




**2015–2016**  
**Annual Report**

**Center for Health, Work & Environment**  
colorado school of public health

## ● Table of Contents

- 4 Director's Note
- 6 Who We Are
- 8 Year in Review
- 9  **In the Classroom**  
Educating Students and Professionals
- 16  **In the Workplace**  
Providing Practical Advice and Support to Employers
- 20  **In the Community**  
Moving Research to Practice
- 26 Financials
- 27 Our Funders and Partners





## Director's Note ●

**F**rom the time I became a physician to when I became a professor at the Colorado School of Public Health, I met too many workers who suffered from preventable job-related illnesses and injuries. I wanted to see employers using quality research to improve their health and safety programs so that employees could be protected from on-the-job injuries, and potentially come home from work healthier.

We started the Center for Health, Work & Environment as an academic hub for a community that wanted to have collective impact. We collaborate with faculty, staff, and partners to discover and share solutions to workplace health and safety challenges.

We chose to first focus on educating and mentoring the next generation of leaders. Today, just ten years after we launched the Mountain & Plains Education and Research Center, I am proud to report that over 100 trainees have completed masters, doctoral, and medical residency training in occupational and environmental health. More than 95% of our alumni are working in industry, government, academic or clinical positions, and more than 90% report the training they received prepared them for their jobs today.

We conduct research that is rigorous and relevant, testing practical solutions in the workplace, to have both immediate and long-term impact. We bring direct value to the workers and organizations who participate, ranging from small business owners in rural Colorado, to Cold War veterans in 50 states, to sugarcane farmers in Guatemala. Publication of our findings disseminates new knowledge even further.

“ Together, we will ensure everyone has a healthy, safe workplace.

We practice what we teach. Health can happen at work. Only three years after starting Health Links™, we have reached over 3,000 employers in Colorado, partnering to improve their health and safety practices for more than 90,000 workers. The initiative is now growing nationally and internationally. It has proven to be a Total Worker Health® solution that is adaptable to any industry or organization.

Our work is far from done. Employers and employees encounter new challenges to staying safe and being healthy, both on and off the job. Our region continues to have some of the highest rates of work-related injuries and fatalities in the country. And people are working while coping with chronic health conditions. Our research shows that more than half of Colorado workers experience mental or behavioral health problems like depression, chronic anxiety, and stress. More than half are overweight or obese. We need the research and funding to prevent disease, promote health, and to protect all workers. To do this, we need to build capacity for the future.

Looking ahead to the new year, we aim to: expand our reach in small and medium-sized businesses and to workers at highest risk of injury and poor health, develop new training opportunities for employers and health professionals, expand our university education

programs, and launch recently funded intervention studies as the country's newest national Center of Excellence for Total Worker Health.

Thank you to the workers and employers who are both our community partners and the people we serve. Thank you to our funders, friends, and families who have helped us move closer to a safer, healthier future for all workers. With your support, we are having collective, measurable impact on the lives of millions of workers and their families.

Together, we will ensure everyone has a healthy, safe workplace.

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

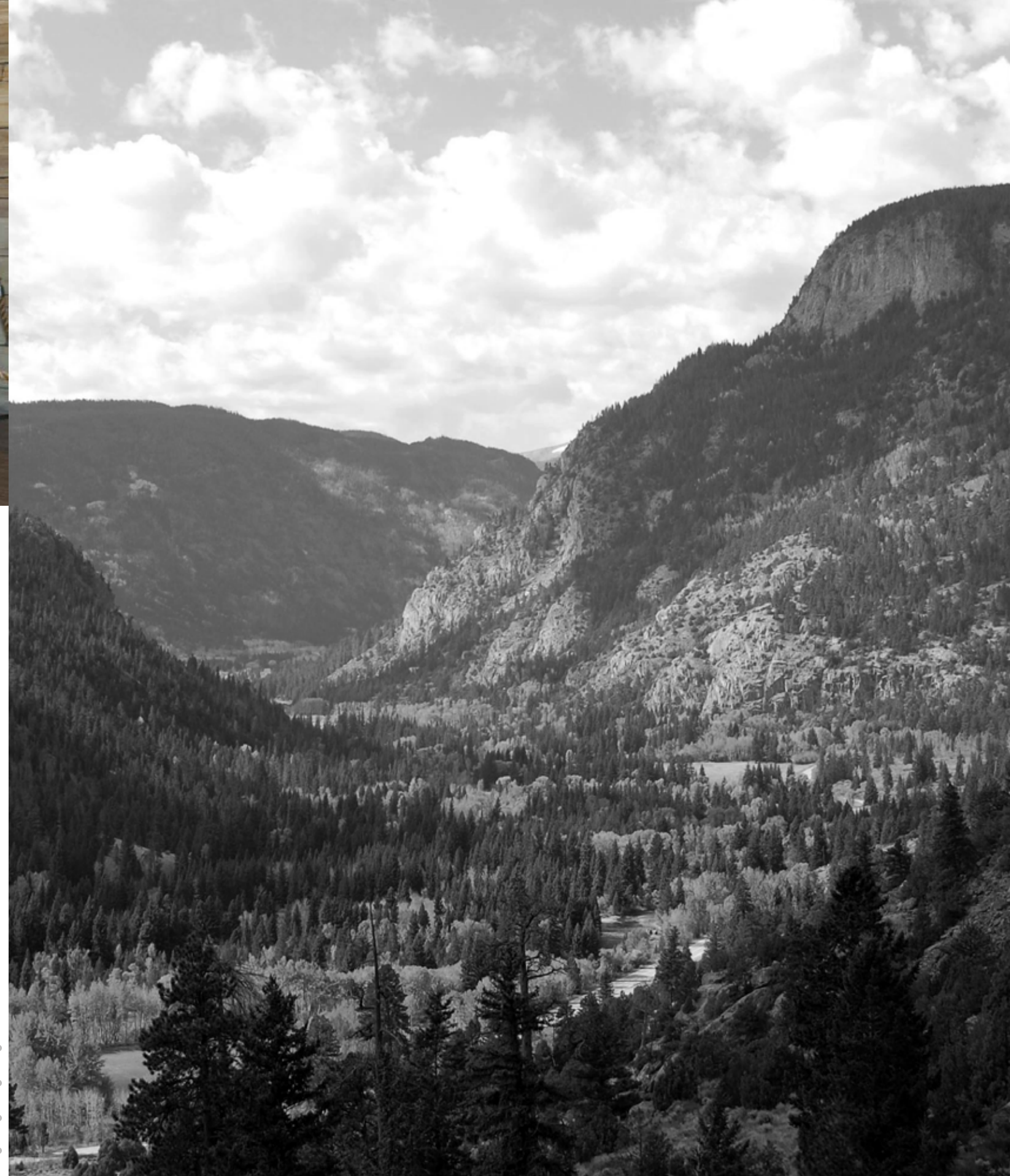


## Who We Are

**T**he Center for Health, Work & Environment at the Colorado School of Public Health is one of six national Centers of Excellence for Total Worker Health® and one of 18 national centers for training occupational health and safety professionals. Our mission is to advance worker health, safety, and well-being.

We educate future leaders, conduct research, and design practical solutions to occupational health and safety challenges with our partners. We use a Total Worker Health approach in all that we do, by prioritizing safety, first and foremost, while striving to improve overall worker health.

We envision a world in which every worker has a safe, healthy workplace.



# Year in Review

## Our Impact

**W**e study and design effective health and safety programs, partner with employers to implement best practices in health and safety, and prepare current and future professionals to become leaders in occupational health and safety.

### By the Numbers



**+90,000**  
workers reached



**2,771**  
students and  
professionals trained



**1,902**  
former Department of Energy site  
workers screened for health issues



**1,338**  
farm workers in Guatemala  
screened for health issues



**273**  
employers advised,  
certified, and funded



**+\$44,000**  
committed to  
pilot research



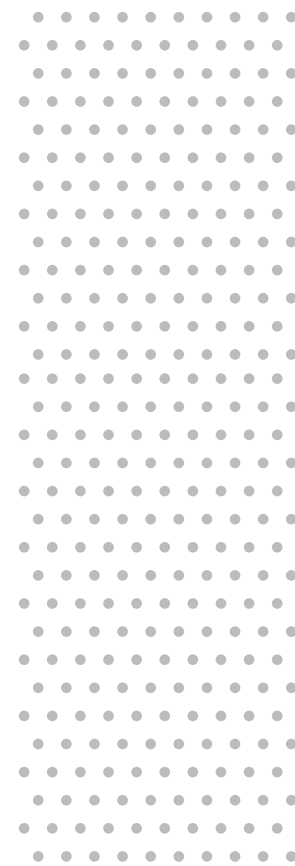
**78**  
research  
manuscripts published

## Highlights

Recognized with the **National Institute for Occupational Safety and Health (NIOSH) National Diversity Award** for hosting the first major workshop on the occupational safety and health needs of American Indian and Alaska Native workers

Shared **key research** informing a **new proposed federal standard** to protect workers at risk for chronic beryllium disease, an incurable lung disease

Helped found the **University of Colorado Consortium for Climate Change and Health**, a group of University of Colorado and allied scientists studying and addressing the effects of climate on human health



## In the Classroom Educating Students and Professionals



To meet the growing demand for skilled occupational health and safety professionals, we offer graduate, post-graduate, and continuing education through our Mountain & Plains Education and Research Center (MAP ERC), one of 18 centers of its kind funded by NIOSH. Courses are offered through Colorado State University and the Colorado School of Public Health.



Since 2008, we have **funded 47 innovative pilot studies** in the western United States, resulting in **more than 40 publications**. These projects advance knowledge and launch the careers of new researchers.



## Impact Snapshot

**100%**

of graduates are working in occupational health and safety

**24**

masters, doctoral, and physician trainees supported with tuition and stipends

**22**

research manuscripts published by trainees



## Supporting the Next Generation of Leaders

We provide tuition and stipend funding to trainees in five degree programs: health physics, industrial hygiene, occupational ergonomics, occupational health psychology, and occupational and environmental medicine.

Students receive in-depth training from experienced faculty, learn to work in interdisciplinary teams with faculty and trainees from other fields, and work with local industries to address real-world challenges.

## Meet Silpa ●

**D**r. Silpa Krefft, a recent MAP ERC graduate, still remembers the day she realized she wanted to be an occupational medicine specialist. She was working in the critical care unit of a local Denver hospital when she heard about a patient struggling to breathe. She rushed upstairs and was surprised to find a young man, only 26 years old, laying in the hospital bed.

Earlier that day, the man had been applying a liquid metal finish to concrete in a tight, enclosed space when his respirator, part of his protective gear, broke off. Hexavalent chromium, a carcinogenic chemical, and other toxins flooded his lungs.

“I remember his boss was with him at the hospital asking, ‘when can he go back to work?’” said Silpa.

The man’s condition was rapidly declining when Silpa and her team sprang into action. With the assistance of occupational medicine specialists, they were able to treat the young man, connect him with to the right people for follow up care, and help him navigate the workers’ compensation insurance system. “I thought, we don’t get this kind of training in pulmonary medicine,” Silpa explained.

From then on, she knew she wanted to treat and prevent work-related injuries and illnesses. Her parents encouraged her to explore other specialties but she refused. “I told them, if I don’t do this, who will help these workers? I can make a difference.”

“ I told them, if I don’t do this, who will help these workers? I can make a difference.



While she had been interested in medicine and working one-on-one with patients since grade school, she also hoped to make a difference in a wider population.

Silpa joined the MAP ERC in 2014 after doctors at National Jewish Hospital suggested that she apply to our occupational and environmental medicine residency program, even while she was completing fellowship training to become a lung specialist.

“The occupational medicine program brought me back

“ We did classroom work, community work, and job training. And the collaboration with trainees across the different programs is great. I can’t imagine doing the job without them now.

full circle into the public health world of prevention and addressing bigger issues. For me, it was one of those things that added meaning to my work,” Silpa explained.

Although Silpa received plenty of on-the-job training prior to joining the program, she credits her MAP ERC education with a great deal of her practical experience. “We did classroom work, community work, and job training. And the collaboration with trainees across the different programs is great. I can’t imagine doing the job without them now.”

Two years later, after completing the residency and her Master of Public Health degree, she joined the faculty at National Jewish Health as an occupational pulmonary medicine specialist. When asked about what keeps her motivated in this difficult, at times disheartening profession, her face lights up just thinking about her patients.

“When you ask about a patient’s occupational and environmental exposures, you get to know the person. To understand illness, you have to understand the person’s life story. You get this amazing appreciation for people and all the different jobs out there.”

## Training Program Highlights

### Health Physics

- 7 trainees**  
supported by the MAP ERC
- 7 publications**  
authored by trainees
- 3 graduates**  
began positions at Remote Sensing Laboratory, Mission Support Alliance, and Duke Energy

### Industrial Hygiene

- 6 trainees**  
supported by the MAP ERC
- 22 publications**  
including 6 with trainee co-authors
- 4 graduates**  
began positions at Montana Tech, Lockheed Martin, Pueblo City-County Health Department, and Los Alamos National Laboratory

### Occupational Ergonomics

- 4 trainees**  
supported by the MAP ERC
- 8 presentations**  
given by trainees at regional, national, and international professional meetings
- 2 graduates**  
began positions at Boeing and Medtronic

### Occupational & Environmental Medicine Residency

- 3 residents**  
supported by the MAP ERC
- 21 publications**  
authored by faculty and residents
- 1 graduate**  
began a position at Resources for Environmental and Occupational Health

### Occupational Health Psychology

- 4 trainees**  
supported by the MAP ERC
- 15 presentations**  
given by trainees
- 2 graduates**  
began positions at NIOSH and Vantage Evaluation

## Professionals Keep Skills Sharp with Ongoing Learning

**F**rom training medical practitioners on how to prevent opioid abuse to preparing safety professionals for the Certified Safety Professional (CSP) exam, we offer a wide array of online and in-person continuing education courses. Professionals working in environmental health and safety, industrial hygiene, ergonomics, medicine, human resource management, and more participate in our continuing education offerings.



**Since 2012, over 2,300 medical practitioners have completed our online chronic pain management course.** This nationally recognized training helps clinicians combat opioid abuse, a current epidemic. In July 2015, we worked with the Colorado Consortium for Prescription Drug Abuse Prevention to create new educational modules specifically for dentists and veterinarians. **Visit [ucdenver.edu/chwe/preventingrxabuse](http://ucdenver.edu/chwe/preventingrxabuse) to learn more.**

### Impact snapshot

**2,747**  
professionals participated in continuing education courses and workshops

**475**  
course hours of continuing education offered

**33**  
conferences, workshops, and seminars hosted

### Hosted the first

workshop bringing together tribal, government, and academic representatives to discuss the health and safety needs of American Indian and Alaska Native workers

We have many educational and networking opportunities for students, professionals, and businesses alike. **Check out our online calendar for a list of upcoming events and trainings at [ucdenver.edu/chwe/events](http://ucdenver.edu/chwe/events).**





## In the Workplace Providing Practical Advice and Support to Employers



## Making the Case that Healthy Business is Better Business

Employers want straightforward, proven ways to promote the health and safety of their employees. In 2013, we launched Health Links to help employers build a culture of health and safety in the workplace. We assess organizations' policies and programs, offer evidence-based recommendations in one-on-one advising sessions, connect employers with local resources, and certify qualifying businesses as Healthy Businesses.

### Impact Snapshot

**\$80,000**

granted to small businesses to  
implement health and safety programs

**+3,000**

employers reached

**167**

advising sessions provided

**111**

businesses certified as Healthy  
Businesses



In February 2016, **Health Links expanded to Florida.** The Department of Health in Manatee County and the local chamber of commerce have championed the program as a way to **promote healthy living and fight chronic disease.**



## Meet Dennis ●



Photo credit: Ball Aerospace

**W**hen Dennis Hu, the director of environmental health and safety at Ball Aerospace, began working with our MAP ERC trainees, he was thrilled. His motivation, as he puts it, “all comes back to young people.” With two university professors for parents, Dennis has always valued education and dedicates much of his time to mentoring young people. “It’s rewarding to me to support the growth and education of young people because that’s where new and innovative solutions come from,” he explains.

Every spring, our trainees take a symposium course, where they gain experience working in their field. Students form interdisciplinary teams and work with local businesses to address their health and safety needs over the course of the semester. A university faculty member serves as an advisor to the student group and business. These public-private partnerships support both learning and business interests. Trainees

“ It adds value to us here at Ball to get the perspective of academia and it’s important for students to see how things are done in practice. You can’t pick that up from a textbook.

learn to solve problems outside of the classroom and businesses tap into young talent.

“It adds value to us here at Ball to get the perspective of academia and it’s important for students to see how things are done in practice. You can’t pick that up from a textbook. Getting things done at a company is different than coming up with a solution on paper. You need buy-in and stakeholders need to give input.” He explains, “That’s something students might not get exposure to and that’s why I like the multidisciplinary approach. That approach is exactly what you have to take in the real world.”

Trainee projects have helped Ball make informed decisions around their occupational health and

safety programs. Madison Hanscom, a student in the occupational health psychology program, recently gave a presentation on how workplace culture impacts employee safety. The research she shared is now helping shape Ball’s 2017 health and safety strategic plan.

“We led focus groups, gathered qualitative data, and offered recommendations. We tried to root everything in best practice and research. And we were heard. Dennis was so receptive,” said Madison.

Even after the course ended, Madison and Dennis have continued to look for opportunities to collaborate. “I met with Dennis about extending some of this work and after talking with him, I came up with a few research ideas. We’re discussing future opportunities for data collection,” Madison explained.

For Dennis, working with our trainees is rewarding on both a personal and professional level. “It’s a big benefit to Ball to be part of improving worker health and safety. We’re always looking ahead at the next generation of satellites, monitoring instruments, and sensor technologies to improve the quality of life for everyone on the planet. It’s fitting that’s what the Center does as well.”

After years of work together, we remain proud to partner with Ball and leaders like Dennis. And according to Dennis, the feeling is mutual. “For Ball to be at the forefront of groundbreaking research... it makes us proud to be associated with the Center.”



Photo credit: Ball Aerospace



## In the Community Moving Research to Practice



## Employee Health Affects Workers' Compensation Claims The Health Risk Management Study

**T**o make the best business case for why employers should invest in health and safety, we wanted to understand how employee health impacts workplace injuries. In 2011, we began a partnership with Pinnacol Assurance, Colorado's largest workers' compensation insurer.

With data collected from Pinnacol's Health Risk Management study, we looked at the workers' compensation claims of more than 300 businesses and 15,000 employees participating in a free wellness program offered to Pinnacol policyholders. Large, medium, and small businesses across a wide range of industries took part in the study. We examined how different health risk factors affect workers' compensation claims.

### What we found:

**97% of employers** reported that worker wellness improves worker safety<sup>1</sup>

Modifiable **health risks affecting claims and costs** included chronic fatigue, sleeping problems, headaches, arthritis, hypercholesterolemia, and hypertension<sup>1</sup>

Employees who were stressed at work were **22% more likely to suffer a work-related injury**<sup>2</sup>

Based on our findings, we **developed the Pinnacol Health Risk Cost Calculator**, the first online tool to show businesses how employee health is related to workers' compensation claims and costs.



<sup>1</sup> Newman, L.S., et al. (2015). Implementation of a worksite wellness program targeting small businesses: the Pinnacol Assurance health risk management study. *Journal of Occupational and Environmental Medicine*, 57(1), 14–21. <http://doi.org/10.1097/JOM.0000000000000279>

<sup>2</sup> Schwatka, N.V., et al. (2016) Health risk factors as predictors of workers' compensation claim occurrence and cost. *Occupational and Environmental Medicine*, Published Online First: 16 August 2016, 1–10. doi:10.1136/oemed-2015-103334

## Guatemala

### Partnering to Improve Farm Worker Health and Understand the Impacts of Climate

As temperatures and the frequency of extreme weather events increase, farm workers are at risk for a range of health and safety problems, from chronic dehydration to chronic kidney disease. In the summer of 2015, we began working with our colleagues at the Center for Global Health to understand and address the health and safety needs of farm workers in Guatemala.

Partnering with AgroAmerica and Pantaleon, two of the largest agricultural businesses in Central America, we launched studies in Guatemala to improve injury prevention and health promotion programs. These projects will shed light not only on the health and safety concerns of banana and sugarcane workers, but also identify best practices for the industry. The findings of this research could impact millions of agriculture workers worldwide.

In October 2015, we helped found the **University of Colorado Consortium for Climate Change and Health (UC4Health)**, a group of University of Colorado scientists banding together to address how climate affects human health. As part of this effort, **we focus on worker health** by designing practical interventions, disseminating what we learn, and changing policies.



## Our Research Advances Protections Against an Incurable Lung Disease

For nearly 30 years, Center Director Dr. Lee Newman has studied beryllium and its effect on workers. This lightweight metal is used to make countless modern wonders, from computers to satellites. Unfortunately, exposure to beryllium can cause an incurable lung disease, chronic beryllium disease, among other health issues. Even minuscule amounts of beryllium dust, can lead to irreversible damage to the body. We estimate that nearly one million workers have been exposed to this toxic metal.

In August 2015, the U.S. Department of Labor Occupational Safety and Health Administration (OSHA) proposed a federal standard to protect American workers from beryllium exposure. OSHA relied on more than 100 scientific research papers authored

by Lee, his protégés, and his colleagues to justify the need for regulation. In an unusual display of solidarity, representatives from industry, government agencies, labor unions, and other stakeholders testified alongside Lee in support of the proposed policy.

If this new rule is adopted, OSHA estimates over 95 premature deaths could be prevented every year. While the policy works its way through the rulemaking process, many companies continue to use a blood test, designed by Lee and his team, to detect chronic beryllium disease in its early stages.



## Thousands of Workers Reached with Health Screenings

### The National Supplemental Screening Program

Over a decade ago, we began working with the Department of Energy and Oak Ridge Associated Universities to identify medical conditions among former energy workers. The National Supplemental Screening Program (NSSP) screens former Department of Energy site employees for occupational illnesses, such as asbestosis and lung cancer. The program also alerts participants to conditions like diabetes and hypertension. Thousands of workers have been properly diagnosed, sought follow up medical care, and received federal compensation as a direct result of this free screening program.

#### Impact snapshot

In a 2016 study of program participants<sup>3</sup>

**40.5%**

were diagnosed with a work-related condition, often qualifying for federal compensation and better care

**85.8%**

were diagnosed with non-occupational health problems, many of whom were not aware of the issue before the screening

**99.1%**

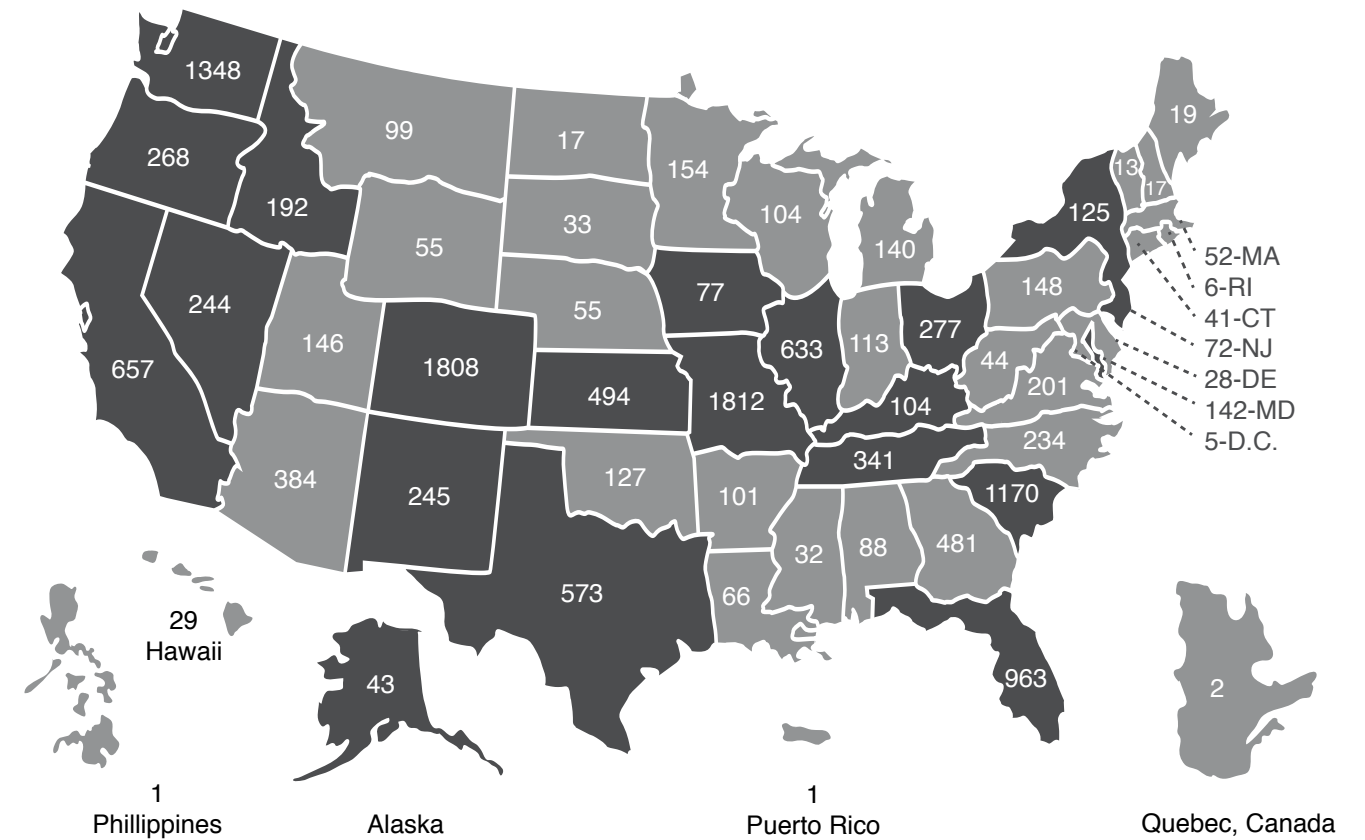
reported feeling satisfied with the program

“Everyone involved in my screening was very helpful, friendly, informative, and professional. I thank you for the opportunity to have this examination.

— Former Los Alamos National Laboratory worker

#### NSSP Participants

through September 2015



● States with Department of Energy sites

**17,000**

former workers screened for health conditions since the program began in 2005

**1,902**

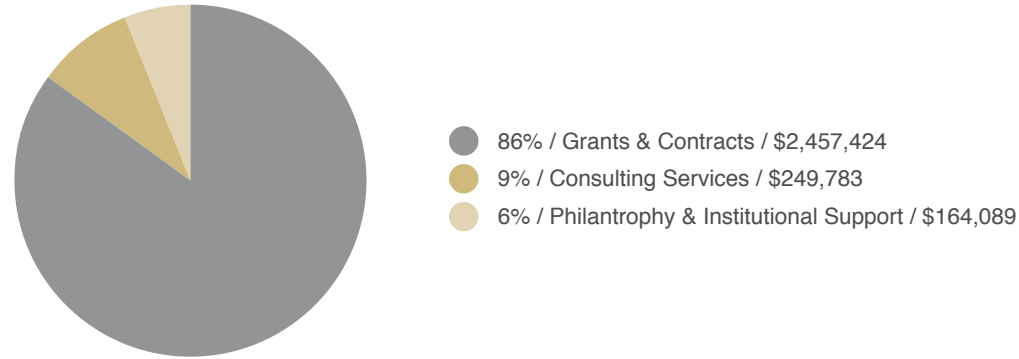
screened in the past year

<sup>3</sup> Stange, B., et al. (2016), Integrated approach to health screening of former department of energy workers detects both occupational and non-occupational illness. *American Journal of Industrial Medicine*, 59, 200–211. doi:10.1002/ajim.22554

# Financials

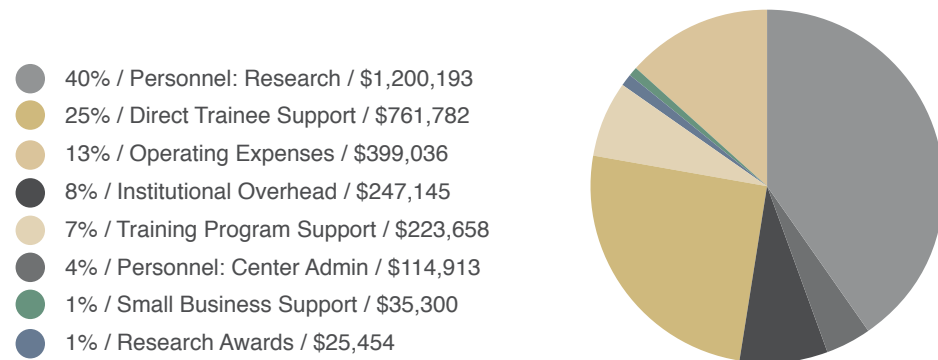
## Revenue and Awards

\$2,871,296



## Expenses

\$3,007,481



These figures represent cash receipts or grant awards received during FY16. This does not account for existing cash reserves, contractually obligated funds which have not yet been collected, or grant funds awarded in previous years which were carried forward. Actual financial resources for FY16 equate to \$5.9M.

# Our Funders and Partners

## Supporters

- National Institute for Occupational Safety and Health
- Pinnacol Assurance
- CU Anschutz Campus Chancellor
- Oak Ridge Associated Universities
- Pantaleon
- U.S. Department of Energy
- National Institutes of Health
- University of Colorado Health and Welfare Trust
- Eagle County Public Health
- The Center for Construction Research and Training (CPWR)
- U.S. Health Resources and Services Administration
- Harold and Robert Hollis Family Trust
- Denver Health Foundation
- Blake Medical Center
- Tri-County Public Health Department
- Otero County Health Department
- Delta County Department of Health and Human Services
- Las Animas-Huerfanos Counties District Health Department

## Partners

- AgroAmerica
- American Industrial Hygiene Association–Rocky Mountain Section
- American Society of Safety Engineers
- Association for Occupational Health Professionals in Healthcare
- Center for Global Health at the Colorado School of Public Health
- Colorado Consortium for Prescription Drug Abuse Prevention
- Colorado Department of Public Health and Environment
- Colorado Office of Economic Development and International Trade
- Colorado School of Public Health
- Colorado Small Business Development Center Network
- Colorado State University
- Denver Health and Hospital Authority
- Health Physics Society
- High Plains Intermountain Center for Agricultural Health & Safety
- National Jewish Health
- Rocky Mountain Academy of Occupational and Environmental Medicine
- Veteran Affairs Medical Center
- Western States Division of the National Institute for Occupational Safety and Health

Thank you for your support.  
**You are vital to our mission.**  
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 To contact us, email [chwe@ucdenver.edu](mailto:chwe@ucdenver.edu)

## Center for Health, Work & Environment

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