



The University of Iowa
Education and Research Center
NIOSH Training Grant T42OH008491

Annual Report

July 1, 2016 - June 30, 2017

Submitted by:

Patrick O'Shaughnessy, PhD, CIH
Center Director
The University of Iowa
Iowa City, Iowa 52242-5000

October 5, 2017

ERC Summary

The mission of the Heartland Center for Occupational Health and Safety, a NIOSH Education and Research Center (ERC), is to help reduce injuries, illnesses, and fatalities of workers in Federal Region VII and beyond by expanding and strengthening the occupational health and safety workforce with well-trained practitioners and well-informed professionals. Since its inception in 2000, the Heartland Center for Occupational Health and Safety (the Center) has served as a resource for Federal Region VII and other regions of the US by providing interdisciplinary graduate, postgraduate, and residency training, as well as continuing education and outreach for practitioners and researchers in occupational health and safety (OHS) professions. The major rationale for the Center is to address problems unique to Federal Region VII including higher than US-average rates of occupational disease and injury, and shortages of trained OHS professionals. This Center is well positioned to address the OHS of the region by preparing trainees with knowledge and experience in the discipline areas most relevant to the needs of its workers. The Center has 6 graduate-level training programs including agricultural safety and health, ergonomics, industrial hygiene, occupational epidemiology, occupational injury prevention, and occupational medicine. The Center's active continuing education and outreach programs reach thousands of practitioners, utilizing both traditional educational methods as well as innovative distance-education technology. The strengths of the Heartland Center include: excellent research and teaching skills of its faculty; strong emphasis on interdisciplinary training and research; concern for the diversity of its trainees; and an active continuing education and outreach programs.

Relevance

The training of over 40 graduate-level students by Center faculty each year directly influences the number of trained occupational health and safety professionals available to Federal Region VII and elsewhere in the United States. Our graduates obtain jobs in industry, academia, and government agencies. The continuing education program, which serves nearly 1200 professionals annually, improves their ability to reduce the high regional rates of occupational disease and injury. The Center also reaches out to over 13,000 regional businesses involving approximately 411,000 workers through a unique outreach program that provides consultation, continuing education, and current OHS information to increase awareness of occupational health and safety and reduce illness and injury in Region VII.

Key Personnel

- Patrick O'Shaughnessy: Center Director – 319.335.4202, patrick-oshughnessy@uiowa.edu
- R. William Field, PhD: Center Deputy Director; Director, Occupational Epidemiology Program; Pilot Program Director – 319.335.4413, bill-field@uiowa.edu
- Tammi Goerd: Director, Continuing Education; Director, Center Outreach – 319.335.4423, tammi-goerd@uiowa.edu
- David Asa: Associate Director of Student Affairs – 319.335.4558, david-asa@uiowa.edu
- Diane Rohlman: Director, Agricultural Safety and Health Training Program – 319.384.4007, diane-rohlman@uiowa.edu
- Nathan Fethke: Director, Ergonomics Training Program – 319.467.4653, nathan-fethke@uiowa.edu
- Fredric Gerr: Director, Occupational Medicine Residency – 319.335.4212, fred-gerr@uiowa.edu
- Thomas Peters, PhD, Director, Industrial Hygiene Training Program – 319.335.4436, thomas-m-peters@uiowa.edu
- Carri Casteel, PhD, Director, Occupational Injury Prevention Training Program – 319.384.4388, carri-casteel@uiowa.edu

ERC Website

<http://www.public-health.uiowa.edu/heartland/>

High Impact Stories

The 2016–17 reporting period comprised a number of high-impact accomplishments of Center faculty, staff, and trainees in the following training programs:

Agricultural Safety and Health

Development of a needs assessment of Iowa's rural health clinics

Trainee Lauren LaDuca (MS 2018) worked with Iowa's Center for Agricultural Safety and Health to conduct a needs assessment of Iowa's rural health clinics for the State Office of Rural Health. She conducted phone interviews with 15% of Iowa's certified rural health clinics to determine any current educational needs; disparities clinic staff observe in their patient population; the strengths of their clinic; the most common medical issue they observe; if they serve agricultural populations; and, if they are part of an accountable care organization. Her work will help the State Office of Rural Health better communicate with and provide information and services to Iowa's rural health clinics.

Researching safety among young farmers

After obtaining her Ph.D. in Spring 2017, trainee Josie Rudolphi accepted an Associate Research Scientist position at the National Farm Medicine Center (NFMC). An Iowa native and a farmer, Dr. Rudolphi worked as high school agricultural teacher and FFA leader. She received four pilot grants as a trainee. Two of these funded her dissertation work, addressing safety among young farmers, and the other two funded international research projects examining the health and safety of agricultural workers in India and Romania. While she was a student, Dr. Rudolphi received the Craig Zwerling and Nancy L. Sprince Scholarship in Occupational and Environmental Health. In her role with the NFMC, she will also collaborate with researchers at the National Children's Center for Rural and Agricultural Health and Safety, continuing her focus on protecting the safety and health of young farmworkers.

Book published highlighting the impact of local policies and culture on safety and health

Recognizing the impact of local policies and culture on safety and health, ASH faculty Dr. Brandi Janssen brings together these issues in her new book, *Making Local Food Work: The Challenges and Opportunities of Today's Small Farmers* (2017 University of Iowa Press). She explores labor in local food production and the interactions between local food and commodity producers to understand how local food production affects the well-being of rural communities. Combining data and statistics with first-hand accounts gathered while working on farms, Dr. Janssen describes the current state of local food production to examine the needs of this growing segment of agricultural workers.

Ergonomics

Trainees obtained professional ergonomist certification

Past Ergonomics Training Program trainee Dr. Mark C. Schall, Jr. (PhD in Industrial Engineering, 2014) has obtained the Certified Professional Ergonomist (CPE) credential from the Board of Certification in Professional Ergonomics (BCPE). Dr. Schall is an Assistant Professor in the Department of Industrial and Systems Engineering at Auburn University. He joins past Ergonomics trainees Dr. Nathan Fethke (PhD in Occupational and Environmental Health, 2006, now at the University of Iowa), Dr. Alysha Meyers (PhD in Occupational and Environmental Health, 2010, now at NIOSH), and Dr. Lauren Gant (PhD in Biomedical Engineering, 2012, now at HNI Corporation in Muscatine, IA) in achieving this important career milestone. In addition, Emily Westfall (nee Determan) (MS in Occupational and Environmental Health, 2013) has obtained both the Associate Ergonomics Professional (AEP) credential from the

BCPE and the Associate Safety Professional (ASP) credential from the Board of Certified Safety Professionals. She is currently employed as a Senior Risk Control Consultant for Liberty Mutual Insurance.

Trainees provided real-world ergonomic assessment experience

The Ergonomics Training Program continues to strengthen ties with local and regional stakeholders to provide unique professional development opportunities for trainees. For example, two current trainees, Nathan Huizinga (MS in Occupational and Environmental Health, ongoing) and Natalie Jones (MS in Biomedical Engineering, ongoing), have gained real-world occupational safety and health work experience through a Co-Op program at Whirlpool's appliance manufacturing facility in Amana, IA.

Industrial Hygiene

Trainees receive awards and scholarships at national conference

IH trainees from the University of Iowa continue to shine at annual meeting of the American Industrial Hygiene Association. Of the 14 trainees attending the 2017 American Industrial Hygiene Conference and Exhibition (AIHce), ten presented posters, six received awards for their poster, and five received scholarships from the American Industrial Hygiene Foundation. Of particular note, the poster of current trainees (Samantha Knowlton and Corey Boles) with ERC faculty member, Matt Nonnenman, entitled "Measuring Particle and Bioaerosol Concentrations Generated from Toilet Flushes During Hospital-Based Patient Care" won three ribbons, one each from the Hazard Prevention and Engineering Control Committee, the Healthcare Working Group, and the Biosafety and Environment Microbiology Committee.

Trainee and faculty awarded a patent

Past trainee Lorenzo Cena (PhD 2013) and ERC faculty member, Thomas Peters, were awarded a patent for the nanoparticle respiratory deposition (NRD) sampler. This sampler, developed with funding from NIOSH, collects nanoparticles mimicking their deposition in the human respiratory system. The sampler is now commercially available through Zefon International.

Wireless exposure assessment network developed

ERC faculty and program director, Thomas Peters, with trainees (Laura Hallett, MS 2017; Alyson Gray, current trainee) developed a wireless network (i.e., sensor array) of stationary, low-cost monitors to obtain a time-series of hazard maps for ozone, noise, and particles. Funded through a NIOSH R01 research grant ("An inexpensive monitoring network to assess workplace exposures"), we integrate the hazard maps with worker location to estimate personal exposures in time intervals as short as 15 min. A network with 40 monitors is now running in a large vehicle manufacturing facility. Quarterly the team validates sensor output and compares personal exposures measured traditionally to those estimated from the network. We envision that the highly resolved personal exposure information will facilitate surveillance and enable proactive hazard control strategies.

Occupational Epidemiology

Risks of neonicotinoid insecticide exposure to agricultural workers explored

ERC Occupational Epidemiology Trainee Program Director, Bill Field, received funding from the Iowa Institute of Public Health Research and Policy (IIPHRP) at the University of Iowa to develop the infrastructure and preliminary data for a research collaborative to investigate the emerging potential risks posed by neonicotinoid exposure to agricultural workers and their families. The collaborative effort is one of the first in the U.S. to examine the potential human exposure of neonicotinoid insecticides as well as to validate biomarkers necessary for future neonicotinoid-

human health investigations. A substantial portion of the investigative work will be conducted by Occupational Epidemiology Program trainee Darrin Thompson.

Trainee investigates cancer among children of pesticide applicators

Mr. Jonathan Davis, Occupational Epidemiology trainee, recently defended his doctoral dissertation that *examined* the risk of cancer in children of pesticide applicators from the Agricultural Health Study. The study included 36,537 children of Iowa participants who were evaluated for cancer incidence during 1975 through 2013 from birth through the age of seventeen. The study provided the first epidemiological evidence of an increased risk of childhood cancer for exposure to trifluralin and EPTC.

Occupational Injury Prevention

Trainee develops the first desktop tractor driving simulator

Kayla Faust, PhD student in Occupational and Environmental Health and Occupational Injury Prevention Program trainee for the Heartland Center for Occupational Health and Safety, is building the first ever desktop tractor driving simulator to quantify driving performance measures among farmers. Specifically, she is developing a new MiniSim which incorporates the vehicle dynamics of a John Deere tractor with respect to vehicle size, weight, driver position and center of gravity. In addition, she is including hardware to simulate the feel and perspective of driving a tractor from the driver's seat. Vehicle dynamics such as braking distance, center of gravity, and field of view are very different in personal vehicles, for example, than in heavy equipment due to their size and engines. Therefore, creating a simulator that better mimics the appearance and "feel" of the vehicle type being studied is crucial when conducting driving simulation research. This new tractor simulator is being developed as part of Ms. Faust's dissertation research.

Report on policies and programs to address the opioid epidemic authored by program faculty

Carri Casteel, Director of the Occupational Injury Prevention Program, was the lead author of a report that provides priority policies and programs that Iowa legislators and other stakeholders can consider as the state moves forward with addressing the opioid problem. The priorities were identified by 38 stakeholders who Dr. Casteel and a team at the Injury Prevention Research Center convened in Des Moines, representing law enforcement, substance abuse treatment, medicine, psychiatry, nursing, public health, nonprofit/advocacy, poison control, insurance, state and local drug control policy, and pharmacy, as well as elected officials or their representatives. The report will be presented on October 16, 2017 to a legislative interim study committee tasked with evaluating Iowa's response to the opioid epidemic. This committee wants input from various relevant agencies and entities and plans to submit a report with its findings and recommendations to Governor Kim Reynolds and the general assembly by November 15, in time for possible action during the next legislative session.

Occupational Medicine Residency

Trainee obtains assistant director position

2016 graduate of the University of Iowa Occupational Medicine Residency Training Program, Steven Rippentrop, MD, MPH, MHA, is the Medical Director of the University of Iowa Health Ventures Clive Clinic in Clive, Iowa. He is also the Assistant Medical Director of University of Iowa Occupational Health and University of Iowa Health Ventures, Corporate Health Partners. Dr. Rippentrop is an Assistant Professor in the Department of Internal Medicine, University of Iowa Carver College of Medicine. In January 2017, he was appointed Associate Program Director of the Occupational Medicine Residency Training Program at the University of Iowa College of Public Health.

Trainee investigates respiratory and ocular symptoms among workers at water parks

2015 graduate of the University of Iowa Occupational Medicine Residency Training Program, Sophia Chiu, MD, MPH, MA, MSc, is the first author of a NIOSH-sponsored investigation of symptoms among employees of an indoor

waterpark resort (Chiu SK, Burton NC, Dunn KH, de Perio MA. Respiratory and Ocular Symptoms Among Employees of an Indoor Waterpark Resort — Ohio, 2016. MMWR Morb Mortal Wkly Rep 2017; 66:986–989). Dr. Chiu is an Epidemic Intelligence Service Officer at the National Institute for Occupational Safety and Health, Centers for Disease control and Prevention.

Trainee obtains high-level position at Mayo Clinic

2013 graduate of the University of Iowa Occupational Medicine Residency Training Program, Laura Breeher, MD, MPH, MS, is Senior Associate Consultant and Associate Medical Director in the Division of Preventive, Occupational and Aerospace Medicine, Department of Internal Medicine, Mayo Clinic, Rochester, Minnesota. She is also the Section Chief of the Division of Preventive, Occupational and Aerospace Medicine, Department of Internal Medicine at Mayo Clinic in Rochester, Minnesota. Dr. Breeher is an instructor in Preventive Medicine, Mayo Clinic College of Medicine.

Trainee to help lead the residency training program

2011 graduate of the University of Iowa Occupational Medicine Residency Training Program, Brenda Buikema, MD, MPH, was appointed Associate Program Director of the Occupational Medicine Residency Training Program at the University of Iowa College of Public Health in January 2017.

Continuing Education

Third year of successful safety conference

The Continuing Education Program partnered with several labor organizations and employers to host the third annual Hawkeye on Safety Conference, held September 8th, 2016. In its third year, the conference grew again in participation, from 494 participants to 503. The course content included electrical safety, workplace stress, trenching and excavation safety, safety communication, confined spaces, an update on OSHA regulations, and Violent Incident Shooter Training, among other topics. Partnering organizations for Hawkeye on Safety 2016 included Carpenters Local 1260; Chicago Regional Council of Carpenters; Iowa’s Building Trades Unions; Laborers Health and Safety Fund; Built by Pros; Cedar Rapids & Iowa City Building Trades; Gilbane Building Company; Local Union 125 Plumbers & Pipefitters; McComas-Lacina Construction LC; Miron Construction Co., Inc.; Iron Workers Local 89; Millwright Local Union 2158; Mortenson Construction; TrueNorth Construction Specialty Group; Wellmark Blue Cross & Blue Shield; Healthier Workforce Center of the Midwest; and the University of Iowa Facilities Management.