

THE UNIVERSITY OF IOWA
EDUCATION AND RESEARCH CENTER
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Heartland

CENTER FOR OCCUPATIONAL

Health & Safety

ANNUAL REPORT

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PREPARED BY

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SUMMARY

The vision of the Heartland Center for Occupational Health and Safety is to be the leading educational and outreach resource for workplace safety and health in the states of Iowa, Kansas, Missouri and Nebraska (Region VII). Its mission is to reduce injuries, illnesses, and fatalities of workers by expanding and strengthening the occupational health and safety workforce with well-trained and well-informed professionals. The Heartland Center serves as a resource for Federal Region VII and other regions of the US by providing interdisciplinary graduate-level training as well as continuing education and outreach for practitioners and researchers in professions related to occupational health and safety (OHS). The Heartland Center is well positioned to address OHS issues unique to the region by preparing trainees with knowledge and experience in the discipline areas most relevant to the needs of workers in this region.

Heartland Center strengths include: a rigorous planning and evaluation structure; the productive research capacity of its faculty; a commitment to interdisciplinary training and research, active continuing education and outreach programs, and institutional support of Center activities. The Heartland Center has six graduate-level academic training programs focusing on industrial hygiene, occupational safety, agricultural safety and health, ergonomics, occupational epidemiology, and occupational injury prevention. 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.





RELEVANCE

The major rationale for the Heartland Center is to address OHS problems unique to Federal Region VII, in particular a shortage of trained OHS professionals and higher than US-average rates of occupational disease and injury. The training of over 40 graduate-level students by Heartland Center faculty each year directly influences the number of trained OHS 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 through an outreach program that provides consultation and current information to increase awareness of occupational health and safety issues in Region VII.

KEY PERSONNEL

Patrick O'Shaughnessy

Center Director

R. William Field, PhD

Center Deputy Director
Occupational Epidemiology Program Director
Pilot Program Director

Tammi Goerd

Continuing Education Director
Center Outreach Director

David Asa

Associate Director of Student Affairs

Thomas Peters

Industrial Hygiene Training Program Director

Nir Kiren

Occupational Safety Program Director

Diane Rohlman

Agricultural Safety and Health Training
Program Director

Nathan Fethke

Ergonomics Training Program Director

Carri Casteel

Occupational Injury Prevention Training
Program Director

HEARTLAND CENTER FACULTY PARTICIPATE IN REGIONAL COVID-19 RESPONSE

As the COVID pandemic closed campus to complete the spring semester at a distance, multiple faculty in the Heartland Center provided expertise throughout the region. Dr. Anthony (Industrial Hygiene, IH) provided guidance to protect essential workers at the University of Iowa throughout the spring and summer months. Dr. O'Shaughnessy (IH) advised the Iowa Department of Public Health on developing alternative personal protective equipment for healthcare workers across Iowa. Drs. Gerr (Former Occupational Medicine Residency Director) and Anthony served on the campus COVID Health and Safety committee, charged with recommending best practices, to the University leadership, to consider for adoption prior to bringing students back to the dorms and reopening the campus for classes. The committee brought in expertise from Dr. O'Shaughnessy to contribute recommendations on protective equipment use and policies, Dr. Peters (IH) to assist with ventilation evaluations and improvement recommendations, and Dr. Nonnenmann (IH) to assist with bathroom engineering recommendations. Dr. Nonnenmann (IH) and colleagues have conducted SARs-CoV-2 aerosol and surface sampling near patients diagnosed with COVID in the medical intensive care units at the University of Iowa Hospital and Clinics. Gerr and Anthony also participated in two webinars to communicate best practices to adopt to reopen K-12 schools (1400 registered) and to the general public on selection and use of face coverings (440), and continue to provide guidance to the general public on many health and safety issues related to COVID. Dr. O'Shaughnessy has aided hospitals seeking to reuse N95 masks by testing their efficacy after being treated with a decontamination method.

HEARTLAND CENTER TRAINEES ADOPT CLASS SAFETY PROJECT TO DEVELOP SAFETY RECOMMENDATIONS FOR AT-HOME WORKERS

During the transition to on-line classes during March of 2020, many Heartland Center trainees lost access to businesses they were planning to provide safety consulting to as part of their semester-long project in the course "Occupational Safety". However, seven students rose to the occasion and refocused to build a web page to help advise millions of workers now working from home. The team sent out questions to their networks and identified their safety concerns and began building evidence-based tools and recommendations to help those be safe at home.

The web page includes chemical safety, electrical safety, home ergonomics, and other topics relevant to safety at home during the COVID pandemic. Faculty and staff with expertise in areas covered by the students provided guidance and oversight, and students developed new skills of communicating safety messages with the general public who were looking for answers to concerns and discomfort at new home "offices." <https://www.public-health.uiowa.edu/news-items/students-offer-safety-advice-for-at-home-workers/>

INDUSTRIAL HYGIENE TRAINEES CONTRIBUTE TO COVID-19 PREPAREDNESS ASSESSMENTS

Current and former IH trainees have actively participated in efforts to minimize the spread of the SARS-CoV-2 virus on campus and internationally. Current IH trainees have investigated ventilation quality across the UI Campus. With guidance from Dr. Peters, IH trainee David Rabidoux measured contaminant decay across 12 instructional rooms to identify and prioritize systems needing improvements to increase air exchange rates prior to scheduling classes in the fall. Nicholas D'Antonio, also an IH trainee, worked with campus EHS staff and alumni Justin Newnum to evaluate the air transport patterns in open laboratories in the School of Dentistry. This investigation examined the impact of using new high-suction devices purchased to minimize the transport of respirable aerosols during dental procedures. Alessandra Pratt, under guidance of Dr. Nonnenmann, has investigated aerosol transport in the School of Music to help answer the questions about whether and how wind instruments can be played indoor during the COVID pandemic.

Former IH trainee Corey Boles (PhD 2019), now Senior Health Scientist and Cardno ChemRisk, spoke in multiple webinars helping prevent the spread of COVID, including for the National Academies (["Protecting Building Engineering and Maintenance Staff," Aug. 19](#)) and the American Industrial Hygiene Association (["Office Settings: Important Reopening Considerations During the COVID-19 Pandemic, Sept. 16](#)).

The [2018 publication](#) by IH trainees Samantha Knowlton (MS 2017) and Corey Boles on bioaerosol concentration from toilet flushing in hospitals has been widely cited in the media (83 news outlets, Sept. 9, 2020) as important to understand the SARS-CoV-2 might be spread in bathrooms.



AGRICULTURAL SAFETY AND HEALTH EDUCATION

A long-time leader in agricultural safety and health education, the University of Iowa went online in 2020. To comply with COVID-19 restrictions, [Agricultural Safety and Health: The Core Course](#) moved from a week-long class that brings together graduate students and safety and health professionals in person to a virtual forum. Twenty-five people participated, representing twelve states including Alaska, Texas, and New York. In addition to virtual lectures, the course incorporated videos, podcasts, and online modules. Many of these materials came from our partners, including the Center for Food Security and Public Health, the National Pork Board, the National Educational Center for Agricultural Safety, and other National Institute for Occupational Safety and Health Agricultural Safety and Health Centers.

The Core Course materials are publicly available at www.gpcah.org/asheducation and have been provided to other AFF centers, community colleges, and agricultural education programs. Online educational modules are available for use at no cost (<https://agsafetyhealth.training-source.org/>).

PARENTS PLAY AN IMPORTANT ROLE IN THE SAFETY OF YOUTH ON THE FARM

Farming is not only a high-risk business, but it also one that involves the entire family. Parents serve as safety mentors for their children who work alongside them on the farm. Trainee Kayla Walls used a mixed methods approach to examine the safety interactions between parents and their children who work on the farm. Specifically, she addressed how youth would respond if their parent asked them to perform a dangerous task, such as entering a grain bin while conveying grain. The findings suggest that although youth trust their parents to provide them with valid safety information, the faith they have in parents is not blind or unquestioning.

The youth indicated that while they would follow a parent's directions, if they were asked to perform unsafe tasks, they would refuse. The findings also suggest the role of parents in their child's safety education on the farm is an important one. Kayla has presented the results of her research at the 2020 International Society for Agricultural Safety and Health (ISASH) and is planning to present her research at the upcoming Midwest Regional Agricultural and Safety Health conference in November. She will defend her research in October, completing her master's degree in 18 months.

OCCUPATIONAL INJURY PREVENTION TRAINEE DEVELOPS FIRST-EVER TRACTOR SIMULATOR FOR RESEARCH

Transportation related incidents are the leading cause of occupational fatalities for all industries in the United States, including the agricultural industry which experiences thousands of crashes involving farm equipment each year. Simulated driving studies offer a safe and cost-effective way to conduct driving research that would not be feasible in the real world. OIP trainee, Kayla Faust, worked with the National Advanced Driving Simulator to develop and evaluate a tractor driving miniSim. In a study of 99 farm equipment operators in Iowa, the simulator's realism was rated favorably overall and across several domains (e.g., Appearance, User Interface) (article in press with the Journal of Agricultural Safety and Health).

Using the tractor simulator in her dissertation research, she found that older, compared with younger, farmers have slower response times when faced with simulated hazards. She also found that older farmers taking antihypertensive medications, compared to those not taking these medications, have slower response times when faced with hazards. These findings are important as the average age of farmers continues to increase each year in the U.S.



PREVENTING OFF-ROAD VEHICLE INJURIES THROUGH INSURANCE POLICIES

All-Terrain Vehicles (ATV) and Side-By-Side Vehicles (SXS) are popular for both off-road use and, increasingly, in agricultural work. However, occupational use exposes the operator to conditions that may cause crashes, potentially resulting in catastrophic injuries and fatalities. The incorporation of safety requirements into insurance policies may be a feasible intervention to reduce injuries and fatalities associated with off-road vehicle use in agriculture. As part of her master's thesis, Karen Thornton (MS, 2020) analyzed results of a survey that examined farmers' recreational and occupational use of off-road vehicles, crash histories and characteristics, and what vehicle damages and liabilities were covered under their insurance policies. Younger operators reported more ATV and SXS crashes. Farmers reported uncertainty about their insurance providers and coverage, particularly for coverage of non-family members. Although off road vehicles are not legally allowed to be driven on Iowa public roads during recreational use, counties have local control over some roadways. Under pressure from advocacy groups and local tourism boards, many counties have passed ordinances to allow ATV and SXS use on public roads. On March 4, 2020, the Linn County Board of Supervisors held a hearing and first consideration for a proposed ordinance regulating the operation of off-road vehicles on public roadways. At the hearing, Ms. Thornton and representatives from the University of Iowa Hospitals and Clinics presented testimony and data as to why these vehicles should not be allowed on the roads, how safe behaviors are not used by operators, and statistics on injuries and crashes. The Supervisors were particularly interested in whether they could mandate insurance coverage for the off-road vehicles as a requirement for licensure to ride on public roads. Ultimately, the supervisors did vote in favor of the ordinance, however they included several safety provisions not initially in the ordinance.

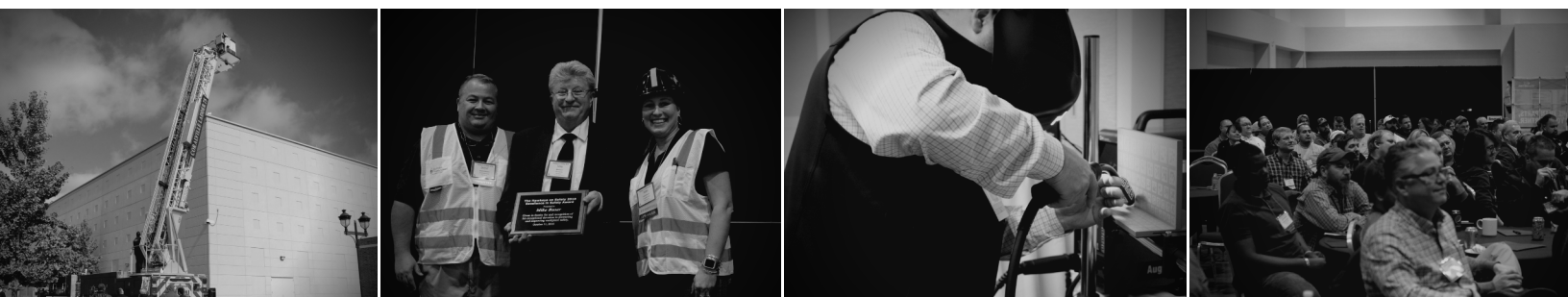


OCCUPATIONAL EPIDEMIOLOGY INVESTIGATES MENTAL HEALTH AND SUBSTANCE DEPENDENCE TREATMENT FOR US VETERANS

Veterans in the United States (US) maintain an increased risk of opioid use dependence (OUD) accidental mortality, and suicide rates compared to the general population. Medication-assisted therapy is an effective treatment option for those with OUD and combines pharmacological treatment through opioid agonist medications such as buprenorphine with psychological therapies. Doctoral trainee, Priyanka Vakkalanka, is completing her dissertation in collaboration with the Veterans Health Administration to examine these medications and treatment delivery methods such as telehealth on treatment retention and mortality. With support from the [Heartland Center for Occupational Health and Safety pilot grant program](#) as well as the R36 Drug Abuse Dissertation Grant funded by the National Institute of Drug Abuse, she is examining whether there are significant barriers and disparities to access and the delivery of care. The proposed study has the potential for decreasing the burden of OUD by evaluating methods in access to care and in its delivery through telehealth capabilities at a national level. If the delivery of care influences longer treatment retention and subsequently decreased mortality, these findings will impact future strategies for medication management of OUD. <https://stories.uiowa.edu/student-research-vakkalanka-virtual-care-veterans>

CONTINUING EDUCATION EVENTS CONTINUE TO GROW DUE TO ESTABLISHED PARTNERSHIPS

The Continuing Education Program has previously assisted the North Central States Regional Council of Carpenters in developing an education program to include nursing credits, called Construction ICRA (Infection Control Risk Assessment). This program has expanded to offer general continuing education credit. This program was originally offered in only Region VII states, but has since expanded to states of MN, WI, SD, ND. As a result of the partnership with the Iowa Occupational Safety and Health Advisory Board and the Central States Occupational Medicine Association, CE Director Tammi Goerdts, was recommended to sit on the planning committee for the annual Iowa Workers Compensation Advisory Committee Symposium. This event provides continuing education for approximately 200 attorneys, paralegals, case managers and insurance adjusters who work in the workers compensation arena, primarily in Iowa but does include those who are licensed to practice in surrounding states of Nebraska and Illinois.



HEARTLAND CENTER GRADUATE IMPROVES EXPOSURE ASSESSMENT AND RISK MANAGEMENT IN THE AIR FORCE

Industrial Hygiene Program alumnus, Dr. Darrin Ott (PhD 2007), Core Technical Competency Lead for all Air Force Medical Research within the Air Force Research Laboratories, oversees scientific strategy and technical quality for a \$65 million research portfolio within the Airman Systems Directorate. This directorate enhances the performance of airmen while protecting their health from chemical, biological, radiological, or physical hazards. Dr. Ott develops and understands the impact of emerging technology on airmen in the context of overall risk and specific applications, such as better protective equipment, bringing home in transport, enabling operators to fly at higher. His passion is mentoring leadership qualities in others, such as his science and technical managers responsible for biomedical impact of flight, systems biology, environmental sensors.

ERGONOMICS GRADUATES INFLUENCE THEIR PROFESSION IN INDUSTRY AND ACADEMIA

Recent graduates of the Heartland Center Ergonomics Training Program have obtained positions that are allowing them to already have a positive effect on their profession in industry and academia.

Dr. Howard Chen (PhD in Industrial Engineering, 2017) is a Research Assistant Professor of Mechanical Engineering at Auburn University

Josh Kersten (MS in Occupational and Environmental Health, 2017) has been promoted to Workplace Health & Safety Manager at Amazon

Dr. Mark Schall (PhD in Industrial Engineering, 2014) has been promoted to tenured Associate Professor of Industrial & Systems Engineering at Auburn University

Dr. Mahmoud Metwali (PhD in Biomedical Engineering, 2019) is a Human Factors Researcher at Facebook

Shamus Roeder (MS in Biomedical Engineering, 2019) is a Biomedical Research Scientist with Intelligent Automation

