director of the IH Program upon the retirement of William Hinds.

Other personnel who contributed to teaching included Victor Liu, PhD, CIH now an industrial hygiene consultant, Craig Conlon, MD, PhD, a former IH Program doctoral student now employed at Kaiser Permanente, George Brogmus, MPH, a current doctoral student and professional ergonomist, Philip Harber, M.D., Professor in the Department of Medicine at UCLA, and Linda Delp, PhD, who is Director of UCLA LOSH and adjunct faculty in the UCLA Community Health Sciences department.

All students included in the UCLA HSAT Program are required to complete either an internship (MPH students) or research project (MS students) that focuses on hazardous substances. The internship project(s) and research project are jointly developed by the student, preceptor, and faculty to ensure that the project is appropriate, sufficiently challenging, academically rigorous, and valuable to the community, as well as the student.

The HSAT program requires two courses (additional to the course requirements of the IH Program) and completion of 40-hour HAZWOPER training. For students already HAZWOPER certified, the 8-hour refresher course is required. The HAZWOPER course is offered to all industrial hygiene students, but required only for HSAT trainees.

Honors and Awards

Students

Khadeeja Abdullah won a California Wellness grant in 2006, the Tony Norton Award in 2007, and the AIHF Liberty Mutual Award in 2007. Airek Mathews received the Outstanding Graduate Student Award from the Southern California and Orange County Sections of the American Industrial Hygiene Association in 2009.

Graduates

Seven out of the nine HSAT graduates for 2006-2009 are employed as industrial hygienists and have responsibility for the management and control of hazardous substances in their job duties. The remaining two graduates are enrolled in a UCLA doctoral program for environmental science and engineering, focused on hazardous substances in the environment. Of the seven working graduates, four are in private industry, one is employed by the federal government, and one works in industrial hygiene consulting. All but one of the nine graduates is employed in Region IX; the remaining one is in Washington, DC.

Conclusions

The UCLA HSAT Program is a well-established program with a stable student enrollment and core faculty. Curriculum and training activities have developed into a comprehensive and effective program.

Hazardous Substance Training

Program Director: Cass Ben-Levi

HST Progress Report

NOTE: Abstract missing.

Abstract

The hst program was very successful in providing a range of hazardous substance courses. In addition to review courses for hazardous materials professions, courses were added including brownfields remediation, confined space, orientation to environmental asessment and respiratory protection.

Program Description

- ***Goals and Objectives***– The objectives of the program are to provide health and safety professionals with:
    - updated training, which allows professionals to stay current with newly identified hazardous materials;
    - updated training, which disseminates best practices involving hazardous substances;
    - continuing education accreditation to enable them to maintain their licenses or certification in hazardous materials management;
    - review courses to prepare for professional certification examinations in hazardous materials management;
    - subsidies for health and safety professionals working for state or local government to make hazardous substance training more accessible to attend.
- ***Faculty Participation*** – while many faculty members work in collaboration with the HST Program, the following are of particular note:
    - William Hinds, ScD – oversaw and advised on all course and grant activities until his retirement on June 30, 2009
    - Nola Kennedy, PhD, CIH, CHMM – teaches sections of CHMM Review and acts as principal investigator and advisor on grants and other projects

Program Activities and Accomplishments

- New Director of Continuing Education/Outreach and HST was hired in October 2004.
- The program began to recover from several months without a permanent Program Director. New courses were put into development and old courses into renovation. The first new course, Risk Assessment, was offered in June 2005.
- The CHMM Review Course was completely overhauled 2005 and since that time has been a National Overview course in co-sponsorship with the Academy of Hazardous Materials Managers.
- A Confined Space for Managers course was created to reach out to health and safety professionals working for public agencies. Over the years it was very successful in creating relationships with dozens of public agencies throughout Southern California.
- 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.”

- Offered new courses in Risk Assessment, Risk Communication, and Hazard Communication.
- Provided an on-site 40-hour HAZWOPER training for the County of Ventura.
- The Program launched a new Workplace Safety and Health Professional Certificate. This comprehensive program provides certificate candidates with a thorough understanding of the challenges of workplace safety and health and the knowledge to be able to mitigate and/or overcome them. The curriculum includes core requirements and electives that allow participants to design the program best suited to their needs. In addition to the basic certificate, candidates can elect a Hazardous Substances specialty.

(Note: n/a in FPR)

Continuing Education/Outreach

Program Director: Cass Ben-Levi

CE/O Progress Report

Abstract

Over the years of this report the Continuing Education program has grown in terms of the depth and breadth of course offerings. Continuing education courses were initiated or strengthened to provide knowledge of best practices in each of the Center's disciplines – Occupational and Environmental Medicine, Occupational and Environmental Health Nursing and Industrial Hygiene, as well as Safety.

The program draws on its faculty as well as practicing professionals to offer courses through which participants can prepare for or maintain their professional accreditation.

Some of the expansion has been effected through collaboration with programs at other institutions, such as the University of Michigan ERC Center (Center for Occupational Health and Safety Engineering) the COEH Program at UC Berkeley.

Other expansion has been generated within the Program through developing new courses in response to needs assessment of its professional target audience. For example, its ergonomics program has grown substantially.

New technology has allowed the Program to offer courses online, greatly expanding its geographical reach.

In response to the changing world of occupational health and safety, where companies are now putting these responsibilities in the hands of non-professionals such as supervisors and lead workers, the Program has partnered with the OSHA Training Institute Education Center at UC San Diego to offer OSHA courses in both general industry and the construction industry.

Two new initiatives are in development and should become operational in 2010/2011. The Program has applied to become a Continuing Medical Education (CME) provider in order to offer more educational activities for physicians. The Program is also prepared to offer a new Workplace Safety and Health Professional Certificate with a comprehensive core of courses, and for which the enrollee may also choose to add an Advanced or Hazardous Substances specialty.

The Outreach Program has been very successful in obtaining grants to provide injury and illness prevention training for low-wage workers and their supervisors primarily in the hospitality industry and in preparing small businesses for pandemic flu.

Program Description

- ***Goals and Objectives***– The objectives of the program are to provide health and safety professionals with:
  - updated training which allows professionals to stay current with best practices in their discipline,
  - continuing education accreditation to enable professionals to maintain their licenses or certification
  - review courses to prepare for professional certification examinations,
  - opportunities for expanding their knowledge.
- ***Faculty Participation*** – while many faculty members work in collaboration with the Continuing Education Program, the following are of particular note:

- William Hinds, ScD – oversaw and advised on all course and grant activities until his retirement on June 30, 2009
- Dean Baker, MD, MPH – served as Faculty Chair of Mold Symposium and was a presenter at previous Mold symposia
- Philip Harber, MD, MPH – serves on Faculty Committee of the Ergonomics Symposium; initiated and supervised Surface Goods Movement Conference; serves as Course Chair of Mold Symposium; presented at previous Mold Symposia; will serve as Chair of the CME Faculty Committee if it is approved by the California Medical Association; advises on many projects and grant activities
- Nola Kennedy, PhD, CIH, CHMM – is co-course director for CIH Review; teaches sections of CHMM Review and Hearing Conservation courses; acts as principal investigator and advisor on grants and other projects
- Leslie Israel, DO, MPH - Will serve on the CME Faculty Committee if it is approved; is an instructor for the Cal/OSHA Aerosol Transmissible Disease Standard course; serves as an advisor on many projects and interdisciplinary activities.

Program Activities and Accomplishments

2004/05

- New Director of Continuing Education/Outreach and HST was hired in October.
- The program began to recover from several months without a permanent Program Director. New courses were put into development and old courses into renovation. The first new course, Risk Assessment, was offered in June.

2005/06

- In 2004/05 the Continuing Education program established a successful partnership with the OSHA Training Institute Education Center (OTIEC) 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.
- 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 avenues as needed topics.
- The 5-day Comprehensive Industrial Hygiene Review, which had not been offered by the Program since 2002, was overhauled and brought back.
- 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.

2006/07

- Offered our first independent course that included CME (Continuing Medical Education) accreditation – Mold: State of the Medical and Environmental Science – through the UC Irvine School of Medicine.
- New courses were added including Effective Cleaning and Contamination Control (IH), Controlling Sharps Injuries Conference (OHN) and a number of OSHA courses (IH and Safety); Health Effects of Surface Goods Movement Conference and Ergonomic Insights to Reduce Occupational Injury – Basics to New Research.

- The partnership with OTIEC at the University of California, San Diego was expanded to include California State University, Dominguez Hills. The number of classes increased to eight.
- The 5-day Comprehensive Industrial Hygiene Review was expanded to twice a year.

2007/08

- Launched monthly ergonomics webinar. For one hour each month, attendees connect by computer and telephone to participate in classes with subjects ranging from Basic to Advanced. Nearly 50 people subscribed to the entire series of twelve sessions.
- The Program also initiated Workplace Safety Weeks – three or four days of one-day classes. The staples are 1) How to Set Up an Injury and Illness Prevention Program and 2) Incident Investigation and Root Cause Analysis. Days Three and Four are variable and have included Communicating Safety and How to Set up a Workplace Violence Prevention Program.

2008/09

- The Program launched a new Workplace Safety and Health Professional Certificate. This comprehensive program provides certificate candidates with a thorough understanding of the challenges of workplace safety and health and the knowledge to be able to mitigate and/or overcome them. The curriculum includes core requirements and electives that allow participants to design the program best suited to their needs. In addition to the basic certificate, candidates can elect an Advanced or a Hazardous Substances specialty.

- Our monthly ergonomics webinar, which began in 2008, was expanded to two series -- Basic/Intermediate and Advanced. The system was improved by using VOIP so that participants can be connected through their computers for audio as well as visual. For one hour each month, attendees from all over the country participate in classes with the course director and guest speakers.
- Applied to become CME provider through the California Medical Association. The application is pending.

- **(Note: n/a in FPR)**
- **Outreach - Grants**

- Grants -- The CE/O Program received three important grants during this period:

  - In July 2006 the Program began a 3-year grant ($160,000) from The California Wellness Foundation to a) provide training for business owners, supervisors, environmental health and safety specialists (EH & S), labor representatives and workers in Identifying and Preventing Workplace Injury and Illness of Service Workers in the Tourism Industry and b) train health care providers in ambulatory settings about occupational health and safety issues that may affect their low-income patients.
  - In October 2006 the SCERC received a one-year grant ($188,287) from OSHA (Susan Harwood Training Grant) for Identifying and Preventing Workplace Injury and Illness of Groundskeepers. More than 700 workers and supervisors were trained.
    - Trained 697 in “Preventing Injury and Illness of Groundskeepers” in English and 50 in Spanish
    - Trained 54 in “Preventing Injury and Illness of Groundskeepers Train the Trainer” in English and 2 in Spanish.
  - In October 2007 the SCERC began a one-year grant ($259,796) from OSHA to train small business owners in three sectors to prepare for pandemic flu. More than 1,300 individuals were trained.
  - In June 2009 The California Wellness Foundation notified us that we would receive another 3-year grant ($200,000) beginning June 2009 to continue "Training to Prevent Workplace Injuries and Illness Among Low Wage Workers in Hazardous Jobs," primarily hotel housekeepers, janitors and kitchen workers.

List of Publications and Theses by Program Area

Articles published, accepted or submitted during the period 07/01/04 through 06/30/09 by ERC core program faculty members and pilot project recipients are listed below. Listed alphabetically by first author. Trainee authors are underlined.

Industrial Hygiene

Birkner, J.S., Hinds, W.C., Fung, D., Kennedy, N.J., "Particle Release from Respirators, Part I: Determination of the Effect of Particle Size, Drop Height and Load," Journal of Occupational Environmental Hygiene, Accepted.

Birkner, J.S., Kovalchik, S., Hinds, W.C., Fung, D., Kennedy, N.J., "Particle Release from Respirators, Part II: Determination of the Effect of Tension Applied in Simulation of Removal," Journal of Occupational Environmental Hygiene, Accepted.

Birkner, J.S., Hinds, W.C., Fung, D., Kennedy, N.J., "Particle Release from Respirators Part III: Assessment of Risk," Journal of Occupational Environmental Hygiene, Accepted.

Boeniger, M., Stull, J., Que Hee, S.S., Phalen, R., Buckley, T., Anna, D., Lui, Y., Vo, E., Gao, P., "Recent Methods Developments and Informational Needs for Chemical Protective Clothing (CPC) Being Supported by the National Institute for Occupational Safety and Health, 8th Symposium on Performance of Protective Clothing: Global Needs and Emerging Markets, Philadelphia, PA, 2004.

Conlon C.F., Krause N., Rempel D.M., "A randomized controlled trial evaluating an alternative mouse and forearm support on upper body discomfort and musculoskeletal disorders among engineers." Occupational Environmental Medicine. 65: 311-8, 2008.

Conlon C.F., Krause N., Rempel D.M., "A randomized controlled trial evaluating an alternative mouse and forearm support on change in median and ulnar nerve motor latency at the wrist." American Journal of Industrial Medicine, 52: 304-310, 2009.

Firestone, R.B. West, A., Kennett, J.P., Becker, L., Bunch, T.E., Revay, Z.S., Schultz, P.H., Belgya, T., Dickenson, O.J., Erlandson, J.M., Goodyear, A.C., Harris, R.S., Howard, G.A., Kennett, D.J., Kloosterman, J.B.,Lechler, P., Montgomery, J., Poreda, R., Darrah, T., Que Hee, S.S., Smith, A.R., Stich, A., Topping, W., Wittke, J.H. , and Wolbach, W.S. Evidence for an Extraterrestrial Impact 12,900 Years Ago that Contributed to the Megafaunal Extinctions and the Younger Dryas Cooling. Proceedings of the National Academy of Sciences, 104: 16016-16021, 2007.

Hinds, W.C., "Aerosol Properties," in AEROSOLS HANDBOOK: MEASUREMENT, DOSIMETRY, AND HEALTH EFFECTS, N.H. Harley and L.S. Ruzer, eds. CRC Press, Boca Raton, Florida (2005).

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. Air Pollution Health Effects Laboratory Report No. 06-01, University of California, Irvine, CA, USA.

Hinds, W. and Zhu, Y., "Measurement and Presentation of Aerosol Size Distributions," in AIR SAMPLING TECHNOLOGIES: PRINCIPLES AND APPLICATIONS, D. Leong, ed. American Conference of Governmental Industrial Hygienists, accepted (2008).

Jennerjohn, N., Eiguren-Fernandez, A., Fung, D.C., Hirakawa, K.S., Hinds, W.C., Kennedy, N.J., "Design, Demonstration and Performance of a Versatile Electrospray Aerosol Generator for Nanomaterial Research and Applications," *Nanotechnology*, 21:255603 (2010).

Kennedy, N.J. and Hinds, W.C., "Release of Simulated Anthrax Particles from Disposable Respirators," Journal of Occupational and Environmental Hygiene, 1, 7-10 (2004).

Kennett, D.J., Kennett, J.P., West, A., Mercer, C., Que Hee, S.S., Bement, L., Bunch, T.E., Sellers, M., and Wolbach, W.S., "Nanodiamonds in the Younger Dryas Boundary Sediment Layer", Science 323: p94 , 2009.

Kennett, D.J., Kennett, J.P., West A., West, G.J., Bunch,T.E., Culleton B.J., Erlandson,J.M.,Que Hee, S.S., Johnson, J.R., Mercer,C., Shen, F., Sellers, M., Stafford, Jr.,T.W., Stich, A., Weaver, J.C., Wittke,J.H., and Wolbach, W.S., "Shock-synthesized Hexagonal Diamonds in Younger Dryas Boundary Sediments", Proceedings of the National Academy of Sciences, 106:12623-12628, 2009

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", Journal of Chromatography. A, 1115: 246-252, 2006.

Krishnadasan, A., Kennedy, N., Zhao, X., Morgenstern, H., Ritz, B.: Nested Case-Control Study of Occupational Physical Activity and Prostate Cancer Among Workers Using a Job Exposure Matrix, Cancer Causes Control 19: 107-114, 2007.

Krishnadasan A., Kennedy N., Zhao Y., Morgenstern H., Ritz B., "Nested Case-control Study of Occupational Chemical Exposures and Prostate Cancer in Aerospace and Radiation Workers", American Journal of Industrial Medicine, 50: 383-390, 2007.

Kuhn, T., Krudysz, M., Zhu, Y., Fine, P.M., Hinds, W.C., Froines, J.R., and Sioutas, C., "Volatility of indoor and outdoor ultrafine particles near a freeway," Journal of Aerosol Science, 36, 291-302 (2005).

Napier, D., Boeniger, M., Boraiko, C., Cocker, J. and Shane Que Hee. " Biological Monitoring: An Introduction," The Synergist, 15 (4): 34-37, 2004.

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.

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,". Journal of Applied Polymer Science, 103: 2057-2063, 2007.

Phalen, R.N. and Que Hee, S.S., " Variability in Surface Infrared Reflectance of Thirteen Nitrile Rubber Gloves at Key Wavelengths for Analysis of Captan", Applied Spectroscopy, 61, 204-211, 2007.

Phalen, R.N. and Que Hee, S.S., " A Moving Robotic Hand System for Whole Glove Permeation and Penetration: Captan and Nitrile Gloves", Journal of Occupational Environmental Hygiene, 5: 257-270, 2008.

Que Hee, S.S. (Editor), "*Biological Monitoring: A Practical Field Manual*," American Industrial Hygiene Association, Fairfax, VA, 2004.

Chapters written by Dr. Que Hee:

Chapter 1: Purpose p1
Chapter 2: Scope p1
Chapter 3: Definitions and Abbreviations pp. 1-4
Chapter 4: Significance and Uses pp.4-5
Chapter 5: Elements of a Biological Monitoring Program in an Occupational and Environmental Hygiene Program (together with G. Spies, R .Suga, K. Cummins) pp. 5-12
Chapter 6: Sampling and Analysis (together with P. Ullucci, R. Suga, P. Michael, A. Zielinski) pp. 12-24
Chapter 7: Using Results pp. 24-32
Chapter 8: Ethical and Legal Aspects of Biological Monitoring pp. 32-35
Chapter 9: Normative References pp. 35-37
Appendix I: Introduction to Biological Monitoring and Question and Answer pp. 39-61.
Appendix II: Case Studies. pp. 63-80
Appendix III: Bibliography of Some Key Works in the Field, 1990-2002 pp. 81-90
Appendix VI: Some Important Internet URLs for Biological Monitoring Information p101

Que Hee, S.S., National Institute for Occupational Safety and Health. Final Performance Report NIOSH RO1 OH03754: *Permeation of Irritant Mixtures Through Protective Materials*, September 1 2004. PI: Shane S. Que Hee.

Que Hee, S.S., Association of Schools of Public Health/National Institute for Occupational Safety and Health S1891-21/21: Final Performance Report for *Field Glove Permeation Instrumental Methods Development*, Jan 1, 2005.

Que Hee, S.S., DeBord, G., Cocker, J., and Flessel, P., "Biological Monitoring and Government Agencies: Past, Present and Future," The Synergist 17(2): 50-53, 2006.

Que Hee, S.S. and Zainal, H., "Permeation of Herbical Dichlobenil from a Casoron Formulation through nitrile gloves," Arch. Environ. Contam. Toxicol., Accepted.

Ritz B., Zhao Y., Krishnadasan A., Kennedy N., and Morgenstern H., "Estimated Effects of Hydrazine Exposure on Cancer Incidence and Mortality in Aerospace Workers," Epidemiology 17:154-61, 2006

Sabty-Daily, R.A., Harris, P., Hinds, W.C., and Froines, J.R., "Size Distribution And Speciation In Paint Spray Aerosol At An Aerospace Facility." The Annals Occupational Hygiene, 49:47-59 (2005)
Sabty-Daily, R.A., Hinds,W.C., and Froines, J.R., "Size Distribution of Chromate Paint Aerosol in a Bench-scale Spray Booth." The Annals Occupational Hygiene, 49: 33-45 (2005).

Xing, X, Wu, G., Wei, F., Liu, P., Wei, Hu, Wang, C., Xu, J., Xun, L., Jia, J., Kennedy, N. Elashoff, D., and Robbins, W., Biomarkers of Environmental and Workplace Boron Exposure, Journal of Occupational Environmental Hygiene 5: 141-147, 2008.

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", Journal of Chromatography A, 1101: 25-31, 2006.

Xu, W. and Que Hee, S.S., “Permeation of a Straight Oil Metalworking Fluid Through Nitrile Gloves”, Journal Hazardous Materials, A137: 709-715, 2006.

Xu, W. and Que Hee, S.S., “Permeation of a Straight Oil Metalworking Fluid Through Disposable Nitrile, Chloroprene, Vinyl, and Latex Gloves”. Journal Hazardous Material, B147, 923-929, 2007.

Xu, W. and Que Hee, S.S., “Swelling of Four Glove Materials Challenged by Six Metalworking Fluids”, Archives of Environmental Contamination Toxicology, 54:1-8, 2008.

Xu, W. and Que Hee, S.S., “ Influence of Collection Solvent on the Permeation of Di-n-Octyl Disulfide Through Nitrile Glove Material,”. Journal Hazardous Material, 151: 692-698, 2008.

Xu, W. and Que Hee, S.S., “Permeation of a Metalworking Fluid Through a Latex Glove Under Field Use Conditions”, Bulletin of Environmental Contamination and Toxicology, In Press, 2009.

Zainal, H. and Que Hee, S.S., “Permeation of Telone EC Through Protective Gloves”, Journal of Hazardous Material. B124: 81-87, 2005.

Zainal, H. and Que Hee, S.S., “Permeation of Telone C-35 EC™ and Chloropicrin Through Protective Gloves”, Journal Applied 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.

Zainal, H. and Que Hee, S.S., “Permeation of Comite Through Protective Gloves”, Journal of Hazardous Material, B137, 165-171, 2006.

Zeidler, M. R., Goldin, J.G., Kleerup, E.C., Kim, H. J., Truong D.A., Gjertson, D.W., Kennedy N. J., and Newman, K. B; Tashkin D. P., Silverman, J. M., and Corren, J., “Small airways response to naturalistic cat allergen exposure in subjects with asthma”, Journal of Allergy Clinical Immunology,118: 1075-81, 2006

Zhang, K.M., Wexler, A.S., Zhu, Y., Hinds, W.C., and Sioutas, C., "Evolution of Particle Number Distribution near Roadways Part II: the 'Road-To-Ambient' Process," Atmospheric Environment,38, 6655-6665 (2004).

Zhang, K.M., Wexler, A.S., Niemeier, D.A., Zhu, Y., Hinds, W.C., and Sioutas, C. "Evolution of Particle Number Distribution Near Roadways. Part III: Traffic Analysis and On-road Size Resolved Particulate Emission Factors," Atmospheric Environment, 39, 4155-4166 (2005).

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,” American Journal of Industrial Medicine,48:249-258, 2005

Zhong, W. and Que Hee, S.S., “ Formaldehyde-induced DNA Adducts as Biomarkers of Human Nasal Epithelial Cell Exposure to Formaldehyde”, Mutation Research, 563: 13-24, 2004.

Zhong, W. and Que Hee, S.S., “Quantitation of Normal and Formaldehyde-Modified Deoxynucleosides by High-Performance Liquid Chromatography/UV Detection”, Biomedical Chromatography, 18: 462-469, 2004.

Zhong, W. and Que Hee, S.S. , “Comparison of UV, Fluorescence, and Electrochemical Detectors for the Analysis of Formaldehyde-Induced DNA Adducts”, Journal of Analytical Toxicology, 29: 182-187, 2005.

Zhu, Y., Hinds, W.C., Shen, S., and Sioutas, C., “Seasonal Trends of Concentration and Size Distribution of Ultrafine Particles near Major Highways in Los Angeles,” Aerosol Science and Technology, 38 (S1), 5-13 (2004).

Zhu,Y., Hinds, W.C., Krudysz, M., Kuhn, T., Froines, J.R., and Sioutas, C., “Penetration of Freeway Ultrafine Particles into Indoor Environments," Journal of Aerosol Science, 36, 303-322 (2005).

Zhu, Y. and Hinds, W.C., "Predicting Particle Number Concentrations Near a Highway Based on Vertical Concentration Profile", Atmospheric Environment, 39, 1557-1566 (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." Environmental Science & Technology, 40, 2531-2536 (2006).

Zhu, Y.,Yu, N., Kuhn, T., and Hinds, W.C., “Field Comparison of P-trak and Condensation Particle Counters”, *Aerosol Science and Technology* 40: 422-430 (2006).

Zhu, Y., Eiguren-Fernandez, A., Hinds, W.C., and Miguel, A.H., "In-Vehicle Exposure To Ultrafine Particles On Los Angeles Freeways," Environmental Science & Technology, 41, 2138-2145 (2007).

Zhu, Y., Fung, D.C., Kennedy, N., Hinds, W.C. and Eiguren-Fernandez, A, "Measurements of Ultrafine Particles and Other Vehicular Pollutants inside a Mobile Exposure System on Los Angeles Freeways." Journal of Air & Waste Management Association, 58:424-434 (2008).

Occupational and Environmental Health Nursing

Leach LS, Myrtle RC, Weaver FA, Dasu S (2009) Assessing the performance of surgical teams, Health Care Manage Rev 34:29-41.

Chen C, McNeese-Smith D, Cowan M, Upenieks V, Afifi A. (2009) Evaluation of a nurse practitioner-led care management model in reducing inpatient drug utilization and cost, Nurs Econ 27:160-8.

Connor KI, McNeese-Smith DK, Vickrey BG, van Servellen GM, Chang BL, Lee ML, Vassar SD, Chodosh J. (2008) Determining Care Management Activities Associated with Mastery and Relationship Strain for Dementia Caregivers, Journal of the American Geriatric Society, 56:891-7.

.

Robbins WA, Wei F, Elashoff DA, Wu G, Xun L, Jia J (2008) Y:X Sperm Ratio in Boron Exposed Men, Journal of Andrology,29:115-121 .

Xing X, Wu G, Wei F, Liu P, Wei H, Wang C, Jun X, Xun L, Jia J, Kennedy N, Elashoff DA, Robbins WA (2008) Biomarkers of Environmental and Workplace Boron Exposure, Journal of Occupational and Environmental Hygiene, 5:141-147.

Martin L, Chen H, Liao X, Allayee H, Shih D, Lee G, Hovland D, Robbins W, Carene K, Hess R, Lusis A, Collins M. (2007) FK506, A Calcineurin Inhibitor, Prevents Cadmium-induced Testicular Toxicity in Mice, Toxicological Sciences 100:474-485.

Lawson CC, Grajewski B, Daston GP, Frazier L, Lynch D, McDiarmid M, Murono 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.

Robbins WA. (2006) Chapter 8: Epidemiological and Occupational Studies of Metals in Male Reproductive Toxicity In: (Ed: Mari S. Golub) Metals, Fertility and Reproductive Toxicity, Taylor and Francis Publishers, pp.175-211.

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, American Association of Occupational Health Nurses Journal, 54:435-443.

McNeese-Smith, D., Baskaran, C., Abraham E.J., Gangadurai, N., Megala, C., Thangavelu, N. (2006). Nurse Education of the Public, in India, About the Dangers of Substance Abuse, Harvard Health Policy Review, Spring, 2006.

Leach, L.S. (2005) Nurse Executive Transformational Leadership and Organizational Commitment Among Staff Nurses. Journal of Nursing Administration, 35:228-37.

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 lLifestyle 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.

Chapin RE, Robbins WA, Scheive L, Sweeney A, Tabacova S, Tomashek K (2004) History Matters: The Influence of Pre- and Peri-conceptional Exposures, Parental Fertility, and Nutrition on Childrens' Health, Environmental Health Perspectives 112:69-78.

In review:
Gawlinski, A, Chung, KN, Davis, IJ (In review) Use of an Evidence-Based Shift Report Tool to Improve Nurses' Communication, American Journal of Nursing

Nyamathi AM, Casillas A, King M, Gresham L, Farb D, Weichmann C (in review) Effect of IMMEX Critical Thinking for Training Nurses on Bioterrorist Attach Agents.

Occupational Medicine (UCI)

Publications
Belkic, K., Landsbergis, P., Schnall, P., Baker, D., "Is job strain a major source of cardiovascular disease risk?" Scandinavian Journal of Work, Environment and Health 30:85-128, 2004.

Boekelheide,K,, Perrault,D. S., Daston,G.P., David, R.M., Luderer, U., Olshan, A.F., Sanderson,W.T., Willhite, CC, Woskie, S. 2004 NTP-CERHR Expert Panel Report on the Reproductive and Developmental Toxicity of 1-Bromopropane. Reproductive Toxicology 18:157-188.

.
Boekelheide, K., Perrault, D. S., Daston, G.P., David, R.M., Luderer, U., Olshan, A.F., Sanderson, W.T., Willhite, C.C., Woskie, S., "NTP-CERHR Expert Panel Report on the Reproductive and Developmental Toxicity of 2-Bromopropane," Reproductive Toxicology 18: 189-217, 2004.

.

Burgel, B.J., Lashuay,N., Israel,L., Harrison, R., Garment Workers in California: Health Outcomes of the Asian Immigrant Women Workers Clinic. American Association of Occupational Health Nurses Journal 2004 Nov; 52(11):465-75.

Hamai, D., and Bondy, S.C. Pro- or Anti-oxidant Manganese: A Suggested Mechanism for Reconciliation. Neurochemistry International. 44: 223-229. 2004.

Israel L., Cadmium. In: Olsen, editor. Poisoning & Drug Overdose, 4th edition. 2004 McGraw-Hill

Lahiri, D.K., Chen, D., Bondy, S.C. and Sharman, E.H., Dietary Supplementation with Melatonin Reduces Levels of Amyloid Beta-peptides in the Murine Cerebral Cortex Journal Pineal Research. 36: 224-231, 2004.

Lawson G, Luderer U. 2004 Gestational and Lactational Exposure to Heptachlor Does Not Alter Reproductive System Development in Rats. Veterinary Human Toxicolology. 46:113-118.

Lopez SG, Luderer U. 2004 Effects of Cyclophosphamide and Buthionine Sulfoximine on Ovarian Glutathione and Apoptosis. Free Radical Biology and Medicine. 36:1366-1377.

Luderer U, Tornero-Velez R, Shay T, Rappaport SM, Heyer N, Echeverria D. 2004 Temporal Association between Serum Prolactin Concentration and Exposure to Styrene. Occupational and Environmental Medicine. 61:325-333.

Luderer U, Bushley, A, Stover, BD, Bremner WJ, Faustman EM, Takaro TK, Checkoway H, Brodkin CA. 2004 Effects of Occupational Solvent Exposure on Reproductive Hormone Concentrations and Fecundability in Men. American Journal of Industrial Medicine. 46:614-626.

Sharman, E., Sharman, K. G., Lahiri, D. K., and Bondy, S. C. Age-related changes in murine CNS mRNA gene expression are modulated by dietary melatonin. Journal Pineal Research, 36: 165-170, 2004.

Aliyu OA, Cullen MR, Barnett MJ, Balmes JR, Cartmel B, Redlich CA, Brodkin 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. American Journal Epidemiology. 2005 Nov 1;162(9):868-78. Epub 2005 Sep 21.

Bondy, S. C., Campbell, A., Sharman, K. Z., Becaria, A., Lahiri, D., Chen, D. M. and Sharman, E. H. Dietary Melatonin Modulates Oxidative Rather than Inflammatory Parameters in the Brain. International Journal of Neuroprotection and Neuroregeneration, 1: 159-164, 2005.

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 Science Technology, 39:737-749, 2005.

Dwight RH, Fernandez L, Baker D, 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.

Fedoruk, MJ, Bronstein R. Ammonia Exposure and Hazard Assessment for Selected Household Cleaning Product Uses. Journal of Exposure Analysis and Environment Epidemiology (2005) 15, 534-544.

Luderer U, Cullen MR. 2005 Endocrine Disorders. In: L Rosenstock, M Cullen, CA Brodkin, 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 Brodkin, C Redlich (Eds), Textbook of Clinical Occupational and Environmental Medicine, New York: Harcourt Brace Jovanovich, pp 618-645.

Park, R. M., Schulte, P. A., Bowman, J. D., Walker, J. T., Bondy, S. C., Yost, M.G.,Touchstone, J. A., and Dosemeci, M. Potential Occupational Risks for Neurodegenerative Diseases. American Journal Industrial Medicine, 48:63-77, 2005.

Sharman, E. H., Sharman, K. G. and Bondy, S. C. Parallel Changes in Gene Expression in Aged Human and Mouse Cortex. Neuroscience Letters 390:4-8, 2005.

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.

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. Journal Neuroimmunology, 176: 16-23, 2006.

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. PMID: 16183247

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., Cadmium. In: Olsen, editor. Poisoning & Drug Overdose, 5th edition. 2006 McGraw-Hill

Israel L. Book Review: Preventing Occupational Disease and Injury by JL Weeks, BS Levy, and GR Wagner, eds. Journal of Occupational and Enviromental Medicine, 2006 June;48(6):650.

Kleinman, MT and Phalen, RF, Toxicological Interactions in the Respiratory System After Inhalation of Ozone and Sulfuric Acid Aerosol Mixtures. Inhalation Toxicology, 18:295-303, 2006.

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.

Phalen, RF and Hoover, MD, Aerosol Dosimetry Research Needs. Inhalation Toxicology 18:841-893, 2006.

Phalen, RF, Oldman, MJ and Nel, AE. Tracheobronchial Particle Dose Considerations for In-vitro Toxicology studies. Tox Sci 92:126-132, 2006.

Phalen, RF and Oldman, MJ, Aerosol Dosimetry considerations. Clinics in Occupational and Envonmental Medicine 2006.

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.

Yang H, Schnall P, Jauregui M, Su Ta-Chen, Baker D. Work Hours and Self-reported Hypertension Among Working People in California. Hypertension 48:1-7, 2006.

Baker D. Formaldehyde. In Rom W (ed): Environmental and Occupational Medicine, 4th ed. Lippincott, Williams & Wilkins, Philadelphia, 2007, 1129-1143.

Seltzer J.M., Fedoruk M.J., Health Effects of Mold in Children. Pediatric Clinics of North America, 2007 Apr;54(2):309-33.

Sharman, E.H., Bondy, S.C., Sharman, K.Z., Lahiri, D., Cotman, C.W., and Perreau, V.M. Effects of Melatonin and Age on Gene Expression in Mouse CNS Using Microarray Analysis. Neurochemistry International 50: 336-344, 2007.

Rosenberg J., Israel L., Clinical Toxicology. In: LaDou, editor. Occupational & Environmental Medicine, 4th edition. 2007 McGraw-Hill.

Tsai-Turton M, Luong BT, Tan Y, Luderer U. 2007 Cyclophosphamide-Induced Apoptosis in COV434 Human Granulosa Cells Involves Oxidative Stress and Glutathione Depletion. Toxicological Sciences. 98: 216-230.

Tsai-Turton M, Nakamura BN, Luderer U. 2007 Induction of Apoptosis by 9,10-Dimethyl-1,2-benzanthracene (DMBA) in Cultured Preovulatory Rat Follicles Is Preceded by a Rise in Reactive Oxygen Species and Is Prevented by Glutathione. Biology of Reproduction. 77: 442-451.

Baker D, Nieuwenhuijsen M. Environmental Epidemiology: Study Methods and Application. Oxford University Press, New York, 2008.

Landsbergis PA, Schnall PL. Belkić KL, Schwartz JE, Baker D, Pickering TG. Work Conditions and Masked (hidden) Hypertension—Insights into the Global Epidemic of Hypertension. Scandinavian Journal of Work, Environment and Health Supplement, 6:41-51, 2008.

Li, H, Campbell, A., Ali, S.F., Cong, P. and Bondy S.C. Chronic Exposure to Low Levels of Aluminum Alters Cerebral Cell Signaling in Response to Acute MPTP treatment. Toxicolologyand Industrial Health (2008).

Su T-C, Lin L-Y, Baker D., Schnall P.L., Chen M-F, Hwang W-C, Chen C-F, Wang J-D. Elevated Blood Pressure, Decreased Heart Rate Variability and Incomplete Blood Pressure Recovery after a 12-hour Night Shift Work. Journal of Occupational Health 50:380-386, 2008.

Baker D, Dobson M, Schnall P. Occupational and Environmental Medicine in the Twenty-First Century. In Schnall P, Dobson M, Rosskam E (eds.) Unhealthy Work – Causes, Consequences, Cures, Baywood Publishing, Amityville, NY, 2009, 283-298.

Koh D, Baker D. Occupational Health. In Detels R, McEwen J, Beaglehole R, Tanaka Heizo (eds): Oxford Textbook of Public Health – Volume 2, Oxford University Press, Oxford, 2009, 894-912.

Theses/OMR-Irvine

Tack Lam, MD, MS
"Effect of Fine Particles on Heart Rate Variability in Aged Rats". June 2005

Alan Hsu, MD, MS
"Exposure to Particulate Matter and Biomarkers of CNS Inflammation in Mice". June 2005

Richard Campbell, MD, MS
"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". June 2006

Michael Collins, DO, MS
"Evaluation of the Quantiferon – TB Gold Blood Test Instead of the Tuberculin Test: An Orange County Health Care Agency Occupational Health Process Improvement Project to Improve Compliance of Healthcare Workers and Other County Employees with Recommendations for Treatment of Latent TB". June 2006.

John Kim, MD, MS
"Historical Exposure Assessment to Airborne Cadmium within Military Occupational Specialties/Occupations" June 2007.

Elaine Tonel, DO, MS
"The Effect of Chronic Ambient Exposure to Particulate Matter on Heart Rate Variability, Heart Rate, and Blood Pressure in Healthy Adult Rats" June 2007.

Gerald West, MD, MS
"Devising a Reliable Method of Noninvasive Oximetry in Rats Exposed to Particulate Matter" June 2007.

Julie Fuller, MD, MS
"The Effects of *In Utero* Exposure to Heptachlor on the Reproductive Function of Women" June 2008.

Roger Hinkson, MD, MPH
"Predictors of VO_{2max} and Body Fat Among Fire Fighters in a Wellness-Fitness Program", June 2008.

Carmen L. Arriola, MD, MS
"Meat Consumption and Breast Cancer Risk: the Possible Role of Growth Promoting Hormones", June 2009.

Thieuha T. Hoang, MD, MS
"Community-Associated Methicillin-Resistant Staphylococcus Aureus: Still a Problem Among Our Military Recruits?", June 2009.

Stephen K. Kumar, MD, MPH
"Comparison of the Estimated VO2max Values Obtained Using Two Different Treadmill Protocols", June 2009.

Occupational Medicine (UCLA)

Harber P, Bansal S, Balmes J. Progression from Beryllium Exposure to Chronic Beryllium Disease: An Analytic Model. Environmental Health Perspectives. 2009 Jun;117(6):970-4.

Harber P, Harrison R, Gelb A. Response to Galbraith and Weill. International Archives of Occupational and Environmental Health. 2009 May 26. [Epub ahead of print]

Harber P, Levine J, Bansal S. How Frequently Should Workplace Spirometry Screening be Performed?: Optimization Via Analytic Models. Chest. 2009 May 1. [Epub ahead of print]

Harber P. Respiratory Disability: What Is It, How Can We Measure It, What Causes It and Is It Important? Thorax. 2009 Apr;64(4):280-2.

Bansal S, Harber P, Yun D, Liu D, Liu Y, Wu S, Ng D, Santiago S. Respirator Physiological Effects Under Simulated Work Conditions. Journal of Occupational and Environmental Hygiene. 2009 Apr;6(4):221-7. .

Harber P, Bansal S, Santiago S, Liu D, Yun D, Ng D, Liu Y, Wu S. Multidomain Subjective Response to Respirator Use During Simulated Work. Journal Occupational Environmental Medicine. 2009 Jan;51(1):38-45.

Harber P, Wynn BO, Lim YW, Mattke S, Asch SM, Nuckols TK. Selection of Workers' Compensation Treatment Guidelines: California experience. Journal Occupational Environmental Medicine. 2008 Nov;50(11):1282-92.

Tarlo SM, Balmes J, Balkissoon R, Beach J, Beckett W, Bernstein D, Blanc PD, Brooks SM, Cowl CT, Daroowalla F, Harber P, Lemiere C, Liss GM, Pacheco KA, Redlich CA, Rowe B, Heitzer J. Diagnosis and Management of Work-related Asthma: American College Of Chest Physicians Consensus Statement. Chest. 2008 Sep;134(3 Suppl):1S-41S.

Harber P. The Family Physician's Role in Assessing Impairment and Disability. American Family Physician. 2008 Jun 15;77(12):1655-6.

ACOEM Special Committee on Competencies. American College of Occupational and Environmental Medicine competencies--2008. Journal of Occupational Environmental Medicine 2008 Jun;50(6):712-24.

Nuckols TK, Lim YW, Wynn BO, Mattke S, MacLean CH, Harber P, Brook RH, Wallace P, Garland RH, Asch S. Rigorous Development Does Not Ensure that Guidelines Are Acceptable to a Panel of Knowledgeable Providers. Journal of General and Internal Medicine 2008 Jan;23(1):37-44.

Harber P, Tashkin DP, Simmons M, Crawford L, Hnizdo E, Connett J; Lung Health Study Group. Effect of Occupational Exposures on Decline of Lung Function in Early Chronic Obstructive Pulmonary Disease. American Journal of Respiratory and Critical Care Medicine 2007 Nov 15;176(10):994-1000..

Hnizdo E, Sircar K, Yan T, Harber P, Fleming J, Glindmeyer HW. Limits of Longitudinal Decline for the Interpretation of Annual Changes in FEV1 in Individuals. Occupational Environmental Medicine 2007 Oct;64(10):701-7

Harber P, Saechao K, Boomus C. Diacetyl-induced Lung Disease. Toxicological Reviews 2006;25(4):261-72.

Harber P, Crawford L, Cheema A, Schacter L. Computer Algorithm for Automated Work Group Classification from Free Text: the DREAM technique. Journal of Occupational and Environmental Medicine 2007 Jan;49(1):41-9.

Marchevsky AM, Harber P, Crawford L, Wick MR. Mesothelioma in Patients with Nonoccupational Asbestos Exposure. An Evidence-based Approach to Causation Assessment. Annals of Diagnostic Pathology 2006 Aug;10(4):241-50.

Harber P, Ducatman A. Training Pathways for Occupational Medicine. Journal of Occupational and Environmental Medicine 2006 Apr;48(4):366-75. .

Harber P, Crawford L, Liu K, Schachter L. Working words: Real-life Lexicon of North American Workers. Journal of Occupational and Environmental Medicine 2005 Aug;47(8):859-64

Yee T, Crawford L, Harber P. Work Environment of Dental Hygienists. Journal of Occupational and Environmental Medicine 2005 Jun;47(6):633-9. .

Crawford L, Gutierrez G, Harber P. Work Environment and Occupational Health of Dental Hygienists: A Qualitative Assessment. Journal of Occupational and Environmental Medicine 2005 Jun;47(6):623-32.

(In addition, numerous research abstracts were published and/ or presented)

PPRT Publications and Presentations
(trainee underlined)

Publications

Josyula, A.B., Kurzius-Spencer, M, Littau, S.R., Yucesoy, B., Fleming, J., Burgess, J.L. Cytokin Genotype and Phenotype Effects on Lung Function Decline in Firefighters. Journal of Occupational Environmental Mededicine 2007; 49:000-000.

Burgess, J.L., Fleming, J.E., Mulenga, E.M., Josyula, A.B., Hysong, T.A., Joggerst, P.J., Kurzius-Spencer, M., Miller, H.B. Acute Changes in Sputum IL-10 Following Underground Exposure to Diesel Exhaust. Clinical Toxicology (2007) 45, 1-6.

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,” Journal of Applied Polymer Science, 103: 2057-2063, 2007.
Phalen, R.N. and Que Hee, S.S., “ Variability in Surface Infrared Reflectance of Thirteen Nitrile Rubber Gloves at Key Wavelengths for Analysis of Captan”, Applied Spectroscopy, 61, 204-211, 2007.

Phalen, R.N., Que Hee, S.S., A Moving Robotic Hand System for Whole Glove Permeation and Penetration: Captan and Nitrile gloves, Journal of Occupational and Environmental Hygiene, April 2008.

Xu, W, and Que Hee, S.S., Permeation of a Straight Oil Metalworking Fluid through a Disposable and a Chemically Protective Nitrile Glove, Journal of Hazardous Material, A137:709-715, 2006.

Xu, W, and Que Hee, S.S., Permeation of a Straight Oil Metalworking Fluid through Disposable Nitrile,

Chloroprene, Vinyl, and Latex Gloves. Available online DOI:10.1016/jhazmat.2007.01.114, Journal of Hazardous Material, 151:692-698, 2008.

Xu, Wenhai, and Que Hee, Shane S. (2008). Swelling of Four Glove Materials Challenged by Six Metalworking Fluids. *Archives of Environmental Contamination and Toxicology*. 54 (1), 1-8. Available online at DOI:10.1007/s00244-007-9011-7.

Book Chapters

Robbins, WA, Young, KE, Wei F, (2007), Feasibility Study of Metal Effects on the X:Y Ratio in Human Sperm, In: (Eds: D. Anderson and M. Brinkworth) Male Mediated Developmental Toxicity, published by the Royal Society of Chemistry Publishing, United Kingdom. (direct contribution)

Robbins, WA (2006), Chapter 8: Epidemiological and Occupational studies of Metals in Male Reproductive Toxicity In: (Ed: Mari S. Golub(Metals, Fertility and Reproductive Toxicity, Taylor and Francis Publishers, pp. 175-211. (indirect contribution by PPRT recipient, Karen Young)

Presentations

Birkner, J., Invited Speaker to the Institute of Medicine of the National Academies Committee on the Development of Reusable Facemasks for Used during an Influenza Pandemic, March 6-7, 2006.

Birkner, J., Invited Speaker to the Institute of Medicine of the National Academies Committee on Evaluation of an Anthropometric Fit Test Panel for the National Institute of Occupational Safety and Health, 2006.

Birkner, J., Expert Reviewer on proposed research entitled: “Metabolic Evaluation of N95 Respirator Use with Surgical Masks for NIOSH, January 31, 2007.

Jennerjohn, N., Zhu, Y., Eiguren-Fernandez, A., Hinds, W.C., “Concentration Measurement of Aerosolized Single-walled Carbon Nanotubes,” International Aerosol Conference, St. Paul, MN; October 2006

Jennerjohn, N., Eiguren-Fernendez, A, Fung, D.C., Hinds, W.C., Kennedy, N.J. poster presentation, “Aerosolization of Manufactured Nanotubes, Quantum Dots, Urban Dust and Diesel Particulate Matter Using an Electrospray Device,” American Association of Aerosol Research. Reno: September 24-28, 2007.

Jennerjohn, N., Eiguren-Fernandez, A., Fung, D.C., Hinds, W.C., Kennedy, N.J, platform presentation scheduled: “Examination of Simulated Workplace Aerosols for Nanoparticle Contamination Using Transmission Electron Microscopy.” American Association of Aerosol Research. Orlando: October 20-24, 2008.

Ko, Pei-yi, Li D., Hoenig P. Bailey I. Rempel D., Effect of Computer Monitor Distance on Visual Symptoms, and Changes in Accommodation and Binocular Vision, Human Factors and Ergonomics Society, 2009, San Antonio.

Ko, Pei-yi, Li D., Hoenig P. Bailey I. Rempel D., Effect of Computer Monitor Distance on Visual Symptoms and Binocular Vision Changes. International Ergonomics Association (IEA), 2009, Beijing. (accepted but could not attend).

Ko, Pei-yi, Li D., Hoenig P. Bailey I. Rempel D., Oculomotor Changes and Visual Symptoms Associated with Computer Use. Association for Research in Vision and Ophthalmology (ARVO), 2009, Fort Lauderdale.
Mullen, Kathleen, presented poster of research study at the ICOH meeting in Vancouver BC, October 26-29, 2007.

Le, Thi (student research assistant for Phalen, R.N.), poster presentation, "Whole-Glove Movement and the Chemical Permeation of Disposable Glove Materials" at AIHce in Toronto, Canada, June 2009

Phalen, R.N., presentation, "The Influence of Hand Movement on the Permeation and Penetration of Captan Through Disposable Nitrile Rubber Gloves" at AIHce, Philadelphia, PA, June 4, 2007

Phalen, R.N., presentation, "Whole-glove permeation testing of disposable gloves with simulated movement" at AIHce in Toronto, Canada, June 2009.

Phalen, R.N., abstract submitted for presentation, "The Detection of Holes in Disposable Nitrile Gloves by Electrical Resistance," for AIHce in Denver, May 2010.

Takaku, Sayaka, presentation, Dynamic Sampling Method for Diacetyl and Acetoin Using Tenax TA Solid Sorbent and (2,3,4,5,6-Pentafluorobenzyl) Hydroxylamine Hydrochloride (PFBHA)" at AIHce, Toronto, Canada, June 1, 2009.

NOTE: Why are there 2 Table 1's with different columns? (we have consolidated into single table w/uniform headings, deleting all scoring!)

Table 1
Southern California ERC -- Pilot Project Studies 04-09

Name	Institution	Status	Title		Hum Subj.	NORA Areas	
04-05							
Krishna Asundi David Rempel	UCSF	Grad. Student Professor	Changes in Gene Expression in Flexor Tendons due to Cyclic Loading: An in Vitro Animal Model Experiment		No	Low Back Disorder	
Seema Bhangar Mark Nicas	UC Berkeley	Grad Student Adjunct Associate Professor	Validating a Model for the Fate and Transport of Particles in Room Air		No	Expsoure Assessment, Indoor Environment	

05-06	Institution	Status	Title	Delete this column		NORA Areas	Delete this column
Jeffrey Birkner	UCLA/SPH-EHS	OH&S doctoral student Faculty sponsor: N. Kennedy	"Release of Particles from Commonly Used respirators Filters"		No	Control Technology, PPE	
Karen Young	UCLA MolTox	MolTox doctoral student/ new investigator Faculty sponsor: W. Robbins	"The Effects of Occupational Nickel Exposure on Human Sperm DNA Integrity"		Yes	Fertility and Pregnancy Abnormalities	
Yifang Zhu	UCLA/EHS	Jr. Faculty	"Exposure to Manufactured Nanoparticles in the Workplace"		No	Exposure Assessment, Emerging Technologies	
Robert Phalen	UCLA/EHS	OH&S doctoral student Faculty sponsor: S. Que Hee	"Influence of Biomechanical Work Factors on the Permeation of Captan through Nitrile Gloves using Robotic Hands"		No	Control Technologies, PPE	
Wenhai Xu	UCLA/EHS	OH&S doctoral student Faculty sponsor: S Que Hee	"Permeation of Metal Working Fluids through Disposable Gloves"		No	Control Technologies, PPE	

06-07	**Institution**	**Status**	**Title**	Delete this column		**NORA Areas**	Delete this column
Jennifer Currie	Univ of AZ College of Public Health	Graduate Student	"Does rapid lung function decline in firefighters predict respiratory morbidity during their retirement?"		Yes	Asthma and COPD	
M. Fogleman/ Nancy Lawrence	Embry-Riddle Aeronautical University, Dept. of Safety Science	New Faculty	Evaluation of Biomechanical Stressors of Baggage Handlers (working title)		Yes	Musculoskeletal Disorders	
Kathleen Mullen	UCSF/OEH School of Nursing	Graduate Student	"Motivations and Obstacles to Returning to Employment for Nurses"		Yes	Social and Economic Consequences	
Gerald Poplin	Univ. of AZ/ ECH College of Public Health	Graduate Student	"Injuries among the Tucson Firefighting Population: Identifying Root Causes and Areas of Intervention"		Yes	Musculoskeletal Disorders, Risk Assessment, Traumatic Injuries	
07-08							
David Fung	UCLA/School of Public Health/ EHS	Graduate Student	"The Effects of Cooking Conditions on Ultrafine Particles"		No	Exposure Assessment,	
Nancy Jennerjohn	UCLA/School of Public Health/ EHS	Graduate Student	"Exposure to Manufactured Quantum Dots in the Workplace"		No	Exposure Assessment, Emerging Technologies	
Jason Wang	UCLA/School of Medicine Dept. Family Medicine	New Investigator (Sponsor)	"An Ergonomics Intervention for Ironing in Garment Industry"		Yes	Musculoskeletal Disorders	
Michael Wehner	UC Berkeley Bioengineering Ergonomics Program	Graduate Student	"Lift-assist System to Reduce Spine Loading for Warehouse Work"		No	Musculoskeletal Disorders	

08-09	Institution	Status	Title	Delete this column		NORA Areas	Delete this column
Arantza Eiguren-Fernandez	UCLA	New Investigator	"Toxicological properties of manufactured nanomaterials and their health effects."		No	Exposure assessment, emerging technologies, risk assessment	
David Fung & Nancy Jennerjohn	UCLA/School of Public Health/EHS	Graduate Students	"Evaluation of TEM Sampling Methods in Occupational Settings"		No	Exposure assessment, emerging technologies	
Pei-Yi Ko	UC Berkeley	Graduate Student	" Visual symptoms associated with computer use"		Yes	Organization of work, exposure assessment	
Sayaka Takaku	UCLA	Graduate Student	"Air Sampling Methods for Diacetyl and Acetoin		No	Exposure assessment	
Ximena P. Vergara	UCLA	Doctoral candidate	Feasibility Study: Development of a Job Exposure Matrix for EMF-ALS Epidemiologic Studies Using Publicly Accessible Data.		Yes	Exposure assessment (incl. electromagnetic fields, electric shocks)	