

FINAL PROGRESS REPORT

THE SOUTHWEST CENTER FOR OCCUPATIONAL AND ENVIRONMENTAL HEALTH

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LIST OF ABBREVIATIONS

AAAS - Association for the Advancement of Science

ABET – Accreditation Board of Engineering and Technology

ABPM – American Board of Preventive Medicine

ACGME – Accreditation Council on Graduate Medical Education

ACHMM – Academy of Certified Hazardous Materials Managers

ACOEM – American College of Occupational and Environmental Medicine

AG Center – Agriculture, Fishing and Forestry Center

AIHA – American Industrial Hygiene Association

AIHce – American Industrial Hygiene Association Conference & Exposition

APC – Administrative and Planning Core

ARM – Associate in Risk Management

ASSE – American Society of Safety Engineers

CBSP – Certified Biological Safety Professional

CCC – Clinical Competency Committee

CDC – Center for Disease Control and Prevention

CE – Continuing Education and Outreach

CEPH – Council on Education in Public Health

CHMM – Certified Hazardous Materials Manager

CHMP – Certified Hazardous Materials Practitioner

CHP – Certified Health Physicist

CIH – Certified Industrial Hygienist

CiSAL – Center for Research in Occupational Health

CPE – Certified Professional Ergonomist

CPHS – Committee for the Protection of Human Subjects (UTHealth IRB)

CSHEMA – Campus Safety, Health, and Environmental Management Association

CCSTE – Council of State and Territorial Epidemiologists

CTSA – Clinical and Translational Science Award

DoD – Department of Defense

DOL – Department of Labor

EHGES – Department of Epidemiology, Human Genetics, and Environmental Science

EH&S – Environmental Health and Safety

EOHS – Environmental and Occupational Health Sciences

EPA – Environmental Protection Agency

EPICOH – International Epidemiology in Occupational Health Conference

ERAS - Electronic Residency Application Service

ERC – Education and Research Center

HBCUs – Historically black colleges and universities

HESI – Health and Environmental Sciences Institute

HSE – Health, safety, and environmental

HMMT – Hazardous Materials Manager-in-Training

HST – Hazardous Substance Training

ICOH – International Commission on Occupational Health

IH – Industrial Hygiene

MPH – Master of Public Health

NIEHS – National Institute of Environmental Health Sciences

NIH – National Institutes of Health

NIOSH – National Institute of Occupational Safety and Health

NORA – National Occupational Research Agenda

NRC – National Research Council

OE – Occupational Epidemiology

OEH – Occupational and Environmental Health

OHN – Occupational Health Nursing

OIP – Occupational Injury Prevention

OSH – Occupational Safety and Health

OSHA – Occupational Safety and Health Administration

OM – Occupational and Environmental Medicine

PHR 6 – Public Health Region 6

PPRTP – Pilot Projects Research Training Program

r2p – Research-to-practice

RAC – Residency Advisory Committee

RFP – Request for Proposals

RRPT – Registered Radiation Protection Technologist

SARC – San Antonio Regional Campus

SHERM Department – Safety, Health, Environment and Risk Management Department

SMSA – Standard metropolitan statistical area

SON – School of Nursing

SWCOEH – Southwest Center for Occupational and Environmental Health

TAMU – Texas A&M University

TEJAS – Texas Environmental Justice Advocacy Services

TPG – Training Project Grant

TSAOHN – Texas State Association of Occupational Health Nurses

TX DSHS – Texas Department of State Health Services

UCL – University College London

UT – University of Texas

UTHealth – University of Texas Health Science Center at Houston

UTSPH – University of Texas School of Public Health

WESTON – Western States Occupational Network

WHO – World Health Organization

ABSTRACT

The University of Texas School of Public Health (UTSPH) is one of six schools within the University of Texas Health Science Center at Houston (UTHealth). The Education and Research Center (ERC) is housed in the Southwest Center for Occupational and Environmental Health (SWCOEH) in the Department of Epidemiology, Human Genetics and Environmental Sciences (EHGES) of the UTSPH. The ERC incorporates faculty and students from various disciplines related to occupational and environmental health. The UT (University of Texas) ERC has been continuously funded since 1977. The overall goal of the Center is to respond to the critical need for well-trained occupational and environmental health (OEH) specialists by providing graduate level academic and research training in the OEH disciplines and providing continuing professional education.

The UTSPH has multiple campuses, the main one located in the Texas Medical Center in Houston and five others in Austin, Brownsville, Dallas, El Paso and San Antonio. This makes the UTSPH unique among all other schools of public health in the United States. All campuses are linked electronically via interactive television, video conferencing, online course delivery and document sharing on a secure server. These resources facilitate seamless, quality teaching and research, expanded course offerings, interdisciplinary collaboration and access to regional stakeholders, as well as to expanded minority student populations. Since 2008, the ERC programs, faculty and students have been located at the Houston and San Antonio campuses.

Master degree level training during the reporting period was provided in Industrial Hygiene (IH) along with doctoral level training in Occupational Epidemiology (OE) and postdoctoral residency training in Occupational Medicine (OM). We also completed training of two doctoral-level occupational injury prevention trainees under phase-out funding. During the reporting period, the ERC has recruited 88 students into the core and allied academic programs. In total, 57 students have graduated (31 NIOSH funded trainees) and graduates have gone on to positions of importance and influence in the fields of occupational safety and health (OSH).

In addition to the academic graduate degree programs, the ERC has had active Continuing Education and Outreach (CE) programs that provided a full spectrum of training opportunities that have responded to changing needs in the occupational and safety arena. A total of 444 continuing education courses were delivered to almost 17,000 participants. These programs are enhanced by annual support of the Pilot Projects Research Training program (PPRTP) for new and transitional investigators. In total, pilot project research awards were made, totaling \$260,333, to new and transitional investigators in three states in federal Region 6.

There was important faculty recruitment in environmental and occupational health sciences at both our Houston and San Antonio campuses. We also developed and implemented a systematic process of evaluation for all academic and non-academic programs of the ERC. Finally, UTHealth received a philanthropic gift from SHELL Health to endow a faculty chair in occupational and environmental health, named in honor of the founding director of the National Institute of Occupational Safety and Health (NIOSH) and the SWCOEH, Dr. Marcus M. Key.

HIGHLIGHTS AND SIGNIFICANT RESULTS

Center-wide Activities

Administrative Core

We recruited two new faculty in environmental and occupational health sciences who joined the ERC and secured two new faculty lines in industrial hygiene and occupational medicine. We successfully developed and implemented a systematic process for program evaluation using a set of measurable criteria for all ERC academic and non-academic programs in accordance with the Center's goals and objectives. The plan for each program includes the classic components of inputs, throughputs (activities), outputs and outcomes. The intended impact includes short-term and long-term goals. Collectively, these evaluations provide a comprehensive review of ERC goals and objectives, evaluation of outcomes and opportunities to strategically plan for changes in the future. Also, UTHealth received a philanthropic gift from SHELL Health to endow a faculty chair in occupational and environmental health, named in honor of the founding director of NIOSH and the SWCOEH, Dr. Marcus M. Key.

Interdisciplinary Coordination

We expanded our interdisciplinary activities to include an annual "field" trip that included guided tours of heavy industry and adjacent neighborhoods along the Houston Ship Channel (June 2012), the Budweiser Brewery in Houston (June 2014) and a tour of Dow Chemical Plant in Freeport, TX (June 2015). These tours were attended by faculty, staff and trainees from all programs and provided opportunities to interact with practicing occupational health and safety professionals.

Outreach

The Outreach Program successfully strengthened and expanded its partnerships with local, regional and national professional associations. Leveraging our relationships with working practitioners allows us to develop and deliver timely educational events to meet the current training needs of the health and safety workforce throughout Public Health Region 6 (PHR 6). A few of our most successful partnerships include the Houston Health Forum (a group of occupational medicine physicians working in the petrochemical industry), the Greater Houston Industrial Hygiene Council (a group of certified industrial hygienists working along the Texas Gulf Coast), the Texas College of Occupational and Environmental Medicine (a group of healthcare providers working primarily in occupational medicine) and the American Industrial Hygiene Association (AIHA).

Pilot Projects Research Training Program

Of the proposals funded during the FY2011-FY2015 funding period, 10 (39%) have been awarded to research trainees, 12 (46%) to new investigators, and 4 (15%) to transitional investigators. During the reporting period, we awarded a total of 26 pilot project grants, totaling \$260,333 to investigators in PHR 6.

Industrial Hygiene Program

We received funding to conduct the following new research projects: a National Institute of Environmental Health Sciences (NIEHS)-funded, five-year research-to-action project to evaluate and mitigate health risks associated with the scrap metals industry in Houston (Dr. E. Symanski, PI with Drs. J. Rios and I. Han); a Department of Defense (DoD)-funded, three-year project to assess noise exposure and hearing loss in the military (Dr. Cooper, PI with Drs. Alamgir, Gimeno, and Whitehead); and a NIOSH-funded four-year project on occupational asthma among health care workers (Drs. Delclos (Occupational and Environmental Medicine (OM) and Gimeno (Occupational Epidemiology (OE)), Co-PIs and Drs. Whitehead and Han).

We received reaccreditation from the Accreditation Board of Engineering and Technology (ABET) of the IH curriculum until September 2021 (with no deficiencies, weaknesses or concerns).

Occupational and Environmental Medicine Residency Program

The OM Residency added several new and effective training sites during the reporting project period, including: The Houston Area Safety Council, Bayer Chemicals, the UT Physicians Department of Orthopedic Surgery and the Harris County Public Health and Environmental Services. We have instituted an annual

orthopedics workshop in conjunction with the UT Tyler OM Residency and the Texas A&M Preventive Medicine Residency, in which the OM residents learn the basics of orthopedic diagnosis and case management.

Occupational Epidemiology Program

We funded four traineeships per year and graduated six trainees over the reporting period. Four new trainees were recruited (three in 2012, one in 2014 and one in 2015). Our trainees received competitive scholarships. Notably Sarai Conway, PhD, was awarded a scholarship to present a poster at the International Epidemiology in Occupational Health Conference (EPICOH) in 2014 and Laura Lee received a scholarship from The University of Utah's Rocky Mountain Center for Occupational and Environmental Health to present work related to her dissertation on the linkage of the National Birth Defects Prevention Study and the Occupational Information Network at the regional National Occupational Research Agenda (NORA) symposium in April 2014. Overall, our trainees have authored over 20 publications, and several communications at national and international conferences. Of the graduates, one works as a clinical analytics manager at a major health insurance company, one is employed as a senior epidemiologist at a major oil company in Texas, another was selected to become a Center for Disease Control and Prevention (CDC)/NIOSH Epidemic Intelligence Service Officer, one has remained at UTSPH as a post-doctoral fellow and the most recent graduate has accepted a post-doctoral fellowship with the U.S. Army Institute of Surgical research.

Continuing Education Program

The program incorporated technology to a great extent in educational events. For example, we used instant polling technology in our courses to examine learner retention of concepts via pre- and post- course assessments. We also used this technology to guide sensitive group discussions, i.e., the seminar *Ethical Decision Making in Dual Loyalty Settings* and the seminar *Ethical Decision Making Tools for Enhancing Organizational Safety Culture*. Another technological accomplishment was the launch of an online platform to deliver asynchronous education. We developed four short courses (in English and Spanish) as part of our *For Everyone* series and two special edition online learning modules:

- Basic Emergency Preparedness for Everyone: An overview course in everyday readiness
- Preparación Básica Para Emergencias para Todos: Un curso general para la preparación cotidiana
- Basic Fire Safety for Everyone (Spanish version completed and currently undergoing quality review)
- Basic First Aid for Everyone (Spanish version in development)
- The Use of Personal Protective Equipment with Suspected Ebola-infected Patients in Ambulatory Care Clinics
- El Uso de Equipo de Protección Personal con Pacientes Sospechosos de Infección por Ebola en Clínicas de Cuidado Ambulatorio

Two exciting events included the collaborative development and delivery of *The Disaster Preparedness for Healthcare Workers and Those Who Care for Vulnerable Populations* – a symposium that drew 97 attendees interested in learning how to protect themselves, their families, and their patients before, during and after a disaster – and *The Chemical Contamination Tabletop Drill*, a simulated scenario with assigned roles for the 70 diverse participants.

OUTCOMES, RELEVANCE AND IMPACT

Center-wide Activities

For the Pilot Projects Research Training Program, awardees have contributed to 15 publications and 36 presentations. Additionally, there were also five funded grants that utilized data from PPRTF-funded pilot projects in the FY2011-FY2015 funding cycle. The SWCOEH made awards to researchers representing Texas, Oklahoma and Louisiana. Additionally, research topics have addressed occupational health and safety issues in multiple NORA industrial sectors including Agriculture, Forestry and Fishing, Construction, Healthcare and Social Assistance, Mining, Oil and Gas Extraction, Public Safety, Services and Wholesale and Retail Trade.

Industrial Hygiene Program

We graduated twenty-two masters IH trainees (>5 per year), nine DrPH trainees and three PhD trainees. Graduates are employed in such places as hospitals, biomedical research institutions, oil and gas companies, aerospace, consulting organizations and in the U.S. military.

Occupational and Environmental Medicine Residency Program

The Occupational Medicine Residency graduated seven qualified OM physicians in the four-year reporting period. These physicians have gone on to engage in practice careers of significant impact.

Occupational Epidemiology Program

During this reporting period, the OE program has trained a diverse group of 11 doctoral trainees, including about a third from underrepresented minorities. Doctoral dissertation research spanned diverse areas (e.g., maternal workplace emotional stressors and physical activity and adverse birth outcomes; long work hours and adverse health outcomes; occupational risk factors and long-term health across the life-course among military personnel; pediatric asthma incidence and associations with air pollution and the examination of methodological issues (e.g., adding occupation and industry into an electronic health records; factors affecting retention of adult Mexican-American participants in longitudinal population-based studies; developing a task-based exposure matrix for radiation; and evaluating the utility of Medicaid data for evaluating incidence of childhood asthma). Of the eleven trainees that have gone through the OE program in the reporting period, five are currently employed in occupational safety and health jobs within PHR 6, including one who is employed in academia as a post-doctoral fellow and four who work in governmental institutions (local, state or federal) as data analysts or officers in health-related institutions, and the other five in the private industry as researchers and consultants.

Continuing Education and Outreach Programs

The CE Program continued to expand in scope, partnerships and delivery methods. In total, our programs delivered 444 educational events to train almost 17,000 people, representing a total of over 84,000 person-hours of training. Just over 39% of these trainees were employed in non-academic private for-profit organizations.

We leveraged extramural funding from non-NIOSH sources and developed new partnerships to expand our training portfolio to include educational activities in emergency preparedness and in mitigating the impact of infectious diseases of public health significance, such as Ebola virus disease. Our online presence has increased to include asynchronous learning modules and live webinars.

Our Outreach Program is dynamic and has developed strong partnerships with the practitioner community, which allows us to rapidly develop and deliver training so that organizations can prepare their workforce for evolving situations. A few examples during the reporting period are as follows:

- The *Silica Exposures in Hydraulic Fracturing* symposium (delivered September 26, 2012) was attended by occupational medicine physicians working in the petrochemical industry. We provided the audience with the most recent information available, including the June 2012 report on crystalline silica and made an informal presentation (E. Symanski, SWCOEH Director) of a SWCOEH white paper to explore an

industry-academic collaboration to evaluate worker exposures in the unconventional oil and gas development industry. N=27.

- The *Higher Education Chemical Safety: Best practices and lessons learned* symposium (delivered November 1-2, 2012) was developed in response to the U.S. Chemical Safety Board report citing new guidelines for research laboratories after several major accidents resulted in major injuries and one death. N=97.
- The *Radioactive Source Theft in Mexico* seminar was developed to inform audiences about the international vulnerabilities of securing radioactive sources and the importance of a robust public health response, after an opportunistic theft of a truck containing a radioactive source was stolen in October 2013. This presentation was delivered several times, December 11, 2013 (n=20) and February 19, 2014 (n=62).

OVERALL DESCRIPTION OF UT EDUCATION AND RESEARCH CENTER

Background

The UT ERC is housed in the SWCOEH in the Department of Epidemiology, Human Genetics and Environmental Sciences and incorporates faculty and students from various disciplines related to occupational and environmental health. The overall goal of the Center is to respond to the critical need for well-trained occupational and environmental health specialists by providing graduate level academic and research training in the OEH disciplines and providing continuing professional education. SWCOEH goals were, and continue to be, to: 1) Provide graduate level training and continuing education; 2) Ensure interdisciplinary integration of SWCOEH programs; 3) Support and conduct translational Occupational Safety and Health (OSH) research; and 4) Ensure sustainability of the SWCOEH in the future.

The UTSPH, part of UTHealth was established in 1967 and offers master- and doctoral level degrees in the major public health disciplines. The UTSPH is the only CEPH (Council on Education in Public Health) accredited school of public health with an extensive regional campus system (six campuses in total). The six campuses serve Texas by providing education, research and service to the large geographic area encompassed by the state. The Houston campus, located in the heart of the Texas Medical Center, is the home campus and regional campuses are located in Austin, Brownsville, Dallas, El Paso and San Antonio. All campuses are linked electronically, facilitating seamless, quality teaching and research, expanded course offerings, interdisciplinary collaboration and access to regional stakeholders, as well as access to expanded minority student populations. The faculty teach and advise students at all campuses and students interact across campuses via interactive video classrooms and online learning modalities. Collaboration across the six campuses provides our students with myriad opportunities for research, practice and community service opportunities. Since its inception, the UTSPH has produced in excess of 7,000 graduates across all of our campuses.

The UT ERC has been continuously funded since 1977. Under the reporting period, we provided master degree level training in Industrial Hygiene (IH), doctoral level training in Occupational Epidemiology (OE) and Occupational Injury Prevention (OIP) (under phase-out funding) and postdoctoral residency training in Occupational and Environmental Medicine (OM). In addition to the academic graduate degree programs, the ERC maintained active Continuing Education and Outreach (CE) programs that provided a full spectrum of training opportunities, and was enhanced by annual support of the Pilot Projects Research Training Program (PPRTP) for new and transitional investigators. The SWCOEH has been a designated World Health Organization (WHO) Collaborating Centre in Occupational Health since 1986. These international educational and research activities greatly enrich the training environment of the SWCOEH and include the collaborative design and implementation of research training programs that involve exchanges of faculty and students among Latin America, Spain and the United States.

ERC Leadership

The ERC is led by **Elaine Symanski, PhD**, Center Director. Dr. Symanski is a tenured associate professor and became Director of the SWCOEH and Interim Director of the ERC in April 2011. NIOSH approved Dr. Symanski's role as ERC Director in February 2012. With training in exposure science and epidemiology, she brings relevant expertise to the ERC. Supporting Dr. Symanski is **Janelle Rios, PhD**, Deputy Director. Dr. Rios joined the faculty in December 2010, has masters and doctoral degrees in public health and extensive regulatory experience. Dr. Rios also directs the CE Program. She assumed the role of Deputy Director in July 2014 given the phased retirement of **Dr. Sharon Cooper** who filled this role previously. With her retirement, Dr. Cooper has served in an advisory capacity to the leadership team and continued to support the academic program in Occupational Epidemiology.

Program directors for academic programs include:

- **Lawrence W. Whitehead, PhD** (Industrial Hygiene),
- **Sharon P. Cooper, PhD** (Occupational Epidemiology, 2011-2014)
- **David Gimeno, PhD** (Occupational Epidemiology, 2014-2015)

- **Arch “Chip” Carson, MD, PhD** (Occupational and Environmental Medicine Residency)

Program directors for non-academic programs include:

- **Lawrence W. Whitehead, PhD** (Diversity Recruitment and Retention, 2011-2014)
- **Mary Ann Smith, PhD** (Diversity Recruitment and Retention, 2014-2015)
- **Arch “Chip” Carson, PhD** (Interdisciplinary Coordination, 2011-2014)
- **Inkyu Han, PhD** (Interdisciplinary Coordination, 2014-2015)
- **David Gimeno, PhD** (Pilot Projects Research Training Program, 2011-2014)
- **David Douphrate, PhD** (Pilot Projects Research Training Program, 2014-2015)
- **Janelle Rios, PhD** (Continuing Education and Outreach Programs)

Additionally, the Occupational Injury Prevention academic program was phased out during the project period. It was led by Dr. Benjamin C. Amick, III, PhD.

ERC Trainees and Graduates

During the reporting period, the ERC recruited 88 students into the core and allied academic programs. In total, 58 students graduated (including 31 NIOSH-funded trainees) and many have gone on to positions of importance and influence in the fields of occupational safety and health.

Resources and Environment

The abundant resources of the UTSPH and the unique regional campus structure make this an excellent setting for a state-of-the-art teaching and research facility in occupational and environmental health. UTHealth is located in the heart of the Texas Medical Center (TMC), one of the world’s most comprehensive medical complexes. The TMC, which comprises 54 member institutions dedicated to teaching and research in the health sciences, provides extraordinary opportunities for students to obtain a broad base of professional experience. UTHealth includes graduate schools in medicine, dentistry, nursing, biomedical sciences, biomedical informatics and public health. The UTSPH was established in 1967 and offers master- and doctoral- level degrees in public health disciplines. In addition to Houston, the UTSPH has five regional campuses in Austin, Brownsville, Dallas, El Paso and San Antonio.

The SWCOEH maintains two laboratories: an IH laboratory in Houston and an Ergonomics laboratory in San Antonio. These laboratories support research and teaching activities and are made available to trainees to support thesis and dissertation research.

Diversity Recruitment and Retention

To assure a steady supply of trained OSH professionals in the region, the ERC further developed and implemented a comprehensive recruitment plan in coordination with the Office of Student Affairs at the UTSPH to increase student enrollment and minority representation. The UTSPH is committed to equal access to its programs for all qualified applicants regardless of age, sex, race, disability, religion or national origin. Diversity needs are addressed with targeted recruitment at area historically black and minority colleges and universities. Since 2014, Mary Ann Smith, PhD, directs the ERC’s diversity and minority recruitment program. Dr. Smith serves the UTSPH as Associate Dean for Student Affairs. Her position allows the ERC to take full advantage of, and piggyback on, the myriad minority-focused recruitment and retention activities of the School. Also, as an outcome of the 2014 Environmental and Occupational Health Sciences (EOHS) strategic retreat, the faculty established a new student scholarship fund using internal discretionary funds. Each year up to fifteen \$1,000 scholarships are made available and awarded on a competitive basis. The objective of these small awards is to increase overall (not exclusively minority) student enrollment.

Human Subjects Summary

All projects that involve human subjects must receive prior review and approval by the UTHealth Committee for the Protection of Human Subjects (CPHS). The ERC has continually received CPHS approval since its founding. All pilot- or training-related research projects must receive additional review and approval by the CPHS or governing Institutional Review Board (IRB) of the research activity.

UTHealth policy requires that all investigators participating in research involving human research subjects, human derived materials or human derived data complete approved training on the protection of human research subjects. Moreover, certificates must be submitted for all personnel involved in the research protocol. During the reporting period, the educational requirement was met by completing the UTHealth-approved course, and certificates of completion were placed in the record as part of the protocol submission for review by CPHS.

TECHNICAL REPORTS

Center-wide Activities

Elaine Symanski, PhD

Administrative and Planning Core

The administration for UT ERC is housed in the SWCOEH, a research center within EHGES. The ERC is directed by the Center Director, Deputy Director and ERC Executive Committee, which comprises the directors of each program area. Beginning in 2011, the ERC expanded monthly meetings of the Executive Committee to include all ERC faculty. The rationale was to provide a mechanism to further enhance communication and provide opportunities for each faculty member to fully engage in ERC activities, including efforts to enhance the visibility of the ERC among internal and external stakeholders, broaden student recruitment activities and bring additional resources to the ERC. The leadership structure is further supported by an active and dynamic Board of Advisors who represent industry, relevant OEH disciplines, professional associations and worker groups. The ERC Executive Committee meets monthly and the SWCOEH Board of Advisors meets once each year. The Director maintains regular, daily contact with the ERC Executive Committee members on the Houston campus and at least weekly contact with those on the San Antonio campus. Additionally, UTSPH supports faculty travel between campuses and this allows for ongoing face-to-face exchange between Houston and San Antonio faculty in managing programs and setting priorities for the SWCOEH. The Director communicates with the Board of Advisors throughout the year via email as a way to promote bidirectional communication, i.e., keeping members up-to-date with ERC activities and soliciting guidance. Additionally, the Director and the Chair of the Board of Advisors meet once a year outside of the annual Board meeting to establish priorities for joint endeavors. The Center Director with the assistance of the Executive Committee and Advisory Board are engaged in needs assessments, strategic planning and program evaluation. Evaluation plans were developed for each academic and non-academic program of the ERC; feedback was sought from the Executive Committee and the Board of Advisors and these “living” documents will undergo changes with each implementation to further enhance the mission, goals and activities of the Center.

The ERC is led by **Elaine Symanski, PhD, Director**. With training in exposure science and epidemiology, she brings relevant expertise to the ERC. Dr. Symanski also serves on the Executive Committee for EHGES and on the Center Council for the UTSPH. Hence, she serves in a leadership capacity for both the Department and the School with ample opportunity to represent the ERC, as needed. **Janelle Rios, PhD** was named deputy director in July 2014, when **Sharon Cooper, PhD** began a two-year phased retirement. Dr. Rios joined the faculty in December 2010, has masters and doctoral degrees in public health and extensive regulatory experience. Supporting the ERC is a core of dedicated staff who provide administrative support, some of whom are funded by non-ERC sources. In addition to the ERC, the SWCOEH currently provides hazardous materials training with funding from the NIEHS and supports research spanning areas that include military health, ergonomics, farmworker health, workplace violence and air pollution epidemiology. Funding primarily comes from the National Institutes of Health (NIH), CDC NIOSH, DOD and the U.S. Environmental Protection Agency (EPA).

The ERC benefits from significant institutional support from the Dean of the UTSPH, as well as from the Director of EHGES. During the reporting period, we recruited two faculty members in occupational and environmental health. Additionally, the UTSPH committed two new faculty lines in occupational medicine and industrial hygiene in July 2014 and Dr. Symanski was named chair of the search committee. The institutional support provides important opportunities to leverage NIOSH funding to extend the reach and scope of our training programs, research and outreach activities.

Coordination and Integration of ERC Programs

Drs. Symanski and Rios work together seamlessly in providing leadership for the ERC. A core of dedicated faculty from Houston and the San Antonio Regional Campus (SARC) serve as Program Directors. Together, they provide a solid administrative structure and management core for the ERC. The video and web-based

communication technology greatly facilitates communication and collaboration between SARC and Houston faculty. All ERC program activities are coordinated through the administrative core, which facilitates the communication, resources and programmatic needs of Center activities, including processing student trainee appointments and other personnel actions, faculty and student travel, purchasing, database management and other administrative support. The core also maintains a shadow accounting system that allows for tracking of Program-specific budgets and reconciling with University reports that only provides accounting by expense category across all programs. The administrative core coordinates SWCOEH-sponsored events and meetings of the ERC Board of Advisors (annually), the ERC faculty (monthly) and SWCOEH program staff (bi-weekly). Under Center leadership, the Board of Advisors and Program Directors remain engaged in and informed of ERC activities. The Director is in regular contact with the Board, collectively and individually, and open bidirectional communication has been the hallmark of this interaction. Further, Board members often seek expertise from ERC faculty on OSH issues.

Organization of Center-wide Activities

The administrative core of the ERC is responsible for organizing and coordinating Center Wide Activities, including the evaluation and strategic planning processes, which involve extensive database management. We assess our ERC programs using a systematic process for program evaluation. We developed comprehensive evaluation plans for each academic and non-academic program of the ERC. With this evaluation, we assess whether we have met short-and long-term goals through the use of process and outcome indicators.

The core is also responsible for organizing conferences, meetings and retreats. Examples of such activities are SWCOEH field trips for faculty and trainees, a key interdisciplinary event that is organized once a year.

The administrative core also organizes visits by leaders in the field. As an example, Bernard Goldstein, MD, Emeritus Professor and Dean of the University of Pittsburgh Graduate School of Public Health, visited UTSPH on February 10, 2014. He met with faculty and students and delivered a keynote presentation on "Opportunities to Improve the Role of Public Health in Preventing and Responding to Oil Spills." Leaders such as Dr. Goldstein provide feedback to faculty and trainees for their research activities as well as input about the research agenda of the SWCOEH.

Records of ERC Activities and Outcomes

We maintain numerous databases (e.g., the Trainee Master List, the PPRTP Applicant and Awardee database, the CE Contacts database, Journal Club list, CE Course, Post Event Evaluation and Impact Surveys, the Advisory Board Communications database, Faculty and Trainee publications and the Proposal and Funded Projects database) that support development of process and outcome indicators. The administrative core is responsible for recording, maintaining and distributing meeting minutes, including those of the Advisory Board and Executive Committee. Moreover, we maintain a well-organized shared drive that is unique to the ERC and allows for access to up-to-date data and documents from any location. The shared drive is maintained by the UTSPH Information Technology Services on a protected server and is backed up daily.

Assessment of Overall Productivity, Effectiveness and Need

The assessment of Center activities was rooted in a carefully planned and deliberate strategic planning process that involved four planning retreats (2008 and 2009) and a regional needs assessment (2009-2010), which documented a clear need for ERC training programs. To assess each program's short-and long-term goals, the Center Director assembled an Evaluation Workgroup in 2011 to construct logic models (with inputs, throughputs (activities), outputs and outcomes) and evaluation plans for all academic and non-academic programs in the ERC. The purpose of the evaluation was to improve the quality of the SWCOEH in terms of operations (e.g., teaching, research and outreach) and administration (e.g., building databases, incorporating guidance from stakeholders and enhancing visibility) by assessing the activities and outcomes of each component of the ERC using a set of measurable criteria. We implemented processes for routine collection of data that would need to be assembled for this purpose. Output and outcome measures included, but were not limited to: number of graduates; time-to-graduation; trainee diversity; number and type of interdisciplinary events and research-to-practice (r2p) activities; diversity recruitment and retention activities; number, type and

geographical impact of pilot project research awards; and number and type of continuing education and outreach events. Collectively, these evaluations provided a comprehensive review of ERC goals to strategically plan for the future.

Other activities provided opportunities to assess the productivity, effectiveness and appropriateness of Center activities. These include several required reports to NIOSH: a final financial statement each September, a report of highlights each October, a non-competing renewal application with detailed progress reports each March and a data report each August (moved to October in 2014). Such reporting requirements allow us to collectively review our activities and highlight our successes as well as target areas that need improvement on an ongoing basis. In addition, ERC productivity and effectiveness was further assessed at Advisory Board meetings where we sought guidance on our activities and unmet or changing regional needs.

Within a larger context, degree programs are evaluated annually through job placement, graduation rates and exit student interviews by the UTSPH Office of Student Affairs. Student course evaluations assess ERC academic programs and contribute to the review of EOHS and Epidemiology faculty, curricula and degree program plans. Finally, the UTSPH Office of Research Services provides an annual reporting of all Centers operating within the School, which allows for an evaluation of productivity as it relates to the submission and awarding of contracts and grants.

Management of Advisory Committees

The Executive Committee is comprised of the Director, Deputy Director and Program Directors. The Executive Committee meets with the entire ERC faculty monthly. The purpose of these meetings is to disseminate information, solicit ideas and harmonize faculty participation in Center activities. In addition, these meetings are important avenues to facilitate active dialogue among the faculty. Minutes are recorded and distributed via email with action items clearly identified. In preparing annual budgets, reviewing monthly expense reports and submitting annual carry forward requests, Dr. Symanski confers with the Deputy Director and the Program Directors.

The External Board of Advisors is diverse and is actively engaged in the Center. Dr. J. Jack Hinton, Vice President of HSE&S - Enterprise Solutions at Baker Hughes serves as Chair. Membership on the Board was re-assessed in spring 2012 to ensure representation of stakeholders in industry, academia, labor and professional organizations. Center leadership holds annual meetings with the Board of Advisors. Dr. Symanski meets with Dr. Hinton to jointly plan the agenda and thereby maximize Board member feedback. Agenda items often relate to strategic planning and addressing the core business of the ERC. Additionally, Dr. Symanski maintains email contact with the Board throughout the year to provide updates and communicate about budgetary matters on the national level. Board members are also involved in other Center activities [e.g., OM Journal Club, IH internship placements, development activities, CE activities, occupational medicine rotation sites, research projects and grant applications]. Additionally, our board members identify employment opportunities for our graduates.

Interaction with Stakeholders

The ERC provides leadership in interacting with key OSH stakeholders at regional, national and international levels. The ERC faculty work closely with faculty and staff from the Agriculture, Fishing and Forestry (AG) Center at UT Tyler to strengthen OSH research, education and training in PHR 6. For example, together, the ERC and AG Center presented the poster "NIOSH Responds to Training Needs in U.S. Public Health Region 6" at the 2014 American Occupational Health Conference, the annual conference of the American College of Occupational and Environmental Medicine (ACOEM). The Deputy Director routinely meets with officers of professional associations (e.g., the AIHA, the Semiconductor Environmental Safety and Health Association, the Texas Medical Association and the Texas College of Occupational and Environmental Health) and other academic institutions (e.g., the University of Arkansas at Little Rock, Wake Forest University, New Mexico State University, Oklahoma Board of Regents, and the University of Texas System).

Meeting Goals

We made significant progress toward achieving our overall mission to respond to the critical need for well-trained OEH specialists by providing graduate level academic and research training. The ERC's 2011–2015 goals were: 1) Provide graduate level training and continuing education; 2) Ensure interdisciplinary integration of SWCOEH programs; 3) Support and conduct translational OSH research; and 4) Ensure sustainability of the SWCOEH in the future.

Goal 1a: Provide graduate level training

Between July 1, 2011 and June 30, 2015, the ERC graduated a total of 57 students. Of these graduates, 31 were NIOSH-funded trainees in the following academic programs: 13 in IH, 8 in OM, 8 in OE and 2 in OIP. What follows are highlights of our activities. Additional details are noted in the technical reports of each academic program.

With training in and outside of the classroom, our trainees are developing skills as able OSH professionals. OE trainee Laura Lee became a member of the American Association for the Advancement of Science (AAAS) and received a scholarship from The University of Utah's Rocky Mountain Center for Occupational and Environmental Health to present her dissertation research at the 12th Annual Regional NORA Young/New Investigators Symposium in 2014, held in Salt Lake City. OE trainee Sadie Conway presented a poster at EPICOH, held in Chicago in June 2014, entitled "*An Exposure Assessment Model for Long Working Hours.*" IH trainee, Jennifer Laine, received Best of Session awards two years in a row for posters presented at the American Industrial Hygiene Association Conference & Exposition (AIHce): "*Hydration Measurements Before and After Heat Stress Testing Using a Freezing Point Osmometer and a Personal Hydration Management System*" (2013) and "*Ergonomic Evaluation of the New Chemical Protective Suit for Military Emergency Responders*" (2014). IH trainees held internships at Baker-Hughes, British Petroleum, The Williams Companies, Disney World, and United States Department of Labor (USDOL)-Occupational Safety and Health Administration (OSHA). Several IH trainees (and IH faculty member Dr. Robert Emery) became Certified Biological Safety Professionals (CBSPs). OM residents have presented each year at the Texas College of Occupational and Environmental Medicine.

Upon graduation, ERC trainees have entered the workforce as OSH professionals. OM residents, Dr. Ayanna Jones accepted a position in the occupational health department of Chevron Corporation in Houston; Dr. Monica Saavedra began work for a worker health clinic, funded by the government in Northern Chile; Dr. Kemka Hekerem accepted an urgent care and occupational medicine position at Excel Health in Katy, TX; and Dr. Dalia Nessim has joined the faculty at the UT Health Science Center at Tyler (with Dr. Jeff Levin, Director of the NIOSH-funded AG Center). IH graduates obtained employment in industry (*Akzo-Nobel; Baker-Hughes Chemicals, BP North America, BP Trinidad and Tobago, Bureau Veritas, Chevron, Conoco-Phillips, CSX Railways, Oxy Chemicals, Waste Management Inc., and Chicago Bridge and Iron*); academia (*UT MD Anderson Cancer Center, UTHealth, West Texas A&M University, and UT Southwestern Medical School at Dallas*); and government (*USDOL-OSHA, NASA, The U.S. Navy, The U.S. Army, and the Arlington County Department of Environmental Services*). Former OE trainees, Judson Janak accepted a post-doctoral fellowship with the U.S. Army Institute of Surgical Research; Christina Socias joined NIOSH as an Epidemic Intelligence Service officer; Judy Wendt Hess works as a senior epidemiologist at Shell Health; and Robert Reynolds is a Clinical Analytics Manager at Cambria Health Solutions. OIP trainee, Cecilia Montano completed a postdoctoral position in the Department of Behavioral Sciences and Health Promotion in the School working on a project addressing OSH risks among day laborers and recently joined the UTSPH faculty.

Goal 1b: Provide Continuing Education

The CE Program delivered 444 educational events in the following topics: 54 in IH, 111 in Occupational Health Nursing (OHN), 154 in OM, 115 in Safety and 10 in "Other" topics. We trained 16,923 people for a total of 84,808 person-hours. Course participants represented the following professions: 1,177 physicians, 789 nurses, 1,169 industrial hygienists, 3,044 safety professionals and 10,797 individuals representing other and (e.g., attorneys, physical therapists and physician assistants) and unknown professions. Participants represented the following employer types: 6,678 from private industry, 492 from government (200 federal, 160

state and 132 local), 9,345 from academic institutions, 46 from foreign organizations and 303 did not report their employer type.

Goal 2: Ensure interdisciplinary integration of SWCOEH programs

All NIOSH trainees took part in interdisciplinary training, research and practice experiences. Some of these activities occurred in shared academic classes and field experiences. Additionally, trainees participated in monthly occupational health journal club, the bi-weekly EOHS seminar series and the annual PPRTP symposium. Trainees also attended lunch meetings with SWCOEH guests; a few examples include Dr. Bernard Goldstein, MD, Emeritus Professor and Dean, University of Pittsburgh Graduate School of Public Health; visiting scholar Dr. Elena Ronda from the University of Alicante in Spain with interests in migrant occupational health and occupational health disparities; and environmental epidemiologist Dr. Kristina Whitworth, new ERC faculty member at SARC. To expand interdisciplinary activities trainees also participated in annual SWCOEH-sponsored field trips, which were organized for the first time during the reporting period. Our field trips included:

- June 15, 2012: A guided tour of heavy industry and adjacent neighborhoods along the Houston Ship Channel. The tour was led by Juan Parras, a community organizer and founder of Texas Environmental Justice Advocacy Services (TEJAS). We chartered a bus to transport our group to the local neighborhoods along the channel. We stopped at a variety of sites including a metal recycling facility, a superfund site, a wastewater treatment facility and the ship channel turning basin. During the tour, our group observed the concentration and close proximity of these industries to residential neighborhoods.
- June 13, 2014: A tour of the Anheuser-Busch manufacturing facility in Houston was led by the facility's safety professionals. Our visit included walking tours of two large operations – the brewing production areas and the packaging area. In the brewing production areas, where we observed both automated and manual operations, and the engineering controls and personal protective equipment used to safely manufacturer products. In the packaging area, we observed the new barrier system (to promote forklift safety), quality control operations that use radiation producing devices (including the safety system built around those devices), and we took part in the hearing protection program.
- June 10, 2015: An educational visit of the Dow Chemical facility in Freeport, Texas. The tour was hosted by members of the facility's health and safety team, including the occupational medicine physician, safety professionals from different segments of the facility, industrial hygienists representing the local facility and the company's regional office, and plant operators. Highlights included a detailed discussion of the methodology used for collecting and analyzing exposure data and a walking tour of a light hydrocarbon production facility.

Goal 3: Support and conduct translational OSH research

We remain committed to translational research in the OSH arena and involve our trainees in these efforts. For example, OM Resident, Dr. Dalia Nessim was lead author on a NIOSH Personal Risk Factors Compendium document regarding the combined influence of occupational risk factors and personal risk factors in the occupational environment. OIP trainee, Cecilia Montano, with PPRTP funding worked at a major oil and gas company on a project evaluating the impact of case management on mental health outcomes for workers. Tim Read, another OIP trainee, worked on a r2p project to develop and test an OSH program survey, which provided evidence of effective safety and health management systems on reduced worker injury rates in the Gulf Coast region.

Goal 4: Ensure sustainability of the SWCOEH in the future

To ensure future sustainability, we critically analyzed each program within the ERC by developing and implementing detailed evaluation plans and analyzing the results. Based on these results, we implemented new initiatives to address our weaknesses and further build on our successes. We also expanded the funding base of the SWCOEH. Among the ERC faculty's new awards was multi-year funding from the DoD to estimate the prevalence and incidence of hearing impairment and auditory injury among active duty military and determine the economic burden of these conditions. This project involves ERC faculty from all core and allied programs. In 2010, we received funding from the NIEHS for The Texas-Utah Consortium for Hazardous Waste

Worker Training, a five-year project that represents a successful partnership between the SWCOEH and the University of Utah Rocky Mountain Center for Occupational and Environmental Health.

Also, in response to a proposal for a philanthropic gift developed by the SWCOEH and the development office at UTHealth, Shell Oil Company agreed to support a permanent endowed faculty chair in occupational and environmental health, **The Marcus M. Key, M.D. Shell Occupational and Environmental Health Endowed Chair**. This leading corporate partnership honors the legacy of Dr. Key, founding director of the NIOSH and founding director of the SWCOEH. Dr. Key's commitment to teaching and mentoring is a cornerstone of the SWCOEH that remains intact today.

We also recruited the following faculty:

Inkyu Han, PhD, joined the faculty as an Assistant Professor in EHGES in January 2012. He earned a PhD in Environmental and Occupational Health from the University of Medicine and Dentistry of New Jersey (now the Rutgers, The State University of New Jersey School of Public Health). He completed postdoctoral training at the Johns Hopkins School of Public Health in Environmental Health and Engineering. Dr. Han has participated in several international collaborative studies to understand the association between air toxics and respiratory health outcomes. His research interests include exposure assessment for personal exposure to environmental and occupational contaminants from air, water, soil, and food; biomarkers of exposure and dose in occupational and general environmental settings; and community-based exposure assessment with real-time equipment and sensors. Dr. Han's current research projects focus on physical and chemical characterization of ultrafine particles and traffic-related air pollution and noise exposure. Dr. Han teaches Environmental Sampling and Analysis, a required core course in our IH program.

Kristina Walker Whitworth, PhD, assistant professor in EHGES, was recruited to the San Antonio Regional Campus in October 2012. Dr. Whitworth obtained a PhD in Epidemiology from the University of Texas School of Public Health in 2009 with Dr. Symanski as her mentor. She then completed a postdoctoral fellowship at the National Institute of Environmental Health Sciences (NIEHS). While at the NIEHS, Dr. Whitworth worked under Dr. Matthew Longnecker in the biomarker-based epidemiology group. Dr. Whitworth's research focuses on the role of environmental exposures on women's reproductive health, pregnancy outcomes, and children's health outcomes. Currently, she is a principal investigator on a NIEHS-funded RO3 grant to assess associations between maternal residential proximity to unconventional oil and gas development and adverse birth outcomes. She also serves as a co-investigator for a DoD funded project examining hearing loss and noise exposures among active duty military personnel. Additionally, she is working on a community engagement project examining community concerns, perceptions and knowledge of shale gas extraction efforts in the Eagle Ford Shale area in Texas. Dr. Whitworth is a member of the OE program and is developing a new course in environmental epidemiology.

Accolades and Accomplishments

Faculty Awards, Recognition and Honors

The ERC faculty are committed to delivering high quality education and conducting translational research that impacts worker health. Two awards during the reporting period that reflect long-term accomplishments in occupational safety and health deserve special mention. In 2013, Dr. Sharon Cooper was awarded the Jane Dale Owen Professorship in Environmental Health Protection. Dr. Robert Emery received the 2012 Howard Fawcett Award for service to the field of safety from the American Chemical Society Division of Chemical Health and Safety.

Other notable activities of ERC faculty include the following: Dr. George Delclos delivered the Keynote address at the 50th anniversary of the founding of residency training programs in Spain ("La formación MIR en los Estados Unidos: algunos puntos para la discusión" [Residency training in the United States: a few discussion points] on October 18, 2013 in Oviedo, Spain. Dr. Hasanat Alamgir presented "Global Economic Change and its Impact on Occupational and Environmental Health in Bangladesh" at the Collegium Ramazzini in Carpi, Italy in fall 2013; he also delivered the keynote address in a meeting sponsored by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) on building occupational health capacity in Bangladesh in Dhaka, Bangladesh on May 27, 2014. Dr. Elaine Symanski was invited to a Health and Environmental

Sciences Institute (HESI) workshop held in Research Triangle Park, North Carolina, in October 2012 to discuss the utility of using epidemiologic data in risk assessments, including the use of advanced analytical methods to address sources of uncertainty. Dr. Symanski was also asked to join a National Research Council Committee of The National Academies to review the National Toxicology Program's assessment of styrene as a carcinogen. Dr. Lawrence Whitehead continued his activities with the AIHA Academic Accreditation Committee and served as a Program Evaluator for ABET. Dr. Gimeno was involved with the Mechanisms for Enhancing Scholarly Achievement (M.E.S.A.) program at the UT Health Science Center San Antonio. Dr. David Douphrate earned the Certified Professional Ergonomist (CPE) credential and Dr. Robert Emery became a CBSP.

Expanded Outreach to Meet Regional Needs

The SWCOEH and the AG Center at Tyler strengthened ties to coalesce efforts and support worker health and safety in PHR 6. To enhance visibility of our joint activities, we delivered a presentation at the May 2014 annual meeting of the ACOEM that highlighted the role of our NIOSH Centers to respond to workforce training needs in PHR 6.

We continued to strengthen our relationship with the Texas Department of State Health Services (TX DSHS) where Dr. David Gimeno serves as an alternate member on the state health department Institutional Review Board, Dr. Hasanat Alamgir served as the lead evaluator for the TX DSHS asthma plan and Dr. Sharon Cooper worked with the Cancer Registry on implementing the NIOSH Industry and Occupation Computerized Coding system.

We also expanded our regional visibility through activities of our CE program where we delivered 444 courses and trained almost 17,000 persons, representing a total of over 84,808 person-hours of training. During the reporting period, face-to-face courses were offered in every state in PHR 6. Regularly scheduled offerings included *Occupational Medicine Orthopedics Workshop; EHS Academy for Academic Institutions; Fundamentals of IH; Hearing Conservation Course; and Biological Safety Officer Training*. In addition, we also developed courses that responded to emerging needs of our stakeholders: *Understanding Environmental Illness: A Community Health & Wellness Workshop for Calcasieu Parish Physicians* (November 2011); *Assessing Chemical Exposures* (May 2012); *Houston Health Forum: Silica Exposures in Hydraulic Fracturing* (September 2012); *Higher Education Chemical Safety* (November 2012); *Houston Health Forum: Infectious Disease Threats in Petroleum Producing Areas* (September 2013); and *Public Health Implications of the Radioactive Source Theft Event in Mexico* (December 2013 and February 2014).

The SWCOEH also invested in a dedicated online platform from which to provide distance learning, including modular courses, training videos and webinars and developed the following courses:

- Basic Emergency Preparedness for Everyone: An overview course in everyday readiness
- Preparación Básica Para Emergencias para Todos: Un curso general para la preparación cotidiana
- Basic Fire Safety for Everyone (Spanish version complete, but not yet published)
- Basic First Aid for Everyone (Spanish version in development)
- The Use of Personal Protective Equipment with Suspected Ebola-infected Patients in Ambulatory Care Clinics

Our outreach activities were further enhanced through our PP RTP. During the reporting period, we awarded a total of 26 pilot project grants, totaling \$260,333, to investigators in PHR 6. Awardees presented their research findings at an annual PP RTP symposium, an event with broadened appeal because we provide continuing medical education credit and added a keynote speaker to the agenda.

Pilot Projects Research Training Program

David Gimeno, PhD (2011-2014)

David I Douphrate, PhD, MPT, MBA, CPE, CSP (2014-2015)

Background

In April 1999, the SWCOEH successfully submitted a proposal for a new Pilot Project Research Training Program (PPRTP) to enhance the Center's occupational safety and health research training mission and to foster stronger inter-institutional ties within PHR 6 in OSH research. The PPRTP is a critical element in the strategy of the Center to meet its regional outreach mission.

Program Administration

The PPRTP activities are administered under the Center Wide Administrative Core. It was under the direction of **David Gimeno, PhD** from 2009 through 2014, at which time he became director of Occupational Epidemiology. In FY 14, a new director, **David Douphrate, PhD, MPT, MBA, CPE, CSP** was identified to provide leadership and direction. Dr. Douphrate is responsible for developing and disseminating a formal request for proposals (RFP) each year; developing scientific and programmatic review criteria; annually selecting members of the scientific review panel on the basis of their expertise in evaluating the scientific merit of the submitted applications; organizing and facilitating proposal reviews; and overseeing fiscal matters and storage of all records of the PPRTP and of any products derived from funded projects.

David Gimeno, PhD, is a tenure-track Associate Professor and has served as the Director of PPRTP for the SWCOEH from 2009 to 2014. Dr. Gimeno joined the SARC in September 2009 from London, UK. In London he was Senior Research Fellow on the Whitehall II study in the Department of Epidemiology and Public Health at University College London (UCL) Medical School where he further developed his research expertise in occupational health, with particular experience in the social and cultural determinants of occupational injuries and illnesses. Dr. Gimeno currently holds an honorary associate position at UCL and an adjunct scientist position at the Institute for Work and Health in Toronto, Canada. In addition, he is part of the research team for the Central American Survey of Working Conditions and Health and the PI of a NIH/Fogarty funded project in Colombia on the assessment of opportunities and challenges in research and training occupational health. Dr. Gimeno leads the epidemiologic analysis of hearing loss on a DoD funded project examining hearing loss among active duty military personnel. He has a strong knowledge of data management systems and advanced statistical analysis skills, with particular emphasis on the use of multilevel statistical models. His occupational health-related research interests include topics on employment status, work organization and health, work stress, health-related productivity, and cross-national studies. His research focuses on occupational exposures and respiratory outcomes and cultural and psychosocial influences on disability. He teaches Applied Epidemiological Analysis in Environmental and Occupational Health and Introduction to Research Methods in Environmental and Occupational Health.

David Douphrate, PhD, MPT, MBA, CPE, CSP earned a PhD in Occupational Ergonomics and Safety from Colorado State University in Ft. Collins, CO, followed by a postdoctoral fellowship at the same institution. Dr. Douphrate also holds a Master of Physical Therapy (MPT) from the University of Texas Medical Branch at Galveston, TX, and Master of Business Administration (MBA) from the University of Mary Hardin-Baylor in Belton, TX. Dr. Douphrate earned his BS degree in Kinesiology from Texas A&M University and is a Certified Professional Ergonomist (CPE) and Certified Safety Professional (CSP). Dr. Douphrate's research focus is in the prevention of work-related musculoskeletal disorders and injuries through ergonomics and safety management and leadership. He is PI of a 5-year research study of ergonomic risk factors among large-herd dairy parlor workers. This study is funded through the NIOSH-funded High Plains and Intermountain Center for Agricultural Health and Safety. Dr. Douphrate is also PI of a 3-year project involving the development of a safety management and leadership training intervention among logging contractors in collaboration with researchers at the NIOSH-funded AG Center. Lastly, Dr. Douphrate currently serves as PI on an OSHA Susan Harwood Training Granting involving the delivery of safety training content to dairy workers. Dr. Douphrate currently teaches occupational safety, occupational ergonomics and occupational health and safety management and leadership courses at UTSPH. Dr. Douphrate has partnered with companies in the agriculture, poultry processing, manufacturing, healthcare and beverage industrial sectors to reduce worker

injuries while simultaneously improving productivity and efficiency. His expertise and experience in occupational injury prevention and rehabilitation as a physical therapist, combined with managerial and leadership expertise, provides a unique set of skills and experiences beneficial to the SWCOEH.

Specific Objectives

The goal of the PPRTP is to enhance the Center's occupational health and safety research training mission and to foster stronger inter-institutional ties within PHR 6 in OSH research. The main operational objective is to provide a support mechanism for small research projects, initiated by new investigators and research trainees, who explore the feasibility of new areas of study, allow investigators to collect preliminary data to subsequently develop R01 or similar type research applications and complete short-term projects.

Results and Discussion

The program has drawn proposals from across the region. A complete list of PPRT awardees for the reporting period is found in the Appendix, Table 2 and a list of products (e.g., publications) appears in the section on publications. Briefly, from an average of 12 applications per year during the original (FY1999-FY2004) funding period, the average number of applications increased to 15 per year during FY2011-FY2015, of which approximately half could be supported. In summary, since 1999, the PPRTP received 224 proposals for pilot studies and approved funding to support 111 (49.5%) research projects. Of the proposals funded during FY2011-FY2015 10 (39%) were awarded to research trainees, 12 (46%) to new investigators and 4 (15%) to transitional investigators. During the reporting period, awardees who have completed their studies have contributed to 15 publications and 36 presentations.

Program Plan

The process for selection and funding of pilot research projects is competitive and modeled after the NIH Center for Scientific Review's approach. The key element in this approach is evaluating the scientific merit of proposals by scientific review panel members, who are selected for their expertise and recruited from institutions in PHR 6 eligible to apply to the Program. This approach is consistent with two goals of the PPRTP. First, it provides for an objective and transparent scientific evaluation of the proposals. Second, the submission, evaluation and award mechanism afford experience with the NIH Center for Scientific Review process to new investigators and doctoral students, and thus it is an integral component of the research training objective of the PPRTP.

Trainee eligibility

Funds are available for the three following categories of awards.

Junior Investigator Award (formerly the New Investigator Award): Junior investigators have research interests in the general area of OSH. These are defined as faculty who have not served as PI on any Public Health Service-supported research grant, other than a R03, R15, R21, K01, K08 or K12 award. Junior investigators may be faculty at any academic institutions with OSH or related graduate programs in PHR 6, including those with NIOSH TPGs.

Research Trainee Awards: Doctoral students or postdoctoral fellows in an OSH discipline are eligible for awards.

New Investigator Awards (formerly the Transitional Investigator Award): New investigators are faculty in areas other than occupational health research who wish to apply their expertise to an OSH issue.

The maximum amount awarded to a single project was \$10,000 except for projects addressing the funding priority focus or transitional investigators who were eligible to receive awards up to \$20,000. In the last two rounds of the reporting period we gave funding priority to topics in petrochemical-related injuries and diseases, injuries in the plumbing and pipefitting industry, and hazardous worker exposure in the unconventional oil and gas industry, as well as to projects that merged big databases (e.g., Workers' Compensation data with Human Resources data) to address OSH questions.

Program announcement and competition

The dates of the RFP announcement, letter of intent, proposal deadlines and symposium for each year of the reporting period appear in Table 1.

Table 1. PPRTP Program Dates

Program Year	Calendar Period	RFP Announced	Letter of Intent	Proposal Submitted	Projects Awarded	Symposium
FY11	2011/12	02/17/11	03/25/11	04/29/11	07/22/11	
		09/29/11*	10/10/11	10/31/11	12/13/11	06/29/12
FY12	2012/13	03/07/12	04/12/12	04/30/12	08/17/12	
		01/18/13*	Not required	02/01/13	03/07/13	06/28/13
FY13	2013/14	04/04/13	04/15/13	05/17/13	08/06/13	06/20/14
		10/22/13*	10/29/13	11/22/13	06/05/14 ^a	06/05/15 ^a
FY14	2014/15	04/11/14	04/18/14	05/23/14	07/25/14	06/05/15

* 2nd Funding Opportunity Announcement

^a Three projects (2 UTSPH and 1 Tulane) started in award cycle 2014-2015

Program Announcement

In FY 14, we moved issuing the RFP earlier in the calendar year to facilitate a more expedient review of proposals and issuance of awards sometime in July. RFPs are announced around March 1 of the calendar year on the ERC website and distributed through email. The current PPRTP distribution list is comprised of contracts and grants office directors, ERC program directors, Board of Advisors and previous PPRTP applicants and awardees. During the reporting period, the distribution list was expanded to include Petroleum Engineering and Geology Departments and Industrial Hygiene Programs in PHR 6 academic institutions and EOHS and Epidemiology Departments in Schools of Public Health in PHR 6. Following an evaluation of the PPRTP (see below) that identified good coverage of PPRTP applicants and awardees in PHR 6 except for Arkansas, we also updated the distribution list to expand the number of recipients from institutions from this state. The RFP, application forms, instructions for applicants and review criteria are available through a link (www.sph.uth.tmc.edu/research/centers/swcoeh/pilot-projects) to the SWCOEH website.

Letter of Intent

The RFP requires applicants to submit a letter of intent approximately two weeks following the announcement. The purpose of the letter is to obtain information about the scope of planned proposals to begin contacting and recruiting reviewers for each application.

Proposal

The deadline for submission of proposals is within two months after the RFP announcement. The PPRTP faculty review applications for completeness and compliance with the requirements. Incomplete or noncompliant applications are returned to the investigator with an explanation as to why; copies of the applications are kept on file and salient information added to the PPRTP database.

Scientific and programmatic review

The PPRTP maintains a pool of potential reviewers with diverse expertise and experience. In order to avoid potential conflicts of interest, panel members cannot serve as reviewers of applications submitted by investigators from their home institution. Whenever appropriate, prior year trainees are recruited as reviewers because the critique of research proposals is considered a component of research training for doctoral students and new investigators. Reviewers are also recruited from faculty in graduate programs throughout PHR 6, thereby enhancing the inter-institutional outreach objective of the Program. At the end of the reporting period, the scientific review panel included 30 researchers from UTSPH, 34 from other institutions in Texas and 18 from outside Texas.

Applications that are complete and judged to be responsive undergo a two-level review. The reviewers receive a review packet that consists of the application, the RFP and the standardized review guidelines and template. Each application is assigned a primary and a secondary reviewer who provide a written evaluation and

preliminary scientific priority score. We use the current NIH 9-point scale for our scoring, with a range from 1 (exceptional, exceptionally strong with essentially no weaknesses) to 9 (poor, very few strengths and numerous major weaknesses). Reviewers are asked to evaluate whether minority, gender, animal welfare and human subjects issues are scientifically acceptable, as well as the appropriateness and adequacy of the proposed budget. The PPRTP Director and faculty review the scores and corresponding comments. If there is a wide discrepancy in scores, each reviewer is contacted to allow for a revised ranking after consideration of the score and comments from the other reviewer. For all applications, a final score is computed as the average of the two reviewers' overall score. The PPRTP faculty facilitate, but do not participate in the discussion and scoring of each proposal. Following the review, the applications are ranked in order of scientific merit.

Following the scientific review, the PPRTP program faculty conduct a *programmatic* review and make funding recommendations to the Center Director based on the proposal scores and the extent to which each application addresses the following elements: Research capacity-building of the investigators, Regional OSH needs, NORA objectives and interdisciplinary and inter-institutional collaboration.

Notification of awards

All applicants are notified by e-mail once the programmatic review is completed. The notification letters, modified in FY 12 to streamline and improve communications, specifies that IRB assurances must be in place prior to the issuance of awards and that scientific issues raised by the reviewers must be satisfactorily addressed in writing. The SWCOEH staff assist in establishing subcontracts (if the trainee is outside UTHealth) or SWCOEH accounts to allow UTSPH awardees access to funds. During the funding period, the SWCOEH staff monitor expenses, communicate with the investigator on budgetary issues, coordinate travel at which the investigator presents results at the annual Symposium, and procure information on research products related to the pilot award (i.e., presentations, manuscripts and grants applications).

Deliverables

Successful awardees are required to make an oral presentation at the annual SWCOEH PPRTP Symposium (see Table 1 for dates). The symposium is announced widely throughout UTHealth and CME credits are awarded (initiated in FY 12). Keynote speakers for the symposium have included previous PPRTP awardees as well as other occupational health practitioners who have presented on specific topics of interest. For example, the 2015 Symposium included a keynote address by Mr. James Shelton, MS, of the OSHA Houston North Area Office. His keynote address was entitled "OSHA Outreach to the Oil and Gas Industry: Opportunities and Challenges of Injury and Illness Data and Research".

The annual symposium serves to foster interdisciplinary collaboration internally and with other institutions. Second, each awardee must also provide a written final report on his/her project. The awardee is encouraged to prepare the report in manuscript format so as to encourage submission of the results for publication. Copies of all reports are kept at the UTSPH campus in Houston. During the reporting period, a Qualtrics survey was developed (in response to the PPRTP evaluation) to assist with tracking the short and long-term goals of PPRTP awardee research, including publications, presentations and future grants.

Regional need

There are several indicator measures of the need for the program. First, the program draws proposals from across the region. In spite of a large and diverse work force, PHR 6 has only one other NIOSH-funded pilot project program, which is a component of the AG Center at Tyler, Texas (pilot projects must be focused on agriculture). Since 2002, we have coordinated the SWCOEH-PPRTP activities with the Tyler program to minimize duplication and maximize benefits and breadth of research activities.

The PPRTP has made continuous improvements in dissemination of the program announcement and has increased the number of applications during 2011-2015. Table 2 shows a summary of the applications we have funded by year and whether the applicants were from the UTSPH or from outside of the School. During FY2011–FY2015, we received 76 letters of intent (286 since the start of the PPRTP in 1999), 79% (78% since 1999) of the letters were followed by full applications and we have funded 43% (50% since 1999) of the

proposals received. In this same period, 70% (75% since 1999) of the applications originated from outside investigators, with 30% (25% since 1999) from UTSPH researchers. For the reporting period, 62% (68% since 1999) of the awards have been granted to investigators from institutions other than UTSPH. In summary, the overall demand for NIOSH pilot projects research funding exceeds the Program's resources and we have continued to receive an increasing number of competitive applications from institutions across PHR 6, suggesting there is both a local and regional need for the Program to support research training in occupational safety and health.

Program records

All hard copy records relevant to the program are maintained in a secure file cabinet by the PPRT Program Coordinator. Electronic records are archived periodically on secure servers.

Table 2. Number of Letters of Intent, Proposals, and Awards

Program Year	Calendar Period	Letters of Intent	Proposals		Awards		Total (\$)
			SPH	Non SPH	SPH	Non SPH	
FY11 ^a	2011/12	21	5	10	4	5	80,358
FY12 ^a	2012/13	19	5	13	2	5	69,988
FY13 ^{a, b}	2013/14	28	7	13	4	3	39,790
FY14 ^c	2014/15	8	1	6	0	3	70,197
Total		76	18	42	10	16	260,333

^a Two Funding Announcements were released during the fiscal year. The numbers reflect the total from both RFPs.

^b Total does not include monies awarded to the three projects (2 UTSPH and 1 Tulane) to start in award cycle 2014-2015.

^c Total includes monies awarded to three projects from award cycle 2013-2014.

Collaboration with Regional Research Training Institutions, Including TPGs

The PPRTTP has a long history of collaboration with many Texas academic institutions with occupational health and safety programs, including The University of Texas Health Science Center at Tyler, The University of Texas Medical Branch in Galveston, Texas A&M University and Texas Tech University in Lubbock. The Program has expanded its reach to other Texas institutions (University of Texas at Austin, University of Texas Health Science Center Southwest Medical Center, University of Texas at Arlington, University of Houston, Texas Women's University, Sam Houston State University, Baylor University, University of Texas at Tyler, and Baylor College of Medicine) and institutions in other states in the Region (University of Oklahoma, Oklahoma State University, University of Tulsa, University of New Mexico, Southeastern Louisiana University, University of Louisiana and Tulane University). There are four principal mechanisms that have enhanced collaboration. First, faculty and students from these institutions are eligible to participate on the Scientific Review Panel. Second, all investigators from occupational safety and health and other relevant graduate programs in PHR 6 may submit proposals for pilot project funding. Third, networking among the SWCOEH and other institutions is enhanced as a result of the funded-project presentations at the UTSPH. Finally, the *new investigator* awards offer an opportunity for researchers in other fields to include aspects of OSH in their studies.

Program Evaluation

In the fall of 2011, the SWCOEH Director assembled an Evaluation Workgroup to include the Director, Deputy Director and CE Director to construct evaluation plans for all major programs under the SWCOEH in accordance with the Center's goals and objectives. Once the plans were developed, the Evaluations were conducted in 2013.

The main component of the PPRTTP evaluation is determining whether it meets its original objectives to enhance the Center's OSH research training mission and foster stronger inter-institutional ties within PHR 6. To help establish objective measures of impact, we collect data in three areas: (1) impact on institutional collaboration within PHR 6, measured by the number of applications and of faculty and trainees from outside UTSPH who serve as reviewers; (2) impact on new knowledge derived from PPRTTP study results, measured by proportion of completed doctoral dissertations among student trainees; publication of PPRTTP study results

in peer-reviewed journals; presentation of PPRTP study findings at scientific meetings and presentation of PPRTP project findings at non-scientific meetings; and (3) potential impact on future knowledge, through additional studies that PPRTP projects made possible or to which the projects made important contributions, measured by the use of PPRTP findings to support R01 grant applications and other applications. The PPRTP provides to the Center Director reports that include data on the numbers of proposals and funded projects, range and ranking of scores from the scientific reviews and resulting publications and presentations.

Three areas needing improvement were identified as an outcome of the Evaluation. For each one, Action Plans were developed:

1. *Limited representation of some states in terms of proposals submitted.* Action Plan: Expand the distribution list by targeting underrepresented states via both individual contacts from ERC faculty and previous awardees as well updating on a regular basis the distribution list. Develop relationships with faculty at academic institutions throughout PHR 6 by visiting campuses in underrepresented states.
2. *Limited scientific productivity of awardees in terms of publication.* Action Plan: Distribution of an annual online survey which will facilitate improved tracking of short and long-term goals of research, including publications, presentations and future grant development.
3. *Limited dissemination of program products.* Action Plan: Improve branding and advertisement by disseminating study findings via the SWCOEH website with additional links to "Current awards" and "Previous awards," as well as links to "Outcomes of the PPRTP" (e.g., publications, presentations and grants).

In summary, we made the following strategic decisions following the Evaluation: we strengthened our efforts to encourage awardees to submit grant proposals. We emphasize the importance of information dissemination by requesting a brief plan for publication of pilot project results as part the Program application. In addition, we will administer a survey to award recipients for a period of up to 5 years after projects end. The administration of the survey will have the dual purpose of collecting data from research trainees on their activities as well as feedback that can be helpful in refining our PPRTP.

Another outcome of our evaluation activity was formal recognition that the PPRTP contributes to the SWCOEH and ERC research training objectives. ERC trainees are eligible to apply to the PPRTP. Also, PPRTP activities provide an avenue for student recruitment to ERC academic programs. Moreover, the PPRTP symposium provides a setting for interdisciplinary activities, another goal of the ERC.

Finally, in addition to providing funding, the PPRTP provides mentoring throughout the process of submission and review of the scientific merit of each proposal. All applicants receive copies of the written reviews; applicants who receive awards must respond to all reviewer comments before they can begin their projects. For awardees who are doctoral students, mentoring is the responsibility of the student's advisor at his/her institution. New investigators also have mentoring faculty at their home institutions. The PPRTP requires applicants to provide a mentoring plan in their pilot submission.

Program Support from Other Sources

Other sources of support from the PPRTP program come from state-funded salary support for Program faculty and administrative personnel. This includes significant pre- and post- award support provided to EHGES faculty. In-kind support is also provided by laboratory personnel who assist PPRTP investigators who need analytical laboratory equipment or expertise.

Conclusions

We have met all of our objectives of enhancing the Center's research training mission and fostering stronger inter-institutional ties within PHR 6 in occupational health and safety research. We have achieved these objectives by providing a support mechanism for small research projects initiated by new investigators and research trainees which explore the feasibility of new areas of OSH research.

Background

Regional Need for ERC

PHR 6 is home to economically important industries. Houston hosts the largest medical center in the world (the healthcare industry is one of the largest in the state, according to the North American Industry Classification System, or NAICS); southeast Texas is a major center of petrochemical and oil and gas activities in the U.S.; and Texas is prominent in the semiconductor industry. Additionally, Texas is a major agricultural state and is the largest port-of-call state with Mexico. Eight of the top 12 (and 4 of the top 5) seaports in the U.S. in tonnage (2012) are in PHR 6, including South Louisiana (#1), Houston (#2), New Orleans (#4) and Beaumont, Texas (#5) (USDOT, 2015). Other industries are significant as well, e.g., natural resources production, education (with attendant campus health and safety issues), service industries, and construction.

The Houston-The Woodlands-Sugarland Metropolitan Statistical Area (MSA, 10 counties) grew from 4.7 million people in 2000 to an estimated 6.4 million in 2014, a 36% increase (2.6% per year). The Dallas-Ft. Worth-Arlington SMSA is even larger (6.8 million) and the two are the fifth and fourth largest MSAs in the US in 2014, respectively (US Bureau of the Census, 2015). Six of the 20 largest cities in the U.S. (2015) are in Texas, Houston (#4), San Antonio (#7), Dallas (#9), Austin (#11), Fort Worth (#16) and El Paso (#19) (Biggestuscities.com, 2015). In population, Texas grew from 20.8 million in 2000 to approximately 26.6 million in 2014, a 27.9% increase (2.0% per year) (Texas State Data Center, 2015).

By 2050 the Dallas-Ft Worth and Houston MSAs are projected to each have a population above 10,000,000 (New Geography, 2015). Similarly, Texas is projected (assuming continuation of the same net migration rates as in the last ten years) to grow to 30.5 million in 2020, 37.2 million in 2030, and 45.0 million in 2040 and is estimated to already be a minority-majority state (Texas State Data Center, 2015). By 2035, Hispanics alone are projected to reach 50% of the Houston MSA, and to reach 50% of Texas between 2035 and 2040 (Texas State Data Center, 2015).

Given these data, the Industrial Hygiene Program of the Texas ERC is well located in Houston, Texas.

Regional Need for IH Academic Program

The IH curriculum in the UTSPH has been continuously updated since the program was created in 1977. It currently has five faculty members. The primary IH faculty members, and respective years of arrival in the program, are Professor Robert Emery (1999), Associate Professors Lawrence Whitehead (1986) and Elaine Symanski (1996) and Assistant Professors Inkyu Han (2012) and David Douphrate (2010). Dr. Emery is part time in the academic program, for a total of 4.15 full-time equivalent (FTE) faculty members.

The IH concentration is strongly enhanced through the availability of NIOSH funds. Financial support from the training grant remains a central and vital source of funding for full-time IH students. Other potential sources of support for IH students include, in addition to extramurally funded projects, student fellowship funds from the AIHA Foundation (several of our students have won these national scholarships during the reporting period) and 3M national IH scholarships. Additionally, the UTSPH EOHS Program makes small scholarships available for incoming students' tuition, which also allow them to waive out-of-state fees.

In summary, the IH Program is meeting its overall mission to graduate students to be qualified practitioners and researchers in order to meet the nation's need for highly qualified OSH professionals.

Program administration

The IH program director is **Lawrence W. Whitehead, PhD, CIH**. Dr. Whitehead is a Certified Industrial Hygienist (CIH) and has passed the American Board of Industrial Hygiene subspecialty examination in Indoor Environmental Quality. In 1999, Dr. Whitehead was selected as a permanent Fellow of the AIHA. Dr.

Whitehead is a tenured associate professor, in the EOHS Program in EHGES, and teaches a two-semester core course sequence in industrial hygiene, Fundamentals of Industrial Hygiene, and Occupational Health Controls. He also co-teaches the Occupational Health Field Trips course, and co-teaches the EOHS MPH program course, Recognition of Hazards in Environmental and Occupational Health. He advises students on courses, enrollment, and internships. He prepared the successful 1995, 2001, 2008 and 2014 self-study reports for ABET accreditation, managed the application site visits (including Nov. 2014), and manages the ongoing accreditation maintenance process. Dr. Whitehead serves on the Accreditation Committee of the Academy of Industrial Hygiene, for which he has served as a site visitor to more than 15 schools, has served as a NIOSH site visitor to 10 schools, and is a corresponding member and past chair of the AIHA Exposure Assessment Strategies Committee. He has recently been appointed to the ABET Board of Delegates, representing the AIHA. He chaired the AIHA Academic Special Interest Group from 2005 to 2008. He served as ERC director from 1991 through mid-1997, served as acting director of the Division of Environmental and Occupational Health during 2004–2005. He is currently the admissions coordinator for the EOHS Program. His research interests are principally in application of exposure assessment issues in occupational and environmental epidemiology. He lectures in CE courses on Fundamentals of Industrial Hygiene.

Inkyu Han, PhD, joined the faculty as an Assistant Professor at the UTSPH in January 2012. He earned a PhD in Environmental and Occupational Health from the University of Medicine and Dentistry of New Jersey (now the Rutgers, The State University of New Jersey School of Public Health). He completed postdoctoral training at the Johns Hopkins School of Public Health in Environmental Health and Engineering. Dr. Han has participated in several international collaborative studies to understand the association between air toxics and respiratory health outcomes. His research interests include exposure assessment for personal exposure to environmental and occupational contaminants from air, water, soil, and food; biomarkers of exposure and dose in occupational and general environmental settings; and community-based exposure assessment with real-time equipment and sensors. Dr. Han's current research projects focus on evaluating and mitigating health risks associated with emissions from metal recycling facilities in Houston's neighborhoods (E. Symanski, PI). In this project, he is leading the yearlong community air monitoring campaign. Dr. Han teaches Environmental Sampling and Analysis, a required core course in our IH program.

Program faculty

Dr. Thomas Stock retired during the current reporting period. Dr. David Douphrate joined the faculty in August 2010 (along with Dr. Han in January 2012). The IH core program faculty are described below.

Robert Emery, DrPH, CIH, CSP, CHP, CBSP, Vice President for Safety, Health, Environment and Risk Management (SHERM) for UTHealth, is also professor of Occupational Health (non-tenure track). Dr. Emery holds an MS in Public Health (University North Carolina–Chapel Hill), MS in Environmental Health (East Carolina University), and a DrPH in Occupational Health from the UTSPH. Previously, he was Radiation and Biological Safety officer at East Carolina University. Dr. Emery is active in SWCOEH continuing education, having originated the Radiation Safety Officer basic and refresher courses and the Comprehensive Health and Safety for Colleges and Universities course, which included a targeted aspect for minority-oriented institutions. He co-teaches the Health and Safety Program Management and Leadership course and a new course in Biosafety. Dr. Emery's research interests include developing methods to provide cost-effective, comprehensive health and safety services to workplaces, particularly in laboratory and research settings and developing programs for special populations, including minors, minorities and the occupationally exposed fetus. His current research is focused on training techniques for the control of biological hazards when in the environment. He is also involved in evaluating regulatory compliance, particularly focused on the analysis of available outcome measures, and determining how this information might be used for preventive purposes. Dr. Emery also sponsors a number of practica annually through SHERM. He has served as dissertation advisor for a number of doctoral students.

David Douphrate, PhD, MPT, MBA, CPE, CSP has served as the PPRTP director starting July 1, 2014. Dr. Douphrate earned a PhD in Occupational Ergonomics and Safety from Colorado State University in Ft. Collins, CO, followed by a postdoctoral fellowship at the same institution. Dr. Douphrate also holds a Master of Physical Therapy (MPT) from the University of Texas Medical Branch at Galveston, TX, and Master of

Business Administration (MBA) from the University of Mary Hardin-Baylor in Belton, TX. Dr. Douphrate earned his BS degree in Kinesiology from Texas A&M University and is a Certified Professional Ergonomist (CPE) and Certified Safety Professional (CSP). Dr. Douphrate's research focus is in the prevention of work-related musculoskeletal disorders and injuries through ergonomics and safety management and leadership. He is PI of a 5-year research study of ergonomic risk factors among large-herd dairy parlor workers. This study is funded through the NIOSH-funded High Plains and Intermountain Center for Agricultural Health and Safety. Dr. Douphrate is also PI of a 3-year project involving the development of a safety management and leadership training intervention among logging contractors in collaboration with researchers at the NIOSH-funded AG Center. Lastly, Dr. Douphrate currently serves as PI on an OSHA Susan Harwood Training Granting involving the delivery of safety training content to dairy workers. Dr. Douphrate currently teaches occupational safety, occupational ergonomics and occupational health and safety management and leadership courses at UTSPH. Dr. Douphrate has partnered with companies in the agriculture, poultry processing, manufacturing, healthcare and beverage industrial sectors to reduce worker injuries while simultaneously improving productivity and efficiency. His expertise and experience in occupational injury prevention and rehabilitation as a physical therapist, combined with managerial and leadership expertise, provides a unique set of skills and experiences beneficial to the SWCOEH.

Elaine Symanski, PhD, tenured associate professor in the Department of EHGES, earned her doctorate in environmental sciences with a minor in epidemiology from the University of North Carolina–Chapel Hill, where she also completed a master's degree in public health. In addition to providing support to the IH and OE programs, she is ERC Director. At the University of North Carolina, she received the Greenberg Award for Excellence in Doctoral Research. She teaches a course on advanced methods in epidemiology. She advises IH trainees, along with OE trainees and chairs or serves on their thesis and dissertation committees. Specific areas of research include the development of statistical approaches to evaluate occupational and environmental exposures, retrospective exposure assessment for workplace contaminants, and investigation of health effects related to occupational and environmental exposures, particularly among vulnerable populations. Her most recent funding was obtained from the NIEHS and the EPA to support air pollution epidemiology studies.

Specific Objectives – Project Goals and Accomplishments

The IH Program established four goals for the 2011-2015 project period. Discussion of these goals and accomplishments are summarized below.

Goal 1: Increase recruiting activities, for both master- and doctoral-level full-time students.

Accomplishment: Our recruitment efforts are robust, resulting in filling all IH traineeship slots. Student recruitment is up and steady. IH also gains students from within EOHS and within the SPH (if qualified). This has led to inclusion of several foreign trainees, who are not funded by NIOSH. An increased number of students increases program viability and visibility.

Goal 2: Maintain ABET status by achieving re-accreditation in 2014–2015.

Accomplishment: The IH program received full ABET accreditation for the period 2015–2020, with no deficiencies, weaknesses or concerns. No interim reports are required.

Goal 3: Maintain current interdisciplinary interaction within the UTSPH programs.

Accomplishment: Interdisciplinary activity is strong, particularly between the OM residents and IH students, who participate together in the following courses: Fundamentals of Industrial Hygiene, Toxicology, and Occupational Health Field Trips, where cross-disciplinary teams jointly write walk-through reports. Additionally, occupational epidemiology trainees participate in many of these courses. All EOHS students also take a core of several additional classes, which include students outside of occupational safety and health. Outside the classroom, the ERC provided ample opportunities for interdisciplinary training, e.g., occupational health journal club, the annual field trip and a variety of continuing education and outreach events.

Goal 4: Maintain current continuing education and outreach activity, seeking to involve all IH faculty. Activity increased.

Accomplishment: During the reporting period, we supported two CE courses: Fundamentals of Industrial Hygiene and Industrial Hygiene Sampling. The target audience includes individuals who possess little or no IH experience and have recently acquired new IH responsibilities at work.

Results and Discussion

Master's Level Training

The first academic course grouping is the six-course MPH core. IH students are required to successfully pass two courses in biostatistics and PH 2100 Foundations of EOHS. The second academic course grouping is a four-course EOHS core. In this group, IH students substitute Industrial Hygiene 1 for Recognition of Hazards in EOHS. The third grouping of academic courses includes the remaining required courses: Occupational Health Controls, Environmental Sampling and Analysis and Occupational Health Field Trips. Finally, our academic program requires a practicum (such as a summer internship) and a culminating experience (such as a thesis or a capstone course, a one-semester class wherein students demonstrate competencies in public health by addressing at least three major projects that resemble types of activities commonly encountered in public health practice).

One way we achieve interdisciplinary training and interactions is by requiring a core set of courses for all trainees, irrespective of program area: PH 2100 Foundations of EOHS, PH 2175 Toxicology, PH 2245 Industrial Hygiene, PH 2260 Occupational Health Field Trips, PH 3725 Health and Safety Management and Leadership and PH 2105 Contemporary Issues in EOHS. In the Occupational Health Field Trips course, teams of students comprising, wherever possible, an IH student and an occupational medicine resident, write six field trip reports and deliver presentations that describe upcoming facility visits.

Doctoral Level Requirements

NIOSH-funded doctoral research trainees must complete the following:

- Each of these three:
 - Introduction to Doctoral Research Methods in EOHS
 - EHOS Doctoral Seminar
 - Applied Epidemiological Analyses
- One course from each of the following pairs:
 - Risk Analysis or Environmental and Occupational Health Policy
 - Injury Epidemiology or Occupational Epidemiology
- Six credit hours in other EOHS doctoral level courses
- Nine credit hours in a minor discipline, typically Public Health Leadership
- Nine credit hours in breadth series

In addition, doctoral trainees must successfully pass a preliminary exam and complete a dissertation. DrPH students must also complete a practicum.

Training program evaluation

During the project period, we developed a logic model to guide the overall IH Program evaluation of specific outputs and outcomes. Program evaluation included a number of activities that are described below. These activities provided data that were used by the IH Program faculty to evaluate short-term outcomes and long-term impact. Moreover, the Evaluation Report for Academic Programs was extremely useful in our ABET site visit as ABET accreditation requires an ongoing outcomes assessment plan, with feedback of assessment results into the program.

Elements of our continuing assessment program were accomplished, including periodic surveys of all graduates of the ABET-accredited masters degree program (since accreditation was granted in 1995) and

surveys of IH graduates since 2014. The surveys ask graduates to 1) rate the importance of each element in our program's published list of educational outcomes and educational objectives, 2) rate how well they felt they could achieve each outcome objective upon graduation, and 3) rate how well they felt they could achieve each outcome objective five years after graduation or at the time of the survey. We used the results of this survey to modify the content in the following courses: Public Health Administration and Health and Safety Program Management and Leadership.

Trainee candidates and Trainees

During the 2011-2015 reporting period, the IH Program filled 20 NIOSH trainee slots (listed in the Appendix, Table 1 for trainees of all programs) and graduated fifteen. Titles of NIOSH trainee research or notation of completion of the capstone course (for MPH trainees) are noted in Table 1.

The majority of funds for support of full time domestic students are provided by the NIOSH ERC. In the reporting period, four of our students were supported by military funds. Our students also receive supplemental funds from other sources to attend events such as the AIHAce.

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Occupational and Environmental Medicine Program

Arch 'Chip' Carson, MD, PhD

Background

The Occupational and Environmental Medicine (OM) Program, originally founded in 1977, is one of 47 postgraduate medical training programs of UTHealth and the only one housed in the UTSPH. It is fully accredited by the Accreditation Council on Graduate Medical Education (ACGME). It is one of two remaining OM residency programs in PHR 6.

Program Administration

During the reporting period, the program was directed by Arch Carson, MD, PhD, a medical toxicologist boarded in Occupational Medicine. George Delclos MD, MPH, PhD, an internist and pulmonologist boarded in Occupational Medicine also played a critical role. The program coordinator was Joy De Los Reyes, MPH. Together, they administer the activities of the OM Program. The three worked closely together and were responsible for the day-to-day management of the program. Both Drs. Carson and Delclos addressed curriculum issues, grant writing and accreditation activities, and advised trainees through their academic and clinical practice experiences.

The OM Program has the benefit of its Residency Advisory Committee (RAC), made up of community practitioners, stakeholders in occupational and environmental medicine and former trainees. During the reporting period, the Committee met twice per year and provided advice to the director regarding applicants to the Program and funding issues, participated in new trainee selection and participated in planning, developing, implementing and evaluating educational activities of the program. They also reviewed and made recommendations for revision of competency-based curriculum goals and objectives and reviewed the program annually using evaluations of faculty, residents and others. The RAC also served as the ACGME-required Program Evaluation Committee.

The Program also maintained a Clinical Competency Committee (CCC), appointed by the Program Director from Program faculty and community stakeholders. The CCC was tasked to review all evaluations of the residents and rated their progress on the accomplishment of ACGME Preventive Medicine/Occupational Medicine training milestones.

Program Faculty

The OM Program core faculty are listed below.

Arch I. Carson, MD, PhD, OM Program Director and Associate Professor of Occupational Health in the Department of EHGES, first joined the OM faculty in October 1992. Dr. Carson served as associate director of the OM Program from 1992 to 1998, and as Program director from 1998 to 2008, and 2010 to 2015. He has an active clinical practice in occupational medicine and toxicology. He co-teaches PH2260-Occupational Health Field Trips, PH2110-Overview of Environmental Health and PH2265-Occupational Medicine Practice (weekly didactic sessions) and cross-lectures in several toxicology and environmental health courses at the UTSPH and he supervises trainees during their rotations in clinical toxicology. He serves as advisor to EOHS students and chairs or serves on their thesis and dissertation committees. Dr. Carson is active in SWCOEH CE offerings. Dr. Carson is recognized as a regional authority in clinical toxicology and is frequently consulted by the community and government agencies regarding occupational and environmental exposures of concern to citizens. He has acted as environmental toxicology consultant to several international non-governmental organizations. These consultations were recently expanded to organizations in countries in Latin America, South Africa and Asia.

George Delclos, MD, MPH, PhD, is a tenured professor in EHGES. He served as previous director of the Division of Environmental and Occupational Health Sciences from 2004 to 2007 and was OM Program director

from January 1993 until October 1998, and from September 2008 until July 2010. He is board certified in internal medicine, pulmonary medicine and occupational medicine. He has been a NIOSH-certified 'B' reader since 1987 and has been continuously recertified since. Dr. Delclos remains active in the clinical practice of occupational and pulmonary medicine, which provides opportunities for trainee rotations and research. In 1993 he was named to the WHO Expert Advisory Panel on Occupational Health and completed this appointment in 2001. From 1995 to 2013 he was PI of a training grant in international occupational and environmental health through the NIH/NIOSH and the Fogarty International Center. This grant provided funding for international students in the areas of occupational epidemiology, toxicology, industrial hygiene, industrial safety and ergonomics, as well as for worker training programs in occupational health in Central and South America. From 1997 until 2007, he directed the ERC and from 2007 until 2010 he was ERC deputy director.

Jim Kelaher, MD, MPH, is Adjunct Associate Professor of Occupational Medicine, is a graduate of the ERC OM Residency Program, is board-certified in both occupational medicine and internal medicine and is an Associate Professor in the Department of Internal Medicine at Baylor College of Medicine. Dr. Kelaher currently serves as the director of the Baylor College of Medicine Occupational Health Program where he oversees clinical and administrative aspects. He is also a site preceptor for the Baylor occupational medicine rotation. Dr. Kelaher also regularly provides consulting services to a wide variety of companies in industries such as healthcare, hospitality and oil, as well as providing expert testimony for peer review and civil case issues and he participates in our CE Program by co-directing the annual Orthopedics Workshop.

Robert Emery, MS, DrPH, CHP, CIH, CSP, RBP, CHMM, CPP, ARM, CBSP, is Professor of Occupational Health in EHGES and the Vice President for Safety, Health, Environment and Risk Management for UTHealth. He is an onsite preceptor for OM trainees during their rotation or practice experiences at UTHealth, Environmental Health and Safety (SHERM) department. Dr. Emery is the PI of a large training grant from the NIEHS titled Texas-Utah Consortium for Hazardous Waste Worker Training, a program developed and delivered with our partners at the Rocky Mountain Center for Occupational and Environmental Health.

David Gimeno, PhD, is a tenure-track Associate Professor in EHGES, having joined the UTSPH in September 2008. He directed the ERC PPRTP from 2011-2014 and has served as Director of the OE program since July 2014. Dr. Gimeno teaches PH2108-Applied Epidemiological Analyses in Environmental and Occupational Health Sciences; he also co-teaches with Dr. Delclos the PHWD-2105-Environmental and Occupational Health Sciences Research Seminar; he is sole instructor of PHWD-2106 Advanced Research Methods in Environmental and Occupational Health Sciences.

Lawrence Whitehead, PhD, CIH, Fellow of the AIHA, is a tenured Associate Professor in EHGES, Director of IH Program, past director of the SWCOEH and past interim director of the Environmental and Occupational Health Sciences Division. He teaches PH2245-Fundamentals of Industrial Hygiene, PH2250-Occupational Health Controls, leads and co-teaches PH2130 Recognition of Environmental and Occupational Health Hazards (with Drs. Zhang and Mena) and co-teaches PH2260 Occupational Health Field Trips with Dr. Carson as lead instructor. Dr. Whitehead also is the faculty admissions coordinator for EOHS as well as its representative to the UTSPH-wide Admissions Committee.

Specific Objectives

Goal 1: Train competent Occupational and Environmental Medicine physicians for practice in the field.

Objective 1.1 Successfully transition to the new milestone-based ACGME requirements and maintain accreditation via the ACGME.

The OM Residency successfully transitioned in 2014 to the milestone-based evaluation and accreditation system. Provisional accreditation was awarded through 2020 and our first annual update under the new system has been submitted and approved.

Objective 1.2 Expand and enrich the quality of the occupational medicine residency experience so that OM trainees are fully prepared to enter the occupational safety and health work community.

We have continued to improve the quality of training of our OM residents by further tying MPH coursework to identified professional competencies and by enriching the practical training experience through new and more diverse rotation sites and experiences.

Objective 1.3 Increase our rates of successful certification of our graduates by the American Board of Preventive Medicine (ABPM), as another measure of the quality of our graduates.

We have improved our first attempt Board certification rate during the project period and have also achieved certification of several delinquent past trainees.

Objective 1.4 Increase the level of research productivity of our residents, in order to contribute to the occupational safety and health scientific evidence base.

All OM residents engage in some form of scholarly research. Residents present their work at regional, national or international scientific meetings.

Goal 2: Increase our national and international reputation as a successfully innovative OEM training program.

Objective 2.1 Progressively increase the output of trained OEM physicians into clinical practice, especially the incorporation of minorities in the professional workforce.

Our average program census increased from three to four residents during the project period.

Objective 2.2 Consistently provide the national and international audience with reports of our successes.

Our national and international reputation continues to rise as we actively collaborate with other training programs, medical schools and other medical specialties, both in the U.S. and abroad.

Objective 2.3 Consistently take on research and policy tasks of national and international importance.

We continue to pursue research consistent with NORA and serve as functionaries and collaborators with national and international councils, commissions and committees to address policy issues that are within our range of professional expertise.

Goal 3: Support the recognition of Occupational Medicine (OM) as a fundamental medical specialty and Occupational Health (OH) as an essential Public Health discipline.

Objective 3.1 Increase our engagement in visible community practice efforts.

We continue to engage in visible community practice activities, however the increase in this effort that we have set as a goal has not currently been realized. This remains a goal for the future.

Objective 3.2 Share in OM/OH research and publication, incorporating both traditional and newer communication technologies of information dissemination.

We continue to engage in research and other scholarly activities, sharing the results through traditional means as well as newer technology-based means, e.g., online before print, web posting and media interviews.

Results and Discussion

The primary strengths of our OM Program are its recognized richness in varied industrial training sites, the stability of its leadership, its interdisciplinary philosophy and its longstanding visibility and partnerships with the professional community. Critical to maintaining a successful OM Program in the future, the UTSPH has launched a recruitment of two faculty members: one in industrial hygiene and one in occupational medicine. The latter position has now been filled and the new OM team member will join the faculty in January, 2016.

The primary goal of our OM Program is to train practicing physicians to be qualified for careers in occupational and environmental medicine in private practice, industry, government, military or academia. The OM residency consists of two years of training that must be preceded by at least one year of hospital-based, general clinical training in an approved program (clinical year), although additional full training in a primary care specialty is preferred. That first clinical year of training is not provided within the OM residency, so it must be obtained elsewhere in order for the physician to be eligible to enter the program. Physician applicants must also be eligible for an unrestricted Texas medical license or in-training permit. At the conclusion of the 2-year program,

physician trainees will have mastered the required list of competencies and are usually eligible for certification by the ABPM.

Funding from NIOSH has been available during the current grant period for four trainees per year. Continued funding of the ERC is central to the existence of the OM Program, not only for the traineeships it provides but also to foster the interdisciplinary milieu that has always characterized the training of our occupational physicians. Moreover, if the program is to continue to grow, NIOSH support as an anchor about which to build increased funding supplements is critical. We have a strong interest in increasing the overall number of OM residency-trained physicians by increasing accredited residency output nationwide, and we have been active locally and nationally in identifying ways to make this possible in our own ERC and in cooperation with other OM residencies. To that end, we have also embraced the new Complementary Pathway to Board Certification of the ABPM and are currently training our first OM Resident to pursue that pathway. The Memorial Hermann System has agreed to fund that resident under the new award period.

The caliber of physicians who enter the program is generally reflected by solid clinical and research backgrounds, in keeping with the Program's RAC recommendations. In addition to the NIOSH OM trainees, other community physicians enroll in the occupational health MPH and doctoral programs, as well as in our weekly clinical case conferences. This avenue has proved to be a valuable means of providing training in occupational health for family practice and emergency medicine physicians, as well as for international students who are themselves physicians.

The OM Residency Program at the UTSPH is one of only two programs in PHR 6 for preparing occupational medicine physicians. Our program serves as a resource to other physician graduate education programs in Texas, particularly the UT Houston Family Medicine Residency and the UT Health Science Center at Tyler OM Residency Program. Ties with the OM Program in Tyler deserve special mention, as this program is also a NIOSH-supported TPG. Prior to 2010, the main activities supported included curriculum and service development. However, beginning in 2010, and with the establishment of formal collaborative ties between the UTSPH and the UT-Tyler Health Science Center, new joint activities were put in place, including monthly didactic sessions (via interactive television), an agreement to make rotation experiences available to trainees in both programs, support for additional trainee travel and educational outreach support for our trainees. For the past three years, both programs have collaborated with the SWCOEH CE Program, the Texas A&M University Preventive Medicine Residency and the Texas Mutual Insurance Company to deliver an annual two-day Orthopedics Workshop, held in Round Rock, Texas.

During this project period, the OM Residency has gained national prominence and leadership status in the national and international discussion of occupational medicine training and its fundamental importance to the success of national health care systems and national security programs. This was accomplished by the visible organization and sponsorship of two conferences in the U.S. on "The Future of Occupational Medicine: Where Will Our Expert Practitioners Come From?," by the SWCOEH, through leadership of the Task Force on the Engagement of Residents and Medical Students in Occupational Medicine of the ACOEM, and participation in national and international conferences with the WHO Collaborating Centres in Occupational Health, the International Commission on Occupational Health (ICOH), the NIOSH OM Residency Task Force, the European Association of Schools of Occupational Medicine, the Scientific Committee on Epidemiology in Occupational Health (EPICOH) of ICOH, and the Panamerican Health Organization (PAHO) Council on Climate-smart and Sustainable Societies, a collaboration among occupational health, environmental science and health promotion units.

Trainees

During the 2011-2015 reporting period, the OM Program filled 12 NIOSH trainee appointments (listed on Appendix, Table 1 for trainees of all programs) and graduated seven. Titles of NIOSH trainee research or notation of completion of the capstone course (MPH) are noted in Table 1.

The following physicians were trained in the OM Residency during the project period.

Center Director: Symanski, Elaine

Monica Saavedra, MD, MPH 11/10-11/11. Dr. Saavedra is currently an occupational health and wellness consultant in the U.S. and Chile.

Thomas Hysler, MD, MPH 7/10-6/12. Dr. Hysler is currently Medical Director for the Houston Area Safety Council.

Asim Abbasi, MD, MPH 7/10-6/12. Dr. Abbasi is currently a staff physician at Excel Medical in Katy, TX.

Dalia Nessim, MD, MPH 7/12-6/14. Dr. Nessim is currently Assistant Professor at the University of Texas Health Science Center at Tyler and the Texas Institute of Occupational Safety and Health.

Kemka Hekerem, MD, MPH 7/12-6/14. Dr. Hekerem is currently a staff physician at Excel Medical in Katy, TX.

Oluwayomi Adekeye, MD, MPH 7/12-6/14. Dr. Adekeye is currently Occupational Medical Physician at the Everett Clinic in Seattle, WA.

Ayanna Jones, MD, MPH 7/13-6/15. Dr. Jones is currently Regional Medical Officer, Chevron Corporation, Houston, TX.

Rini Mathew, DO, MPH 1/14-12/15. Dr. Mathew is a current resident.

Jenny Amani, MD, 7/14-6/16. Dr. Amani is a current resident.

Parvaneh Ehsanzadeh, MD 7/14-6/16. Dr. Ehsanzadeh is a current resident.

Matthew Altman, MD 7/14-6/16. Dr. Altman is a current resident.

Conclusions

At a time when fewer and fewer fully trained OM physicians are available to fill an increasing number of positions, maintaining resources for top-notch, post-graduate medical training in this specialty is even more critical. The demand for board-certified OM physicians continues to be great. Graduates of the SWCOEH OM Program consistently receive professional placements or appointments with responsibilities and authority commensurate with their advanced level of training, with the majority of them staying in PHR 6 to practice. The SWCOEH and the OM Residency continue to gain notoriety and assume leadership roles in national and international policymaking discussions toward the improvement in capacity and effectiveness of occupational health professions both nationally and worldwide.

Occupational Epidemiology Program

Sharon P. Cooper, PhD (2011-2014)
David Gimeno, PhD (2014-2015)

Background

While epidemiology provides an essential scientific core to all of the other programs at the UTSPH, the OE program serves to enhance interdisciplinary collaboration and to increase opportunities to attract outstanding students to the OSH field where the need for skilled researchers and practitioners is great.

The doctoral program in OE originated in the 1999 ERC application led by Dr. Sharon Cooper, receiving funding for five years along with the ERC. After Dr. Cooper left the UTSPH to be Head of the Department of Epidemiology and Biostatistics at Texas A&M School of Public Health, in 2005, a competing renewal was successfully funded for a second 5-year period (2005-2009), and Drs. Scott Lillibridge, George Delclos, and Benjamin Amick served, sequentially, as directors. In summer 2007, Dr. Cooper returned to the UTSPH, in the role as Regional Dean of SARC and reassumed the role of director for the OE Program, which was approved for funding by NIOSH. She continued to direct the program through its third renewal (2011-2014). With Dr. Cooper's phased retirement that began in fall 2014, Dr. David Gimeno, also at SARC, who successfully directed the PPRTP for five years, became the new director.

With its focus on disease and injury causation and prevention, epidemiology is a fundamental science of public health and of occupational safety and health. OE is the study of workplace exposures in relation to disease or other health-related conditions or events in working populations. In particular, OE professionals are "experts that could assess the potential for, or occurrence of, occupational disease and injury in the workplace" (Halperin & Howard, 2011). Occupational epidemiologists are an important component in the spectrum of occupational health professionals and, since its inception, OE has been considered crucial to the work of NIOSH in three central roles regarding occupational disease and injury: (1) field epidemiological investigations of workplaces; (2) assessment of exposure-outcome associations; and (3) estimates of trends of existing and new occupational health issues (i.e., surveillance) (Halperin & Howard, 2011). Occupational epidemiologists are commonly employed in government (55%), academia and educational services (27%) and as private consultants (22%) (McAdams *et al.*, 2011). In these capacities, they assess health risks from occupational exposures, investigate outbreaks of disease, and provide data to support the scientific basis for regulation and control of chemical, physical and biological agents in the workplace. Increasingly, occupational epidemiologists are being asked to extend their reach to address public health concerns possibly arising from environmental exposures. The major OE research focus of the SWCOEH comprises three broad areas: (1) chronic disease epidemiology; (2) military health; and, (3) work organization epidemiology. Current research in these areas have focused in the following NORA Sectors: Agriculture, Forestry & Fishing (injuries and chronic diseases), Healthcare & Social Assistance (respiratory diseases, injuries) and, Services/Public Administration, including military populations (work organization, injuries, chronic diseases). There is also a focused area of research in environmental epidemiology that allows us to link the workplace to the general environment given common sources of occupational/environmental hazards (e.g., agricultural or industrial activities).

The OE program provides students with essential methodological skills as well as exposure to the special issues, methods and background in the field. The OE field is dynamic and new methods need to be developed and employed to examine complex occupational health issues. There are interdisciplinary training needs that pertain to basic and advanced concepts from other disciplines relevant to epidemiology including the application of advanced methods (e.g., Checkoway *et al.*, 2007), the use of new technologies and tools for research data collection and evaluation of surveillance systems (e.g., Howie *et al.*, 2014) and complex statistical modeling (e.g., Berhane & Molitor, 2008). Still, the future of OE is not without challenges and the development and training of future experts remains a priority. Continued NIOSH support is key to our continued success to contribute to the pool of trained occupational epidemiologists to focus on occupational illness and injury identification and prevention (Halperin & Howard, 2011).

Overall, research on public health and epidemiology workforce needs is scarce (Beck & Boulton, 2012). Nonetheless, reports indicate a critical shortage of public health workers, particularly in epidemiology (Beck *et al.*, 2012). There is a need for a larger pool of skilled epidemiologists, with an enhanced ability to detect, prevent and control public health issues, including occupational-related issues (Drehobl *et al.*, 2012). The Council of State and Territorial Epidemiologists' (CSTE) survey has documented the status of the epidemiology workforce at both the state and local level periodically since 2001. Figures show that the state-level epidemiology workforce increased about 13% between early 2009 and late 2010 although the absolute number of epidemiologists was still lower than the 2004 numbers (Boulton *et al.*, 2012). A study on epidemiologic capacity of local health departments among a randomized sample of 100 departments found that none of the staff members functioning in an epidemiologic role held a doctoral degree in epidemiology, yet they were expected to be proficient in epidemiologic competencies (O'Keefe *et al.*, 2013). These findings support the need for training well-prepared epidemiologists, as well as the need to replace retirees, that are expected to amount up to 25% of the total federal, state and local public health workforce over the next five years (Beck *et al.*, 2012).

Specifically focused on occupational health, a seminal "Workforce Plan 2008-2010" report (NIOSH, 2009) noted the national shortage of trained occupational health and safety professionals. They noted that fewer occupational epidemiologists were graduating, the difficulty in filling positions in these areas and a critical need to foster existing epidemiologists and biostatisticians into the occupational health field. NIOSH conducted a national survey among (1) a group of NIOSH-supported and non-NIOSH supported OSH academic programs, including ERCs and TPG awardees (response rate: 65.2%) and (2) a group of employers of OSH professionals (response rate: 34.5%) (McAdams *et al.*, 2011). The estimated number of OE professionals that employers were expected to hire in 2011 and over the next five years (estimate of 99 with standard error of 63) was lower than the number of OE professionals expected to graduate during the same period (a total of 194, 95% of them being NIOSH funded). This is in contrast with 88% of the providers reporting that 75% or more of the OE graduates in the corresponding OE program have obtained an OE job within 2 years of leaving the program. Given the very small sample of employers reporting on OE coupled with the general low response rate of the employer's sample, more comprehensive assessments to evaluate supply and future demand are needed.

Regionally, the former OE Program Director, Dr. Cooper, attended the Western States Occupational Network (WestON) every year since its inception in 2008 (except for 2012). In 2013, Dr. Cooper attended the meeting representing both the ERC and the NIOSH AG Center at UT Tyler, reflective of the growing partnership between the two Centers. WestON involves state occupational health representatives as well as representatives of NIOSH-funded Agricultural Centers and ERCs, and in 2014 Dr. Gimeno attended the meeting in Colorado. Attendance at this meeting is relevant for the OE program since the western region represents fast growth, large Hispanic populations, excessive work-related fatality rates, high-risk industries, emerging technologies and opportunities for collaboration. The ERC, and in particular the OE faculty has a history of research collaboration with both the AG Center at Tyler and the TX DSHS to foster collaborations on occupational health surveillance as well as research projects for trainees in the OE program. For instance, Dr. Gimeno is Member of the Advisory Committee of the Texas Occupational Health & Safety Surveillance Program, a NIOSH-funded State-based Surveillance Occupational Health & Safety Program within the TX DSHS.

The SWCOEH is uniquely located to facilitate the study of several major and important occupational workgroups and exposures including: farmworkers, including adolescent workers; Hispanic worker populations; healthcare workers; the military; and petrochemical industry workers. Data related to working youth in Texas are scant and fragmented, yet sufficient to document substantial problems involving working adolescents, especially in the agricultural sector (Shipp *et al.*, 2013). Hispanics represent about 25% of the Texas labor force (BLS, 2014), but account for 36% of all workplace fatalities in Texas (BLS, 2011). In addition, we are near the largest concentration of petrochemical facilities in the U.S. (i.e., The Houston Ship Channel) as well as being located within the Texas Medical Center that employs more than 106,000 workers. This provides us with the opportunity to study occupational health risks for healthcare workers and collaborate with researchers across institutions. Also, during the reporting period, several collaborations have been established between the SWCOEH and various institutions in San Antonio, including the City of San Antonio, The UT Health Science

Center San Antonio, the U.S. DoD and The Geneva Foundation, a non-profit organization supporting innovative medical research and excellence in education within the U.S. military.

EHGES is the largest and the fastest growing department at UTSPH, and provides a natural pool of potential recruits to the OE program. Students may pursue the MS, MPH, DrPH or PhD in Epidemiology. Further, the OE Program is based on a strong foundation with a 30-year history of commitment to occupational health; it addresses a documented shortage of OSH professionals, including occupational epidemiologists and is located in a region with high-hazard industries and vulnerable working populations. Finally, the financial crisis that peaked in 2008 is having a continued influence, which resulted in lower student numbers on higher education programs across the U.S. However, Texas and, in particular, UTSPH fared relatively well, expanding faculty and student enrollment, with an emphasis on regional campuses. This has continued allowing for the recruitment of outstanding faculty and trainees into the program.

Beyond the standard training at UTSPH, this Program and the ERC serves to: 1) enhance the voice of occupational health within UTSPH and PHR 6 through interdisciplinary education, research, and infrastructure; 2) provide funding to support the infrastructure of our organization which gives visibility that has generated opportunities to participate in relevant conferences and resources to develop and sustain inter-institutional collaborations with relevant agencies, which is a key mechanism by which occupational epidemiologists can be exposed to real applications of their training; and, 3) increase the awareness and outreach of occupational epidemiology to other departments and audiences.

Program administration and Faculty

To accomplish its objectives, the OE program has a core program administration to provide the strategic vision, direction, management, and coordination among OE faculty and trainees.

Dr. David Gimeno, tenure-track associate professor in EHGES at the SARC since 2008 assumed the direction of the OE program in July 2014. In addition to serving as the director for the PPRTP for the ERC from 2009 to June 2014, he has several years of experience in the development and implementation of research projects, training courses and project evaluations. With a phased retirement that began in September 2014, Dr. Cooper continued to be involved in the OE Program through student advising and teaching a core OE course. Dr. Cooper has more than 25 years of research experience in injury, occupational and chronic disease epidemiology. She has published in the area of injuries in working youth, substance use and occupational injuries, childhood cancer, pesticide safety training and ethical issues in working with vulnerable populations. Her expertise, experience and ongoing presence in the program has been valuable in the leadership transition.

There are seven core OE faculty members, all of whom have primary appointments within EHGES. The core faculty meet regularly at either departmental or ERC faculty meetings and are clustered by their physical location. Four faculty are located at SARC (Drs. Gimeno, Alamgir, Cooper and Whitworth) and three are located in Houston (Drs. Delclos, Pompeii and Symanski). The San Antonio faculty regularly travel to Houston or attend meetings through ITV or conference calls. The faculty have been successful in securing research funding, mainly from NIH, CDC and DoD.

Sharon P. Cooper, PhD, is a tenured Professor, recipient of the Jane Dale Owen Professorship in Environmental Protection in EHGES, and former Regional Dean of the SARC. Prior to returning to UTSPH in 2007, she spent 5 years as professor of Epidemiology and head, Department of Epidemiology and Biostatistics at Texas A&M University School Public Health. She earned her masters degree in Biostatistics and Epidemiology from Harvard School of Public Health in 1976, and her doctorate in Epidemiology from the UTSPH in 1982. She is an occupational epidemiologist whose major research focus has been surveillance of occupational illnesses and injuries and assessment of occupational exposures and their relation to injuries and cancer. Recently, she has been the PI of a DoD funded project examining hearing loss among active duty military personnel. She is also interested in research in minority working populations in Texas and in adolescent workers. She is the instructor for the OE course. During the reporting period, she served on the Internal Advisory Board for the Southwest Center for Agricultural Health at UT Health Center at Tyler. She has served as a primary mentor, committee member, and co-published with previous trainees.

David Gimeno, PhD, is a tenure-track Associate Professor and has served as the Director of PPRTP for the ERC since 2009. In July 2014, Dr. Gimeno became the OE Program Director. Dr. Gimeno joined the SARC in September 2009 from London, UK. In London he was Senior Research Fellow on the Whitehall II study in the Department of Epidemiology and Public Health at University College London (UCL) Medical School where he further developed his research expertise in occupational health, with particular experience in the social and cultural determinants of occupational injuries and illnesses. He currently holds an honorary associate position at UCL and an adjunct scientist position at the Institute for Work and Health in Toronto, Canada. In addition, he is part of the research team for the Central American Survey of Working Conditions and Health and the PI of a NIH/Fogarty funded project in Colombia on the assessment of opportunities and challenges in research and training occupational health. Dr. Gimeno leads the epidemiologic analysis of hearing loss on a DoD funded project examining hearing loss among active duty military personnel. He has a strong knowledge of data management systems and advanced statistical analysis skills, with particular emphasis on the use of multilevel statistical models. His occupational health-related research interests include topics on employment status, work organization and health, work stress, health-related productivity, and cross-national studies. His research focuses on occupational exposures and respiratory outcomes and cultural and psychosocial influences on disability. He teaches Applied Epidemiological Analysis in Environmental and Occupational Health and Introduction to Research Methods in Environmental and Occupational Health. In addition to his teaching, Dr. Gimeno served on OE trainee doctoral committees.

Abul Hasanat Alamgir, MBA, PhD, is a tenure-track Associate Professor of Occupational Health at the SARC. Dr. Alamgir has an MBA from West Texas A&M University and completed his PhD in Healthcare and Epidemiology at the University of British Columbia. He worked at the Occupational Health and Safety Agency for Healthcare in British Columbia from 2006 to 2010. His research activities in Canada have primarily focused on conducting epidemiological investigations of workplace hazards and evaluating prevention initiatives in healthcare settings. Dr. Alamgir has worked with TX DSHS to evaluate the Texas Asthma Control Program. NIOSH contracted him to undertake a pilot study to examine small farms and fatality cases in Texas. He also completed a logging workers' injury and fatality surveillance project funded through the NIOSH-funded AG Center at UT Tyler. He was the PI of a funded study on "Cost-effectiveness of Services Uniting Pediatrics and Psychiatry Outreaching to Texas (SUPPORT)," and he prepared the economic evaluation proposal of projects for Bexar County by the Center for Healthcare Quality for the Medicaid 1115 waiver program. Originally from Bangladesh, Dr. Alamgir has strong research interests in global health. His initiative on improving safety and health of fishing communities at the Bay of Bengal (South Asia) was funded by the NIOSH Agriculture, Forestry, and Fishing Program (2010-2012). He worked with Dr. Delclos to develop an occupational health and safety program for a large manual rug weaving factory in Bangladesh. He also has ongoing work on health and safety issues in the garment sector, has collaborated with Alliance for Bangladesh Garment Safety (a consortium of large North American retailers) and has just received funding from the German Government's aid agency Deutsche Gesellschaft für Internationale Zusammenarbeit to study health status and economic consequences among injured factory workers in Bangladesh. He has been invited by several institutions to present on Bangladeshi garment worker safety including Collegium Ramazzini, UCLA, and Harvard University. Currently, Dr. Alamgir leads the economic burden analysis of the DoD-funded project on hearing loss among active duty military personnel. He served as advisor on doctoral committees of OE students.

George L. Delclos, MD, MPH, PhD, is a tenured Professor of Occupational Medicine (OM) and has been a UTSPH faculty member since 1989. During the reporting period, he provided a key role in supporting the OM Program and was Director of the WHO Collaborating Centre for Occupational Health. He is also Medical Director of the UTHealth Employee Health Clinic and clinical associate professor of medicine at Baylor College of Medicine. His interests span medical surveillance of petrochemical workers, occupational hazards of healthcare workers, occupational and environmental respiratory disease and occupational health in developing countries. He co-teaches Clinical Occupational Medicine, Introduction to Research Methods in Environmental and Occupational Health Sciences, the EOHS Doctoral Research Seminar, the MPH Capstone Course, and Occupational Medicine Practice. Dr. Delclos is the lead instructor for Foundations of EOHS (online). He is a board-certified physician in the specialties of internal medicine, pulmonary diseases and occupational medicine. Dr. Delclos was a member of the WHO Expert Advisory Panel on Occupational Health from 1993

until 2002 and has been a technical consultant to the Pan American Health Organization for the past several years, primarily in the area of occupational health research in Latin America. Dr. Delclos is past chair of the NIH Literature Selection Technical Review Committee of the National Library of Medicine and past president of the TXCOEM. He regularly collaborates on various OE research projects and teaching of occupational medicine residents at the University Pompeu Fabra in Barcelona, Spain, through its Center for Research in Occupational Health (CiSAL). Dr. Delclos has mentored OE trainees, served on doctoral committees, co-publishes regularly with students and provides research opportunities for trainees.

Lisa A. Pompeii, PhD, is a tenure-track Associate Professor. Her research focus is in both occupational health and occupational injury among healthcare workers. Dr. Pompeii has led studies and the development of worker training programs funded by NIOSH and OSHA pertaining to musculoskeletal injury and safe-patient handling among nurses and nurses' aides. She is currently the PI of a NIOSH-funded R01 study aimed at developing and evaluating a workplace violence surveillance system specific to patient/visitor-on-worker violence. This is a multisite study involving two large healthcare systems with more than 20,000 employees. Working with Dr. Rios and other staff from the ERC CE Program, she also led a collaborative initiative with the American Association of Occupational Health Nurses (AAOHN), the American Nurses Association (ANA) and NIOSH to develop training for occupational health nurses to serve as their company's respiratory protection program administrator. This initiative involved a national-level roll-out by NIOSH of this online and face-to-face training to foster improved knowledge by OHNs and other occupational health professionals. Dr. Pompeii is currently leading the second phase of this project which involves the development and roll-out of online respiratory protection training programs for a broad spectrum of healthcare workers. Her prior work in occupational health research includes examining exposure to physically demanding work and adverse pregnancy outcomes. In addition she has led studies examining indoor air quality and respiratory symptoms among U.S. Coast Guard workers in the Houston Ship Channel and the utility of automated blood pressure machines for the management of hypertension among office workers in downtown Houston. Dr. Pompeii is the primary instructor for an injury epidemiology course with a focus on occupational injury surveillance and prevention. She serves as both academic and thesis/dissertation advisor to epidemiology, as well as environmental and occupational health graduate students. Dr. Pompeii has served as academic/dissertation advisor and committee member for several NIOSH-funded trainees.

Elaine Symanski, MSPH, PhD, tenured Associate Professor in EHGES earned her doctorate in environmental sciences with a minor in epidemiology from the University of North Carolina at Chapel Hill, where she also completed a master's degree in public health. Dr. Symanski is Director of the SWCOEH. She teaches one of the required courses in advanced epidemiologic methods for majors in Epidemiology. As an exposure scientist, Dr. Symanski also supports the Industrial Hygiene Program. Her particular area of expertise is in developing methods for assessing workplace and environmental exposures, especially as they relate to their application in health effects studies of vulnerable populations. Dr. Symanski has been PI on environmental and occupational health studies for over 15 years. She has served as the PI on NIOSH-funded studies to characterize variability in air and biological measures of exposure, quantify the magnitude of measurement error in worker exposures assessed in parallel by personal and biological monitoring and estimate the probable effect of such error in epidemiologic studies. Currently, she is the PI of a U.S. EPA funded study, a community-based participatory research project, to evaluate the modifying effects of psychosocial stressors on risks for hypertension associated with air pollution among individuals of Mexican origin residing in Houston. She is also the PI of a NCI-funded project to assess the association between ambient levels of hazardous air pollutants and early childhood leukemia in Texas. During the reporting period, she completed a NIEHS funded study to assess the association between fine particulates and ozone and newborn health. Dr. Symanski has been involved in extensive service activities to the UTSPH and her profession. She served on the Committee on Contaminated Drinking Water at Camp Lejeune, a committee of the National Research Council (NRC) of the National Academies and on an NRC Committee to Review the Styrene Assessment in the National Toxicology Program 12th Report on Carcinogens. Dr. Symanski mentored and published with OE trainees.

Kristina W. Whitworth, MSPH, PhD, is a tenure-track Assistant Professor in EHGES at SARC and the newest faculty in the OE Program. She was trained as an environmental epidemiologist through her doctoral work at the UTSPH (a former NIOSH ERC trainee under the mentorship of Dr. Symanski) as well as during her tenure

as a post-doctoral fellow in the Epidemiology Branch at the NIEHS. Her doctoral research focused on the application of geographic information systems to the analysis of childhood lymphohematopoietic cancer incidence related to air toxics near Houston, Texas. She continued to work in environmental epidemiology while at NIEHS, with a focus on biomarkers of exposure and reproductive health outcomes. Projects completed by Dr. Whitworth at NIEHS include examining plasma concentrations of perfluoralkyl compounds in relation to fecundability and pregnancy outcomes, and examining the relation between environmental hazards among reproductive aged women in rural South Africa and biomarkers of reproductive health. Dr. Whitworth served as a co-investigator on two projects: a case-control study of the environmental determinants of hepatocellular carcinoma in South Texas and a DoD funded project examining hearing loss among active duty military personnel. New to the ERC, she will advise and mentor future OE trainees.

Specific objectives

The goal of the OE program was to provide doctoral level training for a research focused career in the multidisciplinary field of OE. We recruited, enrolled, trained, and graduate six outstanding trainees during 2011-2015 who were prepared to compete for careers in academia, industry, government, or non-profit organizations, where the need for skilled researchers and practitioners is great. This doctoral program helped trainees acquire an understanding of the principles of epidemiology and occupational health as well as their integration; experience interdisciplinary teamwork through coursework and research projects; plan, conduct, manage and report epidemiologic studies so as to position themselves as future independent investigators; and obtain basic teaching experience. The specific objectives of the OE program were to: 1) Provide doctoral level training in OE to prepare trainees for a career in research and leadership, 2) Prepare occupational epidemiologists to meet workforce demands in academics, government and private industry, 3) Contribute to the OE evidence base by conducting rigorous research, and 4) Strengthen OE's integration into continuing educational opportunities offered through the SWCOEH.

Results and Discussion

Results related to Objective #1: Provide doctoral level training in OE to prepare trainees for a career in research and leadership, and #2: Prepare occupational epidemiologists to meet workforce demands in academics, government and private industry.

To accomplish these objectives, the OE program developed an effective and comprehensive set of processes regarding recruitment, admission, training and advising of trainees. We describe these processes below as well as related accomplishments. The highlights of this reporting period include funding for four traineeships per year and graduating six funded trainees. Five new trainees were recruited (one in spring 2012, two in fall 2012, one in spring 2014 and one in Spring 2015). Of the trainees who graduated, one works as a clinical analytics manager at a major health insurance company, one is employed as a senior epidemiologist at a major oil company in Texas, one was selected to become a CDC/NIOSH Epidemic Intelligence Service Officer, one has remained at UTSPH as post-doctoral fellow and the most recent graduate has accepted a post-doctoral fellowship with the US Army Institute of Surgical research (see Table 1 of Trainees in the Appendix). There have been no problems accessing a pool of qualified applicants, guiding them successfully to graduation, or securing jobs related to occupational epidemiology.

Recruitment of OE candidates

During the reporting period, OE traineeships were available to DrPH students in EOHS as well as to students in the PhD program in Epidemiology. As an outcome of the evaluation of the OE program, in the next funding cycle, the OE program will be restricted to PhD students in Epidemiology (because we identified that coursework requirements were too burdensome for DrPH EOHS students who were essentially required to complete requirements for two majors (Epidemiology and EOHS). Our decision was also influenced by the upcoming changes from the Council on Education for Public Health (CEPH), the accrediting agency of public health programs, to impose new demands on DrPH programs (e.g., orientation toward evidence-based public health practice, policy analysis and development, or translational and implementation research) beyond the scope of the OE Program.

During the reporting period, the SWCOEH began a major investment in updating its web-based and print

recruiting materials. We target recruitment efforts primarily in PHR 6. Our activities include: distributing advertisements, presenting at colleges and universities, responding to inquiries in a timely fashion, attending and presenting at professional society meetings and identifying promising students (who are already enrolled at UTSPH) early. Regional recruitment was further enhanced by travel to schools of public health in the region and promoting the OE Program at regional professional association and scientific meetings.

Regarding the recruitment of minorities and trainees with disabilities in our program, as a result of our program evaluation, we determined 44% (4 of 9) of OE Program trainees were underrepresented minority students in the period covered by the evaluation. Currently, we coordinate our recruitment efforts with the ERC Diversity Recruitment and Retention Plan. For example, we continually update web-based and other recruitment materials and we visit Hispanic Serving Institutions and Historically Black Colleges and Universities.

Admission and retention of OE candidates

The Admissions Committee operates at the School level and is composed of representatives from: Epidemiology, Biostatistics, EOHS, Behavioral Sciences/Health Promotion and Management, Policy and Community Health, as well as the five regional campuses. The Committee expects a minimum combined verbal and quantitative GRE score of 308 for doctoral-level applicants. Recommendation letters are also requested from two individuals who are qualified to evaluate the applicant's academic ability, performance and character. Applicants should show evidence of promising research ability as evidenced by a thesis or publication; these materials are requested and evaluated as part of the review of applicants. An applicant's packet is first reviewed by each departmental admissions committee and, when needed, regional campus faculty, who indicate their willingness to be the advisor. The Departmental or Campus representative then presents a summary of the applicant's qualifications to the School's Admissions Committee for a recommendation to the Associate Dean for Student Affairs. For those with an expressed interest in OE, the core OE faculty reviews the accepted candidate's suitability for granting a traineeship along with a pool of other qualified applicants. A core OE faculty member serves as the trainee's academic advisor if he/she is selected to receive a traineeship.

During the reporting period, the OE program supported 11 trainees of which we graduated six trainees. A listing of graduates (and their advisors) is provided in Appendix, Table 1. Our retention of trainees has historically been highly successful. During the reporting period, three trainees, voluntarily withdrew for non-academic reasons: Jaennie Yoon (07/01/2011-08/31/2011) withdrew from the program to accept a full-time job in the fall of 2011 after only two months; Jocelyn Murray (09/01/2010-06/30/2011) withdrew from the program in summer 2012 given difficulties balancing the program requirements with her full-time work responsibilities; and Amy Marie Hansen (09/01/2010-08/31/2012) withdrew from the program in fall 2012 after moving out of the state for family reasons. Given that trainees withdrew for personal reasons, we concluded that there was not a retention issue. Nonetheless, the ERC implemented data tracking systems to monitor trainees' progress towards graduation and Center leadership re-emphasized the need for engaged advisors and the importance of advisor-trainee communication to facilitate addressing problems should they occur.

OE Training

Description of Doctoral Degree Programs

Students seeking either a DrPH in EOHS or PhD degree in Epidemiology were eligible to be considered for a traineeship. Applicants to the DrPH in EOHS generally hold an MPH in EOHS or demonstrate other accomplishments indicating similar readiness; PhD applicants in Epidemiology generally hold an MS or MPH in Epidemiology or demonstrate other accomplishments that indicate similar readiness for doctoral study in Epidemiology. Doctoral degrees at the UTSPH requires a minimum of 48 semester credit hours and successful completion of: (1) a Preliminary Examination in the major area designed to evaluate whether doctoral students have the substantive knowledge and methodological skills specific to the design, conduct and analysis of studies relevant to their major and towards independent dissertation research; and, (2) a doctoral research proposal and dissertation. Typically, this requires 4 years of full-time study. UTSPH doctoral degree programs have a 7-year limit; once students are advanced to candidacy, they have a limit of three years to complete their degree programs. If a student reaches the limit but is engaged in the dissertation, a one-year extension is customarily granted. Any further extensions are made term by term, and marked

progress toward completion is carefully evaluated.

Upon entering a doctoral program, each OE doctoral trainee is assigned an academic advisor to guide the trainee towards the completion of the Preliminary Exam, a dissertation proposal and dissertation research. OE trainees must have an OE core faculty member as advisor. The advisor is chosen based on the best match with the student's academic interests and needs although there is a preference among faculty members and students for the advisor to be on the student's campus.

In order to complete a degree with appropriate public health breadth and methodological skills students are required to select one disciplinary minor area of study based on competencies and the recommended courses from the department of the minor discipline (at least 9 credits hours in one of the five public health disciplines) and separate from the major area. For the OE trainees the minor is required to be in Biostatistics. In addition, students are required to select one defined breadth area of study (at least 9 credit hours around a topical or methodological theme). For the OE trainees the breadth is required to be in Occupational Health.

All graduates of the OE program are expected to be independent investigators capable of applying epidemiological methods to problems of human health and disease. They are expected to have acquired competencies that allow them to enter academic careers in teaching or of occupying senior positions in governmental or private health research agencies. OE trainees are expected to attain the following competencies upon graduation:

1. Employ basic and advanced philosophy, theory (including causal inference), and principles of epidemiology in the practice of science.
2. Demonstrate knowledge of the history and role of epidemiology within the context of occupational health.
3. Describe the natural history of common or established occupational diseases, including considerations of its causation, control and prevention.
4. Apply basic and advanced principles and methods of epidemiology to research questions.
5. Conduct advanced quantitative methods to the study of human behavior, population characteristics, and the physical environment as it pertains to work.
6. Conduct research involving the design, data collection, analysis and dissemination of findings from an occupational epidemiological study.
7. Evaluate occupational research proposals and interpret results, taking into account the impact of bias and error on study outcomes and results.
8. Address and apply ethical issues in the practice of OE.
9. Effectively communicate with and instruct others regarding principles of OE.

OE trainees must complete designated core courses during the first year. The trainees may also work on electives as determined in consultation with their advisor, as well as courses in a minor in biostatistics and a breadth area in occupational health. The Preliminary Exam which is taken after the student has completed 6 to 9 required courses (approximately a full-time year or at the first scheduled administration after they reach 27 credit hours maximum). Students who do not pass the exam may re-take it once more at the next administration after a remediation plan is agreed upon between the trainee and the advisor. Any student who fails the exam twice may not remain in the doctoral program. After passing the exam, the student forms a dissertation committee composed of an advisor representing OE, and two other members representing their minor in biostatistics and breadth in occupational health. Additional committee members, who bring specific expertise to the committee, are optional. This committee monitors the trainee's progress toward meeting the requirements of the research proposal. When the dissertation committee is ready to formally approve the proposal, students make an open oral presentation of the research proposal and answer questions from the committee, an "outside" member and other persons in attendance. Once the trainee successfully defends his/her proposal, the student is advanced to candidacy. The committee monitors progress of the dissertation project and approves the final version of the dissertation. Trainees make a formal public presentation of the completed dissertation research.

Specific OE Program Curriculum

The individual course of study, directed by the student's committee, varies depending on each trainee's background and coursework prior to entering the program. The OE Program curriculum was revised during the reporting period to support OE trainees who are in the PhD degree program in epidemiology (see Table 1). It consists of a minimum of 48 credit hours. OE trainees take at least 45 credits of courses, this in agreement with UTSPH policies that required at least 39 credit hours other than dissertation for doctoral programs. While a minimum of three dissertation research credit hours are required towards the minimum degree hour requirement, most doctoral students exceed this minimum. In addition, depending on individual interests, UTSPH has a large number of elective courses available to students which include several courses from different UTSPH departments that are relevant to OE research.

Table 1. Revised Occupational Epidemiology Program curriculum

Course	Credits	Title
CORE for Occupational Epidemiology Trainees (16 credits)		
PHD 2711	3	Epidemiology IV ^a
PHD 2712	3	Experimental Methods in Epidemiology ^a
PHWD 2760	3	Occupational Epidemiology ^{a,b}
PHWD 2835	3	Injury Epidemiology ^{a,b}
PH 2770	3	NIH Proposal Development
PH 2990	1	Epidemiology Seminar
MINOR in Biostatistics (at least 9 credits)		
PH 1830 or ^c	3 or	Categorical Data Analysis ^{a,b} or
PH 1831	4	Survival Analysis ^{a,b}
PH 1820	3	Applied Statistical Analysis I
And one of the following three:		
PH 1821	3	Applied Statistical Analysis II
PH 1745	3	Sampling Techniques (odd years)
PH 1840	3	Statistical Methods for Handling Missing Data (even years)
BREADTH in Occupational Health (at least 20 credits)		
PHD 2101	3	Contemporary Issues in EOHS
PHD 2105	1	EOHS Doctoral Seminar
PH 2245	4	Fundamentals of Industrial Hygiene
Select up to 12 credits more from any occupational health course		
PHWD 2108	3	Applied Epidemiological Analyses in EOHS
PH 2175	4	Principles of Toxicology
PH 2133	3	Fundamentals of Occupational Safety (odd years)
PHD 2135	3	Risk Analysis – Principles and Practice (odd years)
or ^c		or
PHD 2190	3	Environ. and Occupational Health Policy (even years)
PH 2177	3	Toxicology II: Agents and the Environment
or ^c		or
PH 2250	4	Environmental and Occupational Health Controls
PH 2255	4	Clinical Occupational Medicine
PH 2498	3	Principles of Occupational Ergonomics (even years)
DISSERTATION^e		
PH 9999	3	Dissertation Hours ^d
Total	48	

^a Courses required for the Preliminary Exam (PE). ^b Within each section, Core or Minor, either one of these two will count for the PE.

^c These courses are provided as example of current available courses; there may be new offerings in the future. ^d A minimum of three credit hours of dissertation are needed to count towards the minimum of 48.

OE Training Program Evaluation

Student Evaluation

Students are evaluated in each course they take by either a letter grade or a pass/fail determination. In addition, course faculty may provide written comments about each student's performance in formal coursework or dissertation/independent studies via electronic transmission to expand and enhance appraisal of the student's achievements and attainment of learning objectives for the course. UTSPH has developed a "living" document for doctoral trainees to assure understanding and agreement between the trainee and the faculty advisor regarding the academic processes, standards and milestones on the four primary doctoral program stages. Trainees are expected to reach each milestone within the specified time period to make satisfactory progress through the program. Faculty advisors are expected to monitor progress and work with students to meet the milestones and evaluate progress in the fall and spring semesters of each academic year.

Faculty Evaluation

At the end of each course, students may evaluate the faculty through an online format and students are also asked annually to provide an evaluation of their academic advisors. Also the core program faculty of the OE Program participate in an annual peer-review process, which is required of all UTSPH faculty.

Comprehensive Program Evaluation

In the fall of 2011, the Director of the SWCOEH assembled an Evaluation Workgroup to construct logic models and evaluation plans for all major programs under the SWCOEH in accordance with the Center's goals and objectives. The purpose of the evaluation is to improve the quality of the SWCOEH in terms of operations and administration by assessing the activities and outcomes of each component of the ERC using a set of measurable criteria. In spring of 2012, the Director began a series of meetings with all academic program directors to develop their evaluation plans seeking commonalities in process and outcome indicators, where appropriate, but accommodating differences when necessary. Critical guidance in best practices in Program Evaluation was also provided by a colleague in the Department of Health Promotion and Behavioral Sciences at the UTSPH (Dr. L. Kay Bartholomew). The plans were implemented in fall 2013.

As a result of our evaluation activities, we noted the following minor weaknesses: minimal OE content in CE courses, low minority representation and a limited pool of potential trainees. We developed plans to address these weaknesses: (1) Embed OE content into OM, IH and safety CE courses. (2) Expand recruitment by targeting underrepresented minority institutions in conjunction with the Center's Diversity Recruitment and Retention Plan. (3) Make improvements to our recruitment process to attract external candidates by means of developing advertisements to be distributed nationally and regionally (PHR 6) at professional association and scientific meetings; and expand visibility of the OE program to applicants seeking admission and newly matriculated students.

Results related to Objective #3: Contribute to the OE evidence base by conducting rigorous research.

We believe that one of our best measures of success of the OE program is to assess the scientific contributions of OE trainees. Below is a listing of OE trainees (and their advisors) and a summary of their research activities and scientific outputs.

Amanda Marshall (David Gimeno, PhD)

Amanda was recruited into the OE Program in San Antonio in Fall 2014. She has a MPH in Epidemiology and a Bachelor's of Science in Nursing. Her primary interest is on in health hazards among oil field extraction workers. With Dr. Gimeno and Dr. Douphrate she worked on an analysis of musculoskeletal symptoms among dairy parlor workers. Her current projects include an analysis of maternal residential proximity to shale gas drilling sites and adverse birth outcomes in the Barnett Shale region in Texas in conjunction with Dr. Kristina Whitworth (OE faculty) and Dr. Elaine Symanski (Center Director). She presented an abstract titled "Unconventional Oil and Gas Extraction: Occupational Health Research Problems and Solutions" at the Future of Occupational Health Symposium in Seattle, Washington. The abstract submission earned her a scholarship covering travel expenses to and from the symposium.

Presentations:

1. **Marshall A**, Whitworth KW. Unconventional Oil and Gas Extraction: Occupational Health Research Problems and Solutions". Future of Occupational Health Symposium. Seattle, Washington, June 24-25, 2015.

Amanda Staudt (maiden name until mid-2014 was Waclawczyk) (**Hasanat Alamgir, MBA, PhD**)

Amanda was recruited to the OE Program in San Antonio in January 2014. She completed her core coursework with impeccable grades. She is currently a student member of the AIHA and a member of the American Association for the Advancement of Science. Amanda is working on her dissertation proposal on, "Organic Solvent Exposure and Hearing Acuity in U.S. Adults: The National Health and Nutrition Examination Survey, 1999 to 2006". In addition, Amanda was employed part-time as a graduate research assistant at SARC, which helped her to gain more familiarity with statistical software, including SAS, Stata and R as well as with activities such as conducting critical literature reviews, editing and writing manuscripts. Below is a list of her scientific products since joining the program:

Publications:

1. Ren J, **Waclawczyk A**, Hartfield D, Yu S, Kuang X, Zhang H, Alamgir H. Is there an association between fall injuries and Body Mass Index? *South Med J.* 2014;107(5):294-300.
2. **Staudt A**, Mangla A, Alamgir H. A review of Pertussis cases in a Texas County: 2008-2012. *South Med J.* 2015;108(7):452-7.
3. **Staudt A**, Alamgir H, Long D, Inscore S, Wood P. Developing and implementing a city wide Asthma Action Plan: A community collaborative partnership. *South Med J.* 2015 (In press).

Laura Lee (Elaine Symanski, PhD)

Laura joined the OE program in spring 2012. Her research focus is in maternal occupational exposures and adverse birth outcomes. She participated in the 8th Annual National Institute of Child Health and Human Development and Institute of Human Development, Child and Youth Health Summer Institute in Reproductive and Perinatal Epidemiology in Philadelphia, PA in July 2012. She became a member of the AAAS in July 2013. Additionally, Laura was a 2013/14 NIOSH ERC Pilot Project awardee on a project entitled, "The Linkage of the National Birth Defects Prevention Study and the Occupational Information Network." Laura attended a regional NORA symposium that was held in Salt Lake City, UT, in April 2014 and presented work related to her dissertation and pilot project. She was the first ever presenter from the UTSPH. Her presentation was entitled, "Use of the O*NET to assess occupational exposures in a study of adverse pregnancy outcomes." She completed her dissertation entitled, "Maternal Workplace Emotional Stressors and Physical Activity and Adverse Birth Outcomes" in August 2015 and two papers are being prepared for publication that describe this work. Below is a list of her scientific products since joining the program:

Publications:

1. Lupo PJ, **Lee LJ**, Okcu MF, Bondy ML, Scheurer ME. A case-only analysis of gene-hazardous air pollutant interactions and the risk of childhood medulloblastoma. *Pediatr Blood Cancer.* 2012; 59(4):605-10.
2. Lupo PJ, Symanski E, Langlois PH, Gilboa SM, Malik S, Lawson CC, **Lee LJ**, Agopian A, Correa A, Desrosiers TA, Romitti PA, Shaw GE, Mitchell LE. Maternal occupational exposure to polycyclic aromatic hydrocarbons and the risk of congenital heart defects in offspring. *Birth Defects Res A Clin Mol Teratol.* 2012; 94(11):875-81.
3. **Lee LJ**, Canfield MA, Hashmi, S, Moffitt, KB, Marengo L, Agopian AJ, Belmont JW, Freedenberg DF, Tanksley SM, Mitchell LE, Lupo PJ. Association between thyroxine levels at birth and choanal atresia among infants in Texas, 2004-2007. *Birth Defects Res A Clin Mol Teratol.* 2012; 94(11):951-4.
4. **Lee LJ**, Lupo PJ. Maternal Smoking during Pregnancy and Risk of Congenital Heart Defects among Offspring: A Systematic Review and Meta-Analysis. *Pediatr Cardiol.* 2013; 34(2):398-407.

Presentations:

5. **Lee LJ**, Lupo PJ, Canfield MA, Chan W, Hoyt AT, Pompeii LA, Razzaghi H, Tinker SC, Symanski E. Use of the O*NET to assess occupational exposures in a study of adverse pregnancy outcomes. Proc

Dissertation:

6. **Lee LJ**. Maternal Workplace Emotional Stressors and Physical Activity and Adverse Birth Outcomes, Ph.D. Dissertation, The University of Texas School of Public Health, 2015.

Sarai Conway (Lisa Pompeii, PhD, COHN-S)

Sarai joined the program in fall 2012 and graduated in spring 2015. After graduation, Sarai was invited to join the Delta Omega Honorary Society in Public Health. Her research focus has been on long work hours and the risk of chronic disease among US and Spanish workers. She received a NIOSH ERC Pilot Project grant in 2014/15 for her proposal on "Health Effects of Long Working Hours." In her final year of her doctoral program, she presented her research at several conferences including the International Epidemiology in Occupational Health Conference (EPICOH) in Chicago in June 2014. Sarai was awarded a competitive scholarship to attend the conference. In June 2015 she presented at the Society for Epidemiologic Research 2015 Annual Meeting in Denver, CO ("Identification of a Long Work Hours Cut Point for Predicting Elevated Risk of Poor Self-Reported General Health"). Sarai also presented at the Spanish Society of Epidemiology annual meetings in September 2014 (Alicante, Spain) and in September 2015 (Santiago de Compostela, Spain) on work that is part of a collaboration with Dr. Elena Ronda, who was a SWCOEH visiting scholar.. Sarai has several papers under review; one of her dissertation papers ("Dose-Response Relation between Work Hours and Cardiovascular Disease Risk: Findings from the Panel Study of Income Dynamic"), a manuscript pertaining to workplace violence with her academic advisor, Lisa Pompeii, PhD, and a manuscript on findings related to occupational exposures of Latin American immigrant workers in the US and Spain with Dr. Ronda. Sarai is currently a post-doctoral fellow at the UTSPH. Here is a list of her scientific products:

Presentations:

1. **Conway S**, Pompeii L, Gimeno D. An Exposure Assessment Model for Long Working Hours. Conference: 24th International Epidemiology in Occupational Health – EPICOH 2014: Challenges to Occupational Epidemiology in the 21st Century. Chicago, IL. June 24-27, 2014. Publication: *Occup Environ Med.* 2014;71 (Suppl 1):A114.
2. **Conway SC**. How Panel Study income data can be utilized to health of workers in the US. EOHS Research Seminar Series, Houston, Texas. September 19, 2014.
3. **Conway SC**, Pompeii L, Gimeno D, Roberts R, Follis J. Identification of a Long Work Hours Cut Point for Predicting Elevated Risk of Poor Self-Reported General Health. UTSPH Student Research Day 2015, Houston Texas. April 9, 2015.
4. **Conway S**, Pompeii L, Roberts R, Follis J, Gimeno D. Identification of a Long Work Hours Cut Point for Predicting Elevated Risk of Poor Self-Reported General Health. 48th Annual Meeting Society for Epidemiologic Research – SER 2015. Denver, CO, June 16-19 2015.

Dissertation:

5. **Conway SC**. Long Work Hours and Adverse Health Outcomes: Defining a Health Risk-Based Threshold for Work Hour Exposure, Ph.D. Dissertation, The University of Texas School of Public Health, 2015.

Judson Janak, PhD (Hasanat Alamgir, MBA, PhD)

Judson's research interests were in military service, injuries and health behaviors. Judson, at the UTSPH Austin campus, joined the OE Program in fall of 2012. Judson received Dell Center Pilot Funding to perform data abstraction for one paper of his PhD dissertation entitled, "U.S. Military Health: The Epidemiology of Occupational Risk Factors and Long-term Health across the Lifespan". He graduated May 2014. Judson accepted a post-doctoral fellowship with the U.S. Army Institute of Surgical research which began July 2014. Below is a list of his publications related to his training in the OE program:

Publications:

1. **Janak JC**, Pugh MJ, Orman JA. *Epidemiology of traumatic brain injury*. In: Future Medicine Ltd; 2013.

[Submitted to Book Editors].

2. Pettee Gabriel KK, Matthews KA, Pérez A, Edmundowicz D, Kohl HW III, Hawkins MS, **Janak JC**, Kriska AM, Kuller LH. Self-reported and accelerometer- derived physical activity levels and coronary artery calcification in older women: Results from the Healthy Women Study. *Menopause*. 2013; 20(2): 152-61.

Dissertation:

3. **Janak JC**. U.S. Military Health: The Epidemiology of Occupational Risk Factors and Long-Term Health across the Life-Course, Ph.D. Dissertation, The University of Texas School of Public Health, 2014

Robert Reynolds, PhD (George Delclos, MD, MPH, PhD)

Dr. Robert Reynolds graduated in 2013. He is employed by Cambria Health Solutions as a clinical analytics manager. His dissertation was entitled, "Development of a location exposure matrix for ionizing radiation in extraterrestrial environments and its application in the study of mortality for U.S. astronauts." Below is a list of his scientific products related to the OE program:

Publications:

1. **Reynolds RJ**, Day SM. The mortality of Major League Baseball players from Canada, Latin America and the Caribbean. *Global Journal of Medicine and Public Health*. 2012; 1(4): 38-41.
2. Day SM, **Reynolds RJ**. Risk factors for cerebral palsy: current knowledge and future causal inference. *Dev Med Child Neurol*. 2013 Jun; 55(6):490.
3. Kush SJ, Day SM, **Reynolds RJ**. Life expectancy for life care planners. *J Life Care Plan*. 2013; 12(1):31-49.
4. **Reynolds RJ**, Becker EA, Shafer AB. Causes of death and comparative mortality in Texas Public Mental Health Clients, 2006-2008. *Ment Health Clin*. 2013; 3(1):52.
5. Day SM, **Reynolds RJ**, Kush SJ. Letter to the editor regarding "Life expectancy projections supporting life care planning" by RP Bonfiglio and D Kasas in volume 12, number 1. *J Life Care Plan*. 2013; 12:5-7.
6. **Reynolds RJ**, Delclos GL, Cooper SP, Rahbar MH. Radiation dosimetry in space: A systematic review. *WebmedCentral Environmental Medicine*. 2014; 5(2):WMC004578.
7. **Reynolds RJ**, Day SM, Nurgalieva ZZ. Mortality among Soviet and Russian Cosmonauts: 1960-2013. *Aviat Space Environ. Med*. 2014; 85(7): 750-754.
8. **Reynolds RJ**, Kush SJ, Day SM, Vachon P. Comparative mortality and risk factors for death among Justices of the Supreme Court of the United States, 1789-2013: experience from an occupational cohort with over two centuries of follow-up. *J Insur Med*. 2014 (in press).

Dissertation:

9. **Reynolds RJ**. Development of a location exposure matrix for ionizing radiation in extraterrestrial environments and its application in the study of mortality for U.S. astronauts, Dr.PH. Dissertation, The University of Texas School of Public Health, 2013.

Christina Socias, DrPH (Sharon Cooper, PhD)

Dr. Christina Socias focused her research interests in incorporating occupation and industry into an electronic health records database of migrant farmworkers. Dr. Socias graduated in the summer of 2013. She served as a teaching assistant for OE and as a PPTRP reviewer. She was awarded a 2010/11 NIOSH ERC pilot project for a project entitled "Assessing the Impact of Loss to Follow-up in a Cohort Study of South Texas Adolescent Farmworkers: Implications for Planning a Cohort Study" which was part of her dissertation work on "The meaningful use of incorporating occupation and industry in an electronic health record (EHR) database for epidemiologic research". Upon graduating, she was selected to be a CDC/NIOSH Epidemic Intelligence Service Officer. She was the first DrPH graduate from the SARC of UTSPH, as well as the first ERC trainee graduate from the SARC. Dr. Socias was the lead author on a CDC Morbidity and Mortality Weekly Report entitled, "Occupational Ladder Fall Injuries – United States, 2001". Below is a list of her scientific products related to the OE program:

Publications:

1. Cooper SP, Heyer N, Shipp EM, Ryder ER, Hendrickson E, **Socias CM**, del Junco DJ, Valerio M, Partida S. Community Based Research Network: Opportunities for coordination of care, public health surveillance, and farmworker research. *Online J Public Health Inform.* 2014; 6(2):e190.
2. **Socias CM**, Chaumont Menéndez CK, Collins JW, Simeonov P. Occupational Ladder Fall Injuries-United States, 2011. Centers for Disease Control and Prevention, Morbidity and Mortality *Weekly Report (MMWR)*. 2014; 63(16): 341-346.
3. Cook ML, Kowalkowski MA, Collins R, Mathews C, Prosperie SL, **Socias C**, Cooper SP. Trends in Occupation-Related Musculoskeletal Disorders in Texas and the United States (2003-2009). *TPHA Journal*. 2013; 65(4): 11-15.
4. Serrano A, Pinion C, Read TD, Su J, Yoon J, St. John J, **Socias C**, Prosperie SL, Cooper SP. Description of Injuries and Illnesses in the Transportation and Warehouse Sector in Texas and the United States, 2005-2009. *TPHA Journal*. 2013; 65(4):24-28.

Dissertation:

5. **Socias CM**. The meaningful use of incorporating occupation and industry in an electronic health records (EHR) database for epidemiologic research, DrPH Dissertation, The University of Texas School of Public Health, 2013.

Judy Wendt, PhD (Elaine Symanski, MSPH, PhD)

Prior to matriculating as a UTSPH student, Judy received a BS in Community Health Education and Nutrition from UT Austin and a MPH in Epidemiology from the University of Michigan. Her dissertation research was focused on pediatric asthma incidence in Texas using a novel data source and associations with ambient ozone levels in an urban area using Medicaid claims data. Dr. Wendt graduated in 2012. She is employed by Shell Health Americas as a senior epidemiologist. Dr. Wendt is currently collaborating with Dr. Symanski on a project to further evaluate environmental risk factors and childhood asthma. Below is a list of her scientific products related to the OE program:

Publications:

1. **Wendt JK**, Symanski, Stock TH, Chan, W, Du XL. Association of short-term increases in ambient air pollution and timing of initial asthma diagnosis among Medicaid-enrolled children in a metropolitan area. *Environmental Research*. 2014; 131, 50-58.
2. Bhojani FA, Tsai SP, **Wendt JK**, Koller KL. Simulating the impact of changing trends in smoking and obesity on productivity of an industrial population: an observational study. *BMJ Open*. 2014; 4:e004788.
3. **Wendt JK**, Symanski E, Du XL. Estimation of asthma incidence among low-income children in Texas: A novel approach using Medicaid claims data. *Am J Epidemiol*. 2012; 176: 744-750.
4. Tsai SP, Bhojani FA, **Wendt JK**. Risk factors for illness absence due to musculoskeletal disorders in a 4-year prospective study of a petroleum-manufacturing population. *J Occup Environ Med*. 2011; 53(4):434-40.
5. Berg J, Breederveld D, Roukens AH, Hennink Y, Schouten M, **Wendt JK**, Visser LG. Knowledge, attitudes, and practices toward malaria risk and prevention among frequent business travelers of a major oil and gas company. *J Travel Med*. 2011; 18(6), 395-401.
6. **Wendt JK**, Tsai SP, Bhojani FA, Cameron DL. The Shell Disability Management Program: a five-year evaluation of the impact on absenteeism and return-on-investment. *J Occup Environ Med*. 2010; 52(5):544-50.

Dissertation:

7. **Wendt JK**. Pediatric asthma incidence in Texas and associations with ambient ozone levels in an urban area an analysis using Medicaid claims data, Ph.D. Dissertation, The University of Texas School of Public Health, 2012.

Results related to Objective #4: Strengthen OE's integration into continuing educational opportunities offered through the SWCOEH.

Trainees have multiple opportunities through the OE program to build their research experience. The core

faculty are involved in a broad portfolio of successfully funded research projects. For example, as a trainee, Dr. Socias worked with Dr. Cooper on a NIEHS-funded project regarding community-academic linkages to build a national network for farmworker research, and later used the collected data for her dissertation. Trainee, Laura Lee, became a member of the AAAS and collaborated with investigators from the National Birth Defects Study (sponsored by the CDC) on her dissertation research. Three of our trainees were awarded funding from the PPRTP: Socias in the 2010/11 cycle and Conway and Lee in the 2013/14 cycle.

There is also substantial interaction and collaboration among the core faculty in OE. Drs. Alamgir, Cooper, Delclos, Gimeno and Whitworth are collaborating along with other ERC faculty on a project funded by the U.S. DoD investigating hearing injuries, noise exposures and cost burden in military service members. Drs. Gimeno and Delclos have been collaborating on a NIH/Fogarty funded project to establish a network with the Pontificia Universidad Javeriana Center for Ergonomic Studies in Colombia on training and research needs on workplace safety and industrial hygiene, ergonomics and human factors and the psychosocial environment. Dr. David Douphrate collaborates with Dr. Gimeno on a project to reduce the incidence of musculoskeletal injuries among industrialized dairy workers and logging workers. Drs. Whitworth and Symanski, with funding from NIEHS, are working on a study to examine associations between maternal residential proximity to unconventional resource development (e.g., hydraulic fracturing) and adverse birth outcomes. In addition, these faculty co-teach and are guest lecturers, including courses in OE and injury epidemiology.

As an outcome of the Evaluation of the Program, the core faculty aim will work to integrate OE into ERC CE and outreach activities. During the reporting period, we developed plans to: (1) develop a CE course in occupational epidemiology for Health and Safety Professionals; (2) incorporate occupational epidemiology content into existing CE courses such as the Fundamentals of Industrial Hygiene and Industrial Hygiene Sampling; (3) develop an introductory seminar on occupational epidemiology to present at events held by main industrial associations (e.g., the Greater Houston Industrial Hygiene Council)..

Conclusions

In summary, the OE Program has many strengths including outstanding trainees who graduate in time, a revised and updated curriculum, the recruitment of outstanding faculty and a growing research portfolio. Overall, our trainees have been involved in over 20 publications, and several communications at national and international conferences during the fiscal years 2011-2015, OE program members participated in SWCOEH regional recruitment activities, interacted with other programs through our overlapping faculty interests (occupational medicine, injury prevention, and industrial hygiene) and participated actively with the development and implementation of the SWCOEH Evaluation Plan. The OE program has continued the relationship with the TX DSHS, via involvement of OE members in their NIOSH-funded state-based Occupational Safety and Health Surveillance grant (Villanacci, 2013).

In conclusion, we met the five stated goals for the corresponding reporting period: (1) We provided doctoral level training in OE and prepared trainees for careers in research and leadership, graduating four trainees during the past funding cycle and all of them successfully obtained relevant employment upon graduating; (2) We successfully prepared our graduates as occupational epidemiologists to meet workforce demands in academics, government, and private industry. Our four graduates are successfully employed in all three of those areas and continue to excel; (3) The program has also continued to contribute to the OE evidence base by conducting rigorous research; (4) The OE Program successfully strengthened OE's integration into the other academic programs and opportunities offered through the SWCOEH. We also increased the number of faculty members and extended academic opportunity for ERC trainees at the SARC.

Literature Cited

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Janelle Rios, PhD

Background

The Continuing Education (CE) and Outreach Programs are dynamic training programs with a 38-year history of successfully delivering high quality educational events to OSH professionals in PHR 6. The content of our courses target the training needs of OSH professionals, medical professionals involved in employee health and professionals in allied health, government and business by providing specialized, relevant and timely knowledge to reduce both the risk and the impact of occupational and environmental health threats in PHR 6 and the world. Through its diverse academic and professional faculty, CE and Outreach events focus on important emerging issues, with a goal to help OSH professionals stay prepared to manage workplace health and safety issues, including the surrounding communities in which these workplaces reside.

As the educational, professional outreach arm of the SWCOEH, the CE Program leverages the Center's extensive academic and research resources and deep commitment to education, research and service. Through our collaborations with NIOSH, OSHA, NIEHS, the Texas Medical Center, professional associations and other organizations, we provide a comprehensive curriculum covering a wide range of topics that target the occupational health and safety training needs of professionals in PHR 6. Our offerings include a range of professional education, refresher courses, certification preparation, hands-on workshops and forums on emerging issues. We continuously adjust, expand, and improve content and delivery based on needs assessments, course evaluations, requests, feedback from the Board of Advisors and collaboration with local, regional and national groups and organizations.

Our CE and Outreach events are based upon regional needs assessments performed using a variety of methods: post course evaluations; informal in-person discussions with course participants; surveys distributed by email; focus groups; booths at national and regional conferences; personal communications with industry and government officials; meetings with health and safety professional groups and associations; position statements published by professional associations; conversations with their officers or committee members; changes in government regulations and standards; input from our Board of Advisors and internet web page review. With these methods we have obtained clear information on training needs, including the need for professional development training, hazard- recognition, and industry-specific and community-specific topics of interest.

Faculty for CE courses, conferences, and training activities are well-qualified, highly trained, and respected in their OSH specialty fields. The SWCOEH CE Program staff and faculty have established strong relationships with public and private agencies, government, and university partners who have provided valuable feedback and information for needs assessments that have helped us develop and deliver educational events.

The CE and Outreach Programs are directed by Janelle Rios, PhD, who has served as the SWCOEH Deputy Director since July of 2014. Dr. Rios is responsible for program oversight including strategic planning, new course development, updates to existing courses, faculty and speaker coordination, course credentialing, event delivery, program evaluation, collaborations and partnerships, data management, program reports, staff management and grant applications. Administrative support is provided by SWCOEH staff who are responsible for travel requisitions and providing overall financial and budgetary assistance. Staff also assist with pre- and post-event activities and onsite logistics.

Specific Objectives

Activities related to the goals of these programs during the reporting period appear below.

Goal 1: Deliver relevant and timely training to positively impact the practitioner environment. We met this goal by collaborating with many local, state, regional and national professional associations to deliver industry-specific training as requested by leaders in various groups. For example, during the project

period we delivered six symposia (February 2012 [n=18], September 2012 [n=24], February 2013 [n=32], September 2013 [n=42], and February 2014 [n=24]) to 140 occupational medicine physicians and nurses who work in the petrochemical industry. The agendas for these events were developed via significant coordination of physician leaders, two of whom serve on the SWCOEH Board of Advisors. Similarly, we successfully partnered with safety organizations and various industrial hygiene professional associations.

Goal 2: Conduct, analyze and summarize a regional needs assessment at regularly scheduled intervals.

We met this goal by (1) conducting extensive course evaluations (via paper or online surveys) in which we ask open-ended questions regarding future training needs; (2) conducting follow-up impact surveys, in which we ask open-ended questions regarding future training needs; and (3) referencing the results of the National Survey of the Occupational Safety and Health Workforce, released by NIOSH in October 2011.

Goal 3: Develop or modify courses in response to course evaluations and results of national and regional needs assessments.

We met this goal through extensive efforts to document feedback collected from course participants through a variety of methods (i.e., in-person discussions, paper surveys, online questionnaires) at various times (i.e., during educational events, immediately after the event, and 3-6 post event). We routinely discuss these outcomes with subject matter experts, the SWCOEH Board of Advisors and course directors to update existing courses or develop new courses. Additionally, our agility of our programs and the strength of our relationships with collaborators allow us to quickly respond to emerging issues. Some examples are provided in the Outcomes/Relevance/Impact section of this document.

Goal 4: Utilize distance learning techniques in a portion of course offerings.

We met this goal in two ways. First, our university's resources include a video conferencing platform to deliver synchronous webinars. During the project period we used this technology to deliver live webinars to a total audience of 196 connections. Second, we developed and implemented an online platform from which to launch asynchronous learning modules. We currently list five online courses in the catalog for this platform, two are delivered in Spanish. This platform is accessible from our homepage: www.swcoeh.org.

Goal 5: Award continuing education units, as appropriate, for participation in each course.

We met this goal by applying for, obtaining and issuing continuing education units as appropriate for the target audience in each training event, including Continuing Medical Education, Continuing Nursing Education and Industrial Hygiene points.

Goal 6: Provide training to the following groups: occupational physicians, occupational health nurses, industrial hygienists, occupational safety and health professionals, paraprofessionals and technicians, officials from academic institutions, representatives from public health and safety agencies, professional society members and representatives from local and state government.

We met this goal by providing training to all of these groups. During the project period, we trained a total of 16,923 people. Of these, 1,177 were physicians, 789 were nurses, 3,044 were safety professionals, 1,169 were industrial hygienists, and 10,797 classified themselves as "other" or did not report their profession. These trainees self-reported that, at the time of training, they were employed by academia (9,345), private industry (6,678), government (492), foreign institutions (46), non-governmental organizations (6), and 303 either classified their employers as "other" or did not report. CE course offerings by program area is summarized in Appendix, Table 3.

Goal 7: Deliver training to 600 people per year.

We met this goal by training a total of 16,923 people in 444 courses representing a total of 84,808 person-hours of training during the project period. A year by year description is as follows:

- Year 1: 3,226 people for 18,728 person-hours,
- Year 2: 4,565 people for 22,942 person-hours,
- Year 3: 4,404 people for 21,792 person-hours and
- Year 4: 4,728 people for 27,539 person-hours.

Goal 8: Target training events to underserved populations.

We met this goal by offering live in-person events at minority institutions (i.e., Hispanic Serving Institutions and Historically Black Colleges and Universities) such as Texas Southern University (Environmental Health and Safety seminars throughout the project period), San Jacinto College (May 2012, n=about 23) and The University of Texas at El Paso (Assessing Chemical Exposures conference [n=19] followed by a community meeting of ex-ASARCO workers [n=about 42], May 2012). We also delivered three educational events in the African-American community near Mossville, Louisiana (October 2011 [n=14], April 2012 [n=25], July 2013 [n=35]).

Additionally, we published six complimentary online courses to expand our reach into the lay community. Five of these courses are part of our "For Everyone" series, a group of short learning modules (20-30 minutes in length) intended to provide basic safety information to wide audience. Two courses are in Spanish: The Use of Personal Protective Equipment with Suspected Ebola-Infected Patients in Ambulatory Care Clinics and Basic Emergency Preparedness for Everyone: An Overview Course in Everyday Readiness.

Results and Discussion

Our CE and Outreach Programs are strong and active. These programs use a variety of teaching modalities, i.e., didactic sessions, symposia, hands-on workshops, and synchronous and asynchronous online educational events. These programs provide leadership-, worker- and community-level training to many professionals (i.e., physicians, nurses, safety specialists and industrial hygienists) working in many industries and sectors (i.e., private for-profit organizations, all levels of government, non-profit organizations and academia). The number and quality of educational events, the number of attendees and the strength of our partnerships improves each year. We use innovative techniques to deliver educational content and gather data, and we receive favorable feedback from course attendees, who often return to participate in additional training sessions. Finally, our instructors are knowledgeable subject matter experts and often invited to share their expertise in venues throughout the country.

Conclusions

Our programs positively impact worker safety and health, as well as the overall resiliency of the community. Moreover, these programs contribute towards accomplishing the university's mission of service and workforce development and NIOSH's mission of reducing risks of injury and death through education, research and training.

TRAINEE PUBLICATIONS

Occupational Epidemiology

Alamgir H, Wong N, Hu Y, Yu Mo, **Marshall A**, Yu S: [2015] Epidemiology of falling and serious falls among older adults in Texas. *Southern Medical Journal* 108(2):119-124.

Conway S, Pompeii L, Gimeno D. An Exposure Assessment Model for Long Working Hours. Conference: 24th International Epidemiology in Occupational Health – EPICOH 2014: Challenges to Occupational Epidemiology in the 21st Century. Chicago, IL. June 24-27, 2014. Publication: *Occup Environ Med*. 2014;71 (Suppl 1):A114.

Conway SC. How Panel Study income data can be utilized to health of workers in the US. EOHS Research Seminar Series, Houston, Texas. September 19, 2014.

Conway SC, Pompeii L, Gimeno D, Roberts R, Follis J. Identification of a Long Work Hours Cut Point for Predicting Elevated Risk of Poor Self-Reported General Health. UTSPH Student Research Day 2015, Houston Texas. April 9, 2015.

Conway S, Pompeii L, Roberts R, Follis J, Gimeno D. Identification of a Long Work Hours Cut Point for Predicting Elevated Risk of Poor Self-Reported General Health. 48th Annual Meeting Society for Epidemiologic Research – SER 2015. Denver, CO, June 16-19 2015.

Cook ML, Kowalkowski MA, Collins R, Mathews C, Prosperie SL, **Socias C**, Cooper SP: [2013] A descriptive study of musculoskeletal Disorders in Texas and the United States (2003-2009). *Texas Public Health Journal* 65:11-15.

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Bhojani FA, Tsai SP, **Wendt JK**, Koller KL. Simulating the impact of changing trends in smoking and obesity on productivity of an industrial population: an observational study. *BMJ Open*. 2014; 4:e004788.

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Berg J, Breederveld D, Roukens AH, Hennink Y, Schouten M, **Wendt JK**, Visser LG. Knowledge, attitudes, and practices toward malaria risk and prevention among frequent business travelers of a major oil and gas company. *J Travel Med*. 2011; 18(6), 395-401.

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Occupational Injury Prevention

Chaumont MC, Amick III BC, Bazzani L, Robertson M, DeRango K, Rooney T, Moore A: [2012] A Replicated Field Intervention Study Evaluating the Impact of a Highly Adjustable Chair and Office Ergonomics Training on Visual Symptoms. *Applied Ergonomics* 43(4):639-644.

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Menéndez CC, Amick III BC, Jenkins M, Caroom C, RM, Geer F, Moore JS, Harrist RB, Katz J: [2015] Validation Study Comparing Two Self-Reported Upper Extremity Symptom Surveys with Clinical Examinations for Upper Extremity Musculoskeletal Disorders. *Work: A Journal of Prevention, Assessment and Rehabilitation*, in press.

DISSERTATIONS AND THESES

Industrial Hygiene

Pinion C: [2013] The impact of job control on employee perception of management commitment to safety in an Engineering, Procurement and Construction Company, PhD Dissertation Defense, University of Texas Health Science Center at Houston

Calcote J: [2012] An assessment of post-disaster psychological stress in Hazardous Waste Operations and Emergency Response (HAZWOPER) Workers, PhD Dissertation Defense, University of Texas Health Science Center at Houston

Maypole C: [2012] Associations between ambient levels of combustion pollutants and small for gestational age infants in Texas, PhD Dissertation Defense, University of Texas Health Science Center at Houston

Occupational Epidemiology

Conway S: [2015] Long work hours and adverse health outcomes: defining a health risk-based threshold for work hour exposure, PhD Dissertation Defense, University of Texas Health Science Center Houston

Lee L: [2015] Maternal workplace emotional stressors and physical activity and adverse birth outcomes, PhD Dissertation Defense, University of Texas Health Science Center Houston

Reynolds R: [2013] Development of a task exposure matrix for radiation in extraterrestrial environments and its application in the study of mortality for US astronauts, PhD Dissertation Defense, University of Texas Health Science Center Houston

Socias C: [2013] Incorporating occupation and industry into an electronic health records database of migrant farmworkers, PhD Dissertation Defense, University of Texas Health Science Center Houston

Wendt J: [2012] Pediatric asthma incidence in Texas and associations with ambient ozone levels in an urban area: an analysis using Medicaid claims data, PhD Dissertation Defense, University of Texas Health Science Center Houston

PPRTP PUBLICATIONS, PRESENTATIONS AND AWARDS

July 1, 2011 – June 30, 2012

PUBLICATIONS:

Lau, B.Y., Mathur, P., **Gould, G.G.**, and Guo, S. 2011. Identification of a Brain Center Whose Activity Discriminates a Choice Behavior in Zebrafish: Proceedings of the National Academy of Sciences of the United States of America, 108(6):2581-2586. PMID: PMC3038752

Fox, DA, Hamilton, WR, Johnson, JE, Xiao, W, Chaney, S, Mukherjee, S, Miller, DB, O'Callaghan, JP. 2011. Gestational lead exposure selectively decreases retinal dopamine amacrine cells and dopamine content in adult mice. Toxicology and Applied Pharmacology, 256(3): 258-267. PMID: PMC3205288 (Awardee: *Giddabasappa, Anand*)

PRESENTATIONS:

Yuan L, Culberson G. 2011. Effectiveness of a library ergonomics training program. Proceedings of the 55th Annual Meeting of Human Factors and Ergonomics Society, Las Vegas, NV, Sept 2011.

Strunk, K.C. 2011. The Personality Characteristics, Organizational Structure and Job Satisfaction of Sexual Assault Nurse Examiners (SANE)". Proceedings of the International Society for Traumatic Stress Studies (ISTSS) 27th Annual Meeting, Baltimore, MD, Nov 2011.

Cline H, Stephens M, Flynn D, Marzilli S, **Dong, XN**. 2012. Muscle Recruitment of Upper Trapezius for Computer Workers with Chronic Neck Pain. Proceedings of the TACSM Annual Meeting, Austin, TX, Mar 2012.

Stephens M., Cline H., Marzilli S., **Dong XN**. 2012. Muscle recruitment of upper trapezius for computer workers with chronic neck pain. South Central Regional American Society of Biomechanics Meeting, Apr 13-14, Dallas, Texas, 2012.

You R. 2012. Immunological aspects of Carbon Black-induced Emphysema. Proceedings of the Baylor College of Medicine Pulmonary Research Meeting, Houston, TX, Apr 2012.

Massawe E. Nanomaterials for Environmental Remediation: the role of nanoinformatics in support of worker and public health oversight. Proceedings of the National Environmental Health Association (NEHA) 2012 AEC, San Diego, CA, Jun 2012.

Socias, C. Assessing the Impact of Loss to Follow-up in a Cohort Study of South Texas Adolescent Farmworkers: Implications for Planning a Cohort Study. Seminar, Epidemiology Seminar (PHD 2990) from the University of Texas School of Public Health, Houston, TX, Sept 2011.

Proceedings of the NIOSH ERC Pilot Projects Research Symposium, June 29, 2012

Dong, XN. Development of a Portable EMG-based Biofeedback System to Alleviate Chronic Neck Pain of Computer Workers.

Williams, ES. The Relevance of Coal Tar-Based Asphalt Sealants to Workplace Exposures to Polycyclic Aromatic Hydrocarbons.

You, R. Carbon-Induced Immune Cell Activation and Emphysema.

Montano, C. The Association between Mental Disorders and Occupational Injuries among a Cohort of Employees from a Large Oilfield Services Corporation.

Read, T. Development and Testing of an Occupational Health & Safety Program Self-Report Tool.

Lim, H. Parental Exposures to Occupational and Medical Sources of Ionizing Radiation and Risk of Selected Structural Birth Defects

Selde, R. Employer-based Occupational Injury and Illness Surveillance: a Survey of Reporting Practices, Tools and Outcomes.

July 1, 2012 – June 30, 2013

PUBLICATIONS:

Strunk, KC and Strunk, KK. 2012. The contribution of personality and workplace characteristics in predicting turnover intention among sexual assault nurse examiners: A path analytic study. *Journal of Forensic Nursing*, 8(3): 144-50. First published online: 13 June 2012, DOI: 10.1111/j.1939-3938.2012.01141.x.

Book chapter:

Yuan, L. 2012. Reducing Ergonomic Injuries for Librarians Using a Participatory Approach. In M. Soares and F. Rebelo (Eds.), *Advances in Usability Evaluation Part I* (pp.161-170). Boca Raton, FL: CRC Press.

Conference abstract:

Cline H, Stephens M, Flynn D, Marzilli S, **Dong, XN.** 2012. Muscle Recruitment of Upper Trapezius for Computer Workers with Chronic Neck Pain. *International Journal of Exercise Science: Conference Abstract Submissions*: 2(4): Article 20.

PRESENTATIONS:

Yuan L. 2012. Reducing ergonomic injuries for librarians using a participatory approach. Proceedings of the 4th International Conference on Applied Human Factors and Ergonomics 2012 (AHFE 2012), San Francisco, CA, Jul 2012.

Lewis, P and Hajji, A. 2012. Comparison of Two Models for Estimating Equipment Productivity for a Sustainability Quantification Tool. Proceedings of the 2nd International Conference for Sustainable Design, Engineering and Construction, Ft. Worth, TX, Nov 2012.

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Lewis, P and Hazzard, E. 2013. Using Earned Value Management to Quantify Economic, Energy, and Environmental Sustainability in Construction Activities. *Canadian Society of Civil Engineers 2013 Annual Conference and 4th Construction Specialty Conference*, Montreal, QC, May 2013.

Lewis, P. 2013. One More Thing to Worry About: The Environmental Impacts of Our Fleets. 27th Annual Southeastern States Equipment Managers Conference, Little Rock, AR, Jun 3, 2013.

Proceedings of the NIOSH ERC Pilot Projects Research Symposium, June 28, 2013

Lewis, P. Prevention through Design (PtD) to Improve the Design of Construction Processes.

Saito, R. Unintentional Exposures to Antibiotics in Healthcare Environments: Air Sampling and Analysis.

Douphrate, D. Safety Leadership and Management Practices among Large-Herd Dairy Owners.

Bae, S. Quantitative Microbial Risk Assessment of Airborne Microorganisms in Retail Stores.

Khurshid, S. Reactive Oxygen Species (ROS) on Respirable Particles in Institutional and Commercial Buildings.

Mehta, R. Influence of Workplace Stress and Personal Factors on Musculoskeletal Disorders.

Han, I. Analytical Method Development and Validation of Personal Air Sampler for Alkylaniline Exposure Assessment

FUNDED GRANT APPLICATIONS:

PI: Kim Waller, PhD*

09/01/2012 – 08/31/2014

CDC/NIOSH

Parental Exposure to Ionizing Radiation and Birth Defects

Status: Funded

*Findings from previous awardee's pilot project (Hyeyeun Lim) were used to support the grant application. Dr. Waller is Ms. Lim's mentor.

PI: X. Neil Dong, PhD

09/01/2012 – 05/30/2013

The University of Texas at Tyler

Rehabilitation strategies to overcome quadriceps weakness for athletes with anterior cruciate ligament (ACL) reconstruction

Status: Funded

July 1, 2013 – June 30, 2014

PUBLICATIONS:

Massawe, E. 2013. Nanomaterials for Environmental Remediation: Investigating the Role of Nanoinformatics in Support of Environmental, Health, and Safety Oversight of Nanotechnologies at the Local Level. *Journal of Environmental Health*, 76(1): 8-17.

Connors KA, Valenti TW, Lawless K, Sackerman J, Onaivi ES, Brooks BW, **Gould GG.** 2013. Similar anxiolytic effects of agonists targeting serotonin 5-HT(1A) or cannabinoid CB receptors on zebrafish behavior in novel environments. *Aquat Toxicol.* 2013 Dec 12. pii: S0166-445X(13)00346-9. doi:10.1016/j.aquatox.2013.12.005. PMID: PMC3989442

Robledo C, Peck JD, Stoner JA, Carabin H, Cowan L, Koch HM, Goodman JR. 2014. Is bisphenol-A exposure during pregnancy associated with blood glucose levels of diagnosis of gestational diabetes? *J Toxicol Environ Health A.*, 76(14): 865-873. doi: 10.1080/15287394.2013.824395. PMID: PMC3801171

PRESENTATIONS:

Khurshid, S. 2013. Particulate Reactive Oxygen Species in Retail Stores in Austin, Texas. Proceedings of the American Association for Aerosol Research 32nd annual conference, Portland, OR, Oct 2013.

Han, I., Guo, Y. 2013. Characterization of Size-Segregated Particulate Matter in Houston TX. Proceedings of the American Association for Aerosol Research 32nd annual conference, Portland, OR, Oct 2013.

Han, I., 2014. Measurement of Monocyclic Aromatic Amines in an Urban Air. Proceedings of the American Chemical Society 247th National Meeting, Dallas, TX, Mar 2014.

Mehta, R. 2014. Influence of workplace stress and personal factors on musculoskeletal disorders. Proceedings of the Annual TxCOEM Meeting and Symposium, Fort Worth, TX, May 2014.

Saito R, Cherry C, Sartor J. 2014. Antibiotics in Healthcare Environments: Chemical Analysis. Poster session presented at AIHce 2014, San Antonio, TX, Jun 2014.

Conway, M., Haddas, R., and **Yang, J.** 2014. Effect of Deliberate Core Muscle Activation on Lifting Performance in a Recurrent Low Back Pain Population, *2014 South Central American Society of Biomechanics Meeting*, Texas Scottish Rite Hospital for Children in Dallas, Dallas, TX, Apr 2014.

Lewis, K., Haddas, R., and **Yang, J.**, 2014. Effect of Core Muscle Activation on Injury Risks in Mining Lifting for Healthy Population, *2014 South Central American Society of Biomechanics Meeting*, Texas Scottish Rite Hospital for Children in Dallas, Dallas, TX, Apr 2014.

Lewis, K., Haddas, R., and **Yang, J.** 2014. Effects of Core Muscle Activation on Injury Risks in Mining Lifting for Healthy Population, 2014 Great Plains Honors Council Conference, Fort Smith, Arkansas, Mar 2014.

Lee LJ, Lupo PJ, Canfield MA, Chan W, Hoyt AT, Pompeii LA, Razzaghi H, Tinker SC, Symanski E. 2015. Use of the O*NET to assess occupational exposures in a study of adverse pregnancy outcomes. Proceedings of the 12th Annual Regional National Occupational Research Agenda Young/New Investigators Symposium, Salt Lake City, UT, Apr 2014.

Proceedings of the NIOSH ERC Pilot Projects Research Symposium, June 20, 2014.

Hawrylak, P. Tracking Adult Vaccination History Using RFID Tags.

Yang, J. Biomechanical Model for Assessing Injury Risks in Mining.

Campos, A. Predictors of Musculoskeletal Symptoms among Office Workers in Costa Rica based on the CUPID Study and Comparison with other Spanish-speaking Countries.

Lee, L. The Linkage of the National Birth Defects Prevention Study and the Occupational Information Network.

FUNDED GRANT APPLICATIONS

PI: David Corry, MD*

07/01/2013 – 06/30/2017

VA Merit

Carbon Black Induced Activation of Lung APCs

Status: Funded

*Findings from previous awardee's pilot project (Ming Shan/Ran You) were used to support the grant application. Dr. Corry is a Professor at Baylor College of Medicine.

July 1, 2014 – June 30, 2015

PUBLICATIONS:

Shan M, Ran Y, Yuan X, Frazier MV, Porter P, Seryshev A, Hong JS, Song L, Zhang, Y, Hilsenbeck, S, Whitehead, L, Zarinkamar N, Perusich S, Corry DB, Kheradmand F. 2014. Agnostic induction of PPAR γ reverses cigarette smoke-induced emphysema. *J Clin Invest.* 124(3): 1371-1381. doi:10.1172/JCI70587. PMID: PMC3934169

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Yaozhong L, **Roy-Engel A,** Baddoo MC, Flemington EK, Wang G, **Wang H.** 2015. The impact of oil spill to lung health - insights from an RNA-seq study of human airway epithelial cells. *Toxicology* (submitted).

Guo, Y., Afshar, M., **Han, I.,** 2015. Characterization of Size-Segregated Ambient Particulate Matter and Air Toxics. *Journal of Air and Waste Management Association*. (submitted).

Book Chapter (Not yet reported):

Millet, B. 2013. Design and Development of a Digital Error Reporting System for a Rural Nursing Home. In MA Garcia-Ruiz (Ed.), *Cases on Usability Engineering: Design and Development of Digital Products* (pp. 255-269). Hershey, PA: Information Science Reference.

PRESENTATIONS:

Haddas R, and **Yang J.** 2014. Effects of Core Muscle Activation on Injury Risks in Mining Lifting for Healthy Population. *Proceedings from the Seventh World Congress on Biomechanics, Boston, MA, July 2014.*

Conway SH, Cayuela A, Pompeii LA, Delclos G, Ronda E. 2014. Diferencias en la Exposición a Jornadas Laborales Largas en Latinoamericanos en Estados Unidos y España ("Differences in the Exposure to Long Working Hours in Latin American Immigrants in the United States and Spain"), 32nd Conference of the Society for Spanish Epidemiology/ 11th Conference of the Portuguese Association of Epidemiology, Alicante, Spain, Sept 2014.

Conway SH. 2014. How Panel Survey Income Data Can Be Utilized to Examine the Health of Workers in the U.S. University of Texas Health Sciences Center, Division of Environmental and Occupational Health Sciences, Research Seminar, Sept 2014.

Han, I., Guo, Y., Afshar, M. 2014. Land Use Patterns and Size-Resolved Polycyclic Aromatic Hydrocarbons in an Urban Air. *The Geological Society of America, Denver, CO, Oct 2014.*

Mehta, RK., Shortz, AE. 2014. Stress impacts physical competencies in older obese adults. Poster presented at the APHA Annual Meeting & Exposition. New Orleans, LA, Nov 2014. Received the James G. Zimmer New Investigator Research Award, APHA Aging & Public Health

Montano CF, Amick BC, Baraniuk MS, Roberts RE, Tullar JM. 2014. Prevalence and incidence of psychiatric disorder treated episodes in an occupational cohort: Sociodemographic and work trends across a 6-year period. Poster session presented at APHA 2014, New Orleans, LA, Nov 2014.

Montano CF, Amick BC, Baraniuk MS, Roberts RE, Tullar JM. 2014. Investigating the risk of first occupational injury by treated psychiatric disorder episodes of care. Poster session presented at APHA 2014, New Orleans, LA, Nov 2014. Best poster, Students and New Researchers Poster Competition – OHS Section

Lim H, Agopian AJ, Whitehead L, Beasley CW, Langlois PH, Emery RJ, Waller DK, and the National Birth Defects Preventions Study. 2014. 0306 Parental occupational exposure to ionizing radiation and selected birth defects in the US. Poster Presentation, Occup Environ Med, 2014; 71 Suppl 1: A105. doi: 10.1136/oemed-2014-102362.330. PMID: 25018185.

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Banuelas, V.K., **Thompson, B.J.**, Akalonu, C., and Moore, A. 2015. Effects of long, cumulative work-shifts on muscle strength and power-related measures of the upper- and lower-body in female nurses. Presented at the Texas Tech University Undergraduate Research Conference, Lubbock, TX, Apr 2015.

Akalonu, C., **Thompson, B.J.**, Banuelas, V.K., and Moore, A. 2015. Long work shifts' effect on balance, reaction, and vigilance of female nurses. Presented at the Texas Tech University Undergraduate Research Conference, Lubbock, TX, Apr 2015.

Conway S, Pompeii L, Gimeno D, Roberts R, Follis J. 2015. Identification of a Long Work Hours Cut Point for Predicting Elevated Risk of Poor Self-Reported General Health. Presented at the Society for Epidemiologic Research 2015 Annual Meeting, Jun 2015.

Thompson, B.J., Banuelas, V.K., Akalonu, C., Stock, M.S., and Diersing, D. 2015. Effects of shift type, job position, and a rigorous work period on physical- and performance-related attributes in female nursing workers. Presented at the International Society of Sports Nutrition National Conference, Austin, TX. Jun 2015.

Lee LJ, Symanski E. 2015. Maternal occupational exposure during pregnancy and adverse birth outcomes: directions for future research; Presented at Future of Occupational Health Symposium, Seattle, WA, Jun 2015.

Proceedings of the NIOSH ERC Pilot Projects Research Symposium, June 5, 2015.

Wang Q. Evacuation Simulations of Confined Spaces in Petrochemical Facilities

Thompson B. The Effects of Demanding Work Schedule Characteristics on Fatigue and Performance Capacities in Female Healthcare Workers: Injury Risk Profiling Assessment

Wang H., Engel A. Mutagenic Effects of Oil Spill Chemicals on Human Airway Epithelial Cells

Brooks E. Calcium Channel Activation by Polyaromatic Hydrocarbons

Zhang K. Heat and Health: Developing Heat Vulnerability Indicators for Migrant and Seasonal Farmworkers in California as a Prototype for Texas

Conway S. Health Effects of Long Working Hours

FUNDED GRANT APPLICATIONS

PI: David Douphrate, PhD, MPT, MBA, CPE
U01 UTHSC-Tyler/CDC

09/01/2014 – 08/31/2017

Development of Safety Management and Leadership Training Program for Logging Contractors
Status: Funded

PI: Ranjana Mehta, PhD
NIH R15 AREA

09/01/2015 – 08/31/2018

Obesity, stress and neuromuscular functioning in the elderly
Status: Funded

APPENDICES

Table 1 – Trainees and Graduates

Table 1. Trainees and Graduates Since Beginning of Project Period'

Trainees		Graduates							
Trainee Name, Year of Entry, Prior Degree & Institution, (Academic Advisor or Mentor). Identify Under Represented Minority with (URM).	OM Trainees: Previous Residency Training Speciality	Title of Research Project or Research Topic	Degree Program (MS, MPH, PhD, DrPH, etc.)	Date Degree or Certificate Awarded (mm/yyyy)	Date of Certificate for OM (mm/yyyy)	Employed in OSH Field or Advanced Study (Y/N)	Current Employer	Current Position	
Industrial Hygiene									
Wills, Reginald, 1992, Bachelors, California State University - Fresno [Lawrence Whitehead, PhD] (URM)		A comparison of worker risk of injury while working on fully automated side loaders and other residential collection trucks at a large solid waste collection company	MS	12/2011		Y	Waste Management Inc.	Senior Manager, Industrial Hygiene	
Barbee, Gary, 1998, Masters, Texas A&M University [Lawrence Whitehead, PhD]		Capstone course	MPH	05/2012		Y	Assistant Professor	West Texas A&M University	
Brown, Bruce, 1999, Masters, The University of Texas HSC at Houston [George Delclos, MD, MPH, PhD]		An empirical model for estimating Environmental Health and Safety Program Resourcing for colleges and universities	DrPH	05/2014		Y	The University of Texas Southwestern	Director, Environ Health & Safety	
Gutierrez, Janet McCravy, 1999, Masters, The University of Texas HSC at Houston [Lawrence Whitehead, PhD]		A multi-site pilot test study to measure safety climate in the University work setting	DrPH	08/2011		Y	The University of Texas HSC at Houston	Safety Manager, Radiation Safety	
Ortiz, Gerardo, 1999, Masters, University of Puerto Rico [Lawrence Whitehead, PhD] (URM)		Enablers and barriers perceived by professional firefighters in the implementation of a mandatory physical fitness program	DrPH	05/2014		Y	US Department of Labor - OSHA	Govt. Industrial Hygienist	
Plaza, Angel, 2000, Masters, University of Houston - Clear Lake [Lawrence Whitehead, PhD] (URM)		The use of modified Delphi Process for OEL selection	DrPH	12/2012		Y	NASA	Industrial Hygienist	
Holtz, Louis, 2001, Bachelors, Old Dominion University [Lawrence Whitehead, PhD]		Change in Permeation Rates of Acids and Bases Through Limited Use Protective Fabrics After Repeated Wash Cycles	MPH	12/2011		Y	OxyChem	Industrial Hygienist	
Patlovich, Scott, 2002, Masters, The University of Texas HSC at Houston [Lawrence Whitehead, PhD]		Assessing the Biological Safety Profession's Evaluation and Control of Risks Associated with the Field Collection of Potentially Infectious Specimens	DrPH	05/2014		Y	The University of Texas HSC at Houston	Director, Environ Health & Safety	

Table 1. Trainees and Graduates Since Beginning of Project Period'

Trainees			Graduates			
Berkheiser, Matthew, 2004, Masters, University of Houston - Clear Lake [Lawrence Whitehead, PhD]	Evaluation of elevator shafts as a pathway for fungal spores and particles to enter a hospital housing immuno-compromised patients	DrPH	12/2011	Y	MD Anderson Cancer Center	Executive Director
Torres Jr., Reyes, 2005, Bachelors, Texas A&M University [Lawrence Whitehead, PhD] (URM)	Capstone course	MPH	12/2013	Y	Chevron	Industrial Hygienist
Moffett, Jennifer, 2006, Bachelors, Texas A&M University [Thomas Stock, PhD]	Capstone course	MPH	08/2011	Y	MD Anderson Cancer Center	Safety Specialist
Perez, M. Elena, 2006, Bachelors, Sam Houston State University [Lawrence Whitehead, PhD] (URM)	Capstone course	MPH	08/2011	Y	MD Anderson Cancer Center	Safety Specialist
Gamble, Rachel, 2007, Masters, Oklahoma State University [Lawrence Whitehead, PhD]	The feasibility of using a rapid adenosine triphosphate bioluminescence detection assay as an objective means of assessing the presence of biological contamination on laboratory surfaces	DrPH	05/2014	Y	The University of Texas HSC at Houston	Safety Manager, Biological Safety
Salazar Vega, Eduardo, 2008, Masters, The University of Texas HSC at Houston [Lawrence Whitehead, PhD] (URM)	Comparison of machine learning approaches and statistical methods for estimation of airborne chemical exposures	PhD	05/2013	Y	AkzoNobel International Paint LLC	HSE Specialist
*Maypole, Coty, 2009, Masters, The University of Texas HSC at Houston [Elaine Symanski, PhD]	Associations between ambient levels of combustion pollutants and small for gestational age infants in Texas	PhD	12/2012	Y	US Army Public Health Center - Europe	Industrial Hygienist, Civilian
*Bae, Jiwon, 2010, Bachelors, Tulane University, [Thomas Stock, PhD]	Capstone course	MPH	05/2012	Y	The Boeing Company	Occupational Health & Safety Specialist
*Calcote, Joshua, 2010, Masters, Texas A&M Health Science Center School of Rural Public Health [Arch Carson, MD, PhD]	An assessment of post-disaster psychological stress in Hazardous Waste Operations and Emergency Response (HAZWOPER) Workers	DrPH	05/2012	Y	Kim A. Smith & Associates	Health and Safety Consultant
*Geo, Peter, 2010, Bachelors, University of Mary Washington [Lawrence Whitehead, PhD]	Capstone course	MPH	05/2012	Y	Arlington County Dept. of Environmental Services	Safety Specialist II

Table 1. Trainees and Graduates Since Beginning of Project Period'

Trainees			Graduates			
	Capstone course	MPH	05/2012	Y	Bureau Veritas North America Inc.	HSE Consultant
*Hansen, Danielle, 2010, Bachelors, University of Washington [Elaine Symanski, PhD]		MPH	05/2012	Y	Bureau Veritas North America Inc.	HSE Consultant
*Pinon, Clint, 2010, Masters, Eastern Kentucky University [Lawrence Whitehead, PhD]	The Impact of Job Control on Employee Perception of Management Commitment to Safety in an Engineering, Procurement and Construction Company	DrPH	08/2013	Y	Chicago Bridge and Iron (CBI)	Safety and Environmental CTP
Soares, Mario, 2010, Masters, The University of Texas HSC at Houston [George Delclos, MD, MPH, PhD] (URM)		DrPH		Y	Houston Methodist Hospital	Director, EHS, Infection Prevention and Control
Tsenov, Boris, 2010, Masters, Sofia University Bulgaria [Lawrence Whitehead, PhD]		DrPH		Y	The University of Texas HSC at Houston	Safety Specialist, Radiation Safety
Shang, Yue, 2010, Masters, Texas A&M University [George Delclos, MD, MPH, PhD]	Asthma in Texas healthcare workers	DrPH		Y	University of Houston - Downtown	EHS Coordinator
Ahn, Joonhyun, 2010, Masters, Western Illinois University [Lawrence Whitehead, PhD]	Climate change and heat stress	PhD				
*Isfahani, Victoria, 2011, Masters, University of Louisiana at Monroe [Lawrence Whitehead, PhD]	Capstone course	MPH	12/2012	Y	US Navy	Industrial Hygiene Officer
Burke, Fiona, 2011, Masters, University of Houston - Clear Lake [Lawrence Whitehead, PhD]		DrPH		Y	Texas Medical Center	Safety & Emergency Preparedness Manager
Guo, Yuncan, 2011, Masters, Texas A&M Health Science Center School of Rural Public Health [Inkyu Han, PhD]		PhD				
Ramakrishnan, Anushuya, 2011, Doctoral, Indian Institute of Technology [Thomas Stock, PhD]	Maternal exposure to hazardous air pollutants and oral clefts among offspring : Texas, 1999-2008	MPH	12/2012	Y	Environmental Defense Fund	Consultant
*Cluff, Spencer, 2012, Bachelors, Brigham Young University [Lawrence Whitehead, PhD]	Capstone course	MPH	12/2013	Y	ConocoPhillips Petroleum - New Mexico	HSE Lead

Table 1. Trainees and Graduates Since Beginning of Project Period'

Trainees			Graduates				
	Capstone course	MPH	12/2013				
*Dean, Lauren, 2012, Bachelors, Texas A&M University [Lawrence Whitehead, PhD]		MPH		Y	MD Anderson Cancer Center	Safety Specialist	
*Laine, Jennifer, 2012, Masters, University of Michigan School of Public Health [George Delclos, MD, MPH, PhD]		DrPH		Y	The University of Texas HSC at Houston	Safety Manager, Occupational Safety and Fire Prevention	
*Prescott, Joseph, 2012, Bachelors, Michigan Technological University [Lawrence Whitehead, PhD]	Capstone course	MPH	05/2014	Y	Baker Hughes, Chemical Division	Industrial Hygienist	
*Rammah, Amal, 2012, Masters, George Washington University [Lawrence Whitehead, PhD]	Not yet determined	DrPH					
Lepper, Jennifer, 2012, Masters, Tulane University [Lawrence Whitehead, PhD]	Occupational exposure to organophosphate esters and depression in United States Air Force Aircraft Maintainers	PhD		Y	United States Air Force	Major, Bioenvironmental Engineer	
Tamuno, Obeleye, 2012, Doctoral, University of Port Harcourt [George Delclos, MD, MPH, PhD] (URM)	Capstone course	MPH	08/2014		Unknown		
Mejeunov, Tracy, 2012, Masters, Texas A&M University [Cynthia Chappell, PhD]	Capstone course	MPH	05/2014	N	Seeking OSH employment		
Marrow, Brandon, 2012, Bachelors, The University of Texas at Austin [Thomas Stock, PhD]	Capstone course	MPH	12/2013	Y	Oasis Petroleum	Engineer	
*Hartwell, Hope, 2013, Bachelors, Louisiana State University [Lawrence Whitehead, PhD] (URM)	Capstone course	MPH	05/2014	Y	Geospace Technologies	HSE Specialist	
*Berger, Mallory, 2013, Bachelors, Florida Atlantic University [Arch Carson, MD, PhD]	Capstone course	MPH	12/2014	Y	Australia	IH and Safety Consultant	
*Lies, Mark, 2013, Masters, University of Illinois [Lawrence Whitehead, PhD]	Capstone course	MPH	05/2015		Sandia National Lab	Industrial Hygienist/ Biosafety	
Omagbemi, Funmi, 2013, Bachelors, Covenant University [George Delclos, MD, MPH, PhD] (URM)	Capstone course	MPH	05/2015	Y	Bureau Veritas	HSE Consultant	
Blair, Brandon, 2013, Bachelors, University of Houston [Inkyu Han, PhD]	Capstone course	MPH		Y	Biotech industry	Safety Officer	
Rotich, Pauline, 2013, Masters, University of Central Missouri [Lawrence Whitehead, PhD] (URM)	Leave of absence 2015-2016	DrPH		Y	ExxonMobil	Industrial Hygienist	

Table 1. Trainees and Graduates Since Beginning of Project Period'

Trainees			Graduates				
	Capstone course	MPH			Y	The University of Texas HSC at Houston	Safety Specialist, Chemical Safety
Duncan, Matthew, 2013, Bachelors, University of Colorado - Colorado Springs [Lawrence Whitehead, PhD]	Capstone course	MPH					
Fan, Jingwei, 2013, [Arch Carson, MD, PhD]	Capstone course	MPH					
Popoola, Mojisola, 2013, Doctoral, University of Ilorin [Arch Carson, MD, PhD] (URM)	Capstone course	MPH					
*Lopez, Justin, 2013, Bachelors, Rice University [George Delclos, MD, MPH, PhD] (URM)	Capstone course	MPH			Y	Baker Hughes	Industrial Hygienist
*Grumbles, Alyse, 2014, Bachelors, Texas A&M University [Lawrence Whitehead, PhD]	Capstone course	MPH					
*Sung, Angela, 2014, Bachelors, Oklahoma Baptist University [Inkyu Han, PhD]	Capstone course	MPH					
*Nguyen, Kiet, 2014, Bachelors, University of California - Riverside [Inkyu Han, PhD]	Not yet determined	PhD					
Popoola, Olusegun, 2014, Doctoral, University of Ilorin [Arch Carson, MD, PhD] (URM)	Capstone course	MPH					
Sah, Parnita, 2014, Doctoral (Dentistry) [Arch Carson, MD, PhD]	Capstone course	MPH					
Howe, Samantha, 2014, Bachelors, Tulane University [Lawrence Whitehead, PhD]	Capstone course	MPH				United States Navy	Industrial Hygiene Officer Training Program
Spolarich, Matthew, 2014, Bachelors, University of North Carolina - Wilmington [Lawrence Whitehead, PhD]	Capstone course	MPH				United States Coast Guard	
Occupational and Environmental Medicine							
*Abassi, Asim, 2010, Doctoral, King Edward College [George Delclos, MD, MPH, PhD]	Tragedy of the commons and the phenomenon of global warming: a commentary	MPH	Internal Medicine	05/2012	06/2012	Y	Excel Urgent Care
*Hysler, Thomas, 2010, Doctoral, Ross University School of Medicine [George Delclos, MD, MPH, PhD]	Old claim or new injury: the "Bad Back Dilemma"	MPH	Family Medicine	05/2012	06/2012	Y	Houston Area Safety Council
*Saavedra, Monica, 2010, Doctoral, University of Chile [Arch Carson, MD, PhD] (URM)	The value and evaluation of a wellness program	Certificate	General Medicine	N/A	11/2011	Y	Self-employed
							Staff Physician
							Chief Medical Officer
							Wellness Consultant

Table 1. Trainees and Graduates Since Beginning of Project Period'

Trainees				Graduates			
Internal Medicine	How much of the burden of cancer is potentially preventable?	MPH	05/2012	06/2013	Y	Chevron Health and Medical	Regional Medical Officer
*Jones, Ayanna, 2011, Doctoral, Baylor College of Medicine [Arch Carson, MD, PhD] (URM)		MPH			Y		
*Adekeye, Oluwayomi, 2012, MD, University of Ilorin [George Delclos, MD, MPH, PhD] (URM)	Decreasing marijuana use among first-year college students in the Houston area	MPH	08/2013	06/2014	Y	The Everett Clinic	Staff Physician
*Hekerem, Kemka, 2012, Doctoral, University of Port Harcourt [Arch Carson, MD, PhD] (URM)	Reducing the incidence of binge drinking among teens in Houston	MPH	08/2013	06/2014	Y	Excel Urgent Care	Staff Physician
*Nessim, Dalia, 2012, Doctoral, Ain Shams University [Arch Carson, MD, PhD]	Industrial radiography injuries in Texas	MPH	12/2013	06/2014	Y	The University of Texas Health Science Center at Tyler	Assistant Professor
*Bartine, Edwin, 2013, Doctoral, Chicago College of Osteopathic Medicine [Arch Carson, MD, PhD]	Not applicable	MPH	Trainee resigned from the program		N	Gaston Anesthesia Associates PA	Physician and Owner
*Mathew, Rini, 2014, Doctoral, Texas College of Osteopathic Medicine [George Delclos, MD, MPH, PhD]	Decreasing preterm births in Travis County	MPH	05/2015	In training	Y	The University of Texas HSC at Houston	OEM Resident
*Amani, Jenny, 2014, Doctoral, University of Wisconsin [Arch Carson, MD, PhD]	Not yet determined	MPH		In training	Y	The University of Texas HSC at Houston	OEM Resident
*Altman, Matthew, 2014, MD, The University of Texas HSC at Houston Medical School [Arch Carson, MD, PhD]	A tu Salud: Intervention for Montgomery County focusing on obesity in the Hispanic population	MPH	08/2015	In training	Y	The University of Texas HSC at Houston	OEM Resident
*Ehsanzadeh, Parvaneh, 2014, Doctoral, Azad University of Medical Sciences [Arch Carson, MD, PhD]	Chronic kidney disease in Central America	MPH		In training	Y	The University of Texas HSC at Houston	OEM Resident
Occupational Epidemiology							
*Lavery (Hansen), Amy, 2010, Masters, Texas A&M Health Science Center School of Rural Public Health [Lisa Pompeii, PhD]	Not applicable	PhD	Trainee withdrew from the program		N	The Children's Hospital of Philadelphia	Clinical Research Project Manager
*Murray, Jocelyn, 2010, Masters, The University of Alabama at Birmingham [Lisa Pompeii, PhD] (URM)	Not applicable	PhD	Trainee withdrew from the program		Y	NASA	Data Analyst
*Reynolds, Robert, 2010, Masters, University of Arizona [George Delclos, MD, MPH, PhD]	Development of a task exposure matrix for radiation in extraterrestrial environments and its application in the study of mortality for US astronauts	PhD	08/2013		N	Cambria Health Solutions	Clinical Analytics Manager ill

Table 1. Trainees and Graduates Since Beginning of Project Period'

Trainees			Graduates				
			DtPH				
*Socias, Christina, 2010, Masters, The University of Texas HSC at Houston [Sharon Cooper, PhD] (URM)	Incorporating occupation and industry into an electronic health records database of migrant farmworkers		DtPH	08/2013	Y	CDC/NIOSH	Occupational Epidemiologist
*Wendt, Judy, 2010, Masters, University of Michigan School of Public Health [Elaine Symanski, PhD]	Pediatric asthma incidence in Texas and associations with ambient ozone levels in an urban area: an analysis using Medicaid claims data		PhD	05/2012	Y	Shell Oil Company	Senior Epidemiologist
*Yoon, Jaennie, 2011, Masters, Texas A&M Health Science Center School of Rural Public Health [Laura Mitchell, PhD]	Not applicable		PhD	Trainee withdrew from the program	N	Texas Children's Hospital	Senior Systems Analyst
*Lee, Laura, 2012, Masters, University of Iowa [Elaine Symanski, PhD]	Maternal occupational physical activity/stress and adverse pregnancy outcomes		PhD	08/2015	Y	Naval Medical Research Unit - San Antonio	Epidemiologist
*Conway, Sarai (Sadie), 2012, Masters, Syracuse University [Lisa Pompeii, PhD]	Long work hours and adverse health outcomes: Defining a health risk-based threshold for work hour exposure		PhD	05/2015	Y	The University of Texas HSC at Houston	Postdoctoral Research Fellow
*Janak, Judson, 2012, Masters, The University of Texas HSC at Houston [Hasanat Alamgir, PhD]	Military service, injuries, health behaviors and health outcomes		PhD	05/2014	Y	US Army Institute of Surgical Research	Postdoctoral Research Fellow
*Staudt (Waclawczyk), Amanda, 2014, Masters, The University of Texas HSC at Houston [Hasanat Alamgir, PhD]	Organic Solvent Exposure and Hearing Acuity in U.S. Adults: The National Health and Nutrition Examination Survey, 1999 to 2006		PhD				
*Marshall, Amanda, 2014, Masters, The University of Texas HSC at Houston [David Gimeno, PhD]	Not yet determined		DtPH				
Occupational Injury Prevention							
*Mitchell (Hogan), Amber, 2007, Masters, George Washington University School of Public Health and Health Services [George Delclos, MD, MPH, PhD]	Occupational face and eye exposures to blood and body fluids in U.S. hospitals		DtPH	12/2013	Y	International Safety Center	President / Executive Director
*Montano, Cecilia, 2009, Masters, Texas State University [Benjamin Amick III, PhD] (URM)	The relationship between mental health and substance use problems and occupational injuries in the petrochemical industry		PhD	12/2013	Y	The University of Texas HSC at Houston	Faculty Associate

Table 1. Trainees and Graduates Since Beginning of Project Period¹

Trainees			Graduates			
Campos, Adriana, 2009, Masters, Illinois Institute of Technology [David Gimeno, PhD] (URM)	Predictors of musculoskeletal symptoms among office workers in Costa Rica based on the CUPID (Cultural and Psychosocial Influence on Disability) Study and comparison with other Spanish-speaking countries	DrPH	08/2014	Y	Instituto Tecnológico de Costa Rica	Faculty, Occupational Health and Industrial Hygiene
*Read, Timothy, 2010, Masters, Texas A&M University [Benjamin Amick III, PhD]	The development and use of leading indicators for managing occupational safety and environmental health	PhD				
Casillas, Myriam, Masters, The University of Texas HSC at Houston [Benjamin Amick III, PhD] (URM)	Understanding the role and responsibility of leaders in building a culture of health and wellness in an academic setting	PhD	05/2014	N	Texas Tech University Foster School of Medicine	Senior Director, Office of Research
Tsai, I-Hsuan, Doctoral Chung Shan Medical & Dental College [Lisa Pompeii, PhD]	The factors for social participation in people with Spinal Cord Injury	PhD	12/2014		Unknown	
Seide, Rhandi, Masters The University of Texas HSC at Houston [Lisa Pompeii, PhD] (URM)	Employer-based occupational injury and illness surveillance: a survey of reporting practices, tools and outcomes	PhD				

¹ All NIOSH supported and non-NIOSH supported trainees and graduates by year of entry for reporting period July 1, 2011 to June 30, 2015

² Indicate certificate trainees with (Certificate).

* NIOSH supported trainee

Table 2 – Pilot Projects Research Training Program Awardees

**Table 2. Pilot Projects Research Training Program Awardees
July 1, 2011 to June 30, 2015**

Last Name, First Name	Position	Institution (Department)	Award Category	Project Title	Mean Priority Score	Funding	IRB/IACUC Status
July 1, 2011 to June 30, 2012							
Dong, X. Neil	Assistant Professor	The University of Texas at Tyler	New Investigator	Development of a portable EMG-based biofeedback system to alleviate chronic neck pain	3	\$11,565	Approved FWA 09775
Lim, Hyeyeyn	Doctoral Student	The University of Texas School of Public Health	Research Trainee	Parental exposure to occupational and medical sources of ionizing radiation and risk of selected structural birth defects	4.5	\$10,000	Exempt FWA 0667
Massawe, Ephraim	Assistant Professor	Southeastern Louisiana University	New Investigator	Assessment of the State Agencies' technical and scientific capability to regulate workers' and community exposures to nanomaterials use in various applications	4	\$9,993	Exempt FWA 00011388
Montano, Cecilia	Doctoral Student	The University of Texas School of Public Health	Research Trainee	The association between mental disorders and occupational injuries among a cohort of employees from a large oilfield services corporation	3	\$3,300	Approved FWA 0667
Ozer, Ruya	Assistant Professor	The University of Tulsa	Junior Investigator	Reagentless surface modification technique of fabrics for personal protection	3	\$10,000	No human or animal subjects
Read, Timothy	Doctoral Student	The University of Texas School of Public Health	Research Trainee	Development and testing of an occupational health and safety program self-report tool	4	\$10,000	Approved FWA 0667
Selde, Rhandi	Doctoral Student	The University of Texas School of Public Health	Research Trainee	Employer-based occupational injury and illness surveillance: a survey of reporting practices, tools and outcomes	3.8	\$7,500	Approved FWA 0667
Shan, Ming / You, Ran	Postdoctoral Fellow / Doctoral Student	Baylor College of Medicine	Research Trainee	Carbon-induced immune cell activation and emphysema	3	\$8,000	IACUC Approved A3823-01

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Williams, Edward	Assitant Research Scientist	Baylor University	Junior Investigator	The relevance of coal tar-based asphalt sealants to workplace exposures to polycyclic aromatic hydrocarbons	4	\$10,000	Approved FWA 00008275
July 1, 2012 to June 30, 2013							
Bae, Sungwoo	Postdoctoral Fellowt	The University of Texas at Austin	Research Trainee	Quantitative microbial risk assessment of airborne microorganisms in retail stores	2	\$9,990	No human or animal subjects
Han, Inkyu	Assistant Professor	The University of Texas School of Public Health	Junior Investigator	Analytical method development and validation of personal air sampler for alkylaniline exposure assessment	2.5	\$10,000	No human or animal subjects
Khurshid, Shahana	Doctoral Student	The University of Texas at Austin	Research Trainee	Reactive Oxygen Species (ROS) on respirable particles in institutional and commercial buildings	2.5	\$10,000	No human or animal subjects
Lewis, Phil	Assistant Professor	Oklahoma State University	Junior Investigator	PtD to improve the design of construction processes	2.5	\$9,998	No human or animal subjects
Douphrate, David	Assistant Professor	The University of Texas School of Public Health	Junior Investigator	Safety leadership and management practices among large-herd dairy owners	2.5	\$10,000	Exempt FWA 0667
Mehta, Ranjana	Assistant Professor	Texas A&M HSC School of Rural Public Health	Junior Investigator	Influence of workplace stress and personal factors on musculoskeletal disorders	2.6	\$10,000	Approved FWA 00000092
Saito, Rena	Assistant Professor	The University of Texas HSC at Tyler	Junior Investigator	Unintentional exposures to antibiotics in healthcare environments: air sampling and analysis	2.5	\$10,000	Exempt
July 1, 2013 to June 30, 2014							
Campos, Adriana	Doctoral Student	The University of Texas School of Public Health	Research Trainee	Predictors of musculoskeletal symptoms among office workers in Costa Rica based on the CUPID Study and comparison with other Spanish speaking countries	2.5	\$10,000	Exempt FWA 0667

**Table 2. Pilot Projects Research Training Program Awardees
 July 1, 2011 to June 30, 2015**

Last Name, First Name	Position	Institution (Department)	Award Category	Project Title	Mean Priority Score	Funding	IRB/IACUC Status
Hawrylak, Peter	Assistant Professor	The University of Tulsa	Junior Investigator	Tracking adult vaccination history using RFID tags	2.5	\$10,000	No human or animal subjects
Lee, Laura	Doctoral Student	The University of Texas School of Public Health	Research Trainee	The linkage of the National Birth Defects Prevention Study and the Occupational Information Network	2.5	\$9,943	Exempt FWA 0667
Yang, James	Assistant Professor	Texas Tech University	New Investigator	Biomechanical model for assessing injury risks in mining	1.5	\$10,000	Approved FWA 00001568
Conway, Sarai (Sadie)	Doctoral Student	The University of Texas School of Public Health	Research Trainee	Health effects of long working hours	1.5	\$7,897	Exempt FWA 0667
Wang, He (Changed PI: A. Engel)	Assistant Professor	Tulane University	Junior Investigator	Mutagenic effects of oil spill chemicals of human airway epithelial cells	2.5	\$20,000	No human or animal subjects
Zhang, Kai	Assistant Professor	The University of Texas School of Public Health	Junior Investigator	Heat and health: Developing vulnerability indicators for farmworkers in California as a prototype for Texas	1.8	\$12,000	Approved FWA 0667
July 1, 2014 to June 30, 2015							
Brooks, Edward	Professor	The University of Texas HSC at San Antonio	New Investigator	Calcium channel activation by polyaromatic hydrocarbons	1.8	\$10,000	IACUC Approved A3345-01
Thompson, Brennan	Assistant Professor	Texas Tech University	New Investigator	The effects of demanding work schedule characteristics on fatigue and performance capacities in female healthcare workers' injury risk profiling assessment	2.5	\$10,000	Approved FWA 00001568
Wang, Qingsheng	Assistant Professor	Oklahoma State University	Junior Investigator	Evacuation simulations of confined spaces in petrochemical facilities	3.5	\$10,000	No human or animal subjects

Table 3 – CE Course Offerings – Summary by Program Area

**Table 3 CE Course Offerings - Summary by Program Area
 Since Beginning of Project Period¹**

Program Area	Total # of Trainees	Number of Courses	Total Pers-Hours	# Trainees by Profession							# Trainees by Employer					
				MD	NURS	HYG	SAFETY	OTHER	Private Industry	Fed Gov	State Gov	Local Gov	Foreign Country	Aca-demic	NGO	Other
Industrial Hygiene (IH)	1403	54	7144	5	6	954	228	210	1241	29	10	17	0	49	0	57
Occupational Health Nursing (OHN)	1295	111	21736	15	344	11	61	864	1288	0	0	0	0	0	0	7
Occupational Medicine (OM)	3021	154	23369	1097	391	138	73	1322	2019	37	33	32	16	792	1	91
Occupational Safety (OS)	10851	115	31684	31	36	35	2601	8201	2081	131	114	77	30	8216	5	144
Agricultural Safety and Health (Ag S&H)																
Other OS&H, e.g. Tox, Epi, Ergo, Biostat (OT)	353	10	875	29	12	31	81	200	49	3	3	6	0	288	0	4
TOTAL	16923	444	84,808	1177	789	1169	3044	10,797	6678	200	160	132	46	9345	6	303

¹ Beginning of project period = start date of previous competing award.

Table 1. Trainees and Graduates Since Beginning of Project Period'

Trainees					Graduates				
Trainee Name, Year of Entry, Prior Degree & Institution, (Academic Advisor or Mentor). Identify Under Represented Minority with (URM).	OM Trainees: Previous Residency Training Specialty	Title of Research Project or Research Topic	Degree Program (MS, MPH, PhD, DrPH, etc.)	Date Degree or Certificate Awarded (mm/yyyy)	Date of Certificate for OM (mm/yyyy)	Employed in OSH Field or Advanced Study (Y/N)	Current Employer	Current Position	
Industrial Hygiene									
Wills, Reginald, 1992, Bachelors, California State University - Fresno [Lawrence Whitehead, PhD] (URM)		A comparison of worker risk of injury while working on fully automated side loaders and other residential collection trucks at a large solid waste collection company	MS	12/2011		Y	Waste Management Inc.	Senior Manager, Industrial Hygiene	
Barbee, Gary, 1998, Masters, Texas A&M University [Lawrence Whitehead, PhD]		Capstone course	MPH	05/2012		Y	Assistant Professor	West Texas A&M University	
Brown, Bruce, 1999, Masters, The University of Texas HSC at Houston [George Delclos, MD, MPH, PhD]		An empirical model for estimating Environmental Health and Safety Program Resourcing for colleges and universities	DrPH	05/2014		Y	The University of Texas Southwestern	Director, Environ Health & Safety	
Gutierrez, Janet McCrary, 1999, Masters, The University of Texas HSC at Houston [Lawrence Whitehead, PhD]		A multi-site pilot test study to measure safety climate in the University work setting	DrPH	08/2011		Y	The University of Texas HSC at Houston	Safety Manager, Radiation Safety	
Ortiz, Gerardo, 1999, Masters, University of Puerto Rico [Lawrence Whitehead, PhD] (URM)		Enablers and barriers perceived by professional firefighters in the implementation of a mandatory physical fitness program	DrPH	05/2014		Y	US Department of Labor - OSHA	Govt. Industrial Hygienist	
Plaza, Angel, 2000, Masters, University of Houston - Clear Lake [Lawrence Whitehead, PhD] (URM)		The use of modified Delphi Process for OEL selection	DrPH	12/2012		Y	NASA	Industrial Hygienist	
Holtz, Louis, 2001, Bachelors, Old Dominion University [Lawrence Whitehead, PhD]		Change in Permeation Rates of Acids and Bases Through Limited Use Protective Fabrics After Repeated Wash Cycles	MPH	12/2011		Y	OxyChem	Industrial Hygienist	
Patlovich, Scott, 2002, Masters, The University of Texas HSC at Houston [Lawrence Whitehead, PhD]		Assessing the Biological Safety Profession's Evaluation and Control of Risks Associated with the Field Collection of Potentially Infectious Specimens	DrPH	05/2014		Y	The University of Texas HSC at Houston	Director, Environ Health & Safety	

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Trainees			Graduates				
Berkheiser, Matthew, 2004, Masters, University of Houston - Clear Lake [Lawrence Whitehead, PhD]	Evaluation of elevator shafts as a pathway for fungal spores and particles to enter a hospital housing immuno-compromised patients	DrPH	12/2011	Y	MD Anderson Cancer Center	Executive Director	
Torres Jr., Reyes, 2005, Bachelors, Texas A&M University [Lawrence Whitehead, PhD] (URM)	Capstone course	MPH	12/2013	Y	Chevron	Industrial Hygienist	
Moffett, Jennifer, 2006, Bachelors, Texas A&M University [Thomas Stock, PhD]	Capstone course	MPH	08/2011	Y	MD Anderson Cancer Center	Safety Specialist	
Perez, M. Elena, 2006, Bachelors, Sam Houston State University [Lawrence Whitehead, PhD] (URM)	Capstone course	MPH	08/2011	Y	MD Anderson Cancer Center	Safety Specialist	
Gamble, Rachel, 2007, Masters, Oklahoma State University [Lawrence Whitehead, PhD]	The feasibility of using a rapid adenosine triphosphate bioluminescence detection assay as an objective means of assessing the presence of biological contamination on laboratory surfaces	DrPH	05/2014	Y	The University of Texas HSC at Houston	Safety Manager, Biological Safety	
Salazar Vega, Eduardo, 2008, Masters, The University of Texas HSC at Houston [Lawrence Whitehead, PhD] (URM)	Comparison of machine learning approaches and statistical methods for estimation of airborne chemical exposures	PhD	05/2013	Y	AkzoNobel International Paint LLC	HSE Specialist	
*Maypole, Coty, 2009, Masters, The University of Texas HSC at Houston [Elaine Symanski, PhD]	Associations between ambient levels of combustion pollutants and small for gestational age infants in Texas	PhD	12/2012	Y	US Army Public Health Center - Europe	Industrial Hygienist, Civilian	
*Bae, Jiwon, 2010, Bachelors, Tulane University, [Thomas Stock, PhD]	Capstone course	MPH	05/2012	Y	The Boeing Company	Occupational Health & Safety Specialist	
*Calcote, Joshua, 2010, Masters, Texas A&M Health Science Center School of Rural Public Health [Arch Carson, MD, PhD]	An assessment of post-disaster psychological stress in Hazardous Waste Operations and Emergency Response (HAZWOPER) Workers	DrPH	05/2012	Y	Kim A. Smith & Associates	Health and Safety Consultant	
*Ceo, Peter, 2010, Bachelors, University of Mary Washington [Lawrence Whitehead, PhD]	Capstone course	MPH	05/2012	Y	Arlington County Dept. of Environmental Services	Safety Specialist II	

Table 1. Trainees and Graduates Since Beginning of Project Period'

Trainees			Graduates			
	Capstone course	MPH	05/2012	Y	Bureau Veritas North America Inc.	HSE Consultant
*Hansen, Danielle, 2010, Bachelors, University of Washington [Elaine Symanski, PhD]		MPH	05/2012	Y	Bureau Veritas North America Inc.	HSE Consultant
*Pinon, Clint, 2010, Masters, Eastern Kentucky University [Lawrence Whitehead, PhD]	The Impact of Job Control on Employee Perception of Management Commitment to Safety in an Engineering, Procurement and Construction Company	DrPH	08/2013	Y	Chicago Bridge and Iron (CBI)	Safety and Environmental CTP
Soares, Mario, 2010, Masters, The University of Texas HSC at Houston [George Delclos, MD, MPH, PhD] (URM)		DrPH		Y	Houston Methodist Hospital	Director, EHS, Infection Prevention and Control
Tsenov, Boris, 2010, Masters, Sofia University Bulgaria [Lawrence Whitehead, PhD]		DrPH		Y	The University of Texas HSC at Houston	Safety Specialist, Radiation Safety
Shang, Yue, 2010, Masters, Texas A&M University [George Delclos, MD, MPH, PhD]	Asthma in Texas healthcare workers	DrPH		Y	University of Houston - Downtown	EHS Coordinator
Ahn, Joonhyun, 2010, Masters, Western Illinois University [Lawrence Whitehead, PhD]	Climate change and heat stress	PhD				
*Isfahani, Victoria, 2011, Masters, University of Louisiana at Monroe [Lawrence Whitehead, PhD]	Capstone course	MPH	12/2012	Y	US Navy	Industrial Hygiene Officer
Burke, Fiona, 2011, Masters, University of Houston - Clear Lake [Lawrence Whitehead, PhD]		DrPH		Y	Texas Medical Center	Safety & Emergency Preparedness Manager
Guo, Yuncan, 2011, Masters, Texas A&M Health Science Center School of Rural Public Health [Inkyu Han, PhD]		PhD				
Ramakrishnan, Anushuya, 2011, Doctoral, Indian Institute of Technology [Thomas Stock, PhD]	Maternal exposure to hazardous air pollutants and oral clefts among offspring : Texas, 1999-2008	MPH	12/2012	Y	Environmental Defense Fund	Consultant
*Cluff, Spencer, 2012, Bachelors, Brigham Young University [Lawrence Whitehead, PhD]	Capstone course	MPH	12/2013	Y	ConocoPhillips Petroleum - New Mexico	HSE Lead

Table 1. Trainees and Graduates Since Beginning of Project Period'

Trainees			Graduates				
	Capstone course	MPH	12/2013				
*Dean, Lauren, 2012, Bachelors, Texas A&M University [Lawrence Whitehead, PhD]		MPH		Y	MD Anderson Cancer Center	Safety Specialist	
*Laine, Jennifer, 2012, Masters, University of Michigan School of Public Health [George Delclos, MD, MPH, PhD]		DrPH		Y	The University of Texas HSC at Houston	Safety Manager, Occupational Safety and Fire Prevention	
*Prescott, Joseph, 2012, Bachelors, Michigan Technological University [Lawrence Whitehead, PhD]	Capstone course	MPH	05/2014	Y	Baker Hughes, Chemical Division	Industrial Hygienist	
*Rammah, Amal, 2012, Masters, George Washington University [Lawrence Whitehead, PhD]	Not yet determined	DrPH					
Lepper, Jennifer, 2012, Masters, Tulane University [Lawrence Whitehead, PhD]	Occupational exposure to organophosphate esters and depression in United States Air Force Aircraft Maintainers	PhD		Y	United States Air Force	Major, Bioenvironmental Engineer	
Tamuno, Obeleye, 2012, Doctoral, University of Port Harcourt [George Delclos, MD, MPH, PhD] (URM)	Capstone course	MPH	08/2014		Unknown		
Mejeunov, Tracy, 2012, Masters, Texas A&M University [Cynthia Chappell, PhD]	Capstone course	MPH	05/2014	N	Seeking OSH employment		
Marrow, Brandon, 2012, Bachelors, The University of Texas at Austin [Thomas Stock, PhD]	Capstone course	MPH	12/2013	Y	Oasis Petroleum	Engineer	
*Hartwell, Hope, 2013, Bachelors, Louisiana State University [Lawrence Whitehead, PhD] (URM)	Capstone course	MPH	05/2014	Y	Geospace Technologies	HSE Specialist	
*Berger, Mallory, 2013, Bachelors, Florida Atlantic University [Arch Carson, MD, PhD]	Capstone course	MPH	12/2014	Y	Australia	IH and Safety Consultant	
*Lies, Mark, 2013, Masters, University of Illinois [Lawrence Whitehead, PhD]	Capstone course	MPH	05/2015		Sandia National Lab	Industrial Hygienist/Biosafety	
Omagbemi, Funmi, 2013, Bachelors, Covenant University [George Delclos, MD, MPH, PhD] (URM)	Capstone course	MPH	05/2015	Y	Bureau Veritas	HSE Consultant	
Blair, Brandon, 2013, Bachelors, University of Houston [Inkyu Han, PhD]	Capstone course	MPH		Y	Biotech industry	Safety Officer	
Rotich, Pauline, 2013, Masters, University of Central Missouri [Lawrence Whitehead, PhD] (URM)	Leave of absence 2015-2016	DrPH		Y	ExxonMobil	Industrial Hygienist	

Table 1. Trainees and Graduates Since Beginning of Project Period'

Trainees			Graduates					
	Capstone course	MPH			Y	The University of Texas HSC at Houston	Safety Specialist, Chemical Safety	
Duncan, Matthew, 2013, Bachelors, University of Colorado - Colorado Springs [Lawrence Whitehead, PhD]	Capstone course	MPH						
Fan, Jingwei, 2013, [Arch Carson, MD, PhD]	Capstone course	MPH						
Popoola, Mojisola, 2013, Doctoral, University of Ilorin [Arch Carson, MD, PhD] (URM)	Capstone course	MPH						
*Lopez, Justin, 2013, Bachelors, Rice University [George Delclos, MD, MPH, PhD] (URM)	Capstone course	MPH			Y	Baker Hughes	Industrial Hygienist	
*Grumbles, Alyse, 2014, Bachelors, Texas A&M University [Lawrence Whitehead, PhD]	Capstone course	MPH						
*Sung, Angela, 2014, Bachelors, Oklahoma Baptist University [Inkyu Han, PhD]	Capstone course	MPH						
*Nguyen, Kiet, 2014, Bachelors, University of California - Riverside [Inkyu Han, PhD]	Not yet determined	PhD						
Popoola, Olusegun, 2014, Doctoral, University of Ilorin [Arch Carson, MD, PhD] (URM)	Capstone course	MPH						
Sah, Parnita, 2014, Doctoral (Dentistry) [Arch Carson, MD, PhD]	Capstone course	MPH						
Howe, Samantha, 2014, Bachelors, Tulane University [Lawrence Whitehead, PhD]	Capstone course	MPH				United States Navy	Industrial Hygiene Officer Training Program	
Spolarich, Matthew, 2014, Bachelors, University of North Carolina - Wilmington [Lawrence Whitehead, PhD]	Capstone course	MPH				United States Coast Guard		
Occupational and Environmental Medicine								
*Abassi, Asim, 2010, Doctoral, King Edward College [George Delclos, MD, MPH, PhD]	Tragedy of the commons and the phenomenon of global warming: a commentary	MPH	Internal Medicine	05/2012	06/2012	Y	Excel Urgent Care	Staff Physician
*Hysler, Thomas, 2010, Doctoral, Ross University School of Medicine [George Delclos, MD, MPH, PhD]	Old claim or new injury: the "Bad Back Dilemma"	MPH	Family Medicine	05/2012	06/2012	Y	Houston Area Safety Council	Chief Medical Officer
*Saavedra, Monica, 2010, Doctoral, University of Chile [Arch Carson, MD, PhD] (URM)	The value and evaluation of a wellness program	Certificate	General Medicine	N/A	11/2011	Y	Self-employed	Wellness Consultant

Table 1. Trainees and Graduates Since Beginning of Project Period'

Trainees				Graduates			
Internal Medicine	How much of the burden of cancer is potentially preventable?	MPH	05/2012	06/2013	Y	Chevron Health and Medical	Regional Medical Officer
*Jones, Ayanna, 2011, Doctoral, Baylor College of Medicine [Arch Carson, MD, PhD] (URM)		MPH			Y		
*Adekeye, Oluwayomi, 2012, MD, University of Ilorin [George Delclos, MD, MPH, PhD] (URM)	Decreasing marijuana use among first-year college students in the Houston area	MPH	08/2013	06/2014	Y	The Everett Clinic	Staff Physician
*Hekerem, Kemka, 2012, Doctoral, University of Port Harcourt [Arch Carson, MD, PhD] (URM)	Reducing the incidence of binge drinking among teens in Houston	MPH	08/2013	06/2014	Y	Excel Urgent Care	Staff Physician
*Nessim, Dalia, 2012, Doctoral, Ain Shams University [Arch Carson, MD, PhD]	Industrial radiography injuries in Texas	MPH	12/2013	06/2014	Y	The University of Texas Health Science Center at Tyler	Assistant Professor
*Bartine, Edwin, 2013, Doctoral, Chicago College of Osteopathic Medicine [Arch Carson, MD, PhD]	Not applicable	MPH	Trainee resigned from the program		N	Gaston Anesthesia Associates PA	Physician and Owner
*Mathew, Rini, 2014, Doctoral, Texas College of Osteopathic Medicine [George Delclos, MD, MPH, PhD]	Decreasing preterm births in Travis County	MPH	05/2015	In training	Y	The University of Texas HSC at Houston	OEM Resident
*Amani, Jenny, 2014, Doctoral, University of Wisconsin [Arch Carson, MD, PhD]	Not yet determined	MPH		In training	Y	The University of Texas HSC at Houston	OEM Resident
*Altman, Matthew, 2014, MD, The University of Texas HSC at Houston Medical School [Arch Carson, MD, PhD]	A tu Salud: Intervention for Montgomery County focusing on obesity in the Hispanic population	MPH	08/2015	In training	Y	The University of Texas HSC at Houston	OEM Resident
*Ehsanzadeh, Parvaneh, 2014, Doctoral, Azad University of Medical Sciences [Arch Carson, MD, PhD]	Chronic kidney disease in Central America	MPH		In training	Y	The University of Texas HSC at Houston	OEM Resident
Occupational Epidemiology							
*Lavery (Hansen), Amy, 2010, Masters, Texas A&M Health Science Center School of Rural Public Health [Lisa Pompeii, PhD]	Not applicable	PhD	Trainee withdrew from the program		N	The Children's Hospital of Philadelphia	Clinical Research Project Manager
*Murray, Jocelyn, 2010, Masters, The University of Alabama at Birmingham [Lisa Pompeii, PhD] (URM)	Not applicable	PhD	Trainee withdrew from the program		Y	NASA	Data Analyst
*Reynolds, Robert, 2010, Masters, University of Arizona [George Delclos, MD, MPH, PhD]	Development of a task exposure matrix for radiation in extraterrestrial environments and its application in the study of mortality for US astronauts	PhD	08/2013		N	Cambria Health Solutions	Clinical Analytics Manager ill

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Trainees			Graduates				
			DtPH				
*Socias, Christina, 2010, Masters, The University of Texas HSC at Houston [Sharon Cooper, PhD] (URM)	Incorporating occupation and industry into an electronic health records database of migrant farmworkers		DtPH	08/2013	Y	CDC/NIOSH	Occupational Epidemiologist
*Wendt, Judy, 2010, Masters, University of Michigan School of Public Health [Elaine Symanski, PhD]	Pediatric asthma incidence in Texas and associations with ambient ozone levels in an urban area: an analysis using Medicaid claims data		PhD	05/2012	Y	Shell Oil Company	Senior Epidemiologist
*Yoon, Jaennie, 2011, Masters, Texas A&M Health Science Center School of Rural Public Health [Laura Mitchell, PhD]	Not applicable		PhD	Trainee withdrew from the program	N	Texas Children's Hospital	Senior Systems Analyst
*Lee, Laura, 2012, Masters, University of Iowa [Elaine Symanski, PhD]	Maternal occupational physical activity/stress and adverse pregnancy outcomes		PhD	08/2015	Y	Naval Medical Research Unit - San Antonio	Epidemiologist
*Conway, Sarai (Sadie), 2012, Masters, Syracuse University [Lisa Pompeii, PhD]	Long work hours and adverse health outcomes: Defining a health risk-based threshold for work hour exposure		PhD	05/2015	Y	The University of Texas HSC at Houston	Postdoctoral Research Fellow
*Janak, Judson, 2012, Masters, The University of Texas HSC at Houston [Hasanat Alamgir, PhD]	Military service, injuries, health behaviors and health outcomes		PhD	05/2014	Y	US Army Institute of Surgical Research	Postdoctoral Research Fellow
*Staudt (Waclawczyk), Amanda, 2014, Masters, The University of Texas HSC at Houston [Hasanat Alamgir, PhD]	Organic Solvent Exposure and Hearing Acuity in U.S. Adults: The National Health and Nutrition Examination Survey, 1999 to 2006		PhD				
*Marshall, Amanda, 2014, Masters, The University of Texas HSC at Houston [David Gimeno, PhD]	Not yet determined		DtPH				
Occupational Injury Prevention							
*Mitchell (Hogan), Amber, 2007, Masters, George Washington University School of Public Health and Health Services [George Delclos, MD, MPH, PhD]	Occupational face and eye exposures to blood and body fluids in U.S. hospitals		DtPH	12/2013	Y	International Safety Center	President / Executive Director
*Montano, Cecilia, 2009, Masters, Texas State University [Benjamin Amick III, PhD] (URM)	The relationship between mental health and substance use problems and occupational injuries in the petrochemical industry		PhD	12/2013	Y	The University of Texas HSC at Houston	Faculty Associate

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Trainees			Graduates			
Campos, Adriana, 2009, Masters, Illinois Institute of Technology [David Gimeno, PhD] (URM)	Predictors of musculoskeletal symptoms among office workers in Costa Rica based on the CUPID (Cultural and Psychosocial Influence on Disability) Study and comparison with other Spanish-speaking countries	DrPH	08/2014	Y	Instituto Tecnológico de Costa Rica	Faculty, Occupational Health and Industrial Hygiene
*Read, Timothy, 2010, Masters, Texas A&M University [Benjamin Amick III, PhD]	The development and use of leading indicators for managing occupational safety and environmental health	PhD				
Casillas, Myriam, Masters, The University of Texas HSC at Houston [Benjamin Amick III, PhD] (URM)	Understanding the role and responsibility of leaders in building a culture of health and wellness in an academic setting	PhD	05/2014	N	Texas Tech University Foster School of Medicine	Senior Director, Office of Research
Tsai, I-Hsuan, Doctoral Chung Shan Medical & Dental College [Lisa Pompeii, PhD]	The factors for social participation in people with Spinal Cord Injury	PhD	12/2014		Unknown	
Seide, Rhandi, Masters The University of Texas HSC at Houston [Lisa Pompeii, PhD] (URM)	Employer-based occupational injury and illness surveillance: a survey of reporting practices, tools and outcomes	PhD				

¹ All NIOSH supported and non-NIOSH supported trainees and graduates by year of entry for reporting period July 1, 2011 to June 30, 2015

² Indicate certificate trainees with (Certificate).

* NIOSH supported trainee

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 July 1, 2011 to June 30, 2015**

Last Name, First Name	Position	Institution (Department)	Award Category	Project Title	Mean Priority Score	Funding	IRB/IACUC Status
Williams, Edward	Assitant Research Scientist	Baylor University	Junior Investigator	The relevance of coal tar-based asphalt sealants to workplace exposures to polycyclic aromatic hydrocarbons	4	\$10,000	Approved FWA 00008275
July 1, 2012 to June 30, 2013							
Bae, Sungwoo	Postdoctoral Fellowt	The University of Texas at Austin	Research Trainee	Quantitative microbial risk assessment of airborne microorganisms in retail stores	2	\$9,990	No human or animal subjects
Han, Inkyu	Assistant Professor	The University of Texas School of Public Health	Junior Investigator	Analytical method development and validation of personal air sampler for alkylaniline exposure assessment	2.5	\$10,000	No human or animal subjects
Khurshid, Shahana	Doctoral Student	The University of Texas at Austin	Research Trainee	Reactive Oxygen Species (ROS) on respirable particles in institutional and commercial buildings	2.5	\$10,000	No human or animal subjects
Lewis, Phil	Assistant Professor	Oklahoma State University	Junior Investigator	PtD to improve the design of construction processes	2.5	\$9,998	No human or animal subjects
Douphrate, David	Assistant Professor	The University of Texas School of Public Health	Junior Investigator	Safety leadership and management practices among large-herd dairy owners	2.5	\$10,000	Exempt FWA 0667
Mehta, Ranjana	Assistant Professor	Texas A&M HSC School of Rural Public Health	Junior Investigator	Influence of workplace stress and personal factors on musculoskeletal disorders	2.6	\$10,000	Approved FWA 00000092
Saito, Rena	Assistant Professor	The University of Texas HSC at Tyler	Junior Investigator	Unintentional exposures to antibiotics in healthcare environments: air sampling and analysis	2.5	\$10,000	Exempt
July 1, 2013 to June 30, 2014							
Campos, Adriana	Doctoral Student	The University of Texas School of Public Health	Research Trainee	Predictors of musculoskeletal symptoms among office workers in Costa Rica based on the CUPID Study and comparison with other Spanish speaking countries	2.5	\$10,000	Exempt FWA 0667

**Table 2. Pilot Projects Research Training Program Awardees
 July 1, 2011 to June 30, 2015**

Last Name, First Name	Position	Institution (Department)	Award Category	Project Title	Mean Priority Score	Funding	IRB/IACUC Status
Hawrylak, Peter	Assistant Professor	The University of Tulsa	Junior Investigator	Tracking adult vaccination history using RFID tags	2.5	\$10,000	No human or animal subjects
Lee, Laura	Doctoral Student	The University of Texas School of Public Health	Research Trainee	The linkage of the National Birth Defects Prevention Study and the Occupational Information Network	2.5	\$9,943	Exempt FWA 0667
Yang, James	Assistant Professor	Texas Tech University	New Investigator	Biomechanical model for assessing injury risks in mining	1.5	\$10,000	Approved FWA 00001568
Conway, Sarai (Sadie)	Doctoral Student	The University of Texas School of Public Health	Research Trainee	Health effects of long working hours	1.5	\$7,897	Exempt FWA 0667
Wang, He (Changed PI: A. Engel)	Assistant Professor	Tulane University	Junior Investigator	Mutagenic effects of oil spill chemicals of human airway epithelial cells	2.5	\$20,000	No human or animal subjects
Zhang, Kai	Assistant Professor	The University of Texas School of Public Health	Junior Investigator	Heat and health: Developing vulnerability indicators for farmworkers in California as a prototype for Texas	1.8	\$12,000	Approved FWA 0667
July 1, 2014 to June 30, 2015							
Brooks, Edward	Professor	The University of Texas HSC at San Antonio	New Investigator	Calcium channel activation by polyaromatic hydrocarbons	1.8	\$10,000	IACUC Approved A3345-01
Thompson, Brennan	Assistant Professor	Texas Tech University	New Investigator	The effects of demanding work schedule characteristics on fatigue and performance capacities in female healthcare workers' injury risk profiling assessment	2.5	\$10,000	Approved FWA 00001568
Wang, Qingsheng	Assistant Professor	Oklahoma State University	Junior Investigator	Evacuation simulations of confined spaces in petrochemical facilities	3.5	\$10,000	No human or animal subjects

**Table 3 CE Course Offerings - Summary by Program Area
 Since Beginning of Project Period¹**

Program Area	Total # of Trainees	Number of Courses	Total Pers-Hours	# Trainees by Profession							# Trainees by Employer					
				MD	NURS	HYG	SAFETY	OTHER	Private Industry	Fed Gov	State Gov	Local Gov	Foreign Country	Aca-demic	NGO	Other
Industrial Hygiene (IH)	1403	54	7144	5	6	954	228	210	1241	29	10	17	0	49	0	57
Occupational Health Nursing (OHN)	1295	111	21736	15	344	11	61	864	1288	0	0	0	0	0	0	7
Occupational Medicine (OM)	3021	154	23369	1097	391	138	73	1322	2019	37	33	32	16	792	1	91
Occupational Safety (OS)	10851	115	31684	31	36	35	2601	8201	2081	131	114	77	30	8216	5	144
Agricultural Safety and Health (Ag S&H)																
Other OS&H, e.g. Tox, Epi, Ergo, Biostat (OT)	353	10	875	29	12	31	81	200	49	3	3	6	0	288	0	4
TOTAL	16923	444	84,808	1177	789	1169	3044	10,797	6678	200	160	132	46	9345	6	303

¹ Beginning of project period = start date of previous competing award.

TANGIBLE PERSONAL PROPERTY REPORT Final Report SF-428- B

Federal Grant or Other Identifying Number Assigned by Federal Agency (Block 2 on SF-428).

T42 OH008421

1. Report (Select all that apply)

- a. Federally-owned Property (List on Supplemental Sheet SF-428S or recipient equivalent and complete Section 2a below.)
- b. Acquired Equipment with acquisition cost of \$5,000 or more for which the awarding agency has reserved the right to transfer title (List on Supplemental Sheet SF-428S or recipient equivalent and complete Section 2b below.)
- c. Residual Unused Supplies with total aggregate fair market value exceeding \$5,000 not needed for any other Federally sponsored programs or projects. (Complete Section 2c below)
- d. None of the above

2. Complete relevant section(s)

For Agency Use Only

2a. Federally-owned Property
(Select one or more.)

- (i) Request transfer to Award _____
- (ii) Request Federal Agency disposition instructions
- (iii) Other (Provide detail in Block 3 or attach request)

Agency response to requested disposition of Federally owned property:

- (i) Recipient request approved ___ denied ___
- (ii) Dispose in accordance with attached instructions ___

2b. Acquired Equipment (Select one or more.)

- (i) Request unconditional transfer of title with no further obligation to the Federal Government.
- (ii) Request Federal Agency disposition instructions

Agency response to requested disposition of acquired equipment::

- (i) Recipient request approved ___ denied ___
- (ii) Dispose in accordance with attached instructions ___

Authorized Awarding Agency Official

Signature:	Date:
Name:	Phone:
Title	Email

Note: If the awarding agency does not provide disposition instructions within 120 days the recipient may continue to use the equipment for Federally supported projects or dispose in accordance with the applicable property standards.

2c. Reportable Residual Unused Supplies

- (i) Sale proceeds or Estimate of current fair market value \$ _____
- (ii) Percentage of Federal participation %
- (iii) Federal share \$ _____
- (iv) Selling and handling allowance \$ _____
- (v) **Amount remitted to the Federal Government.** \$ _____

3. Comments

Null