

RESEARCH | EDUCATION | PRACTICE

*let's*TALK

CENTER FOR HEALTH, WORK & ENVIRONMENT

2020-2021 *annual report*



a note from our director

LEE NEWMAN



FOLLOW OUR WORK
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Leading the way

When I look for answers, I turn to science, philosophy, poetry, and community. As center director, this has been a year—"year two" of the COVID-19 pandemic—in which I have relied on them all. Here are some of my take-aways that helped our team make an important impact in 2021.

Lessons from Science: Questions change. Answers change. We do science because we don't have all the answers. But we know some things: PPE works. Vaccines work. Climate change is here and is damaging human health, especially the health of vulnerable workers.

Philosophy: Some things must be exempt from doubt. Because doubt is based on beliefs, radical forms of doubt must be set aside, or else human life suffers. (Paraphrasing Ludwig Wittgenstein's *On Certainty*.)

Poetry: The first stanza of "Nothing Twice" by Wislawa Szymborska reminds me that we must adapt:

**Nothing can ever happen twice.
In consequence, the sorry fact is
that we arrive here improvised
and leave without the chance to practice.**

Community: People in our center continue to find meaning in their work, connected by the focus on promoting worker health, safety, and well-being even in times of uncertainty and chaos. We have been reminded that organizations which share a vision and foster a human-centered *climate* have impact and thrive.

"Let's Talk" is the theme for this year's annual report, and what we are talking about is climate. In one use of the word, as in climate change, it poses an existential threat. In another use of the word, as in workplace climate, it can be a salve, a buffer, that helps organizations preserve and even promote well-being.

Read this year's annual report and you will see what I mean. The people, projects, and products address the impact these two forms of climate have on workers. At the macro level, we tackle the effects of extremely hot working conditions contributing to kidney disease and job injuries; and the effects of chronic drought in agricultural communities, such as creating psychological stress and depression. At the micro scale, we address the benefits of workplace climate in partnership with employers that are committed to a people-centered culture. We have learned that businesses that value the health and safety of workers are more successful at keeping workers safer, relatively less stressed, and more productive, even in the face of a pandemic.

We are bombarded in the press and by business consultants who have latched onto the concept of "well-being," as though it is the newest elixir that companies should crave—which may be a good thing. The public is catching on to what we have known for some time: worker well-being, which is the central tenet of *Total Worker Health*®, helps employers and employees meet their personal and professional goals. You will find the theme of well-being threaded throughout this report.

By focusing on climate change, workplace climate, and well-being, our center is poised for what comes next: the so-called "future of work." COVID-19 has created massive disruptions in the way work is done, in the places where work is done, and in the health of the workforce itself. Same can be said for climate change, just on a slower boil. We at CHWE are forecasting, preparing, and positioning the Center to help lead in these times.

Lee S. Newman, MD, MA
Director, Center for Health, Work & Environment
Distinguished Professor, Colorado School of Public Health

...our center is poised for **what comes next:**

THE FUTURE OF WORK

IMPACT SNAPSHOT

JULY 1, 2020 THROUGH JUNE 30, 2021

8,725

PROFESSIONALS TRAINED

16,046

TRAINING HOURS

44

EDUCATION EVENTS

\$89,306

PILOT GRANTS AWARDED



24



**MOUNTAIN & PLAINS EDUCATION AND
RESEARCH CENTER (MAP ERC) TRAINEES**

142

**ORGANIZATIONS ENROLLED IN HEALTH LINKS™
(REPRESENTING 124,640 WORKERS)**



499

FOLLOWERS



866

FOLLOWERS



457

FOLLOWERS



8,181

**HOMEPAGE VISITS
(84% INCREASE)**

SECTION

01





let's talk RESEARCH

page 8.

PUBLICATIONS

This year, we published
90 papers.

page 12.

***TOTAL WORKER HEALTH*® ABROAD**

Protecting workers in
Guatemala continues.

page 14.

SSWELL STUDY

Lessons learned from our five-
year Small+Safe+Well Study.

page 15.

THE SAN LUIS VALLEY

Investigating maternal
exposure in the region.

page 16.

PILOT PROJECTS

Awarding funding to new
investigators and researchers.

RESEARCH
RESEARCH
RESEARCH
RESEARCH
RESEARCH

90

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Guat e

m a l a

Agua, suero, descanso y sombra.

We are continuing our collaboration with the agribusiness Pantaleon, headquartered in Guatemala. In response to the COVID-19 pandemic, CHWE worked with Pantaleon to rapidly establish a critical response to protect the workers at Pantaleon, their families, and the communities where they live and work. Together we developed COVID-19 symptom-based screening strategies at each of the company's operations in Latin America.

This year, we launched two new climate-related studies funded by the U.S. NIH's National Institute for Environmental Health Sciences (NIEHS). We will perform these studies in Guatemala with male and female agricultural workers. We will investigate airborne exposures, either alone or combined with extreme heat exposure and other risk factors, that may result in acute kidney injury and ultimately, chronic kidney disease of unknown origin (CKDu). Within these studies, we will measure several meteorological metrics to examine climate-related exposures and identify markers of climate-potentiated health effects at the individual level.

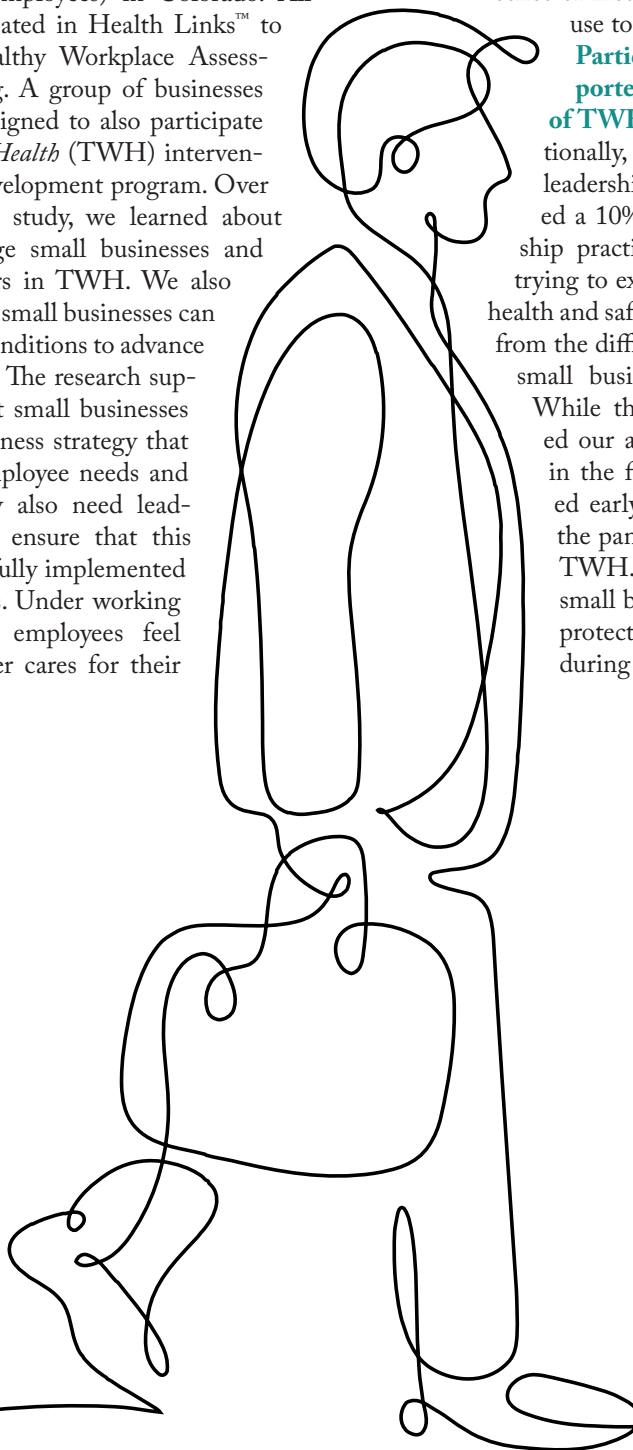
SSWell Study

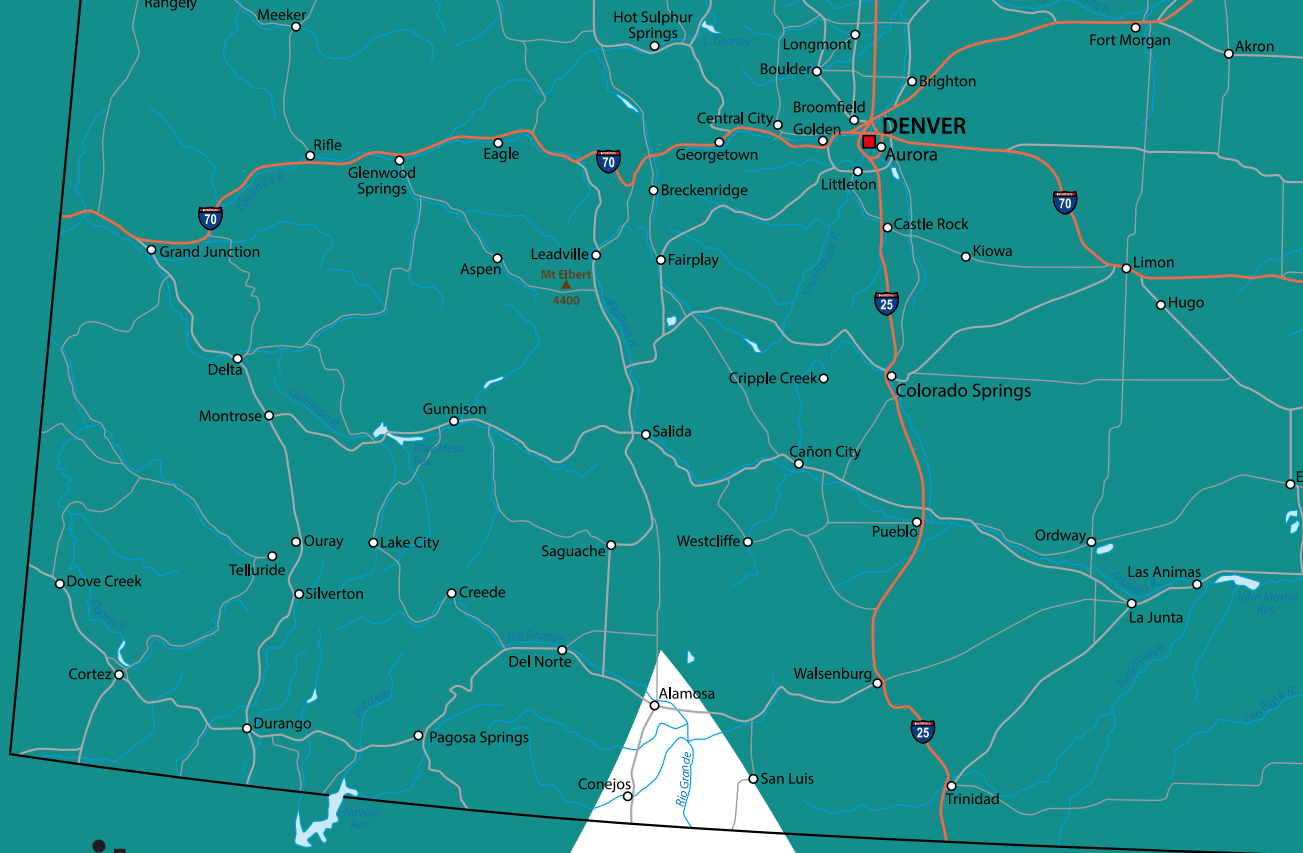
Small+Safe+Well

WE CONCLUDED the Small+Safe+Well (SSWell) study, a five-year (2015-2020) *Total Worker Health*® intervention study on 132 small businesses (those with fewer than 500 employees) in Colorado. All businesses participated in Health Links™ to complete the Healthy Workplace Assessment and advising. A group of businesses were randomly assigned to also participate in a *Total Worker Health* (TWH) intervention leadership development program. Over the course of the study, we learned about methods to engage small businesses and their senior leaders in TWH. We also learned about how small businesses can address working conditions to advance worker well-being. The research supports the idea that small businesses need a TWH business strategy that is informed by employee needs and interests, but they also need leadership support to ensure that this strategy is successfully implemented in daily operations. Under working conditions where employees feel that their employer cares for their

health and safety, employees are more internally motivated to participate in TWH initiatives. This internal motivation can drive their engagement even in the absence of incentives that employers commonly use to drive participation.

Participating small businesses reported an 11% increase in their level of TWH policies and programs. Additionally, leaders who participated in our leadership development program reported a 10% increase in their TWH leadership practices. We faced challenges when trying to examine changes to small business health and safety culture, which likely stemmed from the difficulty of conducting a large, 100+ small business TWH intervention study. While the COVID-19 pandemic affected our ability to conduct some activities in the final year of the study, we pivoted early in the pandemic to study how the pandemic's effects on small business TWH. Our results make it clear that small businesses should plan for how to protect and promote employee health during emergencies.





Community & agricultural research in the San Luis Valley

DR. KATHY JAMES, director of the newly formed Climate, Work & Health Initiative and researcher at our center, specializes in environmental and climate health in vulnerable and socially disadvantaged populations. One of her main projects that launched this year is the Metals and Metal Mixtures: Cognitive Aging, Remediation, and Exposure Sources (MEMCARE) study. The project is part of a Superfund Research Center based at Harvard University, comprising several biomedical and environmental engineering research projects, all with a shared focus on understanding and mitigating the effects of exposure to metals and metal mixtures on cognitive health.

Superfund sites are areas of significant environmental contamination identified by the Environmental Protection Agency. Because of the San Luis Valley's proximity to Superfund sites and historically high rates of environmental metals in the air, water, and soil due to mining, Dr. James' team is conducting a study of maternal and early-childhood metals exposures in the region. Dr. James and project manager Francesca Macaluso are engaging San Luis Valley residents in environmental health education and water quality preservation in their area through the project's Facebook account. They are specifically gathering data to characterize heavy metals exposure in pregnant persons, newborns, and young children in the San Luis Valley.

PILOT PROJECTS

EACH YEAR, we award funding to new investigators and established researchers in other fields of discipline with support from the Mountain & Plains Education and Research Center (MAP ERC) and the *Total Worker Health*® Pilot Project Awards programs. These research grants support innovative studies and research-to-practice projects in occupational safety and health and *Total Worker Health*. This year, we funded five innovative projects, including projects addressing the impact of heat on workplace injury; the stress and health inequities facing Latinx teachers; and a study of employee burnout and supervisor relationships.



MIRANDA DALLY, MS

Center for Health, Work & Environment, University of Colorado Anschutz Medical Campus

Advanced Statistical Methods for Joint Environmental and Occupational Data

This project seeks to demonstrate the feasibility of using advanced statistical methods to assess the relationship between occupational heat exposure, occupational injury, and individual risk factors.



JEREMY HUA, MD

Pulmonary Fellow, Pulmonary and Critical Care Medicine National Jewish Health

Characterizing Lung Particulate Matter Burden from Workplace Mineral Dust Exposures

This study seeks to develop and validate a method for quantification and characterization of in situ lung PM using a novel quantitative polarized light microscopy technique.



BRITTANY LYNNER, MA

Doctoral Student, Department of Psychology, Colorado State University

Hear No Burnout, Speak No Burnout: Supervisory Perceptions of Subordinate Burnout

This project seeks to understand how the relationship between supervisor and subordinate influences the subordinate's expression of burnout and a supervisor's ability to accurately perceive burnout.



TOLUWANIMI MOBOLADE ONI, MPH

Doctoral Student, Occupational and Environmental Health, University of Oklahoma Health Sciences Center

Nicotine and Particulate Matter Exposure Among Vape Shop Workers and Their Health

This project seeks to improve vape shop employees' health and safety knowledge and promote changes to their electronic cigarette use pattern and behavior through a well-tailored training program. We also expect to be able to lower nicotine and PM concentrations in the vape shops through air filtration systems.



ABIGAIL HOLM, MS

Doctoral Student, Department of Psychology, Colorado State University

Minority Stress, Work Stress, & Health Inequity for Latinx/Hispanic K-12 Teachers

The project aims to understand stress and health among Colorado's Latinx and Hispanic teachers to protect worker health and safety. We also seek to understand teachers' attitudes toward developing and integrating diversity affinity groups in their own Colorado school districts.



SECTION

02





let's talk EDUCATION

page 20.

CONTINUING EDUCATION

Training professionals through webinars and partnerships.

page 22.

TOTAL WORKER HEALTH® PROGRAMS

Certificate and leadership programs for *Total Worker Health*.

page 24.

STUDENT PROFILES

Six students highlight their success as part of our MAP ERC.

OVER THE PAST YEAR, 8,725 participants have completed over 16,000 hours of our educational content, including webinars, virtual workshops, online courses, and conference presentations.

CHWE has a strong tradition of collaborating with professional associations, academic institutions, and other industry partners to provide high quality education and to promote a sense of community across a range of disciplines. Over the past year, our team has partnered with the Colorado Safety Association, the American Industrial Hygiene Association – Rocky Mountain Chapter, the Rocky Mountain Academy of Occupational and Environmental Medicine, the American Subcontractors Association, the Association of Occupational Health Professionals in Healthcare, and other professional associations to host, plan, and execute their annual conferences. Through these large-scale events, we were able to provide over **3,000 training hours** and offer continuing education credits for many of these working professionals.

CONTINUING

COVID Town Halls & Pinnacol Webinars

With the onset of the pandemic, our CE team shifted gears to address occupational health and safety training needs related to COVID-19. We developed and sponsored a series of virtual Town Hall trainings. Between February 2020 and January 2021, we co-sponsored a total of 13 trainings, including guidance for employers and individuals on supporting working parents, leadership skills for managing employee stress and fatigue, promoting mental health and resilience, and managing depression and enhancing wellness. Nearly 4,000 individuals attended this series, where we shared specific, action-focused guidance we shared to help employers support workers through the pandemic.

We received a grant from Pinnacol Assurance, Colorado's largest workers' compensation insurance company, to fund the "Taking Care of Our People" webinar series. This series brought up-to-date information about how employers, public health, and communities in Colorado are responding to COVID-19. Each installment focused on a specific group, including mountain communities, small businesses, and ourselves. Nearly 1,000 individuals attended this series.

Health Links Webinars

A foundation of our efforts in reaching the business community is our free webinars offered by Health Links. These hour-long virtual trainings expand our center's reach by offering free continuing education credits for professionals in human resources, health education, and safety. One of the best-attended webinars from the last year (and most-watched on our YouTube channel) was "Becoming an Antiracist Workplace: Our Individual and Collective Responsibility." Knowing that racism is not just a societal but a public health crisis, it is essential that our outreach arm address it by raising awareness among employers and providing them with

tools to tackle it head-on in the workplace. To accompany the launch of the Mental Health Module, Health Links provided a webinar, "The State of Workplace Mental Health: New Directions for *Total Worker Health*." The webinar occurred in May for Mental Health Awareness Month and featured an extensive overview of the impact of COVID-19 on worker mental health brought by our partners at Mental Health America.

Bioethics Series

Our center partnered with other academic organizations, including the Center for Bioethics and Humanities, the Injury & Violence Prevention Center, and the Population Mental Health and Well-Being Program, on a variety of educational webinars over the previous 12 months. Topics for these webinars included firefighter injury prevention; the ethics of COVID-19 vaccines; moral distress in COVID-19 responders; politics during a pandemic; coping with technology fatigue; and many others. These webinars attracted more than 1,500 live views, and the recorded replays on YouTube are still watched to date.

Partner to Educate OSH professionals

CHWE collaborated with the NIOSH Western States Division and Council of State and Territorial Epidemiologists to help plan, promote, and execute the National Occupational Research Agenda (NORA) for Oil and Gas Extraction Council Silica Summit 2.0 and the Western States Occupational Network Meeting (WestON). The Silica Summit was a two-day virtual conference focused on best practices to control workers' exposure to respirable crystalline silica in the oilfield. Over 500 representatives from the oil and gas industry registered to attend the event. WestON 2020 was hosted virtually and addressed health disparities during the COVID-19 pandemic.

EDUCATION





Our courses are delivered by experts who offer
real-world insights rooted in research.

HEALTH, SAFETY & WELL-BEING

This is *Total Worker Health*®.

OUR CERTIFICATE IN TOTAL WORKER HEALTH® PROGRAM has grown in the past year, currently with 13 active students from a variety of backgrounds, including industrial hygiene, ergonomics, occupational medicine, architecture, and public health. We offered eight students scholarships to complete the program via the NIOSH MAP ERC training grant. Six of our students graduated and went on to careers in consulting, corporate health and safety management, public health, and occupational medicine. One student began a doctoral degree in public health.

Looking ahead, we have seven new students with backgrounds in worksite health promotion, occupational safety and ergonomics, occupational medicine, mental health, and public health, who started in Fall 2021. The increasing number of working professionals joining our program from inside and outside of Colorado is notable and demonstrates our progress towards meeting the needs of working professionals seeking to integrate the *Total Worker Health* (TWH) approach into the way they advance worker well-being.

For working professionals with an interest in expanding their career but with limited time available, we continually offer TWH leadership trainings in both online, self-paced courses and live workshops. We held a workshop in November 2020 emphasizing TWH leadership practices, focused specifically on construction and public health workers. Our workshop in April 2021 was dedicated to TWH leadership practices for legal professionals.



changing our culture

I learned how to deeply root wellness and safety into our culture by listening to my team and empowering them to shape our work environment.

— TWH LEADERSHIP TRAINING PARTICIPANT

Student Profiles

The Mountain & Plains Education and Research Center (MAP ERC) creates opportunities for graduate and post-graduate trainees to learn from accomplished faculty and other trainees in six different occupational health and safety disciplines. We offer tuition support, research funds, and stipends to qualified students. The following six students were nominated by the directors from each of our programs.

I am particularly interested in how environmental and occupational exposures impact lung health. During my training as a pulmonary and critical care physician, I studied a rare lung disease called sarcoidosis, which is thought to be caused by environmental exposures. I have continued my research on the disease this past year and studied occupational exposures that cause sarcoidosis.

My occupational medicine training has afforded me a wide breadth of experiences. Beyond the clinical work, I have appreciated learning about the legal and policy issues surrounding occupational health. I found surprising the challenges OSHA faces with implementing new occupational standards to protect workers and the intricacies workers must navigate in the workers' compensation system. Understanding the policy side of occupational health helps me to better advocate for patients with work-related diseases and motivates me to be vigilant for sentinel cases associated with work exposures.

In addition to supporting my Master of Public Health degree, the MAP ERC has provided me with the opportunity to do field work research on sugarcane workers in Guatemala. These experiences offer me the ability to pursue epidemiological research and policy development in my future career in occupational health.

During my OSHA rotation, I was surprised to learn how many enforcement cases were associated with heat stress. In the future, I believe heat and natural disaster-related diseases will become more prevalent. As an occupational medicine physician, it will be important for me to treat these environment-associated diseases and disseminate public health knowledge on how to prevent adverse health effects in the context of a changing climate.





The MAP ERC has provided me a sense of belonging...

I am studying burnout among university student affairs professionals, given their high rate of turnover. My research considers the subordinate-supervisor relationship as a potential job resource to buffer the impact of job demands on burnout. Overall, my research has the potential to inform interventions for mitigating burnout, including health-relevant leadership behaviors.

As part of the MAP ERC practicum course, my teammates and I wrote a white paper detailing the injustices in prison labor related to

occupational safety and health. It was extremely eye-opening to learn that inmates are not considered employees and are thus not afforded any of the protections to which free workers are entitled. Prison labor warrants our attention, and we are the practitioners and researchers with an opportunity to make a difference.

The MAP ERC has provided me with a sense of belonging and community within the field of occupational safety and health. I feel fortunate to engage in multidisciplinary work with peers who hold diverse perspectives and help me to become a better scholar, practitioner, and human. I also am appreciative of the support I have received through a MAP ERC Pilot Project grant. Given that my pilot project is the first full-blown research study of my academic career, I feel reassured that the MAP ERC sees value in a project that means so much to me and my ongoing professional development.

I want to foster organizational climates where people across identities can thrive. I am particularly interested in the workplace experiences of people with substance use disorders and/or people in recovery. This interest stems from being aware of the recovery-hostile environments prevalent in society and wanting to cultivate recovery-friendly workplaces.

BRITTANY LYNNER

occupational health psychology

Having pride in your workplace and community goes a long way...

My main project will be intra/interrater reliability of facial measurements from fellow MAP ERC trainee Kayna Hobbs-Murphy's research. The project takes the concept of using 3D body scanning and anthropometrics to develop face masks that fit the wearer's face (with no air leaks) and have the least amount of particulate transmission possible.

The MAP ERC has provided me with financial support, allowing me to focus on the big things, like assignment due dates and the presentations I have to do this fall semester. For this, I am incredibly grateful.

It has been fun learning about everyone's backgrounds and how that informs their current work and thought process. My BS was in Molecular Microbiology and Immunology, which informs the way I approach academic work, and you can see that in everyone under the MAP ERC umbrella.

Ideally, I'd like to move my workplace to somewhere with an almost or completely zero carbon footprint and give the employees the ability to do the same in their own homes or through some fun work/community program. I believe participating and having pride in your workplace and community goes a long way, so I am very hopeful that my future job enables me to do this.





Agricultural worker health is the most important issue in the global food system.

and in the field. As I write this, I am currently in Guatemala assisting with a study measuring the exposures sugarcane workers experience during their harvesting season. These unique opportunities are not uncommon in the MAP ERC program, and the experience we gain as students working on these projects is vital to our success as both future practitioners and investigators.

We are already seeing the effect climate change has on agricultural workers, as harvesting seasons get hotter and the demand for livestock workers increases with the world's economy. I hope to use my education and training in agricultural OSH to help advocate for agricultural workers through both local initiatives and policy change. We depend on agricultural workers every day, and their overall health and well-being is the most important issue in the global food system.

I am working with dairy workers through the High Plains Intermountain Center for Agricultural Health and Safety (HICAHS). Dairy workers have many different respiratory exposures, and we are testing a high salinity nasal lavage as a potential intervention to reduce their respiratory inflammation. I am most interested in studying exposure to a novel influenza virus (Influenza D). Cows are an important reservoir for Influenza D, but not much is known about its spread into the community or its health effects. I believe our ongoing research with livestock workers can contribute some valuable information to our current understanding of the virus.

I have recently become fascinated with the human microbiome and its potential to affect human health. Humans have thousands of species of microorganisms living in our organ systems and on our skin, and it is estimated that these microorganisms make up 90% of all the cells associated with our body! I believe each person's microbiome can tell us a lot about their health, and some recent studies suggest it may be as important as the human genome in overall health and disease outcomes. Through our research in dairy workers, I am hoping to identify certain characteristics of the nasal microbiome that can help protect people from MRSA and viral infections.

The MAP ERC has graciously allowed me to pursue my academic interests at the highest level. The faculty and mentors I work with use their professional and academic experience to provide the highest quality of training, both in the classroom



EMILY SHARPE ——— *certificate in Total Worker Health®* ———

The climate can impact our well-being.

With this being my first term in the certificate program, I am looking forward to gaining a better understanding of the integration of workplace health promotion and worker safety. Having worked in the field of workplace wellness for the last decade, I'm looking forward to taking the experience of the *Total Worker Health* (TWH) program and providing an even greater level of expertise as it relates to health and safety in the workplace.

I have truly enjoyed getting to better understand the impact of TWH in industries that I am not that familiar with. One project I worked on involved consulting with a company in the construction industry, which really opened my eyes to the health and safety risks within the industry and the various approaches to overcome those risks in the workplace.

I was highly interested in the Certificate in *Total Worker Health*®. Then, the pandemic hit. With so much uncertainty in 2020, I wasn't sure that I could take on the costs of the program. The financial support of MAP ERC provided me the ability to further my education and knowledge, which will also improve my day-to-day work and the impact on our employees.

I have looked at health and well-being from a holistic standpoint. From air pollution to the weather to biological hazards such as COVID or the flu, the climate can affect our well-being. By approaching TWH with climate change in mind, we can seek to collaborate on a broader scale for limiting workplace risk and promoting worker health and safety.

I advocate for nuclear energy as the new primary energy producer for the U.S.



MICHAELA SWINHART

Health Physics/Radiological Health PhD

I am working on the fundamentals of molten salt systems for next-generation nuclear reactor fuel applications. I am a part of the DOE MSR campaign to help establish a database of the thermophysical and chemical properties of binary and tertiary actinide-containing salt systems. I am most interested in collecting data for vapor pressure, heat capacity, and density of these systems to create a safer reactor for next-generation needs.

I am always surprised with the work I get to do! I normally watch from the wings when people are conducting experiments or doing prep-work, but I realized there is a safer, more effective approach for handling this particular sample. My training has given me the confidence and a voice to explain better methods to my superiors. They now allow me to test new methods and even work hands-on with the radiation protection technicians (RPT) to develop new standards of operation.

I never realized how much each discipline in occupational safety and health works to establish the best type of environment for employees to work. I now look for *Total Worker Health*[®] practices in workplaces when applying for jobs or at networking events. I hope to continue to use my training to improve my own worker health and work alongside other OSH professionals to develop and implement trainings and bring awareness of various hazards, including mental stress, that can occur in the workplace.

In my field, I advocate for nuclear energy as the new primary energy producer for the U.S., as well as closing the fuel cycle. I am lucky enough to have a platform to speak publicly to advocate, but we will need legislators and other policy makers to make the change. Nuclear energy also has a bad reputation and it will take many more voices than mine to decrease fears regarding radiation and spread of contamination. I will continue to advocate through my graduate program and hope to be a bigger presence when I transition to my chosen career.

SECTION

03





let's talk PRACTICE

page 32.

PROJECT UPDATES

Continuing to have large impact through COVID-19.

page 34.

HEALTH LINKS™

Nine years of programming and more to come.

page 36.

EVENTS

Bringing together students, researchers, and the community.

page 38.

THE FUTURE OF WORKER HEALTH

Predicting and preparing for the future of work.

page 42.

CLIMATE AND WORKER HEALTH

Understanding the alarming effects of climate on vulnerable workers.

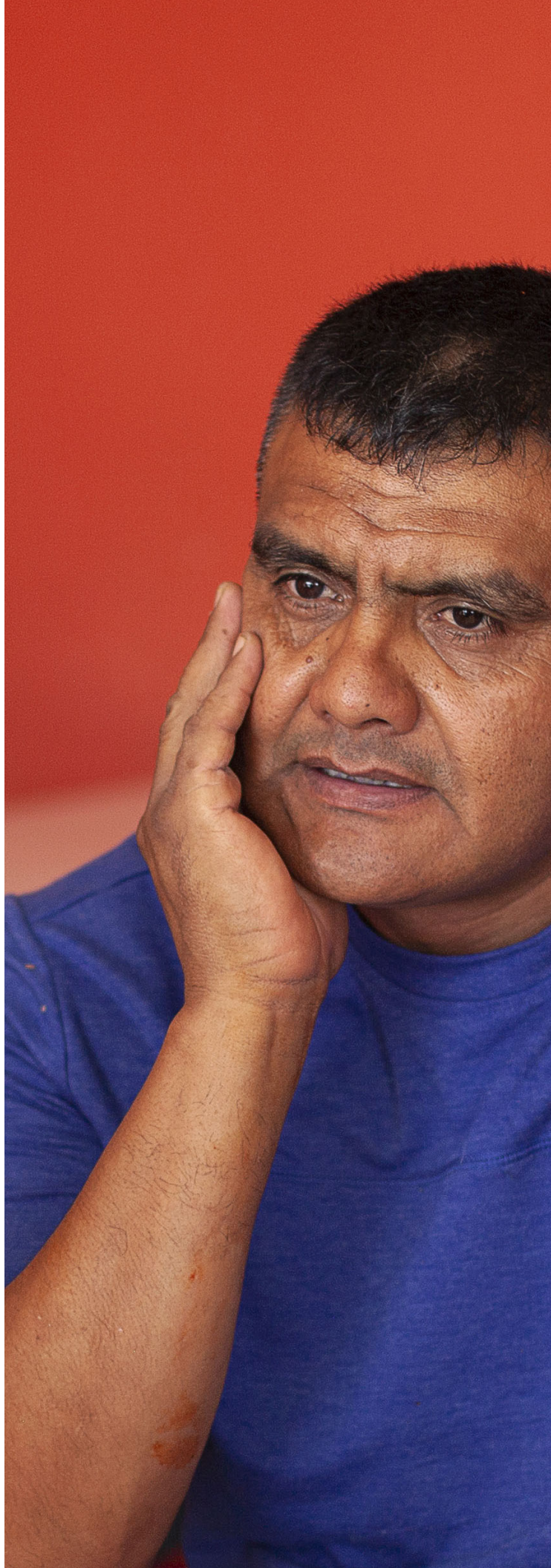
OUR OUTREACH CORE is vital to our mission of improving worker safety and health through communication and dissemination, education, and implementation. By delivering science-based information to diverse stakeholders, including workers, employers, public health, community groups, and other researchers, in collaboration across disciplines, we have increased awareness, knowledge and adaptation of best practices in occupational safety and health and *Total Worker Health*®.

MENTAL HEALTH WORKPLACE

In May 2021, in partnership with the University of Colorado Helen and Arthur E. Johnson Depression Center, Health Links launched the Workplace Mental Health Module, an online toolkit designed for employers wanting to improve the mental health of their employees. The module was created as a direct response to the need for robust worker mental health support, only heightened by the COVID-19 pandemic. The module includes a survey that helps organizations evaluate their management and workplace strategies addressing mental health issues such as depression, anxiety, and substance use. After completing the survey, organizations receive feedback with evidence-based recommendations on ways the company can enhance its current programs and policies such as Employee Assistance Programs (EAP), changes to leadership practices, benefits design, and recovery services for return to work. Participants receive one-on-one advising to set goals and determine the steps that will produce real change in their workplace. The toolkit also includes an online training and a resource guide. 42 organizations have taken the survey to date.

Based on employer response from the survey and through advising sessions, we have seen that business size and industry do not affect how well employers address mental health. Small organizations (those with fewer than 50 employees) that are committed to workplace mental health score higher across all four benchmarks than larger ones that are still working on their approach. In September of 2021, the Denver Post dedicated an entire article in the Sunday edition to the module and three organizations (from construction, education, and financial management) that had participated in it.

Another theme we have seen across our Health Links network is the importance of leadership. When senior leaders talk about their own mental health and have an open-door policy for their employees to talk about mental health, that is a significant predictor of a workplace culture that supports workplace mental health. The Workplace Mental Health survey has also uncovered that most workplaces lack recovery-friendly policies and practices. Providing education, training, and support for employees and managers that are specific to the return-to-work experience for someone after a mental health leave is a critical next step for all the employers in our network. As with all our modules and trainings, we use this feedback and patterns we see to inform future initiatives and training for our network.



COVID-19 RESPONSE

In collaboration with NIOSH and Centro de los Derechos del Migrante, we are analyzing data previously collected from protein workers (meat, poultry and seafood processing workers) across the U.S. Our teams hope to learn about this worker community to inform future outreach, identify worker needs or concerns for information related to COVID-19, and characterize perceptions on vaccine adoption. We will continue working together to write manuscripts using this data to inform future research.

We are also exploring the health and safety needs of the Latino business community during the COVID pandemic, leveraging the work we are doing to reach the Latino employer community mentioned above. In a survey we created, we included questions aimed at identifying their needs during and after the pandemic as well as their health and safety practices. With this information, we plan on developing community outreach resources such as webinars or community forums.

REACHING THE LATINO EMPLOYER COMMUNITY

We have recently been collaborating with Adelante Community Development, a nonprofit organization dedicated to promoting economic and educational opportunities to the Latinx community in Colorado, and the Latino Research and Policy Center based in the Department of Community and Behavioral Health at the Colorado School of Public Health. Together, our teams have developed a Latino-Owned Business Health and Safety Needs Assessment aimed at gaining an understanding of the health and safety needs of the local Latino business community.

The findings from the survey and interviews with Latino-owned businesses will be used to develop, implement, and evaluate resources and programs for workers, employers, and communities that promote health and safety in the workplace.

NATIONAL SUPPLEMENTAL SCREENING PROGRAM

Since 2005, faculty and staff from our center have partnered with Oak Ridge Associated Universities and the Department of Energy (DOE) to administer the National Supplemental Screening Program (NSSP). This program provides free medical screenings to former DOE site workers, as part of the DOE's Former Worker Program. Former employees of national energy laboratories and nuclear weapons facilities are screened for occupational health conditions, such as chronic respiratory illnesses, hearing loss, kidney or liver disease, and certain cancers. In addition, the NSSP screening identifies other significant health problems such as diabetes, hypertension, and lipid disorders.

Limited by restrictions from COVID-19, screenings were paused completely from March to July, 2020. Through the program, we screened 471 workers between July 2020 and June 2021. To date, we have screened 19,543 workers. About 41% of those screened have been diagnosed with a work-related condition and 96% have been diagnosed with a non-work-related health condition, according to a 2016 study. Tens of thousands of workers have sought follow-up care and received federal compensation because of this program.

19,543

WORKERS SCREENED
THROUGH NSSP

HEALTH LINKS™

HEALTH LINKS reached its ninth year of programming, serving organizations of all sizes and representing a range of industries in Colorado and beyond to achieve *Total Worker Health*®. Over the past year, 142 businesses participated in the program through the completion of the Healthy Workplace Assessment and advising. 133 organizations recertified, representing strong commitment to the program and to improving worker safety, health and well-being. Our team completed 184 advising sessions with businesses, providing evidence-based recommendations for implementing *Total Worker Health* (TWH) across our six core benchmarks. We continue to partner with the Colorado Department of Public Health and Environment and local public health agencies as we encourage local employers to adopt programs for chronic disease prevention, specifically the National Diabetes Prevention Program.

New publications show the impact that Health Links makes in employer TWH policies and practices. A recent study published in the *Journal of Occupational and Environmental Medicine*¹ found that Health Links advising signaled improvements in businesses over time periods of one, two, and three years. As the program evolves, we are learning more about what motivates employers to adopt and implement TWH strategies and how they operationalize it. With renewed support from NIOSH as a Center for Excellence for TWH, Health Links will work on new efforts this coming year to update the Healthy Workplace Assessment and offer the new WellBQ instrument for measuring worker well-being to participating employers.

¹ Tenney, Liliana DrPH; Dexter, Lynn MS; Shapiro, David C. BA; Dally, Miranda MS; Brown, Carol E. PhD; Schwatka, Natalie V. PhD; Huebschmann, Amy G. MD; McMillen, Jim MPH; Newman, Lee S. MD Impact of Advising on Total Worker Health Implementation, *Journal of Occupational and Environmental Medicine*: August 2021 - Volume 63 - Issue 8 - p 657-664 doi: 10.1097/JOM.0000000000002212

15+

INDUSTRIES REPRESENTED

142

ORGANIZATIONS PARTICIPATED

25 KICK-START

11 CERTIFIED

27 CERTIFIED PARTNER

71 CERTIFIED LEADER

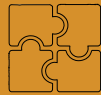
1,706

PROFESSIONALS TRAINED

124,640

WORKERS REACHED

HEALTH LINKS ORGANIZATIONS
IMPROVED IN EVERY BENCHMARK.



↑ 60%

HEALTH PROGRAMS & POLICIES



↑ 38%

SAFETY PROGRAMS & POLICIES



↑ 28%

WORKPLACE ASSESSMENTS



↑ 42%

ORGANIZATIONAL SUPPORTS



↑ 49%

ENGAGEMENT



↑ 38%

EVALUATION

* % change indicates improvement of participating organizations from previous to current year scores from Healthy Workplace Assessment

RESEARCH DAY 2021 brought over 140 students, faculty, and business leaders together for a day “Showcasing Tomorrow’s Leaders in Environmental and Occupational Health & Safety.”

Nelia Viveiros, the Associate Vice Chancellor for Academic Operations for the University of Colorado Denver and Anschutz Medical campuses, led the group through a “Diversity, Equity, and Inclusion Thought Exercise” focused on equity-centered leadership. The event also featured the work of students, alumni, and faculty from the Colorado School of Public Health and trainees supported by the Mountain & Plains Education and Research Center. It provided students with the chance to interact virtually with professionals currently working in the field of environmental and occupational health and safety. The event concluded with an award ceremony for the best student presentations.

140

STUDENTS, FACULTY, AND BUSINESS LEADERS

130

REGISTRANTS

THE EIGHTH HEALTH LINKS ANNUAL EVENT was hosted on October 28, 2021. Held virtually, this year’s event attracted over 130 registrants for a day celebrating *Total Worker Health*®. This year, we recognized seven organizations and one individual as recipients of the Healthy Workplace Awards. We also honored Children’s Hospital Colorado with the inaugural Continued Excellence in *Total Worker Health* Award in response to its continued dedication to worker health, safety, and well-being. The event featured practitioner workshops covering topics including chronic disease prevention; built environments; technology-based wellness tools to support mindfulness; managing telework; and family-friendly workplaces.

CHWE PARTNER AWARDS In July 2021, our center hosted its second annual recognition event to honor the commitment and achievements of some key partners. **Herb Gibson was awarded the Individual Lifetime Achievement Award.** Herb recently retired as the safety and health manager and area director of the OSHA Denver Area Office and has served for over 15 years as a member of our Mountain & Plains Education and Research Center's external advisory panel, helping us become one of the top training programs in the country. **Adelante Community Development was awarded the Community Impact Award.** Adelante is committed to providing resources and support for Latino employer and worker communities in Colorado. Adelante has had a significant impact in the past year, helping hundreds of Latino business owners and their workforce respond to the COVID-19 pandemic through a WhatsApp chatline providing public health guidance, vaccine drives, and community events. **The University of Colorado Center for Bioethics and Humanities was awarded the Partner of the Year Award.** Over the last year, CHWE has partnered with the Center for Bioethics and Humanities on a webinar series concerning ethics and occupational health. Through the Work & Play in a Pandemic Series, we have educated over 1,000 individuals on a variety of important and timely topics around ethics and occupational health.

1,000+

PEOPLE EDUCATED ON ETHICS
AND OCCUPATIONAL HEALTH

INTERNATIONAL SYMPOSIUM FOR TOTAL WORKER HEALTH®

Along with NIOSH, our center is spearheading the 3rd International Symposium to Advance *Total Worker Health®*. The event will focus on planning for work now and in the future and will take place October 11-14, 2022, at the NIH headquarters in Bethesda, Maryland. Bringing together an audience of safety and health professionals, employers, researchers, policymakers, organized labor representatives, and members of the academic community, this one-of-a-kind Symposium will examine opportunities to make workplaces safer and to improve the health and well-being of the workforce across the world.

JOIN US.

Anticipating the future of worker health.

While the physical climate of our planet continues to change, the COVID pandemic has uncovered and elevated critical changes to our workplace climate. Though they may not refer to its official name, workers need and are explicitly expecting their employers to take a *Total Worker Health*® approach to workplace culture, policy, and practice. Academics, practitioners, and workplace leaders have an immediate need to implement *Total Worker Health* (TWH) to meet current and anticipate the future needs of workers. Rapid changes and advances in industry, technology, work arrangements, and worker values are all shaping the future of work. These advances and developments have implications for worker safety, health, and well-being and require innovative and responsive occupational safety and health strategies. We are preparing for the future by innovating and adapting our approach across our main pillars of research, education, and practice.

What new research is underway to address current and future worker needs?

As of September 2021, we are now one of ten national Centers of Excellence for *Total Worker Health*®. Over the next five years, our center will operate from a cooperative agreement from the Centers for Disease Control and Prevention (CDC) to support research that will further advance TWH as an emerging field of science and practice and address the needs of the 21st-century workforce through research, intervention, and outreach activities. The new funding will support research on emerging issues impacting the well-being of American workers.

Our flagship five-year study, the Well-Being and Cancer at Work (WeCanWork) study, is examining the employment experience of low-income, Latino men newly diagnosed with cancer. Principal Investigator Dr. Cathy

The pandemic has uncovered and elevated critical changes to our workplace climate.

Bradly, professor and associate dean for research at the Colorado School of Public Health (ColoradoSPH) and deputy director of the CU Cancer Center, will partner with Dr. Lee Newman and Dr. Lili Tenney to test a clinical-based TWH intervention delivered by oncology care teams to improve patients' ability to continue working during cancer therapy. We will explore how a TWH clinical approach can improve patient outcomes among a very understudied population. This is the first time our center will work with oncology and occupational medicine to advise patients on workplace support related to their health, applying a TWH approach in a clinical setting.

We are also launching a new project that addresses behavioral health for farm workers and owners in the San Luis Valley of southern rural Colorado. A growing body of evidence shows that anxiety, depression, suicide, and other behavioral health challenges occur at significantly higher rates among U.S. agricultural workers, magnified by physical isolation from medical providers. The project, led by

Dr. Kathy James and Dr. Gwen Fisher, will further investigate the contributions to this crisis and form a network of community partners and providers to better support the community.

Another research project led by ColoradoSPH assistant professors Dr. Courtney Welton-Mitchel and Dr. Natalie Schwatka will be a two-year study to adapt and test a workforce mental health intervention with emergency preparedness programs in PreK-8 schools. The project will review and co-create revisions to emergency preparedness plans and the mental health supports in participating schools.

The award will also support the center's TWH initiatives





including Health Links™, described under Practice earlier. The outreach core, led by Dr. Tenney, will focus on dissemination and implementation projects to reach underserved organizations and working communities, including small businesses, Latinx, and Black workforces. The award will support the development of new TWH training in the areas of behavioral health, leadership, and emerging issues, connecting research translation to advance TWH in practice.

How are we preparing future leaders in occupational safety and health? Our center received two renewals from NIOSH in the last year, continuing to support our Mountain & Plains Education and Research Center and Center of Excellence for *Total Worker Health*®. Our status as a two NIOSH-funded center demonstrates our commitment to the intersectionality of occupational safety and health (OSH) disciplines. With the MAP ERC renewal, we now offer funding to support trainees in our Certificate in *Total Worker Health*®, an official sixth discipline offered by the MAP ERC.

We believe that all future OSH leaders should be trained in an interdisciplinary environment and integrate a TWH approach into their specialties. To meet emerging needs, OSH professionals must have knowledge, skills, and experiences covering an array of subjects that consider the safety and health of the worker, including working conditions, work environment, and the nature of work itself. We will require a broader skillset to meet the needs of employers and employees as we face global pandemics, climate change, changes in demographics, emerging technologies, changing work arrangements and profound alterations to our work and home environments.

As the field of TWH solidifies, we believe that a TWH professional should be savvy and established in six competencies: subject matter expertise; advocacy and engagement; program planning, implementation and evaluation; communications and dissemination; leadership and management; and partnership building and coordination.

This integrated approach reflects the complexities that OSH professionals are facing and will continue to face. CHWE believes that not only do future graduate students need to be trained in the TWH approach, so do current workplace leaders: the working professional. Reflected in the diverse group of incoming students in our Certificate in *Total Worker Health*®,

the future leaders in OSH are HR managers, wellness specialists, and corporate culture consultants. What the past two years have shown us is that leaders, managers, and safety and health champions in any role should be candidates for training in TWH and OSH disciplines. The new normal, the “better normal,” is that any professional responsible for business operations or worker health and safety should have skills to identify solutions for the well-being of the workforce as a whole.

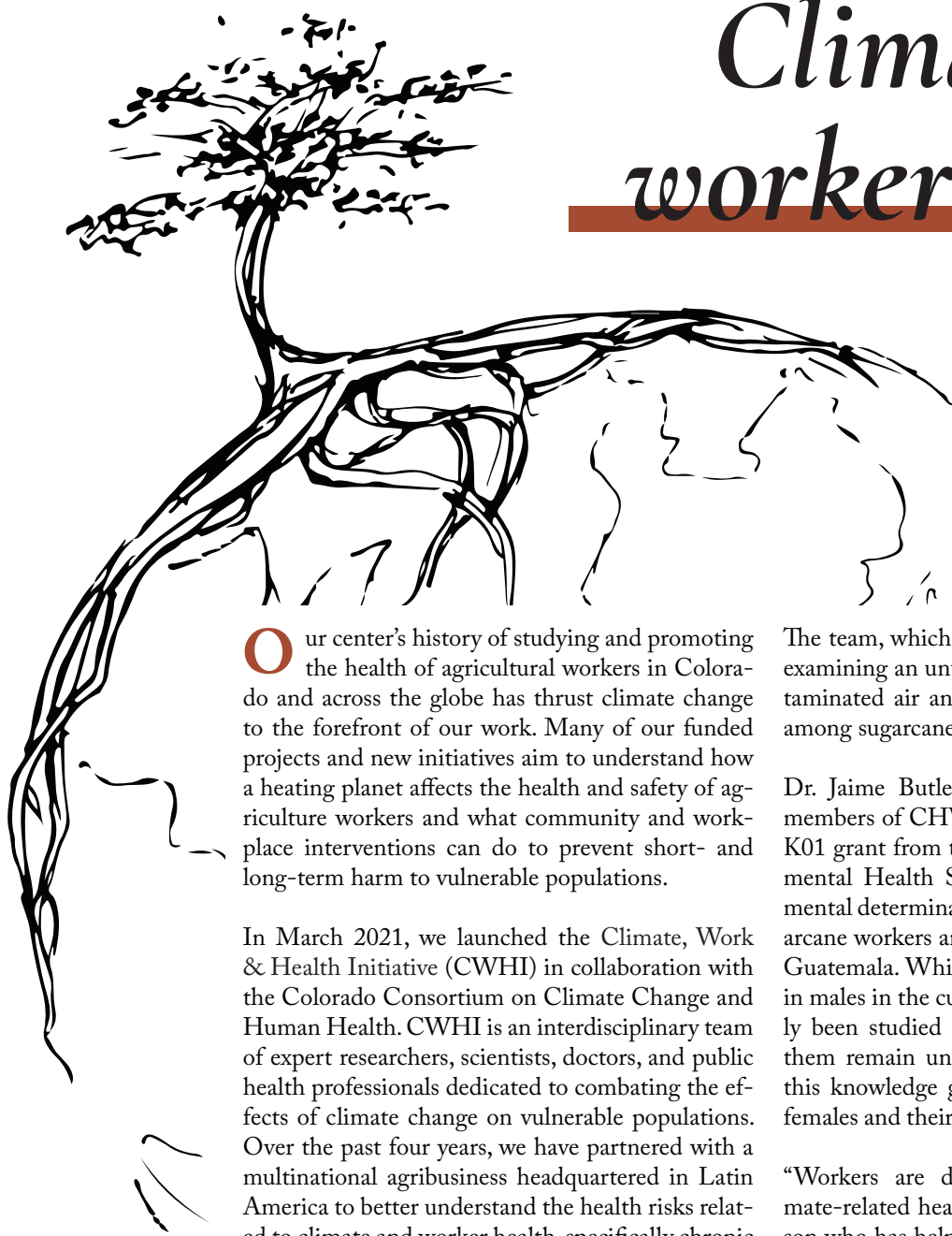
The diversity of the future group of OSH leaders does not end with their backgrounds. We need leaders who reflect the diversity of the workers they serve, a diversity not limited to gender, race, socio-economic background, or discipline. The future of the profession is built upon diversity in every way.

How will we engage the workplace and workforce in the future? Our Outreach Core is at the precipice of anticipating the future of work. Through dissemination and implementation, we are engaging stakeholders to design workplace interventions that can be adopted, scaled and sustained. We have learned the importance of listening to our audiences—the business owner, the manager, the worker. We find that workplace mental health is often the gateway for employers to start pursuing TWH strategies in their workplace. While worker mental health has always been a priority, COVID-19 has elevated mental health as a pivotal issue for employers because of how it affects employee health, safety, well-being and business productivity all at once. Through our advising with Health Links and the launch of the Workplace Mental Health Module, we are encouraged by the direction workplaces are headed and are eager to continue partnering with industry to see lasting change and improvement here.

We anticipate that more workplaces will seek us out to help them identify worker health solutions—specifically how to create a holistic experience that first and foremost ensures employee safety on the job, but also enhances their overall well-being and experience at work. Our practice connects us with partners across a range of disciplines, labor, government, and public health to understand how to filter the needs of employers and employees in the delivery of interventions—these connections remain critical to reaching and engaging workplaces and workforces.

*We need leaders who reflect the
diversity of the workers they serve.*

Climate & worker health.



Our center's history of studying and promoting the health of agricultural workers in Colorado and across the globe has thrust climate change to the forefront of our work. Many of our funded projects and new initiatives aim to understand how a heating planet affects the health and safety of agriculture workers and what community and workplace interventions can do to prevent short- and long-term harm to vulnerable populations.

In March 2021, we launched the Climate, Work & Health Initiative (CWHI) in collaboration with the Colorado Consortium on Climate Change and Human Health. CWHI is an interdisciplinary team of expert researchers, scientists, doctors, and public health professionals dedicated to combating the effects of climate change on vulnerable populations. Over the past four years, we have partnered with a multinational agribusiness headquartered in Latin America to better understand the health risks related to climate and worker health, specifically chronic kidney disease of unknown origin (CKDu), a growing international epidemic. To reduce the impacts of heat stress and work-related injuries, we have collaborated with industry partners to implement hydration and rest strategies.


In the past year, we received significant funding for two studies related to our work in Guatemala. One award, a \$3 million, five-year grant from the National Institutes of Health, is studying the effects of air pollution and climate on the kidney health of sugarcane workers. The award provides funding to identify how air pollutants contribute to CKDu.

The team, which began field work in May 2021, is examining an unusual hypothesis that inhaled contaminated air and dust may cause kidney damage among sugarcane workers.

Dr. Jaime Butler Dawson, one of the founding members of CHWI, was also awarded a three-year K01 grant from the National Institute of Environmental Health Sciences to examine the environmental determinants of kidney injury in female sugarcane workers and female community members in Guatemala. While CKDu has been well-described in males in the current literature, females have rarely been studied and the effects of the disease on them remain unknown. The research will address this knowledge gap and describe the epidemic in females and their specific exposures and risk factors.

"Workers are disproportionately exposed to climate-related health threats," says Dr. Butler-Dawson who has helped lead CHWE's field research in Guatemala over the past four years. "The question remains, how can employers and employees mitigate these threats? We are engaging with workplaces, workers, and communities to mitigate the negative health impacts of climate change."

Dr. Kathy James, a founding member of CHWI, is emphasizing environmental and community health in the Metals and Metal Mixtures: Cognitive Aging, Remediation, and Exposure Sources (MEMCARE) study mentioned in the Research section of this report. "We are already witnessing the alarming consequences of climate on worker



populations who represent both vulnerable and socially disadvantaged groups,” says Dr. James. “These consequences are seen in families, households, and communities. As scientists and advocates, our time is now to bridge the gap between climate research and action.”

“Workers are often left out of the conversation about how climate can impact their health,” says Miranda Dally, a member of CHWI. “Individual, work, environmental, and societal factors all play a significant role in determining the effect of climate on the health and well-being of workers and their communities,” says Dally. “The combination of these factors led us to apply a *Total Worker Health*® approach to this public health crisis, that is,

climate change.” Dally is also a recipient of one of our center’s Pilot Project grants and is working to demonstrate the feasibility of using advanced statistical methods to assess the relationship between occupational heat exposure, occupational injury, and individual risk factors.

CHWE is deeply convicted of the inseparable nature of health, work and environment and is working diligently to improve human health through these projects. We hope that in subsequent years each of these projects will result in findings that not only protect workers from a changing climate but promote their health at work in the process.

The question remains...

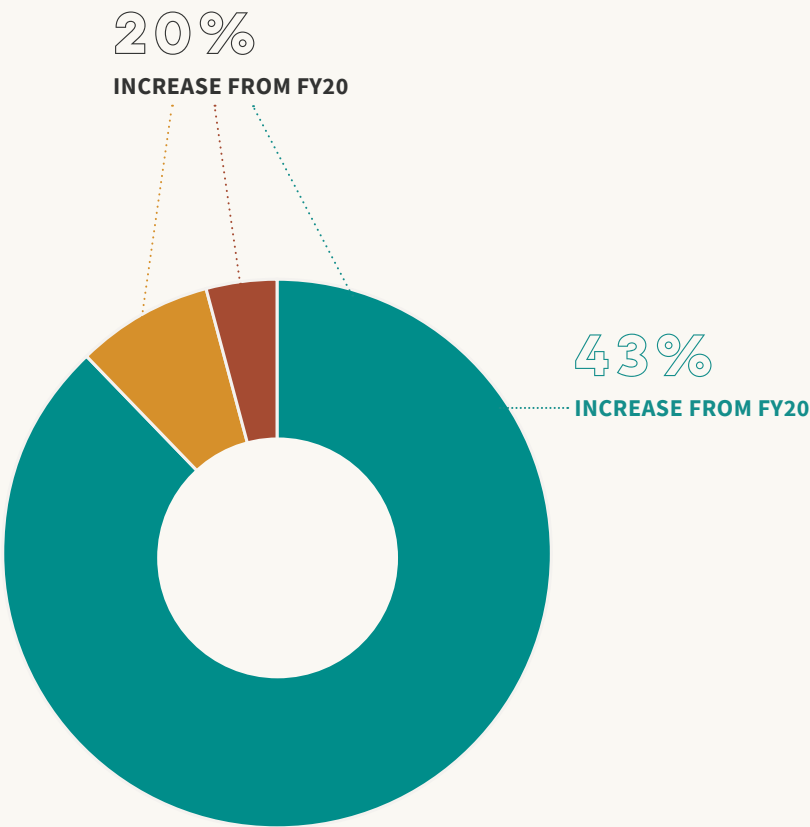
**How can employers and employees
mitigate these threats?**

— DR. JAIME BUTLER-DAWSON

“As scientists and a
is now to bridge
climate research

advocates, **our time**
the gap between
ch and action.”

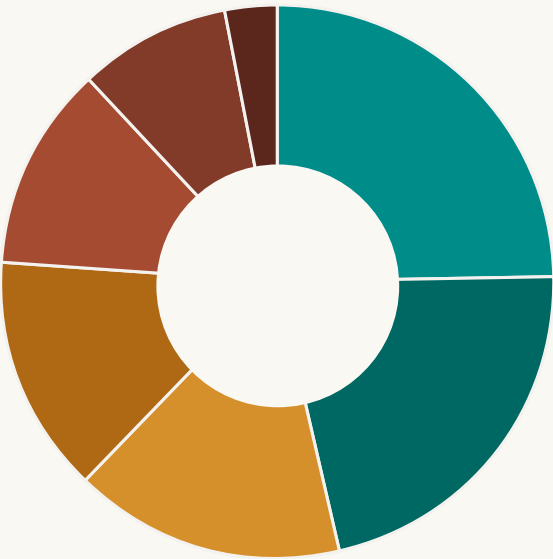
— DR. KATHY JAMES



REVENUE

FY21 total / \$5,684,718

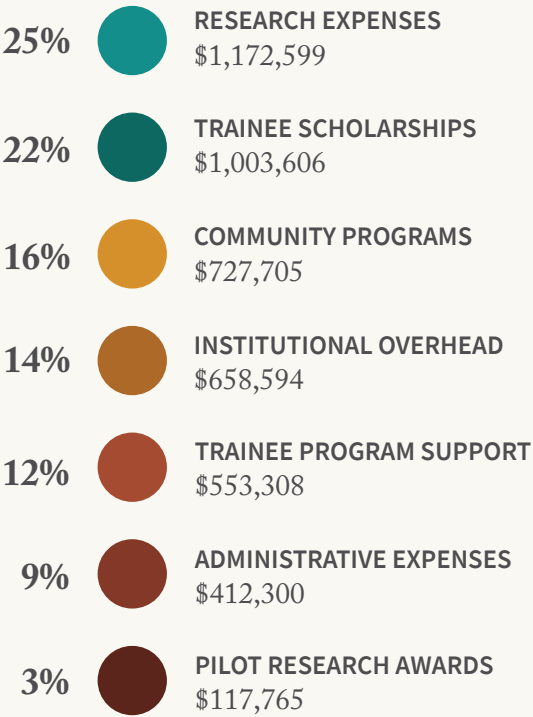
* FY21 runs July 2020-June 2021



EXPENSES

FY21 total / \$4,645,877

* FY21 runs July 2020-June 2021



P

PARTNERS

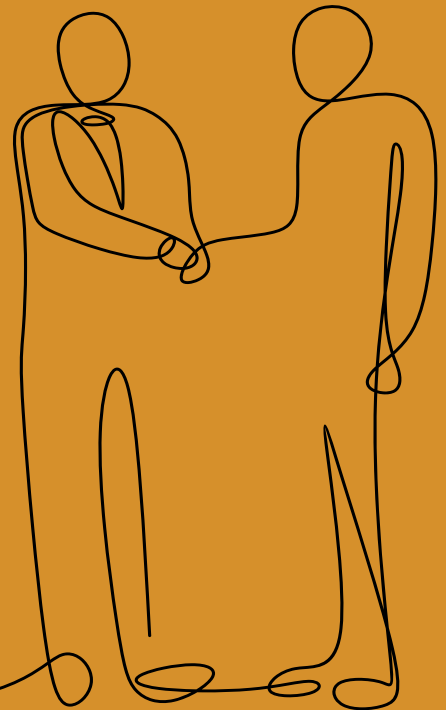
American Industrial Hygiene Association – Rocky Mountain Section | American Society of Safety Professionals | Associated General Contractors of Colorado | Associated Subcontractors Association of Colorado | Association of American Subcontractors | Association for Occupational Health Professionals in Healthcare | Aurora Chamber of Commerce | Center for Bioethics and Humanities | Center for Global Health at the Colorado School of Public Health | Clemson University | Colorado Consortium for Prescription Drug Abuse Prevention | Colorado Department of Public Health and Environment | Colorado Office of Economic Development and International Trade | Colorado Safety Association | Colorado School of Public Health | Colorado Small Business Development Center Network | Colorado State University | Denver Health | Health Physics Society | Helen and Arthur E. Johnson Depression Center | High Plains Intermountain Center for Agricultural Health & Safety | IncentaHEALTH | Johns Hopkins University Education and Research Center for Occupational Safety and Health | Mental Health America | National Association of Chronic Disease Directors | National Jewish Health | Rocky Mountain Academy of Occupational and Environmental Medicine | Rocky Mountain Prevention Research Center | San Luis Valley Farmers Union | SCL Health Saint Joseph | Society for Occupational Health Psychology | The Center for Construction Research and Training | Tri-County Health Department | UC Health

&

S

SUPPORTERS

Chancellor for the University of Colorado Anschutz Medical Campus | Colorado Department of Public Health and Environment (CDPHE) | Harold and Robert Hollis Family Trust | Fund established by Lee Newman and Lori Szczukowski | National Institutes of Health | National Institute of Environmental Health Sciences (NIEHS) | National Institute for Occupational Safety and Health (NIOSH) | Oak Ridge Associated Universities | Pantaleon | Pinnacle Assurance



HUMAN SIDE OF WORK

Recognizing the need to give all workers a voice, the Human Side of Work project aims to use the power of storytelling to establish a growing collection of relatable and heartfelt stories and images of generations, documenting natural work environments and providing a glimpse into the human side of work.

Since the project's launch in October 2021, we have shared 33 unique stories, gained 87 Instagram followers, and received over 1,300 pageviews on the project's website from 10 different countries. A sneak peak of our upcoming Latino-owned business collection is featured in this report.

SUPPORT OUR MISSION

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