

**MIDWEST CENTER FOR OCCUPATIONAL HEALTH AND SAFETY
EDUCATION AND RESEARCH CENTER**

SUMMARY ANNUAL REPORT

July 1, 2021 – June 30, 2022

NIOSH TRAINING GRANT

No. T42 OH 008434



SUBMITTED BY:

**MARIZEN R. RAMIREZ, PHD, MPH, CENTER DIRECTOR
SUSAN F. ARNOLD, PHD, CIH, FAIHA, DEPUTY DIRECTOR**

**DIVISION OF ENVIRONMENTAL HEALTH SCIENCES,
SCHOOL OF PUBLIC HEALTH
UNIVERSITY OF MINNESOTA
MINNEAPOLIS, MINNESOTA 55455**

MIDWEST CENTER FOR OCCUPATIONAL HEALTH AND SAFETY (MCOHS) EDUCATION AND RESEARCH CENTER (ERC)

ANNUAL REPORT – OCTOBER 2022

MCOHS ERC Summary:

The mission of the Midwest Center for Occupational Health and Safety (MCOHS) Education and Research Center (ERC), as a center of excellence, is to provide: 1) cutting-edge interdisciplinary academic and research training to prepare exceptional leaders who make significant contributions to occupational safety and health (OSH), and 2) high impact outreach through continuing education (CE) and translational of research to practice. For this 2020-2025 performance period, MCOHS will also pursue training, research and outreach in occupational health equity as sub-theme of the center to address the needs of an increasingly diverse workforce.

MCOHS ERC Relevance:

The MCOHS ERC serves the region of Minnesota, Wisconsin, North Dakota, and South Dakota and is a resource for industry, labor, federal, state, and local government agencies, agriculture, and numerous other partners. Recognized regionally, nationally, and internationally, it provides outstanding academic and research training programs and innovative continuing education programs to ensure the Center is positioned to continue to produce leaders who make important contributions to occupational safety and health.

MCOHS ERC Key Personnel:

ERC Director

Marizen R. Ramirez, MPH, PhD

Leon S. Robertson Professor in Injury Prevention
Midwest Center for Occupational Health and Safety
Education and Research Center
Division of Environmental Health Sciences
School of Public Health, University of Minnesota
420 Delaware Street SE – MMC #807
Minneapolis, Minnesota 55455
E-mail: mramirez@umn.edu

ERC Deputy Director

Susan Arnold, PhD, CIH

Associate Professor
Telephone: 612-624-6222 Email: arnol353@umn.edu
Website: <https://essi.umn.edu/>

Academic Programs and Overall MCOHS ERC Key Personnel:

Industrial Hygiene

Academic Program Director: Peter C. Raynor, PhD, Professor
Email: praynor@umn.edu
Academic Program Co-Director: Susan Arnold, PhD, CIH, Associate Professor
Website: <http://www.mcohs.umn.edu/industrial-hygiene/>

Occupational and Environmental Medicine

Academic & Residency Program Director: Zeke McKinney, MD, MS, Assistant Professor

Email: Zeke.J.McKinney@healthpartners.com

Occupational and Environmental Health Nursing

Academic Program Director: Carolyn Porta, PhD, RN, Professor

Email: porta@umn.edu

Website: <http://www.mcohs.umn.edu/occupational-and-environmental-health-nursing-oehn/>

Occupational Injury Prevention Research Training Program

Academic Program Director: Marizen Ramirez, PhD, Leon S. Robertson Professor in Injury Prevention

Email: mramirez@umn.edu

Academic Program Co-Director: Hyun Kim, ScD, Associate Professor

Email: kimx4804@umn.edu

Website: <http://www.mcohs.umn.edu/occupational-injury-prevention-research-training-oiprt/>

Occupational Safety

Academic Program Director: Katherine Schofield, PhD, Associate Professor

Email: kscho@d.umn.edu

Academic Program Co-Director: Robert Feyen, PhD, Associate Professor

Email: rfeyen@d.umn.edu

Website: <http://www.mcohs.umn.edu/occupational-safety-os/>

Occupational and Environmental Epidemiology

Academic Program - Director: Bruce Alexander, PhD, Professor

Email: balex@umn.edu

Academic Program Co-Director: Hyun Kim, ScD, Associate Professor

E-mail: kimx4804@umn.edu

Academic Program Co-Director: Richard MacLehose, PhD, Professor

E-mail: macl0029@umn.edu

Website: <http://www.mcohs.umn.edu/occupational-and-environmental-epidemiology>

Continuing Education and Outreach in Occupational Health and Safety

Program Director: Julie Alcorn-Webb, MPH, MA, RN

Email: webbx032@umn.edu

Website: <http://www.mcohs.umn.edu/continuing-education/>

MCOHS ERC Website:

www.mcohs.umn.edu

Program Highlights

Continuing Education (CE)

Program Director: Julie Alcorn-Webb, RN, MA

Return to In-Person Training: NIOSH-Approved Spirometry and CAOHC Hearing Conservation Courses

Despite the continued COVID-19 pandemic, MCOHS CE returned to in-person training for Spirometry and Hearing Certification courses starting July 2021. This presented special challenges related to safety of CE staff, faculty and students. For example, to maintain safe distancing during CE courses, maximum student registration per course was cut in half, resulting in decreased program income per course. Sourcing safety equipment such as HEPA filters for the classrooms and N95 respirators for students continued to be a challenge but was accomplished in coordination with University Facilities Management.

As anticipated, we saw a spike in demand for certification courses once we were able to return to in-person training, which resulted in our ERC offering the following courses throughout the 2021-22 grant year:

- 6 CAOHC Initial Hearing Conservationist Certification courses
- 3 COHC Hearing Conservationist Certification Refresher courses
- 5 NIOSH-Approved Spirometry Certification courses
- 3 NIOSH-Approved Spirometry Certification Refresher courses

Pre-pandemic, typical demand resulted in a total of eight courses offered each year. The 17 courses offered during the same timeframe in 2021-22 shows a 212% increase in demand, with 158 students certified.

FarmResponse: Collaboratively Developed CME Modules Train Rural Healthcare Providers to Provide Mental Health Services for Agricultural Workers

A notable suite of new CE modules called FarmResponse was developed collaboratively with ArgriSafe Network. A 3.5 hours of training on mental health services for agricultural workers was developed in response to the crisis of mental health among American agricultural producers who experience high rates of suicide. Rural areas comprise 85% of the 1,669 federal-designated mental health professional shortage areas, leaving farmers and ranchers without vital mental health services.

For farmers, healthcare providers in their rural communities (MDs, PAs, NPs, etc.) without specialized OHS training are often the only link to mental health resources. FarmResponse improves cultural competencies and understanding of the stressors affecting agricultural producers, workers, and their families for hotline, emergency, primary care, acute care, and behavioral healthcare professionals. To further incentivize rural healthcare practitioners to participate in this training, MCOHS obtained approval for trainees to receive CME credit from the Minnesota Medical Association for a period of 3 years.

<https://www.agrisafe.org/courses/farm-response/>

Industrial Hygiene (IH)

Program Director: Pete C. Raynor, PhD, Professor

Co-Director: Susan Arnold, PhD, CIH, FAIHA, Professor

Interdisciplinary Training, Education and Research Activities for Assessing And Controlling Contaminants From Emerging Technologies (InTERACCT)

Emerging technologies such as additive manufacturing, nanotechnology, and novel drug delivery can revolutionize how we make products, care for health, and accomplish work. However, they may also expose workers to hazardous materials involved in or produced by their use. InTERACCT will train occupational health and safety professionals to protect the health and safety of those working with these new technologies. IH Program Associate Professor Susan Arnold leads InTERACCT with contributions from IH Program PhD student Puleng Moshele, other PhD students, IH Program Professor Pete Raynor, and colleagues at the University of Iowa and UCLA. The project team is developing a comprehensive web-based curriculum focusing on worker health and safety in emerging technologies and providing research-based training for graduate students. The web courses will be designed for training, continuing education, and outreach, and targeted toward industrial hygienists and other environmental and occupational health professionals. InTERACCT is funded by the National Institute of Environmental Health Sciences.

Factors Influence Transmission of Airborne Viruses (FITrAV)

The long-range goal of FITrAV is to reduce the risk of transmission of infectious airborne viruses among people, particularly those at work. To reduce risk, we must first identify the factors that influence risk. Little research has been conducted to measure the concentrations, sizes, and infectivity of particles to which people are exposed at work and in public spaces. Funded by Division of Environmental Health Sciences (EnHS) alumnus Dr. Dale Lundgren and his wife Helen, FITrAV is led by IH Program faculty members Pete Raynor and Susan Arnold with contributions from EnHS PhD students and colleagues in the College of Veterinary Medicine and Department of Mechanical Engineering. Using an array of samplers, the FITrAV team is collecting and analyzing air and surface samples from workplaces and public spaces to quantify human respiratory viruses. The team is also assessing factors that may influence exposure in workplaces and public spaces such as temperature, relative humidity, room dimensions, occupant density, occupant activities, and ventilation parameters. Samples have so far been collected in a music classroom, a medical clinic, a dental clinic, and a sports arena. Viruses identified include SARS-CoV-2, human metapneumovirus, rhinovirus/enterovirus, and bocavirus. There was a greater prevalence of viral RNA in surface samples than air samples.



Dr. Pete Raynor with the FITrAV team

Occupational and Environmental Epidemiology Program (OEE)

Program Director: Bruce Alexander, Associate Professor

Co-Director: Richard MacLehose, PhD, Professor

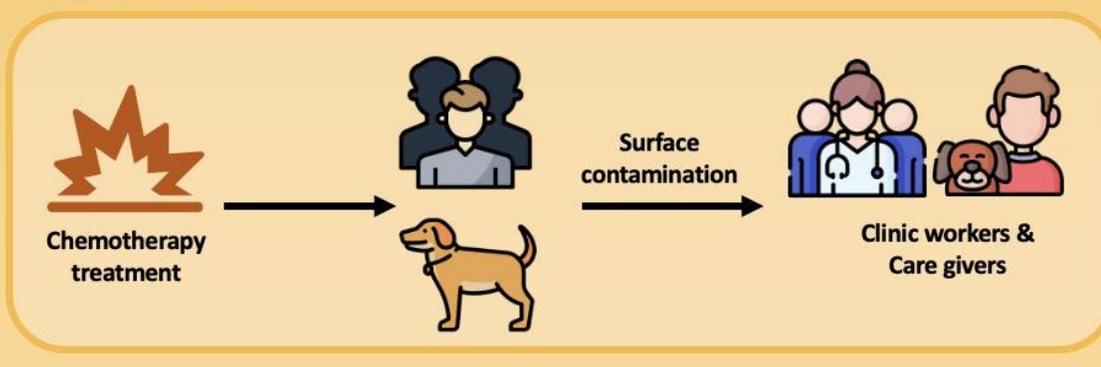
Co-Director: Hyun Kim, ScD, Associate Professor



Andrew Floeder presented initial results of his research on exposure to chemotherapeutic drugs in occupational settings at the annual meeting of the American Industrial Hygiene Conference and Exposition (AIHce). These exposures occur to health care workers in both human and animal health care settings and the health effects are not well understood. An important step in understanding the health effects of these chemicals is developing methods to measure the exposure to the workers.

Mr. Floeder is being mentored by Dr. Silvia Balbo and Susan Arnold (MCOHS-IH) and is collaborating with the Masonic Cancer Center and the University of Minnesota College of Veterinary Medicine. His poster at the AIHce won First Place as the best student poster.

Figure 1. Scheme of project rationale



[Assessment of Chemotherapy Drugs in Occupational Settings - YouTube](#)

Patrick Balias has continued to develop his research on COVID-19 risk and consequences in health care settings. He is being mentored by Drs. Jeff Bender and Bruce Alexander and is collaborating with the Minnesota Department of Health on the Health Care Worker Monitoring Project Health. Health care and other frontline workers were at extremely high risk of COVID during the pandemic. They are also more likely to suffer burnout and mental health effects from the stress of the jobs. This project is evaluating workplace factors that may have increased risk of COVID-19 infection and mental health and burnout in acute care workers and workers in congregate care settings, e.g. nursing homes and home health care.

Occupational and Environmental Health Nursing (OEHN)

Program Director: Carolyn Porta, PhD, MS, MPH, RN

National survey of occupational health nurses about COVID-19 pandemic impacts



EOHN Trainee Lisa Hunwardsen (graduated summer 2022), with advisor Carolyn Porta and mentor Lucy Carlson successfully competed for a small grant from the American Board for Occupational Health Nurses to develop, deploy, and analyze a survey of occupational health nurses in the US and Canada.

[Lisa Hunwardsen receives grant from AOHN](#)

[Lisa Hunwardsen - Survey Results](#)

Survey results have been presented in national and organizational venues, including:

L. Hunwardsen, L. Carlson and K. Kilbride. “Quantifying the Value of Occupational Health Nursing Services to Worker Health & Safety and the Business Bottom Line” Presented at the **American Association of Occupational Health Nursing conference**. June 9, 2022.

L. Hunwardsen, and K. Kilbride. “Illustrating the Value of Occupational Health Nursing Services to the Workplace during COVID-19 and the value of Occupational Health Nursing certification” presented to Occupational Health Nurses for **3M Corporate Occupational Health** in St. Paul, MN. June 20, 2022.

L. Hunwardsen and K. Kilbride “Investigating the Value of Occupational Health Nursing Services to Worker Health & Safety during COVID-19 from the OHN and Business perspective” presented at the **Association of Occupational Health Professionals Conference** in Austin, TX. September 9, 2022.

Study findings were also featured in the following poster presentations:

L. Hunwardsen, L. Carlson, K. Monsen, and C. Porta, “Survey of Occupational Health Nurses: An exploration of how OHNs were impacted by the COVID-19 pandemic”. Competitive Poster Session for Research Day at the **University of Minnesota School of Public Health**. April 14, 2022.

L. Hunwardsen, L. Carlson, K. Monsen and C. Porta. “Exploring the impact of the COVID-19 on Occupational Health Nurses”. Poster presented at the **Association of Occupational Health Professionals conference** in Austin, TX. September 8, 2022.

Occupational Health Nursing Careers, Panel Presentation

Program Director Carolyn Porta participated in a panel composed of occupational health nursing program directors for the **2022 AAOHN annual meeting**; the panel presentation highlighted career gap areas, opportunities for prospective students, and ways to get engaged to learn more.

Trainees into occupational health nursing

EOHN trainee Laura Johnson completed her program in summer 2022 and was promptly hired by Boston Scientific into an occupational health nursing position.

Occupational and Environmental Medicine Academic Training Program (OEM)

Academic & Clinical Residency Program Director: Zeke McKinney, MD, MHI, MPH, FACOEM

How Can We Identify and Monitor Occupational Health Disparities?

This project built on earlier findings from two years of HealthPartners OEM clinic data that showed Hispanic workers had about three times higher rates of low back injuries and about two times higher rates of upper extremity injuries. An important finding of this work was that there are still gaps in identifying populations at risk of occupational injuries, such as evaluating specific populations within the ethnicity "Hispanic." This led to a pilot project where OEM patients provided self-reported demographic information, and industry, occupation, and injury data were coded for more in-depth analysis, as a demonstration of how to monitor different at-risk populations where multiple factors may contribute to risk, such as certain ethnicities working more commonly in some industries where there are higher specific occupational hazards. There is a plan to pursue future grant funding to develop a more robust occupational injury surveillance system in partnership with NIOSH, who has developed tools to assist workers with coding industry and occupation on their own.

Full-text: <https://onlinelibrary.wiley.com/doi/full/10.1002/ajim.23332>

Presentation to Deep South ERC (Dr. McKinney): <https://sites.uab.edu/dsc/2021/10/11/disparities-in-occupational-health-webinar/>

The Public Health Intersection of Law Enforcement Violence and Systemic Racism

In May, 2020, the entire world saw the murder of George Floyd at the hands of Minneapolis police, which led to local, national, and international attention to issues of systemic racism, particularly law enforcement violence. Multiple OEM faculty, in addition to other local physicians in the Minneapolis area, worked to develop a manuscript that can serve as a primer on systemic racism through the lens of law enforcement violence, with a focus on public health. This manuscript was published in the American Journal of Preventive Medicine, and this information has been presented in multiple clinical and non-clinical venues.

Full-text: [https://www.ajpmonline.org/article/S0749-3797\(21\)00415-3/fulltext](https://www.ajpmonline.org/article/S0749-3797(21)00415-3/fulltext)

Are Saunas Effective in Reducing Firefighter Exposure to Cancer-Causing Hazards?

In the mid-to-late 2010s, increasingly firefighters were discussing saunas as a potential means to reduce or remove cancer-causing exposures, through anecdotal reports of rapidly removing the smell of a fire from a firefighter after using a sauna, versus historically having this smell persist for several days with standard personal care (such as showering). This interest led a number of sauna manufacturers to target the firefighting population and fire departments as potential customers, despite a lack of evidence to any such effectiveness. Through a partnership with the City of St. Paul, St. Paul Fire, and the Minnesota Department of Health, a pilot grant was funded to measure the cancer-causing chemicals from soot in urine for firefighters using or not using a sauna after fighting a fire, with similar measurements in sweat for the firefighters using a sauna. Data collection for this project was delayed due to the COVID-19 global pandemic, and currently data is being collected for analysis.

Media: <https://www.kare11.com/article/news/local/breaking-the-news/will-a-sauna-help-prevent-firefighter-cancer/89-a4bde10d-73e9-40c5-87e1-ffcae65d1f63>

How Common is Vaccine Hesitancy in Minnesota Firefighters?

Following the introduction of COVID-19 vaccines, for which first responders (including firefighters) had early access due to being "essential workers" with greater than average exposure, multiple news stories came out discussing significant issues of vaccine hesitancy in this population, though there were no formal studies assessing such concerns. Through a partnership with the Minnesota Department of Health, who had received a grant from NIOSH to study occupational hazards related to COVID-19, a supplemental grant was received to study this issue in Minnesota firefighters, which are a population of approximately 22,000 firefighters, of whom approximately 90% are non-career firefighters.

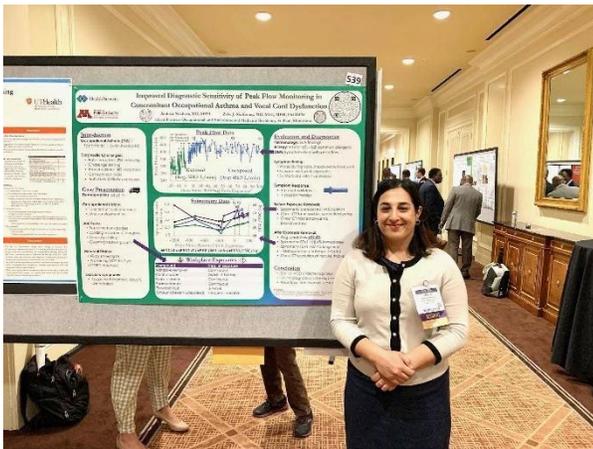
A statewide survey was distributed and yielded approximately 1,000 responses, where data analysis is ongoing with a plan to present to Minnesota firefighters and publish the results, with the intent to use results to guide future interventions to increase vaccine acceptance amongst firefighters. Initial results demonstrate similar rates of vaccination in firefighters compared with the general population, and overall low levels of trust in information from various sources.

Developing a Clinic Model to Treat Hazardous Environmental Exposures

Within the HealthPartners OEM clinics, Dr. McKinney has organically over the past several years developed a practice in which a majority of patients are seen for evaluation of concerning environmental exposures, whether work-related or not. This has led to the HealthPartners OEM clinic opening a new clinic space and hiring a physician assistant to work with Dr. McKinney in starting a focused Environmental Medicine (environmental exposure) clinic, which opened in January, 2022, and in which OEM residents have additional clinical experiences. This new clinic has seen patients with a variety of exposure-related concerns, including many flight attendants concerned about health hazards related to new work uniforms, home mold exposures, individuals with chemical intolerance, and women with retained lead bullet fragments concerned about reproductive hazards.

Full-Text (Contact Dermatitis in Flight Attendants Related to Work Uniforms):

https://journals.lww.com/dermatitis/Citation/2021/07000/A_Mini_epidemic_of_Suspected_Contact_Dermatitis_to.16.aspx



Environmental exposure presentation by Dr. Ambica Nakhasi at the American Occupational Health Conference 2022



Clinical residents on a site visit during 2021

Occupational Injury Prevention Research Training (OIP)

Program Director: Marizen Ramirez, PhD, Leon S. Robertson Professor in Injury Prevention
Associate Professor
Program Co-Director: Hyun Kim, ScD

Our diverse pool of OIP students is making significant impact in the occupational health and safety field through their research and engagement as trainees and recent graduates. Yoon- Sung Nam, PhD, is an Epidemiologic Intelligent Services Officer stationed at the New York City Health Department's Environmental Health Program conducting lead poisoning surveillance studies. Douglas Demoulin, PhD, will soon begin a post-doctoral position with the Molecular and Genetic Epidemiology of Cancer (MAGEC) at the Vanderbilt University Medical Center. Our current trainees are also actively engaged in research-to-practice projects with a strong focus on diversity, equity and inclusion. We highlight a few student-led projects below:



PhD student Alexis Grimes Trotter is developing a study in collaboration with Minneapolis Public Health and Restaurant Opportunities Centers (ROC) United to conduct a mixed methods to study the health and wellness of diverse food service workers during pandemic-normal times. The study will specifically examine the impact of labor shortages in restaurant workers through an analysis of federal, state and local policies; the effect of labor shortages on injury occurrence; and experiences of discrimination resulting in inconsistent work schedules and adverse mental health outcomes.

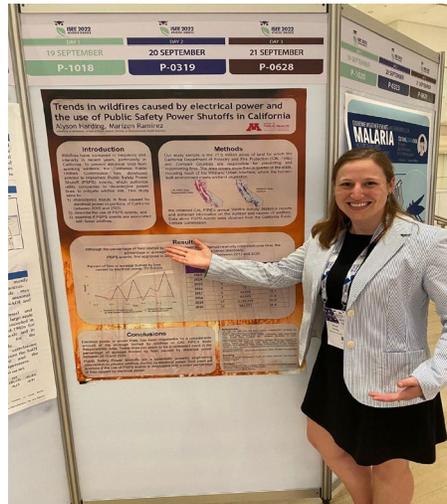
PhD graduate Yoon-Sung Nam recently defended a dissertation examining work-related stress among law enforcement personnel in response to the COVID-19 pandemic and George Floyd murder in two large urban law enforcement agencies in Minnesota. The study involved interviews, surveys and hair cortisol analysis. Prevalence of PTSD symptomology was 24% among sworn and 39% among non-sworn personnel. Both sworn and non-sworn respondents had similar levels of occupational operational and organizational stress. When stratified by career status, early-career non-sworn personnel reported high levels of stress responding to the civil unrest. Mental health stigma was a perceived barrier to seeking help, but service providers with law enforcement backgrounds facilitated seeking help.



[The Effects of COVID-19 on Law Enforcement - YouTube](#)

PhD candidate Alyson Harding is assessing the impact of power safety shut-offs and causes of wildland fires in California, a risk to Total Worker Health. To prevent electrical lines from sparking wildfires, the California Public Utilities Commission has developed policies to implement Public Safety Power Shutoff (PSPS) events, which authorize utility companies to de-energize power lines to mitigate wildfire risk.

This study aims to 1) characterize trends in fires caused by electrical power in portions of California between 2010 and 2020, 2) examine if PSPS events are associated with fewer wildfires, and 3) to assess unintended consequences of PSPS, specifically occupational injuries experienced during safety shut-offs.



Alyson Harding, presenting at the International Society for Environmental Epidemiology, September 2022

Occupational Safety (OS)

Academic Program Director: Katherine Schofield, PhD, Assistant Professor

Academic Program Co-Director: Robert Feyen, PhD, Associate Professor

On-Site Solutions Physical Therapy Annual Meeting, October 2021

Physical therapists (PTs) at On-Site Solutions provide proactive physical therapy and injury prevention on the worksite, not a medical office. They interact with workers in the construction, oil and gas, and manufacturing industries and often partner with on-site occupational safety professionals as an interdisciplinary team to reduce workplace injuries. OS Director Katie Schofield was invited to speak at On-Site Solutions annual meeting to highlight trends in occupational safety education and practice for the physical therapists teams.

Safety Connect Safety Conference and Expo, October 2021

OS Director Katie Schofield was an invited guest on a panel at the Safety Connect Conference, a virtual international conference for EHS professionals. The panel discussed career development opportunities for safety professionals, including certifications, degrees, related paths (occupational safety, IH, environmental, emergency management, etc.) and answered questions from audience members interested in pursuing or advancing a safety career.

Vision Northland Essentia Health Project Technical Tour, December 2021

OS trainees Abigail Hules and Margaret Leider and safety students toured the \$900 million hospital construction project in Duluth, MN. Students viewed tower cranes, swing stage scaffolding, fall protection equipment, safety plans for temporary heat and electricity, large-scale glass curtain installation, special drywall for x-ray rooms, and the increased structural integrity required for rooms which will have overhead safe patient handling equipment.



OS students site visit at Vision Northland Essentia Health

Outreach

Program Director: Julie Alcorn-Webb, RN, MA

Program Co-Director: Susan Arnold, PhD, CIH

NORA Symposium

Annually, MCOHS convenes a National Occupational Research Agenda (NORA) Symposium. This event features a keynote speaker to address a timely topic in OHS and provides a venue for research poster presentations by students, faculty, pilot project recipients, and regional partners. During the 2021-2022 grant year, NORA was again held entirely online due to the COVID-19 pandemic, which allowed for 129 people to attend virtually.



Keynote speaker Dr. Lottie Dyrbye focused on stress and burnout in healthcare, with a special emphasis on workplace challenges posed by COVID-19 and increasing workplace violence. In addition to the keynote, a panel of experts representing three different essential healthcare worker populations discussed their experience with OHS during the pandemic, and virtual posters were presented by 6 student or pilot project researchers. Audience Q&A followed poster presentations, the keynote, and the panel session. NORA symposia are recorded and available on MCOHS's YouTube channel and online.

http://www.mcohs.umn.edu/news_and_events/past_symposia.html

Partnerships with Professional OSH Associations

Collaboration with stakeholders and partners has long been a strength for our CE program. During this grant year, we continued to successfully collaborate with existing partners such as the North Dakota Safety Council, the Northern Region Association of Safety Professionals (NRASP), the Northwest Chapter of the American Society of Safety Engineer (ASSE-NW), the Wisconsin (WI) State Association of Occupational Health Nurses (WSAOHN), the Central States Occupational and Environmental Medicine Association (CSOEMA), and with the local occupational medicine physicians, in partnership with Mayo Clinic, to deliver online training and conferences.

In October 2021, MCOHS again partnered with our local sections of the AIHA and ASSP to provide CE for Safety Connect 2021, the second-ever global virtual environmental health and safety conference and expo. Safety Connect 2021 was a free three-day online event dedicated to leadership, emerging trends, and innovations in OEHS. At 2,791 trainees, attendance for the event exceeded expectations for the second year in a row. Additionally, global reach of this CE event contributed to our objective of reaching learners across the region, country, and internationally. Breakdown of attendee locations are as follows; USA (1,255- 45%), Canada (285- 10%), the Americas (166- 6%), UK/Europe (189- 7%), Asia/Pacific (537- 19%), and Africa (359- 13%). Evaluation data from this event indicates a high likelihood that trainees would attend again next year (4.6/5.0 say they would return). MCOHS participated in planning for the 2022 Safety Connect Conference, to be held October 2022.

<https://www.industryconnectsafety.com/en/>