

NORTHWEST CENTER FOR OCCUPATIONAL HEALTH AND SAFETY
FINAL PROGRESS REPORT
AUGUST 17, 2020

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Grant Number: 5 T42OH008433

Project Period: 07/01/2015 - 06/30/2020

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**NORTHWEST CENTER FOR OCCUPATIONAL HEALTH AND SAFETY
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Abstract

The Northwest Center for Occupational Health and Safety (NWCOS) is a multidisciplinary training program located at the University of Washington, dedicated to the prevention of work-related injury and illness in Federal Region X (representing Alaska, Idaho, Oregon, and Washington). The Center is administered through the Department of Environmental and Occupational Health Sciences (DEOHS) in the UW School of Public Health, and includes program elements in the Schools of Nursing and Medicine. The primary focus of the Center is graduate student training with an emphasis on research-based education. The Center serves as a regional resource for continuing education and outreach activities to health and safety practitioners in the region.

This NWCOS includes an administrative Planning and Evaluation Core, three core academic training programs (Industrial Hygiene, Occupational Health Nursing, and Occupational Medicine Residency) which train graduate students in the traditional disciplines associated with occupational health prevention services, and two allied academic programs focused on specific aspects of occupational health (Occupational Health Services Research and Occupational Health at the Human-Animal Interface). In addition, the Center includes a Pilot Projects Program (Professional Training Opportunities Program), and active Continuing Education and Outreach programs. The Center now also includes a Work and Health Certificate to encourage graduate students from other disciplines to incorporate OHS into their work. The Center has developed two themes for our work, addressing current OHS challenges related to extreme environmental events such as heat stress and natural disaster recovery, and the changing structure of work arrangements described as precarious employment.

Planning and Evaluation Core

Christopher Simpson, Director

Past Performance/Accomplishments in Last Project Period

A. Center-Wide Accomplishments

Center Leadership

Dr. Christopher Simpson was appointed Center Director July 2020, taking over from Dr. Noah Seixas who served from 2017-2020. The previous Director, Dr. David Kalman, served 2012-2017. Dr. June Spector, Program Director for the Occupational Medicine Residency (OMR), joins Dr. Simpson in Center Leadership in July 2020 as the Deputy Director. Lindsay Pysson took over from Hannah Curtis as Center Manager in November 2019 and Mary Saucier took over from Trina Huschka as Center Coordinator in March 2020. Craig Gabriel continues as the Fiscal and Budget Manager. Over the past five years of our project period, the NWCOHS has continued a strong program of training in the traditional disciplines of occupational health, industrial hygiene, occupational health nursing, and occupational medicine, while also maintaining a strong occupational health services research training program and developing two innovative specialty training programs. Our Occupational Health at the Human-Animal Interface (OHAI) is the first program in the country to adopt a “One Health” model and apply it specifically to the health and safety of workers in contact with animals. After getting the program running, it has had strong interest from applicants from a wide range of backgrounds (veterinary medicine, immunology, and epidemiology), and has enrolled approximately five students per year in the MPH One Health curriculum.

Our Construction Management Occupational Safety and Health (CMOSH) program was created with the intent to provide specialized training in occupational health and safety (OHS) for those studying for jobs in construction management, thus improving the safety sophistication of managers in this high-risk industry. Despite the clear rationale for such a program, it was only able to attract about two students per year. This was largely due to a very active labor market for construction management (CM) jobs, making the additional training less attractive to potential recruits. Given the apparent limited impact for this program, and continued flat funding for ERC programs, we decided to discontinue the CMOSH program for NWCOHS funding in the next grant cycle. To continue supporting the potential for OHS training for this audience, we have created a graduate certificate in Work and Health, which could provide specialized training for CM students interested in pursuing these skills. We will also continue to engage construction professionals through continuing education courses.

Interdisciplinary Activities

Over the past project period, we have experimented with several alternative approaches to interdisciplinary activities, all with the goal of providing trainees from our various components a shared appreciation of the contributions and perspectives of their counterparts in OHS professions. In the 2017-2018 period, in conjunction with the West Coast Poverty Center at the UW, we organized a series of discussion groups between academics and community leaders on changes in work organization and their implications for the health of the workforce. Trainees were invited to participate in these discussions, and develop critiques of the issues in multi-disciplinary groups. The following year, we developed a more comprehensive program of Center-wide events, incorporating panel discussions about OHS scientific and professional careers with socializing opportunities, small group discussions, and program-specific mentoring. These events have proven highly popular and useful with our trainees, and we will continue using this model in the coming project period, while expanding the focus to include training on leadership and communication skills. In addition to these events, we are also incorporating training in the Responsible Conduct of Research within an occupational health context, and occasional field trips to unique or exemplary worksites.

URM Faculty and Students

Over the past project period there has been a rapidly developing awareness of diversity, equity, and inclusion (DEI) issues within our university, school, and Center. Our School of Public Health and the NWCOHS leadership have been actively engaged in DEI training and adoption of and retention of students and faculty

from diverse backgrounds. Within DEOHS for the entering class fall 2020, 72% of underrepresented applicants were offered admissions, compared with 68% of applicants overall. . In addition, faculty hiring has stressed the need for increased representation of underrepresented groups. Of 16 faculty hired by our department over the past five years, 14 have been women, with three women from URM groups. Two current open searches are also following best practices for DEI faculty recruitment.

Our newly created NWCOHS strategic plan explicitly states DEI as a value, and a goal, allowing us to evaluate and improve our achievements in this area through our research, training, and outreach activities. In response to the recent national conversation, we have formed an anti-racism workgroup comprised of faculty, staff, and trainees to identify actions to institute anti-racist and anti-oppression content and processes throughout our curricula, research investment, and operations in support of Black workers, other workers of color, and their communities. While these activities are important, and perhaps yield modest results, we believe there is significantly more work to be done. We have developed a Diversity Recruitment and Retention Plan, which identifies numerous action steps toward improving DEI in our programs, and in the field. In addition, we are increasingly focusing on occupational health impacts on underrepresented and underserved communities through the lens of extreme environmental events and precarious employment, both of which disproportionately affect URM worker communities. We will conduct additional outreach to recruit students representing these communities, and participate in faculty hiring processes helping to assure that best practices for DEI are followed. Further, we have developed a set of evaluation metrics, included in our evaluation plan addressing multiple aspects of internal and external DEI related goals.

Planning and Evaluation Procedures

A central role of the Planning and Evaluation Core (PEC) is to assure that we plan for the future and evaluate our accomplishments. We have been continually improving both of these responsibilities through the past project period. For evaluation, we have annually compiled data and self-evaluation materials into an evaluation report, and have used this as a basis for an annual evaluation and planning retreat among program directors. The results of these retreats, along with annual input from trainees and External Advisory Board (EAB) members, has led to adjustments to our program offerings. This includes the adoption of a trainee mentorship program administered through PEC and having a student representative participate in Program Director (PD) meetings. As detailed below, and in the PEC program plan, we have also conducted planning activities, including the Future of Occupational Health project, the Burden of Occupational Exposures, needs assessment, a strategic planning process, and an extensive set of discussions internally and externally about goals and structures for our on-going activities.

Special Projects under the Auspices of the NWCOHS

The NWCOHS has developed or fostered a number of significant projects over the past project period.

The Future of Occupational Health was a two year seminar series resulting in a broadening perspective of occupational health that identified several important themes for the future: changes in the organization of work, the impact of globalization on workers' lives, the changing demographics and vulnerability of the workforce, the blurring of the lines between work and non-work, and global climate change. The work also helped inform Center activities in the subsequent years, and continues to inform our on-going activities. We note that NIOSH is following a similar model through both the Total Worker Health and Future of Work projects.

During the 2018-2019 period, while Deputy Director, Dr. Marissa Baker engaged a graduate student research assistant to conduct a quantitative analysis of the burden of occupational exposures in Region X (Washington, Oregon, Idaho, and Alaska). The project used established job exposure matrices in conjunction with employment statistics to determine the current (2015) and future (2024) prevalence of exposures and thus occupational risk. The results were published.

B. Faculty Accomplishments

Our faculty remain our greatest asset, providing leadership, research excellence, inspiration, and education for our trainees. We very briefly summarize some of the key contributions by our NWCOSHS core faculty in the table below (Table A), and provide additional details subsequently.

Table A. Core Faculty New Grants Received during 2015-2019 as PI.*

Academic Program	# Core Faculty	# Contributing Faculty	# Peer-reviewed Publications (Core Faculty)	# Grants Received (Core Faculty)	Total Grant \$ (Core Faculty)
CMOSH	6	4	12	2	\$214,855
IH	7	11	81	30	\$17,763,000
OMR	5	16	49	18	\$18,122,000
OHN	2	6	17	3	\$3,185,000
OHSR	5	10	45	24	\$18,007,000
OHHAI	3	7	29	9	\$4,991,000

*Some core faculty participate in multiple programs. For this table, they are only included once, in their primary program area.

Selected Faculty Honors

A selected number of honors and innovations among our faculty are provided below, with additional accomplishments described in the individual program narratives.

Dr. Christopher Simpson was appointed to a four-year term on the Safety and Occupational Health study section. Dr. Noah Seixas was confirmed to a second term as Editor in Chief of the Annals of Work Exposures and Health (formerly the Annals of Occupational Hygiene). In 2016, Dr. Michael Yost was awarded the Rachel Carson honor, and in 2019, Dr. Seixas was awarded the Donald Cummings Award for lifetime accomplishment, both from the American Industrial Hygiene Association (AIHA). In 2017, Dr. Seixas was appointed to the National Academy of Sciences Committee on Creating a Smarter Occupational Health Surveillance System for the 21st Century. Richard Gleason, MSPH was awarded the Distinguished Contributions to Lifetime Learning Award in 2017 by the Pacific Northwest Section (PNS) AIHA. Dr. Peter Johnson was awarded Best Oral Presentation at the Society of Automotive Engineers, Noise, Vibration and Harshness Conference (2017). Dr. Butch de Castro, in October 2016, was inducted as a Fellow of the American Academy of Nursing, and was appointed to its Expert Panel on Environmental and Public Health and its Diversity and Inclusivity Committee. Dr. Jenny Hsin-Chun Tsai was recognized in 2018 as one of the 100 UW nurses of influence who have demonstrated an undaunted commitment to improving the lives and health of immigrants. Dr. June Spector received the 2017 UW DEOHS Outstanding Mentor Award. She has been appointed to the Board of Directors of the WA Poison Center, and to the ACGIH Physical Agents TLV Committee. Dr. Joel Kaufman served as Interim Dean of the UW School of Public Health (SPH) from 2016-2018. Dr. Debra Cherry has served on the Board of the Northwest regional component of the ACOEM from 2015-2019, including one year as President. She also served as President of the Occupational Medicine Residency Association and as a member of the American Board of Preventive Medicine (2015 – present). Dr. Jeff Harris serves as a member of the Workplace Health National Steering Committee for the American Heart Association. Dr. Peggy Hannon was a member of the CDC's Work@Health Advance Expert Panel. Dr. Jeanne Sears was a member of the Firefighter Injury Research Camp, Safety Trends-Reliability Study Advisory Board

(Drexel University), and a member of several CSTE Workgroups. Dr. Peter Rabinowitz serves on the National Academy of Sciences Panel on One Health Research.

C. Training Programs

Since 2015, we have graduated 56 students. The IH program graduated 2 PhD and 19 MS students during the project period. CMOSH graduated 5 MS, OMR graduated 7 MPH and four additional residents, OHHAJ graduated 11 MPH students, OHSR graduated 3 PhDs and OHN graduated 5 MPH.

Of the 56 trainees who graduated in the last five years, we have post-graduation data for 50. Forty-four (88%) are working or seeking jobs in occupational health, or pursuing further education.

Many of the accomplishments of our trainees, and their ongoing contributions to the Region and their chosen fields, are detailed in the program progress reports and NIOSH Data Tables. Here we note a few examples of these accomplishments.

IH Program

Frank Ryou won two “best student poster” awards at the American Industrial Hygiene Conference and Expo (AIHCE) 2018, and Max Chmielinski won a best poster award from the non-ionizing radiation committee at AIHCE 2019. In 2016, Dr. Marissa Baker (PhD) received an F31 fellowship from NIEHS and was awarded the 2016 IPA/DGUV Award from the ISES for her work on biomonitoring. She graduated in 2017 and is currently working as an Assistant Professor in UW DEOHS. In 2016, Magali Blanco received the Castner Endowed Student Research Fund award for her research on pesticide drift. Dr. Heather Fowler received the 2017 Omenn Award for Academic Excellence from UW SPH for her research on infectious disease transmission between humans and animals. Dr. Miriam Calkins (PhD) received the 2018 Omenn Award for Academic Excellence for her research on heat illness related to climate change. She graduated in 2018, and is currently working with NIOSH.

OHN Program

In 2016, Kimiko Sasaki and Eunice Soh were each selected for the Jonas Nurse Leaders Scholar Program fellowship. Two OHN alumni obtained board certification in OHN.

OMR Program

Dr. Carly Eckert, 2015 graduate, published her NWCOHS-supported scholarly project on the total worker health of commercial fishermen. Dr. Shilpa Gowda, 2016 graduate, won the Omenn Award for best master’s student and went on to work for NIOSH. Dr. Ann Tu (2016), Dr. Esi Nkyekyer (2017), and Dr. Coralynn Sack (2018) all graduated and now serve in key leadership roles in the UW OEM program. Dr. Sack is triple-boarded in internal medicine, occupational medicine, and pulmonary medicine. Dr. Jessica Chuang, 2019 graduate, won Best Ignite Talk at the Cascadia Symposium and was a finalist at UW Three Minute Thesis Competition. Dr. Chuang was recruited to San Francisco General Hospital as Director of Employee Health, and Clinical Assistant Professor at UCSF.

OHSR Program

Trainee Laura Blamar, 2016 graduate, developed a media presence for her research, which was featured in several blogs and news articles, and in a radio interview on KUOW/NPR. Allyson O’Connor received an award for her work on workplace harassment and mental health in the US working population at the Canadian Association for Research on Work and Health Conference in 2018. Brian Chin and Meagan Brown won awards for their presentations on evaluating physical therapy services among injured workers, and physical activity during the workday, at the Cascadia Symposium in 2017.

D. Regional Impact

As detailed in Outreach, CE, and the academic program reports, we have conducted a wide range of educational, research, and service projects throughout the Region. Our CE and Outreach program has been more effective this cycle in reaching beyond WA State with a variety of programs. CE included 1240 Industrial Hygiene (IH), 878 Occupational and Environmental Medicine (OEM), 552 Occupational Health Nursing (OHN), 5029 Safety professionals in their courses. While the majority of our course offerings are located in WA State, there were increased activities in Alaska, Oregon, and Idaho during this period. We have increased our efforts to reach out to Tribal Nations and strategically added American Indian tribal groups as a target audience for this past cycle (see CE progress report). For example, CE Director Nancy Simcox met with many instructors and students from Ilisagvik College on the North Slope of Alaska, as well as safety managers, workers, and leaders from the Inupiat Community of the Arctic Slope, ASRC Energy Services, BUECI Barrow Utilities, and North Slope Borough Administration Risk Management to assess and learn about OHS training needs in these unique communities. CE supported several tribal conferences in WA State as well. In 2019, an IH doctoral student represented NWCOHS at the American Indian/Alaska Native OHS Conference in Colorado.

The Northwest Center has also organized, sponsored, and participated in many regional conferences. These include: the annual governors' conferences in WA, AK, ID, and OR; the Northwest Occupational Health Conference (NOHC), where our Pilot Training Opportunities Program (PTOP) projects are shared with the wider occupational health community; and the Cascadia Symposium on Occupational and Environmental Health, a collaboration between regional universities doing research on OHS. NWCOHS helps to plan the Cascadia Symposium, while also helping support the David Bates Memorial Lectureship, sponsoring our students to attend, and presenting awards for the best student presentations.

We also note the success of PTOPTOP, which was initiated in this project period. Over four cycles (a fifth is in the solicitation stage), we have funded 21 innovative projects from individuals and organizations in all four regional states, and addressed a wide range of challenging OHS issues (see PTOPTOP progress report). Several projects have also stimulated follow-up programs for the organization or communities. As an example of this, a project out of University of Idaho developed virtual reality (VR) to be used for confined space training. The technology has since been utilized by our Outreach and CE programs for trainings with Alaska Natives in Anchorage.

Academic Training Program

Industrial Hygiene

Marissa Baker, Director

Past Performance / Accomplishments in Last Project Period

a. Program accomplishments and significant changes

Changes to IH program faculty

Several changes in the core IH faculty have occurred during the project period. Ms. Janice Camp, Dr. Bill Daniell, Dr. Richard Fenske, Dr. Peter Johnson, Dr. Howard Frumkin, and Dr. Noah Seixas have retired. Dr. Gretchen Onstad left DEOHS to take up a position with Washington State Department of Ecology, and Dr. Vanessa Galaviz left DEOHS to take up a position with CalEPA. In their place, we welcomed the following new appointments: Dr. Hilary Godwin (Professor and Dean, SPH), Dr. Marissa Baker (Assistant Professor), Ms. Nancy Simcox (Lecturer), Dr. Tania Busch-Isaksen (Senior Lecturer), Dr. Nicole Errett (Assistant Professor), Dr. Elena Austin (Assistant Professor), Dr. Edward Kasner (Clinical Assistant Professor), and Dr. Cora Sack (Acting Assistant Professor).

Curriculum

The IH program curriculum continues to evolve in response to changes in accreditation requirements mandated by the Council on Education for Public Health (CEPH, who accredits our school), administrative changes mandated by the Graduate School at the University of Washington, NWCOHS strategic planning, External Advisory Board input, and a variety of needs affecting our field and programs. The program website can be found at <https://deohs.washington.edu/ms-exposure-sciences-or-occupational-hygiene> for our MS degrees, and <https://deohs.washington.edu/phd-environmental-occupational-hygiene> for our PhD degree. We have also been working to develop content specific to the changing nature of work, and how climate change relates to occupational health to insert as case studies into our curriculum. We have developed a total of eight case studies—four related to the changing nature of work (e.g. gig economy, rise of a temporary workforce) and four related to the relationship between occupational health and climate change. These case studies can be utilized in existing courses, and/or in ERC interdisciplinary events.

During the project period, we restructured our MS in Occupational and Environmental Exposure Sciences (MS-OEES) degree offering into three distinct degrees. NWCOHS IH trainees now enroll in either our MS degree in Occupational Hygiene (MS-OHy), our MS degree in Applied Occupational Hygiene (MS-AOHy), or our PhD degree in Environmental and Occupational and Hygiene (PhD-EOH). The MS degree in Exposure Sciences (MS-ES) shares substantial curricular content with the MS-OH and MS-OHy degrees, however students matriculating into the MS-ES degree are no longer eligible for NWCOHS support, as that degree does not require several occupation hygiene specific classes that are required for the MS-OHy and MS-AOHy degrees.

The MS-OHy degree is a traditional 2-year MS degree and requires a research thesis. In contrast, for MS students seeking professional careers, we offer the MS-AOHy degree which requires a professional portfolio, an internship, and a quarter-long supervised practice-oriented project with written report in lieu of the research thesis. Students enrolled in the MS-AOHy degree typically complete their MS degree over 5 quarters rather than the usual 7-8 quarters. The MS-AOHy degree is targeted towards students with a goal of becoming a practicing IH, and are seeking practice-oriented training to obtain a career in the IH profession.

b. Faculty accomplishments and significant changes

Faculty associated with the NWCOHS Industrial Hygiene training program authored over 100 publications during the project period. Dr. Christopher Simpson (previous IH Program Director) was appointed to a four-year term on the Safety and Occupational Health study section that reviews grant applications submitted in response to NIOSH RFAs. Dr. Simpson has also taken on ERC and departmental leadership, being named the new ERC Director with our 2020 renewal, and the Assistant Chair for Research and Faculty Engagement for DEOHS.

Emeritus Professor Noah Seixas was confirmed to a second term as Editor-in-Chief of the *Annals of Work Exposures and Health*. In 2015, Dr. Seixas, together with Dr. Marissa Baker and IH PhD graduate, Trevor Peckham, conceived of and led the 'Future of Occupational Health' Project - a symposium that explored

the changing nature of work and the implications of those changes for the future of occupational hygiene. In 2019, Dr. Seixas received the Donald E. Cummings Memorial Award from AIHA.

In 2016, Dr. Tania Busch-Isaksen was appointed to serve as a member on the National Environmental Health Science and Protection Accreditation Council for a four-year term (2016-2019). Dr. Busch-Isaksen has also been promoted to Director of the undergraduate program in environmental health, which serves as an important feeder program for our graduate degrees.

In 2016, Dr. Michael Yost was awarded the Rachel Carson award from AIHA. The award is presented to those EH&S persons who have achieved outstanding success and distinction. Richard Gleason, MSPH, was awarded the Distinguished Contributions to Lifetime Learning Award in 2017. Dr. Peter Johnson (IH/ES faculty) was awarded Best Oral Presentation at the Society of Automotive Engineers, Noise, Vibration, and Harshness Conference (2017). In 2017, Dr. Baker was invited to serve on an IARC Monograph review panel assessing the carcinogenicity of welding fumes.

In 2020, Dr. Marissa Baker and Dr. Nicole Errett were awarded the “Communicating Science to the Public” award from the UW School of Public Health due to their work communicating risks and findings to the public and media during the COVID-19 pandemic.

c. Trainee accomplishments

Student head-count in the program was relatively stable throughout the project period, averaging ~11 MS and ~15 PhD students per year. 14 PhD and 27 MS students graduated during the project period. Of the 21 IH-supported MS trainees who graduated during the last cycle, eight are employed in corporate health and safety positions at regional employers including Boeing and Intel; four are employed in health and safety consulting companies; one is a health and safety compliance officer for the state of Washington, 5 are receiving additional training in our PhD-EOH program, and two are working for government agencies (NIOSH and US Coast Guard). The program carries on a strong research and research training program in occupational hygiene to complement its commitment to the education of industrial hygienists with career ambitions in industry and government. NWCOHS trainees were co-authors on nearly 30 peer-reviewed publications during the project period. Since 2010, 18 graduates from our IH program have achieved their CIH certification and nine have achieved ASP or CSP certification.

In addition to their academic training, NWCOHS trainees also regularly attended and presented at local, regional, national, and international conferences. Frank Ryou (PhD-EOH graduate, 2020) won two “best student poster” awards at the 2018 American Industrial Hygiene Conference and Expo (AIHCE) from the Computer Applications and Ergonomics committees, and Max Chmielinski (current PhD-EOH) won a best poster award from the non-ionizing radiation committee at AIHCE 2019. In 2016, then-PhD student (and current Program Director) Marissa Baker received an F31 fellowship from NIEHS to support her research investigating metabolites related to manganese exposure. Similarly, Dr. Trevor Peckham (PhD-EOH graduate, 2020) was awarded an F31 from NIMHD exploring determinants of work quality in the American workforce. Dr. Peckham is now working for King County in their toxics management program.

Dr. Baker was awarded the 2016 IPA/DGUV Award from the International Society of Exposure Science, which fosters doctoral student research in exposure sciences with linkages to biomonitoring. Dr. Baker is now employed as an Assistant Professor at the University of Washington (UW). In 2016, MS student Magali Blanco received the Castner Endowed Student Research Fund award for her research investigating the effect of various spray technologies on pesticide drift. Ms. Blanco is now a PhD student in our department. Dr. Heather Fowler (DVM, PhD) received the 2017 Gilbert S. Omenn Award for Academic Excellence for her research on the risk of infectious disease transmission between humans and animals as well as the occupational health risks faced by veterinary and animal care workers. Dr. Fowler was hired as Director of Public Health Research at the National Pork Board in Des Moines, Iowa, where she guides studies of occupational health and safety in pork production, including zoonotic disease transmission in the swine industry. Dr. Miriam Calkins (PhD) received the 2018 Gilbert S. Omenn Award for Academic Excellence for her research focusing on risks of heat

illness related to climate change. She graduated in 2018, and is currently working as a NIOSH post-doctoral fellow in Cincinnati.

During the current funding period (2015-2019), six underrepresented minority (URM) students enrolled in and completed our MS degree, and five URM students were enrolled in the PhD-EOH degree. Five of the graduated URM MS trainees are employed in the health and safety workforce; the sixth entered into the PhD EOH degree at UW. Several of our URM trainees received scholarship funding from the graduate opportunities and Minority Achievement Program. In 2017, URM trainee Heather Fowler received the Gilbert S. Omenn award for academic excellence from the UW School of Public Health.

d. Outreach / Research to Practice (R2P)

During the project period, 12 IH core and affiliate faculty contributed their time as instructors at CE courses, including courses on radiation, hazardous waste operations, ergonomics, occupational health surveillance, and nanomaterials. IH faculty also served on organizing committees or organized short courses for the Future of Occupational Health conference, the annual Cascadia conference, and meetings of the Pacific Northwest Section of the AIHA.

IH faculty and trainees also engaged in successful R2P and outreach activities. For example:

- In partnership with a cannabis business association, Dr. Simpson, together with IH trainee Max Chmielinski, studied occupational exposure to UV radiation in the cannabis industry. Based on their study findings they developed, in collaboration with the NWCOHS outreach team, a fact sheet of best practices to reduce UV exposures was distributed to workers and employers in Washington's cannabis industry.
- Dr. Simpson, together with IH graduate (2020) Hannah Echt, measured occupational exposures to diacetyl in craft coffee roasteries. They have partnered with one employer to design and evaluate a local exhaust ventilation that will reduce diacetyl exposures in this facility.
- Manaola Hewett and Dr. Seixas created health and safety clinics for low-wage immigrant workers in targeted high-risk occupations (agricultural workers, custodians, and security guards). At the clinics, workers discuss occupational health and safety hazards with trained resource specialists, who then connect the workers with the resources they need. Manaola is evaluating the effectiveness of the clinic model for empowering workers to apply the acquired information at their workplace and to disseminate the information to their peers
- Dr. June Spector led a community-engaged research project to assess and, ultimately address, health disparities related to occupational, environmental, socioeconomic, and biological stressors faced by rural underserved agricultural communities (see also project video, available at: <https://www.youtube.com/watch?v=10AILQxtVw4>).
- Dr. Marissa Baker, Dr. Noah Seixas, and IH PhD graduate (2020), Trevor Peckham wrote a Seattle Times editorial about a crane collapse in Seattle to highlight the importance of occupational health to the Seattle Times' readership.
- Dr. Marissa Baker performed over 40 media interviews with outlets including Newsweek, Time, NPR, Seattle Times and others during the COVID-19 pandemic discussing health risks specific to workers, and providing guidance to the public about how to protect workers across a variety of occupations.
- Dr. Marissa Baker is working with several unions, including the Teamsters, Amalgamated Transit Union, Unite Here!, and SEIU to provide evidence-based guidance on how to safely protect their workers during the COVID-19 pandemic. She and Dr. Nicole Errett received money from the UW Population Health Initiative to work with the Teamsters and ATU to survey app-based drivers and bus drivers to better understand their risk perceptions and health and safety needs during the COVID-19 pandemic.
- Dr. Marissa Baker and Dr. Bush Isaksen are working with the King County and City of Seattle Auditor's Offices to develop and deploy a survey of all city and county workers (those working in the field, and teleworking) to assess risks, evaluate city/county policies, and develop actionable health and safety recommendations for the city and county executive councils.

e. Outputs/Outcomes

- In 2015, Dr. Seixas, together with Dr. Marissa Baker and IH PhD graduate, Trevor Peckham, and emeritus faculty Janice Camp, conceived of and led the 'Future of Occupational Health' Project - a symposium that explored the changing nature of work and the implications of those changes for the future of occupational hygiene. This symposium resulted in a peer-reviewed article that has been cited over 40 times.
- Trevor Peckham, PhD's research on precarious work and the gig economy lead to him completing an internship with WA State Senator Karen Keiser where he shared his research to help inform legislation that would address some concerns of temporary workers. Dr. Peckham organized a work session with state lawmakers, labor advocates, staffing agencies, and other experts to discuss health and safety issues for temporary workers.
- Dr. Noah Seixas worked with women in construction trades to develop training materials that can be used to help women workers cope with the unique occupational health and safety issues they face in male dominated industries.
- Of the 21 IH-supported MS trainees who graduated during the last cycle, eight are employed in corporate health and safety positions at regional employers including Boeing and Intel; four are employed in health and safety consulting companies; one is a health and safety compliance officer for the state of Washington, 5 are receiving additional training in our PhD-EOH program, and two are working for government agencies (NIOSH and US Coast Guard).
- Our PhD graduates have moved on to leadership positions in occupational health and safety. Heather Fowler, DVM, PhD (2017) is the Director of Producer and Public Health at the National Pork Board; Miriam Calkins, PhD (2017) is an Industrial Hygienist at NIOSH; Jane Pouzou, PhD (2016) is a Senior Health Risk Assessment Consultant at EpiX Analytics
- Several of our MS and PhD graduates have moved into roles in local and state government, impacting the public health of the community they serve: Karen Michael, PhD (2016), Laura Rascon Padilla, MS (2015), and Emily Brown, MS (2018) all work for Washington State Department of Labor and Industries in Industrial Hygiene compliance.
- Dr. Eddie Kasner, PhD (2016), Magali Blanco, MS (current PhD trainee), and Emeritus Professor Fenske worked with the WA State Tree Fruit Association and its members to evaluate interventions designed to reduce worker exposure and risk during pesticide applications in tree fruit. This project works with industry, producers and workers to ensure that the decision process used for adopting new pesticide products and new spray technology development includes worker health and safety. The project also involves translating and disseminating of research results. Through providing information and solutions to orchard owners, managers, and handlers, they will be better equipped to protect workers and their families from pesticide exposure and illness.
- Early in the COVID-19 pandemic, Dr. Marissa Baker, Dr. Trevor Peckham (PhD graduate, 2020) and Emeritus Professor Dr. Noah Seixas published: "Estimating the burden of United States workers exposed to infection or disease: a key factor in containing risk of COVID-19 infection". Within the first 2 months of this paper being published, it had been cited over 25 times, and received press coverage from at least 10 different media outlets.

Academic Training Program

Occupational Health Nursing

Butch de Castro, Director

Jenny Hsin-Chun Tsai, Assistant Director

Past Performance / Accomplishments in Last Project Period

a. Program accomplishments and significant changes

The OHN program pursued multiple initiatives to enhance training and respond to current needs in the Region. The Washington State Nurses Association (WSNA) called upon the OHN program to help reconvene its Occupational and Environmental Health and Safety Committee. Operating under WSNA's Professional Nursing & Health Care Council, the committee is charged with providing the association the content expertise and perspective on workplace and environmental issues needed to guide actions that protect and promote the welfare of nurses and healthcare workers throughout the state. WSNA accomplishes this through local collective bargaining efforts, support for research, continuing education, and policy advocacy. OHN Program Director, Dr. A.B. de Castro, was invited to be a member of the group that reconstituted this committee, which can serve as an organizational space where trainees can carry out academic projects with real-world application and utility. To complement academic learning, internal processes to encourage and facilitate experiential learning were more formalized. This helped connect trainees to new practicum sites, as well as more consistently direct them to internship opportunities, including the Nurse Intern Program offered by the national office of the Occupational Safety and Health Administration in Washington, DC. With regard to academic programming, revisions, led by OHN Assistant Program Director, Dr. Jenny Hsin-Chun Tsai, were made to the UW School of Nursing's graduate environmental health certificate program to accommodate a track concentrated on worker health. All levels of university review and approval for these changes were successfully attained. This revised graduate certificate program (Work and Health graduate certificate) serves as the administrative home for the certificate program that was applied for as part of the 2020-2025 competing renewal application for the Northwest Center for Occupational Health & Safety (CDC-NIOSH education and research center). Aside from academic training, Dr. de Castro had two ongoing projects to provide community-based worker safety and health training; namely a collaboration with the Northwest Forest Worker Center in Oregon to train immigrant Latino forest service workers (funded by CDC-NIOSH) and multiple partnerships with non-profit organizations and workforce development programs throughout Alaska, Oregon, and Washington to deliver training on hazardous waste operations and emergency response, disaster preparedness, and construction safety (funded by NIH-NIEHS). Both projects reach under-represented, historically marginalized populations of color in metropolitan, urban areas, and American Indian and Alaska Native communities largely in rural or remote, isolated settings. Dr. Tsai continues to infuse the concept of worker health in and connect occupational health and safety science with service agencies and small businesses that are not commonly included in occupational health research and practice through her ongoing collaboration with other faculty in the School of Nursing and community-based consultation practice.

b. Faculty accomplishments and significant changes

OHN Program Director, Dr. A.B. de Castro, in October 2016, was inducted as a Fellow of the American Academy of Nursing, and was appointed to its Expert Panel on Environmental and Public Health and its Diversity and Inclusivity Committee. In September 2017, he was promoted to Full Professor and, after spending four years with a primary faculty appointment at the UW Bothell School of Nursing and Health Studies, was hired back at the UW (Seattle) School of Nursing to serve as the school's Associate Dean for Diversity, Equity and Inclusion. In March 2019, recognizing his expertise in public health and research record on occupational and environmental health issues, he was selected for a seat on the King County Board of Health by elected officials from King County, Seattle City, and surrounding Puget Sound municipalities. Dr. de Castro's research program focuses on the occupational health of immigrant workers continues with funding support, including a 5-year R01 transnational, longitudinal study of immigrants from the Philippines to the U.S. Since 2012, he has served as the Federal Region X consortium site Principal Investigator of a NIEHS-funded worker training program (Western Region Universities Consortium led by UCLA and including Arizona State University and UC Berkeley) that provides community-based education on hazardous waste operations and emergency response, disaster preparedness, and construction safety through partnerships with non-profit organizations. This training program principally serves under-represented, historically marginalized populations of color in metropolitan, urban areas, and American Indian and Alaska Native communities largely in rural settings.

OHN Assistant Program Director, Dr. Jenny Hsin-Chun Tsai, was recognized as one of the 100 UW nurses of influence who have demonstrated an undaunted commitment to improving the lives of others in November 2018 for her dedication to promoting immigrant health. Her program of research focuses on sociocultural determinants of immigrant health, and applications of community system research and innovative designs to promote health equity. She implemented a CDC-NIOSH R21 award (2014-2017) to assess the integration of basic worker health education in and by four types of community agencies to reach a broad range of Chinese American immigrants. She also received the Summer Fellow Award from the UW School of Nursing to disseminate her research, to attend social network analysis training, and to develop a grant application focusing on the etiology of immigrant worker health disparities. An R01 application was submitted to NIH during the final reporting period. This R01 application is an extension of her theoretical development supported by a CDC-NIOSH K01 award (2008-2012) and ongoing community-based practice and research with Asian communities locally, aiming to advance our understanding of longitudinal effects of multiple social determinants (discrimination, employment and job concerns, social support) on mental health and daily functioning (which included work performance) among recent Chinese immigrant workers. Dr. Tsai and Dr. Rosemberg (OHN PhD trainee, graduated 2012) also drew from their research with different immigrant worker populations and co-authored a methodological article for advancing occupational health disparities research. Recognizing her research expertise, Dr. Tsai was invited by NIOSH to serve as a grant reviewer on the Special Emphasis Review Panel for Training Project Grants (T03) in 2016, and by the UW Institute of Translational Health Sciences to review its Academic/Community Partnership Award in 2017. Dr. Tsai continues to serve on the Executive Committee of the UW Center of Statistics and the Social Sciences (2011-present), an interdisciplinary center that bridges advanced statistics and social sciences, as well as an Associate Editor for *Health Behavior and Policy Review* (2013-present), an interdisciplinary journal that emphasizes translating research to practice and policy. She also reviews conference abstracts for the American Public Health Association, Occupational Health and Safety section (2016-present).

c. Trainee accomplishments

PhD Trainees

A total of 6 PhD trainees (4 funded and 1 unfunded international student) participated in the program during the reporting period; and none have graduated (see additional details in NIOSH Trainee Data Table 2). Of these, 2 (Sasaki; Yumang-Rosss) have taken a leave of absence, 2 (Kwon; Soh) have completed their general exam and are in the process of developing their research dissertation proposal, 1 (Martelino) matriculated in autumn 2018 and is still completing coursework. Of note, from 2016-2018, Kimiko Sasaki was selected for the Jonas Nurse Leaders Scholar Program fellowship (from the Jonas Center for Nursing and Veterans Healthcare), with the goal to increase the number of doctorally-prepared faculty with exceptional leadership skills. Eunice Soh was selected as another funded Jonas Foundation scholar for environmental health (for 2018-2020), and also presented a poster titled “Intersectionality framework: Advancing Total Worker Health and the health equity agenda” at the 2018 annual meeting of the American Public Health Association in San Diego, CA. Janelle Martelino had an abstract accepted for presentation at the 2020 Annual Communicating Nursing Research Conference in Portland, OR (though cancelled due to the COVID-19 pandemic). In January 2020, 1 applicant (Rejto) was offered admission and will be matriculating in Autumn 2020 quarter with intentions of being supported by NIOSH-ERC traineeship funds.

MPH Trainees

A total of 5 trainees (Doughty; Kvak; Nakamura; Vaccaro; Wong) have successfully completed the training program during the reporting period. The following list describes each of their master’s projects. Jane Vaccaro (graduated 2016) developed problem-based learning cases for training emergency response workers about community resiliency. Kim Doughty (graduated 2017) created and evaluated an English/Spanish safety talk intervention for use by supervisors of forestry service workers. Staci Kvak (graduated 2017) conducted an analysis of survey data on workplace harassment and health among nurses in the Philippines. Mikiko Nakamura (graduated 2017) developed a workers’ rights and safety educational resource for immigrants. Jamie Wong (graduated 2018) conducted a qualitative analysis of interviews with formerly incarcerated Asian Americans and Pacific Islanders about their challenges transitioning back into the labor force. Collectively, these master’s projects addressed issues affecting marginalized, underserved worker populations, which is a

prominent emphasis of the OHN training program as well as the focus of OHN faculty's programs of research. These graduated trainees have gone into employment in occupational health and public health practice, with two successfully passing the exam for board certification in occupational health nursing (Certified Occupational Health Nurse - Specialist; COHN-S). In January 2020, 1 applicant (Antonchuk, unfunded trainee) was offered admission and will be matriculating in Autumn 2020 quarter as an unfunded trainee.

d. Outputs and outcomes

- Program Director, Dr. de Castro, was inducted as a Fellow of the American Academy of Nursing in October 2016, promoted to Full Professor in September 2017, selected for a seat on the King County Board of Health in March 2019, and asked to serve on Washington State Nurses Association's Occupational and Environmental Health and Safety Committee.
- Assistant Program Director, Dr. Tsai, was recognized as one of the 100 UW nurses of influence in November 2018.
- A Work and Health graduate certificate program was approved through university channels with administrative home in the UW School of Nursing.
- Two PhD trainees (Sasaki and Soh) were selected for two different fellowship programs offered by the Jonas Center for Nursing and Veterans Healthcare.
- Two MPH trainees (Doughty and Nakamura) successfully passed examination for board certification in OHN (COHN-S) offered by the American Board of Occupational Health Nurses, Inc.
- PhD trainee and graduate (Rosemberg) continues to be actively engaged in immigrant worker health research. She was appointed in September 2018 as Vice Chair for Research for her division, Systems, Population and Leadership, in the School of Nursing at University of Michigan. In addition, her poster won the first place at the 2018 Association of American Occupational Health Nurses conference.

Academic Training Program

Occupational Medical Residency

June Spector, OEM Program Director

Debra Cherry, Occupational Medicine Residency (OMR) Director

Past Performance / Accomplishments in Last Project Period

The OMR program continues to provide premier clinical training combined with excellent academic training in public health. The OMR also continues uninterrupted accreditation by the Accreditation Council on Graduate Medical Education (ACGME) without citations for the past five years. Despite a shortage of applicants nationally, the OMR program has filled for the last five years. Graduates of the program have gone on to successful careers and leadership roles (see NIOSH Trainee Data Table 2 and Section c below).

a. Program accomplishments and significant changes

In the beginning of this project period (2015-2016), OMR made plans to enhance recruitment of trainees, diversify funding, hire new staff and faculty into the program, optimize both the content and format of our courses and training to better meet student needs, and begin to strengthen partnerships with NWCOHS Continuing Education (CE) and Occupational Health at the Human Animal Interface (OHHAI) components by the end of the project period (2020). As outlined below, the OMR has successfully accomplished these goals, and by doing so, has strengthened the OMR program.

Recruitment success

The number of OMR applications received through the national Electronic Residency Application Service (ERAS) system doubled from about 20-30 per year in 2013-2014 to 60-70 per year in 2018-2019. More aggressive recruiting contributed to this success. Optimization of the interview day included adding a one-hour program overview with the Residency Director, reducing travel time for interviews by coordinating all the faculty in one location, adding a lunch with current residents, and adding the opportunity to attend an MPH class. OMR optimized its website and advertised by sending a full-page ad to alumni, faculty, current residents, and flight surgeons, and by posting short ads on the Alliance of Academic Internal Medicine (AAIM) listserv and the UW Washington, Wyoming, Alaska, Montana and Idaho (WWAMI) bulletin board. The OMR has arranged an alumni dinner at the annual specialty meeting, American Occupational Health Conference (AOHC), each year since 2015. This networking dinner brings visibility to the program and improves camaraderie among alumni, who may refer prospective applicants to the OMR. OMR has also generated interest in the specialty by inviting more trainees to do elective rotations in the UW OEM clinic. In the past five years, the OMR has hosted elective rotations for about 20 rehabilitation medicine residents, six UW medical students, four out-of-state medical students, and one family medicine resident from California. The UW OEM Director of the Clinical Program (Dr. Esi Nkyekyer) also engaged in outreach to UW Internal Medicine residents as part of her role as Medical Director of the UW Center of Occupational Health and Education. Several of these rotators and trainees have entered occupational medicine training, and those who did not enter occupational medicine training have integrated occupational health best practices into their primary practices and/or have referred potentially interested trainees to the OMR. Between July 2015 and June 2020, the OMR had 14 graduates, a significant increase from the eight graduates in July 2010-June 2015 and four more than the proposed number of 10 graduates from the 2015-2020 renewal.

Diversification of funding

To improve sustainability of the OMR in the face of funding uncertainty and to improve recruitment, OMR successfully attained two supplemental funding sources through competitive application processes. NIOSH funding is still the cornerstone and primary funding source for OMR, but the supplemental funding provides an opportunity for leverage, which enhances OMR sustainability and recruitment success. Beginning in July 2017, the UW Graduate Medical Education Position Allocation Committee (GMEPAC) granted 0.5 FTE, or about \$40,000 per year, to support OMR trainees in their work at the Harborview Medical Center OEM clinic. Beginning in July 2018, the Veterans Affairs Puget Sound (VAPS) Health Care System granted 0.8 FTE, or about \$70,000 per year, to support OMR trainees in their VAPS rotations through the Veterans Access, Choice, and Accountability Act (VACAA) funding mechanism. OMR trainees work primarily with board-certified occupational medicine specialists at the VA in employee health and the environmental contaminants clinic and also have the opportunity for specialty rotations in rehabilitation medicine, pain medicine, psychiatry, and podiatry.

OMR leadership and staffing

Stable leadership is provided by Dr. Debra Cherry, who continues since 2013 as the OEM Residency Director. In 2018, Stephanie Santos, MHA, joined the OMR as the Residency Administrator. Ms. Santos brings extensive experience as a manager for a health scholars program, as well as formal health administration training, which strengthens the OMR. Dr. June Spector has remained as a core faculty member in the OEM program since she completed OMR training at the UW in 2010, but her rank and role in the program have advanced to her current academic rank of Associate Professor. She is a nationally recognized physician-scientist and, in 2016, she assumed leadership of the OEM program overall, including the academic, residency, and clinical components, replacing Dr. Joel Kaufman in this role. Dr. Kaufman served as Interim Dean of the UW School of Public Health from 2016 to 2018 and returned to his role as Professor in UW DEOHS, Department of Medicine, and Department of Epidemiology in 2018. He continues to serve as a core OMR faculty member, in an advisory role to the OMR leadership, and as a thesis research mentor for OMR trainees. Dr. Debra Milek retired from her role as OEM clinic director in 2018, and Dr. Nkyekyer, a 2017 OMR graduate, replaced her as Director of the UW OEM Clinical Program, including Medical Director of the UW OEM Clinic. Dr. Sverre Vedal retired from his role as an occupational and environmental pulmonologist and physician-scientist in 2019, and Dr. Coralynn Sack has replaced him in this role.

Curriculum and training highlights

Innovative additions to the OMR curriculum over the reporting period include developing and implementing ENV H 550 Occupational and Environmental Diseases, revamping ENV H 596 Current Topics in Occupational and Environmental Medicine, and adding clinical and practicum rotations. The interdisciplinary, interactive, required OMR Occupational and Environmental Disease Course (ENV H 550) was developed to address a need expressed by several NWCOHS components in 2015. ENV H 550 uses a flipped classroom, public health case- and scenario-based active learning approach, with multi-media materials reviewed in advance of class, journal clubs, and supplemental speaker sessions, to engage OMR, Industrial Hygiene (IH), Occupational Health Nursing (OHN), and other students. This course has received top student and peer ratings. During the project period, OMR has begun developing a hybrid online academic and online professional version of this course, in collaboration with the NWCOHS Continuing Education (CE) component, to increase the reach to additional target audiences in the region. ENV H 596 was revamped over the past several years to ensure that topics align with core occupational medicine competencies required by the accrediting body, ACGME, and to avoid duplication with other courses. Active learning methods and a flipped classroom approach were also integrated into ENV H 596, with excellent reviews. OMR also offers outstanding clinical and practicum rotations, including several new rotations at Occupational Medicine Clinics at Kaiser Permanente of Washington in Bellevue, the Hanford Nuclear Reservation in Richland, the Puget Sound VA, Harborview Medical Center Ear, Nose, and Throat (ENT), and UW Medical Center Sports Medicine Clinics in Seattle.

In 2017, the OMR established a relationship with the new Residency Director of Madigan Army Medical Center's Public Health/General Preventive Medicine Residency Program, refreshing the longstanding collaborative relationship with the only other preventive medicine specialty training program in Washington State. Madigan trainees enroll in the OEM MPH alongside OMR trainees. The OMR is leveraged to provide academic occupational medicine training to these Madigan trainees and to military residents with funding to participate in a civilian program, which enhances the training environment for NWCOHS-funded trainees.

Partnerships, including with CE and OHHA

Dr. Ann Tu (2016 OMR graduate) joined the OMR faculty in 2018 while continuing to work as a clinical provider at Kaiser occupational medicine clinic. Since 2018, Dr. Tu has been providing direction to OEM outreach and engagement efforts, and has worked with the NWCOHS CE component to develop several extremely well-attended OEM Grand Rounds sessions for regional community providers during the '18-19 and '19-20 years. Dr. Tu also works with UW Employee Health to facilitate animal worker referrals to the OEM clinic, which allows OMR trainees to participate in clinical care of this special population. Students in the OEM MPH and the OHHA MPH both participate in the interdisciplinary Spring quarter of ENV H 596 Current Topics in Occupational Medicine, where they benefit from OHHA Program Director Dr. Rabinowitz's instruction and focus on integrating the One Health paradigm with occupational medicine.

b. Faculty accomplishments and significant changes

OMR faculty members have continued to demonstrate local, national, and international leadership in extramurally-funded research, teaching, and practice, providing a rich research and clinical training environment for OMR trainees.

Dr. June Spector, Director of the UW OEM program since 2016, continued her work on preventing adverse heat effects in vulnerable working populations under a five-year research project with the NIOSH-funded Pacific Northwest Agricultural Safety and Health (PNASH) Center, in partnership with the local agricultural community, growers, and workers. Her work contributed to publication of a foundational paper on the measurement of individual ambient heat exposure and its potential applications and limitations. She presented research from her NIOSH K01 award at the 2017 NIOSH “Expanding Research Partnerships: State of the Science” Conference in Aurora, Colorado, and at the Western Agricultural Safety and Health Conference in Seattle, WA. She continues to mentor students and has been chair or co-chair of numerous doctoral dissertation committees and master’s thesis committees, including for NWCOHS trainees. She developed and instructed the interdisciplinary Occupational & Environmental Disease course (ENV H 550), rated a combined median score of 5.0/5.0 by students, including students in NWCOHS’ IH, OHN, and OMR components, during the reporting period. She received the 2017 UW DEOHS Outstanding Mentor Award. She served on the Board of Directors of the WA Poison Center and has been appointed to the American Conference of Governmental Industrial Hygienist’s Threshold Limit Values for Physical Agents Committee.

Dr. Joel Kaufman served as Interim Dean of the UW School of Public Health from 2016-2018. Dr. Kaufman led the OEM program for 15 years prior to becoming the Interim Dean. In the past four years, he has continued to provide guidance and support for Dr. June Spector, who assumed the role of Director of UW OEM in 2016. Former NWCOHS trainee and current OMR core faculty member, Dr. Cora Sack, also receives mentorship and guidance from Dr. Kaufman for her research and career development. Dr. Kaufman is a principal investigator of the national Multi-Ethnic Study of Atherosclerosis and Air Pollution (MESA Air) study, and data from this study are frequently used for OEM MPH thesis projects and other degree program projects. Among many other federally-funded R01 grants, Dr. Kaufman is the PI on a large study that investigates the relationship between air pollutants and cardiovascular risk with pooled cohorts. He was awarded the “Best Environmental Epidemiology Paper published in 2016” by the International Society of Environmental Epidemiology and was elected to the Washington State Academy of Sciences in 2017.

Dr. Debra Cherry, the OEM Residency Director, completed a PNASH-funded pilot project on the health of commercial fishermen in rural fishing village in Alaska in 2016, worked as a consultant to address health risks to hazardous waste workers for the Department of Energy (2016-present), and provided CME accredited lead screening presentations for clinicians under a CDC contract (2018-2019). Dr. Cherry’s commercial fishing study was presented at IFISH-5, a NIOSH supported conference, and the Western Agricultural Safety and Health Conference in Seattle, WA. NWCOHS trainee, Carly Eckert, was a co-investigator on the fishing study and presented the results at several meetings, including AOHC, during her training. Dr. Cherry engaged NWCOHS trainee Elizabeth Friedman on a writing team preparing two manuscripts regarding health and hazard data from Hanford Nuclear Reservation. Dr. Cherry presented “Reproductive Health Risks for Workers in Veterinary Medicine” at AOHC in 2019 as part of a panel presentation on animal worker health with Dr. Peter Rabinowitz and NWCOHS trainee, Dr. Jessica Chuang. Dr. Cherry has served on the Board of the Northwest regional component of the American College of Occupational and Environmental Medicine from 2015-2019, including one year as President; as President of the National Occupational Medicine Residency Association; and as a member of the core subcommittee of the American Board of Preventive Medicine (2015 – present).

Dr. Peter Rabinowitz directs the Center for One Health Research, as well as the Canary Database, an online resource for evidence about animals as sentinels of environmental health threats from both toxic and infectious hazards. He has had 40 peer reviewed publications since July 2015 and mentored over 12 MPH thesis projects. He is also the director for the OHHA component of the NWCOHS.

See Section c: “Trainee Accomplishments” for accomplishments of OMR alumni who became OMR faculty members, including Dr. Esi Nkyekyer, Dr. Cora Sack, and Dr. Ann Tu. In addition, in 2019, Dr. Cora Sack was

awarded a NIH K23 mentored career development award in collaboration with Dr. Joel Kaufman, and Dr. Nkyekyer collaborated with Dr. Noah Seixas (NWCOHS Director) on a successful grant from the Washington State Department of Labor and Industries to study a peer navigation model to support safe return to work in home care workers.

c. Trainee accomplishments

In the time period between July 2015 and June 2020, the NWCOHS supported 15 OMR trainees. In addition, three physicians completed the OMR with military funding, six physicians in general preventive medicine training from Madigan Army Medical Center enrolled in the OEM MPH, and 31 physicians in training in other specialties received clinical OEM instruction by completing rotations through the OEM clinic at Harborview.

A high percentage of OMR trainees who graduated during the July 2015-June 2020 cycle have entered leadership and academic careers. Dr. Carly Eckert, 2015 graduate, published her NWCOHS-supported scholarly project on the total worker health of commercial fishermen. She is currently employed in leadership of Ken Sci, a Seattle based company, and is still publishing her research, including an article in 2019 describing a machine-learning based model of risk for hospital readmission. Dr. Shilpa Gowda, 2016 graduate, won the Omenn Award for best DEOHS master's student and went on to work for NIOSH, Health Hazard Evaluation branch, in Cincinnati for a couple of years. As of July 2020, she works as employee health director at VA hospital. Dr. Greg McKelvey (2016) is VP of Health at ASAPP, an artificial intelligence company, where he contributes his occupational medicine and public health expertise to improve health care outcomes through machine learning and artificial intelligence. Dr. Ann Tu, also a 2016 graduate, presented her scholarly project on technostress from multi-media input in 911 call centers as a podium presentation at AOHC, by invitation - an honor bestowed on the top 10% of OMR resident projects nationally. Dr. Esi Nkyekyer, 2017 graduate, presented her research at the Northwest Association of Occupational and Environmental Medicine conference (NAOEM), Cascadia, and AOHC with NWCOHS travel support during her training; published her research; and now serves a key leadership role as Director of the UW OEM Clinical Program and core faculty member for the OMR. Dr. Coralynn Sack, 2018 graduate, presented her research at two national meetings, the American Thoracic Society and MESA Steering Committee, during her training, and joined the core OMR faculty in 2018 as a physician-scientist with a focus on occupational and environmental lung disease. Dr. Sack is triple-boarded in internal medicine, occupational medicine, and pulmonary medicine. Drs. Nkyekyer, Sack, and Tu have all published their research thesis or scholarly project work and are conducting research in the areas of opiate prescribing, occupational pulmonary disease, stress management, and improving occupational health in precarious working populations, which aligns with the NWCOHS theme precarious work and stress. Dr. Elizabeth Friedman, 2019 graduate, worked as a consultant with the regional Agency for Toxic Substances and Disease Registry (ATSDR) office on environmental contamination with per- and polyfluoroalkyl substances (PFAS) during her training and acquired a faculty position at Children's Mercy Hospital after graduation. Dr. Jessica Chuang, 2019 graduate, won two notable awards for presentations related to her MPH thesis, including "Best Ignite Talk at Cascadia- Annual Symposium on Environmental Occupational Health" and "Finalist at UW Three Minute Thesis Competition 2019." Dr. Chuang is currently employed at San Francisco General Hospital as Director of Employee Health, and Clinical Assistant Professor at UCSF, since summer of 2019.

d. Outputs

Below is a summary of outputs produced by OMR trainees supported by NWCOHS during the 2015-2020 project period.

- 6 peer-reviewed publications and 1 manuscripts were completed by OMR trainees (see list of publications below)
- 30 presentations/posters given at national and regional conferences/meetings by OMR trainees (see partial list of presentations/posters listed below)
- 3 book chapters were published by OMR trainees (see list of book chapters below)

Publications

1. **Sack C**, Doney B, Podolanczuk A, Hooper L, Seixas N, Hoffman E, Kawut S, Vedal S, Raghu G, Graham RG, Lederer D, **Kaufman J**. Occupational Exposures and Subclinical Interstitial Lung

- Disease: the Multi-Ethnic Study of Atherosclerosis (MESA) Air-Lung Study. *Am J Respir Crit Care Medicine*. 2017 Oct 15;196(8):1031-1039.
2. **Sack C**, Vedal S, Sheppard L, Raghu G, Barr RG, Podolanczuk A, Doney B, Hoffman E, Gassett A, Hinckley-Stukovsky K, Williams K, Kawut S, Lederer D, **Kaufman J**. Air Pollution and Subclinical Interstitial Lung Disease: The Multi-Ethnic Study of Atherosclerosis (MESA) Air- Lung Study. *Eur Respir J*. 2017 Dec7; 50(6).
 3. **Eckert C**, Baker T, **Cherry D**. Chronic Health Risks in Commercial Fishermen: A Cross-Sectional Analysis from a Small Rural Fishing Village in Alaska. *J Agromedicine*. 2018;23(2):176-185. doi: 10.1080/1059924X.2018.1425172. PubMed PMID: 29648956.
 4. Meischke H, Lilly M, Beaton R, **Tu A**. Protocol: a multi-level intervention program to reduce stress in 9-1-1 telecommunicators. *BMC Public Health*. 2018;18(1):570. Published 2018 May 2.
 5. **Nkyekyer EW**, Fulton-Kehoe D, **Spector J**, Franklin G. Opioid and Benzodiazepine Use Before Injury Among Workers in Washington State, 2012 – 2015. *J Occup Environ Med*. 2018 Sep; 60(9):820-826
 6. Meischke H, Beaton R, Lilly M, **Tu A**, Revere D. A Revised Ecological Model of Occupational Stress: Applications to 9-1-1 Telecommunicators [published online ahead of print, 2020 Jul 20]. *Workplace Health Saf*. 2020;2165079920934316.

Representative presentations/posters

1. **Gowda S**, De Roos AJ, Jeppson R, Mirabelli M, Lane DS, Bonner MR, Margolis HG, Bird CE, Whitsel EA, Anderson GL, Kaufman JD, Bhatti P. Ambient Air Pollution and Lung Cancer Risk in the Women’s Health Initiative Observational Study. Presented at NIOSH HHE; Cincinnati, OH. 04/2016.
2. **Tu A**. Ecological and Transactional Model of Occupational Stress: Application to 911 Telecommunications Coping with Next Generation Technology. Presented at AOHC; Chicago, IL. 04/2016.
3. **Sack C**, Doney B, Podolanczuk A, Hooper L, Seixas N, Hoffman E, Kawut S, Vedal S, Raghu G, Graham RG, Lederer D, Kaufman J. Occupational Exposures and Subclinical Interstitial Lung Disease: the Multi-Ethnic Study of Atherosclerosis (MESA) Air-Lung Study. American Thoracic Society Conference, 2017.
4. **Motz P**. Occupational exposure to metals and impact on dementia incidence. AOHC 2018, New Orleans, LA, 04/2018.
5. **Haldeos D**. Green Space Exposure and Cognition: The Multi-Ethnic Study of Atherosclerosis. AOHC 2018, New Orleans, LA, 04/2018.
6. **Nkyekyer EW**, Fulton-Kehoe D, **Spector J**, Franklin G. Opioid and Benzodiazepine Use Before Injury Among Workers in Washington State, 2012 – 2015. APHA 2018, San Diego CA, 11/2018 [Original Work].
7. **Chuang J**, Nkyekyer EW, Cohen M, **Spector JT**. A randomized study of the effect of a job video on occupational health providers’ understanding of injured workers’ job tasks and return to work practices. AOHC 2019, Anaheim, CA, 04/2019.
8. **Taing R**, Johnson P. Occupational Whole Body Vibration Exposure for Truck Drivers. Graduate Student Research Day, Department of Environmental & Occupational Health Sciences, University of Washington, Seattle, WA, 05/2020

Representative book chapters

1. **Sack C**, Kaufman J, Vedal S. Revision of chapter, “Occupational and Environmental Lung Disease: Diagnosis and Prevention.” In *Scientific American Medicine*. 2017. Nabel E; Decker Intellectual Properties.
 2. Maier A, **Cherry D**, **Friedman E**. “Occupational Health,” Chapter 38, *Information Resources in Toxicology*, Fifth edition. Galley proof submitted June 2019. Publication date March 2020
- e. Outcomes:** Increased number of OEM practitioners with careers in OEM as described in NIOSH Trainee Data Table 2. In the project period, 11 ERC supported OMR trainees graduated. Two trainees who started in 2019 advanced to the second year in 2020, one trainee withdrew in 2017, and one was dismissed in 2020. In addition, three OMR trainees with military funding graduated.

Allied Training Program

Occupational Health Services Research

Jeanne Sears, Director

Past Performance / Accomplishments in Last Project Period

During the initial years of the training program (2000-2005), we focused on trainee recruitment, curriculum development, and establishing the OHSR program within the Health Services PhD program. During the 2005-2010 project period, we focused on better integration within the NWCOHS, expanding training experiences and developing linkages with external organizations in Region X (serving AK, ID, OR, and WA). During the 2010-2015 project period, we focused on expanding collaborations with the UW Health Promotion Research Center on workplace wellness and worker health promotion projects, and with the Harborview Injury Prevention and Research Center on occupational injury projects. During the most recent project period (2015-2020), we focused on improving faculty and trainee diversity and on development of a new course (OHSR Methods), as described below.

Program accomplishments and significant changes

During this reporting period, the OHSR training program supported eight trainees; three have graduated, and the five who have not yet graduated are in good standing and making expected progress toward program completion. The OHSR program has five currently enrolled students: (1) Shanise Owens, a first-year trainee; (2) Erica Chavez Santos, a second-year trainee; (3) Allyson O'Connor, a third-year trainee; and (4) Amy Edmonds, a 4th year OHSR student, who moved on from the OHSR traineeship to other funding in Autumn 2019. A 5th OHSR student, Brian Chin, is on academic leave while working as an ORISE fellow at the NIOSH Center for Workers' Compensation Studies, and continues to conduct his dissertation research. He is expected to defend his dissertation and graduate in Autumn 2020.

Our program continues to successfully recruit trainees, and our efforts to use listservs and OHSR faculty/research networks are paying off. The number of potential applicants who have contacted the Program Director and/or other core faculty about the OHSR traineeship, and who have subsequently submitted applications, has steadily been increasing. In recent years, we have expanded our recruitment at national conferences. We maintain our commitment to recruiting/retaining a diverse group of trainees and continue to provide a supportive environment that includes financial, academic, and social support for our students. Our program continues to focus on improving our minority recruitment through pipeline cultivation, outreach to institutions, instant admissions contact, and strong mentorship from faculty of color.

The Health Services PhD program and OHSR training program engage in specific, strategic activities to support and retain students of diverse backgrounds. These activities are part of larger equity, diversity, and inclusion plans implemented by the Department of Health Services, the School of Public Health, and the University of Washington. During the most recent project period (2015 to 2020), the program successfully focused on several recruitment and retention efforts designed to improve diversity. Our continuing efforts in this area have contributed to an upward trend in the percentage of the applicant pool who are people of color and/or underrepresented minorities.

During this reporting period (2015-2020), the program expanded its health services-based curriculum to include methodological and policy issues specifically relevant to OHSR via successfully developing a new course, OHSR Methods (HSERV 590). This course was developed based on trainee demand, and serves as a major program enhancement that is now required for OHSR trainees. This course was taught in 2016 and 2019 by OHSR Program Director, Jeanne Sears and Deb Fulton-Kehoe, and will be offered every three years. The course covers OHSR-specific topics such as characteristics of WC and other available data sources, stakeholders, under-reporting, marginalized/vulnerable worker populations, employment denominators, surveillance methodology, work disability measurement, and TWH research. It received the best possible overall summative rating (5.0 of 5.0).

During this project period, 5 OHSR students graduated, completing the program in an average of 4.7 years—similar to the 4.4 year average among all Health Services PhD graduates. All 5 graduates quickly and successfully obtained positions in their interest areas (the first 2 were funded during the prior project period but continued on as OHSR students during this project period; the latter 3 were funded during this project period):

- Laura Blamar (2016): Associate Policy Researcher at RAND Corporation (Santa Monica, CA)
- Shuva Dawadi (2017): Data Analyst, Washington State Health Care Authority (Olympia, WA)
- Jeremy Snider (2016): Quantitative Scientist, Flatiron Health (New York City, NY)
- Deborah Passey (2017): Clinical Scientist, Xenex Disinfection Services (San Antonio, TX)
- Meagan Brown (2019): Postdoctoral Scholar-Fellow, Department of Epidemiology, University of Washington (Seattle, WA)

Faculty accomplishments and significant changes

During the project period, our six OHSR core faculty have given at least 70 presentations at national or international meetings and published 134 articles in peer-reviewed journals, 72 directly related to OHSR. OHSR core faculty also actively participated in NWCOHS Continuing Education (CE) courses. For example, Noah Seixas gave a talk for the UW CE Program Nanotechnology and Control Banding course (November 2015; Bremerton, WA). Gary Franklin gave several CE talks, including “Opioids for chronic non-cancer pain in a rapidly changing landscape” at the University of Kansas Regional Neurology Update Course (November 2015; Kansas City, MO), and “Revised chronic pain guidelines” at the Northwest Association of Occupational & Environmental Medicine (September 2015; Stevenson, WA). Dr. Franklin gave the keynote talk at Worker Memorial Day, “Reversing the adverse impact of opioids on injured workers” (April 2019; Seattle, WA). Our OHSR core faculty have presented numerous OHSR-related talks and posters at regional, national, and international conferences. For example, Jeanne Sears gave an oral presentation, “Industrial injury hospitalizations billed to payers other than WC: characteristics and trends by state,” at the Cascadia Annual Symposium on Environmental, Occupational, and Public Health (January 2016; Blaine, WA), and an oral presentation “Evaluation of an opioid prescribing report mailed to Washington State WC providers with high-risk opioid prescribing patterns,” at the Canadian Association for Research on Work and Health Conference (October 2018; Vancouver, Canada).

OHSR core faculty are actively engaged with stakeholders and involved in professional OHSR-related service. During this project period, Jeff Harris served as a member of the Workplace Health National Steering Committee for the American Heart Association. Peggy Hannon was a member of the American Heart Association-Planning Committee for the Workplace Health Summit, and a member of the CDC’s Work@Health Advance Expert Panel. Jeanne Sears was a member of the Firefighter Injury Research & Safety Trends-Reliability Study Advisory Board (Drexel University), and a member of several Council of State and Territorial Epidemiologists (CSTE) Workgroups (Occupational Health Indicator; Injury ICD-10-CM Transition; ICD-10-CM Drug Poisoning Indicators). In 2017, Noah Seixas was appointed to the National Academy of Sciences Committee on Creating a Smarter Occupational Health Surveillance System for the 21st Century.

Our OHSR faculty conducted a number of research projects having significant trainee involvement. For example, Peggy Hannon’s contract with the Washington State Health Care Authority (“The role of managers in worksite health promotion”) supported OHSR trainee Deborah Passey as a Research Assistant (RA), and was the source of her dissertation data. Peggy Hannon is also PI of a National Cancer Institute grant (R01CA160217; “Increasing implementation of evidence-based interventions at low-wage worksites”) that supported OHSR trainee Meagan Brown as an RA, and was the source of her dissertation data. Deborah Fulton-Kehoe, PhD, is a Senior Research Scientist who provides our trainees with mentorship and individualized training in data management and research methods. She was the UW PI of a 2018-2019 subcontract with the Washington State Department of Health (NU17CE002734-01; PI: Alvisurez), on which one of our current OHSR trainees, Allyson O’Connor, is working as an RA. One prong of this multi-faceted CDC-funded project intended to combat the opioid epidemic involves assessing whether opioid prescriptions for injured workers are covered by WC or by other payers. Gary Franklin (OHSR Program Co-Director) provides numerous research opportunities for ERC students via his Occupational Epidemiology and Health Outcomes Research Program, currently including OHSR trainees Allyson O’Connor and Shanise Owens.

OHSR core faculty have conducted several successful research-to-practice (R2P) projects, for example:

- OHSR Program Director Jeanne Sears studied the importance of injury severity measurement for injury surveillance, which resulted in CSTE/NIOSH approval of a new state-based Occupational Health Indicator (OHI 22: Work-Related Severe Traumatic Injuries). She is working with CSTE to update this OHI for use with ICD-10-CM diagnosis codes.
- OHSR Co-Director Gary Franklin led the successful effort to expand the Centers of Occupational Health and Education (COHEs) from their inception as small pilot projects through statewide implementation. The community-based COHEs improve injured worker outcomes and reduce disability by training providers, facilitating case coordination, and promoting occupational health best practices.
- Gary Franklin also led a successful statewide effort to revise the Washington State opioid prescribing guidelines in July 2015, and has been a leader in related efforts nationally.
- Jeff Harris and Peggy Hannon have worked, with funding from the American Cancer Society (ACS), to promote adoption of evidence-based workplace health promotion strategies by large employers. This program operates in 17 U.S. cities and has 540 member companies.

- Colleen Daly, former OHSR trainee and currently OHSR supporting faculty, leads the establishment of global wellness/health promotion strategies at Microsoft, and manages their Living Well Health Center.

Our core OHSR faculty and staff obtained several new OHSR-related grants during this project period, which are providing fodder for OHSR trainee research experience and publications, for example:

- In 2018, Jeanne Sears obtained two NIOSH grants: 1) an R03 (“Stemming the tide of prescription opioid-related morbidity among injured workers”) that involves use of hospital discharge data from eight states to assess the impact of state-level opioid prescribing guidelines on hospitalizations for opioid poisonings and adverse effects (1 R03OH010943-01; PI: Sears), and 2) an R21 (“Keys to re-injury prevention and sustained return-to-work for disabled workers”) that involves linking WC data with state wage data to measure long-term return-to-work patterns, system factors and re-injury, as well as a representative survey of permanently impaired workers that will capture information on unreported re-injury, workplace factors, and worker-suggested solutions (1 R21OH011355-01; PI: Sears).
- In 2019, Gary Franklin obtained a highly competitive grant from the Patient-Centered Outcomes Research Institute (PCORI), titled “Comparative effectiveness of two state payer strategies to prevent unsafe opioid prescribing and improve outcomes for injured workers with musculoskeletal injuries and pain” (UOP- 2017C2-8509; PI: Franklin). This 4-year, \$5 million, project will compare WC-based opioid review programs in Washington and Ohio. He also obtained a contract with Mathematica to assess opioid prescribing practices and related health outcomes for injured workers (40112S05299; PI: Franklin).
- Core faculty Noah Seixas and Hendrika Meischke obtained two grants in 2015-2018 from the Washington State Department of Labor & Industries (WA L&I), focused on “Addressing the health and safety needs of Washington women in the trades” (PI: Seixas).
- In 2016, Peggy Hannon obtained a contract from the Washington State Health Care Authority to investigate “The role of managers in worksite health promotion” (PI: Hannon).
- In 2016, Jeff Harris was awarded an American Cancer Society grant focused on “Workplace health initiatives” (46004; PI: Harris).

Trainee accomplishments

The trainees we attract are of high caliber and have produced high-quality research and publications. During the reporting period, OHSR trainees/students published 33 research articles, 15 of those with NWCOHS funding, and presented at least 42 posters or talks at research conferences/meetings. Trainees work with faculty mentors who are actively engaged in various areas of OHSR, policy, and quality improvement efforts designed to improve surveillance efforts, promote health, reduce disability and improve outcomes for injured workers. All trainees participated in quarterly OHSR training meetings, and in the quarterly OHSR journal club with the University of Minnesota’s NIOSH-funded Occupational Health Services Research and Policy training program. Trainees alternate in choosing the article to discuss, writing discussion questions, and leading the discussion.

All of our OHSR trainees and students have been actively involved in research dissemination activities, ranging from publishing in peer-reviewed journals and presenting at regional, national, and international conferences to dissemination activities with stakeholder groups, including the International Association of Industrial Accident Boards and Commissions (IAIABC), Washington State Department of Labor and Industries (WA L&I), Ohio Bureau of Workers' Compensation, Veterans Health Administration, and CSTE. Our trainees have research opportunities at several sites, including the Occupational Epidemiology and Health Outcomes Program, Health Promotion Research Center, Harborview Injury Prevention and Research Center, and WA L&I’s Safety and Health Assessment and Research for Prevention (SHARP).

Trainee dissertation research covers a broad range of innovative and potentially impactful OHSR topics. This has included investigating environmental, workplace, and health system determinants of unhealthy alcohol use (Amy Edmonds) and engaging managers and supervisors to support employee health (Deborah Passey). A full list of trainee dissertation topics is included in NIOSH Data Table 2.

OHSR trainees/students have also been actively involved in research projects with OHSR faculty, for example:

- Erica Chavez Santos worked as a Bilingual Research Analyst for WA L&I SHARP on a research project aiming to identify injury risk factors among janitors.
- Amy Edmonds collaborated on two manuscripts with Jeanne Sears, one reviewing coverage gaps and cost-shifting for occupational injuries/illnesses, and one describing urban-rural differences in opioid prescribing patterns. Amy is also collaborating on two manuscripts with Emily Williams, one on access to paid sick leave and one on geographic

differences in treatment access among patients with alcohol use disorders.

- Brian Chin, mentored by David Bonauto at WA L&I SHARP, participated in a legislatively-mandated work group that included representatives of firefighter unions, fire departments, fire chiefs, state fund public employers, and self-insured employers. The work group discussed policies for mandatory reporting of hazardous exposures suffered by firefighters, and reported recommendations to the legislature in 2015.
- Laura Fraade-Blanar worked with Jeanne Sears on a research project completed in August 2015: "Using injury severity to improve occupational traumatic injury trend estimates" (NIOSH # R21OH010307; PI: Sears), and co-authored 5 publications related to this project.
- Allyson O'Connor has been working with Gary Franklin on an economic analysis for WA L&I. The goal is to determine cost savings associated with L&I's utilization review program (2020).

Notable recent publications by ERC OHSR trainees include (partial list):

- Sears JM, **Edmonds AT**, Fulton-Kehoe D. Tracking opioid prescribing trends in Washington State (WA) (2012-2017): Differences by county-level economic conditions and urban-rural classification. *J Rural Health*. 2020;36(2):152-166.
- Sears JM, **Edmonds AT**, Coe NB. Gaps in coverage for occupational injuries and illnesses. *Med Care Res Rev*. 2020;77(3):223-235.
- **O'Connor A.**, Peckham TK, Seixas N. (2020). Considering work arrangement as an "exposure" in occupational health research and practice. *Frontiers in Public Health*. doi: 10.3389/fpubh.2020.00363
- Yragui NL, Pacheco P, Sibrian D, **Chavez Santos E.** (2020). Mistreatment of Janitorial Workers: A Hidden Health and Safety Issue. Report to the Washington State Legislature. Technical Report # 00-0-2020. Washington Department of Labor & Industries, Olympia, Washington.

Our OHSR trainees are encouraged to submit research conference abstracts and develop presentation skills, beginning as early as their first year in the program. For example, Erica Chavez Santos gave an Ignite oral presentation at the 2019 Cascadia Annual Symposium on Environmental, Occupational, and Public Health, held in Blaine, Washington as a first-year OHSR trainee (title: "A formative analysis on safety and health among janitorial workers in Washington State"). OHSR trainee Laura Fraade-Blanar developed a media presence for her research, which was featured in several blogs and news articles, and in a radio interview on KUOW/NPR: "The Record" (December 21, 2015). OHSR trainees have presented at numerous research conferences and other dissemination venues, including the American Public Health Association Annual Meeting, Northwest Occupational Health Conference, Annual Conferences on the Science of Dissemination and Implementation in Health, and the NIOSH Division of Surveillance, Hazard Evaluation, and Field Studies meeting. A partial list of recent presentations includes:

- **Edmonds AT.** Paid sick leave access, self-rated health, and health services in a national sample of working adults. Oral presentation. Cascadia 2019: Annual Symposium on Environmental, Occupational and Public Health. January 2019. Blaine, WA.
- Sears JM, **Edmonds AT.** Gaps in coverage for occupational injuries and illnesses. Invited oral presentation. Work and Population Health CSDE Working Group. November 2019. Seattle, WA.
- **Chavez Santos E;** Baquero B. What publicly available data tell us about Latinx communities in Washington State. Poster presentation. Sea Mar Latino Health Forum. October 2019. Seattle, WA.
- **Chavez Santos E,** Smith C, Anderson N, Sibrian D, Pacheco P. Inequities in the workplace: A qualitative analysis highlighting Latinx janitorial worker's occupational safety and health concerns in Washington State. Poster presentation. American Public Health Association. November 2019. Philadelphia, PA.
- **Chavez Santos E,** Krenz J, Torres E, Palmandez P, Carmona J, Spector J. A multi-level approach to heat-related illness prevention for agricultural workers: Methods and preliminary results. Ignite oral presentation. Cascadia 2020: Annual Symposium on Environmental, Occupational and Public Health. January 2020. Abbotsford, Canada.
- **O'Connor A.** Burnout: A silent epidemic in health care. Oral presentation. Cascadia 2020: Annual Symposium on Environmental, Occupational and Public Health. January 2020. Abbotsford, Canada.

Our OHSR trainees/students have also received many honors and awards, for example:

- Meagan Brown won an award for her oral "Ignite" presentation ("Physical activity during the workday and its association with leisure time movement: Is there a compensation effect?") at the Cascadia Annual Symposium on Environmental, Occupational, and Public Health (January 2017; Blaine, WA).
- Brian Chin won an award for his oral "Ignite" presentation ("Assessing trends and best practices of physical therapy services among injured workers with low back pain in Washington State") at the Cascadia Annual Symposium (January 2018; Abbotsford, Canada).

- Allyson O'Connor received the Runner-Up award for Best Student Poster ("The impact of workplace harassment on mental health and self-reported health in the US working population"), at the Canadian Association for Research on Work and Health Conference (October 2018; Vancouver, Canada).
- Shanise Owens was awarded the Health Services Excellence, Equity and Distinction Award in 2019.
- Erica Chavez Santos was awarded the LERA-Bassett Scholarship in Labor Relations in 2019.

OHSR trainees have been awarded several competitive grants. For example, in April 2019, Amy Edmonds and Meagan Brown were jointly awarded the Harry Bridges Labor Studies Graduate Student Grant (project title: "An intersectional and intergenerational exploration of racial/ethnic disparities in employment and working conditions"). In July 2019, Amy Edmonds was awarded a small grant from the Social Security Administration's Analyzing Relationships between Disability, Rehabilitation and Work (ARDRAW) Small Grant Program (project title: "Non-standard employment: health and financial implications for workers living with permanent partial disability;" faculty mentor: Sears).

OHSR trainees/students have developed their teaching skills. For example, Allyson O'Connor worked as INSIGHT Program Coordinator for the Harborview Injury Prevention and Research Center during summer 2018, which entailed developing an injury prevention research curriculum for high school students and teaching/advising duties for undergraduate students. Allyson also guest-lectured for that program in June 2020 on the topic of the "Effect of COVID-19 Stay-at-Home on Emergency Medical Service Usage," and also guest-lectured on "Occupational Wellness" for a School of Nursing course (NURS 200) in May 2020. Meagan Brown has worked as a program planning and evaluation instructor for the Northwest Center for Public Health Practice (NWCPHP), and was invited to lead a class session on building logic models for UW Bothell undergraduate students in February 2018. In Winter 2020, Shanise Owens was teaching assistant for the Public Health Capstone course (SPH 491/492). Since 2019, Erica Chavez Santos has served as a mentor for undergraduate students through the UW School of Public Health Graduate-Undergraduate Pilot Mentoring Program, and, as a Graduate Teaching Assistant, has assisted with the develop of the MPH core curriculum.

OHSR trainees/students have also been involved in many professional service activities, for example:

- Amy Edmonds served as a student organizer for the UW Worker Memorial Day (2019) and the Lobby Day for Health Equity (2018-present).
- Since 2019, Amy Edmonds has served as the Student Representative to the Academic Affairs Committee, UW Department of Health Services.
- Amy Edmonds served on the Membership Committee of the Interdisciplinary Association for Population Health Science, and as a peer reviewer for 3 journals: *Drug and Alcohol Dependence*; *Addiction Science and Clinical Practice*; and the *Journal of Substance Abuse Treatment*.
- Meagan Brown is a member of the UW Health Services Diversity Committee, and was an abstract reviewer for the 2018 AcademyHealth Annual Research Meeting.
- Brian Chin serves as a manuscript reviewer for the *American Journal of Public Health (AJPH)*, and is a member of two IAIABC committees: medical issues and return-to-work/disability management.
- Erica Chavez Santos is a Student Advisory Committee member for the UW Latino Center for Health.
- In 2019, and again in 2020, Erica Chavez Santos served as an abstract reviewer for the American Public Health Association's Occupational Health Section, as well as their Latino Caucus for Public Health.
- Shanise Owens serves as a member of the Dean's Advisory Committee (UW School of Public Health), as well as the Equity, Diversity, and Inclusion Committee (UW Department of Health Services).
- Since March 2020, Allyson O'Connor has volunteered with the Public Health Seattle-King County Communicable Disease Epidemiology Division, assisting in COVID-19 testing data management.

Outputs and outcomes

- 5 trainees graduated (see NIOSH Trainee Data Table 2).
- 33 research publications by OHSR trainees (see the comprehensive publication list for citations).
- At least 42 posters or talks at research conferences/meetings by OHSR trainees.
- The OHSR program successfully developed a highly-rated new course, OHSR Methods (HSERV 590).
- All OHSR graduates quickly and successfully obtained positions in their interest areas, and are well-positioned to influence policy and practice, thereby improving worker health outcomes.

Allied Training Program

Occupational Health at the Human-Animal Interface

Peter Rabinowitz, Director

Past Performance / Accomplishments in Last Project Period

a. Program accomplishments and significant changes

Recruitment and retention of trainees

Since 2015, OHHAI is funding or has funded 13 MPH trainees, either partially or in full. These students have been successfully recruited from a national pool of highly qualified applicants, and they report that the OHHAI funding played a key role in their decision to enter the program. In the last academic year (2019-2020) seven additional MPH in One Health students follow the course curriculum created for the OHHAI program. In fact, one of these students completed an occupational health focused thesis (compassion fatigue in army veterinarians) and we are awarding one of the first year students funding for their second year because she developed an interest in occupational health through this coursework. For the other students, interacting with OHHAI trainees and following the OHHAI curriculum gives exposure to the health and safety needs of animal workers. There have been no concerns with retention of trainees.

Changes in curriculum

We developed a MPH in One Health degree program to stress the unique competencies that apply to the occupational health of animal workers. We also modified the curriculum of the Spring ENVH 586/596 Occupational Medicine seminar to encourage interdisciplinary collaboration between OHHAI students and the OEM residents in training. We are continuing to improve the training experience based on regular written and informal feedback from the OHHAI scholars. There has been a request for more in-depth training and didactics in zoonotic diseases and pandemic disease preparedness. We are adding additional content in these areas to our existing seminar. We have recently had to make some changes to planned field experiences and practicum experiences involving travel due to COVID-19 research and travel restrictions.

Program outreach and promotion

We continue to promote the OHHAI training program via our Center for One Health Research (COHR) Facebook page (which has 1,425 followers), our Center website (including Twitter with 1700 followers), and through posting information about the program on international One Health websites including the One Health Commission and the One Health Initiative. Presentations last year at the national American Occupational Health Conference (AOHC) helped raise awareness about our program. Over the past 5 years we have also presented at international conferences such as the International One Health Platform held in Saskatchewan, and the binational Cascadia conference held yearly. Our distance learning course about infection control on animal farms will be publicized nationally later this year and further promote our program. We generally do yearly outreach to upper grade school children from various public and private schools in the area to talk about One Health and occupational health, though this did not occur this Spring due to COVID-19 restrictions. Our yearly summer outreach to the Urban Indian Health Institute will be held virtually in August. OHHAI scholar Marine de Marken was highlighted on the NWCOHS Blog in June for her thesis work looking at dairy worker health, farm exposures, and immune status on Eastern Washington dairy farms. Another student, Madeline Benoit, is being featured on the DEOHS blog this summer regarding her practicum experience with the National Pork Board under the direction of Heather Fowler VMD, PhD, former NWCOHS trainee, exploring occupational safety and health issues in swine production. Past students have also been featured on departmental websites and videos, such as Kali Turner who did her practicum on occupational health in Aquarium workers. Scholarly works published by our students and faculty have further raised the profile of the OHHAI program.

b. Faculty accomplishments and significant changes

Faculty Grants

During the past project period, Dr. Rabinowitz, OHHAI Program Director, has been awarded a number of significant grants that provide research and training opportunities for OHHAI students, including:

The Healthy Dairy Worker Study: A multiyear field research grant for dairy worker health that includes microbiome and respiratory disease status. This grant was awarded by NIOSH through the Pacific Northwest Center for Agricultural Safety and Health.

Securing Global Public Health through Strengthening Information Systems and Reporting in Kenya: A CDC cooperative agreement that involves training healthcare workers in infection prevention and control (IPC) through ongoing quality improvement. This project has allowed the OHHAI program to further develop approaches for IPC that are now being applied to the animal work setting.

Harborview Emergency Preparedness Training 2018: This project, under subcontract to Harborview Medical Center, involves creating the online learning program for the occupational health of workers in animal agriculture regarding infection prevention and control and outbreak emergency response.

The Health Animal Worker Clinic: This grant from the WA Medical Aid and Accident Fund has helped develop enhanced clinical and preventive services for providers, and workforce education and training for Washington animal workers through initiation of clinical services at Harborview Medical Center focused on animal workers.

The UW MetaCenter for Pandemic Disease Preparedness and Response: This pilot research grant from the UW Population Health Initiative has helped develop an interdisciplinary effort to predict and respond to emerging infectious disease risks on a global scale. This work includes enhancing surveillance for emerging pathogens that can arise at the human-animal occupational interface.

Manuscripts

Dr. Rabinowitz has authored 21 articles related to occupational health in the past project period. These papers cover topics ranging from Staph exposures for dairy workers to influenza precautions and exposures among swine workers and evidence of zoonotic infections in wildlife workers. Heather Fowler VMD, PhD, former NWCOHS trainee, has published a number of ground-breaking animal worker occupational health research studies including a worker's compensation injury data analysis for animal care workers, antibiotic use in small animal veterinary practices, and a One Health Model for Occupational Health and Safety (OHOSH).

New faculty/retiring faculty

New core OHHAI faculty added since the last project period include Dr. Marguerite Pappaioanou DVM PhD, an internationally recognized expert in One Health, veterinary medicine, and public health. Her extensive contacts at CDC and across these fields has provided excellent networking and mentoring opportunities for OHHAI trainees. Infectious Disease specialist Dr. John Lynch has provided expertise in employee health and infection prevention and control. Another addition to the core OHHAI faculty includes Dr. Sally Thompson-Iritani, who brings expertise in laboratory animal occupational health and compassion fatigue. New supporting faculty include Nancy Simcox, who is involved in OHHAI continuing education programs described above, Dr. Marilyn Roberts, an expert in antimicrobial resistance, Dr. Darin Collins an expert in zoo worker occupational health, Beth Lipton DVM MPH, an expert in public health and veterinary occupational health, Julianne Meisner DVM, former OHHAI trainee who is now a postdoctoral fellow, and Christina Pettan-Brewer an expert in laboratory animal worker health. Additionally, Dr. Kevin Bardosh, is an applied medical anthropologist and implementation scientist with a global focus on using social science and community engagement to improve public health delivery and policy, joined the Center as affiliate faculty.

From the original proposal submitted in 2015, faculty who have retired or left the institution include: Benjamin Weigler, lab animal occupational health; Richard Fenske, animal farmworker occupational health; Gretchen Kaufman, Global Animal Worker occupational health; David Wong, National Park Service occupational health; Jennifer Gardner, Dermatologist; and Heather Fowler, veterinary occupational health.

c. Trainee accomplishments

Awards

OHHAI trainee Erica Grant received a Global Health Travel Grant for a practicum with mountain gorilla workers in Rwanda, and the Russell L Castner Endowed Research Award to study macaque workers in Thailand. This year Hien Bui received a global health travel award for her proposed thesis work in Vietnam. Trainee Tia Dostal received the CSTE Fellowship award to work as an epidemiologist in the Washington Department of Health.

d. Outputs

Publications

Since the OHHAI program started in 2015, OHHAI-related trainees have published 10 manuscripts in peer-reviewed journals as first or co-author. These include a study of tuberculosis risk in African livestock keepers, injury risk among aquaculture workers, microbiome transfer between macaque workers and monkeys, and reproductive risks in veterinary workers. Currently 4-6 additional occupational health-related manuscripts are in preparation by recent OHHAI graduates.

Evaluation of Region X Needs

OHHAI trainees have studied worker's compensation data from the Washington State Department of Labor and identified high rates of occupational injuries and infection in veterinary care, animal care, and aquaculture in the Pacific Northwest region. We have conducted surveys regarding occupational health concerns at the annual Pacific Northwest Veterinary Medical conference, and also surveyed veterinary clinics across the state. May of 2020, Peter Rabinowitz received funding from the Pacific Northwest Agriculture Safety and Health Center to survey dairy farmers in Washington to ascertain what types of occupational health research they would like to see in their field. Results of this survey will be compiled by Jose Carmona, an OHHAI alumni and published in the upcoming months, and grants will be submitted toward research in those defined by the stakeholders.

Presentations and conferences

Students have presented at multiple conferences including the Annual Washington State Zoonotic Disease Workshop, the International One Health Congress, International Society for Agricultural Safety and Health, American Occupational Health Conference, Pacific Northwest Veterinary Conference, Consortium of Universities for Global Health, and the Western Agriculture and Health Conference. Due to COVID-19, second year MPH students that would generally present in the Spring quarter were not able to present in 2020.

Media engagements

OHHAI Director Peter Rabinowitz MD MPH has given numerous radio, TV, and print interviews regarding COVID 19 risks as well as zoonotic disease risks to workers.

New collaborations/partnerships

We have strengthened our collaborations with the NWCOHS Occupational Medicine Residency program through the Healthy Animal Worker Clinic (see below). We have developed partnerships with industry (see above response to reviewer Issue 1), and are part of the UW Alliance for Pandemic Preparedness (formerly UW MetaCenter for Pandemic Disease Prevention and Response). We have recently collaborated with the Washington Animal Disease Diagnostic Laboratories at Washington State University in response to animal sampling during the COVID-19 outbreak which can create opportunities to protect veterinary health workers from COVID-19 and future zoonotic disease outbreaks.

We developed a number of successful practicum sites where OHHAI students can get hands on real world training in the occupational health of animal workers. These include the Seattle Aquarium, the Point Defiance Zoo, the National Pork Board, the Mountain Gorilla project, the Washington Department of Health, the Washington State Department of Agriculture, the Harborview Medical Center Healthy Animal Worker Clinic, and the Wildlife Conservation Society,

Training that addresses emerging issues

OHHAI trainees receive extensive and unique training on emerging infectious diseases, including the risk of zoonotic disease outbreaks and their detection and control in workplaces. They also receive training in the effects of climate change on health.

R2P projects

OHHAI students have led or assisted on a number of R2P projects.

Healthy Dairy Worker Project: With support from the UW Pacific Northwest Center for Agricultural Safety and Health, the Center for One Health Research (COHR) is carrying out a longitudinal study of the health of dairy

workers including respiratory and gut health and microbiome adaptation to the dairy environment. Findings from this study have led to development of infection prevention and control training programs for workers in animal agriculture. Current preliminary findings will also raise awareness about the role of allergy in animal workplaces.

Linking Animal and Human Reportable Disease: A recent OHHAI trainee (Kate McConnell) completed thesis work with the Washington State Department of Agriculture to create and analyze an electronic database for animal disease reporting. This allowed identification of clusters of animal cases that could represent human occupational risk, such as psittacosis among animals in a pet store and leptospirosis of dogs in veterinary practices.

Health and Safety in Aquaculture: Despite the growth of the industry, very little is known about health and safety of aquaculture workers. OHHAI trainee Kali Turner's analysis of workers' compensation data is one of the first papers to highlight these issues, and the findings that show high rates of injury are raising awareness in the industry.

Pathogen exposure in wildlife markets: Current research by an OHHAI student regarding pathogen exposure risks in wildlife market workers will be used to inform policy recommendations regarding occupational health and safety aspects of the wildlife trade.

e. Outcomes

Short term outcomes

Five of eleven OHHAI graduates are currently employed in positions directly related to occupational health. A 2017 graduate is now employed as an Epidemiologist at the Washington State Department of Health; a 2018 graduate now works at the Center for One Health Research at UW; a 2019 graduate is now employed with the Pacific Northwest Agriculture Safety and Health Center, and another 2019 graduate is a Council of State and Territorial Epidemiologist fellow at the Washington State Department of Health; a 2020 Graduate was hired as a Senior Research Specialist at CNA. Two graduates are currently enrolled in PhD programs, and two are in medical school.

Intermediate outcomes

The OHHAI program focus on the occupational health of animal workers including research in dairy and veterinary settings has improved relationships with dairy farmers and the dairy industry as well as the veterinary medical community.

Return of results related to health outcomes for participants in studies has resulted in improved health awareness for workers. These have included respiratory testing results, blood pressure results, and results of rabies titers and Bartonella antibodies in dairy and veterinary populations.

Trainings conducted based on OHHAI program activities has improved awareness of best practices in animal workplaces.

Long term outcomes

We expect that OHHAI program activities will lead to improved health and safety status of animal workers in our region. We also expect that OHHAI program activities will lead to increased adoption of best practices for occupational health and safety, and reduced rates of injury and illness, in animal-related worksites in our region and nationally.

Allied Training Program

Construction Management Occupational Safety and Health

Ken-Yu Lin, Director

Past Performance / Accomplishments in Last Project Period

Program description

The Construction Management Occupational Safety and Health (CMOSH) program creates a special Occupational Health and Safety (OH&S) track within the existing Master of Science degree program in the Department of Construction Management at the University of Washington. The program was designed to include an OH&S emphasis in the training and education of future construction management leaders and through these leaders reduce occupational injuries, illnesses and fatalities in construction in the long term. Students and trainees affiliated with the program are expected to have a deeper understanding of the OHS issues in construction and be able to develop corresponding solutions sensible to the construction sector. Their research outputs will address and support the update of the NIOSH NORA construction sector agenda. They will serve as the industry resources and links to the OH&S community at large.

a. Program accomplishments and significant changes

During the reporting period covering 2015 - 2020, the CMOSH program admitted seven students with six of them being funded as trainees. Matriculated trainees have all graduated except one who entered the program in Fall 2019 and are still making progress to fulfill the degree requirement. CMOSH cohort have enjoyed the curriculum, close mentorship, professional development, and research opportunities. Specifically, the program developed a unique capstone course to introduce measurement-driven applications of OSH principals against typical hazards found on construction sites. The course has a strong connection with the construction industry through site visits and guest lectures. A total of 57 graduate students took the course, including a Navy engineers from the Department of Civil Engineering who had no previous access to OH&S courses. Annual student evaluation of the course was consistently at or above 4, with 5 being the best. Program faculty met up with CMOSH cohort on a monthly if not bi-weekly basis for advising. For professional development, all CMOSH cohort completed internships except one trainee who went study abroad during summer. These internship employers range from capital facility owner, general contractor, specialty contractor, and real estate developer, representing different types of construction segment. Also for professional development, CMOSH cohort not only were required to present at the annual New Frontier in Construction Conference hosted by the Center for Construction Research and Education but were also encouraged to attend other professional enrichment events for example the American Industrial Hygiene Conference. Graduated CMOSH cohort have all developed successful thesis works that are interdisciplinary in nature employing OH&S lenses while examining construction operations and the presented hazards. For four years straight, CMOSH organized and sponsored the OH&S session at the annual New Frontier in Construction Conference, covering topics such as physical exposure assessment, instrument for controlling construction dusts, physiological status monitoring in construction, and approaching Total Worker Health (TWH). The conference drew a broad audience that included builders, designers, facility owners, and even regulators.

In 2019, the CMOSH program was not included in the competitive renewal however the program director Dr. Lin will resume the capstone course and continue to interface with the University of Washington ERC leadership.

b. Faculty accomplishments

CMOSH program director Dr. Lin is an endowed Associate Professor from Year 2015 to 2020 and oversees the Safety and Health through Advancement in Research and Education (SHARE) Lab. Dr. Lin has demonstrated her passion and dedication to teaching, student mentoring, interdisciplinary research, and excellent service. In 2018, Dr. Lin received the University of Washington College of Built Environment's Lionel Pries Award for Excellence in Teaching and in 2019, Dr. Lin was awarded a grant from the Washington State Safety & Health Investment Projects (SHIP). Dr. Lin continued to publish and was invited as the keynote speakers at domestic and international events including the 2017 Puget Sound Human Factors and Ergonomics Society (PSHFES) Symposium, the 2018 Northwest Construction Consumer Council (NWCCC) June Meeting, and the 2019 Conference on Computer Applications in Civil and Hydraulic Engineering

(CCACHE). Dr. Lin's publications can be seen in OH&S journals like Safety Science, Applied Ergonomics, and International Journal of Environmental Research and Public Health, as well as in other construction-oriented journals like Journal of Management in Engineering. Dr. Lin has a stellar record of service both inside and outside the University. OH&S related services include serving on the judging panel for the Associated General Contractors' Build WA Award, offering translated OSHA clean-up tips to the Hispanic Contractors Association De Tejas after hurricane Harvey, and chairing the Health, Safety, and Workforce Issues track at the 2020 Construction Research Congress (CRC).

c. Trainee accomplishments

Of the five graduated CMOSH trainees: Sam Murphy is applying to prospective PhD programs; Chris Mak and Elena Franks are holding positions with public agencies; Jeremy Berke and Michael Kimball are working for private employers. These former trainees all are in roles that can contribute to the OH&S decisions within their organizations and are expected to rise to leadership positions for greater impact as they nurture their construction career.

For practical training, Chris Mak completed an eight-week internship with the University of Washington Capital Project Office to assist with the office's adoption of low voltage LED lighting fixtures intended for temporary construction. Jeremy Berke interned with the safety department at Snyder Roofing Company. Elena Franks interned with Schuchart Construction, the general contractor who build many landmark projects in Seattle. Michael Kimball interned with the Ryan Companies, one of the largest general contractors in Minnesota. Sam Murphy, although did not complete summer internship, won the Scan Design Scholarship and went study abroad at the Technical University of Denmark. All the internship employers gave written statements regarding the trainee performance and complemented our trainees highly.

For outreach activities, two graduated CMOSH trainees went onto the regional podcast program "The Heartbeat of Health and Safety" to spread highlights of their thesis work. During the hurricane Harvey recovery, one trainee volunteered to assist with the outreach translation (from English to Spanish) of OSHA clean-up safety tips. Elena Franks won the best student poster award at the 2017 New Frontier in Construction Conference and after graduation gave a talk as the OH&S session speaker at the 2019 event.

For professional development, besides New Frontier in Construction Conference, CMOSH trainees also participated in other OH&S events such as the American Industrial Hygiene Conference & Expo, National Association of Women in Construction (NAWIC) Pacific Northwest Conference, Northwest Occupational Health Conference, and the Cascadia Annual Symposium on Environmental and Occupational and Public Health.

Thesis work completed by the graduated CMOSH trainees demonstrated its potential to make real changes in construction. For one, Chris Mak's thesis assisted the University of Washington with its implementation of low voltage LED light across all active projects on campus, which contributed to the removal of the hazards typically found with the use of traditional temporary construction lighting. Michael Kimball through an independent study with Dr. John Schaufelberger contributed to the textbook writing of "Construction Superintendents, Essential Skills for the Next Generation" by Routledge in 2020. Michael Kimball's CMOSH training enabled him to bring in OH&S related perspectives into the textbook for the education of future construction engineers, managers and leaders.

d. Outputs and outcomes (chronologically listed)

1. **Kimball, M.** *No Worker Left in the Dust: A Case Study on the Highly-contrasted and Variable Levels of Silica Safety.* Seattle]: University of Washington, 2020.
2. **Murphy, S.** *The Implementation and Development of 3D Concrete Printing for On-Site Applications in Construction.* Seattle]: University of Washington, 2020.

3. Lee, W., Migliaccio, G., **Lin, K.Y.** and **Seto, E.** “Workforce Development: Understanding Task-level Job Demands-Resources, Burnout, and Performance in Unskilled Construction Workers”, *Safety Science*, Vol. 123, Mar. 2020, 104577.
4. **Berke, J.** *Solar Ready : Harmonizing the Solar Ready Scope for Safer & More Productive Solar Deployments*. Seattle]: University of Washington, 2018.
5. **Franks, E.** *Safety and Health in Prefabricated Construction : a New Framework for Analysis*. Seattle]: University of Washington, 2018.
6. **Li, Q.** *Mental Health in Temporary Construction Workers*. Seattle]: University of Washington, 2018.
7. Liang, H.K., **Lin, K.Y.**, Zhang, S., “Understanding the Social Contagion Effect of Safety Violations within a Construction Crew: A Hybrid Approach Using System Dynamics and Agent-Based Modeling”, *International Journal of Environmental Research and Public Health*, Vol. 15 (12), 2018.
8. Liang, H.K., **Lin, K.Y.**, Zhang, S., Su, Y.K., “The impact of coworkers’ safety violations on an individual worker: a social contagion effect within the construction crew”, *International Journal of Environmental Research and Public Health*, Vol. 15 (4), 2018.
9. **Lin, K.Y.**, Lee, W., Azari, R., Migliaccio, G., “Training of Low-Literacy and Low-English-Proficiency Hispanic Workers on Construction Fall Fatality”, Case Study in *Journal of Management in Engineering*, Vol. 34(2), 2018.
10. Lee, W., **Lin, K.Y.**, **Seto, E.**, and Migliaccio, G., “Wearable Sensors for Monitoring On-Duty and Off-Duty Worker Physiological Status and Activities in Construction”, *Automation in Construction*, Vol. 83, 2017, pp.341-353.
11. Lee, W., **Seto, E.**, **Lin, K.Y.**, Migliaccio, G. “An Evaluation of Wearable Sensors and Their Placements for Analyzing Construction Worker’s Trunk Posture in Laboratory Conditions”, *Applied Ergonomics*, Vol. 65, 2017, pp. 424 – 436.
12. **Mak, C.** *Implementing Temporary LED Construction Lighting*. Seattle]: University of Washington, 2017.
13. Chi, N.W., **Lin, K.Y.**, El-Gohary, N., and Hsieh, S.H. “Evaluating the Strength of Text Classification Categories on Supporting Construction Field Inspections”, *Automation in Construction*, Vol. 64, 2016, pp. 78 – 88.

Outreach

Nancy Simcox, Director

Past Performance / Accomplishments in Last Project Period

a. Program Accomplishments and significant changes

The NWCOHS serves as a resource for business, labor, government, and especially for practicing occupational health and safety professionals throughout the four states comprising Federal Region X (Washington, Oregon, Idaho, and Alaska). Our Outreach activities to these groups include cooperation with institutions in the Region, support of students in various training programs, professional training (especially the various modalities of continuing professional education), and an extensive array of consulting and practice-oriented research activities. A major component of our ongoing outreach to the region involves multiple modes of delivery of continuing education. Five examples of notable Outreach activities include:

- 1) NWCOHS increased Outreach to Spanish-speaking workers to reduce fatalities and injuries associated with falls in the construction industry by collaborating with diverse organizations and advocacy groups, such as the UW Latino Center for Health, El Centro de la Raza, and SAIF, Valley Family Health Care (OR/ID border), Four Rivers Cultural Center, and the Treasure Valley Community College. Since 2016, we have seen our classes grow from 3-5 students per class to 25-29. We offered 13 classes in Spanish, for free, and successfully trained 187 roofers, laborers, landscapers, painters, construction workers, temporary workers, and carpenters from many small businesses in our Region. Evaluations from the last course held in Portland, Oregon indicated that the most valuable items students learned include the use of a harness, proper processes after setting up a load, the importance of safe work in heights, the need for an OSHA plan, and risk analysis prevention.
- 2) The NWCOHS actively participates in each of the Region's Governor's Health & Safety Conferences, held annually in WA, OR, AK, and ID. Our participation includes offering CE courses and conference session presentations by NWCOHS faculty or other experts in fields relevant to conference topics. In 2019, N. Simcox and the pilot training program grantee from the University of Idaho presented the new Virtual Reality simulation training at AK Governor's Safety & Health Conference and at a confined space training sponsored by the Alaskan Native Tribal Health Consortium (ANTHC) that led to further discussions about VR as a training tool for the future. These types of partnerships that involve all three states collaborating on educational training and modalities will continue in the next cycle. In 2019-20, presentations on developing a strong safety culture were delivered in both English and Spanish at two Ag Safety Days held in Eastern Washington. In addition, a focus on improving health and safety for precarious workers led to a collaborative effort with the UC Berkeley to provide courses for staffing agencies on developing health and safety programs for temporary workers in Washington and Oregon, and then nationally, one adapted for virtual delivery.
- 3) In 2018-2019, CE and NWCOHS faculty participated in several programs on emerging issues related to wildfire smoke for occupational and environmental healthcare providers, fire professionals, industrial hygienists, and safety professionals. An OEM Grand Round Lecture (Health Implications of Exposure to Wildfire Smoke in Firefighters, Other Outdoor Workers and Vulnerable Populations) delivered by Sverre Vedal, Coralynn Sack (UW Occupational Medicine Residency (OMR) faculty) and Gillian Gawne-Mittelstaedt (Director, Tribal Healthy Homes Network) discussed the health implications of wildfire smoke exposures, best practices for protecting workers and the surrounding communities, and clinical approaches to managing patients who suffer from wildfire smoke exposure. NWCOHS also facilitated a session during the UW Department of Environmental and Occupational Health Sciences (DEOHS) Wildfire Smoke Risk Communication Stakeholder Symposium in 2018, where over 150 practitioners, researchers, and students engaged in interactive activities to develop collaborative approaches to addressing critical wildfire smoke public and occupational health challenges. In 2019-20, our pre-conference course on Workplace Violence in Healthcare at the WA Governor's Health & Safety conference led to the development of Workshops for healthcare teams for the Region.
- 4) In 2019-20, CE and NWCOHS faculty participated in outreach activities related to alternative work arrangements, cannabis and Covid-19. For example, Dr. Simpson participated in the Northwest Occupational Health and Safety conference, engaged with professionals at the short course and served as a moderator for the PTOP session.

- 5) The pandemic and necessary social distancing have resulted in a major shift in the way outreach can be accomplished. This has resulted in adapting to dissemination of information primarily by video conference and/or electronically (including courses, informational webinars, and published resources). NWCOHS has been resilient in this regard and has been able to reach our stakeholders in a timely and engaging way. For example, when the UW stopped all in-person group activities in early March, the NWCOHS CEP was able to provide a free informational roundtable with a panel of experts from both medicine and industrial hygiene on the emerging topic of Covid-19 on March 26, 2020 that was attended by 40 professionals live and is recorded and available on the [NWCOHS CE web site](#). Dr. Baker responded to journalist requests, initiated research related to COVID-19 and essential workers, and presented at Worker Memorial Day about the working conditions for essential and precarious workers. Dr. Rabinowitz prepared a live virtual session with students enrolled in the CE Infection Prevention & Control on the Farm pilot course to address emerging agricultural questions.

b. Faculty and trainee accomplishments

Highlights of Outreach accomplishments by our Center faculty and trainees from 2015-2019 include the following:

- NWCOHS co-sponsored the NWCOHS West Coast Poverty Series, offering lectures by various experts in labor, economics, and social justice to initiate discussions between faculty, students, and the community about the changing workforce. In addition, NWCOHS offered a complimentary screening of the film “*A Day’s Work*,” featuring the personal story of a worker killed in an occupational incident. The film screening attracted more than 70 health and safety professionals from many disciplines on UW’s Seattle campus. NWCOHS trainees participated in these programs.
- NWCOHS partnered with Pacific Northwest Section of the American Industrial Hygiene Association (PNS-AIHA) and the Oregon Institute of Occupational Health Sciences in planning and implementing a highly reviewed symposia ‘Workplace Aggression: Best Practices to prevent, identify, and safely mitigate aggressive behavior and violence’ in Spring 2019. During this course, 125 participants discussed the science of workplace violence among healthcare workers, teachers, and service workers, and shared practical solutions for mitigating violence. This course represented an excellent mix of theory and applied science.
- Outreach and participation among labor and union conferences increased during this cycle. Ms. Simcox and NWCOHS trainee, Jessica Porter, designed and coordinated a workshop for the Washington Labor Education and Research Center annual meeting to discuss strategies to strengthen safety rules and regulations. Speakers included Dr. Leslie Phillips (SEIU 775 Benefits Group and NWCOHS External Advisory Board member), Steve Garey (USW Local 12-591), and Hannah Curtis (UW Safety and Health Empowerment for Women in Trades Study and NWCOHS Center Manager).
- By serving as mentor to interns of the Occupational Health Internship Program (a nurse and labor study student), Outreach and CE Director, Nancy Simcox, collaborated with the United SteelWorkers Union during Summer 2018 to raise awareness among union members and the community about the new WA State proposed rule related to Process Safety Management. Educational materials and a video were developed and available on the USW Local 12-591 website (<http://www.usw12-591.org/>).
- Dr. Peter Rabinowitz, OHHA Director, coordinated and participated in a one-day course on *Agriculture Workers and Zoonotic Diseases: One Health Approach to Infection Prevention and Control on the Farm* at the Centilia Cultural Center in May 2018. Educational content and issues explored with practitioners are being used for an e-Learning program for agricultural employers, staff of health departments, veterinarians, and safety professionals. OHHA trainees participated in this program, and those that did not attend were able to review the recordings. OHHA and CE developed and piloted an online course titled “Infection Prevention & Control on the Farm” in 2020.

- Dede Montgomery (OHSU Total Worker Health Center) delivered a *Total Worker Health* CE course in Seattle, WA, as well as a lecture for the local chapter of the American Society of Safety Professionals (ASSP) Puget Sound. These events continue to build partnerships for expanding the Total Worker Health curriculum across the region, and foster collaboration with other NIOSH-funded centers in our region. The Outreach marketing team promoted the program to professionals within human resources, wellness programs, and others in the region.
- Outreach/CE has coordinated the UW Worker Memorial Day event for five years in conjunction with many campus unions, UW Environmental Health and Safety (EH&S) Office, UW United Students Against Sweatshops, and the UW Harry Bridges Center for Labor Studies. This interdisciplinary event gives opportunities for learning and networking among UW students who might not otherwise interact together.
- Dr. Gary Franklin, Occupational Health Services Research (OHSR) Co-Program Director, presented on new WA State opioid prescribing guidelines during the WA Governor's Industrial Safety and Health Medical Track: '*Current Issues in Treating Injured Workers*' in Spokane, WA, which also covered topics such as the impact of marijuana legalization on the workplace, Ebola preparedness, workplace violence, and tools for returning the injured worker to the workplace. Dr. Franklin also was the keynote speaker for the UW Worker Memorial Day event in 2019.
- In Region X, Outreach developed new partnerships between the Oregon Department of Environmental Quality, OR OSHA, Northwest Green Chemistry, and WA State Department of Ecology to foster exchanges about green chemistry and the use of safer chemicals among occupational health and pollution prevention professionals. In addition, new curricula on the integration of toxicology concepts, occupational health, and green chemistry were shared with 100 educators at a national conference (Biennial Conference on Chemical Education in Colorado) and a regional conference (National Science Teachers Association in Oregon).
- Since 2016, the NWCOHS has been working to increase our presence on social media. Student recruitment and the sharing of educational products have been key focuses of our social media strategy. Recently, we updated our blog (<https://deohs.washington.edu/nwcohs/about/blog>) and began regularly posting student profiles and stories highlighting NWCOHS research, helping to share the important work our students and faculty are doing. Blog posts from the NWCOHS blog are frequently shared in our OSHA Center newsletter, Twitter announcements, and have helped raise awareness among our audiences related to the academic programs, CE programs, and resources available through the NWCOHS (see social media report, Appendix VIII.d).
- Outreach is staying current with social media convention and started developing short videos (1-3 minutes) to further raise OHS awareness about a certain topic among practitioners. A video sharing statistics on workplace violence in health care and promoting our upcoming training received 882 views on Facebook, while a similar video promoting a Bakken Oil rail incident response training was viewed 708 times on Facebook. Our video "*Home Safe for the Holidays*" was viewed 1.9k times over the past two years, while the video created for Father's Day has been viewed 2.3k times. NWCOHS also collaborated with the UW School of Public Health to produce a newsletter article and video that focused on workplace violence for the UW Worker Memorial Day event that was shared on Twitter, LinkedIn, and Facebook in 2017 (<https://sph.washington.edu/news-events/news/survivor-workplace-violence-calls-empathy-workers-memorial-day>).
- After a crane collapsed in Seattle and killed two workers and a member of the public, NWCOHS leadership published an op-ed article in the Seattle Times addressing the issues of blaming the worker for such tragedies, and the challenges of multi-employer worksites.² Simcox and Yost published an [op-ed in the Seattle Times](#) addressing the issues of COVID-19 pandemic and the need to use the hierarchy of controls for worker protection.

c. Outcomes and Outputs:

- Outreach to policy decision makers increased this cycle. We placed a policy intern with the WA State legislature during 2018-19 year, in which a student developed background and legislative language to support safety and health for workers employed through staffing agencies (see <https://deohs.washington.edu/hsm-blog/protecting-precarious-workers>). During the next cycle, NWCOHS will continue to do outreach to host employers by collaborating with the staffing agency associations in the region.
- Social media is vital to our outreach program, and allows us to disseminate important OHS information, faculty research findings via webinars/recordings, and other educational materials (e.g. fact sheets, research publications, and course announcements). Many of our social media posts receive high engagement rates, using the 0.062% average engagement rate for higher education as our standard. In March 2019, a Facebook post about our visit to Illisagvik College in Alaska and the PTO project reached 892 people, and an engagement rate of 11%. Another tweet reached a 3.4% engagement rate, and shared information about Dr. Simpson's research on respiratory exposure and outcomes among cannabis workers via a webinar recording. Another tweet, with an engagement level of 1.6%, helped recruit students to our training program: "The NWCOHS trains the next generation of Occupational Health & Safety Professionals...what could YOU achieve as an Exposure Science or Occupational Hygiene Master's Student? Find out during a free online information session: <http://bit.ly/NWCInfo2019> <pic.twitter.com/OyfCImo29i>." We will continue to disseminate our products and educational materials via social media as a way to reach our students, alumni, practitioners, and stakeholders serving the OHS community.
- According to the needs assessment publication by Doubleday (2018), the most common chemical exposures in the northwest during our next cycle will be cleaning agents. In 2019-2020, faculty raised awareness about this issue by conducting presentations on how to transition to safer chemicals and cleaning agents to many audiences including custodial managers at the Alaska School Board annual meeting, Alaskan Natives at the Alaska Forum on the Environment, safety professionals in Washington/Oregon at ASSP annual meeting as well as UW undergraduate/graduate students in academic programs. During the COVID-19 pandemic, Ms. Simcox developed a [fact sheet](#) in English and Spanish on workplace cleaning and disinfection that was disseminated through American Public Health Association OHS Section, WA Department of Health, Washington Department of Ecology, and unions (SEIU 775 Benefits).

Continuing Education

Nancy Simcox, Director

Past Performance / Accomplishments in Last Project Period

The overall purpose of the CE program is to provide Region X with innovative, high quality continuing education and training for all disciplines of occupational health and safety practitioners, employers, and employees. This over-arching goal remains unchanged. Our quantitative goals and objectives were met during the last cycle for each program area by training 1240 Industrial Hygiene (IH), 878 Occupational and Environmental Medicine (OEM), 552 Occupational Health Nursing (OHN), 5029 Safety professionals. The majority of our course offerings during this cycle were located in Washington State, aligning with the workforce population in the Region; however, CE has continued to increase activities in Alaska, Oregon, and Idaho. In 2020, we shifted to delivering our courses in virtual classrooms via two-way video conferencing to accommodate social distancing guidelines, which has resulted in an increase in participation from outside of Washington. See NIOSH Data Table 3 for all CE activities, including live classes, virtual instructor-led courses and online offerings. We also continue to reach new audiences with our occupational safety course offerings; for example, of 5462 'other' professionals, 977 were daycare providers and 263 were public health professionals from two webinars delivered by CE for the NY/NJ ERC Public Health Lecture Series at Rutgers University. Other professionals, such as public health professionals, environmental specialists, chemists and educators, were also offered occupational health training to increase OHS capacity in their workplaces. Our current registration process also allows EH&S directors to select "other" as a category, which also explains the large number. We plan to correct this with our website upgrade during the next cycle.

In our last renewal, we set out five goals, for which we have made significant progress, as detailed here:

a. Address constituent needs for new information and best practices in OHS

CE continues to use a variety of needs assessment strategies to identify priorities noted in the last proposal. This cycle, we participated in the development and distribution of a national Education and Research Centers (ERC) needs assessment survey distributed by MAP ERC in 2015-2016. CE conducted a needs assessment at various OHS meetings across the region with 183 practitioners responding from all four states, and we conducted an online survey of the needs of our stakeholders at the end of the cycle, which is being used to guide future programming.

b. Translate current research into usable information for practitioners and workplaces

CE considers the professional development courses (online and in-person) as the key 'products' of its efforts to facilitate R2P for our target audiences. Through multiple media platforms, CE shared NWCOHS research findings, course offerings, and student experiences with our audiences via the NWCOHS blog, newsletters, social media, podcasts, and email campaigns. For example, we highlighted our interview with Maryann D'Alessandro, Director of the National Protective Technology Laboratory, about NIOSH resources on personal protective equipment in our January 2018 podcast and newsletter. We also put together a panel of experts from our faculty and the Washington Department of Labor & Industries to conduct a roundtable on Covid-19 in March 2020.

c. Provide topical training content in a variety of formats to multiple OHS audiences

CE developed five new e-Learning programs in areas of agricultural medicine, occupational health nursing and OEM, and green chemistry, and is currently working on several more occupational disease on-line activities (by leveraging additional funding). CE Director, Nancy Simcox, served on the American National Standard Z490.2, Accepted Practices for e-Learning in Occupational Safety, Health and Environmental Management Committee during 2018-2019. CE Marketing Manager, Becky Yost attended e-Learning courses in instructional design to increase CE team skills. Currently, participation in these programs are low due to our delayed registration process (students must wait 24 hours to access program), and CE will address this during the next cycle during its website update.

CE updated their course on *Supervisory Safety and Health* by integrating research findings from the UW Safety and Health Empowerment for Women in Trades study into the curriculum, including topics on intercultural competence, racism, sexism, and principles of safety communication. The materials were reviewed by the UW School of Public Health Director of Equity, Diversity & Inclusion, and was disseminated

to all Pacific Northwest OSHA instructors who teach this class in December 2019. In 2020, this program was delivered via a virtual classroom.

d. Continuously improve pedagogical methods and use of technology in course delivery

CE utilized new innovative active learning techniques to increase engagement. A confined space Virtual Reality (VR) module, developed through a PTOF award with faculty at the University of Idaho, allowed workers to experience a 'real' confined space, move from scene to scene, select objects, and perform tasks realistically, but without any actual harmful exposures. In OEM Grand Rounds Lecture activities, participants practiced a hands-on shoulder exam, engaged in mindfulness techniques to reduce provider stress, and were able to try out wearable "exoskeleton" equipment designed to reduce muscle fatigue. CE conducted several spray paint safety courses, requested by WA Department of Labor and Industries (WA L&I) in response to explosion incidents. As part of the curriculum, participants used a virtual spray-painting tool to practice techniques to reduce overspray, built a safe and effective temporary spray booth, and had access to a permanent paint spray booth with hands-on demonstrations of painting equipment and techniques. Other instances where "active learning techniques" have been employed include table-top emergency response exercises in several courses, silent reflection as part of a diversity and inclusion curriculum, written self- assessment reports integrated into a leadership course, and discussion boards in e-Learning programs.

e. Organize forums for exchange of experience and expertise among practitioners, workers, and employers

CE engages in many unique activities to promote OHS and engage our Regional workforce, including participation in four State Governor's Safety and Health Conferences and Center-wide interdisciplinary activities. A 'World Café' discussion at the *UW Wildfire Smoke Risk Communication Stakeholder Synthesis Symposium* was facilitated by CE to share lessons learned from recent wildfires with representatives from over 30 agencies, organizations, communities, and Tribes. NWCOHS trainees, along with UW United Students Against Sweatshops, organized, planned, and implemented the 2018 *UW Worker Memorial Day* event focusing on worker rights, safety, and the "Me Too" movement. CE co-sponsored the 2018 American Conference on Human Vibration in June 2018, and offered a preconference course on the current research of human vibration and its impact on worker health.

Accomplishments by each program area

Industrial Hygienists:

For decades, the CE program has annually partnered with the Pacific Northwest Section of the American Industrial Hygiene Association (PNS-AIHA) to offer short courses for industrial hygienists at the *Northwest Occupational Health Conference* (NOHC); topics this cycle included nanotechnology, shift work, and occupational health surveillance. This conference continues to be an excellent way to communicate and translate our R2P efforts. In 2016, we co-sponsored '*Health & Safety in the 24/7 Economy*' with the Oregon Institute of Occupational Health Sciences (OHSU). One hundred twenty participants discussed the science of circadian rhythms, the physiological impacts of shift work, and shared practical solutions to maintaining worker health in the current economy; this activity responded to the NWCOHS's "*Future of Occupational Health 2015 Report*" (Appendix II.b). In 2018, an occupational health surveillance course was developed and delivered with faculty from NWCOHS (IH and OEM), OHSU (psychology), UMass Lowell (public health), and other practitioners from WA Labor & Industries SHARP, MA Department of Health, and BSI Environmental Health & Safety. Other educational activities for IH include:

- Several leadership courses in partnership with the UW Center for Leadership and Strategic Thinking (CLST) at the UW Foster School of Business to assess leadership development at the individual and student cohort levels. These courses were also relevant for other OHS professionals, such as safety.
- Assisted Exposure Science faculty and trainees in the development and dissemination of educational materials to employers and workers in the legalized cannabis industry. The NWCOHS

blog post was viewed by 1,400 people and fact sheets were downloaded by over 150 industry professionals and stakeholders (using leveraged funding).

- A ‘*Total Worker Health Fundamentals*’ course taught in collaboration with OHSU and professionals from Microsoft and Seattle City Light.
- Collaboration with the Rutgers University Public Health Webinar Series (NY/NJ ERC) to offer two webinars- Webinars: “*Green Chemistry: Finding Safer Alternatives for Occupational Applications*” and “*Motivational Leadership: Are You Ready to Change?*”, also in collaboration with UW Foster School of Business, CLST.

Occupational and Environmental Medicine

Each autumn, Northwest Association of Occupational and Environmental Medicine (NAOEM) offers a 1-2 day conference for occupational health providers in our region. CE assisted in the planning of this conference and the application for accredited continuing education credits, organized and presented at industrial site visits, and sponsored a session or set of speakers each year in conjunction with NWOCHS OEM faculty. In 2019, the conference will be held in Anchorage, Alaska. Examples of sessions during the past cycle include Dr. G. Cangelosi: “*Climate change and international and emerging infectious diseases*” and Dr. P. Rabinowitz: “*One Health: The interface of human and animal connections*” (see other academic program plans for details). We increased the participation rate of the OEM Grand Rounds series by covering emerging topics and focusing on clinical best practices (e.g. how to conduct a shoulder exam, health effects of wildfire smoke, the use of exoskeletons in the workplace, the resurgence of black lung and silicosis, and the motivational interview). We expanded our outreach to include local medical societies and targeted medical specialties for specific lectures (e.g. radiology and pulmonology for the May 2019 black lung/silica lecture with Dr. Cecile Rose). We also offered a live interactive webinar option that allowed for individual remote participation as well as group participation from a satellite site in Olympia, which was facilitated by staff at WA L&I. CE developed OHS curriculum with the UW Department of Emergency Physicians by conducting iterative simulations of care of patients with highly infectious diseases such as Ebola virus to assess risk and determine best practices for provider safety while wearing high-level PPE (leveraged new funding for this project). A just-in-time app for providers was developed based on these activities, including interactive materials developed from 3-D virtual reality technology, and a short course was held in the UW simulation lab to share this information and training techniques with healthcare and public health professionals (leveraged funding by N. Simcox).

Occupational Health Nursing Professionals

Since 2015, one hundred and seventy nursing professionals completed the “*Occupational Health Basics for Nurse Practitioners and Nursing Professionals*” online program. Most notably, this module was integrated as part of the academic curriculum in two nursing programs; 92 students at Seattle University College of Nursing and 46 nursing students at the University of Southern Florida. This year, CE and the UW Department of Emergency Medicine collaborated to offer a CE course on workplace violence for healthcare workers in Eastern Washington (leveraging other funding sources). Respondents of the impact survey stated that they identified new policy approaches for handling patient agitation. CE also co-sponsored a similar event with OHSU, convening 165 practitioners to discuss strategies for workplace violence prevention for healthcare, field service workers, and educators. CE offered NIOSH-approved spirometry courses to 147 OHNs and mid-level providers; impact surveys indicate that these classes are very beneficial for resolving testing issues. In 2016, CE offered a medical track with CME at the Washington State Industrial Safety and Health conference featuring a variety of presentations including the new WA opioid prescribing guidelines by Dr. Gary Franklin, impact of legalization of marijuana on the workplace, Ebola preparedness, workplace violence, and tools for returning the injured worker to the workplace.

Safety Professionals

CE offered many training opportunities for first responders, fire safety, and emergency planning professionals. Through collaborations with regional stakeholders, such as FEMA Region X, National Safety Council, Fire Departments, and private business (e.g. Starbucks and GeoEngineers), CE offered courses on emerging issues such as Bakken oil transportation, wildfire smoke, and a safety officer program. A four-

day process safety management (PSM) course with industry examples specific to regional needs in petrochemicals, as well as seafood refrigeration were offered in Alaska, Oregon, and Washington. In addition, the course was offered live in Anchorage and live cast to a Valdez classroom to enhance course accessibility. In addition, CE recently updated our young worker health and safety curriculum to align with the NIOSH Talking Safety program. New regional programs and other resources were added to our website including Oregon's Young Employee Safety, Spanish language materials, and sector specific materials (e.g., Young Workers in Agriculture and Youth in Construction).

Occupational Health at the Human-Animal Interface (OHHA)

New topics including the hazards of chemotherapeutic agents in veterinary practices and detail practical strategies for safe handling of these hazardous drugs that can cause serious health and safety harm to exposed workers were addressed at the WA State Veterinary Medical Association conference. In addition, Dr. Peter Rabinowitz worked with CE and University of Indiana to offer a one-day course on Animal Agriculture Workers and Zoonotic Disease Emergencies at the Centilia Cultural Center (El Centro de la Raza, Seattle). In 2020, OHHA and CEP piloted an online training program titled "Infection Prevention and Control on the Farm", and will be adding COVID-19 content to the program prior to launching in fall 2020.

Construction Management Occupational Safety and Health (CMOSH)

CE worked with the NWCOHS CMOSH program to reach the construction industry through an annual construction management conference, monthly newsletters, and promotion of the Pacific Northwest OSHA Education Center. Faculty member Rick Gleason was a guest lecturer in CMOSH courses. By leveraging our work with the Pacific Northwest OSHA Education Center, CE delivered several one day fall prevention courses in Spanish to 158 workers in WA and OR/ID, and students attended from small roofing companies, insurance companies, OSHA regulators, and SAIF. We also offered a free webinar that included three speakers: one from OSHA, a student from Sellen Construction who recently attended one of our CE courses, and a CE instructor. This webinar had an excellent turnout with over 100 people listening to a discussion on the process of transitioning to safer chemicals in construction.

Other Professionals

CE increased OHS training opportunities among new professionals, and others outside the field of OHS (e.g., teachers, wellness directors, and environmental health professionals). Examples include: 1) a green cleaning curriculum was developed for early care and education providers for Penn State Extension (to date, 977 providers have completed the program, including 58 from our region), and 2) a series of professional development courses that focus on best practices for transitioning to safer chemicals that brought together safety, and many professionals representing pollution prevention and environmental health (leveraged other funding sources).

f. Outputs and Outcomes

- CE partnered with unions (Northwest 1199), hospital associations (in WA and AK) and academic institutions (OHSU) to offer educational materials and professional development trainings on workplace violence. New resources and toolkits were provided and shared with the practice community primarily in healthcare, as well as other sectors, such as education, and retail. Examples of Outputs for this initiative are below:
https://osha.washington.edu/sites/default/files/documents/WPV_GISH2018_Final.pdf
https://osha.washington.edu/sites/default/files/documents/WPV_Workshops2019_Version3.pdf
<https://osha.washington.edu/pages/workplace-violence-resource-page>
<https://www.ohsu.edu/oregon-institute-occupational-health-sciences/workplace-aggression-0>

A quote from one of our practitioners who attended the Team Workplace Violence Workshop in Seattle describes an important outcome we received 3 months after the course: *"This is a great way to bring entities together to share best practices and strategies that are working well for others and these*

strategies can be considered / evaluated and possibly used to improve current situations that are proving to be difficult or challenging for other entities to manage or get a handle on.”

- Table A provides a list of several products, and provides at least one example of an OHS impact as reported by respondents to the three-month follow-up impact surveys.

Table A. Several CE activities highlighting faculty involvement and examples of impact

Description	Target Audience/Faculty and Instructors	Examples of Reported Impact on Health & Safety
2-Day Loss Prevention Through Ergonomics: Best Economic Practice for Sustaining Worker Health	Safety, OEM, OHN, IH and Other/Dr. Johnson (NWCOHS); Dr. David Rempel (UCSF); Nina Altman (OT industry); Experts in ergonomics and safety from WA State L&I and industry experts	Started a tool design and review committee to ensure the ergonomic aspect of tools are reviewed before purchases
1-Day Treating Patients with Highly Contagious Infectious Diseases: Using Technology to Advance Safety	Safety, OEM, OHN, IH and Other/Dr. Meschke (NWCOHS); Dr. Fernandez (UW Emergency Medicine); Dr. Lynch (UW Medical Director of Infection Prevention); Ross Ehrmentraut (RN TeamCORE Clinical Manager)	Modified training program for High Risk Infectious Disease response team to incorporate information from the course and more 'just in time' planning and preparedness
3-day Emergency Safety Officer Course as part of a certificate program (OR and WA)	Safety, IH and Other/Dr. Errett (NWCOHS); Dana Stahl (PNWOSHA Program); Mathew Bernard (FEMA Region X); Aaron Collins (Starbucks); Lark Stewart (National Safety Council)	Developed a new standard operating protocol to address Insurance Services Office (ISO) auditors, and shared it with mutual aid partners
2-day Radiation Safety: Principles, Practice and Emerging Issues	Safety, IH and Other/Chris Simpson (NWCOHS); Dr. Yost (NWCOHS); Brooke Buddemeier (Lawrence Livermore National Laboratory) Dana Stahl (PNWOSHA); Phil Campbell (UW EHS)	Hands-on demonstrations are valuable, and the use of various sampling meters with actual sources of radiation to make measurements beneficial
2-day Leadership, Readiness, and Motivation for the Health and Safety Professional	All/Molly Breysse Cox (UW Foster School of Business- CLST); John Fauver (Fred Hutchinson Cancer Research Center); Dr. Cohen (NWCOHS)	Solicited more group feedback to integrate others into problem solving and making them part of the solution.
1-day Agricultural Workers and Zoonotic Diseases: One Health Approach to Infection Prevention and Control on the Farm	OHHAI, OEM, OHN, and Other/Dr. Rabinowitz (NWCOHS); Vickie Ramirez (NWCOHS); Jocelyn Herstein (Global Center for Health Security, Indiana University); Dr. Shawn Gibbs (Indiana University)	Expanded professional network with other professionals to identify additional partners in the field to respond to zoonotic emergencies
1-day Infection Control Course for Emergency Responders with special section on Covid-19	Safety/John Lynch, Department of Medicine: Allergy and Infectious Diseases; Marilyn Roberts, DEOHS; Gail Fraser Chanpong, DEOHS	<p>Instituted the use of APRs as opposed to N-95 masks. We secured fit testing the week after the training and were able to get ahead of the need.</p> <p>We instituted wearing all PPE on EVERY call to avoid patient contacts without obvious S/S of COVID that are infectious. We have had a few positive notifications from our local hospital but due to the PPE on all calls our crews were not exposed.</p> <p>We are investigating a safer less aerosolyzing med-neb device.</p>

Research Training Program

Pilot Training Opportunities Program

June Spector, Director

PTOP Progress Report

The Northwest Center for Occupational Health and Safety (NWCOHS)'s Professional Training Opportunities Program (PTOP) is a pilot projects program aimed at both degree-seeking students across Federal Region X, and employees and staff of nonprofits or other groups. PTOPTOP aims to: enhance and add value to existing programs of study in occupational health and safety (OHS) in Federal Region X; build a professional community between our Center and related programs and professionals in Region X; and support communication, collaboration, and professional development among those with a professional or academic interest in occupational health throughout the region.

Through PTOPTOP, students or employees seek small amounts of support (\$10,000 upper limit) for a one-year period for specific proposed activities. For students, money is for activities that go beyond course activities and enhance the research or training experience of the student in preparation for graduate study or professional practice in an OHS-related role. For employees of a nonprofit/union this money is for expanding and evaluating an existing program that helps support capacity building for the recipient individual and/or organization. PTOPTOP aims to fund as many projects as fit within the allotted budget, with at least four projects funded each year.

Past Performance / Accomplishments in Last Project Period

The PTOPTOP program was directed in its first year by Dr. Noah Seixas, and subsequently by Dr. Marissa Baker and then by Dr. Christopher Simpson in 2019/2020. PTOPTOP awards were made in 2017, 2018, 2019, and 2020. Table A summarizes the accomplishments for the program over this project period in terms of the number of applications received, and where the applications have come from. While the number of applications have decreased over the three-year period, the number of applications coming from nonprofits has increased annually, and each year we have received applications from new organizations/institutions. In the first year of the PTOPTOP program, Program Director Dr. Noah Seixas delivered seminars at academic institutions across the region to promote the funding source, which likely explains the higher number of applications in 2016/2017. We received 14 applications for the 2019/2020 cycle. Tables B and C highlight the diversity of applicants and funded projects over the past cycle.

Table A. Applications received for PTOPTOP program

	2016/2017	2017/2018	2018/2019	2019/2020
# applications received / # funded	22 / 6	17 / 4	12 / 6	14/5
# states applications came from	4	4	4	4
# applicants from academic institutions / # applications from non-profits	21 / 1	15 / 2	8 / 4	3/2
# applications from new organizations	12	3	4	2 (AMSEA, AVCP)
Total \$ Awarded	\$39,408	\$44,783	\$39,615	\$38,893

Table B. Organizations/Institutions submitting an application through the 2019/2020 cycle

2016/2017	Boise State University; Central Washington University; Idaho State University; National Asian Pacific Center on Aging; Oregon Health & Science University; Oregon State University; Portland State University; University of Alaska-Fairbanks; University of Idaho; University of Oregon; University of Washington; Washington State University
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2017/2018	Association of Occupational and Environmental Clinics; Ilisagvik College; Oregon State University; Pacific Northwest Pollution Prevention Resource Center; Portland State University; University of Idaho; University of Washington; Washington State University
2018/2019	Alaska Native Tribal Health Consortium; Boise State University; Formerly Incarcerated Group Healing Together (FIGHT); Portland State University; Rural American Digital Lab; Northwest Green Chemistry; Oregon Health & Science University; Oregon State University
2019/2020	Alaska Marine Safety Education Association (AMSEA); Association of Village Council Presidents (AVCP); Ilisagvik College; Oregon Health Sciences University; Oregon State University; Pacific Northwest Pollution Prevention Resource Center; Portland State University; University of Oregon; University of Washington; Washington State University

Table C. Funded proposals through the 2019/2020 cycle

Year	Title	Organization/Institution	Awardee Name
2016/2017	Effects of working memory and muscle fatigue on dynamic gait balance control in older workers	University of Oregon	Teresa Chen
2016/2017	Cannabis industry and pesticide usage	Oregon State University	Richard Evoy
2016/2017	Extending the quality improvement of child care to include the career: Identifying the extent of occupational health risks for child care providers	Oregon State University	Jessica Henry
2016/2017	Differential stress/strain responses among nurses as a function of race	Portland State University	Lauren Park
2016/2017	The impact of caregiving on worker health: a daily diary study of personal support workers	Oregon Health & Science University	Kelsey Parker
2016/2017	Job hazard analysis in agriculture: Developing tools to evaluate the effect of alternative production systems on worker health	Boise State University	Jessica Porter
2017/2018	Increasing capacity for maritime safety training on the North Slope of Alaska	Ilisagvik College	Scott Barr
2017/2018	First Aid and Safety Training (FAST) video development for commercial fishermen	Oregon State University	Hayley Strenke
2017/2018	Washington refinery safety project	Association of Occupational and Environmental Clinics	Katherine Kirkland
2017/2018	Digital apprenticeship: training simulator for the 21st century	University of Idaho	Serendel MacPhereson and Elyse Vaarstra

2018/2019	Characterizing and communicating lessons learned from agricultural pesticide misuse investigations in Idaho	Boise State University	Rachel Phinney
2018/2019	Assessment of whole body vibration and work-related interventions within a public works department	Oregon State University	Stephanie Fitch
2018/2019	Rural Alaska Native utility and construction worker injury prevention project	Alaska Native Tribal Health Consortium	Chris Fish
2018/2019	Rethinking Rural: Seed. Root. Work.	Rural American Digital Lab (RADLab)	Aurora Martin
2018/2019	Mental Health Training at Scale: Developing online tools for evidence-based workplace solutions	Portland State University	Whitney Vogel
2018/2019	Strategies for addressing occupational health hazards at the workplace for formerly incarcerated workers	FIGHT (Formerly Incarcerated Group Healing Together)	Jamie Wong
2019/2020	Fatigue Reduction Training for Night Shift Nurses Project	Kootenai Health	Sandra Albritton
2019/2020	Assessing worker satisfaction with PFDs in the Bristol Bay salmon gillnet fishery	Alaska Marine Safety Education Association (AMSEA)	Heather Brandon
2019/2020	Vocational Health Internships at Iḷisaḡvik College	Iḷisaḡvik College	Caitlin Walls
2019/2020	Examining Psychological Health Among Oregon Migrant & Seasonal Farm Workers	Portland State University	Megan Snoeyink
2019/2020	Policy analysis of worker health and safety: best practices for public sector employees exposed to wildfire smoke during work	University of Washington	Alexa Yadama

All of the above awardees have presented or will present at the Northwest Occupational Health Conference (NOHC). Recipients from 2016/2017 presented at the October 2017 conference in Spokane, WA; 2017/2018 recipients presented at the October 2018 conference in Bremerton, WA; 2018/2019 recipients presented at the 2019 conference in Bend, OR; and the 2019/2020 recipients will present at the 2019/2020 conference in Kennewick, WA in October 2020.

On the NWCOHS website, current and recently completed PTOP projects are listed, including a link to recipients' NOHC presentations: <https://deohs.washington.edu/nwcohs/research/pilot-funding>

PTOP projects have also been highlighted on the NWCOHS blog to increase awareness about the program and to showcase the projects that the Center supports: <https://deohs.washington.edu/nwcohs/about/blog>

Publications 2015-2020

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Table 1: Academic Training Report since Beginning of Project Period

Table 1. Academic Training Report Since Beginning of Project Period¹
Submit one report per academic program. Fill in header.

Degree Awarded	How Does Degree Read?	Total # Applicants to Degree Program	Total # Applicants Admitted to Degree Program	Total # Under Represented Minority Applicants Admitted	# Full-Time Students Enrolled²	# Full-Time NIOSH-Supported Trainees	# Part-Time Students Enrolled²	# Part-Time NIOSH-Supported Trainees	# Trainees Graduated During Reporting Period
Master's degree ³		42	32	3	22	21	0	0	19
MS	Occupational & Environmental Exposure Sciences (enrollment 2015, 2016, 2017)*	39	29	3	19	18	0	0	16
MS	Occupational Hygiene (enrollment 2018, 2019)	3	3	0	3	3	0	0	1
MS	Applied Occupational Hygiene (enrollment 2018, 2019)	1	1	0	2	2	0	0	2
	<i>*No longer funding students in this MS program</i>								
Doctorate degree		110	30	5	15	3	0	0	2
PhD	Environmental & Occupational Hygiene	110	30	5	15	3	0	0	2
Post-doctoral									
Certificate Program									

¹ Reporting period for renewals is from the start date of prior competing award. New applicants should report past five years.

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³ OM residents may be double-counted under Masters degree training and post-doctoral training.

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Master's degree ³		6	6	0	5	5	0	0	5
MPH	Environmental & Occupational Health Specialized Training Nursing	6	6	0	5	5	0	0	5
Doctorate degree		7	7	0	6	5	0	0	0
PhD	Nursing Science	7	7	0	6	5	0	0	0
Post-doctoral									
Certificate Program									

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Master's degree ³		26	20	5	17	10	0	0	7
MPH	Occupational and Environmental Medicine	24	18	5	15	9	0	0	6
MPH	Epidemiology	2	2	0	2	1	0	0	1
	<i>*Includes trainees with military funding</i>								
Doctorate degree									
Post-doctoral		251	18	3	18	15	0	0	11
	Occupational Medicine Residency	251	18	3	18	15	0	0	11
Certificate Program									

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Master's degree ³		0	0	0	0	0	0	0	0
Doctorate degree		279	67	15	59	8	0	0	5
PhD	Health Services	279	67	15	59	8	0	0	5
Post-doctoral		0	0	0	0	0	0	0	0
Certificate Program									

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Master's degree ³		111	56	4	36	13	0	0	11
MPH	Environmental and Occupational Health with specialized training in Occupational Health at the Human Animal Interface (enrollment year 2015, 2016, 2017)*	91	44	2	25	5	0	0	5
MPH	One Health (enrollment 2018, 2019)	20	12	2	11	8	0	0	6
	<i>*No longer funding students in this MPH program</i>								
Doctorate degree									
Post-doctoral									
Certificate Program									

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Master's degree ³		9	7	1	7	6	0	0	5
MS	Construction Management with a specialization in Occupational Safety and Health	9	7	1	7	6	0	0	5
Doctorate degree									
Post-doctoral									
Certificate Program									

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Table 2: Trainees and Graduates Supported since Beginning of Project Period

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Submit one report per academic program. Fill in header.

Trainees				Graduates				
Trainee ID, Year of Entry, Prior Degree & Institution, (Current Academic Advisor or Mentor and Department). Identify Under Represented Minority with (URM).	OM Trainees: Previous Residency Training Specialty	Title of Research Project or Research Topic	Degree Program (MS, MPH, PhD, DrPH, etc.)	Date Degree or Certificate Awarded (mm/yyyy)	Date of Certificate for OM (mm/yyyy)	Employed in OSH Field or in OSH Advanced Study (Y/N)	Current Employer	Current Position
Oteri Oghoghohemeh, 1463901, 2014, BA Biology, Rutgers University (Noah Seixas, DEOHS). URM.		Estimating Worker Noise Exposure in Medium Noise Environments in the Semiconductor Industry	MS	12/2015		Y	Intel	Industrial Hygienist
Spencer Birch, 1265041, 2015, BS Chemistry, University of Washington (Chris Simpson, DEOHS).		Evaluation of PAH Metabolites as Biomarkers for Occupational Wood Smoke Exposure in Wildland Firefighters	MS	06/2017		Y	Boeing	Industrial Hygienist
Darrick Dickerson, 1566301, 2015, BS Biology, University of Hawaii (Marty Cohen, DEOHS). URM.		Identifying and Assessing Noise and Airborne Exposures in an Emergent Fabrication Program at a Large-Scale Aircraft Manufacturing Company	MS	12/2016		Y	Boeing	Occupational Safety Administrator
Samuel House, 1566251, 2015, BS Global and Community Health, Tulane University (Marty Cohen, DEOHS).		Occupational Falls in Non-Construction Industries	MS	06/2017		Y	Wood Inc	Safety and Industrial Hygiene Professional
Brooke Reynolds, 1566298, 2015, BS Environmental Health, Colorado State University (Edmund Seto, DEOHS).		Quantification and Modeling of Black Carbon Exposure for Seattle Commuters	MS	06/2017		Y	Intel	EHS Engineer
Emily Zamzow, 1566250, 2015, BS Environmental and Occupational Health Boise State University (Chris Simpson, DEOHS).		Measuring Urinary Hydroxylated PAH Metabolites as Biomarkers of Exposures to Diesel Exhaust in Underground Miners	MS	08/2017		Y	Boeing	Safety Specialist
Max Chmielinski, 1463790, 2016, BS Mechanical Engineering, Virginia Polytechnic Institute BENFR Mechanical Engineering (Chris Simpson, DEOHS).		Preliminary Indoor UV and Blue Light Exposure Assessment in Marijuana Growing Facilities	MS, PhD	MS - 06/2016		Y	University of Washington	PhD Student
Manaola Hewett, 1233147, 2016, BS Biology/Environmental Health, University of Washington (Noah Seixas, DEOHS). URM.		Piloting a Health and Safety Clinic Model to Address Precarious Worker Concerns	MS	08/2018		Y	Mackin Consultancy Ltd	EHS Coordinator
Ara Jo, 0760319, 2016, BS Environmental Health, University of Washington (Peter Rabinowitz, DEOHS).			MS	12/2019		Y	Boeing	Occupational Health & Safety Specialist
Logan Kegley, 0963122, 2016, BS Environmental Health, University of Washington (Michael Yost, DEOHS).		Implementation of a Glove-Based PPE Qualification Process for a Smaller-Scale R&D Lab in the Semiconductor Industry	MS	12/2017		Y	Intel	EHS Engineer
Peckman, Trevor, 1222672, 2016, MS Environmental Health, University of Washington (Noah Seixas, DEOHS)		Employment Quality, Health, and Health Disparities in the Modern U.S. Economy	PhD	06/2020		N	King County Department of Natural Resources and Parks	Environmental Scientist
Nolan Schmidt, 1625427, 2016, BS Chemistry, Eastern Oregon State College (Marty Cohen, DEOHS).			MS	DNF				
Rami Atallah, 0426370, 2017, BS Physics, University of Washington (Marty Cohen, DEOHS).		Evaluating Controls for Paint Chip Reduction During Broadcast Tower Restoration Work	MS	12/2018		Y	Wood Inc	Industrial Hygienist

Emily Brown, 1725853, 2017, BA Studio Art, Scripps College (Marty Cohen, DEOHS).		Challenges for the City of Seattle and the New Respirable Crystalline Silica Standard	MS	12/2018		Y	Washington State Department of Labor and Industries, Division of Occupational Safety and Health	Health & Safety Compliance Officer
Niloufar Ghodsian, 1569947, 2017, BS Environmental Health, University of Washington (Chris Simpson, DEOHS)		Health Effects of Exposure to Cannabis in Workers in an Indoor Growing Facility	MS	06/2017		Y	University of Washington	PhD Candidate
Jessica Porter, 1726011, 2017, BS Environmental and Occupational Health, Boise State University (Noah Seixas, DEOHS).		Perceptions of and Objective Measures of Gendered Stress in Construction	MS	06/219		Y	Lawrence Livermore National Laboratory	Industrial Safety Professional
Brynne Silvey, 1329443, 2017, BS Public Health, University of Washington (Chris Simpson, DEOHS).		Characterization of Occupational Exposure to Airborne Contaminants in an Indoor Cannabis Production Facility	MS	06/2019		Y	Boeing	Industrial Hygienist
Robert Vannice, 1725856, 2017, BS Environmental Management, University of Maryland (Marty Cohen, DEOHS)		Assessment of Silica Exposures in the Investment Casting Foundry Environment: Sampling, Analysis, and Design Criteria for Controlling Exposures	MS	12/2018		Y	Bureau Veritas	Industrial Hygiene Consultant
Hannah Echt, 1827420, 2018, BA Anthropology, Kenyon College (Chris Simpson, DEOHS)		Characterization of Naturally Occurring Alpha Diketone Emissions and Exposures at a Coffee Roasting Facility and Associated Retail Café	MS	06/2020		Y	NIOSH	Fellow
Sarah Philo, 1827426, 2018, MS Global Health, Duke University (Hendrika Meschke, Health Services)			PhD			Y	University of Washington	PhD Student
Zakary Reimann, 1827449, 2018, BS Public Health, Brigham Young University (Marty Cohen, DEOHS)		Video Exposure Monitoring as a Consultative Tool in Industrial Hygiene	MS	12/2019		Y	Department of Labor and Industries	Industrial Hygiene Compliance Safety and Health Officer
Hyoung Gon (Frank) Ryou, 1411910, 2018, MPH Environmental Occupational Health Science, University of Illinois (Pete Johnson, DEOHS).		Characterization of Whole-Body Vibration Exposures in Forklift operators	PhD	06/2020			Seeking employment	
Ben Weber, 1827522, 2018, BS Mechanical Engineering, US Coast Guard Academy (Chris Simpson, DEOHS).		Noise Exposure Assessment for Our U.S. Coast Guard Vessels	MS	06/2020		Y	US Coast Guard (active duty)	Industrial Hygienist
Hunter Burbidge, 1923445, 2019, BS Environmental Sciences, Brigham Young University (Marissa Baker, DEOHS).			MS			Y	University of Washington	MS Student
Allen Chan, 1923727, 2019, BS Radiation Health Physics, Oregon State University (Marissa Baker, DEOHS).			MS			Y	University of Washington	MS Student
Claire Schollaert, 1923988, 2019, MPH Environmental Health, Boston University (Tania Busch Isaksen, DEOHS).			PhD			Y	University of Washington	PhD Student

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Jane Ann M. Vaccaro, 7840829, 2014, BS Nursing, University of Washington (Butch de Castro, DEOHS).		Teaching community resiliency for disaster preparedness through problem-based learning	MPH	06/2016		Y	Vaccaro and Associates	Owner
Kim Doughty, 1573064, 2015, BS Biology, Northeastern Illinois University (Butch de Castro, DEOHS).		Peligros en el bosque: Health and safety fotonovelas for forestry workers	MPH	06/2017		Y	Public Health - Seattle & King County	Public Health Nurse
Staci Kvak, 1566306, 2015, MS Nursing, Kent State University (Butch de Castro, DEOHS).		Generalized workplace harassment and physical health outcomes in nurses in the Philippines	MPH	06/2017		Y	University of Washington Medical Center	Healthcare Epidemiologist
Mikkie Nakamura, 0650605, 2015, BS Nursing, University of Washington (Butch de Castro, DEOHS).		Developing a workers' rights and safety educational resource for emigrants from the Philippines to the U.S.	MPH	06/2017		Y	Willows Spa and Bodyworks	Massage Therapist
Sasaki Kimiko, 112099, 2015, MS Nursing, Kent State University (Butch de Castro, DEOHS).		None	PhD	On leave		N	Evergreen Health	Home Health Nurse
Doreen Yumang Ross, 1463020, 2015, MS Nursing and MPH Environmental and Occupational Health, University of Florida (Butch de Castro, DEOHS).		None	PhD	On leave		Y	Compass Health	Nurse Practitioner, Medical and Occupational Health
Jamie Wong, 1625392, 2016, BA Ethnic Studies, Brown University (Bill Daniell, DEOHS).		A taste of freedom: The meaning and experience of work for formerly incarcerated Asian Pacific Islander individuals	MPH	08/2018		N	City of Seattle	Policy Advisor
Eunice Soh, 0522999, 2017, MS Nursing and MPH, Johns Hopkins University (Jenny Tsai, School of Nursing).		None yet	PhD					
Janelle Martelino, 0029395, 2018, MSN, University of Washington (Butch de Castro, School of Nursing).		None yet	PhD					
Katie Anne Blanchard, 1841285, 2019, BSN, Pacific Lutheran University (Butch de Castro, School of Nursing).		None yet	PhD					

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Carly (Miller) Eckert, 1222256 MD, 2013, MPH, University of Washington, (Debra Cherry, MD; GIM) (URM)	Surgery	Chronic Health Risks in Commercial Fishermen: A Cross-Sectional Analysis from a Small Rural Fishing Village in Alaska			9/1/2015	Y	KenSci, Inc	Medical Director
Shilpa Gowda, 1470109, MD, 2014, MD, Brown University, (Parveen Bhatti, PhD; Epidemiology)	Surgery	The Association between Air Pollution Exposure and Lung Cancer Risk in the Women's Health Initiative Study	MPH	09/2016	09/2016	Y	Southeast Louisiana Veterans Healthcare System	Director, Employee Health and Occupational Medicine
Ann Tu, 1411598, MD, 2014, MPH, Columbia University, (Hendrika Meischke, PhD; Health Services)	General Preventive Medicine	Conceptual Framework for Telecommunicator Stressors and Outcomes: Focusing on stress from multi-media input at a 911 call center	Graduate non-matriculating in OEM MPH classes		6/1/2016	Y	UW Department of Medicine, Occupational and Environmental Medicine, Kaiser	Clinical Assistant Professor, Clinical Provider, Occupational
Thomas Greg McKelvey, 1573525, MD, 2015, MPH, Johns Hopkins University, (Debra Cherry, MD; GIM)	Plastic Surgery	Spine Treatment Guidelines for Group Health Clinics, 2016 Update	Started MS, informatics (did not complete)		Withdrew after 1 1/2 yrs	Y	ASAPP	Vice President, Health
Esi Nkyekyer, 1573344, MD, 2015, MD, Yale University, (Debra Fulton-Kehoe, MPH and Gary Franklin, MD; WA LNI) (URM)	Internal Medicine	Opioid and benzodiazepine use and risk of occupational injury	MPH	06/2017	06/2017	Y	UW Department of Medicine, Occupational and Environmental Medicine	Medical Director, Acting Assistant Professor
Demitris Haldeos, 1625481, MD, 2016, MD, Stony Brook University, (Sverre Vedal, MD and Howie Frumkin, MD; DEOHS) (URM)	Internal Medicine	Green Space Exposure and Cognition: The Multi Ethnic Study of Atherosclerosis	MPH	08/2018	08/2018	Y	Concentra	Clinical provider, Occupational medicine and urgent care
Coralynn Sack, 1424392 MD, 2017, MD, SUNY Buffalo, (Joel Kaufman, MD; DEOHS)	Pulmonary and Critical Care Medicine	Occupational Exposures and Subclinical Interstitial Lung Disease: The MESA (Multi-Ethnic Study of Atherosclerosis) Air-Lung Study	MPH	06/2018	06/2018	Y	UW Department of Medicine, Occupational and Environmental Medicine	Assistant Professor
Priya Motz, 1669178, DO, 2016, DO, Nova Southeastern University, (Lianne Sheppard, PhD; DEOHS and Biostats)	Internal Medicine	Occupational exposure to metals and impact on dementia incidence	MPH	06/2018	06/2018	Y	CA Department of Healthcare Services	Occupational medicine consultant
Jessica Chuang, 1726079, MD, 2017, MD, UC San Diego, (June Spector, MD, and Marty Cohen, PhD; DEOHS)	Surgery	A Randomized Study of the Effect of a Job Video Compared to Job Description Alone on Occupational Health Providers' Knowledge About the Job of Injury and Return to Work Practices	MPH	06/2019	06/2019	Y	UC San Francisco	Clinical Assistant Professor, Director of Employee Health
Elizabeth Friedman, 1776245, MD, 2018, MD, University of Missouri, (Debra Cherry, MD; GIM)	General Preventive Medicine	Nuclear waste vapors and worker health: A weight of the evidence review	Graduate non-matriculating in OEM MPH classes		06/2019	Y	Children's Mercy Hospital	Pediatric Environmental Health Specialist

Monya De, 1877877, MD, 2018, MPH, UC Berkeley, (Debra Cherry, MD; GIM)	Internal Medicine	N/A	Graduate non-matriculating in OEM MPH classes		Dismissed after 1 1/4 yrs			Self-described health journalist
Srivani Kanumuri, 1978864, MD, 2019, MPH, University of Texas, (Debra Cherry, MD; GIM)	Preventive Medicine	Descriptive analysis of putative factors associated with delay in processing claims of injured workers admitted to HMC through the HMC ED	Graduate non-matriculating in OEM MPH classes		06/2020			Interviewing for clinical occupational medicine practice
Richard Taing, 1810536, MD, 2018, MD, University of Kentucky, (Esi Nkyekyer, MD; GIM)	Internal Medicine	Measuring Exposure of Whole Body Vibration	MPH	06/2020	06/2020			Interviewing for clinical occupational medicine practice
Michael Cashman, 1928067, MD, 2019, MHA, George Washington University, (Coralynn Sack, MD; GIM)	Internal Medicine		MPH					
Anthony Norman, 8933443, MD, 2019, MD, University of Washington, (June Spector, MD; DEOHS)	Surgery		MPH					

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Jeremy Snider, 1138425, 2011, MPH, George Washington University (Dave Grembowski, Health Services)		Assessing variation in personal health service delivery and workplace smoking ban enforcement by local health departments	PhD	08/2016		No	Flatiron Health	Qualitative Scientist
Deborah Passey, 1364700, 2013, MS, University of Utah (Peggy Hannon, Health Services)		Engaging Managers and Supervisors to Support Employee Health	PhD	08/2017		Yes	Xenex Disinfection Services	Clinical Scientist
Brian Chin, 1423162, 2014, MS, University of Illinois (Jeanne Sears, Health Services)		Access, utilization, and outcomes of physical therapy services among injured workers with back pain in Washington State	PhD			Yes	National Institute for Occupational Safety and Health (NIOSH)	Occupational Health Services Researcher
Meagan Brown, 1568016, 2015, MPH, University of North Carolina (Peggy Hannon, Health Services) URM.		Promoting Health Among Vulnerable Workers: Disentangling Context and Implementation	PhD	12/2019		No	University of Washington, Department of Epidemiology	Postdoctoral Scholar-Fellow
Amy Edmonds, 1623350, 2016, BA/BS, UC Berkeley (Emily Williams, Health Services)		Environmental, workplace, and health system determinants of unhealthy alcohol use and its care	PhD					
Allyson O'Connor, 1566296, 2017, MPH, University of Washington (Christian Helfrich, Health Services)		Organizational level factors associated with burnout among primary care employees	PhD					
Erica Chavez Santos, 1020518, 2018, MPH, Columbia University (Jeanne Sears, Health Services). URM.			PhD					
Shanise Owens, 1924374, 2019, MS/MA, London School of Hygiene and Tropical Medicine (Jeanne Serars, Health Services). URM.			PhD					

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Trainee ID, Year of Entry, Prior Degree & Institution, (Current Academic Advisor or Mentor and Department). Identify Under Represented Minority with (URM).	OM Trainees: Previous Residency Training Specialty	Title of Research Project or Research Topic	Degree Program (MS, MPH, PhD, DrPH, etc.)	Date Degree or Certificate Awarded (mm/yyyy)	Date of Certificate for OM (mm/yyyy)	Employed in OSH Field or in OSH Advanced Study (Y/N)	Current Employer	Current Position
Anika Larson, 1566308, 2016, BS Biology, Arizona State University (Peter Rabinowitz, DEOHS).		3rd-Generation Cephalosporin Resistance in Retail Meat from the U.S. National Antimicrobial Resistance Monitoring System (NARMS)	MPH	06/2017		N/A	University of Washington-School of Medicine	Medical Student
Kali Turner, 1566274, 2015, BS Biology, University of Idaho (Peter Rabinowitz, DEOHS).		Occupational Injuries of Aquaculture Workers in Washington State	MPH	06/2017		N	Washington State Department of Health	Epidemiologist
Lauren Frisbie, 1625431, 2016, BS Biology, University of Illinois (Peter Rabinowitz, DEOHS).		A Comparison of Antimicrobial Resistance in Escherichia Coli Among Humans and Bovines in Washington State	MPH	12/2018		Y	University of Washington, Center for One Health Research	Research Coordinator
Erica Grant, 1625376, 2016, BS Microbiology, Arizona State University (Peter Rabinowitz, DEOHS)		A Comparative Analysis of Gut microbiota on the Human-Macaque Interface in Northwest Thailand	MPH	06/2018		N/A	Luxembourg Institute of Health	PhD Student
Kate McConnell, 1625397, 2016, BA Spanish, Wellesley College (Peter Rabinowitz, DEOHS)		Linking Human and Animal Notifiable Zoonotic Disease Data in Washington State	MPH	12/2018		N/A	University of Washington	PhD Candidate
Jose Carmona, 1027416, 2017, BA Public Health, University of Washington (Peter Rabinowitz, DEOHS). URM.		The Healthy Dairy Worker Study	MPH	08/2019		Y	University of Washington	Research Coordinator
Kathleen Conery, 0927119, 2017, BS Biology, University of Washington (Peter Rabinowitz, DEOHS).		Effects of the Built Environment on Health in a Floating Slum Community in Iquitos, Peru	MPH	06/2019				
Tia Dostal, 1725984, 2017, BS Biology, University of Montana (Peter Rabinowitz, DEOHS).		Risk Factors for Dengue in Peru: 2000-2018	MPH	08/2019		Y	Council of State and Territorial Epidemiologists Fellowship (https://cstefellows.org/)	Fellow
Mary Carol (M.C.) Nachtigal, 9123847, 2017, MSN Nursing, Seattle University (Peter Rabinowitz, DEOHS).		Occupational Association of Salmonella and Shiga Toxin-Producing E. coli Cases in Washington State 2005-2016	MPH	06/2019		N	Immediate Clinic	ANRP
Marine de Marcken, 1827613, 2018, BS Animal Science, Cornell University (Peter Rabinowitz, DEOHS).		Occupational Dairy Exposure and IgE-mediated Allergic Disease in Yakima, WA	MPH	06/2020		N	Quinnipiac University Medical School	Medical School
Brianna Willis, 1827455, 2018, BS Animal Science, Texas A&M (Nicole Errett, DEOHS). URM.		Perceived exposures of disaster scientists and experts that performed Ridgecrest earthquake reconnaissance	MPH	06/2020		Y	CNA Corporation	Senior Research Specialist
Madeline Benoit, 1923411, 2019, BS Animal Science, Oregon State University (Peter Rabinowitz, DEOHS)		Effectiveness of Dairy Safety training	MPH					
Hein Bui, 9123847, 2019, MD, Thomas Jefferson Medical College (Peter Rabinowitz, DEOHS)		Occupational pathogen exposure in animal market workers-Vietnam	MPH					

¹ List all NIOSH supported trainees and graduates by year of entry. Reporting period for renewals is from start date of prior competing award. New applicants should report last five years.

² Indicate certificate trainees with (Certificate).

Table 2. Trainees and Graduates Supported Since Beginning of Project Period¹
Submit one report per academic program. Fill in header.

Trainees				Graduates				
Trainee ID, Year of Entry, Prior Degree & Institution, (Current Academic Advisor or Mentor and Department). Identify Under Represented Minority with (URM).	OM Trainees: Previous Residency Training Specialty	Title of Research Project or Research Topic	Degree Program (MS, MPH, PhD, DrPH, etc.)	Date Degree or Certificate Awarded (mm/yyyy)	Date of Certificate for OM (mm/yyyy)	Employed in OSH Field or in OSH Advanced Study (Y/N)	Current Employer	Current Position
Christopher Mak, 1441663, 2015, BA Music, Western Washington University (Dr. Ken-Lu Yin, Department: Construction Management).		Temporary LED Construction Lighting	MS	06/2017		Y	Seattle Housing Authority	Assistant Construction Project Manager
Elena Franks, 1363633, 2016, BA+MA Architecture, University of Florence (Dr. Ken-Lu Yin, Department: Construction Management).		Safety and Health in Prefabricated Construction: A New Framework for Analysis	MS	06/2018		Y	Port of Seattle	Project Manager
Jeremy Berke, 1740618, 2017, BA Urban Planning, Haverford College (Dr. Ken-Lu Yin, Department: Construction Management). URM.		Solar Ready: Harmonizing the Solar Ready Scope for Safer & more productive Solar Deployments	MS	09/2018		Y	BoxPower	Project Manager
Michael Kimball, 1940012, 2018, BA Urban Studies, University of Minnesota (Dr. Ken-Lu Yin, Department: Construction Management).		No Worker Left in the Dust: A case study on the highly-contrasted and variable levels of silica safety	MS	06/2020		Y	Clark Construction	Project Engineer
Samuel Murphy, 1331054, 2018, BS Construction Management, University of Washington (Dr. Ken-Lu Yin, Department: Construction Management).		The Implementation and Development of 3D Concrete Printing for On-Site Applications in Construction	MS	06/2020		N		
Sharon Stukalo, 1969306, 2019, BS Sustainable Building Science Technology, South Seattle College (Dr. Ken-Lu Yin, Department: Construction Management).						Y	IBEW, Local 46	Inside Wire Journeyman

¹ List all NIOSH supported trainees and graduates by year of entry. Reporting period for renewals is from start date of prior competing award. New applicants should report last five years.

Table 3: Continuing Education Offerings by Program Area

NIOSH Data Table 3_IH. Continuing Education Offerings by Discipline

Discipline: Industrial Hygiene (IH)
 Institution: University of Washington (8433)
 CE Program Director: Nancy Simcox, MS

Reporting Period Start Date: 7/1/2015
 Reporting Period End Date: 6/30/2020

Course Title ¹	Number of Participants per Course	Contact Hours / Course	Person-Hours / Course	# Participants by Profession						# Participants by Employer					
				IH	OHN	OM	OS	Other	Total	Private Industry	Federal State Local Gov.	Academic	Non-Profit	Other	Total
Industrial Hygiene Totals	4006	555	20519	828	30	85	2471	592	4006	744	2518	594	12	138	4006
HUMAN VIBRATION: Assessment and Impact on Workers (06/12/18)	38	8.0	304.0	3		1	27	7	38	12	16	7		3	38
Vehicle Seat Design, Whole Body Vibration WEBINAR SERIES (04/17/19) (online)	56	1	56.0	13	3		28	12	56	22	12	15		7	56
Introduction to Ergonomics (BOEING-ERGO) (06/19/19)	17	7.5	127.5	4			3	10	17	17					17
Loss Prevention Through Ergonomics: Best Economic Practices (03/08/16)	78	16.0	1248.0			8	13	57	78	22	35	11	0	10	78
NOHC18: Occupational Health Surveillance - Trends and New Initiatives (10/10/18)	130	8.0	1040.0	75	1	1	27	26	130	43	48	36		3	130
NOHC17: Improving Exposure Data Interpretation (10/25/17)	70	8.0	560.0	41		2	27		70	17	27	10		16	70
NOHC16: Health & Safety in the 24/7 Economy (10/19/16)	121	8.0	968.0	69	2	3	28	19	121	53	28	28		12	121
NOHC15: Nanomaterials, Chemical Exposures and Control Banding (10/14/15)	117	8.0	936.0	62		1	16	38	117	53	58	6	0	0	117
Ignitable Coatings & Spray Operations: Preventing Fires (12/3/15)	51	8.0	408.0	13		0	24	14	51	7	29	6	0	9	51
Occupational Lead Poisoning Case Study Webinar (09/12/19) (online)	11	1.0	11.0	7		2	1	1	11	6	3	1		1	11
Cascadia 2017 Annual Symposium (1/7-8/17)	112	11.0	1232.0	22	1	19	23	47	112	2	4	105		1	112
Cascadia 2018 Annual Symposium (01/05/18)	102	11.0	1122.0	22	1	7	8	64	102		1	91		10	102
Cascadia 2019 Annual Symposium (01/11/19)	124	11.0	1364.0	20	3	17	17	67	124	1	6	114		3	124
PNS-AIHA Spring Symposium 2016 (05/2/16)	80	9.0	720.0	62		0	6	12	80	39	22	13	3	3	80
PNS-AIHA Spring Symposium 2017 (04/19/17)	39	8.0	312.0	33			4	2	39	18	14	4		3	39
PNS-AIHA Spring Symposium 2018 (04/18/18)	62	8.0	496.0	33			11	18	62	17	34	10		1	62

NIOSH Data Table 3_IH. Continuing Education Offerings by Discipline

Course Title ¹	Number of Participants per Course	Contact Hours / Course	Person-Hours / Course	# Participants by Profession						# Participants by Employer					
				IH	OHN	OM	OS	Other	Total	Private Industry	Federal State Local Gov.	Academic	Non-Profit	Other	Total
PNS-AIHA Spring Symposium 2019 (04/18/19)	60	8	480.0	42			9	9	60	18	27	14		1	60
Total Worker Health 101 and Beyond (04/30/19)	19	8	152.0	6	1	1	7	4	19	7	5	5		2	19
Application of Industrial Hygiene in an Emergency Response Day 1 AIHce	39	8.0	312.0	33			2	4	39	22	12	4		1	39
Application of Industrial Hygiene in an Emergency Response Day 2 AIHce	39	8.0	312.0	35			1	3	39	20	12	4		3	39
Process Safety Management (06/27/16)	37	32.0	1184.0	9		0	9	19	37	17	10	3	0	7	37
Process Safety Management (03/13/17)	9	32.0	288.0	1			5	3	9	7	1	1			9
Process Safety Management Valdez Site (03/13/17)	3	32.0	96.0				2	1	3		1			2	3
Process Safety Management (01/29/18)	14	32.0	448.0	1			10	3	14	6	7	1			14
HM16: Tanks & Pipes Webinar (09/17/15) (online)	4	1.0	4.0				4		4	1	3	0	0	0	4
HM16: Combustible Dust Webinar (09/17/15) (online)	5	1.0	5.0				5		5	1	4	0	0	0	5
HM16: Oxidizers, Pyrophorics, and Unstable Materials Webinar (10/15/15)	13	1.0	13.0				12	1	13	1	12	0	0	0	13
HM16: Flammable & Combustible Liquids Webinar (10/15/15) (online)	11	1.0	11.0				11		11	0	11	0	0	0	11
HM16: Chemical Storage in Group M Occupancies -Webinar (11/19/15) (online)	6	1.0	6.0				6		6	2	4	0	0	0	6
HM16: Chlorine & Toxic Gases Webinar (11/19/15) (online)	7	1.0	7.0				7		7	2	5	0	0	0	7
HM16: Marijuana Processing Webinar (12/17/15) (online)	27	1.0	27.0				27		27	0	27	0	0	0	27
HM16: Means of Egress Webinar (12/17/15) (online)	27	1.0	27.0				27		27	0	27	0	0	0	27
HM16: International Codes 101 Webinar (01/14/16) (online)	36	1.0	36.0	1	0	0	35	0	36	1	34	1	0	0	36
HM16: Ammonia Refridgeration - Webinar Series (01/14/16) (online)	44	1.0	44.0	1	0	0	43	0	44	1	42	1	0	0	44
HM16: Marijuana Processing Webinar Series (02/18/16) (online)	157	1.0	157.0	4	0	0	128	25	157	4	137	5	0	11	157
HM16: Hazardous Materials Inventory Statements Webinar (02/18/16) (online)	60	1.0	60.0	1	0	0	59		60	1	58	1	0	0	60

NIOSH Data Table 3_IH. Continuing Education Offerings by Discipline

Course Title ¹	Number of Participants per Course	Contact Hours / Course	Person-Hours / Course	# Participants by Profession						# Participants by Employer					
				IH	OHN	OM	OS	Other	Total	Private Industry	Federal State Local Gov.	Academic	Non-Profit	Other	Total
HM16: IBC H-Occupancies Webinar (03/17/16) (online)	36	1.0	36.0	1	0	0	35	0	36	1	34	1	0	0	36
HM16: Compressed Gases and Acetylene Webinar (03/17/16) (online)	39	1.0	39.0	1	0	0	38	0	39	1	37	1	0	0	39
HM16: Explosion Control Webinar (04/21/16) (online)	20	1.0	20.0	1	0	0	19	0	20	1	18	1	0	0	20
HM16: Separation and Containment Webinar (04/21/16) (online)	25	1.0	25.0	1	0	0	24	0	25	1	23	1	0	0	25
HM16: Metal Treatment and Plating Webinar (05/19/16) (online)	23	1.0	23.0	1	0	0	22	0	23	1	21	1	0	0	23
HM16: Exhaust Ventilation Webinar (05/19/16) (online)	18	1.0	18.0	1	0	0	17	0	18	1	16	1	0	0	18
HM16: Electrical for a Hazardous Location Webinar (06/16/16) (online)	31	1.0	31.0	1		0	30		31	1	29	1	0	0	31
HM16: High Pile Storage Webinar (06/16/16) (online)	45	1.0	45.0	1		0	44		45	1	43	1	0	0	45
HM16: Tanks & Pipes Webinar (09/21/16) (online)	26	1.0	26.0	1			25		26	3	22	1			26
HM16: Hotwork Webinar (09/21/16) (online)	25	1.0	25.0	1			24		25	3	22				25
HM16: Flammable & Combustible Liquids Webinar (10/27/16) (online)	30	1.0	30.0	1			29		30	3	27				30
HM16: LPG Hydrogen Fueling Facilities Webinar (10/27/16) (online)	29	1.0	29.0	1			28		29	3	26				29
HM16: Chemical Storage in Group M Occupancies Webinar (11/17/16) (online)	20	1.0	20.0	1			19		20	3	17				20
HM16: Review of Recent Fixed Site Haz Mat Incident Webinar (11/17/16) (online)	21	1.0	21.0	1			20		21	3	18				21
HM16: Pressure Relief Devices and Batteries Webinar (12/15/16) (online)	24	1.0	24.0	1			23		24	3	21				24
HM16: Means of Egress Webinar (12/15/16) (online)	27	1.0	27.0	1			26		27	3	24				27
HM17: International Codes 101 Webinar Series (01/19/17) (online)	32	1.0	32.0	1			31		32		32				32

NIOSH Data Table 3_IH. Continuing Education Offerings by Discipline

Course Title ¹	Number of Participants per Course	Contact Hours / Course	Person-Hours / Course	# Participants by Profession						# Participants by Employer					
				IH	OHN	OM	OS	Other	Total	Private Industry	Federal State Local Gov.	Academic	Non-Profit	Other	Total
HM17: Biodiesel Webinar (01/19/17) (online)	21	1.0	21.0	1			20		21		21				21
HM17: Hazardous Materials Inventory Statements Webinar (02/23/17) (online)	36	1.0	36.0	1			35		36		36				36
HM17: Combustible Dust Webinar (02/23/17) (online)	38	1.0	38.0	1			37		38		38				38
HM17: Dental gas & Dry Cleaners Webinar (03/16/17) (online)	29	1.0	29.0	1			28		29		29				29
HM17: IBC H-Occupancies Webinar (03/16/17) (online)	26	1.0	26.0	1			25		26		26				26
HM17: Industrial Ovens Webinar (04/27/17) (online)	23	1.0	23.0	1			22		23		23				23
HM17: Separation & Containment Webinar (04/27/17) (online)	9	1.0	9.0	1			8		9		9				9
HM17: Exhaust Ventilation Webinar (05/18/17) (online)	27	1.0	27.0	1			26		27		27				27
HM17: Review of Recent Fixed Site Haz Mat Incident Webinar (05/18/17) (online)	30	1.0	30.0	1			29		30		30				30
HM17: Electrical for a Hazardous Location Webinar (06/15/17) (online)	47	1.0	47.0	1			46		47		47				47
HM17: Marijuana Processing Webinar (06/15/17) (online)	46	1.0	46.0	1			45		46		46				46
HM17: Fire Safety During Construction and Marinas Webinar (09/21/17) (online)	25	1.0	25.0	1			24		25	3	22				25
HM17: Tanks & Pipes Webinar (09/21/17) (online)	26	1.0	26.0	1			25		26	3	22	1			26
HM17: Flammable & Combustible Liquids Webinar (10/19/17) (online)	30	1.0	30.0	1			29		30	3	27				30
HM17: Oxidizers, Pyrophorics, Unstable Materials (10/19/17) (online)	29	1.0	29.0	1			28		29	3	26				29
HM17: Chemical Storage in Group M Occupancies Webinar (11/16/17) (online)	20	1.0	20.0	1			19		20	3	17				20
HM17: Small Distillery Webinar (11/16/17) (online)	21	1.0	21.0	1			20		21	3	18				21
HM17: Means of Egress Webinar (12/14/17) (online)	27	1.0	27.0	1			26		27	3	24				27
HM17: Testing Chemical Safety Systems Webinar (12/14/17) (online)	24	1.0	24.0	1			23		24	3	21				24

NIOSH Data Table 3_IH. Continuing Education Offerings by Discipline

Course Title ¹	Number of Participants per Course	Contact Hours / Course	Person-Hours / Course	# Participants by Profession						# Participants by Employer					
				IH	OHN	OM	OS	Other	Total	Private Industry	Federal State Local Gov.	Academic	Non-Profit	Other	Total
HM18: International Codes 101 Webinar (01/25/18) (online)	32	1.0	32.0	1	0	0	31	0	32	0	32	0	0	0	32
HM18: Global Harmonized System of Chemical Webinar (01/25/18) (online)	22	1.0	22.0	1	0	0	21	0	22	0	22	0	0	0	22
HM18: Hazardous Materials Inventory Statements Webinar (02/22/18) (online)	47	1.0	47.0	1	0	0	46	0	47	3	44	0	0	0	47
HM18: Ammonia Refrigeration Webinar (02/22/18) (online)	48	1.0	48.0	1	0	0	47	0	48	3	45	0	0	0	48
HM18: IBC H-Occupancies Webinar (03/15/18) (online)	25	1.0	25.0	1	0	0	24	0	25	3	22	0	0	0	25
HM18: NFPA 45 Fire Protection Laboratories Chemicals Webinar	21	1.0	21.0	1	0	0	20	0	21	3	18	0	0	0	21
HM18: Explosion Control Webinar (04/19/18) (online)	38	1.0	38.0	1	0	0	37	0	38	3	35	0	0	0	38
HM18: FC Chapter 50 Hazardous Materials Webinar (04/19/18) (online)	37	1.0	37.0	1	0	0	36	0	37	3	34	0	0	0	37
HM18: Compressed Gases and Acetylene Webinar (05/17/18) (online)	12	1.0	12.0	0	0	0	12	0	12	0	12	0	0	0	12
HM18: Separation & Containment Webinar (05/17/18) (online)	17	1.0	17.0	0	0	0	17	0	17	0	17	0	0	0	17
HM18: Exhaust Ventilation Webinar (06/21/18) (online)	28	1.0	28.0	1	0	0	27	0	28	3	25	0	0	0	28
HM18: High Pile Storage Webinar (06/21/18) (online)	34	1.0	34.0	1	0	0	33	0	34	3	31	0	0	0	34
HM18: LPG, Hydrogen, and Natural Gas Fueling Webinar (9/20/18) (online)	9	1.0	9.0				9		9		9				9
HM18: Electrical for a Hazardous Location Webinar (9/20/18) (online)	9	1.0	9.0				9		9		9				9
HM18: Chemical Tanks & Pipes Webinar (10/18/18) (online)	18	1.0	18.0	1			17		18	2	16				18
HM18: Review of Recent Fixed Site Haz Mat Incident Webinar (10/18/18) (online)	18	1.0	18.0	1			17		18	2	16				18
HM18: Flammable Liquids Webinar (11/29/18) (online)	15	1.0	15.0	1			14		15	1	14				15
HM18: Metal Treatment and Plating Webinar (11/29/18) (online)	5	1.0	5.0				5		5		5				5
HM18: Chemical Storage in Group M & Cooking Webinar (12/13/18) (online)	28	1.0	28.0	1			27		28	2	26				28

NIOSH Data Table 3_IH. Continuing Education Offerings by Discipline

Course Title ¹	Number of Participants per Course	Contact Hours / Course	Person-Hours / Course	# Participants by Profession						# Participants by Employer					
				IH	OHN	OM	OS	Other	Total	Private Industry	Federal State Local Gov.	Academic	Non-Profit	Other	Total
HM18: Explosives and Ammonium Nitrate Webinar (12/13/18) (online)	29	1.0	29.0	1			28		29	2	27				29
HM19: Changes in the 2018 I-Codes Part 1 Webinar (01/24/19) (online)	20	1.0	20.0	1			15	4	20	1	18			1	20
HM19: Hazardous Materials Inventory Statements Webinar (01/24/19) (online)	29	1.0	29.0	1			24	4	29	1	27			1	29
HM19: Changes in the 2018 I-Codes Part 2 Webinar (02/21/19) (online)	28	1	28.0	1			23	4	28	1	26			1	28
HM19: IBC H-Occupancies Webinar (02/21/19) (online)	24	1	24.0	1			19	4	24	1	22			1	24
HM19: Changes in the 2018 I-Codes Part 3 Webinar (03/21/19) (online)	28	1	28.0	1			23	4	28	1	26			1	28
HM19: Separation & Containment Webinar (03/21/19) (online)	27	1	27.0	1			22	4	27	1	25			1	27
HM19: Stationary Power Systems Webinar (04/25/19) (online)	20	1	20.0	1			15	4	20	1	18			1	20
HM19: Exhaust Ventilation Webinar Series (04/25/19) (online)	21	1	21.0	1			16	4	21	1	19			1	21
HM19: Hazardous Materials Chapter 50 Webinar (05/16/19) (online)	26	1	26.0	1			21	4	26	1	24			1	26
HM19: Higher Education Laboratories Webinar (05/16/19) (online)	16	1	16.0	1			11	4	16	1	14			1	16
HM19: Small Distilleries Webinar (06/20/19) (online)	14	1	14.0	1			10	3	14	1	12			1	14
HM19: Electrical for a Hazardous Location Webinar (06/20/19) (online)	14	1	14.0	1			10	3	14	1	12			1	14
Sustainability, Toxicology, and Human Health - Green Chemistry (12/6/19)	20	50	1000.0	1			3	16	20	11	4	5			20
NOHC: H&S in the Cannabis Industry (10/23/19)	92	8	736.0	76		1	12	3	92	39	36	16		1	92
Respiratory Exposure to Cannabis Workers - webinar (3/10/20)	95	1	95.0	47	9	7	29	3	95	40	31	14		10	95
Worker H&S During the COVID-19 Pandemic - Virtual Panel Discussion (3/26/20)	31	1	23.3	7	1	6	14	3	31	10	4	17			31
Using Anthropometry, Biomechanics, and Usability to Inform Product Design Confirmation - webinar (2/26/20)	97	1	97.0	20	8	9	56	4	97	45	19	20	9	4	97

NIOSH Data Table 3_IH. Continuing Education Offerings by Discipline

Course Title ¹	Number of Participants per Course	Contact Hours / Course	Person-Hours / Course	# Participants by Profession						# Participants by Employer					
				IH	OHN	OM	OS	Other	Total	Private Industry	Federal State Local Gov.	Academic	Non-Profit	Other	Total
Principles of Green Chemistry - Green Chemistry and Chemical Stewardship (3/13/20)	18	50	900.0				11	7	18	8	4	4		2	18
Assessment Tools - Green Chemistry and Chemical Stewardship (6/5/20)	20	50	1000.0				3	17	20	9	3	8			20
Intro to Ergonomics (BOEING) (10/23/19)	11	8	82.5				11		11	11					11
Intro to Ergonomics (BOEING) (11/13/19)	18	8	135.0				2	16	18	17		1			18
Intro to Ergonomics (BOEING) (12/04/19)	15	8	112.5	1			3	11	15	13		2			15
Asbestos (Construction) (online)	51	1	51.0				12	39	51	24	1	2		24	51
Asbestos (General Industry) (online)	36	1	36.0				10	26	36	16	2			18	36
Bloodborne Pathogens (online)	75	1	75.0	4			22	49	75	29	5	8		33	75
Concrete and Masonry Construction (online)	10	1	10.0				4	6	10	5	1	1		3	10
Construction Safety: Struck-by and Caught-In or Between Hazards (online)	9	1	9.0				4	5	9	4	1	1		3	9
Crane Safety (Construction) 2010 (online)	9	1	9.0				3	6	9	4	1	1		3	9
DOT Hazardous Materials General Awareness (online)	10	1	10.0					10	10	1	8			1	10
DOT Hazmat Security Awareness for Shippers and Carriers (online)	3	1	3.0					3	3	2				1	3
DOT Training for Drivers of Hazmat Shipments (online)	4	4	16.0				1	3	4	2	0			2	4
DOT Training for Offerors of Bulk and Non-bulk Hazmat Packages (online)	16	5	80.0				1	15	16	7	1	2		6	16
DOT Training for Offerors of Non-bulk Hazmat Packages (online)	2	4	8.0					2	2	2	0				2
Electrical Safety (Construction) (online)	8	1	8.0				4	4	8	4	1	1		2	8
Ergonomics (Construction) (online)	36	1	36.0				21	15	36	10	5	3		18	36
Ergonomics in the Office (online)	167	1	167.0				18	149	167	65	9	1		92	167
GHS Hazard Communication (online)	47	1	47.0				16	31	47	11	5	6		25	47
Health Hazards in Construction: Lead and Silica (online)	10	1	10.0				3	7	10	4	1	1		4	10
Hearing Conservation (online)	43	1	43.0				23	20	43	16	9	2		16	43

NIOSH Data Table 3_IH. Continuing Education Offerings by Discipline

Course Title ¹	Number of Participants per Course	Contact Hours / Course	Person-Hours / Course	# Participants by Profession						# Participants by Employer					
				IH	OHN	OM	OS	Other	Total	Private Industry	Federal State Local Gov.	Academic	Non-Profit	Other	Total
Hydrogen Sulfide (H2S) (online)	35	1	35.0				22	13	35	14	3	1		17	35
Introduction to Industrial Hygiene (online)	37	1	37.0				12	25	37	10	6	3		18	37
Managing Safety and Health (online)	26	1.42	37.0		1		14	11	26	7	3	3		13	26
Respiratory Protection (online)	37	1	37.0				16	21	37	14	5	1		17	37
Spill Prevention Control and Countermeasure (online)	26	1	26.0				18	8	26	10	1	1		14	26
Permit-Required Confined Spaces (online)	16	1	16.0				6	10	16	7	2			7	16
Welding and Cutting (online)	24	1	24.0				20	4	24	10	2			12	24

¹ List each individual course offered with date (MM/DD) during reporting period by program area (IH, OHN, OM, OS, Other). Add rows as needed. Do not alter the spreadsheet and/or formulas other than to add additional rows for classes. This worksheet is linked to other worksheets.

NIOSH Data Table 3_OHN. Continuing Education Offerings by Discipline

Discipline: Occupational Health Nursing (OHN)
 Institution: University of Washington (8433)
 CE Program Director: Nancy Simcox, MS

Reporting Period Start Date: 7/1/2016
 Reporting Period End Date: 6/30/2020

Course Title ¹	Number of Participants per Course	Contact Hours / Course	Person-Hours / Course	# Participants by Profession						# Participants by Employer					
				IH	OHN	OM	OS	Other	Total	Private Industry	Federal State Local Gov.	Academic	Non-Profit	Other	Total
Occupational Health Nursing Totals	431	511	3482	3	303	28	22	75	431	195	38	160	0	38	431
Ebola and Other Highly Pathogenic Infections (05/04/17)	39	1.5	58.5	2	21		5	11	39	27	2	3		7	39
Workplace Violence Best Practices for Prevention and Resilience (09/25/18)	51	8.0	408.0		39		7	5	51	36	12	1		2	51
NIOSH-Approved 2-Day Initial Spirometry Training Course (09/09/15)	6	16.5	99.0		6				6	0	0	0	0	6	6
NIOSH-Approved 2-Day Initial Spirometry Training (11/07/15)	8	16.0	128.0		3			5	8	3	2	0	0	3	8
NIOSH-Approved 2-Day Initial Spirometry Training (05/21/16)	7	16.0	112.0		1			6	7	4	1	0	0	2	7
NIOSH-Approved 2-Day Initial Spirometry Training (06/11/16)	6	16.0	96.0		1	3		2	6	2	1	3	0	0	6
NIOSH-Approved 2-Day Initial Spirometry Training (10/15/16)	6	16.0	96.0		3			3	6	2	4				6
NIOSH-Approved 2-Day Initial Spirometry Training (05/20/17)	6	16.0	96.0		4	1		1	6	1	1			4	6
NIOSH-Approved 2-Day Initial Spirometry Training Course (06/01/17)	6	16.0	96.0		6				6		6				6
NIOSH-Approved 2-Day Initial Spirometry Training Course (07/23/17)	6	16	96.0		1	1		4	6	5				1	6
NIOSH-Approved 2-Day Initial Spirometry Training (09/28/17)	5	16.0	80.0		5				5	5					5
NIOSH-Approved 2-Day Initial Spirometry Training (10/21/17)	4	16.0	64.0			4			4	4					4
NIOSH-Approved 2-Day Initial Spirometry Training Course (11/04/17)	2	16.0	32.0			1		1	2	1		1			2
NIOSH-Approved 2-Day Initial Spirometry Training Course (12/09/17)	6	16.0	96.0			1	1	4	6	3	2	1			6
NIOSH-Approved 2-Day Initial Spirometry Training Course (03/10/18)	6	16.0	96.0		3	1	2		6	6					6
NIOSH-Approved 2-Day Initial Spirometry Training Course (03/22/18)	6	16	96.0			6			6	6					6

NIOSH Data Table 3_OHN. Continuing Education Offerings by Discipline

Course Title ¹	Number of Participants per Course	Contact Hours / Course	Person-Hours / Course	# Participants by Profession						# Participants by Employer					
				IH	OHN	OM	OS	Other	Total	Private Industry	Federal State Local Gov.	Academic	Non-Profit	Other	Total
NIOSH-Approved 2-Day Initial Spirometry Training Course (04/07/18)	5	16.0	80.0			2	1	2	5	5					5
NIOSH-Approved 2-Day Initial Spirometry Training Course (04/30/18)	4	16.0	64.0			4			4	4					4
NIOSH-Approved 2-Day Initial Spirometry Training Course (11/03/18)	3	16.0	48.0				1	2	3	3					3
NIOSH-Approved 2-Day Initial Spirometry Training Course (12/08/18)	6	16.0	96.0		5			1	6	6					6
NIOSH-Approved 2-Day Initial Spirometry Training Course (03/10/19)	6	16.0	96.0		2	1		3	6	3	2			1	6
NIOSH-Approved 2-Day Initial Spirometry Training (03/27/19)	6	16.0	96.0		6				6	6					6
NIOSH-Approved 2-Day Initial Spirometry Training (05/19/19)	5	16.0	80.0		3	1		1	5	4				1	5
NIOSH-Approved 2-Day Initial Spirometry Training Course (06/09/19)	3	16.0	48.0		1		2		3			2		1	3
NIOSH-Approved 2-Day Initial Spirometry Training (06/21/19)	4	16.0	64.0		4				4	4					4
NIOSH-Approved Spirometry 1-Day Refresher Training (09/11/15)	3	8.0	24.0		3				3	0	0	0	0	3	3
NIOSH-Approved Spirometry 1-Day Refresher Training (03/19/16)	5	8.0	40.0		3	2			5	5	0	0	0	0	5
NIOSH-Approved Spirometry 1-Day Refresher Training (04/23/16)	3	8.0	24.0		1			2	3	1	0	0	0	2	3
NIOSH-Approved Spirometry 1-Day Refresher Training (09/17/16)	3	8.0	24.0					3	3	3					3
NIOSH-Approved Spirometry 1-Day Refresher Training (04/22/17)	6	8.0	48.0		2			4	6	4				2	6
NIOSH-Approved Spirometry 1-Day Refresher Training (10/14/17)	2	8.0	16.0		1			1	2	2					2
NIOSH-Approved Spirometry 1-Day Refresher Training (04/14/18)	3	8.0	24.0		3				3	2	1				3
Occupational Health Basics for Nurse Practitioners (07/01/15 - 06/30/16) (online)	92	3.0	276.0		92				92	2	2	88	0	0	92
Occupational Health Basics for Nurse Practitioners (07/01/16 - 06/30/17) (online)	10	3.0	30.0	1				9	10	9	1				10

NIOSH Data Table 3_OHN. Continuing Education Offerings by Discipline

Course Title ¹	Number of Participants per Course	Contact Hours / Course	Person-Hours / Course	# Participants by Profession						# Participants by Employer					
				IH	OHN	OM	OS	Other	Total	Private Industry	Federal State Local Gov.	Academic	Non-Profit	Other	Total
Occupational Health Basics for Nurse Practitioners (07/01/17 - 06/30/18) (online)	46	3.0	138.0		44		1	1	46	1	1	43		1	46
Occupational Health Basics for Nurse Practitioners (07/01/18 - 06/30/19) (online)	21	3.0	63.0		20		1	0	21	3		17		1	21
Violence in the Workplace (online)	2	0.5	1.0					2	2	2					2
Disability in the Workplace (online)	1	0.5	0.5				1		1					1	1
NIOSH-Initial Spirometry (11/02/19)	4	16.0	64.0		2			2	4	3		1			4
NIOSH-Initial Spirometry (8/21/19)	7	16.0	112.0		7				7	7					7
NIOSH-Initial Spirometry (11/7/19)	4	16.0	64.0		4				4	4					4
NIOSH-Initial Spirometry (12/19/19)	7	16.0	112.0		7				7	7					7

¹ List each individual course offered with date (MM/DD) during reporting period by program area (IH, OHN, OM, OS, Other). Add rows as needed. Do not alter the spreadsheet and/or formulas other than to add additional rows for classes. This worksheet is linked to other worksheets.

NIOSH Data Table 3_OM. Continuing Education Offerings by Discipline

Discipline: Occupational Medicine (OM)
 Institution: University of Washington (8433)
 CE Program Director: Nancy Simcox, MS

Reporting Period Start Date: 7/1/2015
 Reporting Period End Date: 6/30/2020

Course Title ¹	Number of Participants per Course	Contact Hours / Course	Person-Hours / Course	# Participants by Profession						# Participants by Employer					
				IH	OHN	OM	OS	Other	Total	Private Industry	Federal State Local Gov.	Academic	Non-Profit	Other	Total
Occupational Medicine Totals	1568	146	7883	134	148	714	246	326	1568	622	304	396	48	198	1568
A Day in the Life of the Influenza Virus: How to Reduce Risk in the Workplace (09/20/17)	13	1.5	19.5	1	1		6	5	13	5	7			1	13
Opioid Prescription Guidelines - WAGISH-Medical Track (09/28/16)	41	1.0	41.0		2	5	34		41	13	14	1		13	41
Overview of Hazardous Drugs in Healthcare Settings - (09/19/17)	10	1.8	17.5	5	1		2	2	10	5	5				10
Reducing Home Care Worker Injuries: The SEIU 775 Benefit Group's (09/19/17)	12	1.5	18.0	1			8	3	12	4	7	1			12
Safe Patient Handling and Mobility WAGISH (09/19/17)	10	1.5	15.0				9	1	10	1	8			1	10
Tools for Providers to Help Patients Get Back to the Workplace - WAGISH (09/28/16)	15	1.5	22.5		2	5	5	3	15	6	5	1		3	15
Treating Patients with Highly Contagious Infectious Disease (04/06/16)	44	8.0	352.0	7	9	7	4	17	44	10	9	18	0	7	44
Workplace Violence in Healthcare Facilities - "Active Shooter" (09/28/16)	145	2.0	290.0	1	1	3	84	56	145	59	57	8		21	145
Pacific Northwest Veterinary Conference (09/27/15)	23	8.0	184.0	1		6	1	15	23	15	2	3	0	3	23
NW Association of Occupational Medicine Annual Conference (09/27/15)	106	20.0	2120.0	2	17	78		9	106	44	10	20	32	0	106
NW Association of Occupational Medicine Annual Conference (09/10/16)	103	15.0	1545.0		8	77		18	103	67	10	9	16	1	103
NW Association of Occupational Medicine Annual Conference (10/14/17)	102	10.3	1045.5	1	13	74	2	12	102	20	7	7		68	102
NW Association of Occupational Medicine Annual Conference (09/08/18)	78	10.3	799.5	2	2	69	2	3	78	58	5	9		6	78
Tactics for Tough Cases - Grand Rounds OEM Lecture (09/24/15)	19	1.0	19.0	4		7		8	19	2	3	12	0	2	19
Tactics for Tough Cases - WEBINAR OEM Lecture (09/24/15) (online)	8	1.0	8.0	1	3	0		4	8	3	3	1	0	1	8
Burn Injury - Grand Rounds OEM Lecture (11/18/15)	26	1.0	26.0	3	3	10		10	26	5	4	14	0	3	26

NIOSH Data Table 3_OM. Continuing Education Offerings by Discipline

Course Title ¹	Number of Participants per Course	Contact Hours / Course	Person-Hours / Course	# Participants by Profession						# Participants by Employer					
				IH	OHN	OM	OS	Other	Total	Private Industry	Federal State Local Gov.	Academic	Non-Profit	Other	Total
Burn Injury - WEBINAR OEM Lecture (11/18/15) (online)	4	1.0	4.0		3			1	4	1	2	0	0	1	4
Fatigue Risk Management - Grand Rounds OEM Lecture (02/03/16)	35	1.0	35.0	3	4	19	1	8	35	14	4	14	0	3	35
Fatigue Risk Management - WEBINAR OEM Lecture (02/03/16) (online)	3	1.0	3.0		1			2	3	1	0	1	0	1	3
Shoulder Pain - Grand Rounds OEM Lecture (03/02/16)	34	1.0	34.0	3	1	19		11	34	14	5	8	0	7	34
Shoulder Pain - WEBINAR OEM Lecture (03/02/16) (online)	34	1.0	34.0	3	1	19		11	34	14	5	8	0	7	34
Custodial Workers - Grand Rounds OEM Lecture (05/04/16)	26	1.0	26.0	3	3	5	3	12	26	6	6	11	0	3	26
Custodian Workers - WEBINAR OEM Lecture (05/04/16) (online)	21	1.0	21.0		2	2	2	15	21	8	7	4	0	2	21
Occupational Asthma - Grand Rounds OEM Lecture (10/12/16)	14	1.2	16.8	2		9		3	14	2	4	5		3	14
Occupational Asthma - WEBINAR OEM Lecture (10/12/16) (online)	8	1.2	9.6	1	1	3		3	8	1	5	2			8
Back Pain - Grand Rounds OEM Lecture (11/16/16)	31	1.2	37.2	3	4	16	1	7	31	12	1	12		6	31
Back Pain - WEBINAR OEM Lecture (11/16/16) (online)	11	1.2	13.2		4	4		3	11	6	2	3			11
Obliterative Bronchiolitis - Grand Rounds OEM Lecture (02/08/17)	22	1	22.0	4	2	9		7	22	7	4	11			22
Obliterative Bronchiolitis - WEBINAR OEM Lecture (02/08/17) (online)	14	1.0	14.0	2	1	3	1	7	14	3	6	1		4	14
Hepatitis C - Grand Rounds OEM Lecture (03/08/17)	17	1.0	17.0	2	3	10		2	17	4	3	10			17
Hepatitis C - WEBINAR OEM Lecture (03/08/17) (online)	5	1.0	5.0	1	1	3			5	3		2			5
Mindfulness - Grand Rounds OEM Lecture (05/03/17)	23	1	23.0	3	5	10	2	3	23	4	1	13		5	23
Mindfulness - WEBINAR OEM Lecture (05/03/17) (online)	3	1.0	3.0		2	1			3	1		2			3
Chemical Exposures in the Workplace - Grand Rounds OEM Lecture (11/30/17)	23	1.2	27.6	5	1	7	1	9	23	5	6	9		3	23
Chemical Exposures in the Workplace - WEBINAR OEM Lecture (11/30/17) (online)	7	1.2	8.4	2	2	1	1	1	7	1	3	2		1	7

NIOSH Data Table 3_OM. Continuing Education Offerings by Discipline

Course Title ¹	Number of Participants per Course	Contact Hours / Course	Person-Hours / Course	# Participants by Profession						# Participants by Employer					
				IH	OHN	OM	OS	Other	Total	Private Industry	Federal State Local Gov.	Academic	Non-Profit	Other	Total
Occupational Foot Injuries - Grand Rounds OEM Lecture (03/08/18)	16	1.2	19.2	2		11	1	2	16	5	1	10			16
Occupational Foot Injuries - WEBINAR OEM Lecture (03/08/18) (online)	4	1.2	4.8		3	1			4	3	1				4
Motivational Interview Tools - Grand Rounds OEM Lecture (05/10/18)	21	1.2	25.2	2	3	11	1	4	21	8	4	8		1	21
Motivational Interview Tools - WEBINAR OEM Lecture (05/10/18) (online)	21	1.2	25.2	2	3	11	1	4	21	8	4	8		1	21
Wildfire Smoke - Grand Rounds OEM Lecture (01/31/19)	43	1.2	51.6	6	5	17	7	8	43	12	8	22		1	43
Wildfire Smoke - WEBINAR OEM Lecture (01/31/19) (online)	28	1.2	33.6	5	1	8	10	4	28	7	11	6		4	28
Exoskeletons in the Workplace - Grand Rounds OEM Lecture (03/21/19)	34	1.2	40.8	3	3	16	10	2	34	14	5	14		1	34
Exoskeletons in the Workplace - WEBINAR OEM Lecture (03/21/19) (online)	18	1.2	21.6	1		8	5	4	18	8	6	2		2	18
Black Lung and Silicosis - Grand Rounds OEM Lecture (05/02/19)	33	1.2	39.6	5	4	16	3	5	33	6	4	18		5	33
Black Lung and Silicosis - WEBINAR OEM Lecture (05/02/19) (online)	13	1.2	15.6		1	7	2	3	13	6	4	2		1	13
Graduated Return to Work (with CME) (7/1/15 - 6/30/16) (online)	5	3.0	15.0		2	2	1		5	4	0	1	0	0	5
Graduated Return to Work online course (7/1/15 - 6/30/19) (online)	25	3.0	75.0	1	2	7	2	13	25	17	1	5		2	25
Introduction to Agricultural Medicine (7/1/16 - 6/30/19) (online)	9	3.5	31.5	2	2	4	1		9	2	2	3		2	9
Grand Rounds: Occ Repro Exp (9/26/19)	31	1.25	38.8	7	3	14	6	1	31	5	9	17			31
NAOEM Annual Meeting (9/8/19)	36	10.25	369.0	2	1	26	6	1	36	23	3	10			36
Noise-Induced Hearing Loss: Occupational Disease	19	1.75	33.3	11		3	4	1	19	9	5	5			19
Grand Rounds: Neck or Shoulder? Diagnosis and Treatment	46	1.25	57.5	3	3	30	8	2	46	25	8	13			46
Graduated Return to Work (online)	8	3.00	24.0		1	6	1		8	8					8
Grand Rounds: COVID-19 and the Practice of Occupational Medicine	68	1.25	85.0	16	8	35	8	1	68	28	8	30		2	68

¹List each individual course offered with date (MM/DD) during reporting period by program area (IH, OHN, OM, OS, Other). Add rows as needed. Do not alter the spreadsheet and/or formulas other than to add additional rows for classes. This worksheet is linked to other worksheets.

NIOSH Data Table 3_OS. Continuing Education Offerings by Discipline

Discipline: Occupational Safety (OS)
Institution: University of Washington (8433)
CE Program Director: Nancy Simcox, MS

Reporting Period Start Date: 7/1/2015
Reporting Period End Date: 6/30/2020

Course Title ¹	Number of Participants per Course	Contact Hours / Course	Person-Hours / Course	# Participants by Profession						# Participants by Employer					
				IH	OHN	OM	OS	Other	Total	Private Industry	Federal State Local Gov.	Academic	Non-Profit	Other	Total
Occupational Safety Totals	6898.0	1613.1	42304	275	71	50	2244	4258	6898	3074	1628	922	56	1218	6898
Practical Applications for Assessing Workplace Risks (07/28/17)	20.0	5.0	100.0	2			10	8	20	6	5	6		3	20
#SafetyCulture: Health and Safety in the Social Media Age (06/29/17)	46.0	8.0	368.0	6	1		20	19	46	11	21	12		2	46
Animal Agriculture Workers and Zoonotic Disease Emergencies (05/04/18)	42.0	8.0	336.0	3	2	7	3	27	42	6	9	27			42
Assessing Biological and Chemical Risks in the Workplace: Practical (02/16/17)	48.0	8.0	384.0	7		1	34	6	48	9	11	21		7	48
Center for Bioplastics and Biocomposites Industry Advisory (11/14/17)	57.0	2.0	114.0	1				56	57	17	3	35		2	57
Leadership in Health and Safety (09/21/16)	48.0	8.0	384.0	5	1		28	14	48	20	4	15		9	48
Leadership, Readiness, and Motivation for the Health and Safety (10/02/17)	20.0	16.0	320.0	3			13	4	20	4	8	7		1	20
Motivational Leadership: Are You Ready to Change? (10/18/19) (online)	161.0	1.0	161.0	3	17	2	45	94	161	42	73	35		11	161
Green Chemistry: Finding Safer Alternatives for Occupational (09/21/19) (online)	102.0	1.0	102.0	9	1	2	43	47	102	15	40	34		13	102
Green Cleaning, Sanitizing, Disinfecting: A Curriculum for ECE (1/1/19-6/30/19) (online)	977.0	4.0	3908.0					977	977	977	0				977
Infectious Disease Prevention & Exposure Control for Emergency First (05/03/19)	25.0	8.0	200.0	2			19	4	25		11	4		10	25
Workplace Aggression: Best Practices to Prevent (06/07/19)	172.0	6.0	1032.0	7	7		81	77	172	63	30	46	27	6	172
Zero Waste Washington Plastics Summit (09/25/17)	206.0	2.0	412.0				10	196	206	52	76	35		43	206

NIOSH Data Table 3_OS. Continuing Education Offerings by Discipline

Course Title ¹	Number of Participants per Course	Contact Hours / Course	Person-Hours / Course	# Participants by Profession						# Participants by Employer					
				IH	OHN	OM	OS	Other	Total	Private Industry	Federal State Local Gov.	Academic	Non-Profit	Other	Total
Radiation Safety - Principles, Practice, and Emerging Issues (03/19/18)	37.0	16.0	592.0	10			15	12	37	8	12	14		3	37
Radiation Safety - Principles, Practice, and Emerging Issues (03/20/18)	6.0	8.0	48.0	2			3	1	6	1	2	2		1	6
Labor & Industries Green Chemistry Seminar (07/13/17)	28.0	1.5	42.0	15			11	2	28		22	5		1	28
Sustainability, Toxicology, and Human Health (09/25/17 - 12/10/17) (online)	19.0	50.0	950.0	1			6	12	19	9	4	1		5	19
Principles of Green Chemistry (01/08/18 - 03/16/18) (online)	16.0	50.0	800.0	1			7	8	16	8	2	1		5	16
Assessment Tools for Safer Chemical Decisions (04/02/18 - 06/08/18) (online)	15.0	50.0	750.0	1			7	7	15	6	2	1		6	15
Sustainability, Toxicology, and Human Health (09/24/18 - 12/07/18) (online)	16.0	50.0	800.0				3	13	16	9	2	3		2	16
Principles of Green Chemistry (01/07/19 - 03/15/19) (online)	12.0	50.0	600.0				3	9	12	6	1	3		2	12
Assessment Tools for Safer Chemical Decisions (04/01/19 - 06/07/19) (online)	11.0	50.0	550.0				2	9	11	5	1	3		2	11
Fair Work Center Train-the-Trainer Workshop Day 1 (5/3/17)	24.0	7.0	168.0	3			4	17	24	1	2	5		16	24
Fair Work Center Train-the-Trainer Workshop Day 2 (5/5/17)	22.0	5.0	110.0	3			3	16	22		1	6		15	22
Worker Memorial Day (04/27/16)	52.0	1.0	52.0	12			13	27	52	2	2	41	1	6	52
Worker Memorial Day (04/27/17)	55.0	1.0	55.0	10	1	1	13	30	55	7	3	37		8	55
Worker Memorial Day (04/25/18)	54.0	1.5	81.0	5			10	39	54	3	3	42		6	54
Worker Memorial Day (04/24/19)	73.0	1.5	109.5	14	4	2	28	25	73	7	9	52		5	73
Movie Screening ' A Day's Work' UW DEOHS (03/21/16)	71.0	2.0	142.0	12	6	4	17	32	71	27	11	28	5	0	71
Pacific Northwest Pollution Prevention Resource Center (10/25/17)	39.0	1.8	68.3	2			4	33	39	3	23	2		11	39
Practical Applications for Assessing Workplace Risks (10/20/17)	7.0	3.0	21.0				4	3	7	2	4	1			7
Radiation Safety - Principles, Practice, and Emerging Issues (03/19/18)	37.0	16.0	592.0	10			15	12	37	8	12	14		3	37
Radiation Safety - Principles, Practice, and Emerging Issues (03/20/18)	6.0	8.0	48.0	2			3	1	6	1	2	2		1	6

NIOSH Data Table 3_OS. Continuing Education Offerings by Discipline

Course Title ¹	Number of Participants per Course	Contact Hours / Course	Person-Hours / Course	# Participants by Profession						# Participants by Employer					
				IH	OHN	OM	OS	Other	Total	Private Industry	Federal State Local Gov.	Academic	Non-Profit	Other	Total
Tribal Green Summit (03/09/16)	17.0	1.0	17.0	2			13	2	17	4	6	4	3	0	17
Essentials of Hazardous Materials Management (12/06/16)	27.0	22.0	594.0	3			8	16	27	8	13	3		3	27
Bloodborne Pathogens & Infectious Disease Exposure Control (06/04/18)	19.0	7.0	133.0	3	2	1	12	1	19		15	4			19
40 Hour HAZWOPER (06/05/17)	12.0	40.0	480.0				12		12			12			12
Introduction to Hazardous Materials (BOEING-HAZMAT) (06/17/19)	17.0	7.5	127.5	4			3	10	17	17					17
Trainer Tools - Transitioning to Safer Chemicals (12/01/16)	6.0	3.0	18.0	2			3	1	6	1		4		1	6
Washington Governor's Industrial Safety & Health Conference (10/08/15)	81.0	8.0	648.0	4	8	11	3	55	81	22	45	6	4	4	81
Confined Space Hazard Awareness - Yakima Agricultural Safety Day (02/22/17)	10.0	4.0	40.0				9	1	10	1	2			7	10
Alaska State Governor's Health and Safety Conference (4/7/16)	5.0	1.0	5.0				5		5	5	0	0	0	0	5
Foundations of Safety Leadership Training (10/18/16)	16.0	3.5	56.0	4			6	6	16	6		9		1	16
Intro to Safety & Health Mgmt (02/01/17)	14.0	4.0	56.0				3	11	14	5	1			8	14
Pacific Northwest Pollution Prevention Resource (10/02/18)	57.0	0.5	28.5	1			20	36	57	8	27	6	16		57
Public Warehousing and Storage (09/18/17)	28.0	7.5	210.0				26	2	28	6		21		1	28
Supervisory Safety & Health Duties (7/20/16)	9.0	20.0	180.0	1			3	5	9	2	5	1		1	9
Supervisory Safety & Health Duties (11/16/16)	8.0	20.0	160.0				7	1	8	1	4	1		2	8
Supervisory Safety & Health Duties (3/22/17)	6.0	20.0	120.0	1			2	3	6	1	4	1			6
Supervisory Safety & Health Duties (3/22/17)	14.0	20.0	280.0				8	6	14	7	4	3			14
Supervisory Safety & Health Duties (07/19/17)	11.0	20.0	220.0				9	2	11	4	4	2		1	11
Supervisory Safety & Health Duties (03/21/18)	15.0	20.0	300.0				13	2	15	5	2	3		5	15

NIOSH Data Table 3_OS. Continuing Education Offerings by Discipline

Course Title ¹	Number of Participants per Course	Contact Hours / Course	Person-Hours / Course	# Participants by Profession						# Participants by Employer					
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Supervisory Safety & Health Duties (05/02/18)	6.0	20.0	120.0	1			5		6	2	4				6
Supervisory Safety & Health Duties (07/18/18)	16.0	20.0	320.0	2			12	2	16	10	5	1			16
Supervisory Safety & Health Duties (11/15/18)	11.0	20.0	220.0				11		11	7	4				11
Supervisory Safety & Health Duties (02/06/19)	10.0	20.0	200.0				8	2	10	4	3	2		1	10
Supervisory Safety & Health Duties (06/12/19)	15.0	20.0	300.0		1	1	11	2	15	5	3	1		6	15
Emergency Safety Officer Course (06/21/17)	8.0	20.0	160.0	1			4	3	8	1	3	4			8
Emergency Safety Officer Course (11/29/17)	14.0	20.0	280.0	2			9	3	14	4	9	1			14
Emergency Safety Officer Course (06/27/18)	11.0	20.0	220.0	1			10		11	7	3	1			11
Emergency Safety Officer Course (11/21/18)	5.0	20.0	100.0				5		5	1	3	1			5
Emergency Safety Officer Course (05/09/19)	4.0	20.0	80.0				4		4	2	2				4
Bakken Oil Transport: Emerging Risks Awareness Training (7/27/15)	23.0	8.0	184.0	4			6	13	23	2	14	3	0	4	23
Bakken Oil Transport: Emerging Risks Awareness Training (7/31/15)	28.0	8.0	224.0	12			3	13	28	2	20	2	0	4	28
Bakken Oil Transport: Emerging Risks Awareness Training (10/22/15)	15.0	8.0	120.0	1	1		3	10	15	3	11	0	0	1	15
Bakken Oil Transport: Emerging Risks Awareness Training (10/23/15)	38.0	8.0	304.0	4			9	25	38	2	28	1	0	7	38
Bakken Oil Transport: Emerging Risks Awareness Training (8/23/16)	14.0	8.0	112.0	1			13		14		12	1		1	14
Bakken Oil Transport: Emerging Risks Awareness Training (8/25/16)	32.0	8.0	256.0	2			30		32		31			1	32
Bakken Oil Transport: Emerging Risks Awareness Training (9/27/16)	23.0	8.0	184.0	3		1	19		23	3	20				23
Bakken Oil Transport: Emerging Risks, Incident Response (09/29/17)	29.0	8.0	232.0				21	8	29	1	15	4		9	29
Annual Hazardous Waste Refresher (7/28/15)	13.0	8.0	104.0				1	12	13	3	8	0	0	2	13

NIOSH Data Table 3_OS. Continuing Education Offerings by Discipline

Course Title ¹	Number of Participants per Course	Contact Hours / Course	Person-Hours / Course	# Participants by Profession						# Participants by Employer					
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Annual Hazardous Waste Refresher (7/29/15)	28.0	8.0	224.0				12	16	28	3	24	1	0	0	28
Annual Hazardous Waste Refresher (7/30/15)	10.0	8.0	80.0				1	9	10	0	9	0	0	1	10
Annual Hazardous Waste Refresher (1/19/16)	33.0	8.0	264.0	4			2	27	33	8	21	1	0	3	33
Annual Hazardous Waste Refresher (1/20/16)	39.0	8.0	312.0				1	38	39	0	35	0	0	4	39
Annual Hazardous Waste Refresher (1/21/16)	35.0	8.0	280.0	1			4	30	35	0	33	0	0	2	35
Annual Hazardous Waste Refresher (1/22/16)	32.0	8.0	256.0	1			1	30	32	0	31	1	0	0	32
Annual Hazardous Waste Refresher (7/12/16)	14.0	8.0	112.0	1			13		14	7	5	2			14
Annual Hazardous Waste Refresher (7/13/16)	30.0	8.0	240.0				30		30	7	22			1	30
Annual Hazardous Waste Refresher (7/14/16)	6.0	8.0	48.0				6		6		6				6
Annual Hazardous Waste Refresher (7/15/16)	10.0	8.0	80.0				10		10	1	7	2			10
Annual Hazardous Waste Refresher (1/17/17)	20.0	8.0	160.0	2			18		20		18	1		1	20
Annual Hazardous Waste Refresher (1/18/17)	27.0	8.0	216.0				27		27	5	22				27
Annual Hazardous Waste Refresher (1/19/17)	23.0	8.0	184.0				23		23	1	19	3			23
Annual Hazardous Waste Refresher (1/20/17)	14.0	8.0	112.0				14		14	1	13				14
Annual Hazardous Waste Refresher (7/12/17)	23.0	8.0	184.0				23		23	5	17			1	23
Annual Hazardous Waste Refresher (7/13/17)	21.0	8.0	168.0				21		21	6	12	2		1	21
Annual Hazardous Waste Refresher (7/14/17)	10.0	8.0	80.0				10		10	1	7	2			10
Annual Hazardous Waste Refresher (1/16/18)	23.0	8.0	184.0	1			22		23	1	19	1		2	23
Annual Hazardous Waste Refresher (1/17/18)	31.0	8.0	248.0	1			30		31	5	24	1		1	31

NIOSH Data Table 3_OS. Continuing Education Offerings by Discipline

Course Title ¹	Number of Participants per Course	Contact Hours / Course	Person-Hours / Course	# Participants by Profession						# Participants by Employer					
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Annual Hazardous Waste Refresher (1/18/18)	24.0	8.0	192.0	2			22		24	2	20	2			24
Annual Hazardous Waste Refresher (1/19/18)	19.0	8.0	152.0				19		19		18	1			19
Annual Hazardous Waste Refresher (1/23/18)	35.0	8.0	280.0	2			14	19	35	5	26	3		1	35
Annual Hazardous Waste Refresher (1/24/18)	33.0	8.0	264.0				19	14	33	2	24	6		1	33
Annual Hazardous Waste Refresher (1/25/18)	39.0	8.0	312.0	2			27	10	39	4	32	3			39
Annual Hazardous Waste Refresher (4/19/18)	17.0	8.0	136.0				13	4	17		17				17
Annual Hazardous Waste Refresher (7/17/18)	18.0	8.0	144.0	4			7	7	18	3	13	2			18
Annual Hazardous Waste Refresher (7/18/18)	13.0	8.0	104.0	2			7	4	13	5	6	2			13
Workplace Fires and Emergencies (General Industry) (online)	14.0	20.0	280.0				14		14	1	12			1	14
HAZWOPER Refresher (7/15/19)	10.0	8.0	80.0				6	4	10		10				10
HAZWOPER Refresher (7/16/19)	17.0	8.0	136.0	3			11	3	17	5	7	5			17
HAZWOPER Refresher (1/22/20)	34.0	8.0	272.0	2			19	13	34	4	28	2			34
HAZWOPER Refresher (1/23/20)	17.0	8.0	136.0				10	7	17	3	11	3			17
HAZWOPER Refresher (1/24/20)	26.0	8.0	208.0	1			19	6	26	2	23	1			26
Western Ag S&H Conference (8/7/20)	154.0	16.3	2502.5	7	8	13	79	47	154	16	20	115		3	154
Preventing Workplace Violence in Healthcare (9/24/20)	30.0	8.0	240.0	4	7	2	17		30	13	10	6		1	30
Silica Protection Training for Construction (05/28/20)	31.0	7.0	217.0	2			26	3	31	21	8			2	31
Workplace Violence for Healthcare Teams (12/6/20)	10.0	8.0	80.0				9	1	10	7	1	2			10
Temp Worker H&S - Seattle (12/6/2019)	28.0	4.0	112.0	3	1		24		28	18	6	4			28
Temp Worker H&S Rhett - Portland (1/30/20)	21.0	4.0	84.0	2			19		21	15	4	2			21
Temp Worker H&S - Seattle (2/6/20)	5.0	4.0	20.0				5		5	4	1				5
Ag Safety Culture in English Kennewick (2/5/20)	74.0	1.0	74.0	4		1	69		74	62	7	5			74

NIOSH Data Table 3_OS. Continuing Education Offerings by Discipline

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Ag Safety Culture in Spanish Kennewick (2/5/20)	63.0	1.0	63.0				57	6	63	61		2			63
Temp Worker H&S - Seattle (3/6/20)	8.0	4.0	32.0	1			7		8	6	1	1			8
Exposure Control First Responders - Poulsbo WA (3/9/20)	16.0	8.0	128.0	1			15		16	2	13	1			16
Safe Patient Handling & Green Cleaning in Healthcare - Longview (3/4/20)	32.0	2.0	64.0	3			29		32	15	16	1			32
Agriculture Safety Culture - English - Agriculture Safety Day Wenatchee (2/26/20)	40.0	1.0	40.0	1			28	11	40	28	7	5			40
Agriculture Safety Culture - Spanish - Agriculture Safety Day Wenatchee (2/26/20)	18.0	1.0	18.0				8	10	18	14	2	2			18
Rural Worker Health & Safety Training Resources - Alaska Forum on the Environment (02/12/20)	37.0	1.3	46.3	1			30	6	37	15	22				37
Supervisor S&H Duties - Portland (8/21/19)	16.0	20.0	320.0				12	4	16	5	4	1		6	16
Supervisor S&H Duties - Boise (10/30/19)	5.0	20.0	100.0				5		5	3		2			5
Supervisor S&H Duties - Portland (2/5/20)	13.0	20.0	260.0				12	1	13	6	3	1		3	13
Supervisor S&H Duties - Seattle (12/18/19)	4.0	20.0	80.0	4					4	2	1			1	4
Supervisor S&H Duties - Virtual (6/25/20)	11.0	20.0	220.0				9	2	11	7	1	1		2	11
Introduction to Hazardous Materials (BOEING) (10/22/19)	11.0	7.5	82.5				11		11	11					11
Introduction to Hazardous Materials (BOEING) (11/12/19)	18.0	7.5	135.0				18		18	17		1			18
Introduction to Hazardous Materials (BOEING) (12/03/19)	15.0	7.5	112.5	1			3	11	15	13		2			15
Emergency Safety Officer - Seattle (10/24/19)	4.0	20.0	80.0	1			3		4		3	1			4
Emergency Safety Officer - Seattle (11/1/19)	10.0	20.0	200.0				10		10		10				10

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Emergency Safety Officer - Seattle (11/22/19)	6.0	20.0	120.0				6		6		6				6
Accident Prevention and Countermeasures for Management (online)	5.0	1.0	5.0				3	2	5	1	0			4	5
Cargo Securement for Drivers: General Requirements (online)	6.0	0.9	5.3				1	5	6	4	0			2	6
Commercial Driver's License (CDL) for Drivers (online)	1.0	1.0	1.0					1	1	1					1
Commercial Driver's License (CDL) for Management (online)	1.0	1.0	1.0					1	1		0			1	1
Concrete and Masonry Construction (online)	19.0	1.0	19.0				10	9	19	5	3			11	19
Construction Safety: Struck-by and Caught-In or Between Hazards (online)	17.0	1.0	17.0				8	9	17	6	1			10	17
Crane Safety (Construction) 2010 (online)	16.0	1.0	16.0				8	8	16	6	2			8	16
Crane Safety (Construction) 2010 (online)	5.0	1.0	5.0				1	4	5	3				2	5
DOT Training for Offerors of Bulk and Non-bulk Hazmat Packages (online)	2.0	1.0	2.0					2	2	1				1	2
Driver Qualifications (DQ) for Management (online)	2.0	5.0	10.0					2	2		0			2	2
Drug and Alcohol for CMV Drivers (online)	1.0	2.0	2.0					1	1	1					1
Drug and Alcohol for Management (online)	1.0	1.0	1.0					1	1		0			1	1
Drug and Alcohol Reasonable Suspicion Training for Management (online)	3.0	2.5	7.5				1	2	3	2	0			1	3
Electrical Safety (Construction) (online)	19.0	1.5	28.5				8	11	19	8	1			10	19
Electrical Safety (General Industry) (online)	37.0	1.0	37.0				18	19	37	14	3	4		16	37
Ergonomics (Construction) (online)	4.0	1.0	4.0				2	2	4	2	1			1	4
Ergonomics in the Office (online)	49.0	1.0	49.0				1	48	49	47				2	49
Excavations (Construction) (online)	36.0	1.0	36.0				12	24	36	19	2	1		14	36
Fall Protection (online)	60.0	1.0	60.0				15	45	60	34	2	2		22	60
Fire Safety (Construction) (online)	22.0	1.0	22.0				12	10	22	7	1	2		12	22

NIOSH Data Table 3_OS. Continuing Education Offerings by Discipline

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Fire Safety and Emergency Preparedness (General Industry) (online)	29.0	1.0	29.0		1		14	14	29	10	3	2		14	29
First Aid (online)	45.0	2.0	90.0				9	36	45	24	1	2		18	45
Flammable and Combustible Liquids (online)	25.0	1.0	25.0				14	11	25	8	3	2		12	25
FMCSR Motor Carrier Compliance: General Cargo Securement (online)	1.0	1.0	1.0					1	1		0			1	1
Forklift Safety (online)	31.0	0.8	23.3				16	15	31	14	3	1		13	31
GHS Hazard Communication (online)	29.0	1.0	29.0				4	25	29	5	3	14		7	29
Hand and Power Tools (Construction) (online)	25.0	1.0	25.0				14	11	25	9	2	2		12	25
HAZWOPER 8-Hour Refresher (online)	189.0	1.0	189.0	1			15	173	189	66	33	6		84	189
Heavy Equipment (Construction) (online)	12.0	8.0	96.0				4	8	12	6	3	1		2	12
Hours of Service for CMV Drivers (online)	3.0	0.8	2.3					3	3	3	0				3
Hours of Service for Management (online)	3.0	1.8	5.3					3	3	2	0			1	3
Hydrogen Sulfide (H2S) (online)	2.0	2.0	4.0				2		2	2					2
Introduction to OSHA (Construction) (online)	19.0	1.0	19.0				8	11	19	5	1	2		11	19
Introduction to OSHA (General Industry) (online)	24.0	2.0	48.0				14	10	24	10	2	2		10	24
Ladder Safety (online)	35.0	1.0	35.0				16	19	35	11	6	2		16	35
Lockout/Tagout (online)	45.0	1.0	45.0				16	29	45	23	2	4		16	45
Materials Handling (Construction) (online)	21.0	1.0	21.0				10	11	21	6	2	2		11	21
Materials Handling (General Industry) (online)	23.0	1.0	23.0				15	8	23	9	3	1		10	23
Operating CMVs: What Drivers Need to Know (online)	1.0	1.7	1.7					1	1	1					1
Operating CMVs: What Management Needs to Know (online)	3.0	1.0	3.0					3	3	2	0			1	3
OSHA 10-Hour Construction Safety (online)	553.0	1.0	553.0				7	546	553	269	18	1		265	553

NIOSH Data Table 3_OS. Continuing Education Offerings by Discipline

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OSHA 10-Hour General Industry (online)	17.0	10.0	170.0				1	16	17	6				11	17
OSHA 10-Hour General Industry Safety (online)	91.0	10.0	910.0				6	85	91	25	5	4		57	91
OSHA 30-Hour Construction Safety (online)	481.0	10.0	4810.0		1	1	32	447	481	348	18	5		110	481
Permit-Required Confined Spaces (online)	42.0	30.0	1260.0				14	28	42	21	4	1		16	42
Personal Protective Equipment (Construction) (online)	20.0	1.0	20.0				10	10	20	6	3	2		9	20
Personal Protective Equipment (General Industry) (online)	25.0	1.0	25.0				16	9	25	10	2	2		11	25
Respiratory Protection (online)	3.0	1.0	3.0				1	2	3	1		1		1	3
Safe Driving Practices (online)	24.0	1.0	24.0				12	12	24	8	3	1		12	24
Safe Driving Practices for CMV Drivers (online)	5.0	1.0	5.0				1	4	5	4	0			1	5
Scaffolds (Construction) (online)	35.0	1.0	35.0				12	23	35	19	2	1		13	35
Spill Prevention Control and Countermeasure (online)	2.0	1.0	2.0				1	1	2	1				1	2
Steel Erection (Construction) (online)	15.0	1.0	15.0				12	3	15	5	3	1		6	15
Vehicle Inspection and Maintenance for CMV Drivers (online)	4.0	1.0	4.0					4	4	4	0				4
Vehicle Inspection, Repair, and Maintenance Regulations (online)	1.0	1.0	1.0					1	1	1					1
Vehicle Parts and Accessories Safety Regulations (online)	1.0	1.0	1.0					1	1	1					1
Walking-Working Surfaces (General Industry) (online)	29.0	1.0	29.0				17	12	29	8	4	2		15	29
Welding and Cutting (online)	13.0	1.0	13.0				5	8	13	5	2	2		4	13
Workplace Fires and Emergencies (General Industry) (online)	30.0	1.0	30.0		1		14	15	30	10	3	3		14	30

¹List each individual course offered during reporting period with date (MM/DD) by program area (IH, OHN, OM, OS, etc.). Add rows as needed. Do not alter the spreadsheet and/or formulas other than to add additional rows for classes. This worksheet is linked to other worksheets.

NIOSH Data Table 3_Other CE Offerings. Continuing Education Offerings by Discipline

Academic Program: Other CE Offerings
 Institution: University of Washington (8433)
 CE Program Director: Nancy Simcox, MS

Reporting Period Start Date: 7/1/2015
 Reporting Period End Date: 6/30/2020

Course Title ¹	Number of Participants per Course	Contact Hours / Course	Person-Hours / Course	# Participants by Profession						# Participants by Employer					
				IH	OHN	OM	OS	Other	Total	Private Industry	Federal State Local Gov.	Academic	Non-Profit	Other	Total
Other CE Offerings Totals	258	21	1243	0	0	1	46	211	258	14	53	72	0	119	258
Integrating Green Chemistry and Engineering Design (11/12/16)	67	2.0	134.0					67	67	5	49	1		12	67
Biennial Conference on Chemical Education (10/7/16)	29	8.0	232.0					29	29			29			29
Green Cleaning in Day Care/ECE (online)	95	8.0	760.0					95	95					95	95
Moving to Greener Chemicals Workshop for AK School Maintenance Employees	44	2.0	88.0				34	10	44	2		42			44
Transitioning to Safer Chemicals & Green Cleaning - Alaska Forum on the Environment (2/10/20)	23	1.3	28.8			1	12	10	23	7	4			12	23

¹ List each individual course offered during reporting period with date (MM/DD) by program area (IH, OHN, OM, OS, etc.). Add rows as needed. Do not alter the spreadsheet and/or formulas other than to add additional rows for classes. This worksheet is linked to other worksheets.

NIOSH Data Table 3_All Continuing Education Tables Totaled

Discipline	# Trainees	Contact Hours	Person-Hours	Count of Classes	# Trainees by Profession						# Trainees by Employer					
					IH	OHN	OM	OS	Other	Total	Private Industry	Federal State Local Gov.	Academic	Non-Profit	Other	Total
Industrial Hygiene Totals	4006	554.8	20518.8	104	828	30	85	2471	592	4006	744	2518	594	12	138	4006
Occupational Medicine Totals	1568	145.7	7882.5	48	134	148	714	246	326	1568	622	304	396	48	198	1568
Occupational Health Nursing Totals	431	511.0	3482.0	38	3	303	28	22	75	431	195	38	160	0	38	431
Occupational Safety Totals	6898	1613.1	42304.2	90	275	71	50	2244	4258	6898	3074	1628	922	56	1218	6898
Other CE Offerings Totals	258	21.3	1242.8	2	0	0	1	46	211	258	14	53	72	0	119	258
Grand Totals	13161	2845.8	75430.2	282	1240	552	878	5029	5462	13161	4649	4541	2144	116	13161	13161