

FINAL PROGRESS REPORT

THE SOUTHWEST CENTER FOR OCCUPATIONAL AND ENVIRONMENTAL HEALTH

**The University of Texas
Health Science Center at Houston (UTHealth)
School of Public Health**

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LIST OF ABBREVIATIONS

ABET – Accreditation Board of Engineering and Technology

ABIH – American Board of Industrial Hygiene

ABPM – American Board of Preventive Medicine

ACGME – Accreditation Council on Graduate Medical Education

ACOEM – American College of Occupational and Environmental Medicine

ADS - Accreditation Data System

AIHA – American Industrial Hygiene Association

APHA – American Public Health Association

ASPPH – Association of Schools and Programs of Public Health

BCM – Baylor College of Medicine

BOA – Board of Advisors

BSO – Biological Safety Officer

CAPE – Center Administration, Planning and Evaluation

CDC – Center for Disease Control and Prevention

CE – Continuing Education and Outreach

CEPH – Council on Education in Public Health

CEU – Continuing Education Units

CHMM – Certified Hazardous Materials Manager

CIH – Certified Industrial Hygienist

CME – Continuing Medical Education

CNE – Continuing Nursing Education

COVID-19 – Coronavirus 2019

CPE – Certified Professional Ergonomist

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

CSP – Certified Safety Professional

DR2 – Disaster Research Response

EDP - Environmental Disease Prevention

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

EH&S – Environmental Health and Safety

EOHS – Environmental and Occupational Health Sciences

ERC – Education and Research Center

ERHMS – Emergency Responder Health Monitoring and Surveillance

FEMA – Federal Emergency Management Agency

FTE – Full-Time Equivalent

GC-CPEH - Gulf Coast Center for Precision Environmental Health

GE – General Electric

eGFR - Glomerular Filtration Rate

GHIHC – Greater Houston Industrial Hygiene Council

GIS – Geographic Information System

GME – Graduate Medical Education

HASC – Houston Area Safety Council

HPBS – Health Promotion and Behavioral Sciences

IAQA - Indoor Air Quality Association

IARC – International Agency for Research on Cancer

IH – Industrial Hygiene

IRB – Institutional Review Board

ITC – Intercontinental Terminals Company

ITV – Interactive television

LMS – Learning Management System

LOA – Leave of Absence

MPH – Master of Public Health

MS – Master of Science

NAICS – North American Industry Classification System

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

OE – Occupational Epidemiology

OEH – Occupational and Environmental Health

OH – Occupational Health

OIP – Occupational Injury Prevention

OS – Occupational Safety

OSH – Occupational Safety and Health

OSHA – Occupational Safety and Health Administration

OM – Occupational and Environmental Medicine

P2R – Prevention, Preparedness and Response

PCP – Primary Care Provider

PhD – Doctor of Philosophy

PHR 6 – Public Health Region 6

PI – Principle Investigator

PMC – PubMed Central

PPE – Personal Protective Equipment

PPRTP – Pilot Projects Research Training Program

r2p – Research-to-practice

RAC – Residency Advisory Committee

ReACH – Center for Research to Advance Community Health

RFP – Request for Proposals

RSO – Radiation Safety Officer

SAC – San Antonio Campus

SOPHAS – Schools of Public Health Application Service

SPH – School of Public Health

SW Ag Center – Southwest Center for Agricultural Health, Injury Prevention and Education

SWCOEH – Southwest Center for Occupational and Environmental Health

TDSHS - Texas Department of State Health Services

TIOSH – Texas Institute of Occupational Safety and Health

TMA – Texas Medical Association

TMC – Texas Medical Center

TPG – Training Project Grant

TWH – Total Worker Health

TxCOEM – Texas College of Occupational and Environmental Medicine

U.S. – United States

UTHealth – University of Texas Health Science Center at Houston

WestON – Western States Occupational Network

WHO – World Health Organization

WTP – Worker Training Program

Abstract

The Southwest Center for Occupational and Environmental Health (SWCOEH) is the NIOSH Education and Research Center (ERC) at The University of Texas Health Science Center at Houston (UTHealth) School of Public Health (SPH). The UTHealth SPH has a unique, multi-campus system, with the main campus located in the Texas Medical Center in Houston and five other campuses in Austin, Brownsville, Dallas, El Paso, and San Antonio. All campuses are linked electronically, facilitating quality teaching and research, expanded course offerings, interdisciplinary collaboration and access to regional stakeholders, as well as expanding our reach to minority student populations.

The SWCOEH's mission is to promote health, safety and well-being of workers and the community with a focus on Public Health Region 6 (PHR6: Arkansas, Louisiana, New Mexico, Oklahoma, and Texas), which concentrates high-risk industries like agriculture, construction, and petrochemical. Our activities are critical to developing and maintaining the high-quality research and training infrastructure crucial to prevent workers' fatalities, injuries and illnesses in PHR6. Continuously funded since it was established in 1977, the overall goal is to respond to the critical need for well-trained occupational and environmental health specialists by providing graduate-level academic training and outreach and continuing education programs in the occupational health disciplines with an underlying foundation of a state-of-the-art research program. Further, as an affiliate member of the NIOSH *Total Worker Health*[®] program, the SWCOEH embraces the Total Worker Health (TWH) paradigm, shifting beyond the traditional prevention of workplace illness, injury or health promotion.

The SWCOEH provides master level training in Industrial Hygiene (IH), doctoral level training in IH, Occupational Epidemiology (OE), and Total Worker Health (TWH), and postdoctoral residencies in Occupational Medicine (OM). In addition to the academic degree programs, the SWCOEH has active Outreach and Continuing Education (CE) Programs that provide a full spectrum of training opportunities, enhanced by an annual Pilot Projects Research Training Program (PPRTP) for new and transitional investigators. During the project period 2015-2020, we have had 44 NIOSH funded trainees: 18 in IH, 11 in OE, 14 in OM, and one in TWH program, the first NIOSH-funded ERC doctoral program in TWH in the U.S., and which just began recruiting students in fall 2019. Additionally, the SWCOEH trained students with other funding sources: 27 in IH, 3 in OM, 1 in OE and 1 in the Occupational Injury Prevention (OIP), which we discontinued in 2015, bringing the total number of trainees to 76. Of these, the programs have graduated a total of 53 students, 30 of whom were NIOSH funded: 17 in IH, 4 in OE, 8 in OM, and 1 formerly funded in OIP. Further, since 2016, we have had four trainees in a newly created Complementary OM Pathway, securing external funding other than NIOSH. In addition to the academic graduate degree programs, the SWCOEH CE Program trained 4,081 people in 160 educational events, representing 19,902 person-hours. In total, the PPRTP has awarded \$346,096 to 31 new and transitional investigators in PHR6.

Center Administration, Planning, and Evaluation

**Southwest Center for Occupational
and Environmental Health
UTHealth Education and Research Center**

**Close Out Report
(July 2015 – June 2020)**

**David Gimeno, PhD
Program Director
(01/01/2020-present)**

**Elaine Symanski, PhD
Program Director
(07/01/2015-12/31/2019)**

Center Administration, Planning, and Evaluation Final Progress Report (July 2015 to June 2020)

Background

This is the Final Progress Report of the Center Administration, Planning, and Evaluation (CAPE) of the Southwest Center for Occupational and Environmental Health (SWCOEH), the NIOSH Education and Research Center (ERC) at The University of Texas Health Science Center at Houston (UTHealth) School of Public Health.

This report **highlights the achievements of the SWCOEH** for the 2015-2020 period, during which we have made significant progress toward our overall goal 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, continuing professional education and service to the practice community. In this period, when we celebrated the SWCOEH ERC 40th Anniversary, a total of 76 students were trained in our ERC academic training programs and 53 graduated; all were employed upon graduation. A total of 160 Continuing Education (CE) events were delivered to 4,081 people, representing 19,902 person-hours. Through our Pilot Projects Research Training Program (PPTRP), 31 projects were awarded totaling \$346,096 to research trainees, junior investigators and investigators new to OSH. SWCOEH faculty submitted 96 grant applications, receiving 38 new awards with total direct costs of over \$14M. In 2016, we recruited two new tenure-track Assistant Professors in OSH: **Brett Perkison, MD, MPH**, for the OM program, and **Wei-Chung Su, PhD, CIH** for the IH program. Also, we continued the enhancement of the SWCOEH website (www.swcoeh.org) with links to relevant information for our stakeholders (e.g., Hurricane Harvey, alumni's tab). A key activity was the development of a new strategic plan to guide our future directions. This process culminated in the **SWCOEH White Paper**, which we reassessed and renewed our commitment to in 2019. Our plan, with key deliverables, focuses on building research resources, enhancing our research portfolio with new initiatives and a particular emphasis on increasing impact and collaborations within and outside the ERC. A commitment from the White Paper was for the SWCOEH to embrace NIOSH *Total Worker Health*[®] paradigm, which focus on worker well-being beyond traditional prevention of workplace illness, injury or health promotion efforts.

Two recent circumstances are to be highlighted. First, in October 2019 we submitted our 5-year competing renewal for 2020-2025. The Summary Statement received on March 2020 noted that the weaknesses listed were mostly minor, and that our application's strengths largely outweighed its weaknesses. All our programs were recommended for funding, and in June 2020, we submitted the required Just-In-Time documentation. We are waiting for the official Notice of Grant Award. Second, in response to the pandemic of COVID-19, the infectious disease caused by a novel coronavirus (SARS-CoV-2), changes in the normal SWCOEH operations were implemented so that classes, interdisciplinary activities, in-person CE became interactive virtual events, and travel was restricted. Also, several scientific meetings which our trainees had planned to attend, were either cancelled or moved to virtual events. Throughout these challenging times, we have strived to maintain our mission to promote and improve health, safety, and well-being in the workplace and the community, with a particular focus on the impact of COVID-19.

CAPE Goals

The goal of the CAPE is to provide an effective and efficient administrative infrastructure that helps promote excellence in teaching, research and community service to meet the SWCOEH's goals and achieve the aims of the NIOSH training grant program. The CAPE is led by the **SWCOEH Director, David Gimeno, PhD**, who is responsible for the overall planning, coordination, integration and evaluation of all ERC components and activities. Supporting Dr. Gimeno is **Deputy Director George Delclos, MD, MPH, PhD**, and a core of dedicated staff under

the coordination of **Ms. Annette Allett, Program Manager**, who provides support for the day-to-day management and long-term continuity to the ERC leadership, directly assisting the ERC Director and Deputy Director with the coordination and integration of all the ERC components, the staff associated with them, and their related activities. The SWCOEH **goals for 2015-2019** were to (1) facilitate OSH research and training; (2) improve our impact on community and worker health by conducting periodic assessments in accordance with program-specific evaluation plans; (3) successfully manage academic and non-academic programs; (4) enhance the funding base of the SWCOEH; and (5) incorporate input from stakeholders.

Objective 1 – Facilitate OSH research and training: We continue to **strengthen the research and training grant support infrastructure through expanded and renewed staffing**. In January 2016, we hired: (1) a CE and Outreach Coordinator (Ms. Michelle McDaniel). As previously reported to NIOSH, the previous CE Director, moved to UTHealth SPH Dean's office in April of 2016 and in September decided to operate the NIEHS-funded hazardous wastes worker training program (WTP), a collaboration with the Rocky Mountain ERC at the University of Utah, outside the SWCOEH. This move resulted in an immediate and significant loss of funding for staff and a loss of several long-standing SWCOEH ERC courses (Biological Safety Officer (BSO); Chemical Hazardous Materials Management (CHMM); and Radiation Safety officer (RSO)). Dr. Symanski (ERC Director) assumed the role as CE Director and launched efforts to secure funding for staff and with Ms. McDaniel, re-built the Center's professional workforce development training program. Recognizing the overall needs of the SWCOEH, we hired a senior data analyst in fall 2016 to assist with development and implementation of evaluation data for all ERC programs and website design and, when funding became available in 2019, a half-time CE Instructional Developer. Additionally, Dr. Symanski recruited Ms. Peggy Weinshilbom as a Research Coordinator for Occupational Medicine and Pilot Projects Research Training Program to fill a position vacated by the prior coordinator. Ms. Weinshilbom is now fully dedicated to the OM program after Ms. Silvia Santiago joined the SWCOEH on 2/16/2020 to support the PPRTTP program. She had previously served the SWCOEH as departmental administrative support, so she is familiar with the activities, procedures and the team itself.

To increase our capacity to facilitate OSH research and training, in addition to the **two new OM and IH faculty, other UTHealth SPH faculty were incorporated** into the SWCOEH: **Dr. Rena "Sue" Day**, a Professor in EHGES, nutritional epidemiologist in the UTHealth SPH Dietetic Internship Program and the Nourish Program, joined the OE faculty in fall 2015; **Dr. Kai Zhang**, a tenure-track Assistant Professor in EHGES and PPRTTP Associate Director (named Director for the new cycle) was added as OE faculty in fall 2018; and **Dr. Christine Markham**, Professor, Interim Chair of the Health Promotion and Behavioral Sciences Department and Associate Director of the Center for Health Promotion and Prevention Research, joined the TWH faculty in fall 2018. Dr. Day was critical for successfully adding a doctoral TWH academic program to our ERC programs. These results reinforce our decision to continuously make efforts to add into the SWCOEH personnel who can effectively contribute to and strengthen our ability to implement our strategic plan and help us to successfully achieve our goals.

Objective 2 – Develop and implement program evaluation plans: In 2011-2013, in line with our goals, we developed and **implemented evaluation plans for all SWCOEH ERC programs**, including logic models (inputs, activities, outputs and outcomes), and associated process and outcome metrics. As a part of our continuing evaluation, to enhance our academic and CE offerings, each cycle we request feedback regarding future demands of OSH professionals. Our latest evaluation and needs assessment were conducted in 2019. Results of these two activities are summarized in each Program Plan. **Our evaluation is an ongoing key activity to continually improve** the quality of the ERC. For instance, we identified a need for correction in

acknowledging the NIOSH Training Grant in publications. While we send regular reminders to all ERC members about properly acknowledging the ERC grant and include this requirement in letters to appointed trainees and PP RTP awardees, we have now a centralized publication database to improve tracking of scientific products. Following NIOSH requirements, we separate publications where the ERC grant was acknowledged, and those that only mention affiliation to the SWCOEH. **ERC faculty outputs** include 149 presentations and 196 peer-reviewed journal publications, of which 57 included the ERC grant number and 34 were affiliation only products. Corresponding **trainee outputs** are 52 presentations and 44 peer-reviewed publications, of which 28 had the ERC grant number and four only the affiliation.

Objective 3 – Successfully manage academic and non-academic programs: We successfully managed our academic programs and worked on enhancing the stability and vitality of non-academic programs. We received criticisms for multiple leadership changes in prior years with junior faculty in leadership positions. Dr. Gimeno was proposed as the new Director of the ERC to start on the funding cycle (07/01/2020) but assumed the role on 01/01/2020 when Dr. Symanski left UTHealth SPH. Dr. Gimeno has direct knowledge and experience with leadership role and the dynamics of the ERC, having previously directed the ERC Occupational Epidemiology program (2014-2020) and the PPTRP (2009-2014). OE Director, **Dr. Gimeno**, assumed the role in 2014/15 after **Dr. Cooper's** retirement and successfully led an uneventful transition of the program. We acknowledge some of our faculty are junior in their careers, but this doesn't preclude them having the appropriate expertise and experience to run well-organized programs, and who can incorporate new elements and energy. Transitions in the non-academic programs is discussed elsewhere (see **Objective 1 for CE/Outreach**, above, and **PPTRP**, below). For academic programs transitioning leadership to solid and well-prepared but more junior faculty, we named Associate directors to work closely with the Directors in executing the plans efficiently and ensuring smooth transitions: (1) IH: **Dr. Douphrate** became Director on 7/1/2019 after **Dr. Whitehead** announced his phased retirement and became Associate Director; (2) OM: On 7/1/2019, **Dr. Carson** fully retired, **Dr. Delclos** became Director while mentoring **Dr. Perkison**, who became Associate Director. Dr. Perkison is named Director for the new cycle and Dr. Delclos will return to Associate Director. Finally, two OE faculty (**Dr. Pompeii** and **Dr. Alamgir**) left UTHealth but their roles were assumed by **Dr. Day** and **Dr. Zhang** (see **Objective 1** above).

Objective 4 – Enhance the funding base of the SWCOEH: In this reporting period, SWCOEH faculty submitted **96 proposals and received 38 awards** (over \$14M in total costs) in OSH projects, with a majority of them in the following NORA sectors: Agriculture, Forestry & Fishing; Healthcare & Social Assistance; Public Safety; and, Oil & Gas. The most frequent cross-sectors were: Musculoskeletal Health, Respiratory Health, Traumatic Injury Prevention; Cancer, Reproductive, Cardiovascular & Other Chronic Disease Prevention; and, Healthy Work Design & Well-Being. Guided by our White Paper, at our monthly ERC meetings, we regularly discussed new research ideas and proposals under development. A successful outcome of our strategic planning is that faculty continued to receive funding to support research programs in: **(1) Total Worker Health initiative:** A re-development of EOHS doctoral programs into a new PhD in Environmental Sciences with a TWH track, the approval of this track as the first NIOSH ERC doctoral program in TWH in the U.S., obtaining additional support for a TWH trainee from Baker Hughes GE, a NIOSH U13 Cooperative Agreement (PI: Dr. Delclos) to develop workshops and conferences to advance the TWH agenda, and the SWCOEH becoming a NIOSH TWH Affiliate Member; **(2) Total Exposure Health:** Drs. Whitworth and Gimeno (OE faculty), and Dr. Han (IH) have had three pilot projects funded (two ERC PPTRP, and one P30 Pilot Project) around occupational and environmental hazards among domestic workers, which has led to an R01 application; **(3) Enhanced infrastructure:** the NIEHS-funded P30 the Gulf Coast Center for Precision Environmental Health with BCM and with Dr. Symanski as Deputy Director; **(4)**

Enhanced mentoring of Junior faculty: an NIEHS R01 (PI: Dr. Whitworth) on the effect of occupational and environmental air pollution on fetal growth and child neurodevelopment; an award from the American Heart Association to Dr. Zhang on the impact of urban exposures on cardiovascular diseases; and a UTHealth SPH New Investigator award to Dr. Su to measure on-site workplace ultrafine particle lung deposition.

Objective 5 – Effectively communicate with stakeholders: The **ERC aims to represent stakeholders in PHR6**. In the last renewal, we received feedback regarding our Board of Advisors (BOA)'s representation being predominantly from Texas, the oil and gas industry and limited reach to labor organizations and underserved populations. Major representation from Texas is warranted given Texas is the 2nd state with the highest number of Fortune 500 headquarters (n=50) in the U.S. and houses the largest medical complex in the world, in Houston. In the other PHR6 states, there are 13 (6 in Arkansas, 5 in Oklahoma, 2 in Louisiana, and none in New Mexico). Jack Hinton, DrPH, CIH (BOA Chair) at Baker Hughes, Faiyaz Bhojani, MD, DrPH, (BOA Co-Chair) at Shell Health and James Davis, MD (Co-Chair) at Exxon Mobil Corporation, hold high-level positions with a reach that is international. However, as contacts with OSH professionals expand, our **Board of Advisors has also expanded in size, scope and membership**. During this period, we: (1) added two new members: James Davis, MD, Occupational Health Manager from Exxon Mobil Corporation, and James Shelton, MS, Compliance Assistance Specialist from Houston North OSHA Area Office. Aiming to improve the efficiency of the interactions with the BOA, **we created BOA Co-Chairs roles to strengthen the strategic planning of the ERC**. While the ERC will continue to meet with the full BOA annually, executive planning meetings with the BOA Co-Chairs will occur quarterly to seek more frequent input over major decisions regarding ERC goals, trainee labor market needs and integration of issues from PHR6. We have also initiated steps to add members from industries relevant to PHR6 beyond the energy sector: healthcare (e.g., Texas Children's Hospital, MD Anderson Cancer Center), transportation (e.g., Southwest, United Airlines), and waste-related industry (e.g., Waste Management).

Past Performance / Accomplishments of the SWCOEH Programs in Last Project Period

During the reporting period, the ERC had core academic programs in IH and OM, and two allied academic programs in OE and THW, which was approved in June 2018 as the first doctoral program in TWH in the U.S.

Academic Programs

Trainee enrollment and graduation: Since 2015, we have had **44 NIOSH funded trainees** in our academic training programs: 18 in IH, 11 in OE, 14 in OM, and one in TWH program, which just began recruiting students in fall 2019. Additionally, the programs **trained students with other funding sources**: 27 in IH, 3 in OM, 1 in OE and 1 in the Occupational Injury Prevention (OIP) program, which was discontinued in 2015, bringing the total number of trainees to 76. Of these, the programs have **graduated a total of 53 students, 30 of whom were NIOSH funded**: 17 in IH, 4 in OE, 8 in OM, and 1 formerly funded in OIP.

Program development: During the reporting period we focused on growing program offerings and expanding the reach of our programs and our Outreach Program efforts in the following areas: (1) **TWH initiative:** In 2017, building on our White Paper and with critical feedback from our Board of Advisors, we redeveloped our **PhD in Environmental Sciences program to include a new TWH track**, which was approved by NIOSH in late 2018 as a new ERC doctoral program in TWH. This is the **only graduate doctoral TWH program in the U.S.** With a broader focus on worker well-being, this new track incorporates existing environmental health, occupational safety, behavioral sciences, epidemiology and worker-centered well-being courses. Also, related to

TWH, an academic/industry collaboration with Baker Hughes GE resulted in a **philanthropic gift to support tuition and fees and a stipend** for a 12-month period for a TWH trainee. As we broaden consideration of the role of workers' lifestyle in promoting worker well-being, we are collaborating with UTHealth SPH to sponsor Culinary Medicine courses to be offered to trainees; (2) **Growing our CE Program**: We successfully delivered **160 CE courses**: 70 in occupational medicine, 32 in industrial hygiene, 19 in safety, and 39 events multidisciplinary seminars, **training a total of 4,081 people**. Our success in number of events and attendees is the result of our efforts to continue stabilizing and growing support for our CE program after the operation of one of our CE training activities was lost; (3) **Expanding our reach**: We have **expanded student and minority recruitment** in our academic programs. By virtue of our location, we receive a large proportion of minority applicants and we have successfully recruited and retain such students. We have a considerable proportion of **underrepresented U.S. minority students among ERC trainees (24%)**, consistent with the proportion of such students in all UTHealth SPH (around 20%-25%). We have also **enhanced our PP RTP, with many awards to PHR6 institutions outside Texas**. Also, from our evaluation and from the feedback from reviewers, we determined that prospective ERC applicants want direct access to what the ERC does and to 'people who look like us'. This led to creating a **"Trainee Stories" tab in our website** where past trainees describe their motivation to apply for SWCOEH traineeships, how the program prepared them for an OSH job, and give advice to future trainees.

Outreach

Since 2015, we responded to **emerging disaster response** needs in the community, and collaborated on **r2p training** with other institutions, businesses, professional and scientific societies, labor organizations and community groups to enhance worker's safety and well-being. Outreach activities included **web-based modalities**. For example, guided by our White Paper and our commitment to TWH, in collaboration with the Society of Petroleum Engineers, we delivered the webinar, *Advancing Worker Well-Being and Productivity Through Total Worker Health*, on May 8, 2019 to 146 attendees. We also **developed new collaborations** with the Houston Chapter of the Indoor Air Quality Association (IAQA) with registration fees for IAQA future meetings waived for faculty and trainees. With the Greater Houston Industrial Hygiene Council, we are discussing workforce development and education needs among key IH stakeholders in the area. We also **coalesce efforts with other PHR6 partners** (e.g., UTHealth Tyler Agricultural Center) to strengthen support for OSH by co-sponsoring events. Other Outreach-related activities are described in the next section.

Interdisciplinary Coordination

The SWCOEH ERC closely **integrates training, research and practice activities** among its programs. All trainees participate in interdisciplinary experiences in which students from different OSH disciplines participate in assessment and problem solving as a team. Beyond classroom activities, ERC trainees participate in the monthly Journal Club, the bi-weekly Environmental and Occupational Health seminars, and annual events like the PP RTP Symposium, the UTHealth SPH Research Day, field trip (e.g., to a coal-fired power plant in 2018 or the Port of Houston Ship Channel Boat Tour in 2019). We also screen films on occupational topics (e.g., "A Day's work" in 2016, about safety of a temporary employee who was killed on his first day of work, or "Cesar's Last Fast," in 2019 about activist César Chavez's struggle for the humane treatment of America's farm workers) followed by an expert panel discussion. Trainees had three unique interdisciplinary opportunities: (1) When Hurricane Harvey (2017) devastated part of Houston, the SWCOEH led a team of 30 graduate students, trainees, faculty and staff to develop an outreach program that provided nearly 1,200 personal protection kits and bilingual training to homeowners, volunteers and construction workers on how to use protection kits and safely clean-up flooded homes.

Concurrently, in collaboration with Baylor College of Medicine (BCM), and Oregon State University, we collected nearly 200 soil and 30 water samples to examine the impact of flooding on the community. Further, as a result from our outreach activities post-Hurricane Harvey, we developed a “Harvey” website in partnership with the Houston Health Department and BCM to provide reliable and consistent messages and resources for Houstonians, residents and workers alike, involved in recovery efforts. This resource was shared with the University of North Carolina at Chapel Hill ERC in the aftermath of Hurricane Florence in 2018; (2) Shortly after the Intercontinental Terminal Company Fire in Deer Park, Texas (2019), we trained ERC trainees on the collection of contaminants in air in disaster areas, use of qualitative and quantitative methods for gathering information on the health impact of the fire; (3) we celebrated the SWCOEH 40th Anniversary with a 2018 Scientific Symposium including presentations by Dr. Sarah Felknor, Associate Director of Research Integration and Extramural Performance at NIOSH; Dr. David Michaels, former Assistant Secretary of Labor at OSHA. We also had a panel discussion on TWH with, among others, Jack Hinton and Faiyaz Bhojani, Chair and Co-Chair of the ERC Board of Advisors, respectively. Later that month, the SWCOEH, jointly with UTHealth Tyler, co-hosted Kate Moore, to discuss her New York Times bestselling book, “The Radium Girls” on the outbreak of cancer in female radium dial painters.

Pilot Projects Research Training Program (PPRTP)

The PPRTP Program’s goal is to enhance the ERC’s research training mission and foster inter-institutional ties within PHR6 in OSH research by supporting small research projects to obtain pilot data to be leveraged in larger proposals. PPRTP’s application and review materials are available online and distributed each round through the ERC website and by email to contracts and grants offices of higher-education institutions and programs in PHR6, Board of Advisors, and prior PPRTP applicants. In response to the 2015 review we have: (1) Integrated opportunities for research mentorship throughout the research training program for all applicants: a mentorship plan and scientific product plan and timeline on future publications, conference presentations, and grant submissions plan is required at the application stage; awardees are required to provide quarterly progress reports; we communicate with awardees and mentors at the midway point of the project to evaluate progress and challenges they may be encountering; (2) Surveyed applicants on their experience of the effectiveness of dissemination of funding announcements and suggestions on improvement of the PPRTP process; (3) Updated our distribution list yearly with current contact information and to expand our reach to states with low PPRTP submissions (e.g., New Mexico) and from underrepresented applicants by adding contacts from the U.S. Department of Education accredited graduate-level minority serving institutions in PHR6; (4) Developing online grant-writing support training through our CE program for all applicants. Since 2015, we have received 103 letters of intent and 75 proposals from all states in PHR6, representing 30 institutions. We awarded 31 projects totaling \$346,096 to research trainees, junior and investigators new to OSH in institutions in all states but New Mexico. Thus, PHR6 coverage is met, except for New Mexico, for which we are working to identify additional relevant institutions; (5) Increased output record: 22 peer-reviewed publications, 44 conference presentations, and 4 submitted proposals from PPRTP awardees using PPRTP findings. One proposal was awarded, and two are pending. Overall, the PPRTP has demonstrated success, long-term sustainability, continuous improvement and commitment to training and resource development in PHR6.

**Academic Training Program in
Industrial Hygiene**

**Southwest Center for Occupational
and Environmental Health
UTHealth Education and Research Center**

**Close Out Report
(July 2015 – June 2020)**

**David I. Douphrate, PhD, MPT, MBA, CPE, CSP
Program Director
(07/01/2019-present)**

**Lawrence W. Whitehead, PhD, CIH, AIHA Fellow
Program Director
(07/01/2015-06/30/2019)**

Industrial Hygiene Program Final Progress Report (July 2015 to June 2020)

Background

This is the Final Progress Report of the academic training program in Industrial Hygiene in the Southwest Center for Occupational and Environmental Health (SWCOEH), the NIOSH Education and Research Center (ERC) at The University of Texas Health Science Center at Houston (UTHealth) School of Public Health. As an Affiliate Member of the NIOSH *Total Worker Health*[®] initiative, the SWCOEH embraces the TWH paradigm, a holistic, systems-thinking approach, integrating personal, socioeconomic, and environmental factors to focus on worker well-being, shifting beyond the traditional prevention of workplace illness, injury or health promotion. **Our IH Program began in the SWCOEH ERC in 1977.** The six current primary IH faculty members, and respective years of arrival to the program, are tenured Professor Robert Emery (1997); tenured Associate Professors Lawrence Whitehead (1986) and David Doupbrate (2010); and Assistant Professor Inkyu Han (2012); and we attracted a new industrial hygiene faculty member, Dr. Wei-Chung Su, Assistant Professor, who joined us in August 2016. Dr. Su is an aerosols researcher, and is a CIH. Dr. Su developed a course in Exposure Assessment. Dr. Emery's faculty appointment is part time; therefore, 5.15 FTE faculty support the program currently. The IH program has had two directors over its entire previous history, Professor James Hammond though 1986, and Dr. Whitehead from 1986 to 2019. As of July 1, 2019, Dr. Doupbrate assumed the role of Director of the IH program with Dr. Whitehead as Associate Director.

Two recent circumstances are to be highlighted. First, in October 2019 we submitted our 5-year competing renewal for 2020-2025. The Summary Statement received on March 2020 noted that the weaknesses listed were mostly minor, and that our application's strengths largely outweighed its weaknesses. All our programs were recommended for funding, and in June 2020, we submitted the required Just-In-Time documentation. We are waiting for the official Notice of Grant Award. Second, in response to the pandemic of COVID-19, the infectious disease caused by a novel coronavirus (SARS-CoV-2), changes in the normal SWCOEH operations were implemented so that classes, interdisciplinary activities, in-person CE became interactive virtual events, and travel was restricted. Also, several scientific meetings which our trainees had planned to attend, were either cancelled or moved to virtual events. Throughout these challenging times, we have strived to maintain our mission to promote and improve health, safety, and well-being in the workplace and the community, with a particular focus on the impact of COVID-19.

There have been 301 degrees granted to 281 graduates (20 having earned two degrees) over the lifetime of the availability of IH courses at the UTHealth SPH. Starting in 1971 there were 15 identifiable IH graduates before the ERC and the formal IH program began in 1977. In total, the graduates consist of 134 MPH graduates, 110 MS graduates, 31 PhD graduates, and 26 DrPH graduates (20 dual degree holders are counted twice, once in each degree). The MS degree plan in Environmental and Occupational Health Sciences (EOHS) was discontinued after 2002 as its curriculum had become essentially the same as the MPH degree plan. The DrPH in EOHS was discontinued after 2017 and our doctoral efforts were centralized into one degree (PhD in Environmental Sciences) with two tracks (Environmental Disease Prevention, EDP, and TWH); current DrPH students will finish their degree plans. We consistently have had an incoming cohort of three to five MPH students over the last 10 years, and often gain IH students from among other EOHS students who learn of the program after beginning their coursework. Similarly, over the past decade, an average of 0.7 EOHS doctoral students have directly entered the program per year. This latter number does not count recently entered PhD EDP students who have not identified research areas yet and may work on IH-related topics and then be counted.

The financial support provided by the ERC remains a central, vitally important and stable source of funding for full-time IH students. Other mechanisms of financial support exist for IH students and we aggressively pursue them when they become available. For example, in addition to extramurally-funded research projects, several of our former students have been awarded national student fellowship funds from the American Industrial Hygiene Association (AIHA) Foundation, and two former students have been awarded the national 3M IH scholarship. Additionally, including the incoming class for fall 2019, six recent IH students have had military support.

The **overall objectives** of the IH Program are to: (1) graduate IH practitioners, largely MPH and some doctoral graduates, to assist in meeting the industry demand for practicing IHS in Public Health Region 6 (PHR6) and nationally, and (2) graduate doctoral researchers in IH-related specialties to contribute to the occupational safety and health (OSH) evidence base and other national needs. Guided by our overall purpose, we are dedicated to continuously improving our program through comprehensive evaluations to develop well-qualified master's (MPH) and doctoral (PhD) graduates and assist in fulfilling the need for IH professionals in PHR6 and beyond.

Performance in the Prior Project Period, FY15-19.

The overall goal of our IH program is to provide master's-level training (MPH) for a practice career, or doctoral training (PhD) for research. The specific goals, objectives and progress for the 2015-2019 period are below:

Goal 1. Maintain a skilled faculty which delivers quality graduate level IH education.

Objective 1.1. Maintain at least two IH faculty members who actively teach and advise graduate students.

Objective 1.2. Maintain a minimum of one Certified Industrial Hygienist (CIH) faculty member

These two objectives have been achieved. We have continuously maintained a core of IH faculty during the current project reporting period of more than three members (currently 5.15 FTE), including three CIH faculty members. Additionally, one faculty member (Doughrte) holds both the CPE and CSP credentials.

Goal 2. Conduct program evaluations to assess the effectiveness of achieving goals and educational objectives ("student outcomes", in Accreditation Board for Engineering and Technology, i.e., ABET, terminology), and appropriateness of the curriculum, and revise as necessary.

Achieved. From 2017 to 2019, UTHealth SPH has prepared for its 2019 CEPH accreditation review. This cycle included greater scrutiny of objectives and their assessment than in prior cycles, extended to all EOHS courses designed to meet MPH objectives. These courses are part of the IH curriculum. While CEPH requirements for course learning objectives are more general than those for IH specifically, their evaluation significantly strengthens the overall IH program. In summer 2019, we also began preparing for our next ABET self-study, due in fall 2020. This will include formal evaluations of IH courses and how IH objectives are met. This process will culminate in an ABET site review in January 2021. We anticipate our ABET accreditation will be renewed in 2021.

Goal 3. Provide academic courses and research projects based on well-constructed, scientifically-sound principles and curriculum elements.

Achieved. The curriculum review and update process for CEPH is noted above; this includes greater exposure to research methods (e.g., a new course on qualitative research methods is now required of all MPH students). We have made annual changes to the EOHS MPH curriculum

and IH courses. We are changing teaching responsibilities for IH courses as part of our IH leadership transition plan, which also includes curriculum reviews. Informal feedback from interns and recent graduates indicates we are covering topical areas and competencies needed to be successful in their current work practice. For ABET accreditation, we will undertake a formal evaluation of the curriculum during the upcoming review. Doctoral research topics are presented in NIOSH Table 2. A major change in the doctoral programs is the discontinuation of the DrPH degree, with the last student cohort entering in fall 2017. At the same time, the PhD was revised with two academic tracks: EDP and TWH. Neither track is solely designated as IH, but doctoral students with research interests in the general IH area, whom we would designate as IH doctoral students, may pursue either track.

Objective 3.1. Produce an average of three graduates per year (one doctoral and two masters), as a three-year running average.

Achieved. We have met and exceeded this output each year in the reporting period.

Objective 3.2 Produce graduates who demonstrate a high level of technical, scientific and ethical competence in the application of IH principles.

Objective 3.3 Produce graduates who communicate effectively with technical and non-technical audiences about occupational health issues in a wide array of work environments including business, government, education and research

Objective 3.4 Produce graduates who can work independently or as part of a team, particularly in conducting research or in developing highly complex projects

These three objectives have been achieved as evidenced by specific elements in IH and EOHS courses address addressing these competencies. A formal evaluation will be part of the ABET evaluation and assessment activities which commenced in fall 2020.

Objective 3.5 Produce graduates who will attain professional certification credentials

Achieved. We continuously monitor CIH certification attainment by our graduates. The overall proportion of all IH graduates having earned the CIH is 34.8% (n=96) of 276 total graduates. From discussions with other IH program directors, a CIH certification rate of 25-35% of graduates is common. Due to limited opportunity for work experience, graduates from the last three years are not yet likely to be eligible to take the CIH certification examination. Many do not take the exam immediately after graduation, or are in jobs where the CIH is not required or supported by attending conferences or continuing education (CE) activities. Among our IH graduates, 41 (14.9%) have obtained Certified Safety Professional (CSP) designation; 39.1% of graduates hold at least one of these two certifications (CIH or CSP).

Goal 4. Maintain accreditation of the MPH IH hygiene curriculum with the Applied and Natural Science Accreditation Commission of ABET.

Achieved. Current ABET IH accreditation was received in 2015. Re-accreditation review will be in 2020/21.

Goal 5. Contribute to CE and Outreach Programs by annually providing 40 hours of instruction.

Partially achieved. We have achieved an average of 13 hours of IH CE instruction time per year in this reporting period. We acknowledge this as an identified area for improvement. In the new funding period, IH faculty will continue to work with the SWCOEH CE and Outreach Program to address continuing assessments of professional development needs and interest in IH topics to identify relevant topics, and develop and deliver quality CE products for the IH community. This will enable more effective planning of IH-related CE coursework.

Trainee Outputs

Trainee outputs include 14 presentations and 8 peer-reviewed journal publications, of which 6 included the ERC grant number and 2 were affiliation only products. NIOSH Tables 1 and 2 summarize production of trainees in the reporting period. We have trained 17 IH NIOSH trainee MPH students, and three IH-related NIOSH trainee doctoral graduates. The first is now a Research Fellow at Baylor College of Medicine, the second is Executive Director, EH&S, at the University of Miami, and the third is an IH officer in the United States Navy. In NIOSH Table 2, we list the research topics for doctoral students graduating during the reporting period. All master's graduates selected the capstone option and therefore did not complete a thesis.

Faculty Outputs

IH faculty outputs include 60 presentations and 41 peer-reviewed journal publications, of which 28 included the ERC grant number and 13 were affiliation only products. Considering **grant applications**, of the 43 proposals submitted by IH faculty, 21 received funding (\$8.1M in total costs), for a total of 50 active grants during the reporting period. While projects cover all sectors and cross-sectors, the most frequent NORA sectors among these active projects the most frequents are: Agriculture, Forestry & Fishing, Transportation, Warehousing & Utilities, and Public Safety. The most frequent cross-sectors are Musculoskeletal Health, Respiratory Health, Traumatic Injury Prevention, and Healthy Work Design & Well-Being.

INDUTSTRIAL HYGIENE

Trainee Outputs – Publication and Presentations

Note: Not underlined = ERC grant acknowledged; Underlined = ERC Affiliation Only

PUBLICATIONS (peer-reviewed journal articles)

Trainees

2020

1. Rodriguez A, Douphrate DI, Gimeno Ruiz De Porras D, Perez A, Hagevoort R, Nonnenmann M, **Cienega L**. 2020. Association of category of cattle exposure with tuberculosis knowledge among dairy workers in Bailey County, Texas. J Agromedicine:1-10.
2. An Han H, Han I, McCurdy S, Whitworth K, Delclos G, **Rammah A**, Symanski E. 2020. The intercontinental terminals chemical fire study: A rapid response to an industrial disaster to address resident concerns in Deer Park, Texas. Int J Environ Res Public Health 17:986. PMID: 32033278

2019

3. Berumen-Flucker B, Rodriguez A, **Cienega L**, Casanova V, Pompeii L, Gimeno Ruiz de Porras D, Douphrate DI. 2019. Evaluation of safety management and leadership training using mobile technologies among logging supervisors. J Agromedicine 24:197-204. PMID: 30624154
4. **Rammah A**, Walker Whitworth K, Han I, Chan W, Jimenez MD, Strom SS, Bondy ML, Symanski E. 2019. A mixed-methods study to examine the role of psychosocial stress and air pollution on hypertension in Mexican-origin Hispanics. J Racial Ethn Health Disparities 6:12-21. PMID: 29679333
5. **Rammah A**, Whitworth KW, Han I, Chan W, Symanski E. 2019. PM2.5 metal constituent exposure and stillbirth risk in Harris County, Texas. Environ Res 176:108516.
6. **Rammah A**, Whitworth KW, Han I, Chan W, Symanski E. 2019. Time-varying exposure to ozone and risk of stillbirth in a nonattainment urban region. Am J Epidemiol 188:1288-1295.
7. **Rammah A**, Whitworth KW, Han I, Chan W, Hess JW, Symanski E. 2019. Temperature, placental abruption and stillbirth. Environ Int 131:105067. PMID: 31376592

2018

None to report

2017

8. **Pinion C**, Brewer S, Douphrate D, Whitehead L, DeliFraine J, Taylor W, Klyza J. (2017). The impact of job control on employee perception of management commitment to safety. Saf Sci. 93:70-75. DOI: 10.1016/j.ssci.2016.11.015.

2016

None to report

2015

None to report

PRESENTATIONS

Trainees

2020

1. **Cardone A**, Su WC. Deposition Estimation of Workplace Ultrafine Particle in the Worker's Lower Airways. Conference: 2020 American Industrial Hygiene Conference & Exposition (AIHce). Organization: American Industrial Hygiene Association. Place: Virtual Only Conference. Date: 1-3 June, 2020. Type: Poster.

2019

2. **Laine, J.** 2019 Charlotte Regional Safety and Health Conference, "The Prevalence of Safety Professionals' Knowledge, Involvement, and Competency Associated with Workplace Wellness Programs; Gauging the Safety Professionals Engagement with Total Worker Health™", Dissertation Defense, Charlotte, NC, April 4, 2019
3. **Laine, J.** "The Prevalence of Safety Professionals' Knowledge, Involvement, and Competency Associated with Workplace Wellness Programs; Gauging the Safety Professionals Engagement with Total Worker Health™", Dissertation Defense, Houston, TX, April 2, 2019

2018

4. **Laine, J.** 2018 Region III ASSP PDC, "Results from Safety Professional Survey on Wellness Programs", Oklahoma City, OK, August, 2018
5. **Laine, J.** 8th Annual Public Health Camp at UT Health San Antonio, "Public Health Preparedness with Fire and Life Safety", July 2018
6. **Rammah A**, Whitworth KW, Chan W, Han I, Symanski E. Cumulative Exposure to Ozone and Risk of Stillbirth in a non-Attainment Urban Region. Presented at The University of Texas Health Science Center at Houston (UTHealth) School of Public Health Research Day, April 5, 2018, Houston, TX.
7. **Rammah A**, Whitworth KW, Chan W, Han I, Judy Wendt Hess, Symanski E. Temperature, stillbirth and placental abruption in Harris County, Texas. Presented at the EOHS Research Seminar, The University of Texas Health Science Center at Houston (UTHealth) School of Public Health, April 12, 2018, Houston, TX.

2017

8. **Laine, J.** 12th Annual Alaska Occupational Safety Summit, "The Prevalence of Practicing Safety Professionals' Knowledge and Involvement with Workplace Wellness Programs", October 2017
9. **Laine, J.** "Fire and Life Safety", UTHealth Classified Staff Council, June 2017

10. **Laine, J.** Proposal Defense, "The Prevalence of Practicing Safety Professionals' Knowledge, Involvement, and Competency Associated with Workplace Wellness Programs", April 2017
11. **Rammah A**, Whitworth KW, Chan W, Han I, Symanski E. Exposure to Ambient Air Pollution and Fetal Death in Harris County, Texas. Presented at the Environment Section of the American Public Health Association (APHA) Annual Meeting, November 2017, Atlanta, GA. Received 'Top Ten Submissions' recognition in the Student Achievement Poster Award Track.
12. **Rammah A**, Whitworth KW, Han I, Chan W, Jimenez MD, Strom SS, Bondy, ML, Symanski E. Hypertension in Mexican Americans: Assessing Disparities in Air Pollutant Risks. Presented at the American College of Epidemiology Annual Meeting, September 2017, New Orleans, LA. Shortlisted for Best Student Poster Award.

2016

13. **Laine, J.** ASSE Region III PDC, "The Prevalence of Safety Professionals' Knowledge and Involvement with Workplace Wellness Programs", San Antonio, TX, August 2016
14. **Laine, J.** Environmental Health and Safety Trade Seminar, "The Prevalence of Practicing Safety Professionals' Knowledge and Involvement with Workplace Wellness Programs", Galveston, TX, June 2016

2015

None to report

INDUSTRIAL HYGIENE

Faculty Outputs – Publication and Presentations

Note: Not underlined = ERC grant acknowledged; Underlined = ERC Affiliation Only.

PUBLICATIONS (peer-reviewed journal articles)

Faculty

2020

1. An Han H, **Han I**, McCurdy S, Whitworth K, Delclos G, Rammah A, Symanski E. 2020. The intercontinental terminals chemical fire study: A rapid response to an industrial disaster to address resident concerns in Deer Park, Texas. Int J Environ Res Public Health 17:986. PMID: 32033278
2. **Han I**, Richner D, An Han H, Hopkins L, James D, Symanski E. 2020. Evaluation of metal aerosols in four communities adjacent to metal recyclers in Houston, Texas, USA. J Air Waste Manag Assoc 70:568-579.
3. **Han I**, Whitworth KW, Zhang X, Afshar M, Berens PD, Symanski E. 2020. Characterization of urinary concentrations of heavy metals among socioeconomically disadvantaged black pregnant women. Environ Monit Assess 192:200-200. PMID: 32107644

4. Pate WJ, Betancourt JA, Delclos G, **Douphrate DI**, Gimeno Ruiz de Porras D. 2020. Patient & employee safety culture: Measurement & agreement. *Prof Saf* 65:41-46.
5. Rodriguez A, **Douphrate DI**, Gimeno Ruiz De Porras D, Perez A, Hagevoort R, Nonnenmann M, Cienega L. 2020. Association of category of cattle exposure with tuberculosis knowledge among dairy workers in Bailey County, Texas. *J Agromedicine*:1-10. PMID: 32449645.
6. **Su W-C**, Chen Y, Xi J. 2020. Estimation of the deposition of ultrafine 3D printing particles in human tracheobronchial airways. *J Aerosol Sci* 149:105605.
7. Symanski E, An Han H, Hopkins L, Smith MA, McCurdy S, **Han I**, Jimenez M, Markham C, Richner D, James D, Flores J. 2020. Metal air pollution partnership solutions: Building an academic-government-community-industry collaboration to improve air quality and health in environmental justice communities in Houston. *Environ Health* 19:39-39. PMID: 32248802

2019

8. Berumen-Flucker B, Rodriguez A, Cienega L, Casanova V, Pompeii L, Gimeno Ruiz de Porras D, **Douphrate DI**. 2019. Evaluation of safety management and leadership training using mobile technologies among logging supervisors. *J Agromedicine* 24(2):197-204. PMID: 30624154.
9. **Douphrate DI**, Fethke NB, Nonnenmann MW, Rodriguez A, **Gimeno Ruiz de Porras D**. 2019. Reliability of observational- and machine-based teat hygiene scoring methodologies. *J Dairy Sci.* 102(8):7494-7502. PMID: 31178196.
10. Ish J, **Symanski E**, Whitworth KW. 2019. Exploring Disparities in Maternal Residential Proximity to Unconventional Gas Development in the Barnett Shale in North Texas. *Int J Environ Res Public Health* 16(3):298.
11. Rammah A, Walker Whitworth K, **Han I**, Chan W, Jimenez MD, Strom SS, Bondy ML, Symanski E. 2019. A mixed-methods study to examine the role of psychosocial stress and air pollution on hypertension in Mexican-origin Hispanics. *J Racial Ethn Health Disparities* 6:12-21. PMID: 29679333
12. Rammah A, Whitworth KW, **Han I**, Chan W, **Symanski E**. 2019. PM2.5 metal constituent exposure and stillbirth risk in Harris County, Texas. *Environ Res.* 176:108516.
13. Rammah A, Whitworth KW, **Han I**, Chan W, **Symanski E**. 2019. Time-varying exposure to ozone and risk of stillbirth in a non-attainment urban region. *Am J Epidemiol.* 188(7):1288-1295.
14. Rammah A, Whitworth KW, **Han I**, Chan W, Wendt-Hess J, Symanski E. 2019. Temperature, stillbirth, and placental abruption. *Environ Int.* 131:105067. PMID: 31376592
15. Rodriguez A, Casanova V, Levin JL, Gimeno Ruiz de Porras D, **Douphrate DI**. 2019. Work-related musculoskeletal symptoms among loggers in the Ark-La-Tex region. *J Agromedicine* 24(2):167-176. PMID: 30624156.

16. Staudt AM, Whitworth KW, Chien LC, **Whitehead LW**, Gimeno Ruiz de Porras D. 2019. Association of Organic Solvents and Occupational Noise on Hearing Loss and Tinnitus among Adults in the U.S., 1999 to 2004. *Int Arch Occup Environ Health*. 92:403-413
17. **Su WC**, Chen Y, and Xi J. 2019. A new approach to estimate ultrafine particle respiratory deposition. *Inhal. Toxicol*. 31(1):35-43. PMID: 30782028
18. **Su WC**, Chen Y, Bezerra M, and Wang J. 2019. Respiratory deposition of ultrafine welding fume particles. *J Occup Environ Hyg*. 16:694-706.
19. Tee Lewis PG, Chen T-Y, Chan W, **Symanski E**. 2019. Predictors of residential mobility and its impact on air pollution exposure among children diagnosed with early childhood leukemia, *J Environ Epidemiol Exposure Sci* 29:510-519

2018

20. **Han I**, Samarneh L, **Symanski E**, Stock TH. 2018. Impact of Transient Noise and Air Pollution Affected by Truck and Train Traffic in Underserved Communities. *Transp Res D Trans Environ*. 63:706-717.
21. Payne-Sturges DC, Scammell MK, Levy JI, Cory-Slechta DA, **Symanski E**, Carr Shmool JL, Laumbach R, Linder S, Clougherty JE. 2018. Methods for evaluating the combined effects of chemical and nonchemical exposures for cumulative environmental health risk assessment, *Int. J. Environ Public Health*, 15:2797. PMID: 30544651
22. Rush EL, Singer AB, Longnecker MP, Haug LS, Sabaredzovic A, **Symanski E**, Whitworth KW. 2018. Oral Contraceptive Use as a Determinant of Plasma Concentrations of Perfluoroalkyl Substances among Women in the Norwegian Mother and Child Cohort (MoBa) Study. *Environ Int*. 112: 156-164. PMID: 29274593
23. Whitworth KW, Marshall AK, **Symanski E**. 2018. Drilling and Production Activity Related to Unconventional Gas Development and Severity of Preterm Birth. *Environ Health Perspect*. 126(3):037006 PMID: 29578659

2017

24. Campos-Fumero A, **Delclos GL**, **Douphrate DI**, Felknor SA, Vargas-Prada S, Serra C, Coggon D, **Gimeno Ruiz de Porras D**. 2017. Low back pain among office workers in three Spanish speaking-countries: findings from the CUPID study. *Inj Prev*. 23(3):158-164. PMID: 27585564
25. **Han I**, Guo Y, Afshar M, Stock TH, **Symanski E**. 2017. Comparison of trace elements in size-fractionated particles in a low socioeconomic status (SES) community and a high SES community in Houston, TX. *Environ Monit Assess*. 189(2):67.
26. **Han I**, **Symanski E**, Stock TH. 2017. Feasibility of Low-cost Portable Particle Monitors for Measurement of Fine and Coarse Particulate Matter in Urban Ambient Air. *J Air Waste Manag Assoc*. 67(3):330-340.
27. Nonnenmann MW, Gimeno Ruiz de Porras D, Levin J, **Douphrate DI**, Boggaram V, Schaffer J, Gallagher M, Hornick M, Reynolds S. 2017. Pulmonary function and airway inflammation among dairy parlor workers after exposure to inhalable aerosols. *Am J Ind*

Med. 60(3):255-263. PMID: 28195657

28. Whitworth KW, **Han I**, Mei Y, Sharma SV, Berens P, **Symanski E**. 2017. Accessing disadvantaged pregnant women in Houston, Texas and characterizing biomarkers of metal exposures: a feasibility study. *Int J Environ Res Public Health*. 14(5):474-512. PMID: 28468266
29. Whitworth KW, Marshall AK, **Symanski E**. 2017. Maternal Residential Proximity to Unconventional Gas Development and Perinatal Outcomes among a Diverse Urban Population in Texas. *PlosOne*. 12: e0180966. PMID: 28732016
30. Pinion C, Brewer S, **Douphrate D**, **Whitehead L**, DeliFraine J, Taylor W, Klyza J. 2017. The impact of job control on employee perception of management commitment to safety. *Saf Sci*. 93:70-75.

2016

31. Campos-Fumero A, Delclos GL, **Douphrate DI**, Felknor SA, Vargas-Prada S, Serra C, Coggon D, Gimeno Ruiz de Porras D. 2016. Upper extremity musculoskeletal pain among office workers in three Spanish speaking-countries: findings from the CUPID study. *Occup Environ Med*. 73:394-400. PMID: 26972870.
32. Lee LJ, **Symanski E**, Lupo PJ, Tinker SC, Razzaghi H, Chan W, Hoyt AT, Canfield MA. 2016. The role of maternal occupational physical activity and psychosocial stressors on selected adverse birth outcomes. *Occup Environ Med* 74:192-199. PMID: 27919059
33. Lee LJ, **Symanski E**, Lupo PJ, Tinker SC, Razzaghi H, Pompeii LA, Hoyt AT, Canfield MA, Chan W, National Birth Defects Prevention S. 2016. Data linkage between the national birth defects prevention study and the occupational information network (O*NET) to assess workplace physical activity, sedentary behaviors, and emotional stressors during pregnancy. *Am J Ind Med* 59(2):137-149. PMID: 26681357
34. Lim H, Beasley CW, **Whitehead LW**, **Emery RJ**, Agopian AJ, Langlois PH, Waller KD. 2016. Maternal exposure to radiographic exams and major structural birth defects. *Birth Defects Res A Clin Mol Teratol* 106:563-572. PMID: 27001904
35. **Douphrate DI**, Nonnenmann MW, Hagevoort R, Gimeno Ruiz de Porras D. 2016. Work-related musculoskeletal symptoms and job factors among large-herd dairy milkers. *J Agromed*. 21(3):224-233. PMID: 27092590.

2015

36. Bangia KS, **Symanski E**, Strom SS, Bondy M. 2015. A cross-sectional analysis of polycyclic aromatic hydrocarbons and diesel particulate matter exposures and hypertension among individuals of Mexican origin, *Environ Health*, 14(1):51. PMID: 26068905
37. **Emery RJ**, Rios J, Patlovich SJ. 2015. Thinking Outside the Box: Biosafety's Role in Protecting Non-Laboratory Workers from Exposure to Infectious Disease. *Appl Biosaf*. 20(3):128–129 PMID: 28966562
38. Lim H, Agopian AJ, **Whitehead LW**, Beasley CW, Langlois PH, **Emery RJ**, Waller DK and the National Birth Defects Preventions Study. 2015. Maternal occupational exposure

to ionizing radiation and selected birth defects in the US. Birth Defects Res A Clin Mol Teratol 103:243-254. PMID: 25820072

39. Park ES, **Symanski E**, Han D, Spiegelman C. 2015. Part 2. Development of Enhanced Statistical Methods for Assessing Health Effects Associated with an Unknown Number of Major Sources of Multiple Air Pollutants. Res Rep Health Eff Inst:51-113. PMID: 26333239
40. Payne-Sturges D, Korfmacher K, Cory-Slechta D, Jimenez M, **Symanski E**, Carr Shmool J, Dotson-Newman O, Clougherty J, French R, Levy J, Laumbach R, Rodgers K, Bongiovanni R, Scammell MK. 2015. Engaging communities in research on cumulative risk and social stress-environment interactions: Lessons learned from EPA's STAR Program. Environ Justice 8(6):203-212. PMID 27688822.
41. **Symanski E**, Karpman M, Jimenez M, Lopez DS, Felknor SA, Upadhyaya M, Strom SS, Bondy ML. 2015. Using a community engaged approach to develop a bilingual survey about psychosocial stressors among individuals of Mexican origin. J Health Care Poor Underserved, 26:1456-1471. PMID: 26548692

PRESENTATIONS

Faculty

2019

1. **Douphrate D**, Rodriguez A. Logging machine operators health and safety training. Western Ag Safety and Health Conference: Cultivating Collaborations, Seattle, WA, August 7-9, 2019.
2. **Douphrate D**, Rabinowitz P, Nonnenmann M, Fowler H Hagevoort R, Austin E. Animal agriculture and the One Health approach. Western Ag Safety and Health Conference: Cultivating Collaborations, Seattle, WA, August 7-9, 2019. (panel organizer and moderator)
3. Chen Y, **Su WC**, Bezerra M, Wang J. Application of the Mobile Aerosol Lung Deposition Apparatus (MALDA) on Estimation of Ultrafine Welding Fume Respiratory Deposition, 37th Annual AAAR Conference, Portland, Oregon, 2019.
4. **Su WC**. "A Novel Approach for Investigating the Respiratory Deposition of Welding Fumes", American Industrial Hygiene Conference and Expo, Minneapolis, Minnesota, 2019.
5. **Symanski E**, Tee Lewis G, Chen T-Y, Chan W, La, D and Ma X. Neighborhood Matters: Residential levels of air toxics and increased risk of early childhood acute lymphocytic leukemia, Invited Speaker, AACR, J Environmental Carcinogenesis: Potential Pathway to Cancer Prevention, June 2019, Charlotte, NC.
6. **Symanski, E**. SWCOEH Responds to Hurricane Harvey: Action to Research to Sustainability. Baylor College of Medicine (BCM) Symposium: Harvey 2 Years After, August 22, 2019, Houston, TX.

2018

7. **Douphrate D.** Sustainable forestry management: the role of worker health and safety. Invited keynote presentation. Arkansas Timber Producer Association Annual Meeting, Hot Springs, AR, August 24-25, 2018.
8. **Douphrate D,** Hagevoort R, Murphy D, Naerebout R, Rodriguez A. Addressing key safety and health issues on the dairy. Invited panel organizer and moderator. Raising Safety: North American Agricultural Safety Summit, Scottsdale, AZ, February 21-23, 2018.
9. **Douphrate D.** Dairy parlor ergonomics Raising Safety: North American Agricultural Safety Summit, Scottsdale, AZ, February 21-23, 2018.
10. **Su WC,** Chen Y. Ultrafine Particle Respiratory Deposition Measurement, American Industrial Hygiene Conference and Expo, Philadelphia, Pennsylvania, 2018.
11. **Su WC,** Chen Y. A Novel Approach for Investigating Workplace Ultrafine Particles Respiratory Deposition, 10th International Aerosol Conference, St. Louis, Missouri, 2018.
12. Chen Y, **Su WC.** Investigation of the Feasibility of Workplace On-Site Ultrafine Particle Respiratory Deposition Measurement, 10th International Aerosol Conference, St. Louis, Missouri, 2018.
13. Lewis R, **Whitehead LW.** Current and Future pressures on academic IH programs. Amer. Ind. Hyg. Conf. & Expo., Philadelphia PA, May, 2018.
14. Whitworth KW, Marshall AK, **Symanski E.** Unconventional Gas Development Activity and Severity of Preterm Birth in the Barnett Shale, Texas. Oral Talk presented at the Joint Annual Meeting of the International Society for Environmental Science (ISES) and the International Society for Environmental Epidemiology (ISEE), August 26-30, 2018, Ottawa, Canada.

2017

15. Rodriguez A, **Douphrate DI,** Gimeno Ruiz de Porras D. The association of worksite ergonomic and safety risk factors with work-related musculoskeletal health outcomes among logging machine operators in the Texas, Louisiana and Arkansas region. Conference: The University of Texas Health Science Center at Houston Research Day. Organization: The University of Texas Health Science Center at Houston. Place: Houston, TX (USA). Date: 6 April 2017. Type: Poster.
16. **Douphrate D.** Dairy worker safety: issues, research and solutions. United Dairymen of Idaho Annual Meeting, Boise, ID, November 8-9, 2017
17. **Douphrate D.** Worker safety and performance: past, current and future research and outreach efforts. Idaho Milk Processors Annual Convention, Sun Valley, ID, August 9-10, 2017
18. Hagevoort R, **Douphrate D,** Naerebout B, Brose, White J. Challenges surrounding training the next generation in dairy. Panel Discussion. Western Dairy Management Conference, Reno, NV, February 28 - March 2, 2017.

19. **Su WC**, Chen Y. "Workplace Ultrafine Particle Respiratory Deposition Measurement", 36th Annual AAAR Conference, Raleigh, North Carolina, 2017
20. Chen Y, **Su WC**. Deposition of Ultrafine Particles in Human Airway, 36th Annual AAAR Conference, Raleigh, North Carolina, 2017
21. **Han I**, Samarneh L, **Symanski E**. Effects of train and truck traffic on noise levels in urban communities. Acoustical Society of America. Boston, MA, June 25- 29, 2017.
22. **Han I**, Afshar M, **Symanski E**. Characterization of Particulate Air Pollution in a Community near the Port of Houston. National Environmental Monitoring Conference, Washington DC, August 7-11, 2017
23. Rammah A, **Symanski E**, Whitworth KW, **Han I**, Jimenez M, Chan W, Bondy M, Strom S. Hypertension in Mexican Americans: Assessing Disparities in Air Pollutant Risks. Presented at the American College of Epidemiology Annual Meeting, September 24-26, 2017, New Orleans LA. Published in Annals of Epidemiology. 2017; 27(8): 513.
24. Marshall AK, **Symanski E**, Whitworth KW. Unconventional gas drilling and production activity: Do phase of drilling and timing of activity impact the risk for preterm birth among pregnant women living near well sites? Presented at the American College of Epidemiology Annual Meeting, September 24-26, 2017, New Orleans, LA. Published in Annals of Epidemiology. 2017; 27(8): 530.

2016

25. Campos-Fumero A, Delclos GL, **Douphrate DI**, Felknor SA, Vargas-Prada S, Serra C, Gimeno D. Low back pain among office workers in Costa Rica, Nicaragua and Spain. Conference: 25th EPICOH Conference: Occupational Health, Think Globally, Act Locally. Organization: Scientific Committee on Epidemiology in Occupational Health. Place: Barcelona, Catalonia (Spain). Date: September 4-7, 2016. Type: Oral communication.
26. Campos-Fumero A, Gimeno D, **Douphrate DI**, Felknor SA, Vargas-Prada S, Serra C, Delclos GL. Upper extremity musculoskeletal pain among office employees in Costa Rica, Nicaragua and Spain. Conference: PREMUS 2016 - The 9th International Scientific Conference on the Prevention of Work-Related Musculoskeletal Disorders. Organization: Musculoskeletal Disorders Scientific Committee of the International Commission of Occupational Health (ICOH). Place: Toronto, ON, Canada. Date: June 20-23, 2016. Type: Poster.
27. **Whitehead L**, Tucker D, Gimeno D, Whitworth K, Betancourt J, Leonard S, Zhang A, Senchak A. Descriptive Evaluation of Noise Dosimetry Values in the Defense Occupational and Environmental Health Readiness System — Industrial Hygiene Component (DOEHRS-IH). Conference: 2016 American Industrial Hygiene Conference & Exposition (AIHce). Organization: American Industrial Hygiene Association. Place: Baltimore, MD, USA. Date: May 21-26, 2016. Type: Oral communication.
28. **Douphrate D**. Dairy safety management: current situation, challenges, and solutions.

Invited Presenter. Washington State Dairy Safety Conference. Ellensburg, WA, November 7-8, 2016.

29. **Douphrate D.** Safety Training Effectiveness Evaluation-The What, When, Why, Where & How. Invited presenter. Occupational Safety and Health Administration (OSHA) Susan Harwood Trainer Exchange. Washington, D.C. October 18-19, 2016.
30. **Douphrate D,** Hagevoort R, Rodriguez A, Pompeii L. Delivery of safety training to U.S. dairy workers using novel mobile technologies. Nordic Meeting of Agricultural Occupational Health and Safety, Billund, Denmark, August 24-26, 2016.
31. Hagevoort R, **Douphrate D,** Garcia Buitrago A, Rodriguez A. Delivery of animal handling training to U.S. workers using novel mobile technologies. Nordic Meeting on Agricultural Occupational Health & Safety, Billund, Denmark, August 24-26, 2016.
32. **Douphrate D.** Full-shift and task-specific ergonomic exposure assessment of posture and muscle activity among dairy parlor workers in U.S. large herd operations. **Ninth International Conference on Prevention of Work-Related Musculoskeletal Disorders (PREMUS)**, Toronto, Canada, June 20-23, 2016.
33. **Douphrate D.** Dairy worker health and safety. Invited Presenter. Washington Department of Safety and Health Technical Symposium, Wenatchee, WA, May 25-26, 2016.
34. **Douphrate D.** Safety training on dairy farms. Invited Presenter. Washington Department of Safety and Health Technical Symposium, Wenatchee, WA, May 25-26, 2016.
35. **Douphrate D.** Dairy worker health and safety: current situation, research challenges and lessons learned. 1st Annual Occupational Health and Safety Research Conference. Keynote presenter. University of Iowa, Iowa City, IA, April 1, 2016.
36. Hagevoort R, **Douphrate D.** Dairy safety management. Western States Dairy Producers Trade Association Annual Meeting. Las Vegas, NV, March 30, 2016.
37. **Douphrate D.** On-farm risk management and safety on dairy farms: Regulatory requirements and planning. High Plains Dairy Conference, Lubbock, TX, March 1-2, 2016.
38. **Douphrate D.** Worker health and safety on U.S. dairies. Invited lecture to the Governor's Agricultural Safety Day. Wenatchee, WA, February 24, 2016.
39. **Su WC,** Cheng YS, Chen TH. Deposition of Multi-Walled Carbon Nanotube (MWCNT) Aerosols in Human Nasal, Oral, and Lung Airways, 35th Annual AAAR Conference, Portland, Oregon, 2016
40. Marshall A, **Symanski E,** Whitworth KW. Maternal residential proximity to unconventional gas development (UGD) and adverse birth outcomes in the Barnett Shale area, TX, 2010-2012. Poster presented at the 2016 UTHealth Student Research Day, Houston, TX, March 31, 2016.

41. Hardos, JE, **Whitehead LW**, **Han I**, D.K. Ott, K Waller (2016) Depression Prevalence and Exposure to Organophosphate Esters in Aircraft Maintainers. Aerospace Medicine Association annual conference. April 24-28, 2016, Atlantic City.
42. Whitworth KW, Marshall A, **Symanski E**. Assessing exposure to unconventional gas development and its association with preterm birth in the Barnett Shale, Texas. Abstract presented at the 2016 Conference of the International Society for Environmental Epidemiology, September 1-4, 2016, Rome, Italy.
43. Marshall A, **Symanski E**, Whitworth KW. Maternal residential proximity to unconventional gas development (UGD) and adverse birth outcomes in the Barnett Shale area, TX, 2010-2012. Abstract presented at the 2016 Epidemiology Congress of the Americas, June 21-24, 2016, Miami, Florida.
44. Rammah A, **Symanski E**, Whitworth KW, Han I, Jimenez M, Chan W, Bondy M, Strom S. Hypertension in Mexican Americans: Assessing Disparities in Air Pollutant Risks. Poster presented at the 2016 UTHealth Student Research Day, March 31, 2016, Houston, TX.
45. Marshall A, **Symanski E**, Whitworth KW. Maternal residential proximity to unconventional gas development (UGD) and adverse birth outcomes in the Barnett Shale area, TX, 2010-2012. Poster presented at the 2016 UTHealth Student Research Day, March 31, 2016, Houston, TX.
46. **Emery RJ**, Patlovich SJ, Rios J. Combined presentation: "Global Health Security, Infection Prevention and Biosafety, and Educational Opportunities of Biosafety and Infection Disease Training Initiative", Association for Professionals in Infection Control and Epidemiology (APIC) Houston Chapter Meeting, March 17, 2016.
47. Le AB, Rios J, **Emery RJ**, Biddinger PD, Patlovich SJ, Wright B, Beam E, Gibbs SG, Lowe JJ, Abstract 368327: Biosafety and Infectious Disease Training Initiative (BIDTI), A National Institute of Environmental Health Sciences (NIEHS) Worker Training Program (WTP), including Emergency Health Services. 144th American Public Health Association (APHA) Annual Meeting, October 29- November 2, 2016 at Denver, CO. Session 0.0: Disaster Preparedness – 3, Monday, October 31: 2:30PM-3:30PM.

2015

48. **Douphrate D**. Acute agricultural injuries. Texas Rural Health Association, Agromedicine Workshop, Fort Worth, TX, October 29-30, 2015.
49. **Douphrate D**. Musculoskeletal diseases and ergonomics in agriculture. Texas Rural Health Association, Agromedicine Workshop, Fort Worth, TX, October 29-30, 2015
50. **Douphrate D**. Safety performance on dairy farms. Invited lecture to the World Dairy Expo. Madison, WI, October 1-2, 2015
51. **Douphrate D**. Safety performance on dairy farms. Invited lecture to delegations from

Pakistan and China, University of Wisconsin at River Falls, WI, September 27-28, 2015

52. **Douphrate D**, Reynolds S. Worker health and safety on dairy farms: a report of development of an effective research and outreach stakeholder network. Invited lecture to the Western States Occupational Network (WestON), Denver, CO, September 17-18, 2015
53. **Douphrate D**. Interventions to reduce exposure to physical risk factors for musculoskeletal disorders among dairy parlor workers. American Industrial Hygiene Conference and Exposition (AIHce). Salt Lake City, UT, May 30-June 4, 2015.
54. **Douphrate D**. Safety performance on dairy farms. Invited lecture to the Western Dairy Management Conference, Reno, NV, March 3-5, 2015.
55. **Douphrate D**. Safety training using mobile learning technologies on large herd dairy operations. OSHA Susan Harwood Trainer Exchange Conference, Washington, DC, February 18-19, 2015
56. **Su WC**, Cheng YS. "Deposition of Graphene Aerosols in Human Airways", American Industrial Hygiene Conference and Expo, Salt Lake City, Utah, 2015.
57. **Han I**, Guo Y, Afshar M. Particle size distributions of trace elements in a community near industrial and traffic sources. American Chemical Society National Meeting, Boston, MA, August 16-20, 2015.
58. Lopez DS, Advani S, Tsilidis KK, Daniel CR, Wang R, **Symanski E**, Canfield S. Association of urinary phthalate metabolites with erectile dysfunction in racial and ethnic groups in NHANES 2001-2004. American Urological Association Meeting, May 14-19, New Orleans, LA, 2015.
59. Swartz MD, Cai Y, Chan W, **Symanski E**, Mitchell LE, Danysh H, Langlois P, Lupo PJ. Using Bayesian hierarchical models to simultaneously evaluate multiple pollutants associated with Spina Bifida. Joint Statistical Meetings, Seattle, WA, August 2015.
60. Shim J, Pérez A, **Symanski E**, Nyitray AG. The association between vitamin D and human papillomavirus cervicovaginal infection in the United States. 30th International Papillomavirus Conference & Clinical and Public Health Workshops (HPV 2015), Lisbon, Portugal, September 17-21, 2015.

**Academic Training Program in
Occupational and Environmental Medicine**

**Southwest Center for Occupational
and Environmental Health
UTHealth Education and Research Center**

**Close Out Report
(July 2015 – June 2020)**

**Brett Perkison, MD, MPH
Program Director
(07/01/2020-present)**

**George L. Delclos, MD, MPH, PhD
Program Director
(07/01/2019-06/30/2020)**

**Arch Carson, MD, PhD
Program Director
(07/01/2015-06/30/2019)**

Occupational Medicine Program Final Progress Report (July 2015 to June 2020)

Background

This is the Final Progress Report of the academic training program in Occupational Medicine (OM) in the Southwest Center for Occupational and Environmental Health (SWCOEH), the NIOSH Education and Research Center (ERC) at The University of Texas Health Science Center at Houston (UTHealth) School of Public Health. As an affiliate of the NIOSH *Total Worker Health*® program, the SWCOEH embraces the TWH paradigm, a holistic, systems-thinking approach, integrating personal, socioeconomic, and environmental factors to focus on worker well-being, shifting beyond the traditional prevention of workplace illness, injury or health promotion. The OM program, originally founded in 1977, is one of 47 postgraduate medical training programs of UTHealth, the only one housed in the UTHealth SPH, and one of two remaining OM residency programs in Public Health Region (PHR) 6. Since 1977, 93 physicians have graduated from the OM program. Last reviewed in December 2018, the OM residency is fully accredited by the Accreditation Council on Graduate Medical Education (ACGME), and now undergoes annual reaccreditation based on data submitted to the Accreditation Data System (ADS). The next ACGME self-study is due in October 2021, to be followed by a 10-year site visit by October 2025. The primary strengths of our program are its recognized richness in varied industrial and clinical 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, since the last review, the UTHealth SPH has recruited two new faculty members: one in IH and one in OM. During the past grant period, the program was directed by Arch Carson, MD, PhD until July 1, 2019 when he retired after 27 years at UTHealth SPH. George L. Delclos, MD, MPH, PhD was Associate Residency Program Director for the Residency during Dr. Carson's tenure. Brett Perkison, MD, MPH joined the OM faculty in 2016 as tenure-track Assistant Professor. Upon Dr. Carson's retirement, Dr. Delclos assumed the OM Program Director Position and Dr. Perkison became Associate Program Director. Dr. Perkison is proposed as new OM Program Director, effective with the start of the new grant period in July 2020, and Dr. Delclos will return to Associate Program Director.

Two recent circumstances are to be highlighted. First, in October 2019 we submitted our 5-year competing renewal for 2020-2025. The Summary Statement received on March 2020 noted that the weaknesses listed were mostly minor, and that our application's strengths largely outweighed its weaknesses. All our programs were recommended for funding, and in June 2020, we submitted the required Just-In-Time documentation. We are waiting for the official Notice of Grant Award. Second, in response to the pandemic of COVID-19, the infectious disease caused by a novel coronavirus (SARS-CoV-2), changes in the normal SWCOEH operations were implemented so that classes, interdisciplinary activities, several resident rotations, in-person CE became interactive virtual events, and travel was restricted. Also, several scientific meetings which our trainees had planned to attend, were either cancelled or moved to virtual events. Throughout these challenging times, we have strived to maintain our mission to promote and improve health, safety, and well-being in the workplace and the community, with a particular focus on the impact of COVID-19.

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 ACGME-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 for the physician to be eligible to enter the OM program. Physician applicants

must also be eligible for an unrestricted Texas medical license or in-training permit. The first program year consists mainly of enrollment in graduate studies leading to the Master of Public Health (MPH), as well as professional clinical training in fundamental OM interdisciplinary practice. Most of the required curriculum for the MPH degree is accomplished in the first 18 months. The clinical activities include supervised new and continuing patient evaluations in the ambulatory clinic setting, inpatient consultations, weekly clinical conferences, monthly occupational health journal club and various occupational medicine professional service projects. The second residency year consists of a series of supervised, progressive responsibility, professional practice rotations as a member of a functioning occupational health team or in a medical specialty setting of particular interest or value to the trainee. Each rotation is rated for the specific OM professional competencies and training depth it provides for trainees. Residents also complete any remaining requirements for the MPH degree. At the conclusion of the 2-year program, physician trainees will have mastered the required list of competencies and milestones, and are usually eligible for certification by the American Board of Preventive Medicine (ABPM).

In 2016, we also expanded our OM training opportunities to include the new ABPM-recognized *complementary pathway to board certification*, which is designed for physicians wishing to make a mid-career shift into OM. To complete this pathway, physicians must: (1) have already completed two or more years of training in a clinical residency program, with a minimum of 10 months of direct patient care; (2) complete one year in an ACGME-accredited OM residency program; (3) complete post-graduate level courses in epidemiology, biostatistics, health services administration, environmental health sciences, and social and behavioral sciences, and (4) must have been practicing OM, or have been in training in OM for at least two of the past five years. To date, we have had four trainees opt for this pathway.

The caliber of physicians who enter the program is generally reflected by solid clinical and/or research backgrounds, in keeping with the Program's Residency Advisory Committee (RAC) recommendations. For the past several years, most of our OM trainees have had substantial prior training in another primary specialty before entering the OM program. 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, monthly journal club, and biweekly research seminar, often on a part-time basis. 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 also physicians.

The OM Residency consistently graduates well-educated physicians who obtain productive and influential professional practice positions in industry, government and academia. The specific strengths contributing to this success include a strong, experienced and committed faculty in place over time, exceptional community training resources and partnerships, and a consistently high quality of resident trainees. During the current reporting period, there have been four NIOSH-funded OM trainees per year. Our application includes a request to continue funding at this same level. Since the last review, we also secured external funding for complementary pathway residents (one graduated in 2017, funded by the UTHealth Office of the President, and another graduated in 2018, with full support from the Memorial-Hermann, our university-affiliated health system). The Memorial-Hermann funding for up to one FTE resident will continue each year. In addition, due to closure of the General Preventive Medicine Residency at the University of Texas Lower Rio Grande Valley, we accepted one of their residents, who transferred over to occupational medicine, for the FY2019 year. His position is fully funded by his former program. Additional discretionary funds are used to support gaps in cost related to resident education and travel, research seminar speakers, and journal club support, as the need arises. Continued ERC funding is critical 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 OM program is to continue growing, it is essential that NIOSH remains a support to build additional funding support around. 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.

Past Performance/Accomplishments in the last Project Period

In 2016, Dr. Delclos was inducted as member of The University of Texas Kenneth I. Shine, MD Academy of Health Science Education. He also received two teaching awards: the 2015 The University of Texas System Regents' Outstanding Teaching Award and the 2015 UTSPH Excellence in Teaching Award. Additionally, Dr. Delclos was named one of the "Top Doctors 2016" in occupational medicine by Houstonia Magazine and also joined the Scientific Committee of the 2018 European Union of Medicine in Assurance and Social Security Congress in Maastricht, Netherlands.

Nationally, the past five years of OM training were shaped by fairly substantive changes in ACGME Preventive Medicine Program requirements, reorienting them towards establishing and documenting progress on specific Milestones. We have implemented this transition successfully, as reflected in our documentation in the ADS, and the success of both our internal (GME) and external (ACGME) evaluations. At present, we remain fully accredited by ACGME. The next self-study will be due in fall 2020, and the next 10-year site visit will be in 2022; we are well positioned for both. Ultimately, our objective is to contribute significantly to both the NIOSH mandate of assuring an adequate supply of qualified OM professionals for the nation, and to the OSHA purpose of assuring safe and healthful working conditions for our nation's workers. We do this by ensuring that our graduates are of the highest quality possible. In the previous project period (2015–2020), we set out three major goals for the OM program, each with several objectives. Progress on each of these is described below:

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 Accreditation Council for Graduate Medical Education (ACGME): Fully Achieved (see **Background**).

Objective 1.2. Expand and enrich the quality of the OM residency experience so that OM trainees are fully prepared to enter the occupational safety and health (OSH) work community: Achieved and ongoing, by adding greater didactic content in the MPH program geared toward a more systems-based and interprofessional approach to EOHS practice, guided by the NIOSH TWH initiative, through a greater variety of residency rotations, and through increased ERC-wide interdisciplinary activities.

Objective 1.3. Increase our rates of successful certification of our graduates by the American Board of Preventive Medicine, as another measure of the quality of our graduates: Achieved and ongoing.

Objective 1.4. Increase the level of research productivity of our residents, in order to contribute to the OSH health scientific evidence base: Partially achieved, through greater didactic training in research methods, a greater number of research products during the MPH phase and more resident presentations at scientific meetings.

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

Objective 2.1. Progressively increase the output of trained OM physicians into clinical practice, especially the incorporation of minorities in the professional workforce: Achieved and ongoing.

Objective 2.2. Consistently provide the national and international audience with reports of our successes: Achieved and ongoing. At the local and state levels, we are active in TxCOEM through leadership positions of our OM faculty and recent graduates (Drs. Perkison, Carson and Macaluso-Davidson), participating in the organization of our annual scientific meeting, and presenting at that meeting. Together with the rest of our colleagues in the ERC, and with Dr. Perkison in one of the lead roles, our numerous community outreach activities during Hurricane Harvey and local disasters such as the ITC fire in Deer Park Texas are summarized in the **Outreach Program Progress Report and Program Plan**, which also summarizes the press releases and online publications generated from these efforts. Nationally, our OM Faculty (Drs. Perkison and Carson) have had active roles in the ACOEM House of Delegates, the Academic Occupational Medicine Section and the national OM Residency Directors group. Internationally, Dr. Delclos remains active in teaching occupational medicine residents at Universitat Pompeu Fabra in Barcelona, Spain, conducting research in Europe (sickness absence, improved detection of occupational disease) and in Latin America (national surveys of working conditions and health), and as PI/Director of the WHO Collaborating Center in Occupational Health at UTHealth SPH, assisting the Pan American Health Organization in implementation of its 2015-2020 Workers' Health Action Plan (see **Objective 2.3, below**).

Objective 2.3 Consistently take on research and policy tasks of national and international importance: Achieved and ongoing. Dr. Perkison and Dr. Carson have been active members of the ACOEM House of Delegates for over 10 years, representing Texas. The House of Delegates is a legislative body, representative of the membership of the College, which reviews and determines policy recommendations for the College. In addition, Dr. Perkison has been on the ACOEM Council on Policy Affairs since 2016, and became Council Co-Chair in 2019. Dr. Carson became a member of the Council in 2019 as well. This Council reviews current federal legislation being considered as well existing federal policies scheduled for review relating to OEH. In this capacity, Dr. Perkison has been primary author on an ACOEM guidance statement on the role of the occupational medicine and climate change (Perkison *et al.*, 2018). Dr. Perkison also served on the ACOEM Scientific Affairs Panel until 2018, coauthoring a guidance statement for regulating marijuana in the workplace in those states that recently legalized its use (Phillips *et al.*, 2015). Dr. Delclos is Director of the WHO Collaborating Centre in Occupational Health since 1993 and a Senior Scientist at the Center for Occupational Health Research at the Universitat Pompeu Fabra in Barcelona, Spain. Through these two organizations, he has led initiatives to improve the detection of occupational illness in Latin America and Spain, by participating in the development of online courses in OM for primary care physicians and in the founding of an occupational disease detection unit for hospitals in the Spanish national health system.

Goal 3. Support the recognition of OM as a fundamental medical specialty and OSH as an essential Public Health discipline.

Objective 3.1. Increase our engagement in visible community practice efforts: Achieved and ongoing. Locally, we interact frequently with the occupational health professional community through our monthly OM Journal Club (in continuous existence for over 30 years), our biweekly EOHS Research Seminar (open to the public) and by collaborating with colleagues in large annual

gatherings, such as the Houston Health Forum. In addition, as mentioned above, we have been active in responding to community needs stemming from Hurricane Harvey in 2017 and the Deer Park ITC fire in 2019.

Objective 3.2. Share in OM/OSH research and publication, incorporating both traditional and newer communication technologies of information dissemination: Achieved and ongoing. OM faculty have been active in research during the past period as evidenced by their grant submissions, funded projects, peer-reviewed publications, and through local, national and international scientific presentations and keynote lectures. More recently, the ERC has entered into a series of collaborative research activities with NIOSH, through its TWH initiative and the NIOSH Office of Research Integration, seeking to move forward NIOSH agenda on future of work and expanding paradigm for OSH. Notable examples of activity in this area are the recent award of a CDC/NIOSH U13 Conference grant (2019-2022; PI: Delclos) to develop a combination of workshops and conferences to advance the TWH agenda, and co-authorship of Dr. Delclos on a systematic literature review of the Future of Work, and a position paper on the Expanded Focus of OSH for Fall 2019.

Program Deliverables

The goal of the 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. In the project period, we have been quite successful, with 10 graduates, who immediately secured positions in corporate, clinical and large health system occupational medicine programs. During this reporting period, OM trainees and faculty have been productive. Following NIOSH requirements, we are separating publications where (a) the SWCOEH ERC grant was included in Acknowledgments, as well as (b) those with mention of our SWCOEH affiliation only.

Trainee Outputs

NIOSH Tables 1 and 2 summarize, for the past reporting period, our past and current residents, board certification status and current job status. **OM trainee outputs** include 28 presentations and one affiliated only peer-reviewed journal publication.

Faculty Outputs

OM faculty outputs include 84 presentations and 50 peer-reviewed journal publications, of which 33 included the ERC grant number and 17 were affiliation only products. More consistent acknowledgement of the ERC grant is an area for improvement. Considering **grant applications**, of the 44 proposals submitted by OM faculty, 21 received funding (\$5.9M in total costs), for a total of 47 active grants during the reporting period. The most frequent NORA sectors among active projects were Agriculture, Forestry & Fishing, Health Care and Social Assistance, and Transportation, Warehousing & Utilities. The most frequent cross-sectors were Musculoskeletal Health, Respiratory Health and Traumatic Injury Prevention.

OCCUPATIONAL AND ENVIRONMENTAL MEDICINE Trainee Outputs – Publication and Presentations

Note: Not underlined = ERC grant acknowledged; Underlined = ERC Affiliation Only.

PUBLICATIONS (*peer-reviewed journal articles*) Trainees

2020

1. **Carey P.** Revision Sistemática y Metaanálisis de Técnicas que Previenen el Dolor Lumbar, Archivos de Prevención de Riesgos Laborales 2020; 23(2):277-281.

PRESENTATIONS Trainees

2020

1. **Bayne L.** Journal Club, Workplace interventions, El Khamali R et al. Effects of a multimodal program including simulation on job strain among nurses working in intensive care units: a randomized clinical trial. JAMA 2018; 320 (19): 1988-1997. April 16, 2020.
2. **Carey P.** Journal Club, Substance abuse/preventive medicine, Welch AE, Zweig KC, Liao T et al. Alcohol and drug-related mortality among enrollees in the World Trade Center Health Registry (WTCHR), 2004 to 2012. May 21, 2020.
3. **Aghakasiri N.** Universal Access to Occupational Health - A Focus on Community Health, Emerging Issues/TxCOEM virtual conference, June 26, 2020.
4. **Carey P.** Concise Review of the Regulatory & Health Effects of Per- and Polyfluoroalkyl Substances (PFAS), Emerging Issues/TxCOEM virtual conference, June 26, 2020.
5. **Shapiro M.** The Heat-related Death of a Mail Carrier, Emerging Issues/TxCOEM virtual conference, June 26, 2020.
6. Frangos SA, Anwar N, **Aghakasiri N.** Universal Access to Occupational Health - A Focus on Community Health. *Event:* Virtual SPE (Society of Petroleum Engineers) International Conference and Exhibition on Health, Safety, Environment, and Sustainability. Organization: SPE. Place: Virtual Conference. Date: 27-31, July 2020. Type: e-Poster.

2019

7. **Mehta R.** TxCOEM Symposium, OM Residency Research Presentations, Lead Toxicity: Case Study, Saturday, May 18, 2019
8. **Mehta R.** OM - Journal Club, Occupational epidemiology/ occupational injury, Risk of Injury after evening and night work: Findings from the Danish working hours database. Scand J Work Environ Health 2018, Thursday, March 21, 2019
9. **Shapiro M.** OM - Journal Club, Professional Practice, Effects of opioid vs non-opioid medications on pain-related functions in patients with chronic back pain or hip or knee

osteoarthritis pain: the SPACE randomized clinical trial. JAMA 2018; 319 (9): 972-882., Thursday, February 21, 2019

10. **Aghakasiri N.** OM - Journal Club, Health promotion/preventive medicine, Sharma SV, Upadhyaya M, Karhade M, Baun WB, Perkison WB, Pompeii LA, Brown HS, Hoelscher DM. Are Hospital Workers Healthy?: A Study of Cardiometabolic, Behavioral, and Psychosocial Factors Associated With Obesity Among Hospital Workers. JOEM. 2016;58(12):1231-1238., Thursday, May 16, 2019

2018

11. **Agrawal V.** TxCOEM Symposium, OM Residency Research Presentations, Amine Exposure and Work-related Asthma, Saturday, May 19, 2018
12. **Agrawal V.** OM - Journal Club, Occupational epidemiology/occupational illness, Fisher JE et al. Physical activity, air pollution, and the risk of asthma and chronic obstructive pulmonary disease. Am J Respir Crit Care Med. 2016; 194 (7): 855-865., Thursday, May 17, 2018
13. **Ama I.** OM - Journal Club, Occupational epidemiology/Professional practice, Ashley-Martin J et al. Air pollution during pregnancy and cord blood immune system biomarkers. JOEM 2016; 58 (10): 979-987., Thursday, March 22, 2018

2017

14. **Macaluso Davidson A.** CMQ, TxCOEM Symposium, OM Residency Research Presentations, Harm & Health, a case series presentation of work related exposure, Saturday, May 6, 2017
15. **Macaluso Davidson A.** OM - Journal Club, Health promotion/professional practice, Dement JM, Epling C, Joyner J, Cavanaugh K. Impacts of workplace health promotion and wellness programs on health care utilization and costs: results from an academic workplace. JOEM 2015; 57 (11): 1159-1169., Thursday, February 16, 2017
16. **Blanco R.** TxCOEM Symposium, OM Residency Research Presentations, The Role of the State Public Health Department in the Preparation and Management for Super Bowl in Houston, TX, Saturday, May 6, 2017
17. **Surasi K.** OM - Journal Club, Health promotion/environmental health, Zheng Y et al. Associations of weight gain from early to middle adulthood with major health outcomes later in life. JAMA 2017; 318 (3): 255-269/, 42999, September 21, 2017
18. **Stroud D.** OM - Journal Club, Occupational respiratory disease, Aldrich TK, Vossbrinck M, Zeig-Owens R, Hall CB, Schwartz TM, Moir W et al. Lung function trajectories in World Trade Center-exposed New York City firefighters over 13 years: the roles of smoking and smoking cessation. Chest 2016; 149 (6): 1419-1427. [and accompanying editorial], Thursday, April 20, 2017
19. **Stroud D.** OM - Journal Club, Occupational epidemiology, Dembe A and Yao X. Chronic disease risks from exposure to long-hour work schedules over a 32-year period. JOEM 2016; 58 (9): 861-867., Thursday, November 16, 2017

2016

20. **Ehsanzadeh P.** ACOEM Annual Scientific Meeting, Poster Presentation, A systematic literature review of risk factors for chronic kidney disease of unknown origin CKDu), April 10-16, 2016
21. **Altman M.** Annual TxCOEM Meeting & Symposium, OM Residency Research Presentations, A Case of Mistaken Identity, Saturday, April 30, 2016
22. **Amani J.** Annual TxCOEM Meeting & Symposium, OM Residency Research Presentations, The Mysterious Case of the Chocolate Blood, Saturday, April 30, 2016
23. **Blanco R.** OM - Journal Club, Environmental health/environmental epidemiology, Geens T, Aerts E, Borguet M, Haufroid V, Godderis L. Exposure of hairdressers to aromatic diamines: an interventional study confirming the protective effect of adequate glove use. *Occ Env Med.* 2016; 73:221-228., Thursday, September 15, 2016

2015

24. **Mathew R.** Annual TxCOEM Meeting & Symposium, OM Residency Research Presentations, Red Eyes in the Lab, Friday, May 1, 2015
25. **Ehsanzadeh P.** Annual TxCOEM Meeting & Symposium, OM Residency Research Presentations, Nanosafety, Friday, May 1, 2015
26. **Ehsanzadeh P.** OM - Journal Club, Agricultural Health and Safety, McCauley L et al. Oregon indigenous farmworkers. Results of Promotor Intervention on Pesticide Knowledge and Organophosphate Metabolite Levels. *JOEM* 2013; 55: 1164-1170., Thursday, May 21, 2015
27. **Altman M.**, OM - Journal Club, Professional Practice, Slater ML. Challenges with QuantiFERON-TB Gold Assay for Large-Scale, Routine Screening of U.S. Healthcare Workers. *Am J Respir Crit Care Med.* 2013; 188: 1005-1010., Thursday, March 19, 2015
28. **Amani J.** OM - Journal Club, Occupational epidemiology/Occupational illness, Souza K et al. Individual-level and plant-level predictors of acute, traumatic occupational injuries in a manufacturing cohort. *Occ Env Med.* 2014;71(7):477-83., Thursday, January 15, 2015

OCCUPATIONAL AND ENVIRONMENTAL MEDICINE Faculty Outputs – Publication and Presentations

Note: Not underlined = ERC grant acknowledged; Underlined = ERC Affiliation Only.

PUBLICATIONS (*peer-reviewed journal articles*) Faculty

2020

1. An Han H, Han I, McCurdy S, Whitworth K, **Delclos G**, Rammah A, Symanski E. 2020. The Intercontinental Terminals Chemical Fire Study: A Rapid Response to an Industrial Disaster to Address Resident Concerns in Deer Park, Texas. *Int J Environ Res Public Health* 17(3):986. PMID: 32033278.

2. Hashemi NS, Thørrisen MM, Skogen JC, Sagvaag H, **Gimeno Ruiz de Porras D**, Aas RW. 2020. Gender Differences in the Association between Positive Drinking Attitudes and Alcohol-Related Problems. The WIRUS Study. *Int J Environ Res Public Health* 17:5949. PMID: 32824384
3. Ish J, **Gimeno Ruiz de Porras D**, Whitworth KW. 2020. Mental wellbeing among Hispanic female domestic cleaners. *Arch Public Health*. 78:10.
4. Pate W, Betancourt J, **Delclos G**, **Douphrate D**, **Gimeno Ruiz de Porras D**. 2020. Patient & employee safety culture: Measurement & agreement. *Prof Saf* 65:41-46.
5. Patel J, **Gimeno Ruiz de Porras D**, Mitchell LE, Patel RR, De Los Reyes J, **Delclos GL**. 2020. Work-Related Asthma among Certified Nurse Aides in Texas. *Workplace Health Saf.* (In Press). PMID: 32364022
6. **Perkison WB**, Li Y, Symanski E, Bakos-Block C, Zhang K, Magal R, McDaniel M, Adekanye J, Esquenazi S, Rammah A. 2020. The Post Hurricane Harvey Respiratory Protection Training Program. *J Occup Environ Med.* (In Press).
7. Rodriguez A, **Douphrate DI**, **Gimeno Ruiz de Porras D**, Perez A, Hagevoort R, Nonnenmann MW, Cienega L. 2020. Association of category of cattle exposure with tuberculosis knowledge among dairy workers in Bailey County, Texas. *J Agromedicine*:1-10. PMID: 32449645.
8. Rueda-Garrido JC, Vicente-Herrero MT, Del Campo MT, Reinoso-Barbero L, de la Hoz RE, **Delclos GL**, Kales SN, Fernandez-Montero A. 2020. Return to work guidelines for the COVID-19 pandemic. *Occup Med (Lond)* 70(5):300-305. PMID: 32476022
9. Schulte PA, Streit JMK, Sheriff F, **Delclos G**, Felknor SA, Tamers SL, Fendinger S, Grosch J, Sala R. 2020. Potential Scenarios and Hazards in the Work of the Future: A Systematic Review of the Peer-Reviewed and Gray Literatures. *Ann Work Expo Health* (In press). PMID 32719849.
10. **Su, WC**, Chen Y, Xi J. 2020. Estimation of the deposition of ultrafine 3D printing particles in human tracheobronchial airways. *J Aerosol Sci* 149:105605.

2019

11. Gerasimaviciute V, Bultmann U, Diamond PM, Tullar JM, **Delclos GL**, **Gimeno Ruiz de Porras D**, Amick III BC. 2019. Reciprocal associations between depression, anxiety and work-related injury. *Inj Prev.* (Online First). PMID 31685530
12. Benavides FG, Ramada JM, Ubalde-López M, **Delclos GL**, Serra C. 2019. A hospital occupational diseases unit: an experience to increase the recognition of occupational disease. *Medicina del Lavoro* 110(4):278-284. PMID: 31475689.
13. Benavides FG, Serra C, **Delclos GL**. 2019. What can public health do for the welfare state? Occupational health could be the answer. *J Epidemiol Community Health* 73:1141-1144. PMID 31586935.
14. Berumen-Flucker B, Rodriguez A, Cienega L, Casanova V, Pompeii L, **Gimeno Ruiz de Porras D**, **Douphrate DI**. 2019. Evaluation of safety management and leadership training

using mobile technologies among logging supervisors. J Agromedicine. 24(2):197-204. PMID: 30624154.

15. **Douphrate DI**, Fethke NB, Nonnenmann MW, Rodriguez A, **Gimeno Ruiz de Porras D**. 2019. Reliability of observational- and machine-based teat hygiene scoring methodologies. J Dairy Sci. 102(8):7494-7502. PMID: 31178196.
16. Kaipust CM, Jahnke SA, Poston WSC, Jitnarin N, Haddock CK, **Delclos GL**, Day RS. 2019. Sleep, obesity, and injury among U.S. male career firefighters. J Occup Environ Med, 61(4):e150-e154. PMID: 30789448.
17. Lai D, Arif AA, Xu H, **Delclos GL**. 2019. A comparative study of three classification procedures: asthma among healthcare professionals in Texas. Int J Clin Biostat Biom 5:021.
18. Mulla S, Hakulinen C, **Gimeno Ruiz de Porras D**, Presseau J, Jokela M, Vänskä J, Paunio T, Elovainio M. 2019. Medical Specialty Choice and Well-Being at Work: Physician's Personality as a Moderator. Arch Environ Occup Health. 74(3):115-129. PMID: 29522380.
19. Rodriguez A, Casanova V, Levin JL, **Gimeno Ruiz de Porras D**, **Douphrate DI**. 2019. Work-related musculoskeletal symptoms among loggers in the Ark-La-Tex region. J Agromedicine. 2019; 24(2):167-176. PMID: 30624156.
20. Staudt AM, Whitworth KW, Chien LC, Whitehead LW, **Gimeno Ruiz de Porras D**. 2019. Association of Organic Solvents and Occupational Noise on Hearing Loss and Tinnitus among Adults in the U.S., 1999 to 2004. Int Arch Occup Environ Health. 92:403-413. PMID: 30806784
21. **Su W-C**, Chen Y, and Xi J. 2019. A new approach to estimate ultrafine particle respiratory deposition. Inhal. Toxicol. 31(1):35-43. PMID: 30782028
22. **Su W-C**, Chen Y, Bezerra M, and Wang J. 2019 Respiratory deposition of ultrafine welding fume particles. J Occup Environ Hyg. 16:694-706 PMID: 31461396
23. Whitworth KW, Berumen B, **Delclos GL**, Fragoso S, Mata C, **Gimeno Ruiz de Porras D**. 2019. Job Hazards and Respiratory Symptoms in Hispanic Female Domestic Cleaners. Arch Occup Environ Health. 75:70-74. PMID: 31033410

2018

24. Basto-Abreu AC, Barrientos-Gutiérrez T, Zepeda-Tello R, Camacho V, **Gimeno Ruiz de Porras D**, Hernández-Ávila M. 2018. The relationship of socioeconomic status with body mass index depends on the socioeconomic measure used. Obesity. 26(1):176-184. PMID: 29152913.
25. Hernandez AM, **Gimeno Ruiz de Porras D**, Marko D, **Whitworth KW**. 2018. The Association of PM_{2.5} and Ozone with Diabetes Prevalence in the US, 2002-2008. J Occup Environ Med. 60(7):594-602. PMID 29634612
26. Sabastizagal I, Vives A, Astete J, Burgos M, **Gimeno Ruiz de Porras D**, Benavides FG. 2018. Reliability and Completion of The Working Conditions Items Included in The

CTESLAC Questionnaire: Results From The Study of Working Conditions, Safety and Health in Peru. Arch Prev Riesgos Labor. 21(4):196-202. PMID: 30372603.

27. Tarlo SM, Arif AA, **Delclos GL**, Henneberger P, Patel J. 2018. Opportunities and obstacles in translating evidence to policy in occupational asthma. *Ann Epidemiol.* 28(6):392-400. PMID: 28434545.

2017

28. Campos-Fumero A, **Delclos GL**, **Douphrate DI**, Felknor SA, Vargas-Prada S, Serra C, Coggon D, **Gimeno Ruiz de Porras D**. 2017. Low back pain among office workers in three Spanish speaking-countries: findings from the CUPID study. *Inj Prev.* 23(3):158-164. PMID: 27585564.
29. Coggon D, Ntani G, Walker-Bone K, Palmer KT, Felli VE, Harari R, Barrero LH, Felknor SA, **Gimeno D**, Cattrell A, Vargas-Prada S, Bonzini M, Solidaki E, Merisalu E, Habib RR, Sadeghian F, Masood Kadir M, Warnakulasuriya SSP, Matsudaira K, Nyantumbu B, Sim MR, Harcombe H, Cox H, Sarquis LM, Marziale MH, Harari F, Freire R, Harari N, Monroy MV, Quintana LA, Rojas M, Salazar Vega EJ, Clare Harris E, Serra C, Martinez JM, **Delclos G**, Benavides FG, Carugno M, Ferrario MM, Pesatori AC, Chatzi L, Bitsios P, Kogevinas M, Oha K, Sirk T, Sadeghian T, Peiris-John RJ, Sathiakumar N, Wickremasinghe AR, Yoshimura N, Kelsall HL, Hoe VCW, Urquhart DM, Derrett S, McBride D, Herbison P, Gray A. 2017. Epidemiological differences between localised and non-localised low back pain. *Spine.* 42(10):740-747. PMID: 27820794.
30. Conway SH, Pompeii LA, **Gimeno Ruiz de Porras D**, Follis JL, Roberts RE. 2017. The Identification of a Long Work Hours Threshold for Predicting Elevated Risks of Adverse Health Outcomes. *Am J Epidemiol.* 186(2):173-183. PMID: 28459945
31. **Gimeno Ruiz de Porras D**, Rojas Garbanzo M, Aragón A, Carmenate-Milián A, Benavides FG. 2017. Effect of informal employment on the relationship between psychosocial work risk factors and musculoskeletal pain in Central American workers. *Occup Environ Med.* 74(9):645-651. PMID: 28442543.
32. Nonnenmann MW, **Gimeno Ruiz de Porras D**, Levin J, **Douphrate DI**, Boggaram V, Schaffer J, Gallagher M, Hornick M, Reynolds S. 2017. Pulmonary function and airway inflammation among dairy parlor workers after exposure to inhalable aerosols. *Am J Ind Med.* 60(3):255-263. PMID: 28195657.
33. Ubalde-Lopez M, Arends I, Almansa J, **Delclos GL**, **Gimeno D**, Bültmann U. 2017. Beyond return to work: the effect of multimorbidity on work functioning trajectories after sick leave due to common mental disorders. *J Occup Rehab.* 27(2):210-217. PMID: 27250634.
34. Ubalde-Lopez M, **Delclos GL**, Benavides FG, Calvo-Bonacho E, **Gimeno D**. 2017. The effect of multimorbidity on sickness absence by specific diagnoses. *Occup Med (Lond).* 67(2):93-100. PMID: 27496547.
35. Pinion C, Brewer S, **Douphrate D**, **Whitehead L**, DeliFraine J, Taylor W, Klyza J. 2017. The impact of job control on employee perception of management commitment to safety. *Saf Sci.* 93:70-75.

2016

36. Campos-Fumero A, **Delclos GL, Douphrate DI**, Felknor SA, Vargas-Prada S, Serra C, Coggon D, **Gimeno Ruiz de Porras D**. 2016. Upper extremity musculoskeletal pain among office workers in three Spanish speaking-countries: findings from the CUPID study. *Occup Environ Med*. 73:394-400. PMID: 26972870.
37. Conway S, Pompeii L, Roberts R, Follis J, **Gimeno D**. 2016. Dose-Response Relation between Work Hours and Cardiovascular Disease Risk: Findings from the Panel Study of Income Dynamics. *J Occup Environ Med*. 58(3):221-226. PMID: 26949870
38. Conway SH, Cayuela A, **Delclos GL**, Pompeii LA, Ronda E. 2016. Association between long work hours and poor self-reported general health among Latin American immigrant and native workers in the United States and Spain. *Am J Ind Med* 59(12):1105-1111. PMID: 27424568.
39. Conway SH, Pompeii LA, Roberts RE, **Gimeno D**, Follis JL. 2016. Response to Letter to the Editor. *J Occup Environ Med* 58(8):e319 PMID: 27501002
40. Lim H, Beasley CW, **Whitehead LW, Emery RJ**, Agopian AJ, Langlois PH, Waller KD. 2016. Maternal exposure to radiographic exams and major structural birth defects. *Birth Defects Res A Clin Mol Teratol* 106:563-572. PMID: 27001904
41. Liu S, Ganduglia C, Li X, **Delclos G**, Franzini L, Ph.D; Zhang K. 2016. Fine particulate matter components and emergency department visits among a privately insured population in Greater Houston. *Sci Total Environ* 566-567:521-527. PMID: 27235902
42. Sarquis LMM, Coggon D, Ntani G, Walker-Bone K, Palmer KT, Felli VE, Harari R, Barrero LH, Felknor SA, **Gimeno D**, Cattrell A, Vargas-Prada S, Bonzini M, Solidaki E, Merisalu E, Habib RR, Sadeghian F, Masood Kadir M, Warnakulasuriya SSP, Matsudaira K, Nyantumbu B, Sim MR, Harcombe H, Cox H, Sarquis LM, Marziale MH, Harari F, Freire R, Harari N, Monroy MV, Quintana LA, Rojas M, Salazar Vega EJ, Clare Harris E, Serra C, Martinez JM, **Delclos G**, Benavides FG, Carugno M, Ferrario MM, Pesatori AC, Chatzi L, Bitsios P, Kogevinas M, Oha K, Sirk T, Sadeghian T, Peiris-John RJ, Sathiakumar N, Wickremasinghe AR, Yoshimura N, Kelsall HL, Hoe VCW, Urquhart DM, Derrett S, McBride D, Herbison P, Gray A. 2016. Classification of neck/shoulder pain in epidemiological research: a comparison of risk factors, disability and prognosis among 12,195 workers from 18 countries. *Pain*. 157(5):1028-1036. PMID: 26761390.
43. Socias C, Liang Y, **Delclos G**, Graves J, Hendrikson E, Cooper S. 2016. The feasibility of using electronic health records (EHR) to describe demographic and clinical indicators of migrant and seasonal farmworkers. *J Agromedicine* 21(1):71-81. PMID: 26479964.
44. Ubalde-López M, **Delclos GL**, Calvo-Bonacho E, Benavides FG, **Gimeno D**. 2016. Measuring multimorbidity in a working population: the effect on incident sickness absence. *Int Arch Environ Occup Health*. 89(4):667-678. PMID: 26615549.
45. Vargas-Prada S, Coggon D, Ntani G, Walker-Bone K, Palmer KT, Felli VE, Harari R, Barrero LH, Felknor SA, **Gimeno D**, Cattrell A, Bonzini M, Solidaki E, Merisalu E, Habib RR, Sadeghian F, Masood Kadir M, Warnakulasuriya SSP, Matsudaira K, Nyantumbu B, Sim MR, Harcombe H, Cox H, Sarquis LM, Marziale MH, Harari F, Freire R, Harari N, Monroy MV, Quintana LA, Rojas M, Clare Harris E, Serra C, Martinez JM, **Delclos G**,

Benavides FG, Carugno M, Ferrario MM, Pesatori AC, Chatzi L, Bitsios P, Kogevinas M, Oha K, Sathiakumar N, Wickremasinghe AR, Yoshimura N, Kelsall HL, Hoe VCW, Urquhart DM, Derrett S, McBride D, Herbison P, Gray A, Salazar Vega EJ. 2016. Descriptive epidemiology of somatising tendency: findings from the CUPID study. *PLoS One*. 11(4):e0153748. PMID: 27128094.

46. Douphrate DI, Nonnenmann MW, Hagevoort R, **Gimeno Ruiz de Porras D**. 2016. Work-related musculoskeletal symptoms and job factors among large-herd dairy milkers. *J Agromedicine*. 21(3): 224-233. PMID: 27092590.
47. Pompeii L, Byrd A, **Delclos GL**, and Conway SH. 2016. The American Association of Occupational Health Nurses' Respiratory Protection Education Program and Resources Webkit for Occupational Health Professionals. *Workplace Health Saf* 64(12): 564-572. PMID: 27758935.

2015

48. **Emery RJ**, Rios J, Patlovich SJ. 2015. Thinking Outside the Box: Biosafety's Role in Protecting Non-Laboratory Workers from Exposure to Infectious Disease. *Appl Biosaf*. 20(3):128-129. PMID 28966562.
49. Lim H, Agopian AJ, **Whitehead LW**, Beasley CW, Langlois PH, **Emery RJ**, Waller DK, National Birth Defects Preventions Study. 2015. Maternal occupational exposure to ionizing radiation and selected birth defects in the US. *Birth Defects Res A Clin Mol Teratol* 103:243-254. PMID: 25820072
50. Torá-Rocamora I, Martínez JM, **Gimeno D**, Alberti C, Jardí J, Manzanera R, Benavides FG, **Delclos GL**. 2015. Assessment of the magnitude of geographical variations in the duration of non-work-related sickness absence by individual and contextual factors. *Gac Sanit*. 29(3):164-171. PMID: 25638744.

PRESENTATIONS

Faculty

2019

1. Figueroa-Solis E, **Delclos GL**, **Gimeno Ruiz de Porras D**. Pilot Test of the DEGREE Protocol, CKDu Module, and Point-of-care Device Measurements in Outdoor Hispanic Workers. Conference: Third International Workshop on Chronic Kidney Diseases of Uncertain/Non-Traditional Etiology in Mesoamerica and Other Regions. Organization: The National Institute of Diabetes & Digestive & Kidney Diseases (NIDDK) and CENCAM – Consortium for the Epidemic of Nephropathy in Central America and Mexico. Place: San José, Costa Rica. Date: 20-22 March 2019. Type: Poster. Available at: https://www.niehs.nih.gov/news/events/pastmtg/2019/ckd_2019/index.cfm.
2. **Gimeno Ruiz de Porras D**, **Delclos GL**, Figueroa-Solis E, Rojas M. Self-reported CKDu and associated risk factors in Central America. Preliminary results from the Second Central American Survey of Working Conditions and Health. Conference: Third International Workshop on Chronic Kidney Diseases of Uncertain/Non-Traditional Etiology in Mesoamerica and Other Regions. Organization: The National Institute of Diabetes & Digestive & Kidney Diseases (NIDDK) and CENCAM – Consortium for the

Epidemic of Nephropathy in Central America and Mexico. Place: San José, Costa Rica.
Date: 20-22 March 2019. Type: Poster. Available at:
https://www.niehs.nih.gov/news/events/pastmtg/2019/ckd_2019/index.cfm.

3. **Douphrate D**, Rodriguez A. Logging machine operators health and safety training. Western Ag Safety and Health Conference: Cultivating Collaborations, Seattle, WA, August 7-9, 2019.
4. **Douphrate D**, Rabinowitz P, Nonnenmann M, Fowler H Hagevoort R, Austin E. Animal agriculture and the One Health approach. Western Ag Safety and Health Conference: Cultivating Collaborations, Seattle, WA, August 7-9, 2019. (panel organizer and moderator)
5. Chen Y, **Su WC**, Bezerra M, Wang J. Application of the Mobile Aerosol Lung Deposition Apparatus (MALDA) on Estimation of Ultrafine Welding Fume Respiratory Deposition, *37th Annual AAAR Conference, Portland, Oregon, 2019*.
6. **Delclos GL**. The expanded focus for occupational safety and health (OSH): implications for research and training of OSH professionals." The Future of Work and Expanded Focus for Occupational Safety and Health. Expanding Research Partnerships Webinar. CDC\NIOSH. September 18, 2019.
7. **Delclos GL**. Panel member. Expanded focus for Occupational Safety and Health. NIOSH Center Directors Meeting. University of Cincinnati. Cincinnati, Ohio. August 20, 2019.
8. **Delclos GL**. Condiciones de trabajo, empleo y salud en América Latina: el uso de una herramienta costo-efectiva para su análisis. [Working conditions, employment and health in Latin America: a cost-effective tool for analysis] Foro de Investigación de la Red de Posgrados en Salud en el Trabajo. Unidad Politécnica para el Desarrollo y la Competitividad Empresarial. Mexico City, Mexico. June 27, 2019.
9. **Delclos GL**. Un canvi paradigmatic en l'enfocament de la salut laboral: el bienestar total del treballador. [A paradigmatic change in the focus of occupational health: total worker well-being]. Recordem al Dr. Francesc Arró i Triay: passat, present i future de la Medicina del Treball. Barcelona Official Medical Society. May 23, 2019.
10. **Su WC**. A Novel Approach for Investigating the Respiratory Deposition of Welding Fumes, American Industrial Hygiene Conference and Expo, Minneapolis, Minnesota, 2019.

2018

11. Sagiraju HKR, Chien LC, Jatoi I, Valerio MA, **Gimeno D**. Effects of demographics, immigration related factors and cancer screening on female breast cancer mortality rates in United States. Conference: 146th Annual Meeting and Expo of the American Public Health Association (APHA): Creating the Healthiest Nation: Health Equity Now. Organization: APHA. Place: San Diego, CA, MD. Date: 10-14 November 2018. Type: Oral communication.
12. Figueroa-Solis E, **Delclos GL**, **Gimeno Ruiz de Porras D**. Pilot test of the DEGREE protocol, CKDu module, and point-of-care device measurements in outdoor Hispanic

workers. Conference: Chronic Kidney Diseases in Agricultural Communities Conference. Organization: The National Institute of Diabetes & Digestive & Kidney Diseases (NIDDK). Place: Bethesda, MD. Date: 25-26 June 2018. Type: Poster.

13. Mullola S, Hakulinen C, **Gimeno Ruiz de Porras D**, Presseau J, Jokela M, Vänskä J, Paunio T, Elovainio M. Physician's Personality Moderates the Association Between Medical Specialty and Well-Being at Work. American Educational Research Association (AERA) 2018 Annual Meeting: The Dreams, Possibilities, and Necessity of Public Education. Organization: AERA. Place: New York, NY. Date: 13-17 April 2018. Type: Oral communication.
14. **Douphrate D**. Sustainable forestry management: the role of worker health and safety. Invited keynote presentation. Arkansas Timber Producer Association Annual Meeting, Hot Springs, AR, August 24-25, 2018.
15. **Douphrate D**, Hagevoort R, Murphy D, Naerebout R, Rodriguez A. Addressing key safety and health issues on the dairy. Invited panel organizer and moderator. Raising Safety: North American Agricultural Safety Summit, Scottsdale, AZ, February 21-23, 2018.
16. **Douphrate D**. Dairy parlor ergonomics Raising Safety: North American Agricultural Safety Summit, Scottsdale, AZ, February 21-23, 2018.
17. **Su WC**, Chen Y. Ultrafine Particle Respiratory Deposition Measurement, American Industrial Hygiene Conference and Expo, Philadelphia, Pennsylvania, 2018
18. **Su WC**, Chen Y. A Novel Approach for Investigating Workplace Ultrafine Particles Respiratory Deposition, 10th International Aerosol Conference, St. Louis, Missouri, 2018.
19. Chen Y, **Su WC**. Investigation of the Feasibility of Workplace On-Site Ultrafine Particle Respiratory Deposition Measurement, 10th International Aerosol Conference, St. Louis, Missouri, 2018.
20. Lewis R, **Whitehead LW**. Current and Future pressures on academic IH programs. Amer. Ind. Hyg. Conf. & Expo., Philadelphia PA, May, 2018.

2017

21. Casanova V, Caldwell E, **Gimeno D**. Examining Worksite Participation in a Community-Wide Wellness Initiative. Conference: Seventh International Conference on Health, Wellness & Society. Organization: Health, Wellness & Society Research Network. Place: Denver, CO. Date: 5-6 October 2017. Type: Article Submission. Available at: The International Journal of Health, Wellness, and Society 2017; 7.
22. Rojas Garbanzo M, Benavides FG, Aragón A, Carmenate Milián L, **Gimeno Ruiz de Porras D**. Asociación entre Factores de Riesgo Psicosocial y Dolor Musculoesquelético en Trabajadores Informales y Formales en Centroamérica. Conference: XXXV Reunión Científica de la Sociedad Española de Epidemiología (SEE) y XXI Congresso da Associação Portuguesa de Epidemiologia (APE). Organization: SEE and APE. Place: Barcelona, Spain. Date: 6-8 September 2017. Type: Poster.

23. Sagiraju HKR, Jatoi I, Valerio M, Chien LC, **Gimeno D**. Effects of county-level attributes on geographic variation in female breast cancer mortality rates across counties in United States. Conference: 2017 ASCO (American Society of Clinical Oncology) Annual Meeting: Making a Difference in Cancer Care WITH YOU Organization: ASCO. Place: Chicago, IL. Date: 2-6 June 2017. Type: Publication-only abstract. Available at: J Clin Oncol 2017; 35(suppl; abstr e13093).
24. Patel J, **Gimeno D**, **Delclos GL**. Constructing and Updating a Job-Exposure Matrix (JEM) for use with a Statewide Survey of Asthma in Texas Healthcare Professionals (HCPs). Conference: The University of Texas Health Science Center at Houston Research Day. Organization: The University of Texas Health Science Center at Houston. Place: Houston, TX (USA). Date: 6 April 2017. Type: Poster.
25. Rodriguez A, **Doupbrate DI**, **Gimeno Ruiz de Porras D**. The association of worksite ergonomic and safety risk factors with work-related musculoskeletal health outcomes among logging machine operators in the Texas, Louisiana and Arkansas region. Conference: The University of Texas Health Science Center at Houston Research Day. Organization: The University of Texas Health Science Center at Houston. Place: Houston, TX (USA). Date: 6 April 2017. Type: Poster.
26. **Doupbrate D**. Dairy worker safety: issues, research and solutions. United Dairymen of Idaho Annual Meeting, Boise, ID, November 8-9, 2017
27. **Doupbrate D**. Worker safety and performance: past, current and future research and outreach efforts. Idaho Milk Processors Annual Convention, Sun Valley, ID, August 9-10, 2017
28. Hagevoort R, **Doupbrate D**, Naerebout B, Brose, White J. Challenges surrounding training the next generation in dairy. Panel Discussion. Western Dairy Management Conference, Reno, NV, February 28 - March 2, 2017.
29. **Su WC**, Chen Y. Workplace Ultrafine Particle Respiratory Deposition Measurement, 36th Annual AAAR Conference, Raleigh, North Carolina, 2017.
30. Chen Y, **Su WC**. Deposition of Ultrafine Particles in Human Airway, 36th Annual AAAR Conference, Raleigh, North Carolina, 2017
31. **Delclos GL**. Patología Profesional del Aparato Respiratorio. Maestría en Medicina del Trabajo y Salud Ocupacional. Universidad Mayor, Real y Pontificia San Francisco Xavier de Chuquisaca. Santa Cruz, Bolivia. 30-hour course. May 22-27, 2017
32. **Delclos GL**. Surveys of working conditions and health: uses and limitations. Houston Texas Association of Occupational Health Nurses meeting. Houston, Texas. May 9, 2017.
33. **Delclos GL**. Asthma in healthcare professionals. NIOSH State-based Surveillance for Occupational Lung Disease meeting. Austin, Texas. April 25, 2017.

34. **Delclos GL**. Diagnosis of tuberculosis and newer tests of exposure. Awareness and prevention of tuberculosis disease. A webinar series designated for ExxonMobil. Presented by the Biosafety and Infectious Disease Training Initiative, a NIEHS Worker Training Program. March 2, 2017

2016

35. Sagiraju HKR, Chien LC, Valerio M, Jatoi I, **Gimeno D**. Geographic variation in the female breast cancer mortality rates across counties in United States. Conference: 2016 San Antonio Breast Cancer Symposium. Organization: The Cancer Therapy & Research Center (CTRC) at UT Health Science Center San Antonio and the American Association for Cancer Research (AACR). Place: San Antonio, TX, USA. Date: 6-10 December 2016. Type: Poster.
36. Ubalde-Lopez M, **Delclos GL**, Benavides FG, **Gimeno D**. Multimorbidity matters: The effect on specific sickness absence diagnosis-groups. Conference: 9th European Public Health Conference: All for Health – Health for All. Organization: European Public Health Association (EPHA) and the Österreichische Gesellschaft für Public Health. Place: Viena, Austria. Date: 9-12 November 2016. Type: Oral communication. Available at: Eur J of Public Health 2016;26 (suppl 1): cku167.086.
37. Boot C, Young A, Viikari-Juntura E, Chan C, **Gimeno Ruiz de Porras D**, Linton S. Workplace outcomes in stay at work and return to work research. Conference: 4th WDPI [Work Disability Prevention & Integration] conference: work disability prevention knowledge. Organization: VU University Medical Center (VUmc) Academy. Place: Amsterdam, The Netherlands. Date: 25-28 September 2016. Type: Oral communication.
38. Ubalde-Lopez M, Arends I, Almansa J, **Delclos GL**, **Gimeno D**, Bültmann U. Multimorbilidad y capacidad funcional después de una incapacidad temporal por trastorno mental [Multimorbidity and functional capacity after a sick leave due to a mental disorder]. Conference: XXXIV Reunión Científica de la Sociedad Española de Epidemiología (SEE) y XI Congresso da Associação Portuguesa de Epidemiologia (APE): Epidemiología para la salud en todas las políticas. Organization: SEE and APE. Place: Sevilla, Spain. Date: 14-16 September 2016. Type: Oral communication.
39. Campos-Fumero A, **Delclos GL**, **Douphrate DI**, Felknor SA, Vargas-Prada S, Serra C, **Gimeno D**. Low back pain among office workers in Costa Rica, Nicaragua and Spain. Conference: 25th EPICOH Conference: Occupational Health, Think Globally, Act Locally. Organization: Scientific Committee on Epidemiology in Occupational Health. Place: Barcelona, Catalonia (Spain). Date: September 4-7, 2016. Type: Oral communication.
40. Conway S, Pompeii L, Roberts R, Follis J, **Gimeno D**. Evidence of a Dose-Response Relationship between Work Hours and Cardiovascular Disease Risk. Conference: 25th EPICOH Conference: Occupational Health, Think Globally, Act Locally. Organization: Scientific Committee on Epidemiology in Occupational Health. Place: Barcelona, Catalonia (Spain). Date: September 4-7, 2016. Type: Oral communication.

41. Rojas Garzanzo M, Benavides FG, **Gimeno D**. Psychosocial risk exposure and musculoskeletal pain among formal and informal workers in Central America. Conference: 25th EPICOH Conference: Occupational Health, Think Globally, Act Locally. Organization: Scientific Committee on Epidemiology in Occupational Health. Place: Barcelona, Catalonia (Spain). Date: September 4-7, 2016. Type: Poster.
42. Ubalde-Lopez M, Arends I, Almansa J, **Delclos G, Gimeno D**, Bültmann U. Work functioning after sick leave due to common mental disorders: the effect of multimorbidity. Conference: 25th EPICOH Conference: Occupational Health, Think Globally, Act Locally. Organization: Scientific Committee on Epidemiology in Occupational Health. Place: Barcelona, Catalonia (Spain). Date: September 4-7, 2016. Type: Oral Communication.
43. Campos-Fumero A, **Gimeno D, Douphrate DI**, Felknor SA, Vargas-Prada S, Serra C, **Delclos GL**. Upper extremity musculoskeletal pain among office employees in Costa Rica, Nicaragua and Spain. Conference: PREMUS 2016 - The 9th International Scientific Conference on the Prevention of Work-Related Musculoskeletal Disorders. Organization: Musculoskeletal Disorders Scientific Committee of the International Commission of Occupational Health (ICOH). Place: Toronto, ON, Canada. Date: June 20-23, 2016. Type: Poster.
44. Merino-Salazar P, Benavides FG, **Gimeno D** on behalf of the Network of Experts on Working Conditions, Employment and Health Surveys. Core questionnaire and methodological criteria for Working, Employment and Health Conditions Surveys in Latin America and the Caribbean. Conference: Second International Conference on Survey Methods in Multinational, Multiregional and Multicultural Contexts (3MC 2016). Organization: International Workshop on Comparative Survey Design and Implementation (CSDI). Place: Chicago, IL, USA. Date: May 25-29, 2016. Type: Oral communication.
45. Whitehead L, Tucker D, **Gimeno D**, Whitworth K, Betancourt J, Leonard S, Zhang A, Senchak A. Descriptive Evaluation of Noise Dosimetry Values in the Defense Occupational and Environmental Health Readiness System — Industrial Hygiene Component (DOEHRS-IH). Conference: 2016 American Industrial Hygiene Conference & Exposition (AIHce). Organization: American Industrial Hygiene Association. Place: Baltimore, MD, USA. Date: May 21-26, 2016. Type: Oral communication. Available at: <http://www.aihce2016.org>.
46. **Gimeno D**, Betancourt J, Tucker D, Whitworth KW, Gorrell N, Hammill T, Senchak A, Packer M. Epidemiology of Hearing Impairment and Injuries in the U.S. Militar. Conference: 2014 American Industrial Hygiene Conference & Exposition (AIHce). Organization: American Industrial Hygiene Association. Place: Baltimore, MD, USA. Date: May 21-26, 2016. Type: Oral communication. Available at: <http://www.aihce2016.org>.
47. Sagiraju HKR, Betancourt JA, Whitworth KW, Hammill TL, Packer MD, **Gimeno D**. The Department of Defense Epidemiologic and Economic Burden of Hearing Loss Study (DEEBoHLS): Incidence of Hearing Loss among active duty members in United States

military. Conference: 5th Graduate School Faculty Development and Research Symposium - In Sickness and In Health: Collaborating to Improve Readiness and Health Outcomes. Organization: Army Medical Department Center and School (AMEDDC&S) U.S. Army Health Readiness Center of Excellence (HRCoE). Place: San Antonio, TX, USA. Date: April 20-21, 2016. Type: Poster.

48. Patel J, **Gimeno D, Delclos GL**. Constructing and Updating a Job-Exposure Matrix (JEM) for use with a Statewide Survey of Asthma in Texas Healthcare Professionals (HCPs). Conference: The University of Texas Health Science Center at Houston School of Public Health Research Day. Organization: The University of Texas Health Science Center at Houston. Place: Houston, TX (USA). Date: 06 April 2016. Type: Poster.
49. Patel J, **Delclos GL, Gimeno D**. Work-Related Asthma among Nurse Aides in Texas – A Pilot Study. Conference: The University of Texas Health Science Center at Houston Research Day. Organization: The University of Texas Health Science Center at Houston. Place: Houston, TX (USA). Date: 31 March 2016. Type: Poster.
50. **Doupbrate D**. Dairy safety management: current situation, challenges, and solutions. Invited Presenter. Washington State Dairy Safety Conference. Ellensburg, WA, November 7-8, 2016.
51. **Doupbrate D**. Safety Training Effectiveness Evaluation-The What, When, Why, Where & How. Invited presenter. Occupational Safety and Health Administration (OSHA) Susan Harwood Trainer Exchange. Washington, D.C. October 18-19, 2016.
52. **Doupbrate D**, Hagevoort R, Rodriguez A, Pompeii L. Delivery of safety training to U.S. dairy workers using novel mobile technologies. Nordic Meeting of Agricultural Occupational Health and Safety, Billund, Denmark, August 24-26, 2016.
53. Hagevoort R, **Doupbrate D**, Garcia Buitrago A, Rodriguez A. Delivery of animal handling training to U.S. workers using novel mobile technologies. Nordic Meeting on Agricultural Occupational Health & Safety, Billund, Denmark, August 24-26, 2016.
54. **Doupbrate D**. Full-shift and task-specific ergonomic exposure assessment of posture and muscle activity among dairy parlor workers in U.S. large herd operations. Ninth International Conference on Prevention of Work-Related Musculoskeletal Disorders (PREMUS), Toronto, Canada, June 20-23, 2016.
55. **Doupbrate D. Dairy worker health and safety. Invited** Presenter. Washington Department of Safety and Health Technical Symposium, Wenatchee, WA, May 25-26, 2016.
56. **Doupbrate D**. Safety training on dairy farms. Invited Presenter. Washington Department of Safety and Health Technical Symposium, Wenatchee, WA, May 25-26, 2016.
57. **Doupbrate D**. Dairy worker health and safety: current situation, research challenges and lessons learned. 1st Annual Occupational Health and Safety Research Conference. Keynote presenter. University of Iowa, Iowa City, IA, April 1, 2016.
58. Hagevoort R and **Doupbrate D**. Dairy safety management. Western States Dairy

Producers Trade Association Annual Meeting. Las Vegas, NV, March 30, 2016.

59. **Douphrate D.** On-farm risk management and safety on dairy farms: Regulatory requirements and planning. High Plains Dairy Conference, Lubbock, TX, March 1-2, 2016
60. **Douphrate D.** Worker health and safety on U.S. dairies. Invited lecture to the Governor's Agricultural Safety Day. Wenatchee, WA, February 24, 2016.
61. **Su WC**, Cheng YS, Chen TH. Deposition of Multi-Walled Carbon Nanotube (MWCNT) Aerosols in Human Nasal, Oral, and Lung Airways, 35th Annual AAAR Conference, Portland, Oregon, 2016
62. **Delclos GL.** Condiciones de trabajo, empleo y salud en América Latina: el uso de una herramienta costo-efectiva para su análisis. [Working conditions, employment and health in Latin America: a cost-effective tool for analysis. XVI Congreso ORP. Cartagena de Indias, Colombia. October 5-7, 2016
63. **Delclos GL.** A worldwide perspective on working conditions and health. [Keynote address]. 25th International Epidemiology in Occupational Health (EPICOH) Conference, Barcelona, Spain, September 4-7, 2016.
64. Hardos, JE, **Whitehead LW**, Han I, D.K. Ott, K Waller (2016) Depression Prevalence and Exposure to Organophosphate Esters in Aircraft Maintainers. Aerospace Medicine Association annual conference. April 24-28, 2016, Atlantic City.
65. **Emery RJ**, Patlovich SJ, Rios J. Combined presentation: Global Health Security, Infection Prevention and Biosafety, and Educational Opportunities of Biosafety and Infection Disease Training Initiative, Association for Professionals in Infection Control and Epidemiology (APIC) Houston Chapter Meeting, March 17, 2016,.
66. Le AB, Rios J, **Emery RJ**, Biddinger PD, Patlovich SJ, Wright B, Beam E, Gibbs SG, Lowe JJ, Abstract 368327: Biosafety and Infectious Disease Training Initiative (BIDTI), A National Institute of Environmental Health Sciences (NIEHS) Worker Training Program (WTP), including Emergency Health Services. 144th American Public Health Association (APHA) Annual Meeting, October 29- November 2, 2016 at Denver, CO. Session 0.0: Disaster Preparedness – 3, Monday, October 31: 2:30PM-3:30PM.

2015

67. **Gimeno D**, Betancourt JA, Tucker DL, Cooper SP, Alamgir AH, Whitworth KW, Gorrell NS, **Delclos GL**, Hammill TL, Senchak AJ, Packer MD. The Epidemiology of Hearing Injuries, Noise Exposures and Hearing Loss in the Military. Conference: The 2015 AMSUS Annual Continuing Education Meeting: Federal Health 2015 – The New Normal. Organization: Association of Military Surgeons of the United States (AMSUS). Place: San Antonio, TX, USA. Date: December 1, 2015. Type: Oral communication.
68. Kulakova OV, Sánchez Hernández MO, **Gimeno Ruiz de Porras D.** Impact of Psychosocial Work Factors on the Mental Health of Workers in Central America. Conference: 8th International and 13th National Congress of Clinical Psychology.

Organization: AEPC - Spanish Association of Behavioral Psychology. Place: Granada, Spain. Date: November 19-22, 2015. Type: Oral communication. Available at: www.aepc.es/psclinica_web/LIBRORESUMENES_2015.pdf.

69. **Gimeno D**, Betancourt JA, Tucker DL, Cooper SP, Alamgir H, Whitworth KW, Gorrell NS, **Declos GL**, Hammill TL, Senchak AJ, Packer MD, Sagiraju H, Turner CA. Hearing Impairment and Noise-Induced Hearing Injury in the United States Military. Conference: 143rd Annual Meeting and Exposition of the American Public Health Association (APHA): Health in All Policies. Organization: APHA. Place: Chicago, IL, USA. Date: October 31-Nov 4, 2015. Type: Poster.
70. **Gimeno D**, Betancourt JA, Tucker DL, Cooper SP, Alamgir AH, Whitworth KW, Gorrell NS, **Declos GL**, Hammill TL, Senchak AJ, Packer MD. Hearing Injuries, Noise Exposures and Burden of Hearing Loss in the Military. Conference: 2015 Military Health System Research Symposium (MHSRS). Organization: Department of Defense. Place: Fort Lauderdale, FL, USA. Date: August 17-20, 2015. Type: Poster.
71. **Douphrate D**. Acute agricultural injuries. Texas Rural Health Association, Agromedicine Workshop, Fort Worth, TX, October 29-30, 2015.
72. **Douphrate D**. Musculoskeletal diseases and ergonomics in agriculture. Texas Rural Health Association, Agromedicine Workshop, Fort Worth, TX, October 29-30, 2015
73. **Douphrate D**. Safety performance on dairy farms. Invited lecture to the World Dairy Expo. Madison, WI, October 1-2, 2015
74. **Douphrate D**. Safety performance on dairy farms. Invited lecture to delegations from Pakistan and China, University of Wisconsin at River Falls, WI, September 27-28, 2015
75. **Douphrate D**, Reynolds S. Worker health and safety on dairy farms: a report of development of an effective research and outreach stakeholder network. Invited lecture to the Western States Occupational Network (WestON), Denver, CO, September 17-18, 2015
76. **Douphrate D**. Interventions to reduce exposure to physical risk factors for musculoskeletal disorders among dairy parlor workers. American Industrial Hygiene Conference and Exposition (AIHce). Salt Lake City, UT, May 30-June 4, 2015.
77. **Douphrate D**. Safety performance on dairy farms. Invited lecture to the Western Dairy Management Conference, Reno, NV, March 3-5, 2015.
78. **Douphrate D**. Safety training using mobile learning technologies on large herd dairy operations. OSHA Susan Harwood Trainer Exchange Conference, Washington, DC, February 18-19, 2015
79. **Su WC**, Cheng YS. Deposition of Graphene Aerosols in Human Airways, American Industrial Hygiene Conference and Expo, Salt Lake City, Utah, 2015.

80. **Delclos GL.** Work-related asthma in the healthcare professions. 2015 American Academy of Allergy, Asthma and Immunology. Houston, Texas. February 20-24, 2015.
81. **Delclos GL.** Working conditions and health in Latin America. Impact Conference 2015: Connecting Houston to the World through Global Health. Houston Global Health Collaborative. Rice University, Houston, TX. March 22, 2015.
82. **Delclos GL.** Empresa, ética y salud laboral [Company, ethics and occupational health]. Simposio ORP. Bogotá, Colombia. August 18-19, 2015.
83. **Delclos GL.** Los principios de la bioética aplicados a la salud ocupacional y a la prevención [The application of bioethical principles to occupational health and prevention]. XV Congreso ORP. Santiago, Chile. November 23-25, 2015.
84. **Delclos GL** "Directions and challenges for future disability and disability management research". Munterdam Symposium: Back to the Future. Dutch Research Centre for Insurance Medicine. Amsterdam, Netherlands. December 17, 2015.

**Academic Training Program in
Occupational Epidemiology**

**Southwest Center for Occupational
and Environmental Health
UTHealth Education and Research Center**

**Close Out Report
(July 2015 – June 2020)**

**David Gimeno, PhD
Program Director
(07/01/2015-present)**

Occupational Epidemiology Program Final Progress Report (July 2015 to June 2020)

Background

This is the Final Progress Report of the academic training program in Occupational Epidemiology (OE) in the Southwest Center for Occupational and Environmental Health (SWCOEH), the NIOSH Education and Research Center (ERC) at The University of Texas Health Science Center at Houston (UTHealth) School of Public Health. As an affiliate of the NIOSH *Total Worker Health*® program, the SWCOEH embraces the TWH paradigm, a holistic, systems-thinking approach, integrating personal, socioeconomic, and environmental factors to focus on worker well-being, shifting beyond the traditional prevention of workplace illness, injury or health promotion. As background, Dr. Sharon Cooper originated the OE program in the 1999 SWCOEH ERC application, receiving funding for five years. A competing renewal was successfully funded for a second 5-year period (2005-2009). Subsequently, Dr. Cooper left UTHealth SPH to serve as the department chair of the Epidemiology and Biostatistics Department at Texas A&M School of Public Health. Drs. Scott Lillibridge, George Delclos, and Benjamin Amick served, sequentially, as directors of the OE program until Dr. Cooper reassumed the role upon her return to UTHealth SPH in summer 2007 as the Dean of the UTHealth SPH San Antonio Campus (SAC). Dr. Cooper then directed the OE program through its third renewal (2011-2014). Dr. David Gimeno, also at SAC and previous 5-year director of the Pilot Projects Research Training Program (PPRTP), assumed the OE Program directorship upon Dr. Cooper's phased retirement in 2014. Dr. Cooper continued to support the ERC with Dr. Elaine Symanski, the ERC Director, through fall 2017. Dr. Gimeno was proposed as the new Director of the ERC to start on the funding cycle (07/01/2020) but assumed the role on 01/01/2020 when Dr. Symanski left UTHealth SPH. Dr. Gimeno will continue leading the OE program. Once post-COVID conditions allow for re-starting faculty searches, we will look for a suitable faculty to take over the role of the Occupational Epidemiology director.

Two recent circumstances are to be highlighted. First, in October 2019 we submitted our 5-year competing renewal for 2020-2025. The Summary Statement received on March 2020 noted that the weaknesses listed were mostly minor, and that our application's strengths largely outweighed its weaknesses. All our programs were recommended for funding, and in June 2020, we submitted the required Just-In-Time documentation. We are waiting for the official Notice of Grant Award. Second, in response to the pandemic of COVID-19, the infectious disease caused by a novel coronavirus (SARS-CoV-2), changes in the normal SWCOEH operations were implemented so that classes, interdisciplinary activities, in-person CE became interactive virtual events, and travel was restricted. Also, several scientific meetings which our trainees had planned to attend, were either cancelled or moved to virtual events. Throughout these challenging times, we have strived to maintain our mission to promote and improve health, safety, and well-being in the workplace and the community, with a particular focus on the impact of COVID-19.

Program Goals

The goal of this program is to **provide doctoral-level training for a research-focused career in the multidisciplinary field of OE**. Our intent is to prepare trainees for competitive careers in academia, industry, government, or non-profit organizations, where the need for skilled researchers and practitioners is great. Through the OE doctoral program, trainees acquire an understanding of the principles of epidemiology and occupational health, and integrate these principles within the TWH framework; experience interdisciplinary teamwork through coursework and research projects; plan, conduct, manage and report epidemiologic studies to position themselves as future independent investigators; and obtain teaching experience. The OE program is structured and aligns with the goals of the UTHealth SPH's PhD in Epidemiology program. The OE goals and objectives include:

Goal 1. Provide doctoral level training in OE to prepare trainees for a career in research and leadership.

Objective 1.1. Provide a multi-disciplinary doctoral curriculum composed of courses in epidemiology, biostatistics, and occupational health to address OE competencies.

Objective 1.2. Extend OE traineeship opportunities to students across UTHealth SPH campuses.

Goal 2. Prepare OE trainees to meet workforce demands in academics, government, and private industry.

Objective 2.1. Maintain recruitment efforts to identify outstanding OE trainees, with a continued effort in identifying underrepresented minorities to represent the nation's diverse workforce.

Objective 2.2. Track OE trainees from application through graduation and career trajectory to examine how trainee performance (e.g., grades) is related to trainee's educational experiences and job interests.

Goal 3. Contribute to the OE evidence base by conducting rigorous research.

Objective 3.1. Increase external research funding of faculty in OE to provide opportunities for OE trainees to be involved in current OE research.

Objective 3.2. Increase the research productivity of the OE trainees regarding obtaining their own funding (e.g., pilot projects) and authorship of scientific products (e.g., papers, posters).

Goal 4. Strengthen OE's integration into continuing educational opportunities offered through the ERC.

Objective 4.1. Involve OE faculty in at least one continuing education course per year.

Past Performance / Accomplishments in Last Project Period

Trainees: We **proposed training six to eight trainees and we supported 11 trainees** (including seven new) since some trainees only received either the stipend or tuition and fees. One of our trainees, Ms. Whitney Harrison [underrepresented minority] (appointed on 01/01/16), was originally part-time while others transitioned to part-time due to outside employment: Ms. Kalyn Jannace (appointed 09/01/15), and Ms. Amanda Marshall (appointed 09/01/14) who is currently on leave of absence [LOA] for personal reasons. The rest of trainees were full-time: Ms. Bethany Alcauter (appointed on 09/01/17), Ms. Carolyn Crisp [underrepresented minority] (appointed on 01/01/19), Ms. Jennifer Ish (appointed 09/01/18), Ms. Kelly Oyer-Peterson (appointed on 01/01/18), and Ms. Susan Wu (appointed on 09/01/19), our most recent recruit. Of our current trainees, three are in Houston (Jannace, Wu, and Harrison, who is still a Houston's student but moved to San Antonio in Fall 2018 for job-related reasons), three in San Antonio (Ish, Marshall, Oyer-Peterson), and two in Austin (Alcauter, Crisp). Three of the current OE trainees are appointed to receive tuition and fees only: Harrison, Jannace, and Marshall, who each work full-time outside of UTHealth. Of the current trainees, four are completing their coursework and/or working on their proposals and four are working on their dissertations. Four trainees graduated in this period: Dr. Chris Kaipust (appointed on 01/1/16 in Houston), Dr. Laura Lee (appointed 01/01/12 in Houston), Dr. Anabel Rodriguez [underrepresented minority] (appointed on 01/01/17 in San Antonio), and Dr. Amanda Staudt (appointed 01/01/14 in San Antonio). Graduates went into jobs represented by NAICS sectors: 541720 "Research and Development in Social Sciences and Humanities"; 541712 "Research and Development in Physical, Engineering, and Life Sciences"; and, 611310 "Colleges, Universities, and Professional Schools", respectively.

Faculty honors, awards and appointments: The relationship with state agencies continued with Dr. Gimeno's appointment as a principal member of the Institutional Review Board (IRB) of the Texas Department of State Health Services (TDSHS). This appointment was continued for 10 years until Dr. Gimeno assumed the direction of the SWCOEH since the monthly IRB meeting

overlaps with the monthly ERCs meeting. Both Drs. Gimeno and Symanski served on the Advisory Committee of the NIOSH-funded State-based Texas Occupational Health & Safety Surveillance at TDSHS. Also, both Drs. Whitworth and Symanski were members of the Advisory Committee to the Texas Cancer Registry at TDSHS. In 2016, Dr. Delclos was inducted as member of The University of Texas Kenneth I. Shine, MD Academy of Health Science Education. He also received two teaching awards: the 2015 The University of Texas System Regents' Outstanding Teaching Award and the 2015 UTSPH Excellence in Teaching Award. Dr. Delclos was a member of the Scientific Committee of the 2018 European Union of Medicine in Assurance and Social Security Congress in Maastricht, Netherlands as well as a member of the National Library of Medicine PMC Journal Review Program, U.S. National Institutes of Health. Dr. Gimeno served as Associate Editor of the Brazilian Journal of Occupational Health and became a member of the Research Advisory Committee for the ERC in Colorado School of Public Health. Dr. Gimeno was an invited expert for the 2017 "Global Working Conditions Survey: Central America" workshop in Buenos Aires, Argentina organized by International Labour Organization and the European Foundation for the Improvement of Working and Living Conditions (Mariya Aleksynska *et al.*, 2019). In 2017, Dr. Symanski participated in the *IARC Monographs* Working Group Evaluation of Benzene and the "Texas Health Journal: The Health Newsletter of the University of Texas System" (10/2017) a story on research by Drs. Gimeno and Delclos on working conditions in Central America. SWCOEH ERC news are regularly posted on its website and the UTHealth SPH website.

In 2016, we added a new faculty member to the occupational epidemiology program, Dr. Rena Sue Day, MS, PhD, Professor in Epidemiology. Dr. Day's research focuses on obesity, chronic disease, physical activity and Hispanic populations. Dr. Kai Zhang, PhD, joined the Occupational Epidemiology program in 2018. Dr. Zhang has extensive experience in the assessment of physical and chemical exposures to environmental and occupational stressors using state-of-the-art models, Geographic Information System (GIS), and spatial analysis. Additionally, his research interest focuses on characterizing the health impact of natural disasters such as heat waves on vulnerable populations (e.g., outdoor workers) and reducing such adverse health impact through prevention and intervention programs. Three OE faculty left UTHealth, Dr. Pompeii on 10/2018, Dr. Symanski on 01/2020 and Dr. Whitworth on 05/2020. Faculty searches are underway to incorporate epidemiology faculty once post-COVID conditions allow for it.

OE-related course updates: Dr. Symanski took over Dr. Cooper's summer OE core course for 2017-2019. Upon Dr. Symanski's departure, a new instructor is being determined. Dr. Delclos and Perkison (OM) became co-instructors of the Injury Epidemiology course in 2019.

Research portfolio: The OE faculty has a **growing research portfolio** (38 active grants between 2015 and 2018, of which 21 were new awards, for a total cost of \$10.4M), continuing building SWCOEH ERC-related research opportunities for current students. For instance, Dr. Gimeno is the PI (with Delclos as co-I) of a cooperative agreement with the U.S. Department of Labor, which partially supports a nationally representative household survey of working conditions and health among over 9,000 workers in the six Spanish-speaking Central America countries (i.e., Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panama). Drs. Symanski, Whitworth and Han collaborate on a NIEHS-funded project related to identifying and mitigating metal air pollution from metal recycling facilities in disadvantaged neighborhoods. Dr. Symanski also served as co-director of a recently funded multi-institutional NIEHS Environmental Health Sciences P30 Core Center, the Gulf Coast Center for Precision Environmental Health (GC-CPEH). Dr. Whitworth was awarded an R01 to examine air pollution effects on fetal growth and child neurodevelopment in a large Spanish cohort, which will be the basis for an OE trainee's (Ish) dissertation focused on the impact of occupational exposures on the same outcomes. Dr. Day is PI of a FEMA grant on

firefighter health and wellness programs. Drs. Gimeno and Douphrate (IH Program Director) collaborate on a series of NIOSH-funded projects on dairy and logging workers. Finally, Drs. Gimeno and Delclos mentored a doctoral student who was awarded an SWCOEH ERC PPRTT award to test the Glomerular Filtration Rate (eGFR) Epidemiology Study (DEGREE) protocol, point-of-care field measurements and module on risk factors for Chronic Kidney Disease of unknown origin among Houston Hispanic day laborers. Finally, Drs. Gimeno and Whitworth have established a relationship with a grassroots organization comprised of Hispanic, often undocumented, women working in San Antonio, TX as domestic cleaners and conducted a PPRTT pilot study (awarded on 01/2017 to Dr. Whitworth) to identify environmental and occupational health hazards. In addition to a peer-review publication, results of this pilot project provided the basis for two additional pilot projects: one from the PPRTT program led by OE trainee Oyer-Peterson (awarded 07/2019) with mentorship from Drs. Whitworth and Gimeno; and, a second awarded to Drs. Whitworth and Gimeno funded by the aforementioned P30 grant (awarded 08/2019) as well as an R01 application (Dr. Whitworth, and Han, IH faculty), receiving an impact score 20, 4th percentile, and pending final decisions from the Council Review (October 2020).

Regionally, the OE Director and/or the SWCOEH ERC Director has attended the Western States Occupational Network (WestON). Established in 2008, WestON involves state occupational health representatives as well as representatives of NIOSH-funded Centers. To broaden OE faculty visibility, we aim to rotate attendance to these annual meetings. Attendance 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 OE faculty have a long-standing collaboration with both the NIOSH Agricultural Center at The University of Texas Health Science Center at Tyler and TDSHS. We use these collaborations to create research opportunities for OE trainees.

In conclusion, during the past cycle, we met our goals: (1) We have had no challenges accessing a pool of highly qualified applicants, providing doctoral-level research training in OE, and graduating trainees; (2) We successfully prepared our graduates to meet workforce demands in academics, government, and private industry. All OE graduates are successfully employed and continue to excel (e.g., Dr. Janak is now Chief of Epidemiology and Biostatistics at the U.S. Department of Defense Joint Trauma System; Dr. Kaipust is Postdoctoral Fellow at the Institute for Biobehavioral Health Research; Dr. Lupo is Associate Professor of Pediatrics and Director of Epidemiology at Baylor College of Medicine; Dr. Rodriguez is Research Coordinator at UTHealth, and Dr. Wendt Hess, PhD is Epidemiologist at Shell); (3) The OE program has contributed with rigorous research to the OE evidence base; (4) The OE program successfully strengthened its integration into other SWCOEH programs and opportunities, including extending offerings for trainees beyond Houston.

Program Deliverables

NIOSH Tables 1 and 2 summarize the scientific products of the OE program in the reporting period. During this reporting period, OE trainees and faculty have been productive. Following NIOSH requirements, we are separating publications where (a) the SWCOEH ERC grant was included in Acknowledgments, as well as (b) those with mention of our SWCOEH affiliation only.

OE trainee outputs include 9 presentations and 24 peer-reviewed journal publications, of which 21 included the ERC grant number and 3 were affiliation only products. **OE faculty outputs** include 85 presentations and 78 peer-reviewed journal publications, of which 46 included the ERC grant number and 32 were affiliation only products. Considering **grant applications**, two OE trainees (Rodriguez, Oyer-Peterson) were each awarded Pilot Project awards. Faculty submitted over 60 proposals with 23 receiving funding (over \$10M of total costs), for a total of 40 active

grants during this period. The most frequent NORA sectors of active projects were Health Care and Social Assistance, Public Safety, and Oil & Gas. The most frequent NORA cross-sectors were Cancer, Reproductive, Cardiovascular & Other Chronic Disease Prevention, and Respiratory Health, and Healthy Work Design & Well-Being. These were closely followed by Musculoskeletal Health and Traumatic Injury Prevention. Our graduates are employed in Public Health Regions (PHR) 5, 6, and 7.

OCCUPATIONAL EPIDEMIOLOGY

Trainee Outputs – Publication and Presentations

Note: Not underlined = ERC grant acknowledged; Underlined = ERC Affiliation Only.

PUBLICATIONS (*peer-reviewed journal articles*)

Trainees

2020

1. **Ish J**, Gimeno Ruiz de Porras D, Whitworth KW. 2020. Mental wellbeing among Hispanic female domestic cleaners. Arch Public Health 78, 10.
2. **Rodriguez A**, Douphrate DI, Gimeno Ruiz de Porras D, Perez A, Hagevoort R, Nonnenmann MW, Cienega L. 2020. Association of category of cattle exposure with tuberculosis knowledge among dairy workers in Bailey County, Texas. J Agromedicine:1-10. PMID: 32449645.

2019

3. Berumen-Flucker B, **Rodriguez A**, Cienega L, Casanova V, Pompeii L, Gimeno Ruiz de Porras D, Douphrate DI. 2019. Evaluation of safety management and leadership training using mobile technologies among logging supervisors. J Agromedicine. 24(2):197-204. PMID: 30624154.
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prevalence in the United States: a spatiotemporal analysis. *Geospat Health*. 11(3):439
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24. Weiss NS Cooper SP, **Socias C**, Weiss RA, Chen VW. 2015. Coding of Central Cancer Registry Industry and Occupation Information: The Texas and Louisiana Experiences. *J Registry Manag*. 42(3):103-110 PMID: 27028094

PRESENTATIONS

Trainees

2020

1. **Ish J**, Journal Club, Worker well-being, Valley MA and Stallones L. Effect of mindfulness-based stress reduction training on healthcare worker safety: a randomized waitlist-controlled trial. *JOEM* 2017; 59 (10): 935-941. January 16, 2020.

2019

2. **Crisp C**, Journal Club, Total Worker Health, Kaipust CM, Jahnke SA, Poston WSC, Jitnarin N, Haddock CK, Delclos GL, Day RS. Sleep, obesity, and injury among U.S. male career firefighters. *Journal of Occupational and Environmental Medicine* 2019 Apr;61(4):e150-e154. October 17, 2019.
3. **Ish J**, Katherine Bay, Occupational Exposure to Endocrine-disrupting Chemicals during Pregnancy and Fetal Development and The Gut-Brain Axis in Starr County Evaluating Depressive Symptoms in the Context of Gut Microbial Diversity, Epidemiology Seminar, October 16, 2019.

2018

4. **Rodriguez A**. Using mobile technology to increase safety awareness among dairy workers in the United States. 2018 Agricultural Safety and Health Council of America (ASHCA) North American Agricultural Safety Summit; 2018 February 22; Scottsdale, AZ, United States.

2017

5. Whitworth K, **Marshall A**, Symanski E. The association between unconventional gas development and preterm birth: evaluating drilling phases and critical windows of susceptibility. 2017 Annual Meeting of the American College of Epidemiology (ACE); 2017 September; New Orleans, LA, USA.
6. **Rodriguez A**, Douphrate DI, Gimeno Ruiz de Porras D. The association of worksite ergonomic and safety risk factors with work-related musculoskeletal health outcomes among logging machine operators in the Texas, Louisiana and Arkansas region. Conference: The University of Texas Health Science Center at Houston Research Day.

Organization: The University of Texas Health Science Center at Houston. Place: Houston, TX (USA). Date: 6 April 2017. Type: Poster.

2016

7. Chien L-C, Li X, **Staudt A**. Physical inactivity displays a mediator role in the association of diabetes and poverty: a spatial analysis. *Conference*: 2016 Joint Statistical Meetings. *Place*: Chicago, Illinois. *Date*: August 2, 2016. *Type*: Oral communication.
8. Cayuela A, **Conway S**, Delclos G, Ronda E. Differences in Exposure to Long Working Hours and Poor Self-Reported General Health in Latin American and Spanish-Born Workers in Spain: The PELFI Cohort Study. *Conference*: 25th EPICOH *Conference*: Occupational Health, Think Globally, Act Locally. *Organization*: Scientific Committee on Epidemiology in Occupational Health. *Place*: Barcelona, Catalonia (Spain). *Date*: September 4-7, 2016. *Type*: Oral communication.
9. **Conway S**, Pompeii L, Roberts R, Follis J, Gimeno D. Evidence of a Dose-Response Relationship between Work Hours and Cardiovascular Disease Risk. *Conference*: 25th EPICOH Conference: Occupational Health, Think Globally, Act Locally. *Organization*: Scientific Committee on Epidemiology in Occupational Health. *Place*: Barcelona, Catalonia (Spain). *Date*: September 4-7, 2016. *Type*: Oral communication.

2015

None to report

OCCUPATIONAL EPIDEMIOLOGY

Faculty Outputs – Publication and Presentations

Note: Not underlined = ERC grant acknowledged; Underlined = ERC Affiliation Only.

PUBLICATIONS (*peer-reviewed journal articles*)

Faculty

2020

1. An Han H, Han I, McCurdy S, Whitworth K, **Delclos G**, Rammah A, Symanski E. 2020. The Intercontinental Terminals Chemical Fire Study: A Rapid Response to an Industrial Disaster to Address Resident Concerns in Deer Park, Texas. *Int J Environ Res Public Health* 17(3):986. PMID: 32033278.
2. Hashemi NS, Thørrisen MM, Skogen JC, Sagvaag H, **Gimeno Ruiz de Porras D**, Aas RW. 2020. Gender Differences in the Association between Positive Drinking Attitudes and Alcohol-Related Problems. The WIRUS Study. *Int J Environ Res Public Health* 17:5949. PMID: 32824384
3. Ish J, **Gimeno Ruiz de Porras D**, Whitworth KW. 2020. Mental wellbeing among Hispanic female domestic cleaners. *Arch Public Health*. 78:10.
4. Liu J, Zhou J, Yao J, Zhang X, Li L, Xu X, He X, Wang B, Fu S, Niu T, Yan J, Shi Y, Ren X, Niu J, Zhu W, Li S, Luo B, **Zhang K**. 2020. Impact of meteorological factors on the

covid-19 transmission: A multi-city study in China. Sci Total Environ 726:138513-138513. PMID: 32304942

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7. Perkison WB, Li Y, Symanski E, Bakos-Block C, **Zhang K**, Magal R, McDaniel M, Adekanye J, Esquenazi S, Rammah A. 2020. The Post Hurricane Harvey Respiratory Protection Training Program. J Occup Environ Med. (In Press).
8. Rodriguez A, Douphrate DI, **Gimeno Ruiz de Porras D**, Perez A, Hagevoort R, Nonnenmann MW, Cienega L. 2020. Association of category of cattle exposure with tuberculosis knowledge among dairy workers in Bailey County, Texas. J Agromedicine:1-10. PMID: 32449645.
9. Rueda-Garrido JC, Vicente-Herrero MT, Del Campo MT, Reinoso-Barbero L, de la Hoz RE, **Delclos GL**, Kales SN, Fernandez-Montero A. 2020. Return to work guidelines for the COVID-19 pandemic. Occup Med (Lond) 70(5):300-305. PMID: 32476022
10. Schulte PA, Streit JMK, Sheriff F, **Delclos G**, Felknor SA, Tamers SL, Fendinger S, Grosch J, Sala R. 2020. Potential Scenarios and Hazards in the Work of the Future: A Systematic Review of the Peer-Reviewed and Gray Literatures. Ann Work Expo Health (In press). PMID 32719849.
11. Wu Y, Lin S, Tian H, **Zhang K**, Wang Y, Sun B, Liu X, Liu K, Xue Y, Hao J, Liu H, Liu S, Shao P, Luo L, Bai X, Liu W, Wu B, Zhao S. 2020. A quantitative assessment of atmospheric emissions and spatial distribution of trace elements from natural sources in China. Environ Pollut 259:113918.
12. Zhang, X, Zhao H, Chow WH, Bixby M, Durand C, Markham C, **Zhang K**. 2020. Population-Based Study of Traffic-Related Air Pollution and Obesity in Mexican Americans. Obesity (Silver Spring) 28(2):412-420. PMID 31797571.

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13. Gerasimaviciute V, Bultmann U, Diamond PM, Tullar JM, **Delclos GL**, **Gimeno Ruiz de Porras D**, Amick III BC. 2019. Reciprocal associations between depression, anxiety and work-related injury. Inj Prev. <https://doi.org/10.1136/injuryprev-2019-043403> PMID 31685530.
14. Benavides FG, Ramada JM, Ubalde-López M, **Delclos GL**, Serra C. 2019. A hospital occupational diseases unit: an experience to increase the recognition of occupational disease. Medicina del Lavoro 110(4):278-284. PMID: 31475689.
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24. Rammah A, **Whitworth KW**, Han I, Chan W, Jimenez MD, Strom SS, Bondy ML, Symanski E. 2019. A Mixed-Methods Study to Examine the Role of Psychosocial Stress and Air Pollution on Hypertension in Mexican-origin Hispanics. J Racial Ethn Health Disparities. 6(1):612-21. PMID: 29679333.
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39. Rush EL, Singer AB, Longnecker MP, Haug LS, Sabaredzovic A, **Symanski E**, **Whitworth KW**. 2018. Oral Contraceptive Use as a Determinant of Plasma

Concentrations of Perfluoroalkyl Substances among Women in the Norwegian Mother and Child Cohort (MoBa) Study. Environ Int. 112: 156-164. PMID: 29274593

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43. Tarlo SM, Arif AA, **Delclos GL**, Henneberger P, Patel J. 2018. Opportunities and obstacles in translating evidence to policy in occupational asthma. Ann Epidemiol. 28(6):392-400. PMID: 28434545.
44. **Whitworth KW**, Marshall AK, Symanski E. 2018. Drilling and Production Activity Related to Unconventional Gas Development and Severity of Preterm Birth. Environ Health Perspect. 126(3):037006 PMID: 29578659

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45. Campos-Fumero A, **Delclos GL**, Douphrate DI, Felknor SA, Vargas-Prada S, Serra C, Coggon D, **Gimeno Ruiz de Porras D**. 2017. Low back pain among office workers in three Spanish speaking-countries: findings from the CUPID study. Inj Prev. 23(3): 158-164. PMID: 27585564.
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54. **Whitworth KW**, DeLaRosa E, Mackay T, Hernandez AM, Martin MK, Lopez J, Small M, Winkler P, Valerio MA. 2017. Exploring Perceptions of Fracking and Environmental Health in a 3-County Population in South Texas. *J Epidemiol Res*. 3(1).
55. **Whitworth KW**, Han I, Mei Y, Sharma SV, Berens P, **Symanski E**. 2017. Accessing disadvantaged pregnant women in Houston, Texas and characterizing biomarkers of metal exposures: a feasibility study. *Int J Environ Res Public Health*. 14(5):474-512. PMID: 28468266
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65. Socias C, Liang Y, **Delclos G**, Graves J, Hendrikson E, **Cooper S**. 2016. The feasibility of using electronic health records (EHR) to describe demographic and clinical indicators of migrant and seasonal farmworkers. *J Agromedicine* 21(1):71-81. PMID: 26479964.
66. Ubalde-López M, **Delclos GL**, Calvo-Bonacho E, Benavides FG, **Gimeno D**. 2016. Measuring multimorbidity in a working population: the effect on incident sickness absence. *Int Arch Environ Occup Health*. 89(4):667-678. PMID: 26615549.
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68. White AJ, Sandler DP, D'Aloisio AA, Stanczyk F, **Whitworth KW**, Baird DD, Nichols HB. 2016. Anti-Mullerian Hormone (AMH) in relation to tobacco and marijuana use and sources of indoor heating/cooking. *Fertil Steril* 106:723-730. PMID: 27240193

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70. **Douphrate DI**, Nonnenmann MW, Hagevoort R, **Gimeno Ruiz de Porras D**. 2016. Work-related musculoskeletal symptoms and job factors among large-herd dairy milkers. J Agromedicine. 21(3): 224-233. PMID: 27092590.
71. **Pompeii L**, Byrd A, **Delclos GL**, Conway SH. 2016. The American Association of Occupational Health Nurses' Respiratory Protection Education Program and Resources Webkit for Occupational Health Professionals. Workplace Health Saf 64(12): 564-572. PMID: 27758935.
72. **Pompeii LA**, Schoenfisch A, Lipscomb HJ, Dement JM, Smith CD, Conway SH, 2016. Hospital workers bypass traditional occupational injury reporting systems when reporting patient and visitor perpetrated (type II) violence. Am J Ind Med 59(10): 853-865. PMID: 27409575

2015

73. **Bangia KS**, **Symanski E**, Strom SS, Bondy M. 2015. A cross-sectional analysis of polycyclic aromatic hydrocarbons and diesel particulate matter exposures and hypertension among individuals of Mexican origin, Environ Health, 14(1):51. PMID: 26068905
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75. **Payne-Sturges D**, Korfmacher K, Cory-Slechta D, Jimenez M, **Symanski E**, Carr Shmool J, Dotson-Newman O, Clougherty J, French R, Levy J, Laumbach R, Rodgers K, Bongiovanni R, Scammell MK. 2015. Engaging communities in research on cumulative risk and social stress-environment interactions: Lessons learned from EPA's STAR Program, Environ Justice 8(6):203-212. PMID 27688822.
76. **Symanski E**, Karpman M, Jimenez M, Lopez DS, Felknor SA, Upadhyaya M, Strom SS, Bondy ML. 2015. Using a community engaged approach to develop a bilingual survey about psychosocial stressors among individuals of Mexican origin, J Health Care Poor Underserved, 26:1456-1471. PMID: 26548692
77. **Torá-Rocamora I**, Martínez JM, **Gimeno D**, Alberti C, Jardí J, Manzanera R, Benavides FG, **Delclos GL**. 2015. Assessment of the magnitude of geographical variations in the duration of non-work-related sickness absence by individual and contextual factors. Gac Sanit. 29(3):164-171. PMID: 25638744.
78. Weiss NS **Cooper SP**, Socias C, Weiss RA, Chen VW. 2015. Coding of Central Cancer Registry Industry and Occupation Information: The Texas and Louisiana Experiences. J Registry Manag. 42(3):103-110 PMID: 27028094

PRESENTATIONS

Faculty

2020

1. **Day RS.** Work Safe, Stay Healthy at Home Webinar: Do You Miss Being in Control? Presented to: Webinar - Ergonomics, Nutrition, Physical Activity, and Mental Health guidance while working remotely from home during COVID-19. Southwest Center for Occupational & Environmental Health, NIOSH-funded Education & Research Center. April, 2020.

2019

2. Figueroa-Solis E, **Delclos GL, Gimeno Ruiz de Porras D.** Pilot Test of the DEGREE Protocol, CKDu Module, and Point-of-care Device Measurements in Outdoor Hispanic Workers. Conference: Third International Workshop on Chronic Kidney Diseases of Uncertain/Non-Traditional Etiology in Mesoamerica and Other Regions. Organization: The National Institute of Diabetes & Digestive & Kidney Diseases (NIDDK) and CENCAM – Consortium for the Epidemic of Nephropathy in Central America and Mexico. Place: San José, Costa Rica. Date: 20-22 March 2019. Type: Poster. Available at: https://www.niehs.nih.gov/news/events/pastmtg/2019/ckd_2019/index.cfm.
3. **Gimeno Ruiz de Porras D, Delclos GL,** Figueroa-Solis E, Rojas M. Self-reported CKDu and associated risk factors in Central America. Preliminary results from the Second Central American Survey of Working Conditions and Health. Conference: Third International Workshop on Chronic Kidney Diseases of Uncertain/Non-Traditional Etiology in Mesoamerica and Other Regions. Organization: The National Institute of Diabetes & Digestive & Kidney Diseases (NIDDK) and CENCAM – Consortium for the Epidemic of Nephropathy in Central America and Mexico. Place: San José, Costa Rica. Date: 20-22 March 2019. Type: Poster. Available at: https://www.niehs.nih.gov/news/events/pastmtg/2019/ckd_2019/index.cfm.
4. Allen N, Krefman A, Labarthe D, Greenland P, Juonala M, Lehtimäki T, **Day RS,** Bazzano L, Van Horn L, Liu L, Alonso C, Gillman M, Webber L, Pahkala K, Laitinen T, Raitakari O, Muggeo V, Lloyd-Jones D. Determining Change-points in Longitudinal Cardiovascular Health Scores Using Segmented Mixed Models. Presented to: American Statistical Association Conference on Statistical Practice in New Orleans, LA, February 2019.
5. Pool LR, Krefman AE, Labarthe D, Greenland P, Juonala M, Kähönen M, Lehtimäki T, **Day RS,** Bazzano L, Van Horn L, Liu L. 2019. The Timing of Cardiovascular Health Decline and Its Association With Subclinical Atherosclerosis in Adulthood *Circulation* 139 (Suppl_1), pp.A024-A024. Presented to: American Heart Association's Epidemiology and Prevention/Lifestyle and Cardiometabolic Health 2019 Scientific Sessions.
6. **Day RS,** Jahnke SA. Risky Business: Health on and Beyond the Fireground. Presented to: Surviving the Fire Service: Taking Firefighter Health Science to the Street in Kansas City, KS, September, 2019.
7. **Delclos, GL,** The expanded focus for occupational safety and health (OSH): implications for research and training of OSH professionals." The Future of Work and Expanded Focus for Occupational Safety and Health. Expanding Research Partnerships Webinar. CDC/NIOSH. September 18, 2019.

8. **Delclos GL**. Panel member. Expanded focus for Occupational Safety and Health. NIOSH Center Directors Meeting. University of Cincinnati. Cincinnati, Ohio. August 20, 2019.
9. **Delclos GL**. "Condiciones de trabajo, empleo y salud en América Latina: el uso de una herramienta costo-efectiva para su análisis. [Working conditions, employment and health in Latin America: a cost-effective tool for analysis". Foro de Investigación de la Red de Posgrados en Salud en el Trabajo. Unidad Politécnica para el Desarrollo y la Competitividad Empresarial. Mexico City, Mexico. June 27, 2019.
10. **Delclos GL**. "Un canvi paradigmatic en l'enfocament de la salut laboral: el bienestar total del treballador." [A paradigmatic change in the focus of occupational health: total worker well-being]. Recordem al Dr. Francesc Arró I Triay: passat, present i future de la Medicina del Treball. Barcelona Official Medical Society. May 23, 2019.
11. **Symanski E**, Tee Lewis G, Chen T-Y, Chan W, La, D and Ma X. Neighborhood Matters: Residential levels of air toxics and increased risk of early childhood acute lymphocytic leukemia, Invited Speaker, AACR, J Environmental Carcinogenesis: Potential Pathway to Cancer Prevention, June 2019, Charlotte, NC.
12. **Symanski, E**. SWCOEH Responds to Hurricane Harvey: Action to Research to Sustainability. Baylor College of Medicine (BCM) Symposium: Harvey 2 Years After, August 22, 2019, Houston, TX.

2018

13. Sagiraju HKR, Chien LC, Jatoi I, Valerio MA, **Gimeno D**. Effects of demographics, immigration related factors and cancer screening on female breast cancer mortality rates in United States. Conference: 146th Annual Meeting and Expo of the American Public Health Association (APHA): Creating the Healthiest Nation: Health Equity Now. Organization: APHA. Place: San Diego, CA, MD. Date: 10-14 November 2018. Type: Oral communication.
14. Figueroa-Solis E, **Delclos GL**, **Gimeno Ruiz de Porras D**. Pilot test of the DEGREE protocol, CKDu module, and point-of-care device measurements in outdoor Hispanic workers. Conference: Chronic Kidney Diseases in Agricultural Communities Conference. Organization: The National Institute of Diabetes & Digestive & Kidney Diseases (NIDDK). Place: Bethesda, MD. Date: 25-26 June 2018. Type: Poster.
15. Mullola S, Hakulinen C, **Gimeno Ruiz de Porras D**, Presseau J, Jokela M, Vänskä J, Paunio T, Elovainio M. Physician's Personality Moderates the Association Between Medical Specialty and Well-Being at Work. American Educational Research Association (AERA) 2018 Annual Meeting: The Dreams, Possibilities, and Necessity of Public Education. Organization: AERA. Place: New York, NY. Date: 13-17 April 2018. Type: Oral communication.
16. **Day RS**. The First Twenty for Volunteer Firefighters. Presented to: FEMA, Assistance to Firefighters Grants Fire Prevention and Safety Research & Development Annual Meeting at FRI in Dallas, TX, August 2018
17. Allen NB, Krefman A, Labarthe D, Greenland P, Juonala M, Kähönen M, **Day RS**, Lehtimäki T, Van Horn L, Bazzano L, Liu L, Alonso CF, Webber LS, Pahkala K, Laitinen T, Raitakari O, Lloyd-Jones D. Critical Periods in Cardiovascular Health Across the Life

Course: A Pooled Cohort Analysis. *Circulation*, 2018;137:A015. Presented to: American Heart Association's Epidemiology and Prevention/Lifestyle and Cardiometabolic Health 2018 Scientific Sessions.

18. **Whitworth KW**, Marshall AK, **Symanski E**. *Unconventional Gas Development Activity and Severity of Preterm Birth in the Barnett Shale, Texas*. Oral Talk presented at the Joint Annual Meeting of the International Society for Environmental Science (ISES) and the International Society for Environmental Epidemiology (ISEE), August 26-30, 2018, Ottawa, Canada.
19. Santos IC, Martin MS, Reyes ML, Carlton DD, Smuts J, Choi W, Kim Y, Kim SB, **Whitworth KW**, Stigler-Granados P, Hildenbrand Z, Schug KA. *MALD-TOF and GC-VUV for the Identification of Bacteria and Their Responses to Environmental Stressors*. Presented at the American Society for Mass Spectrometry 66th Conference on Mass Spectrometry and Allied Topics, June 3-7, 2018, San Diego, CA.

2017

20. Casanova V, Caldwell E, **Gimeno D**. Examining Worksite Participation in a Community-Wide Wellness Initiative. Conference: Seventh International Conference on Health, Wellness & Society. Organization: Health, Wellness & Society Research Network. Place: Denver, CO. Date: 5-6 October 2017. Type: Article Submission. Available at: The International Journal of Health, Wellness, and Society 2017; 7.
21. Rojas Garbanzo M, Benavides FG, Aragón A, Carmenate Milián L, **Gimeno Ruiz de Porras D**. Asociación entre Factores de Riesgo Psicosocial y Dolor Musculoesquelético en Trabajadores Informales y Formales en Centroamérica. Conference: XXXV Reunión Científica de la Sociedad Española de Epidemiología (SEE) y XXI Congresso da Associação Portuguesa de Epidemiologia (APE). Organization: SEE and APE. Place: Barcelona, Spain. Date: 6-8 September 2017. Type: Poster.
22. Sagiraju HKR, Jatoti I, Valerio M, Chien LC, **Gimeno D**. Effects of county-level attributes on geographic variation in female breast cancer mortality rates across counties in United States. Conference: 2017 ASCO (American Society of Clinical Oncology) Annual Meeting: Making a Difference in Cancer Care WITH YOU Organization: ASCO. Place: Chicago, IL. Date: 2-6 June 2017. Type: Publication-only abstract. Available at: J Clin Oncol 2017; 35(suppl; abstr e13093).
23. Patel J, **Gimeno D**, **Delclos GL**. Constructing and Updating a Job-Exposure Matrix (JEM) for use with a Statewide Survey of Asthma in Texas Healthcare Professionals (HCPs). Conference: The University of Texas Health Science Center at Houston Research Day. Organization: The University of Texas Health Science Center at Houston. Place: Houston, TX (USA). Date: 6 April 2017. Type: Poster.
24. Rodriguez A, Douphrate DI, **Gimeno Ruiz de Porras D**. The association of worksite ergonomic and safety risk factors with work-related musculoskeletal health outcomes among logging machine operators in the Texas, Louisiana and Arkansas region. Conference: The University of Texas Health Science Center at Houston Research Day. Organization: The University of Texas Health Science Center at Houston. Place: Houston, TX (USA). Date: 6 April 2017. Type: Poster.

25. Han I, Samarneh L, **Symanski E**. Effects of train and truck traffic on noise levels in urban communities. Acoustical Society of America. Boston, MA, June 25- 29, 2017.
26. Han I, Afshar M, **Symanski E**. Characterization of Particulate Air Pollution in a Community near the Port of Houston. National Environmental Monitoring Conference, Washington DC, August 7-11, 2017
27. **Delclos GL**. "Patología Profesional del Aparato Respiratorio". Maestría en Medicina del Trabajo y Salud Ocupacional. Universidad Mayor, Real y Pontificia San Francisco Xavier de Chuquisaca. Santa Cruz, Bolivia. 30-hour course. May 22-27, 2017
28. **Delclos GL**. "Surveys of working conditions and health: uses and limitations." Houston Texas Association of Occupational Health Nurses meeting. Houston, Texas. May 9, 2017.
29. **Delclos GL**. "Asthma in healthcare professionals." NIOSH State-based Surveillance for Occupational Lung Disease meeting. Austin, Texas. April 25, 2017.
30. **Delclos GL**. "Diagnosis of tuberculosis and newer tests of exposure." Awareness and prevention of tuberculosis disease. A webinar series designated for ExxonMobil. Presented by the Biosafety and Infectious Disease Training Initiative, a NIEHS Worker Training Program. March 2, 2017
31. **Pompeii L**, Tan M, Rates, Risk and Predictors of Barrett's Esophagus Recurrence After Radiofrequency Ablation in a Community Practice Setting: a National Veterans Cohort Study Digestive Disease Week, May 6, 2017, Chicago, IL.
32. Jetelina KK, Reingle Gonzalez JM, Cuccaro P, Peskin MP, **Pompeii L**, Atem F Self-reporting discrepancies of bullying victimization and perpetration measures APHA 2017 Annual Meeting & Expo. Atlanta, GA.
33. Rammah A, **Symanski E**, **Whitworth KW**, Han I, Jimenez M, Chan W, Bondy M, Strom S. *Hypertension in Mexican Americans: Assessing Disparities in Air Pollutant Risks*. Presented at the American College of Epidemiology Annual Meeting, September 24-26, 2017, New Orleans LA. Published in Annals of Epidemiology. 2017; 27(8): 513.
34. Marshall AK, **Symanski E**, **Whitworth KW**. *Unconventional gas drilling and production activity: Do phase of drilling and timing of activity impact the risk for preterm birth among pregnant women living near well sites?* Presented at the American College of Epidemiology Annual Meeting, September 24-26, 2017, New Orleans, LA. Published in Annals of Epidemiology. 2017; 27(8): 530.
35. **Whitworth, KW**. *Environmental and Occupational Health Hazards among Vulnerable Domestic Cleaners in San Antonio, TX*. Presented at the 2016 Annual UTHealth School of Public Health Southwest Center for Occupational and Environmental Health Pilot Projects Symposium, June 5, 2017

2016

36. Sagiraju HKR, Chien LC, Valerio M, Jatoi I, **Gimeno D**. Geographic variation in the female breast cancer mortality rates across counties in United States. Conference: 2016 San Antonio Breast Cancer Symposium. Organization: The Cancer Therapy & Research

Center (CTRC) at UT Health Science Center San Antonio and the American Association for Cancer Research (AACR). Place: San Antonio, TX, USA. Date: 6-10 December 2016. Type: Poster.

37. Ubalde-Lopez M, Delclos GL, Benavides FG, **Gimeno D**. Multimorbidity matters: The effect on specific sickness absence diagnosis-groups. Conference: 9th European Public Health Conference: All for Health – Health for All. Organization: European Public Health Association (EPHA) and the Österreichische Gesellschaft für Public Health. Place: Viena, Austria. Date: 9-12 November 2016. Type: Oral communication. Available at: Eur J of Public Health 2016;26 (suppl 1): cku167.086.
38. Boot C, Young A, Viikari-Juntura E, Chan C, **Gimeno Ruiz de Porras D**, Linton S. Workplace outcomes in stay at work and return to work research. Conference: 4th WDPI [Work Disability Prevention & Integration] conference: work disability prevention knowledge. Organization: VU University Medical Center (VUmc) Academy. Place: Amsterdam, The Netherlands. Date: 25-28 September 2016. Type: Oral communication.
39. Ubalde-Lopez M, Arends I, Almansa J, **Delclos GL, Gimeno D**, Bültmann U. Multimorbilidad y capacidad funcional después de una incapacidad temporal por trastorno mental [Multimorbidity and functional capacity after a sick leave due to a mental disorder]. Conference: XXXIV Reunión Científica de la Sociedad Española de Epidemiología (SEE) y XI Congresso da Associação Portuguesa de Epidemiologia (APE): Epidemiología para la salud en todas las políticas. Organization: SEE and APE. Place: Sevilla, Spain. Date: 14-16 September 2016. Type: Oral communication.
40. Campos-Fumero A, **Delclos GL**, Douphrate DI, Felknor SA, Vargas-Prada S, Serra C, **Gimeno D**. Low back pain among office workers in Costa Rica, Nicaragua and Spain. Conference: 25th EPICOH Conference: Occupational Health, Think Globally, Act Locally. Organization: Scientific Committee on Epidemiology in Occupational Health. Place: Barcelona, Catalonia (Spain). Date: September 4-7, 2016. Type: Oral communication.
41. Conway S, **Pompeii L**, Roberts R, Follis J, **Gimeno D**. Evidence of a Dose-Response Relationship between Work Hours and Cardiovascular Disease Risk. Conference: 25th EPICOH Conference: Occupational Health, Think Globally, Act Locally. Organization: Scientific Committee on Epidemiology in Occupational Health. Place: Barcelona, Catalonia (Spain). Date: September 4-7, 2016. Type: Oral communication.
42. Rojas Garzanzo M, Benavides FG, **Gimeno D**. Psychosocial risk exposure and musculoskeletal pain among formal and informal workers in Central America. Conference: 25th EPICOH Conference: Occupational Health, Think Globally, Act Locally. Organization: Scientific Committee on Epidemiology in Occupational Health. Place: Barcelona, Catalonia (Spain). Date: September 4-7, 2016. Type: Poster.
43. Ubalde-Lopez M, Arends I, Almansa J, **Delclos G, Gimeno D**, Bültmann U. Work functioning after sick leave due to common mental disorders: the effect of multimorbidity. Conference: 25th EPICOH Conference: Occupational Health, Think Globally, Act Locally. Organization: Scientific Committee on Epidemiology in Occupational Health. Place: Barcelona, Catalonia (Spain). Date: September 4-7, 2016. Type: Oral Communication.

44. Campos-Fumero A, **Gimeno D**, Douphrate DI, Felknor SA, Vargas-Prada S, Serra C, **Delclos GL**. Upper extremity musculoskeletal pain among office employees in Costa Rica, Nicaragua and Spain. Conference: PREMUS 2016 - The 9th International Scientific Conference on the Prevention of Work-Related Musculoskeletal Disorders. Organization: Musculoskeletal Disorders Scientific Committee of the International Commission of Occupational Health (ICOH). Place: Toronto, ON, Canada. Date: June 20-23, 2016. Type: Poster.
45. Merino-Salazar P, Benavides FG, **Gimeno D** on behalf of the Network of Experts on Working Conditions, Employment and Health Surveys. Core questionnaire and methodological criteria for Working, Employment and Health Conditions Surveys in Latin America and the Caribbean. Conference: Second International Conference on Survey Methods in Multinational, Multiregional and Multicultural Contexts (3MC 2016). Organization: International Workshop on Comparative Survey Design and Implementation (CSDI). Place: Chicago, IL, USA. Date: May 25-29, 2016. Type: Oral communication.
46. Whitehead L, Tucker D, **Gimeno D**, **Whitworth K**, Betancourt J, Leonard S, Zhang A, Senchak A. Descriptive Evaluation of Noise Dosimetry Values in the Defense Occupational and Environmental Health Readiness System — Industrial Hygiene Component (DOEHRS-IH). Conference: 2016 American Industrial Hygiene Conference & Exposition (AIHce). Organization: American Industrial Hygiene Association. Place: Baltimore, MD, USA. Date: May 21-26, 2016. Type: Oral communication. Available at: <http://www.aihce2016.org>.
47. **Gimeno D**, Betancourt J, Tucker D, Whitworth KW, Gorrell N, Hammill T, Senchak A, Packer M. Epidemiology of Hearing Impairment and Injuries in the U.S. Militar. Conference: 2014 American Industrial Hygiene Conference & Exposition (AIHce). Organization: American Industrial Hygiene Association. Place: Baltimore, MD, USA. Date: May 21-26, 2016. Type: Oral communication. Available at: <http://www.aihce2016.org>.
48. Sagiraju HKR, Betancourt JA, **Whitworth KW**, Hammill TL, Packer MD, **Gimeno D**. The Department of Defense Epidemiologic and Economic Burden of Hearing Loss Study (DEEBoHLS): Incidence of Hearing Loss among active duty members in United States military. Conference: 5th Graduate School Faculty Development and Research Symposium - In Sickness and In Health: Collaborating to Improve Readiness and Health Outcomes. Organization: Army Medical Department Center and School (AMEDDC&S) U.S. Army Health Readiness Center of Excellence (HRCoe). Place: San Antonio, TX, USA. Date: April 20-21, 2016. Type: Poster.
49. Patel J, **Gimeno D**, **Delclos GL**. Constructing and Updating a Job-Exposure Matrix (JEM) for use with a Statewide Survey of Asthma in Texas Healthcare Professionals (HCPs). Conference: The University of Texas Health Science Center at Houston School of Public Health Research Day. Organization: The University of Texas Health Science Center at Houston. Place: Houston, TX (USA). Date: 06 April 2016. Type: Poster.
50. Patel J, **Delclos GL**, **Gimeno D**. Work-Related Asthma among Nurse Aides in Texas – A Pilot Study. Conference: The University of Texas Health Science Center at Houston Research Day. Organization: The University of Texas Health Science Center at Houston. Place: Houston, TX (USA). Date: 31 March 2016. Type: Poster.

51. **Day RS.** Invited Session: Expanding Your Reach: Innovations and Opportunities for Remote Participant Visits to Boost Retention and Enrollment in Research Studies – Fuel2Fight. Presented to: Society for Clinical Trials 37th Annual Meeting, Montreal, Quebec, May 2016.
52. **Day RS.** The First Twenty for Volunteer Firefighters. Presented to: FEMA, Assistance to Firefighters Grants Fire Prevention and Safety Research & Development Annual Meeting in San Antonio, TX, August 2016.
53. **Delclos G.L.** “Condiciones de trabajo, empleo y salud en América Latina: el uso de una herramienta costo-efectiva para su análisis. [Working conditions, employment and health in Latin America: a cost-effective tool for analysis]. XVI Congreso ORP. Cartagena de Indias, Colombia. October 5-7, 2016
54. **Delclos G.L.** “A worldwide perspective on working conditions and health.” [Keynote address]. 25th International Epidemiology in Occupational Health (EPICOH) Conference, Barcelona, Spain, September 4-7, 2016.
55. Marshall A, **Symanski E**, **Whitworth KW.** *Maternal residential proximity to unconventional gas development (UGD) and adverse birth outcomes in the Barnett Shale area*, TX, 2010-2012. Poster presented at the 2016 UTHealth Student Research Day, Houston, TX, March 31, 2016.
56. **Pompeii LA**, Schoenfisch AL, Lipscomb HJ, Dement JM, Smith C. “Surveillance of Patient/Visitor Perpetrated Non-Fatal Violence Against Healthcare Workers.” AAOHN National Conference. Jacksonville, FL, May 2016.
57. **Pompeii LA**, Novak D. “Respiratory Protection for Healthcare Workers.” AAOHN National Conference. Jacksonville, FL, May 2016.
58. **Pompeii LA**, Schoenfisch AL, Lipscomb HJ, Dement JM, Smith C. Tools for Measuring Workplace Violence in Healthcare: The Hospital Violence Surveillance Study. AOHP National Conference. Myrtle Beach, SC. September 2016.
59. **Pompeii LA**, Novak D. Respiratory Protection for Healthcare Workers. AOHP National Conference. Myrtle Beach, SC. September 2016.
60. Boggess B, **Pompeii LA**, Scott B. “Injury Disparities in the Texas Opt-Out Model of Workers’ Compensation” APHA 2016 Conference. Denver, CO. October 2016.
61. Jetelina KK, Reingle Gonzalez JM, Cuccaro P, Peskin MP, **Pompeii L**, Atem F. Trends in Bullying Perpetration, Victimization, and Medically-Attended Violent Injuries among a Cohort of Children. Oral presentation at the American Public Health Association, November 3, 2016, Denver, CO.
62. **Whitworth KW**, Marshall A, Symanski E. Assessing exposure to unconventional gas development and its association with preterm birth in the Barnett Shale, Texas. Abstract presented at the 2016 Conference of the International Society for Environmental Epidemiology, September 1-4, 2016, Rome, Italy.

63. Marshall A, **Symanski E, Whitworth KW**. Maternal residential proximity to unconventional gas development (UGD) and adverse birth outcomes in the Barnett Shale area, TX, 2010-2012. Abstract presented at the 2016 Epidemiology Congress of the Americas, June 21-24, 2016, Miami, Florida.
64. Rammah A, **Symanski E, Whitworth KW**, Han I, Jimenez M, Chan W, Bondy M, Strom S. Hypertension in Mexican Americans: Assessing Disparities in Air Pollutant Risks. Poster presented at the 2016 UTHealth Student Research Day, March 31, 2016, Houston, TX.
65. Marshall A, **Symanski E, Whitworth KW**. Maternal residential proximity to unconventional gas development (UGD) and adverse birth outcomes in the Barnett Shale area, TX, 2010-2012. Poster presented at the 2016 UTHealth Student Research Day, March 31, 2016, Houston, TX.

2015

66. **Gimeno D**, Betancourt JA, Tucker DL, Cooper SP, Alamgir AH, **Whitworth KW**, Gorrell NS, **Delclos GL**, Hammill TL, Senchak AJ, Packer MD. The Epidemiology of Hearing Injuries, Noise Exposures and Hearing Loss in the Military. Conference: The 2015 AMSUS Annual Continuing Education Meeting: Federal Health 2015 – The New Normal. Organization: Association of Military Surgeons of the United States (AMSUS). Place: San Antonio, TX, USA. Date: December 1, 2015. Type: Oral communication.
67. Kulakova OV, Sánchez Hernández MO, **Gimeno Ruiz de Porras D**. Impact of Psychosocial Work Factors on the Mental Health of Workers in Central America. Conference: 8th International and 13th National Congress of Clinical Psychology. Organization: AEPC - Spanish Association of Behavioral Psychology. Place: Granada, Spain. Date: November 19-22, 2015. Type: Oral communication. Available at: www.aepc.es/psclinica_web/LIBRORESUMENES_2015.pdf.
68. **Gimeno D**, Betancourt JA, Tucker DL, Cooper SP, Alamgir H, **Whitworth KW**, Gorrell NS, **Declos GL**, Hammill TL, Senchak AJ, Packer MD, Sagiraju H, Turner CA. Hearing Impairment and Noise-Induced Hearing Injury in the United States Military. Conference: 143rd Annual Meeting and Exposition of the American Public Health Association (APHA): Health in All Policies. Organization: APHA. Place: Chicago, IL, USA. Date: October 31-Nov 4, 2015. Type: Poster.
69. **Gimeno D**, Betancourt JA, Tucker DL, Cooper SP, Alamgir AH, **Whitworth KW**, Gorrell NS, **Delclos GL**, Hammill TL, Senchak AJ, Packer MD. Hearing Injuries, Noise Exposures and Burden of Hearing Loss in the Military. Conference: 2015 Military Health System Research Symposium (MHSRS). Organization: Department of Defense. Place: Fort Lauderdale, FL, USA. Date: August 17-20, 2015. Type: Poster.
70. Hostler D, **Day RS**, Jahnke S. Firefighter Health and Safety Research: New Frontiers and Future Directions. Presented to: Congressional Fire Services Institute, Washington, DC, April 2015.
71. **Day RS**. The First Twenty for Volunteer Firefighters. Intervention Development. Presented to: Redmond Symposium, Assistance to Firefighters Grant Program Research and Development Annual Meeting in National Harbor, MD, August 2015

72. **Day RS.** Strategic Visioning: Fitness, diet, stress, obesity, substance use (e.g. alcohol and tobacco), diabetes, dyslipidemia, hypertension and cardiovascular disease among firefighters. Presented to: National Fallen Firefighters - Future Directions in Cardiovascular Research for the U.S. Fire & EMS Service, September 2015
73. **Delclos GL.** Work-related asthma in the healthcare professions. 2015 American Academy of Allergy, Asthma and Immunology. Houston, Texas. February 20-24, 2015.
74. **Delclos GL.** Working conditions and health in Latin America. Impact Conference 2015: Connecting Houston to the World through Global Health. Houston Global Health Collaborative. Rice University, Houston, TX. March 22, 2015.
75. **Delclos GL.** Empresa, ética y salud laboral [Company, ethics and occupational health]. Simposio ORP. Bogotá, Colombia. August 18-19, 2015.
76. **Delclos GL.** Los principios de la bioética aplicados a la salud ocupacional y a la prevención [The application of bioethical principles to occupational health and prevention]. XV Congreso ORP. Santiago, Chile. November 23-25, 2015.
77. **Delclos GL.** Directions and challenges for future disability and disability management research. Munsterdam Symposium: Back to the Future. Dutch Research Centre for Insurance Medicine. Amsterdam, Netherlands. December 17, 2015.
78. Lopez DS, Advani S, Tsilidis KK, Daniel CR, Wang R, **Symanski E**, Canfield S. Association of urinary phthalate metabolites with erectile dysfunction in racial and ethnic groups in NHANES 2001-2004. American Urological Association Meeting, May 14-19, New Orleans, LA, 2015.
79. Swartz MD, Cai Y, Chan W, **Symanski E**, Mitchell LE, Danysh H, Langlois P, Lupo PJ. Using Bayesian hierarchical models to simultaneously evaluate multiple pollutants associated with Spina Bifida. Joint Statistical Meetings, Seattle, WA, August 2015.
80. Shim J, Pérez A, **Symanski E**, Nyitray AG. The association between vitamin D and human papillomavirus cervicovaginal infection in the United States. 30th International Papillomavirus Conference & Clinical and Public Health Workshops (HPV 2015), Lisbon, Portugal, September 17-21, 2015.
81. Deal JA, Sharrett AR, Windham BG, Kritchevsky S, **Pompeii LA**, Lin FR. Relationship Between Hearing Impairment and Physical Function and Falls in Older Adults: Recent Insights from Two Observational Epidemiologic Studies. International Society of Gait and Posture Research World Congress. June 2015.
82. Nichols HB, Baird DD, Stanczyk FZ, Steiner AZ, Troester MA, **Whitworth KW**, Sandler DP. Anti-Mullerian hormone concentrations in premenopausal women and breast cancer risk. Abstract presented at the 2015 Annual meeting of the 48th Annual Society for Epidemiologic Research Meeting, June 16-19, 2015, Denver, CO.
83. Alvarado MD, Mackay TM, De La Rosa EM, **Whitworth KW**, Valerio MA, Frio Translational Advisory Board Members, Atascosa Health Center, and Karnes Community Advisory Board Members. Partners for a Healthy Community and Environment (PaCE) Project: Exploring health literacy, attitudes, and behaviors

associated with environmental health in the Eagle Ford Shale. Poster presented at the 2015 Community Engagement Symposium: Developing and Enhancing Collaborations for the Translation of Research, May 2015, San Antonio, TX.

84. Mackay TM, Alvarado MD, De La Rosa EM, **Whitworth KW**, Valerio MA. Partners for a Healthy Community and Environment (PaCE) Project: Community perceptions of the environmental health impact of unconventional oil and gas development in the Eagle Ford Shale. Poster presented at the UTSPH Student Research Day 2015: Building Broader Connections, April 2015, Houston, TX
85. Mackay TM, Alvarado MD, De La Rosa EM, **Whitworth KW**, Valerio MA. Working with community partners to identify perceptions of environmental health impacts of unconventional oil and gas development in the Eagle Ford Shale: Partners for a Healthy Community and Environment (PaCE) Project. Poster presented at the 6th Annual Frontiers of Translation Science Research Day, April 2015, San Antonio, TX.

**Academic Training Program in
Total Worker Health**

**Southwest Center for Occupational
and Environmental Health
UTHealth Education and Research Center**

**Close Out Report
(July 2018 – June 2020)**

**R. Sue Day, PhD
Program Director
(07/01/2018-present)**

Total Worker Health Final Progress Report (July 2018 to June 2020)

Background

The Total Worker Health (TWH) Doctoral Academic Training Program is a new addition to the Southwest Center for Occupational and Environmental Health (SWCOEH), the NIOSH Education and Research Center (ERC) housed within the Department of Epidemiology, Human Genetics and Environmental Sciences (EHGES) at the University of Texas Health Science Center at Houston (UTHealth) School of Public Health. Our TWH program has the unique distinction of being the first doctoral training program of its kind anywhere. **Our goal is to train the next generation of doctoral occupational safety and health (OSH) professionals in *Total Worker Health*® principles and approaches.** These TWH professionals, including researchers and practitioners, will develop, implement and evaluate policies and practices in industries to reduce injury, fatality, illness and promote health and well-being among workers in Public Health Region 6 (PHR 6) and in the nation. **The TWH Program was initially approved by NIOSH in June 2018, but without funding support. In FY19, the SWCOEH received notice of funding for fall 2019 and we immediately enrolled our first trainee.**

Our TWH program originated in 2017, when Drs. Day, Gimeno and Symanski spearheaded an effort to reconfigure, strengthen and heighten relevance of the Environmental and Occupational Health Sciences (EOHS) doctoral programs. This effort resulted in a **new PhD in Environmental Sciences with two tracks: one in TWH** and one in Environmental Disease Prevention. The TWH track is the basis of the ERC TWH Program. The TWH curriculum builds upon experienced UTHealth SPH faculty in the departments of EHGES and Health Promotion and Behavioral Sciences (HPBS), each with strong records of sustained research and education. Our trainees enroll in the PhD in Environmental Sciences, TWH Track, do a minor in HPBS, and a breadth area in worker-centered well-being. The UTHealth SPH main campus is in Houston and there are five other campuses with faculty and students in five major cities across Texas: Austin, Brownsville, Dallas, El Paso, and San Antonio. Students enroll at one campus and take courses in person with faculty at the home campus, by interactive television (ITV) across campuses, and via online courses. Nearly all courses are taught using ITV. During this COVID-19 pandemic we flipped all of our in-person courses to the WebEx platform seamlessly and there was no break in any of our educational offerings. The TWH program was offered at the Houston and San Antonio campuses during this evaluation period, and we have TWH ERC-affiliated faculty supporting students in both of these locations. **Our first admitted TWH student, eligible for a NIOSH traineeship, was recruited in Houston and began training in September 2019.**

The SWCOEH is housed in the UTHealth SPH, which is part of the Texas Medical Center, the world's largest medical complex with 21 hospitals, 13 support organizations, eight academic and research institutions, six nursing programs, three public health organizations, three medical schools, two universities, two pharmacy schools and one dental school, handling 7.2 million patient visits annually and supporting 106,000 workers. Our faculty have strong partnerships and collaboration arrangements throughout the medical center and with important occupational workgroups in the greater Houston community, San Antonio and across the nation, to facilitate student training and research opportunities. Examples of the worker group partnerships include: farmworkers; dairy and logging workers; Hispanic worker groups (including domestic cleaners); healthcare workers; first responders, firefighters; military; and petrochemical industry workers. The ERC has strong relationships with industry and worker group partners in PHR 6 with expressed interest in supporting the ERC TWH Program. These partners are committed to facilitating training and research opportunities for TWH students. The ERC faculty in Houston and San Antonio, the 4th and 7th most populous cities in the US, **provide unique training and research opportunities** in different parts of the state. Houston spans over 655 square miles of

land, is bordered on the south by the Gulf of Mexico, and is home to the largest petrochemical district in the continental US. Houston is tri-ethnic with 38.8% Anglo, 35.9% Hispanic, and 16.7% African Americans, providing a diverse environment for students to train, work and live. The ERC Houston faculty have strong relationships with Texas Children's Hospital Employee and Wellness Center, with faculty serving as consulting medical directors, trainees completing theses with hospital partners and our residents involved in policy-making task forces. Strong oil and gas relationships are longstanding with Royal Dutch Shell, Chevron and Exxon. More than one third of Houstonians over the age of five speak a language other than English in the home. San Antonio is predominantly Hispanic (63%), with 26% Anglo, 7% African American, and 2.5% Asian. About 42% of the population lives in households where Spanish is spoken. The San Antonio campus has a long history of working with the UT Health Science Center at San Antonio, particularly with the School of Medicine and the Center for Research to Advance Community Health (ReACH); the University Health System, the public district hospital for San Antonio; the San Antonio Metropolitan Health District, as well as Brooke Army Medical Center, one of the Army's largest medical care facilities as well as community partners.

Past Performance Accomplishments in Last Project Period

The TWH Program was initially approved by NIOSH in June 2018, but without funding support. **The SWCOEH ERC received notice of funding for the TWH program for the 2019-20 grant year. This report covers the progress made during the second year (2019-2020) with research training funding for 1 trainee.** Our planning and recruitment in the unfunded year successfully resulted in acceptance of our first trainee for Fall of 2019. We continued to use the same recruitment materials and approach during this year and have filled both of our approved training slots for Fall of 2020. Our recruitment flyer details the program and explains the resources provided as well as the unique educational and training opportunities we offer at UTHealth SPH. We use these materials at professional meetings, recruitment fairs and venues, such as the Association of Schools and Programs of Public Health (ASPPH) meetings in conjunction with the annual American Public Health Association (APHA) meeting. The TWH Track option was added to the SOPHAS student application portal to allow declaration of interest in this track at the time of application to UTHealth SPH. Recruitment flyers were circulated electronically (email and social media) to existing students and alumni to provide awareness of the new educational program. UTHealth SPH staff and faculty recruiting at colleges and universities or professional society meetings were provided flyers to help identify promising students. We recruited from existing students (already enrolled at UTHealth SPH) to consider changing to the TWH Track or matriculating as a doctoral student after graduation with a master's degree. Our website <https://sph.uth.edu/research/centers/swcoeh/twh/> is also an outward facing tool for TWH Track traineeship information.

During the recent project period, we implemented the curriculum for TWH students approved for our university by the Council on Education for Public Health accreditation in 2019-2020. The new courses developed specifically for this Track of students, Total Worker Health and Worker-Well-being and Occupational Health Psychology were offered and received great reviews by students. The Total Worker Health Field Experience course is developed and will begin when our first trainees complete the Preliminary Exam and are ready for the field experience. The EOHS Doctoral Research Seminar series, taken by all EOHS doctoral students and OM residents, began devoting at least 25% of its presentations to TWH-related topics to broaden exposure of trainees to TWH applications in practice and research. Incorporation of TWH and worker well-being content into the instructional activities of all our trainees' courses, as appropriate, makes the entire ERC training program stronger and more cohesive.

Program Deliverables

Our goal is to train the next generation of doctoral-trained occupational safety and health professionals in *Total Worker Health* principles and approaches. These occupational safety and health professionals will contribute to the nation's TWH professionals (researchers and practitioners) and will develop, implement and evaluate policies and practices in industries to reduce injury, fatality, illness and promote health and well-being among workers in PHR 6 and in the nation. **As the first doctoral training program in TWH in the nation**, we aligned our training program closely with the principles of the NIOSH TWH program, the research products of the Centers of Excellence for *Total Worker Health*, and the research and practice activities of other NIOSH TWH Affiliates. We became a new **TWH Affiliate** in summer 2019 and are delighted to announce we received notice of a **3-year extension (2020-2023)** of this status. Our ERC is emphasizing TWH and worker well-being through courses and inter-professional activities to embody the principles taught. Our TWH trainees will participate in planning and implementation activities associated with a recently funded U13 Cooperative Agreement with NIOSH (G. Delclos, PI) to develop topic-specific workshops centered on examining workforce changes in coming years, training needs and research methods and measures in worker well-being. They will be actively involved in the international, inter-professional conference we coordinate (scheduled for early 2021) and participate in dissemination of the findings from all the events to the scientific community.

NIOSH Tables 1 and 2 summarize the scientific products of the TWH program in the reporting period. Following NIOSH requirements, we are separating publications where (a) the SWCOEH ERC grant was included in Acknowledgments, as well as (b) those with mention of our SWCOEH affiliation only. **TWH trainee outputs** include 1 presentation and no peer-reviewed journal publications. **TWH faculty outputs** include 1 presentation and 10 peer-reviewed journal publications, of which 8 included the ERC grant number and 2 were affiliation only products.

TOTAL WORKER HEALTH

Trainee Outputs – Publication and Presentations

Note: Not underlined = ERC grant acknowledged; Underlined = ERC Affiliation Only.

PUBLICATIONS (peer-reviewed journal articles)

Trainees

2020

None to report

PRESENTATIONS

Trainees

2020

1. **Daywalker R**, Journal Club, Chronic disease in the workplace/work productivity, Dewa CS, Hoch JS, Nieuwenhuijsen K, Parikh SV, Sluiter JK. Toward effective work accommodations for depression. Examining the relationship between different combinations of depression symptoms and work productivity losses. JOEM 2019; 61 (1): 75-79. February 20, 2020.

TOTAL WORKER HEALTH

TWH Faculty Outputs – Publication and Presentations

Note: Not underlined = ERC grant acknowledged; Underlined = ERC Affiliation Only.

PUBLICATIONS (peer-reviewed journal articles)

Faculty

2020

1. An Han H, Han I, McCurdy S, Whitworth K, **Delclos G**, Rammah A, Symanski E. The Intercontinental Terminals Chemical Fire Study: A Rapid Response to an Industrial Disaster to Address Resident Concerns in Deer Park, Texas. Int J Environ Res Public Health. 2020; 17(3).
2. Hashemi NS, Thørrisen MM, Skogen JC, Sagvaag H, **Gimeno Ruiz de Porras D**, Aas RW. Gender Differences in the Association between Positive Drinking Attitudes and Alcohol-Related Problems. The WIRUS Study. Int J Environ Res Public Health 2020; 17: 5949.
3. Ish J, **Gimeno Ruiz de Porras D**, Whitworth KW. Mental wellbeing among Hispanic female domestic cleaners. Arch Public Health. 2020; 78:10.
4. Pate W, Betancourt J, **Delclos G**, Douphrate D, **Gimeno Ruiz de Porras D**. Patient & Employee Safety Culture Measurement & Agreement. Prof Saf. 2020;64(2):41-46.
- 5.

6. Patel J, **Gimeno Ruiz de Porras D**, Mitchell LE, Patel RR, De Los Reyes J, **Delclos GL**. Work-Related Asthma among Certified Nurse Aides in Texas. Workplace Health Saf. 2020 (In Press).
7. **Perkison WB**, Li Y, Symanski E, Bakos-Block C, Zhang K, Magal R, McDaniel M, Adekanye J, Esquenazi S, Rammah A. The Post Hurricane Harvey Respiratory Protection Training Program. J Occup Environ Med. 2020 (In Press).
8. Rodriguez A, Douphrate DI, **Gimeno Ruiz de Porras D**, Perez A, Hagevoort R, Nonnenmann MW, Cienega L. Association of category of cattle exposure with tuberculosis knowledge among dairy workers in Bailey County, Texas. J Agromed. 2020 (In Press).
9. Rueda-Garrido, JC, Vicente-Herrero MT, Del Campo MT, Reinoso-Barbero L, de la Hoz RE, **Delclos GL**, Kales SN, Fernandez-Montero A. Return to work guidelines for the COVID-19 pandemic. Occup Med (Lond). 2020; 70(5): 300-305.
10. Schulte PA, Streit JMK, Sheriff F, **Delclos G**, Felknor SA, Tamers SL, Fendinger S, Grosch J, Sala R. Potential Scenarios and Hazards in the Work of the Future: A Systematic Review of the Peer-Reviewed and Gray Literatures. Ann Work Expo Health 2020 (In press).

2019

11. Gerasimaviciute V, Bultmann U, Diamond PM, Tullar JM, **Delclos GL**, **Gimeno Ruiz de Porras D**, Amick III BC. Reciprocal associations between depression, anxiety and work-related injury. Inj Prev. 2019. (In Press)

PRESENTATIONS

Faculty

2020

1. **Day RS**. Work Safe, Stay Healthy at Home Webinar: Do You Miss Being in Control? Presented to: Webinar - Ergonomics, Nutrition, Physical Activity, and Mental Health guidance while working remotely from home during COVID-19. Southwest Center for Occupational & Environmental Health, NIOSH-funded Education & Research Center. April, 2020.

**Pilot Project Research
Training Program (PPRTP)**

**Southwest Center for Occupational
and Environmental Health
UTHealth Education and Research Center**

**Close Out Report
(July 2015 – June 2020)**

**Kai Zhang, PhD
Program Director
(07/01/2020-present)**

**David I. Douphrate, PhD, MPT, MBA, CPE, CSP
Program Director
(07/01/2015-06/30/2020)**

Pilot Project Research Training Program Final Progress Report (July 2015 to June 2020)

Background

This is the Final Progress Report of the Pilot Project Research Training Program (PPRTP) in the Southwest Center for Occupational and Environmental Health (SWCOEH), the NIOSH Education and Research Center (ERC) at The University of Texas Health Science Center at Houston (UTHealth) School of Public Health. The PPRTP is based within the SWCOEH ERC that has a 42-year history of commitment to occupational safety and health (OSH) and addressing a shortage of OSH professionals in Public Health Region (PHR) 6, which includes Arkansas, Louisiana, New Mexico, Oklahoma and Texas. The SWCOEH ERC is part of the Department of Epidemiology, Human Genetics, and Environmental Sciences (EHGES) at UTHealth SPH, located in the Texas Medical Center, the largest medical complex in the world. UTHealth, the most comprehensive academic health center in Texas, is a unique environment offering extraordinary opportunities to train public health professionals. As an affiliate of the NIOSH *Total Worker Health*® program, the SWCOEH ERC embraces the *Total Worker Health* (TWH) paradigm, a holistic, systems-thinking approach, integrating personal, socioeconomic, and environmental factors to focus on worker well-being, shifting beyond the traditional prevention of workplace illness, injury or health promotion.

Two recent circumstances are to be highlighted. First, in October 2019 we submitted our 5-year competing renewal for 2020-2025. The Summary Statement received on March 2020 noted that the weaknesses listed were mostly minor, and that our application's strengths largely outweighed its weaknesses. All our programs were recommended for funding, and in June 2020, we submitted the required Just-In-Time documentation. We are waiting for the official Notice of Grant Award. Second, in response to the pandemic of COVID-19, the infectious disease caused by a novel coronavirus (SARS-CoV-2), changes in the normal SWCOEH operations were implemented so that classes, interdisciplinary activities, in-person CE became interactive virtual events, and travel was restricted. Also, several scientific meetings which our trainees had planned to attend, were either cancelled or moved to virtual events. Throughout these challenging times, we have strived to maintain our mission to promote and improve health, safety, and well-being in the workplace and the community, with a particular focus on the impact of COVID-19.

PPRTP Plan

The SWCOEH ERC PPRTP was first established in 1999 to enhance the SWCOEH ERC's OSH research training mission and to foster stronger inter-institutional ties within PHR6 in occupational health research. The process for selecting and funding pilot research projects through this Program is competitive and modeled after the NIH Center for Scientific Review's approach, also used in the NIOSH extramural research program. 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 SWCOEH-PPRTP. First, it provides for an objective and transparent scientific evaluation of the proposals submitted to the Program's scientific review panel. Second, the submission, evaluation and award mechanism affords 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.

The PPRTP objectives for the funding cycle were:

- 1) Release RFP with focus on special topics, NORA priorities and the needs of PHR 6.
- 2) Refine and increase the efficiency of distributing the RFP announcement, particularly in Arkansas and New Mexico.
- 3) Increase the number of applications while maintaining the rigor of the review process.

- 4) Improve productivity by further facilitating the dissemination of study findings in the peer-reviewed literature. (Starting in FY14, the RFP will request applicants to provide a brief plan for the publication of study results and describe plans for future grant applications).
- 5) Work with our contracts and grants office to streamline and improve the efficiency of the contract process and fiscal administration of the projects awarded. (The administrative component of the Program is made more cumbersome by multiple procedures at the contracts and grants offices of the different institutions. Some improvements have been made, but streamlining the process to the extent that we can remains an objective).
- 6) Refine and administer the research trainee survey as a means of collecting information on the impact of the program and for program improvement.

During this funding cycle, we increased our marketing of the PPRTTP to institutions outside Texas. As a result, we have seen an increase in applications and awards to researchers from both Arkansas (four applications and two awards) and Louisiana (six applications and one award). We still received a limited number of applications from New Mexico (one application and no awards in the current cycle). In the entire 21-year history of the PPTRP, we have received only nine letters of intent and six proposals, resulting in only one funded project, from New Mexico applicants. As a result, we plan to employ a more strategic marketing plan in New Mexico by targeting institutions with potential OSH aligned, graduate-level educational or research programs. We will also enhance our efforts by identifying and distributing the Request for Proposal announcement to new department chairs, faculty and other personnel in relevant departments at research universities throughout PHR6.

Past Performance / Accomplishments of the PPRTTP Program in Last Project Period

The PPRTTP is in its 21st year and has matured and expanded since it started in 1999 (see **Table PPRTTP-1, below**). The average number of applications have stayed at similar levels, 15 per year (75 total) in FY2010-14 to 14 per year (75 total) in FY2015-19, of which approximately 42.0% (n=31) were supported (\$346,096 total). Since 1999, we have received 292 PPRTTP proposals and awarded 140 (47.9%) projects. Based on the combined funding level for the 140 funded projects to date (\$1,488,762) and considering the available resources for the PPRTTP, the productivity of the Program compares quite well with that expected from the typical 3-year R01 award (\$250,000/year in direct costs) after completion. There will be additional products (i.e., dissertations, publications, presentations) from past and current projects, as trainees complete their doctoral dissertations and publish their results. Since the Program's inception, the PPRTTP funded projects in each state of PHR6. Abstracts of funded projects can be found on our website (www.swcoeh.org). This record demonstrates the success and long-term sustainability of the PPRTTP.

Letters of Intent

Between 2015 and 2020, we received a total of 1033 letters of intent to submit a PPRTTP proposal. These letters were submitted from investigators in higher-education institutions in all states in PHR6: four (4.3%) from Arkansas, seven (7.5%) from Louisiana, one (1.1%) from New Mexico, 32 (34.4%) from Oklahoma, and 50 (53.8%) from Texas. On average, we received 19 letters of intent each year of the funding cycle.

Proposals

Since 2015, we received a total of 75 proposals from higher-education institutions in all states in PHR6: four proposals from two distinct institutions in Arkansas; six proposals from four distinct institutions in Louisiana, one proposal from one institution in New Mexico, 25 proposals from five distinct institutions in Oklahoma, and 32 proposals from 15 distinct institutions in Texas. Research proposals were submitted from a total of 30 distinct higher-education institutions, with each

UTHealth SPH campus classified as a distinct campus in our tabulations. On average, we received 13.8 proposals each year in the five years of this funding cycle.

Table PPRTP-1. Number of Letters of Intent, Proposals and Awards

Program Year	Calendar Period	Letters of Intent	Proposals		Awards		\$ Total
			SPH	Non SPH	SPH	Non SPH	
Year 1	1999/2000	4	3	1	3	1	39,477
Year 2	2000/01	8	1	5	1	4	45,398
Year 3	2001/02	23	2	13	2	6	79,501
Year 4	2002/03	14	3	9	2	4	76,469
Year 5	2003/04	24	5	12	4	5	85,318
Year 6	2004/05	27	5	16	1	7	73,325
Year 7	2005/06	20	4	14	3	5	80,000
Year 8	2006/07	21	3	14	2	5	78,024
Year 9	2007/08	17	3	13	2	5	87,492
Year 10	2008/09	15	2	10	0	6	82,247
Year 11	2009/10	13	5	6	5	4	92,560
Year 12	2010/11	24	2	13	1	7	79,874
Year 13 ^a	2011/12	21	5	10	4	5	80,358
Year 14 ^a	2012/13	19	5	13	2	5	69,988
Year 15 ^{a,b}	2013/14	28	7	13	2	2	39,790
Year 16 ^c	2014/15	8	1	6	2	4	70,197
Year 17	2015/16	13	1	7	1	3	39,701
Year 18 ^a	2016/17	30	5	16	3	4	79,785
Year 19 ^a	2017/18	17	5	9	3	4	79,888
Year 20 ^a	2018/19	23	2	16	2	4	79,533
Year 21	2019/20	10	2	5	2	3	49,837
Total	1999/2020	364	71	221	47	93	1,488,762

^a Two funding announcements in this year; numbers are for the total; ^b Total does not include monies awarded to 2 UTHealth SPH and 1 non-SPH projects to start in 2014/15; ^c Total includes three projects from 2013/14.

Funded Projects

During this funding cycle, we funded a total of 31 projects (~6 per year) from investigators from institutions in four of the five states in PHR6: three projects from two distinct institutions in Arkansas, one project from one institution in Louisiana, seven projects from three distinct institutions in Oklahoma, and 18 projects from 10 institutions in Texas). Funded projects represented a total of 16 distinct higher-education institutions, with each UTHealth SPH campus classified as a distinct campus. Approximately 62% of awarded projects were from non-UTHealth SPH institutions: 10 from research trainees, 10 from junior investigators, and nine from new investigators in OSH. Additionally, the funded projects represented seven of the 10 National Occupational Research Agenda (NORA) industrial sectors, and all seven cross-sectors (see **Table PPRTP-2**).

Table PPRTP-2. PPRTP funded project by NORA sector and cross-sector.

	FY15	FY16	FY17	FY18	FY19	Total
NORA Sector						
Agriculture, Forestry & Fishing	-	1	-	2	-	3
Construction	1	-	2	1	-	4
Healthcare and Social Assistance	-	2	-	-	-	2
Manufacturing	-	-	1	-	1	2

Mining	-	-	-	-	-	-
Oil & Gas Extraction	2	1	1	-	-	4
Public Safety	1	-	1	-	3	5
Services	-	3	2	3	1	9
Transportation, Warehousing & Utilities	-	-	-	-	-	-
Wholesale & Retail Trade	-	-	-	-	-	-
NORA Cross-sector						
Cancer, Reproductive, Cardiovascular & Other Chronic Diseases	1	1	2	1	1	6
Hearing Loss Prevention	1	-	-	-	-	1
Immune, Infectious & Dermal Disease Prevention	-	-	1	-	-	1
Musculoskeletal Health	1	2	-	1	1	5
Respiratory Health	1	2	3	2	1	9
Traumatic Injury Prevention	-	-	1	1	2	4
Healthy Work Design & Well Being	-	2	-	1	-	3
Total	4	7	7	6	5	29

Outcomes

To date, in the reported funding period, awardees who completed their funded pilot project generated 22 peer-reviewed publications, one book chapter, and delivered 44 conference presentations using data from their funded PP RTP project (see Table PP RTP-3). In addition, seven PP RTP awardees have submitted four grant proposals using findings from their pilot projects.

Dr. Sadie Conway, 2014-2015 awardee, used her pilot project findings to support a NIOSH R03 proposal in October 2015 entitled *Occupational Exposures to Long Work Hours: Thresholds of Effect and Influence of Exposure Patterns on Chronic Health Conditions*, and Dr. Kai Zhang, 2014-2015 awardee, used his pilot project findings to support a NIOSH R03 proposal in October 2015 entitled *Assessing Heat-Related Morbidity among Migrant and Seasonal Farmworkers*. Dr. David Doupbrate, 2012-2013 awardee, used his pilot projects findings to support a proposal in December 2015, *Safety Management and Leadership on Large Herd Dairy Farms*, submitted to NIOSH through the High Plains and Intermountain Center for Agricultural Health and Safety (HICAHS). Additionally, his findings helped to support a U01 proposal entitled *Development of Safety Management and Leadership Training Program for Logging Contractors* which was subsequently funded by NIOSH (Project dates: 2014-2017; Total direct amount: \$681,989) and also to support a Susan Harwood Safety training grant submitted to OSHA, which was awarded funding through September 2017. Dr. Aditya Jayadas, 2015-2016 awardee, used his pilot project findings to support an R21 grant submitted to NIOSH entitled *Empathic Co-redesign of Police Duty Belt, Vehicle Seat and Interior to Reduce Low Back Pain*. Dr. Kaitlin Gallagher (2016-2018 PP RTP awardee) published her research findings in the *European Journal of Applied Physiology* as well as *Medicine and Science in Sports and Exercise*. Additionally, data from Dr. Gallagher's study made possible a doctoral student award (Aaron Caldwell, University of Arkansas) by the Central States American College of Sports Medicine.

During this reporting period, past awardees presented their pilot research findings at several conferences. For example, Dr. Adriana Campos-Fumero, 2013-2014 awardee, presented her research entitled *Low back pain among office workers in Costa Rica, Nicaragua and Spain at the 25th International Epidemiology in Occupational Health (EPICOH) Conference* in Barcelona, Spain in September 2016. Dr. Sadie Conway, 2014-2015 awardee, also presented at the same conference. Her presentation was entitled *Evidence of a Dose-Response Relationship between Work Hours and Cardiovascular Disease Risk*. Dr. Conway also was invited to present at the Marconi Research Conference in January 2017 in Galveston, TX. Her presentation was entitled

Work Hours and Cardiovascular Disease. Dr. Aditya Jayadas presented research findings at the Southwest Human Factors Symposium in San Antonio in June 2017 and the 8th International Conference on Applied Human Factors and Ergonomics in Los Angeles in July 2017. Dr. Kristi Whitworth, 2016-2017 awardee, presented research findings at the 2017 Institute for Integration of Medicine and Science (IIMS) Community Engagement Symposium in San Antonio, Texas in October. Lastly, Dr. Bovorn Sirikul, 2016-2017 awardee, presented research findings at the 46th Annual Meeting of the Southeast American College of Sports Medicine in Chattanooga, TN in February 2018. Janil Patel, 2016-2017 awardee, presented research findings at the CDC/NIOSH Respiratory Health Division Seminar in Morgantown, WV in September 2017. Dr. Jennifer Gonzales (2017-18 PPRTP awardee), presented at the Law Enforcement Public Health Conference, October 23, 2018, in Toronto, Ontario.

Additionally, during this reporting period, past awardees published or submitted pilot findings in 11 peer-reviewed journals. For example, Dr. Edward Brooks, 2014-2015 awardee, published pilot research findings in *Seminars in Immunology*. Dr. Adriana Campos-Fumero, 2013-2014 awardee, published research findings in *Occupational and Environmental Medicine*. Dr. Sadie Conway, 2014-2015 awardee, published research findings in the *Journal of Occupational and Environmental Medicine*. Dr. Kai Zhang, 2014-2015 awardee, published research findings in *Occupational and Environmental Medicine*. A full list of publications for this reporting period is listed in the Publications section. Dr. Brennan Thompson, 2014-2015 awardee, published research findings in *Human Factors* and Dr. Jun Wang, 2015-2016 awardee published research findings in *Annals of Work Exposures and Health*. Dr. Adam Pickens, 2015-2016 awardee, published his research findings in *The Hearing Journal*. Dr. Lu Yuan, 2010-2011 awardee, published pilot research findings in *Ergonomics*, and Dr. Inkyu Han, 2012-2013 awardee, published his pilot project findings in *Environment and Pollution*. Dr. Laura Lee, 2013-2014 awardee, published her research findings in the *American Journal of Industrial Medicine*.

Table PPRTP-3. PPRTP outcomes from funded projects.

	FY15		FY16		FY17		FY18		Total
	UTHealth SPH		UTHealth SPH		UTHealth SPH		UTHealth SPH		
	Yes	No	Yes	No	Yes	No	Yes	No	
Peer-reviewed articles	4	5	6	2	-	1	2	2	22
Presentations	2	7	7	7	4	10	3	5	44
Grant proposals									
Submitted	-	-	-	-	1	1	1	-	3
Funded	-	-	-	-	1	-	-	-	1

Awardees in the fifth and final year of the FY2015-19 funding cycle have not had sufficient time to generate manuscripts or grant submissions using data from their research project. Therefore, we have included outcome data from the four first years (FY2015-18) of the reported funding cycle. In these years, awardees contributed to 22 peer-publications and 44 conference presentations. In addition, PPRTP awardees or faculty mentors submitted four grant proposals using findings from funded projects, one received funding, one did not receive funding, and two are pending under review. Also, as trainees complete their doctoral dissertations and publish their results, there will be additional products.

Proposal Reviews

During the reported funding cycle, the PPRTP relied on a robust pool of 134 reviewers representing a diverse spectrum of expertise such as industrial hygiene, ergonomics, safety,

infectious disease, medicine and epidemiology. Reviewers represent higher-education research institutions in 18 different states. We rely on non-UTHealth SPH affiliated reviewers, which comprised 70% of our pool of reviewers during this funding cycle. As part of the PPRTTP mentorship program, we also rely on prior PPRTTP awardees to provide proposal reviews when their content expertise was applicable. Providing the opportunity for past awardees to serve as proposal reviewers is another example of the PPRTTP research mentorship mechanism. This gives prior recipients the opportunity to improve their grant review skills which may be applicable should they be called upon to review grants at a later date.

Pilot Projects Research Training Outputs

2019-2020

July 1, 2019- June 30, 2020

PUBLICATIONS

Awardees from UTHHealth School of Public Health

Rodriguez A, Douphrate DI, Gimeno Ruiz De Porras D, Perez A, Hagevoort R, Nonnenmann M, Cienega L. 2020. Association of category of cattle exposure with tuberculosis knowledge among dairy workers in Bailey County, Texas. J Agromedicine:1-10. PMID: 32449645.

Rodriguez A, Douphrate, D, Gimeno Ruiz de Porras D, Perez A, Hagevoort R, Nonnenmann M, Prot E. 2020 Bovine Tuberculosis case intervention using T.SPOT.TB assay to screen dairy workers in Bailey County, Texas. Front Public Health. <https://doi.org/10.3389/fpubh.2020.00479>

Rodriguez A, Douphrate D, Gimeno Ruiz de Porras D, Perez A, Hagevoort R, Nonnenmann M, Cienega L. 2020 Association of category of cattle exposure with self-reported history of tuberculosis among dairy workers in Bailey County, Texas. Workplace Health and Safety. 2018-2019 (under review)

PRESENTATIONS

Awardees from UTHHealth School of Public Health

Alcauter B. Heat Stress and Kidney Function Among Immigrant Construction Workers in Texas. **Event:** SWCOEH ERC Pilot Projects Research Symposium. **Organization:** SWCOEH ERC. **Place:** Houston, TX. **Date:** June 19, 2020. **Type:** Virtual Oral communication.

Harrison W. Houston Union Firefighters' Perceptions of Cancer Risk and Other Health Outcomes. **Event:** SWCOEH ERC Pilot Projects Research Symposium. **Organization:** SWCOEH ERC. **Place:** Houston, TX. **Date:** June 19, 2020. **Type:** Virtual Oral communication.

Oyer-Peterson K. Exposure to Environmental and Occupational Health Hazards Among Vulnerable Domestic Cleaners in San Antonio. **Event:** SWCOEH ERC Pilot Projects Research Symposium. **Organization:** SWCOEH ERC. **Place:** Houston, TX. **Date:** June 19, 2020. **Type:** Virtual Oral communication.

Awardees from other institutions

Backes RA, Atkins WC, Thomas S, Glenny CP, McDermott BP. Renal Stress Responses to Work in the Heat Comparing Different Hydration Regimens. **Event:** Annual Meeting for the Central States Chapter of the American College of Sports Medicine (ACSM). **Organization:** ACSM. **Place:** Broken Arrow, OK. **Date:** October 24-25, 2019 **Type:** Poster.

Dalwadi S. Defining Occupational Ionizing Radiation Exposure with Low Dose Rate Brachytherapy for Prostate Cancer. **Event:** SWCOEH ERC Pilot Projects Research Symposium. **Organization:** SWCOEH ERC. **Place:** Houston, TX. **Date:** June 19, 2020. **Type:** Virtual Oral communication.

Kollock R. Fit-for-Duty: A Preliminary Analysis of the Predictive Value of the Physical Abilities Test (PAT) for Work-related Casualty. **Event:** SWCOEH ERC Pilot Projects Research Symposium. **Organization:** SWCOEH ERC. **Place:** Houston, TX. **Date:** June 19, 2020. **Type:** Virtual Oral communication.

Molsberry R. Leveraging Personal Technology to Intervene on Continuous Occupational Stress Among Law Enforcement Officers. **Event:** SWCOEH ERC Pilot Projects Research Symposium. **Organization:** SWCOEH ERC. **Place:** Houston, TX. **Date:** June 19, 2020. **Type:** Virtual Oral communication.

Waymire PS, Atkins WC, Flynn AL, Held RM, Backes RA, McDermott BP. Physiological and Perceptual Stress Compared Between Hydration Beverages During and Following Work in the Heat. **Event:** Annual Meeting for the Central States Chapter of the American College of Sports Medicine (ACSM). **Organization:** ACSM. **Place:** Broken Arrow, OK. **Date:** October 24-25, 2019 **Type:** Poster.

Xiang Y. Model-based Ergonomic Design for Collaborative Lifting. **Event:** SWCOEH ERC Pilot Projects Research Symposium. **Organization:** SWCOEH ERC. **Place:** Houston, TX. **Date:** June 19, 2020. **Type:** Virtual Oral communication.

2018-2019

July 1, 2018- June 30, 2019

PUBLICATIONS

Awardees from UTHHealth School of Public Health

Su WC, Chen Y, Xi J. A new approach to estimate ultrafine particle respiratory deposition. *Inhal Toxicol.* 2019;31(1):35-43.

Whitworth KW, Berumen B, Delclos GL, Fragoso S, Mata C, Gimeno Ruiz de Porras D. 2019. Job Hazards and Respiratory Symptoms in Hispanic Female Domestic Cleaners. *Arch Occup Environ Health.* 75:70-74. PMID: 31033410

Awardees from other institutions

Gallagher KM, Payne M, Daniels B, Caldwell AR, Ganio MS. Walking breaks can reduce prolonged standing induced low back pain. *Hum Mov Sci.* 2019;66:31-37.

Caldwell AR, Gallagher KM, Harris BT, Rosa-Caldwell ME, Payne M, Daniels B, Ganio MS. Prolonged standing increases lower limb arterial stiffness. *Eur J Appl Physiol.* 2018;118(10):2249-2258.

PRESENTATIONS

Awardees from UTHHealth School of Public Health

Perkison W. The Hurricane Harvey Outreach Protection Plan Worker and Resident Survey. **Event:** SWCOEH ERC Pilot Projects Research Symposium. **Organization:** SWCOEH ERC.

Place: Houston, TX. **Date:** June 21, 2019. **Type:** Oral communication.

Reingle Gonzalez JM. Real-Time, Objective Measurements of Physiological Stress among Law Enforcement Officers in Dallas, Texas. **Event:** The Fourth International Conference on Law Enforcement & Public Health. **Organization:** Centre for Law Enforcement and Public Health. **Place:** Toronto, Canada. **Date:** October 21-24, 2018. **Type:** Oral communication.

Rodriguez A. Tuberculosis Among Dairy Workers in Bailey County, Texas. **Event:** SWCOEH ERC Pilot Projects Research Symposium. **Organization:** SWCOEH ERC. **Place:** Houston, TX. **Date:** June 21, 2019. **Type:** Oral communication.

Awardees from other institutions

Azoug A. Mitigating Posture Changes and Risks of Falling in Standing Pregnant Workers. **Event:** SWCOEH ERC Pilot Projects Research Symposium. **Organization:** SWCOEH ERC. **Place:** Houston, TX. **Date:** June 21, 2019. **Type:** Oral communication.

Chang C. The Role of Nano-Particulated Carbon Black in Lung Cancer Development. **Event:** SWCOEH ERC Pilot Projects Research Symposium. **Organization:** SWCOEH ERC. **Place:** Houston, TX. **Date:** June 21, 2019. **Type:** Oral communication.

Caldwell AR, Harris BT, Rosa-caldwell ME, Payne M, Daniels B, Gallagher K M, Ganio MS. Prolonged Standing Increases Lower Peripheral Arterial Stiffness Independent Of Walking Breaks. **Event:** Annual Conference of Central States Chapter American College of Sports Medicine (ACSM). **Organization:** ACSM. **Place:** Toronto, Canada. **Date:** October 21-24, 2018. **Type:** Poster.

Ibarra-Mejia G. Exploring Molecular Changes and Inflammatory Cytokines. **Event:** SWCOEH ERC Pilot Projects Research Symposium. **Organization:** SWCOEH ERC. **Place:** Houston, TX. **Date:** June 21, 2019. **Type:** Oral communication.

McDermott, B. The Effect of Sugar-Sweetened Electrolyte Beverages on Biomarkers of Hydration and Renal Stress During and Following Industrial Work in the Heat. **Event:** SWCOEH ERC Pilot Projects Research Symposium. **Organization:** SWCOEH ERC. **Place:** Houston, TX. **Date:** June 21, 2019. **Type:** Oral communication.

GRANT APPLICATIONS

Awardees from UTH Health School of Public Health

Whitworth K, Han I. Study of Cleaners in San Antonio: Immunologic and Inflammatory Responses to Total Volatile Organic Compound (VOC) Exposure. (Re-submission) **Agency:** NIH/NIEHS. **Outcome:** Not funded.

2017-2018

July 1, 2017 - June 30, 2018

PUBLICATIONS

Awardees from other institutions

Pickens AW, Robertson LD, Smith ML, Zheng Q, Song S. Headphone Evaluation for App-Based Automated Mobile Hearing Screening. *Int Arch Otorhinolaryngol*. 2018;22(4):358-363.

PRESENTATIONS

Awardees from UTH Health School of Public Health

Figuerola-Solis E. Pilot testing of the DEGREE Study Protocol, POC Field Measurements, and Module on Risk Factors for CKDu in Hispanic Outdoor Workers. **Event:** SWCOEH ERC Pilot Projects Research Symposium. **Organization:** SWCOEH ERC. **Place:** Houston, TX. **Date:** June 22, 2018. **Type:** Oral communication.

Reingle Gonzalez JM. The Law Enforcement Officer Stress Surveillance Study (LEO-Stress). **Event:** SWCOEH ERC Pilot Projects Research Symposium. **Organization:** SWCOEH ERC. **Place:** Houston, TX. **Date:** June 22, 2018. **Type:** Oral communication.

Su W. Ultrafine Particle Respiratory Deposition Measurement. **Event:** SWCOEH ERC Pilot Projects Research Symposium. **Organization:** SWCOEH ERC. **Place:** Houston, TX. **Date:** June 22, 2018. **Type:** Oral communication.

Fragoso S, Berumen B, Herrera A, Cavazos I, Gimeno D, Whitworth KW. A community-academic partnership to address occupational and environmental hazards among Hispanic women working as domestic cleaners. **Event:** 2017 Institute for Integration of Medicine and Science (IIMS) Community Engagement Symposium. **Organization:** IIMS, UT Health San Antonio. **Place:** San Antonio, TX. **Date:** October 27, 2017. **Type:** Type communication.

Awardees from other institutions

Bezerra M. Oxidative Gases Emission and Particulates' Oxidative Potential from Non-conventional Welding. **Event:** SWCOEH ERC Pilot Projects Research Symposium. **Organization:** SWCOEH ERC. **Place:** Houston, TX. **Date:** June 22, 2018. **Type:** Oral communication.

Feng Y. A Virtual Human System for Health Risk Assessments in a Representative Whole-lung Configuration Associated with Welding Fume Exposure. **Event:** SWCOEH ERC Pilot Projects Research Symposium. **Organization:** SWCOEH ERC. **Place:** Houston, TX. **Date:** June 22, 2018. **Type:** Oral communication.

Daniels B, Payne M, Caldwell A, Ganio M, Gallagher KM. The influence of walking breaks while standing on gluteus medius activity and low back pain. **Event:** 41st Annual American Society of Biomechanics Conference. **Organization:** American Society of Biomechanics and University of Colorado Boulder. **Place:** Boulder, CO. **Date:** August 8-11, 2017. **Type:** Oral communication.

Payne M, Daniels B, Ganio M, Caldwell A, Gallagher KM. The influence of walking breaks on lumbar spine kinematics during prolonged standing. **Event:** 41st Annual American Society of Biomechanics Conference. **Organization:** American Society of Biomechanics and University of Colorado Boulder. **Place:** Boulder, CO. **Date:** August 8-11, 2017. **Type:** Oral communication.

Caldwell AR, Harris BT, Rosa-Caldwell ME, Payne M, Daniels B, Gallagher, K.M, Ganio MS. Prolonged standing increases lower peripheral arterial stiffness independent of walking breaks. **Event:** Annual Meeting of the Central States Chapter American College of Sports Medicine

(ACSM). **Organization:** ACSM. **Place:** Kansas City, MO. **Date:** October 18-19, 2017. **Type:** Oral communication.

Jayadas A, Petrova A, Peksoz S. Interactions of factors contributing to low back pain in patrol police officers: implications for intervention. **Event:** 8th International Conference on Applied Human Factors and Ergonomics (AHFE). **Organization:** AHFE. **Place:** Los Angeles (CA). **Date:** July 17-21, 2017. **Type:** Oral communication.

Derafshi M, Petrova A, Jayadas A, Peksoz S. Investigation of Patrol Officers' Musculoskeletal Health: Needs Assessment of Campus Patrol Officers. Internatinoal Textile and Apparel Association (ITAA) Annual Conference. **Organization:** ITAA. **Place:** St. Petersburg, FL. **Date:** November 14-18, 2017. **Type:** Oral communication.

Shortz A. Development of Fatigue Risk Assessment Method for High Risk Environments (FRAME). **Event:** SWCOEH ERC Pilot Projects Research Symposium. **Organization:** SWCOEH ERC. **Place:** Houston, TX. **Date:** June 22, 2018. **Type:** Oral communication.

Kirkendoll C, Sirikul B. Relationship between physiological and perceptual heat strain during simulated industrial tasks in a hot and humid environment. **Event:** 46th Annual Meeting Southeast American College of Sports Medicine (ACSM). **Organization:** ACSM. **Place:** Chattanooga, TN. **Date:** February 15-17, 2018. **Type:** Oral communication.

Xu Y. Occupational Exposure to SVOCs from Indoor "Green" Paints. **Event:** SWCOEH ERC Pilot Projects Research Symposium. **Organization:** SWCOEH ERC. **Place:** Houston, TX. **Date:** June 22, 2018. **Type:** Oral communication.

FUNDED GRANT APPLICATIONS

Awardees from UHealth School of Public Health

Zhang K. Assessing Heat-Related Morbidity among Migrant and Seasonal Farmworkers. **Agency:** NIOSH. **Award type:** R03. **Period:** 09-01-2016 / 8-31-2018.

GRANT APPLICATIONS

Awardees from UHealth School of Public Health

Whitworth K, Han I. Study of Cleaners in San Antonio: Immunologic and Inflammatory Responses to Total Volatile Organic Compound (VOC) Exposure. (Submission) **Agency:** NIH/NIEHS. **Outcome:** Not funded.

Awardees from other institutions

Jayadas A, Peksoz S, Petrova A. Empathic co-redesign of police duty belt, vehicle seat and interior to reduce low back pain. Agency: CDC-NIOSH. Outcome: Not Funded.

2016-2017

July 1, 2016 - June 30, 2017

PUBLICATIONS

Awardees from UTHHealth School of Public Health

Campos-Fumero A, Delclos GL, Douphrate DI, Felknor SA, Vargas-Prada S, Serra C, Coggon D, Gimeno Ruiz de Porras D. Low back pain among office workers in three Spanish-speaking countries: findings from the CUPID study. *Inj Prev*. 2017;23(3):158-164.

Conway SH, Pompeii LA, Roberts RE, Gimeno D, Follis JL. Response to Letter to the Editor. *J Occup Environ Med*. 2016;58(8):e319.

Conway SH, Pompeii LA, Gimeno Ruiz de Porras D, Follis JL, Roberts RE. The Identification of a Threshold of Long Work Hours for Predicting Elevated Risks of Adverse Health Outcomes. *Am J Epidemiol*. 2017;186(2):173-183.

Conway SH, Pompeii LA, Roberts RE, Follis JL, Gimeno D. Dose-Response Relation Between Work Hours and Cardiovascular Disease Risk: Findings From the Panel Study of Income Dynamics. *J Occup Environ Med*. 2016;58(3):221-6.

Han J, Guo Y, Afshar M, Stock TH, Symanski E. Comparison of trace elements in size-fractionated particles in two communities with contrasting socioeconomic status in Houston, TX. *Environ Monit Assess*. 2017;189(2):67.

Tarlo SM, Arif AA, Delclos GL, Henneberger P, Patel J. Opportunities and obstacles in translating evidence to policy in occupational asthma. *Ann Epidemiol*. 2018;28(6):392-400.

Awardees from other institutions

Yoon HU, Anil Kumar N, Hur P. Synergistic Effects on the Elderly People's Motor Control by Wearable Skin-Stretch Device Combined with Haptic Joystick. *Front Neurobot*. 2017;11:31.

Wang J, Hoang T, Floyd EL, Regens JL. Characterization of Particulate Fume and Oxides Emission from Stainless Steel Plasma Cutting. *Ann Work Expo Health*. 2017;61(3):311-320.

PRESENTATIONS

Awardees from UTHHealth School of Public Health

Ahn J. Climate Change and Occupational Heat Stress in the United States. **Event:** SWCOEH ERC Pilot Projects Research Symposium. **Organization:** SWCOEH ERC. **Place:** Houston, TX. **Date:** June 2, 2017. **Type:** Oral communication.

Campos-Fumero A, Delclos GL, Douphrate DI, Felknor SA, Vargas-Prada S, Serra C, Gimeno D. Low back pain among office workers in Costa Rica, Nicaragua and Spain. **Event:** 25th EPICOH Event: Occupational Health, Think Globally, Act Locally. **Organization:** Scientific Committee on Epidemiology in Occupational Health. **Place:** Barcelona, Catalonia (Spain). **Date:** September 4-7, 2016. **Type:** Oral communication.

Cayuela A, Conway S, Delclos G, Ronda E. Differences in Exposure to Long Working Hours and Poor Self-Reported General Health in Latin American and Spanish-Born Workers in Spain: The PELFI Cohort Study. **Event:** 25th EPICOH Conference: Occupational Health, Think Globally, Act Locally. **Organization:** Scientific Committee on Epidemiology in Occupational Health. **Place:**

Barcelona, Catalonia (Spain). **Date:** September 4-7, 2016. **Type:** Oral communication.

Conway S, Pompeii L, Roberts R, Follis J, Gimeno D. Evidence of a Dose-Response Relationship between Work Hours and Cardiovascular Disease Risk. **Event:** 25th EPICOH Event: Occupational Health, Think Globally, Act Locally. **Organization:** Scientific Committee on Epidemiology in Occupational Health. **Place:** Barcelona, Catalonia (Spain). **Date:** September 4-7, 2016. **Type:** Oral communication.

Patel J. Work Related Asthma Among Certified Nurse Aides in Texas. **Event:** SWCOEH ERC Pilot Projects Research Symposium. **Organization:** SWCOEH ERC. **Place:** Houston, TX. **Date:** June 2, 2017. **Type:** Oral communication.

Patel J, Gimeno D, Delclos GL. Constructing and Updating a Job-Exposure Matrix (JEM) for use with a Statewide Survey of Asthma in Texas Healthcare Professionals (HCPs). **Event:** The University of Texas Health Science Center at Houston Research Day. **Organization:** The University of Texas Health Science Center at Houston. **Place:** Houston, TX (USA). **Date:** April 6, 2017. **Type:** Poster.

Whitworth KW Environmental and Occupational Health Hazards among Vulnerable Domestic Cleaners in San Antonio, TX. **Event:** SWCOEH ERC Pilot Projects Research Symposium. **Organization:** SWCOEH ERC. **Place:** Houston, TX. **Date:** June 2, 2017. **Type:** Oral communication.

Awardees from other institutions

Daniels B, Payne M, Caldwell A, Ganio M, Gallagher KM. The influence prolonged standing with and without walking breaks on low back symptom reporting and gluteus medius muscle activity. **Event:** Annual South Central American Society of Biomechanics Conference. **Organization:** The Texas Back Institute and the University of Arkansas. **Place:** Plano, TX. **Date:** March 31 – April 1, 2017. **Type:** Oral communication.

Payne M, Daniels B, Caldwell A, Ganio M, Gallagher KM. The influence of a walking break during a bout of prolonged standing on lumbar spine kinematics. **Event:** Annual South Central American Society of Biomechanics Conference. **Organization:** The Texas Back Institute and the University of Arkansas. **Place:** Plano, TX. **Date:** March 31 – April 1, 2017. **Type:** Oral communication.

Gallagher KM. Using Walking Breaks to Reduce the Biomechanical and Cardiometabolic Risk Factors Related to Prolonged Occupational Standing. **Event:** SWCOEH ERC Pilot Projects Research Symposium. **Organization:** SWCOEH ERC. **Place:** Houston, TX. **Date:** June 2, 2017. **Type:** Oral communication.

Hur P. Enhancing Balance of the Aged Workers Via Sensory Augmentation Toward the Reduction of Injuries Due to Falls. **Event:** SWCOEH ERC Pilot Projects Research Symposium. **Organization:** SWCOEH ERC. **Place:** Houston, TX. **Date:** June 2, 2017. **Type:** Oral communication.

Jayadas A. Use of RULA to analyze a typing task in Patrol Officers. **Event:** Southwest Regional Human Factors & Ergonomics Society. **Organization:** The University of Texas at San Antonio. **Place:** San Antonio, TX. **Date:** June 9, 2017. **Type:** Oral communication.

Mutambudzi M. Use of O*NET Job Characteristics to Prospectively Examine Job Strain as a Risk Factor for Incident Diabetes in Older U.S. Workers. **Event:** SWCOEH ERC Pilot Projects Research Symposium. **Organization:** SWCOEH ERC. **Place:** Houston, TX. **Date:** June 2, 2017. **Type:** Oral communication.

Sirikul B. Physiological Strain Incurred During Simulated Fishing Work in a Hot and Humid Environment. **Event:** SWCOEH ERC Pilot Projects Research Symposium. **Organization:** SWCOEH ERC. **Place:** Houston, TX. **Date:** June 2, 2017. **Type:** Oral communication.

2015-2016

July 1, 2015 - June 30, 2016

PUBLICATIONS

Awardees from UTH Health School of Public Health

Campos-Fumero A., Delclos GL, Douphrate DI, Felknor SA, Vargas-Prada S, Serra C, Coggon D, Gimeno Ruiz de Porras D. Upper extremity musculoskeletal pain among office workers in three Spanish-speaking countries: findings from the CUPID study. *Occup Environ Med.* 2016;73(6):394-400.

Lee LJ, Symanski E, Lupo PJ, Tinker SC, Razzaghi H, Pompeii LA, Hoyt AT, Canfield MA, Chan W; National Birth Defects Prevention Study. Data linkage between the National Birth Defects Prevention Study and the Occupational Information Network (O*NET) to assess workplace physical activity, sedentary behaviors, and emotional stressors during pregnancy. *Am J Ind Med.* 2016;59(2):137-49.

Lim H, Beasley CW, Whitehead LW, Emery RJ, Agopian AJ, Langlois PH, Waller DK; National Birth Defects Prevention Study. Maternal exposure to radiographic exams and major structural birth defects. *Birth Defects Res A Clin Mol Teratol.* 2016;106(7):563-72.

Zhang K, Arauz RF, Chen TH, Cooper SP. 2016. Heat effects among migrant and seasonal farmworkers: a case study in Colorado. *Occup Environ Med.* 73(5):324-8.

Awardees from other institutions

Akopian AN, Fanick ER, Brooks EG. TRP channels and traffic-related environmental pollution-induced pulmonary disease. *Semin Immunopathol.* 2016;38(3):331-8.

Thompson BJ, Stock MS, Banuelas VK, Akalonu CC. The Impact of a Rigorous Multiple Work Shift Schedule and Day Versus Night Shift Work on Reaction Time and Balance Performance in Female Nurses: A Repeated Measures Study. *J Occup Environ Med.* 2016;58(7):737-43.

Liu YZ, Roy-Engel AM, Baddoo MC, Flemington EK, Wang G, Wang H. The impact of oil spill to lung health--Insights from an RNA-seq study of human airway epithelial cells. *Gene.* 2016;578(1):38-51.

Haddas R, Yang J, Sizer P. Effects of Gender and Recurrent Low Back Pain on Lifting Style. *Cent Eur J Sport Sci Med.* 2015; 11 (3): 15-28.

Haddas R, Yang J, Lieberman I. Effects of volitional spine stabilization on lifting task in recurrent

low back pain population. Eur Spine J. 2016;25(9):2833-41.

PRESENTATIONS

Awardees from UTH Health School of Public Health

Conway SH, Cayuela A, Pompeii LA, Delclos G, Ronda E. Association between Long Work Hours and Poor Self-Reported General Health among Latin American Immigrant and Native Workers in the U.S. and Spain. **Event:** XXXIV Annual Scientific Meeting of the Spanish Society of Epidemiology (SEE) and XI Congress of the Portuguese Association of Epidemiology (APE): Epidemiology for health in all policies. **Organization:** SEE and APE. **Place:** Sevilla, Spain. **Date:** 14-16 September 2016. **Type:** Oral communication.

Patel J, Delclos GL, Gimeno D. Work-Related Asthma among Nurse Aides in Texas – A Pilot Study. **Event:** The University of Texas Health Science Center at Houston Research Day. **Organization:** The University of Texas Health Science Center at Houston. **Place:** Houston, TX (USA). **Date:** March 31, 2016. **Type:** Poster.

Awardees from other institutions

Jayadas A. Empathic & Co-Design: Redesign of Duty Belts for Police Officers. **Event:** SWCOEH ERC Pilot Projects Research Symposium. **Organization:** SWCOEH ERC. **Place:** Houston, TX. **Date:** June 3, 2016. **Type:** Oral communication.

Queen A, Jayadas A, Petrova A, Peksoz S. Police Officer Duties: Challenges & Opportunities for Interventions. **Event:** Professional Development Event, Oklahoma State University (OSU). **Organization:** OSU. **Place:** Tulsa, OK. **Date:** Feb 2016. **Type:** Oral Communication.

Pickens A. Optimization of Hardware for Optimal Data Collection Using a Mobile Hearing Screening Application (hEAR). **Event:** SWCOEH ERC Pilot Projects Research Symposium. **Organization:** SWCOEH ERC. **Place:** Houston, TX. **Date:** June 3, 2016. **Type:** Oral communication.

Thompson BJ, Banuelas VK, Akalonu C, Moore A, Stock MS. Does a rigorous multi-shift work schedule impact balance, response time, and strength-related performances in female healthcare workers? **Event:** National Strength and Conditioning Association (NSCA) National Conference. **Organization:** NSCA. **Place:** Orlando, FL. **Date:** July 8-11, 2015.

Thompson BJ, Banuelas VK, Stock MS. Lower body strength-based fatigue responses of a typically demanding, multi-shift work period in female nurses. **Event:** American College of Sports Medicine (ACSM) Annual Meeting. **Organization:** ACSM. **Place:** Boston, MA. **Date:** May 31-June 4, 2016.

Wang Q. Evacuation simulations of confined spaces in petrochemical facilities. **Event:** Mary Kay O'Connor Process Safety Center 18th Annual International Symposium. **Organization:** Texas Engineering Experiment Station, Texas A&M University. **Place:** College Station, TX. **Date:** October 27-29, 2015.

Wang J. Representativeness of Chamber Sampling in Occupational Metal Fume Exposure Assessment. **Event:** SWCOEH ERC Pilot Projects Research Symposium. **Organization:** SWCOEH ERC. **Place:** Houston, TX. **Date:** June 3, 2016. **Type:** Oral communication.

Outreach Program

**Southwest Center for Occupational
and Environmental Health
UTHealth Education and Research Center**

**Close Out Report
(July 2015 – June 2020)**

**Michelle R. McDaniel, BS, CHES
Program Director
(01/01/2020-present)**

**Elaine Symanski, PhD
Program Director
(03/16/2016-12/31/2019)**

**Janelle Rios, PhD
Program Director
(07/01/2015-03/15/2016)**

Outreach Final Progress Report (July 2015 to June 2020)

Background

This is a close out progress report for the Outreach program that complements the existing Continuing Education (CE) Program, two non-academic programs (Pilot Project Research Training Program [PPRTP], and Interdisciplinary Activities), and the academic programs in Industrial Hygiene (IH), Occupational Epidemiology (OE), Occupational Medicine (OM) and Total Worker Health (TWH) in the Southwest Center for Occupational and Environmental Health (SWCOEH), the NIOSH-funded Education and Research Center (ERC) at The University of Texas Health Science Center at Houston (UTHealth) School of Public Health (SPH). The SWCOEH has a 43-year history of commitment to occupational safety and health (OSH), with the purpose of our Outreach Program being to serve the OSH needs of our stakeholders, with a particular focus on practitioners in Public Health Region 6 (PHR 6). As an Affiliate of the NIOSH *Total Worker Health*[®] (TWH) program, the SWCOEH embraces the TWH paradigm, a holistic, systems-thinking approach, integrating personal, socioeconomic, and environmental factors to focus on worker well-being, shifting beyond the traditional prevention of workplace illness, injury or health promotion. The SWCOEH Outreach program is extremely passionate about incorporating TWH in all opportunities for outreach in the new funding cycle.

Two recent circumstances are to be highlighted. First, in October 2019 we submitted our 5-year competing renewal for 2020-2025. The Summary Statement received on March 2020 noted that the weaknesses listed were mostly minor, and that our application's strengths largely outweighed its weaknesses. All our programs were recommended for funding, and in June 2020, we submitted the required Just-In-Time documentation. We are waiting for the official Notice of Grant Award. Second, in response to the pandemic of COVID-19, the infectious disease caused by a novel coronavirus (SARS-CoV-2), changes in the normal SWCOEH operations were implemented so that classes, interdisciplinary activities, in-person CE became interactive virtual events, and travel was restricted. Also, several scientific meetings which our trainees had planned to attend, were either cancelled or moved to virtual events. Throughout these challenging times, we have strived to maintain our mission to promote and improve health, safety, and well-being in the workplace and the community, with a particular focus on the impact of COVID-19.

Outreach Goals

The underlying purpose of the SWCOEH Outreach Program is to serve the OSH needs of our stakeholders, with a particular focus on practitioners in Public Health Region 6 (PHR 6). The SWCOEH outreach program aims to provide the OSH practitioner with research to practice training, facilitate interaction with Training Project grantees and sister centers such as the NIOSH-funded Southwest Center for Agricultural Health, Injury Prevention and Education at The University of Texas Health Science Center at Tyler, as well as to collaborate with professional societies, labor, trade organizations and community groups to enhance worker safety and health. The Outreach activities are aimed to be supported by multiple modalities, including web-based technologies. The success of the SWCOEH outreach activities is due, in part, to our faculty who as leaders in their fields lend their expertise to local, state, regional, national and international professional associations through speaking engagements and consultations. While the SWCOEH outreach program is developed to impact the practitioner environment through a series of planned activities, it also has the capacity to respond to emerging needs as they arise.

Past Performance and Accomplishments

During the project period, our Outreach program continued to actively respond to requests from professional activities, academic institutions, other organizations and the community. Our success is due to the rich partnerships we developed with professional associations and other

academic institutions, including the training project grant (TPG) awardee in Tyler, TX. TPG and ERC leaders serve on each other's external advisory boards and we share resources (e.g., contact lists and online registration capabilities). In addition, Hurricane Harvey, the ITC fire, and the COVID-19 pandemic, all unanticipated at the start of the previous project period, created an unparalleled opportunity to strengthen its outreach activities, as explained below. Target audiences, who were likewise often collaborators, include community citizens in the affected areas, first responders, health departments, workers, employers, and other academic institutions. Highlights on these and other specific Outreach activities follow.

Disaster Response Research to Practice (r2p) and Disaster Research Response (DR2)

(a) Hurricane Harvey: In August 2017, Hurricane Harvey broke a national rain record with over 50 inches of rain and record-breaking catastrophic flooding to Houston, Southeast Texas and Louisiana. Within a few days after landfall, the SWCOEH ERC developed and launched disaster response outreach and environmental monitoring plans to provide supplies and training on proper cleanup of flooded homes and businesses to residents and workers. For this, we used the SWCOEH infrastructure, together with financial and in-kind support from the UTHealth SPH Dean's Office and from VWR International, a company that donated NIOSH-approved N95 respirators and gloves. Though a great number of ERC faculty, staff and students were personally impacted by loss of property, they led and participated in outreach activities throughout the duration of response.

Our activities included: (1) Hurricane Harvey health and safety training: the ERC (38 ERC faculty, staff and trainees) led health and safety disaster response outreach efforts to provide supplies and training to flooded community residents and recovery workers, distributing 1200 personal protection "kits" with N95's, gloves, and bilingual "proper use" instructions at 19 community events between September and November, 2017; (2) Emergency Responder Health Monitoring and Surveillance (ERHMS) collaborations: we hosted the CDC/NIOSH ERHMS first responder team, who provided training on their framework and its application to our faculty, staff, trainees and ERC stakeholders. Collaborative coordination plans were established with Harris County Public Health on how to best use this training for future disaster response training and outreach. The ERC also contributed to disaster response in workshops organized by Harris County Judge, Lina Hidalgo; (3) Occupational Medicine (OM) faculty presentations and consultations: ERC members served on multiple Harvey education panels within Harris County Super Neighborhoods to discuss safe cleanup of flooded homes and health effects of mold. Our OM faculty provided free clinical evaluations of police officers exposed to organic peroxides and other contaminants released by the local Arkema Chemical Plant a few days after Hurricane Harvey; (4) Harvey website: in collaboration with the Houston Health Department and Baylor College of Medicine (BCM), we developed a single-source disaster resource website to ensure messages to the public were evidence-based, reliable and consistent. This website, which includes short training videos in English and Spanish and vetted links to disaster response resources, was shared with the University of North Carolina ERC following Hurricane Florence, so they could replicate our experience; (5) Community Environmental Monitoring Campaign: based on the Federal Emergency Management Agency flooding map, 200 soil and 38 water samples from nine affected Houston neighborhoods were collected to supplement an existing ERC NIEHS R01 'research to action' project to mitigate health risks associated with metals recycling; (6) Environmental Health Outcomes Research among Hurricane Harvey Survivors: within 30 days of the flooding, SWCOEH, along with researchers from BCM, Texas A&M University and Oregon State University, collected health data and biological and personal samples from 200 flood-impacted residents; (7) Hurricane Harvey Oral History Project with SWCOEH Faculty and UTHealth SPH students: following the storm, we began gathering oral histories of individuals impacted by and/or involved with Harvey response; and, (8) Guidance from other Disaster Researchers: we invited

Dr. Sherry Barron, of City University of New York to present on OSH efforts for Latino construction day laborers following Hurricane Sandy.

(b) Intercontinental Terminals Company (ITC) Fire Response, Deer Park, Texas, 2019: In early 2019, our Harvey outreach infrastructure and lessons learned allowed our ERC to rapidly respond to community concerns following a petrochemical fire in Deer Park, Texas. Burning tanks released chemicals into the air and water sources, resulting in mandatory shelter in place orders for nearby residents, and closing portions of the Houston Ship Channel and of major thoroughways. We were engaged in two main activities: (1) community air monitoring: An ERC team of faculty and IH trainees used real-time air sensors and symptom surveys while the ITC fire was still burning and a few weeks later, to evaluate the health impact on nearby residents; and (2) consultations and presentations on the ITC Fire: ERC faculty responded to media requests (e.g., Houston Chronicle, TV Channel 2) to address public health concerns from the affected communities.

(c) Response to COVID-19 Pandemic, February 2020 – ongoing: In response to increasing concerns of SARS-CoV-2 (coronavirus), public health experts gathered at the Houston SPH campus on Wednesday, February 5, to discuss what is known, unknown and what to anticipate about this new strain of coronavirus. Drs. George Delclos and Robert “Bob” Emery were two of the experts on the panel. This was one of the first activities broadcasted at SPH in relation to COVID-19. Students, faculty and staff were given the opportunity to ask questions and take part of the discussion across all SPH campuses through ITV or in-person participation.

As time went on and COVID-19 became an international pandemic, SWCOEH faculty, staff and trainees have published a bi-lingual English and Spanish COVID-19 resource website, conducted and participated in COVID-19 related educational webinars, published industry bulletins and research, participated in media interviews, and have directed or participated in advisory and safety council teams and meetings for universities, Texas Medical Center institutions, city, county, state, and private sector companies.

The COVID-19 resource website (<https://sph.uth.edu/research/centers/swcoeh/covid-19/>), published on April 3, is a bilingual English/Spanish resource that offers linkages to SWCOEH's direct webinar registrations and post-webinar recordings, industry-specific publishing and research publications, media interviews, and linkages to local, regional, national and international public health web-based resources.

Highlights from the 19 webinars conducted include; (1) Work Safe, Stay Healthy at Home: Ergonomics, Nutrition, Physical Activity, and Mental Health guidance while working remotely from home during COVID-19, held on April 14, 2020, included best practices and tips to 81 participants across academia; local, state and federal government; non-profit and the private sector tuned in to learn (a) ergonomic set up of proper workstations at home; (b) nutrition and physical activity guidance to stay healthy while working and social distancing at home; (c) taking care of mental health and well-being while working and social distancing; (2) Construction and COVID-19: Staying Safe on the Job Site, held April 14, included discussions on the basics of COVID-19 and how it can spread at your job site, practical ways of ensuring a healthy and safe construction job site, how to reuse and sterilize PPE equipment properly, a review of resources available to employers and employees, and a Q&A session with panel of health & safety experts from SWCOEH, Houston Area Safety Council (HASC) and El Paso chamber of Commerce. Webinar participants (n=88) comprised of construction workers, employers and contractors from the El Paso, Texas area; (3) Reopen Texas: Return to Work the Right Way, held weekly from May 20-July 1, 2020, included a seven-part, free, statewide webinar series with an opportunity for live

Q&A sessions. These webinars are a collaboration between UTHealth School of Public Health, SWCOEH Houston, San Antonio and El Paso faculty, the Prevention, Preparedness, and Response (P2R) Academy (a NIEHS-funded center), and the HASC. Each webinar featured a panel of specialists in occupational safety, occupational medicine, risk assessment, and guest panelists who are industry representatives experienced in return to work practices. Webinar themes were industry specific to retail, restaurant, construction and manufacturing, places of worship, mental health and employee resilience, personal care establishments, and other healthcare settings. More information available at (<https://bit.ly/2WUTTAr>). Full list of webinars available at: <https://sph.uth.edu/research/centers/swcoeh/covid-19/industry>.

COVID-19 related bulletins and research publishing by ERC faculty include available at: <https://sph.uth.edu/research/centers/swcoeh/covid-19/industry> (scroll to “UTHealth Research Publications).” Also, COVID-19 related media interviews include 17 interviews, with some conducted in Spanish, on topics related to trends, mortality rates, PPE for frontline healthcare workers, antibody tests, and how to properly wear masks and PPE. Full list with web link available at: <https://sph.uth.edu/research/centers/swcoeh/covid-19/media>.

Research to Practice (r2p)

We support projects that advance research findings into the workplace because of their high potential impact on the practitioner environment. OHS faculty subject matter experts and health educators should disseminate research applications and findings to the workforce and communities. Through activities like those mentioned as disaster response activities (section A.2.1), trainings and webinars, and other dissemination activities, we will continue to move research into practice in order to reduce and prevent injuries, illness, and fatalities.

Highlights of r2p activities delivered during the reporting period included: (1) EOHS Research Seminar Series: offered biweekly in the fall and spring semesters, this series is multifaceted and targets very different groups: a) graduate students, who take it for academic credit, b) EOHS and non-EOHS faculty, c) community EOHS professionals, who are eligible for CEUs, and d) the general community. The seminar is offered to both a live audience or via streaming, and is widely disseminated. It provides an opportunity to discuss practical applications and recommended work policies or practices. The 2018-2019 series drew an audience of around 300 participants over 61 seminars; of these, 47 had speakers outside of UTHealth SPH and 16 international. Average attendance at these seminars is between 20 and 30, but tracking did not begin until 2018, after we began awarding CEUs and also provided live streaming access; (2) TWH Webinar: to raise awareness of the TWH paradigm shift among industry stakeholders, we delivered the webinar ‘Advancing Worker Well-Being and Productivity through TWH’ on May 8, 2019. The Society of Petroleum Engineers was a collaborative partner in marketing this webinar as to reach a broad international audience. (3) Also in 2019, Dr. Delclos (OM faculty), delivered a NIOSH-sponsored international webinar, together with Dr. Paul Schulte of NIOSH, on the *Expanded focus for OSH and the Future of Work*.

Forums, Seminars and Symposiums

In collaboration with the NIOSH TPG at UTHealth Tyler, we held (1) Radium Girls, A Conversation with Author Kate Moore: as part of our SWCOEH 40th Anniversary celebrations, in early 2018 we organized a public event with the author on the outbreak of work-related disease in female radium dial painters, together with a half day seminar open to community OSH providers and the general public, featuring internationally recognized speakers, including Dr. Dave Michaels (former OSHA Administrator) and photojournalist Earl Dotter, among others; and (2) Emerging Issues Conference in OEHS: held biannually in collaboration with UTHealth Tyler TPG, TxCOEM, the Texas Chapter of ACOEM, this one-day conference highlights emerging issues in occupational

and environmental health. Aside from the collaborations with UTHealth Tyler, other events included: (1) *Ergonomics and Human Factors Webinar Series*: a collaborative and free monthly webinars led by ERC CE programs nationwide (still ongoing) with the goal of providing access to current research supported through NIOSH ERC programs. SWCOEH ERC faculty presented in these series (e.g., in 2019, Dr. Douphrate, IH Director, on large-herd dairy milking parlors) with attendees from PHR6 and several other states around the nation; (2) *American College of Preventive Medicine Listening Session at UTHealth SPH on the Role of Physicians in Implementing the CDC 6|18 Initiative*: In 2017, together with the American College of Preventive Medicine and the U.S. Centers for Disease Control and Prevention (CDC), we co-hosted sessions to explore the role of practicing health care providers in implementing the CDC's 6|18 Initiative (CDC, 2018). There were 33 participants, consisting of physicians, public health practitioners, nurses, and researchers.

Collaborations with Practitioners Nationwide

Our active partners span local, state, regional and national audiences including; members of the SWCOEH ERC Board of Advisors, BCM, Environmental Defense Fund, Houston Area Safety Council, Houston Chapter of the Indoor Air Quality Association (IAQA), GHIHC, TxCOEM, TMA and The University of Texas System, ACOEM, the National Network of NIOSH ERCs, NIEHS, and NIOSH.

There is a strong partnership between the SWCOEH ERC and The University of Texas Health Science Center at Tyler (UTHealth Tyler) and its Southwest Center for Agricultural Health, Injury Prevention and Education (SW Ag Center), a NIOSH TPG in PHR6. Jeff Levin, MD, DrPH, serves on our ERC Board of Advisors, and Dr. David Douphrate (ERC faculty) is the SW Ag Center's Deputy Director. We join forces with the SW Ag Center to plan, cosponsor, and deliver CE and outreach events.

Disaster Response through the SWCOEH ERC Outreach Program. Public health emergencies are defined as much by their health consequences as by their causes and precipitating events, and as situation becomes emergent when its health consequences have the potential to overwhelm routine community capabilities to address them. Extreme weather events such as hurricanes are increasing in frequency and intensity, often associated with flash floods in coastal, urbanized and industrial areas within the Southwest U.S. and the more coastal areas of PHR6. Vulnerable populations make up approximately 18% of the at-risk population and are less able to prepare, respond, or recover from natural disasters. The large petrochemical industry concentrated in the Greater Houston-Galveston area is also vulnerable to the effects of extreme weather events, from both a safety and financial standpoint. Over the past project period, Texas and Louisiana experienced several disasters. Of these, several affected Houston, including the Memorial Day Flood (2015), Hurricane Harvey (2017) and the ITC Fire (2019). With the expertise of ERC faculty, the SWCOEH rapidly assembled a disaster response, centered on health and safety outreach directed at recovery workers and citizens during Harvey, the ITC fires, and have responded to the COVID-19 pandemic. Detailed outreach efforts are presented in **Disaster Response Research to Practice (r2p) and Disaster Research Response (DR2)**

Visiting Scholars Program

In fall and spring, the SWCOEH partners with the UT Health SPH EOHS Program on a bi-weekly lunchtime seminar series. This activity, now in its 12th year (and for which we award CEUs since 2018) is also open to the public. Presenters are local, national or international. Some notable speakers in this period were Drs. Henneberger (NIOSH), Michaels (former OSHA Administrator), Felknor (NIOSH), Kogevinas (IS Global, Barcelona), Schoefisch (Duke University), Kines

University of Texas ERC Final Progress Report
Center Director: David Gimeno, PhD

(National Research Centre for the Working Environment, Denmark), and Newman (University of Colorado).

Continuing Education Program

**Southwest Center for Occupational
and Environmental Health
UTHealth Education and Research Center**

**Close Out Report
(July 2015 – June 2020)**

**Michelle R. McDaniel, BS, CHES
Program Director
(01/01/2020-present)**

**Elaine Symanski, PhD
Program Director
(03/16/2016-12/31/2019)**

**Janelle Rios, PhD
Program Director
(07/01/2015-03/15/2016)**

Continuing Education Final Progress Report (July 2015 to June 2020)

Background

This is a close out progress report for the Continuing Education (CE) program that complements the existing Outreach program, and the academic programs in Industrial Hygiene (IH), Occupational Epidemiology (OE), Occupational Medicine (OM) and Total Worker Health (TWH) in the Southwest Center for Occupational and Environmental Health (SWCOEH), the NIOSH-funded Education and Research Center (ERC) at The University of Texas Health Science Center at Houston (UTHealth) School of Public Health (SPH). The CE Program has continuously and successfully offered occupational safety and health (OSH) training since the inception of the SWCOEH in 1977. Over 43 years, tens of thousands of OSH professionals across Public Health Region (PHR) 6 (Arkansas, Louisiana, New Mexico, Oklahoma and Texas), have received training on current OSH issues. The CE program leverages the ERC's academic and research resources and commitment to education, research, and service with our partners and stakeholders to successfully develop and deliver consistently high quality, meaningful and timely continuing education. Through our collaborations with SWCOEH faculty, the Texas Medical Center (TMC), other academic institutions, and leading professional societies, we provide a comprehensive curriculum covering a wide range of OSH topics targeting the training needs of PHR6 professionals. This CE program continually adjusts, expands, and improves offerings based on needs assessments, course evaluations, requests, and stakeholders' feedback.

Two recent circumstances are to be highlighted. First, in October 2019 we submitted our 5-year competing renewal for 2020-2025. The Summary Statement received on March 2020 noted that the weaknesses listed were mostly minor, and that our application's strengths largely outweighed its weaknesses. All our programs were recommended for funding, and in June 2020, we submitted the required Just-In-Time documentation. We are waiting for the official Notice of Grant Award. Second, in response to the pandemic of COVID-19, the infectious disease caused by a novel coronavirus (SARS-CoV-2), changes in the normal SWCOEH operations were implemented so that classes, interdisciplinary activities, in-person CE became interactive virtual events, and travel was restricted. Also, several scientific meetings which our trainees had planned to attend, were either cancelled or moved to virtual events. Throughout these challenging times, we have strived to maintain our mission to promote and improve health, safety, and well-being in the workplace and the community, with a particular focus on the impact of COVID-19.

CE Goals

The **mission** of the CE Program is to serve as a training resource for PHR6 professionals in the OSH field by delivering specialized courses in response to regional and national needs. **CE goals and objectives** are to:

Goal 1. Target CE events to appropriate OSH disciplines and groups of interest.

Objective 1.1. Target CE events to occupational physicians and nurses, industrial hygienists, OSH personnel, officials from institutions of higher education, and others.

Objective 1.2. Target CE events towards minority groups to increase their participation in our CE events.

Goal 2. Be responsive to feedback from CE participants and need assessments.

Objective 2.1. Develop and/or modify CE offerings in response to CE event evaluations and the results of the national and regional needs assessments.

Goal 3. Offer a variety of learning formats and Continuing Education Units (CEUs) to ensure opportunities for participant success and to continue their professional practice.

Objective 3.1. Utilize distance-learning techniques in a portion of CE offerings.

Objective 3.2. Award CE units, as appropriate.

Objective 3.3. Impact the practitioner environment through research-to-practice (R2P)

activities.

Goal 4. Increase reach of CE events

Objective 4.1. Structure programs so they are convenient for personnel from higher education, public health and safety agencies and professional associations.

Objective 4.2. Provide CE courses at reduced cost to ERC academic trainees.

Objective 4.3. Provide training to at least 600 participants per year.

Goal 5. Strengthen integration of academic programs into the CE opportunities offered through the SWCOEH.

Objective 5.1. Involve ERC faculty and trainees in at least one CE course per year.

Past Performance/Accomplishments in the last Project Period

Goal 1. Objective 1.1. Target Populations: The CE Program routinely target representatives from the following occupations: physicians, nurses, industrial hygienists, OSH professionals and other public health professionals.

Goal 1. Objective 1.2. Enhance Minority Participation: We work to increase the number of minorities working in OSH fields by collaborating with institutions that serve minority populations. We market courses to historically black colleges and universities, and Hispanic serving institutions (e.g., Lone Star College, Texas Southern University, UT El Paso). During Harvey outreach and training, we sustained new partnerships with stakeholders in predominately African American and Hispanic communities and continue to engage in outreach and trainings.

Goal 2. Objective 2.1. New and Updated Courses: We continuously develop new trainings and modify existing trainings based on regional and national need. In 2016 and 2017, the CE program collaborated with Dr. Delclos to offer a new interprofessional seminar series, **The History and Culture of Disease and Healing**, jointly with Rice University and the University of Houston, and held at The Health Museum of Houston. This seminar provided an innovative venue to host lectures on the relationships between human history, culture, epidemiology and impact of disease and the arts of healing. CE Units offered included CME, CNE, Social Work CEUs and certificates of attendance for non-credentialed providers. Participants (n=177, 257 training hours) were exposed to the complex mix of cultural, ethical, environmental, historical, medical, and spiritual issues that affect health and well-being. Due to venue cost, this seminar series is on hold.

In 2017, **GeoMedicine** was led by Dr. Symanski and Abi Oluyomi, PhD, EHS Assistant Professor at Baylor College of Medicine (BCM), and Drs. Zhang and Highfield at UTHealth SPH. Designed for healthcare professionals, the course introduced concepts and principles for the practice of GeoMedicine, highlighting GIS-related technologies in healthcare, and offering an opportunity to engage in hands-on GIS exercises. Participants (n=15) reported being able to add GIS content and tools to current practices and teachings. CE Units offered were in the form of CME and certificates of attendance for non-credentialed providers.

In 2017, we identified a need from our course evaluations and reinstated the **Occupational Medicine for Primary Care Providers** course, to enhance knowledge among PCPs in treatment of patients with work-related injuries and illnesses. This two-day face-to-face training was offered in October 2018 to 32 professionals for a total of 408 training hours. The course is a joint effort between CE and OM faculty, Drs. Delclos, Carson and Perkison. Guest instructors are physicians and professionals from TMC, Chevron, Shell Health, or Insurance and workers' compensation claims specialists. Participants reported plans to expand their practices to include OM practice guidelines and include treatment of workers' compensation patients. This workshop will lead to an online course which is under development to be piloted in 2021 with general and family medicine physician residents at UTHealth McGovern Medical School.

CE collaborates with the local IAQA and AIHA chapter, bringing practitioners together to address indoor environmental problems for the benefit of consumers and the public. The event is open to IAQA professionals and non-member professionals. The forums were held in September 2018 and March 2019 with a total of 44 participants in attendance; 86% were private industry IH and EH&S professionals. More events with local IH chapters are under discussion.

As of fall 2018, the CE program collaborates with ERC faculty Drs. Gimeno and Dr. Delclos to expand the audience attending the **Environmental and Occupational Health Science (EOHS) Research Seminar Series** and engage professional community stakeholders in a live audience or through streaming. The Q&A session offers an opportunity to discuss practical applications and recommended work policies or practices. CE and Outreach markets the seminar and provides CEUs to credentialed professionals. The seminar is offered biweekly in the fall and spring semesters. We are working with UTHealth media services to record and upload the webinars to video-sharing website (e.g., YouTube), to expand access and awareness. Participants reported they recognize, for example, how health and wellbeing are affected by: (1) nonstandard work arrangements; (2) environmental disaster-related residential construction; and (3) identifying better biomarkers of exposure to prevent chronic kidney disease of unknown origin in developing countries. The 2018/19 series drew an audience of 287, and the series will continue in the new cycle.

A new course, the **University Environmental Health and Safety Analytics Workshop**, was successfully piloted by CE in May 2019. Multiple universities in Colorado, graduates of our EH&S Academy, reached out to discuss operational issues and multiple critical questions plaguing their university professional communities. Participants were asked to bring data collected in their programs to actively engage in the dialogue. Faculty presenters included Drs. Emery and Patlovich who trained 25 EH&S professionals in safety, IH and administration working at six universities across Colorado. Participants reported being better able to communicate and present data to key stakeholders that influence EH&S program resources. Plans to host the course in our region are in progress.

Collaborative pilot-testing led by ERC CE programs nationwide resulted in a free monthly series of **Ergonomics and Human Factors** webinars offered in 2018/19 (still ongoing), presenting current ERC-supported research. In June 2019, ERC's Dr. Doupbrate and Dr. Nate Fethke (University of Iowa ERC) presented on large-herd dairy milking parlors to 32 attendees in 11 states. This continued activity expanded into an IH webinar series in 2020 and both Ergonomics and IH series will continue into 2021 (<https://www.coeh.berkeley.edu/20erc-webinars>).

In alignment with TWH, the CE Program collaborates with ERC faculty and others on efforts to raise awareness of key industry stakeholders to the value of TWH and examines how to best how to operationalize TWH. One outcome of efforts led by Dr. Symanski and Jack Hinton (BOA chair) was the first TWH event, **Advancing Worker Well-Being and Productivity Through Total Worker Health**, a webinar held in May 2019. We secured CommPartners, an e-learning production service, to assist in producing and hosting the webinar. The Society of Petroleum Engineers co-marketed the webinar, which reached a broad international audience.

Aligned with NIOSH TWH initiative, is the *"Shaping the Future to Ensure Worker Health and Wellbeing Shifting paradigms for Research, Training and Policy,"* a new 3-year NIOSH U13 Cooperative Agreement (Delclos, PI). This project includes a series of workshops, an international conference, and dissemination activities to bring together a broad, interprofessional audience. The focus is on the three critical areas of research, training and policy/application, and drawing

regional, national and international professionals. In the first year, activities were held over February and June of 2020. February's 1.5-day workshop titled, **How will the future of work shape the OSH professional of the future? A workshop**, was held in Houston, TX and focused on the future of training in OSH, and examined some of the challenges and opportunities OSH education will face in both the academic and industry settings. Among the expanded focus in OSH topics were the future of work, future of teaching and learning, systems thinking, and the employer perspective of future OSH professionals. In total, 47 individuals were in attendance from academic, government, private and non-profit sectors. Participants commented on "the value of identifying gaps and needs, and also in shedding some light on issues in adult education in the 21st century. Others valued the opportunity to look beyond past educational and current work experience, and engaging in real and meaningful discussions with professionals from a variety of backgrounds. This workshop brought an understanding to NIOSH priority areas for the future more clearly, along with a clear understanding of training options in occupational health and safety training programs." The second workshop, **How will the future of work shape research issues, methods and applications? A workshop** focused on the future of research in OSH and was originally planned as a face-to-face 1 ½ day gathering in Houston in May 2020. However, due to the COVID-19 pandemic, we converted this workshop to a virtual event. We distributed activities over the month of June, using a web-based, flipped online classroom format via Canvas Catalog LMS and WebEx Training platform. The themes of workshop were centered around the published work of Schulte *et al.*, *Toward an Expanded Focus for Occupational Safety and Health (OSH): a Commentary*, making emphasis on two axis: (1) Horizontal Expansion (i.e., integration of work and non-work related factors into OSH research); and (2) Vertical Expansion (i.e., integration of OSH research over the working life and with a focus on well-being). Fifty-three academic and non-academic professionals participated in the workshop. Examples of positive feedback received from the participants included how beneficial the workshop had been for attendees to become "more aware of the massive changes that already happened in the workplace, and how much of traditional work arrangements have already disappeared" or "new understanding of the cumulative effects of non-work and work in general." Others noted that "previously held interest in the transition into work for youth [...] was reignited and with viewing the workshop presentations and participating in discussions." Given the positive feedback, we were encouraged to continue utilizing the flipped online classroom format for future workshops.

Goal 3. Objective 3.1. Technology and Distance Learning. Important advances: In 2018, we completed a major redesign of our website for a more modern and user-friendly experience. Since October 2016, a new online registration system powered by Learning Stream™ provides user-centric registration services and seamless event management. Since 2018, we host Cisco Webex™ webinars for distance education participants for events like the EOHS Seminar Series, Advancing Worker Well-being and Productivity, and the PP RTP Seminars. As of March 2020, due to COVID-19, all activities that were not postponed were moved into an online format using Webex and Canvas Catalog's learning management system at least through fall 2020.

Goal 3. Objective 3.2. Continuing Education Units: All CE courses carry appropriate CEUs. **See Goal 2.**

Goal 3. Objective 3.3. Practitioner Impact: Our partners include local, state, regional and national societies; among these, our ERC Board of Advisors, the Houston Area Safety Council, AIHA Gulf Coast Chapter, Texas Medical Association, University of Texas System, National Network of NIOSH ERCs, ACOEM, and NIOSH.

Goal 4. Objective 4.1. Program Structure: CE programs are structured to accommodate those working in academia, public health, and safety agencies and professional associations. For

example, the monthly OM Journal Club occurs in the early evening with host-sponsored dinner. Other events for OM physicians occur on Fridays and Saturdays outside of clinic schedules (e.g., Orthopedics Workshop, an annual 2-day, hands-on workshop). Further, the OM symposium is held on a Saturday in collaboration with the TxCOEM and TMA, and this year's 2020 OM symposium was held virtually jointly with our sister center (SW Ag Center and TIOSH) in Tyler, Texas.

Goal 4. Objective 4.2. Discounts for Academic Trainees: We often offer low or no-cost registration for SWCOEH trainees who, if possible, assist CE staff in logistical activities. At GHIHC and IAQA meetings, IH trainees can discuss trends in OSH professions, share challenges, and do peer networking. OM trainees attend and present at the annual TxCOEM Symposium, and other students attend and present at the OM Journal Club at no cost.

Goal 4. Objective 4.3. Provide training to at least 600 participants per year: We exceeded this number in the past cycle. FY 15 = 727; FY 16 = 898; FY 17 = 769; FY 18 = 1045; FY 19 = 642.

Goal 5. Objective 5.1. Involve ERC faculty and trainees in at least one CE course per year. Since 2015, all ERC faculty and trainees met this goal by assisting in CE course content development and design, directing or instructing courses. All trainees present at Journal Club and OM trainees present at TxCOEM.

Program Deliverables

Since 2015, the CE program delivered 160 courses (~30 per year) and seminars to 4,081 people with a total 19,902 training hours to intended target audiences. Of these, 44% were in OM, 20% in IH and 12% in Occupational Safety (OS). The number of participants per year was above 700 with the exception of 2019-2020 due to COVID-19 (642), and reaching over 1,000 in 2018. By profession, participants matched the course topics, with most being in OM (30%), IH (21%) and OS (12%). By sector, 46% were from academia, 27% from private industry and 9% from government. The number of ERC faculty and trainees participating in CE events was consistently above 60, increasing to 89 (trainees) and 124 (faculty) in 2018. Participation of OM faculty and trainees in CE events was the highest (41% to 63%, depending on the year) compared to other programs (8% to 39%, respectively). **More details on program deliverables are available in Table 3.**

Publications List (peer-reviewed journal articles)

Note: Not underlined = ERC grant acknowledged; Underlined = ERC Affiliation Only.
Asterik (*) denotes trainee or PPRTTP awardee

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NIOSH Tables

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**Close Out Report
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