

A. COVER PAGE

Project Title: Longitudinal Study of Total Worker Health in Small Enterprises	
Grant Number: 5K01OH011726-03	Project/Grant Period: 07/01/2019 - 06/30/2022
Reporting Period: 07/01/2021 - 06/30/2022	Requested Budget Period: 07/01/2021 - 06/30/2022
Report Term Frequency: Final	Date Submitted: 09/29/2023
Program Director/Principal Investigator Information: NATALIE VIRGINIA SCHWATKA , BA MS PHD Phone Number: 3037244607 Email: NATALIE.SCHWATKA@CUANSCHUTZ.EDU	Recipient Organization: UNIVERSITY OF COLORADO DENVER Mail Stop F428, Anschutz Medical Campus, Bldg 500 13001 East 17th Place, Room W1124 Aurora, CO 800452571 DUNS: 041096314 UEI: MW8JHK6ZYEX8 EIN: 1846000555A7 RECIPIENT ID:
Change of Contact PD/PI: NA	
Administrative Official: GARRETT STEED OCG Mail Stop F428 Anschutz, Fitzsimons Bldg 13001 E 17th Place, Rm W1124 Aurora, CO 80045 Phone number: 3037246254 Email: xenia@ucdenver.edu	Signing Official: GARRETT STEED OCG Mail Stop F428 Anschutz, Fitzsimons Bldg 13001 E 17th Place, Rm W1124 Aurora, CO 80045 Phone number: 3037246254 Email: xenia@ucdenver.edu
Human Subjects: NA	Vertebrate Animals: NA
hESC: No	Inventions/Patents: No

B. ACCOMPLISHMENTS

B.1 WHAT ARE THE MAJOR GOALS OF THE PROJECT?

Career development:

My overall career goal is to become an independent researcher in the field of OS&H. I aim to be an expert in how organizational-level factors affect safety and health outcomes in small businesses across a range of industry sectors, with particular emphasis in the design and evaluation of interventions that enhance TWH. More specifically, I aim to become an expert in TWH systems and how leadership practices contribute to their development and effectiveness. All of the aforementioned training and research activities have helped me gain a greater understanding of workplace health protection and how to leverage organizational practices to improve it in the construction industry. However, if I am to be a successful TWH researcher, I need to develop the knowledge and skills related to health promotion and its integration with safety systems, as well. Second, if I am to specialize in organizational commitment to TWH, and evidence-based application of TWH concepts, then I need to address the gaps in research related to organizational support for TWH. Third, if I am to apply these concepts to small businesses, I need to explore other industries. Finally, if I aim to conduct intervention studies, I need to receive additional training in multi-level and longitudinal data analyses as well as qualitative data analyses. In order to meet my goal, I have the following objectives for this K01 award:

1. To gain an understanding of health promotion and its connection with health protection via a TWH strategy.
2. To understand TWH systems and leadership practices among small businesses.
3. To develop qualitative and quantitative data analytic skills that will help me understand how relationships between organizations and workers impact safety, health, and well-being outcomes.

Research project:

Specific Aim 1: Determine the predictive relationship between organizational level TWH systems and worker level health outcomes. Over a 24-month observation period, I will test the relationship between TWH systems across six domains, organizational climates for safety and health, and worker motivation, behavior, health status, and productivity. Overarching hypothesis: Small businesses adoption of TWH programs and policies and a positive change in organizational climates for safety and health will result in improvements in worker health, safety, and productivity outcomes.

Specific Aim 2: Understand how small business leadership practices affect TWH system effectiveness. I will complement SA1 with an investigation of how leadership practices influence TWH system effectiveness. To do this I will conduct a qualitative study with management, workers, and safety/human resource managers.

B.1.a Have the major goals changed since the initial competing award or previous report?

No

B.2 WHAT WAS ACCOMPLISHED UNDER THESE GOALS?

File Uploaded : Final B.2 What was accomplished.pdf

B.3 COMPETITIVE REVISIONS/ADMINISTRATIVE SUPPLEMENTS

For this reporting period, is there one or more Revision/Supplement associated with this award for which reporting is required?

No

B.4 WHAT OPPORTUNITIES FOR TRAINING AND PROFESSIONAL DEVELOPMENT HAS THE PROJECT PROVIDED?

File Uploaded : Final B.4. Opportunities for training and professional development.pdf

B.5 HOW HAVE THE RESULTS BEEN DISSEMINATED TO COMMUNITIES OF INTEREST?

NOTHING TO REPORT

B.6 WHAT DO YOU PLAN TO DO DURING THE NEXT REPORTING PERIOD TO ACCOMPLISH THE GOALS?

Not Applicable

B.2 WHAT WAS ACCOMPLISHED UNDER THESE GOALS?

Career development:

Objectives for this K01 award:

1. To gain an understanding of health promotion and its connection with health protection via a TWH strategy.
2. To understand TWH systems and leadership practices among small businesses.
3. To develop qualitative and quantitative data analytic skills that will help me understand how relationships between organizations and workers impact safety, health, and well-being outcomes.

Education. I have taken course work to address each of these objectives, including latent variable methods, health psychology, an executive leadership course, a social network analysis, and am taking a longitudinal data analysis course. I also participated in training in the responsible conduct of research. Finally, I learned how to write a business case study through a one-on-one mentoring activity with a business professor at UC Denver who has experience writing business school case studies. This resulted in a TWH case study that I have used in multiple classes.

Mentorship. I met with my mentor, Dr. Lee Newman, on a weekly basis to discuss progress. I have also met with my department chair on a quarterly basis to update them on my career plans and activities and to discuss progress towards promotion. Finally, I met with all mentors to discuss my career development plans and activities annually.

Presentations. On a yearly basis, I presented my research during my department's research in progress seminar as well as my Center's weekly all-hands meetings to obtain feedback from faculty, staff, and students. I presented my research at a national conferences, including Work, Stress & Health, American Occupational Health Conference, ASSP Safety21 Conference and Expo, AIHA-Rocky Mountain Section Fall Technical Conference, International Symposium to Advance Total Worker Health, Society for General Internal Medicine Annual Conference, 33rd International Congress on Occupational Health, XXII World Congress on Safety and Health at Work 2021, Oregon Construction Safety Summit, NYNJ ERC Occupational Health and Safety Center 42nd Annual Scientific Meeting, and Colorado Safety Association Annual Rocky Mountain Safety Conference. I submitted a proposal (as session chair) to the Preventative Medicine Conference in May 2020, but this conference was cancelled due to COVID-19. I presented my research during webinars hosted by CPWR: The Center for Construction Research and Training, Health Links, NIOSH Center's Meeting, NIOSH NORA Traumatic Injury Prevention Council, and CPH-NEW Total Worker Health Learning Lab. I hosted two virtual TWH leadership workshops with business leaders.

Publications. During the entire award period, I published 10 peer reviewed papers that were directly related to this award. I also have one manuscript currently under review related to this award. I also published 3 book chapters.

Other research effort. I successfully completed the aims of a CPWR: Center for Construction Research & Training grant in Fall 2019. This resulted in three peer reviewed publications and a safety leadership training that will reach over 100,000 construction workers per year. I have also helped the Center with the Small+Safe+Well study funded through our Center of Excellence in Total Worker Health. I assisted with data analyses and manuscripts as well as the leadership

intervention component of the study. I have also helped the Center with the international Total Worker Health research project in Central America by collaborating on intervention development and evaluation as well as manuscripts. Finally, I wrote, received funding, and completed a two-year small research project focused on mental health integrated emergency preparedness in public schools using a shared leadership approach that was part of our NIOSH Center of Excellence in Total Worker Health.

Future grant funding.

I prepared and submitted (or was a mentor/collaborator on) several successful grant applications.

- I assisted my mentor, Dr. Lee Newman, with our Center's NIOSH ERC renewal application by co-writing a proposal to fund our Certificate in Total Worker Health program as a new program. Since funding began, we have been able to support 25 students.
- I received a small, two year grant proposal that was submitted as part of our Center of Excellence in Total Worker Health renewal grant focused on integrating workforce mental health into school emergency preparedness via shared leadership and peer support. I completed this project in August 2023.
- One of my mentees received a small grant from CPWR: The Center for Construction Research and Training to study the effect of climate on construction worker injury in Colorado. I serve as a mentor on this project.
- One of my collaborators in the School of Medicine received funding from the American Medical Association for us to study hospitalist workload and burnout.

I prepared and submitted a few proposals that were not funded.

- I wrote a small, two year grant proposal that was submitted with Mental Health America's Center of Excellence in Total Worker Health grant in Winter 2020/2021 focused on leadership for mental health in rural small businesses. While this proposal scored well, the overall center application was not funded.
- I retooled this grant proposal under our Center's NIOSH TWH Center of Excellence resubmission application focused on leadership for mental health in rural small businesses.
- I also retooled this proposal and submitted to NIOSH as a standalone R01 grant focusing on the construction industry.
- I collaborated with researchers from UC Health to write a HRSA grant focused on leadership and healthcare worker well-being.

I currently have three proposals under review/in preparation for funding:

- I have a R03 grant under review at AHRQ to conduct a Total Worker Health and leadership needs assessment among federally qualified health centers.
- I have a 3-year NSF grant under review to study the conditions that promote effective leadership practices to support healthcare worker well-being.
- I am preparing an R01 grant focused on collaborative TWH leadership in the construction industry that will go in with CPWR: The Center for Construction Research and Training's NIOSH National Construction Center application.
- I am preparing an R01 grant focused on the impact of working conditions on early childhood educators and the children they care for that will go into the NIH's request for proposals on work and health disparities.

Research project:

Specific Aim 1: Determine the predictive relationship between organizational level TWH systems and worker level health outcomes. Over a 24-month observation period, I will test the relationship between TWH systems across six domains, organizational climates for safety and health, and worker motivation, behavior, health status, and productivity. **Overarching hypothesis:** Small businesses adoption of TWH programs and policies and a positive change in organizational climates for safety and health will result in improvements in worker health, safety, and productivity outcomes.

To address this aim's hypothesis, I planned to use data that was being collected as part of a larger study my mentor, Dr. Newman, was leading. As part of this larger study, we were collecting longitudinal data on TWH policies, programs, and practices as well as employee survey report of climates and health, safety, and productivity outcomes. Due to the challenges of collecting and linking longitudinal data from employees from multiple companies' over the course of three years, including the significant impact that the COVID-19 pandemic had on small business, we were not able to collect the data that we would have needed to address this career development aim 1 as planned.

However, I was able to devise a new research study using these data to evaluate changes in small business TWH practices over time.

1. **Schwatka, NV**, Dally, M, Shapiro, D, Tenney, L, Dexter, L, Brown, C, Newman, LS. (in preparation). A longitudinal evaluation of small business health and safety practices.

I used the statistical methods I learned in my Latent Profile Analysis course to categorize small business into classes using information on their TWH business practices. My collaborators and I then hypothesized that change in a business's TWH business practices overtime depended on the existing TWH environment in year 1 – i.e., their level of existing TWH policies and programs as well as the leadership and climate to support the policies and programs. We tested this hypothesis over the course of three years at the business level with 43 businesses. Overall, we observed that the businesses that started with relatively few TWH business practices improved upon their practices the most. We conducted a qualitative investigation of the goals that each business set for themselves at year one to better understand whether intentions to enhance their TWH practices. For example, businesses in the beginning stages of adopting TWH practices were focused on goals related to ensuring their leadership demonstrated support for workplace health and safety.

Additionally, I utilized year 1 data to conduct cross-sectional studies that address this aim.

2. **Schwatka, NV**, Dally, M, Tenney, L, Shore, E, Brown, C, Newman, LS. (2020). Total Worker Health leadership and business strategies are related to safety and health climates in small business. *International Journal of Environmental Research and Public Health*. 17(6), 2142. PMID: [PMC7143812](https://pubmed.ncbi.nlm.nih.gov/34143812/)

In this manuscript, my co-authors and I investigated the role of small business Total Worker Health® (TWH) strategies and perceptions of leadership in the development of health and safety climates. We confirm the primacy of the relationship between leadership commitment

to safety and workplace safety climate. After accounting for leadership commitment to safety, business-reported policies and practices that promote the health, safety and well-being of workers (i.e., TWH strategies) were no longer related to safety climate. In contrast, the relationship between TWH strategies and health climate depended on the level of small business leadership commitment to worksite wellness. These findings suggest that TWH professionals can enhance safety and health climates via improving leadership practices. Future research should investigate integrated TWH leadership development strategies as a means of simultaneously improving safety and health climates.

3. **Schwatka, NV**, Sinclair, R, Fan, W, Dally, M, Shore, E, Brown, C, Tenney, L, Newman, LS. (2020). How does organizational climate motivate employee safe and healthy behavior in small business? A Self Determination Theory perspective. *Journal of Environmental and Occupational Medicine*. 62(5): 350-358. PMID: [PMC7225023](#)

We found that safety climate was associated with all three types of safety motivation and that all types of safety motivation were associated with safety participation behaviors. All types of safety motivation mediated the association between safety climate and safety participation behaviors. We also found that health climate was associated with all types of health motivation and that each type of health motivation was associated with health participation behaviors. All types of health motivation mediated the association between health climate and health participation behaviors. This manuscript was recently re-submitted to the *Journal of Occupational and Environmental Medicine* after addressing reviewer comments.

4. **Schwatka, N. V.**, Dally, M., Shore, E., Dexter, L., Tenney, L., Brown, C. E., & Newman, L. S. (2021). Profiles of total worker health® in United States small businesses. *BMC public health*, 21(1), 1010. PMID: [PMC8164062](#)

After taking a course in latent variable methods in year 1 of this proposal, I applied what I learned to understand how the work environment shapes employee engagement in TWH policies and programs. I used a latent profile analytical approach to characterize what TWH strategies small businesses use based on TWH indicators collected at the business (TWH policies and programs) and employee (leadership and climate) levels. My findings indicated that small businesses can employ one of four strategies. There were two profiles characterized by low and high levels of the indicators as well as profiles with two different foci on either TWH business strategies or leadership and climate. Employees working for a business with a profile that focused on leadership and climate, in addition to having a business strategy, reported the best safety and health behaviors.

I have also been involved in three manuscripts that evaluate two types of Total Worker Health interventions focused on helping businesses adopt and implement TWH policies and programs.

5. **Schwatka, NV**, Brown, CE, Tenney, L, Scott, JG, Shore, E, Dally, M, Newman, L. (2021). Evaluation of a Total Worker Health leadership development program for small business. *Occupational Health Sciences*. 5: 163-188. PMID: PMC10291283

Organizational leadership practices play a pivotal role in TWH policy and program development and implementation. I led the development and evaluation of a TWH leadership

program for small business owners and other senior leaders. In a manuscript that is currently under review, I describe the intervention and our implementation and effectiveness evaluation of the training. Our study sheds light on how to train small business leaders on key TWH leadership principles and gives preliminary evidence for its effectiveness in improving small business leaders' leadership practices.

6. Shore, E, Tenney, L, **Schwatka, NV**, Dally, M, Dexter, L, Brown, CE, Newman, L. (2021). A pilot study of changes in Total Worker Health policies and programs and associated changes in safety and health climates in small business. *AJIM*. 64(12): 1045-1052. PMID: PMC8989365

I collaborated with my colleagues to determine whether changes to TWH policies and programs were associated with changes in safety climate and health climate over a one year period. We found that there was a small, but positive association. This study is important for two reasons. First, it demonstrates that if businesses develop and implement TWH policies and programs their employees are likely to perceive that their business cares for their health and safety. Second, it is one of the few studies that links these business and employee level data over two time periods.

7. **Schwatka, NV**, Dally, M, Shore, E, Tenney, L, Brown, CE, Scott, JG, Dexter, L, Newman, LS. (2022). Small+Safe+Well: Lessons learned from a Total Worker Health® randomized intervention to promote organizational change in small business. *BMC Public Health*. 22, 1039. PMID: [PMC9128251](#)

I collaborated with my colleagues to evaluate a Total Worker Health, organizational change intervention. We did not observe changes in any of our key outcomes – TWH policies and programs as well as employee reports of climate, behavior, etc. However, through this work we identified many opportunities for developing and implementing leadership-based TWH interventions in small businesses.

I was also able to evaluate changes in safety and health climates at multiple time points during the early months of the pandemic.

8. Brown, C, Dexter, L, **Schwatka, NV**, Dally, M, Tenney, L, Shore, E, Newman, LS (2021). Total Worker Health® and Small Business Employee Perceptions of Health Climate, Safety Climate, and Well-Being during COVID-19. *International Journal of Environmental Research and Public Health*. 18: 9702. PMID: [PMC9469982](#)

We found that perceptions of health and safety climates remained stable across all timepoints. However, employee well-being scores declined between the pre-pandemic period and subsequent COVID-19 timepoints. These findings suggest that while small organizations continued to be viewed as supporting employees' health and safety over the course of the pandemic, well-being scores declined, indicating that other factors contributed to decreased well-being. This study highlighted opportunities for enhancing our TWH leadership program to help small businesses develop sustainable practices that could withstand emergency events.

Finally, I was able to expand my research questions to an international audience with existing data that my mentor data from Central America.

9. **Schwatka, NV**, Jaramillo, D, Dally, M, Krisher, L*, Dexter, L, Butler-Dawson, Clancy, R*, Fisher, GG, Newman, LS. (2022). Latin American agricultural workers' job demands and resources and the association with health behaviors at work and overall health. *Frontiers in Public Health*, Section: Occupational Health and Safety. 10:838417. PMID: [PMC9021611](https://pubmed.ncbi.nlm.nih.gov/39916111/)

After taking a course in latent variable methods in year 1 of this proposal, I applied what I learned to understand how the work environment shapes agricultural workers' health in Latin America with existing data from my mentor. This study illuminated disparities in what might contribute to agricultural workers' health and offered opportunities for employers to consider ways to design healthy work for all. It also was a unique opportunity to study theories and concepts not typically studied in Latin American agricultural workers.

Specific Aim 2: Understand how small business leadership practices affect TWH system effectiveness. I will complement SA1 with an investigation of how leadership practices influence TWH system effectiveness. To do this I will conduct a qualitative study with management, workers, and safety/human resource managers.

The COVID-19 pandemic made it challenging to conduct focus groups as planned. To overcome this obstacle, I translated my plans into four studies that highlight the importance of leadership for TWH system effectiveness. The first study (#9) was a direct translation of what I had planned to do for Aim 2 into a project that was feasible given my connections to the construction industry. Two of the studies (#10 and #11) reflect new collaborations with faculty in our School of Medicine where I was able to learn more about leadership and TWH in the healthcare industry. The final study (#12) reflects another translation of my original aim to specifically focus on how leadership practices specific to mental health at work affects TWH system effectiveness – a topic that was very important during the pandemic. I was able to hire a professional research assistant to assist with some of these research activities.

10. **Schwatka, NV**, Schilz, M*, & Johnson, J. (2023). Shared leadership for Total Worker Health in the construction industry. *Journal of Environmental and Occupational Medicine*. 65(5):e290-e297. PMID: PMC10175193 (available on 2024-05-01).

The purpose of this study was to investigate the organizational, supervisor, team, and individual factors associated with employee and leader perceptions of shared Total Worker Health (TWH) transformational leadership in teams. We conducted a cross-sectional study with 14 teams across three construction companies. Shared TWH transformational leadership in teams was associated with employees and leaders' perceptions of support from coworkers. Other factors were also associated it, but it differed by position. We found that leaders may be focused on the mechanics of sharing TWH transformational leadership responsibilities and workers may be more focused on their internal cognitive abilities and motivations. Our results suggest the potential ways of promoting shared TWH transformational leadership among construction teams.

11. **Schwatka, NV**, Burden, M, Dyrbye, L. (in press). An organizational leadership development approach to support health worker mental health. *American Journal of Public Health*.

This was an editorial that was part of the special issue of AJPH on health worker mental health organized by NIOSH. This editorial explains the importance of health worker mental health, current leadership development approaches in the healthcare industry, and opportunities to improve these leadership development approaches to advance health worker well-being.

12. **Schwatka, NV**, Keniston, A, Astik, G, Linker, A, Gowling, G, Auerbauch, A, Burden, M. (under review). Leading the Way: Hospitalist Shared Leadership for Safety, Health, and Well-being at Work. American Journal of Public Health.

The purpose of this paper was to assess how hospitalist leaders (e.g., division head) and frontline hospitalists frame safety, health, and well-being (SHW) at work, their perception of hospital supports for SHW, and whether and how they are sharing leadership responsibility for each other's SHW at work. We conducted a mixed-methods study, using a survey and rapid qualitative analysis of five virtual focus groups, with 17 hospitalists was conducted from fall 2022-winter 2023. Formal leaders generally reported better perceptions of their organizations, teams, leaders, and their own responses to SHW than non-leaders. Frontline hospitalists were significantly less likely to report that their team and themselves were engaged in SHW efforts than formal leaders. Five focus group themes emerged relating to SHW concerns as well as organizational, supervisory, team and individual leadership for SHW. Our findings highlight the important role of local support for hospitalist SHW and shed light on systemic, hospital-wide problems that may impede their SHW. We believe that positioning hospitalists as leaders for SHW will result in systems-wide changes in practices to support the SHW of all care team members.

NOTE. I did not collect demographic information from focus group participants and thus cannot provide an inclusion/enrollment report for this specific study.

13. **Schwatka, NV**, Schilz*, Shapiro, D, Tenney, L. (in preparation). A Qualitative Study of Leadership for Mental Health in the Workplace.

The main research questions for this study were to understand what leaders do to promote mental health in the workplace as well as what leadership improvements are needed to promote mental health in the workplace? We conducted interviews with business that participated in our center's Health Links Mental Health Module, targeting both the TWH champion (n=17) responsible for implementing TWH in the organization as well as a member of their leadership team (n=15). We found that both entities are most concerned about stress generally, workload, suicide prevention, and caregiving. TWH champions and leaders diverged in areas related to what leadership is currently doing to protect and promote workforce mental health. This study provides several suggestions for businesses to think about how leaders can best support employee mental health.

NOTE. I did not collect demographic information from interview participants and thus cannot provide an inclusion/enrollment report for this specific study.

*Denotes manuscripts with a student.

B.4 WHAT OPPORTUNITIES FOR TRAINING AND PROFESSIONAL DEVELOPMENT HAS THE PROJECT PROVIDED?

In addition to my accomplishments related professional development activities listed in section B.2, I have also taught courses and served on advisory boards.

Over the course of this award period, I taught a one credit course on the spectrums of professions in protecting and promoting worker health (Fall 2019) as well as a two/three credit course on occupational safety and ergonomics (Fall 2019 – Present). I also developed a three-credit course in occupational health psychology (Fall 2022). All courses were for Certificate in Total Worker Health students, Master of Public Health students and occupational medicine residents/fellows. I spent 15% of my time completing these teaching activities. These teaching activities are related to my research career development as I incorporate research findings into my lectures to teach students about the latest research in my field.

In December 2020, I became the director of our Certificate in Total Worker Health program. I am responsible for the overall direction of the program, including training budget, recruitment, curriculum, student mentoring, and evaluation.

I also have attended departmental meetings and retreats and provided advising to Master of Public Health students.

I served on the American Society of Safety Professional's (ASSP) Total Worker Health Task Force (2018-2020). In this role, I assisted ASSP and the task force with curating TWH resources for ASSP members - existing resources or resources that we needed to develop to meet member needs. I spent about 1% of my time on this activity. This activity was related to my research career development as I aim to help the team identify evidence based TWH resources for ASSP members.

I served on the newly formed Society for Total Worker Health advisory board (2022 – Present). In this role, I assisted with forming early and pivotal activities to launch the society. I spent about 1% of my time on this activity.

Finally, I served on the Occupational Safety and Health Administration's safety culture expert panel (2023 – present). In this role, I was tasked with helping to write a leader-focused brief on the importance of safety culture and how to build a culture of safety. In the future, I will be tasked with helping the administration develop tools and resources to assist leaders in their efforts to build a culture of safety. I spent about 5% of my time on this activity.

My institution does not use individual professional development plans.

C. PRODUCTS

C.1 PUBLICATIONS

Are there publications or manuscripts accepted for publication in a journal or other publication (e.g., book, one-time publication, monograph) during the reporting period resulting directly from this award?

Yes

Publications Reported for this Reporting Period

Public Access Compliance	Citation
N/A: Not NIH Funded	Schwatka NV, Dally M, Tenney L, Shore E, Brown CE, Newman LS. Total Worker Health Leadership and Business Strategies Are Related to Safety and Health Climates in Small Business. International journal of environmental research and public health. 2020 March 24;17(6). PubMed PMID: 32213806; PubMed Central PMCID: PMC7143812; DOI: 10.3390/ijerph17062142.
N/A: Not NIH Funded	Schwatka NV, Sinclair RR, Fan W, Dally M, Shore E, Brown CE, Tenney L, Newman LS. How does Organizational Climate Motivate Employee Safe and Healthy Behavior in Small Business?: A Self-Determination Theory Perspective. Journal of occupational and environmental medicine. 2020 May;62(5):350-358. PubMed PMID: 32080015; PubMed Central PMCID: PMC7225023; DOI: 10.1097/JOM.0000000000001839.
N/A: Not NIH Funded	Schwatka NV, Brown CE, Tenney L, Scott JG, Shore E, Dally M, Newman LS. Evaluation of a Total Worker Health(®) leadership program for small business leaders. Occupational health science. 2021 March 27;5:163-188. PubMed PMID: 37366387; PubMed Central PMCID: PMC10291283; DOI: 10.1007/s41542-021-00086-5.
N/A: Not NIH Funded	Schwatka NV, Dally M, Shore E, Dexter L, Tenney L, Brown CE, Newman LS. Profiles of total worker health® in United States small businesses. BMC public health. 2021 May 29;21(1):1010. PubMed PMID: 34051787; PubMed Central PMCID: PMC8164062; DOI: 10.1186/s12889-021-11045-8.
N/A: Not NIH Funded	Brown CE, Dexter L, Schwatka NV, Dally M, Tenney L, Shore E, Newman LS. Total Worker Health(®) and Small Business Employee Perceptions of Health Climate, Safety Climate, and Well-Being during COVID-19. International journal of environmental research and public health. 2021 September 15;18(18). PubMed PMID: 34574628; PubMed Central PMCID: PMC8469982; DOI: 10.3390/ijerph18189702.
N/A: Not NIH Funded	Shore E, Tenney L, Schwatka NV, Dally M, Dexter L, Brown CE, Newman LS. A pilot study of changes in Total Worker Health® policies and programs and associated changes in safety and health climates in small business. American journal of industrial medicine. 2021 December;64(12):1045-1052. PubMed PMID: 34462934; PubMed Central PMCID: PMC8989365; DOI: 10.1002/ajim.23290.
N/A: Not NIH Funded	Schwatka NV, Jaramillo D, Dally M, Krisher L, Dexter L, Butler-Dawson J, Clancy R, Fisher GG, Newman LS. Latin American Agricultural Workers' Job Demands and Resources and the Association With Health Behaviors at Work and Overall Health. Frontiers in public health. 2022;10:838417. PubMed PMID: 35462804; PubMed Central PMCID: PMC9021611; DOI: 10.3389/fpubh.2022.838417.
N/A: Not NIH Funded	Schwatka NV, Dally M, Shore E, Tenney L, Brown CE, Scott JG, Dexter L, Newman LS. Small + Safe + Well: lessons learned from a Total Worker Health® randomized intervention to promote organizational change in small business. BMC public health. 2022 May

	24;22(1):1039. PubMed PMID: 35610627; PubMed Central PMCID: PMC9128251; DOI: 10.1186/s12889-022-13435-y.
N/A: Not NIH Funded	Schwatka NV, Johnson S, Schilz M. Shared Leadership for Total Worker Health in the Construction Industry. Journal of occupational and environmental medicine. 2023 May 1;65(5):e290-e297. PubMed PMID: 36808123; PubMed Central PMCID: PMC10175193; DOI: 10.1097/JOM.0000000000002812.
N/A: Not NIH Funded	Schwatka NV, Burden M, Dyrbye L. An organizational leadership development approach to support health worker mental health. American Journal of Public Health. Forthcoming.
C.2 WEBSITE(S) OR OTHER INTERNET SITE(S)	
Not Applicable	
C.3 TECHNOLOGIES OR TECHNIQUES	
Not Applicable	
C.4 INVENTIONS, PATENT APPLICATIONS, AND/OR LICENSES	
Have inventions, patent applications and/or licenses resulted from the award during the reporting period? No	
If yes, has this information been previously provided to the PHS or to the official responsible for patent matters at the grantee organization? No	
C.5 OTHER PRODUCTS AND RESOURCE SHARING	
NOTHING TO REPORT	

D. PARTICIPANTS

D.1 WHAT INDIVIDUALS HAVE WORKED ON THE PROJECT?

Commons ID	S/K	Name	Degree(s)	Role	Cal	Aca	Sum	Foreign Org	Country	SS
NVSWATKA	Y	Schwatka, Natalie Virginia	BA,MS,PHD	PD/PI	8.0	0.0	0.0			NA
	N	Schilz, Matthew		Technician	6.0	0.0	0.0			NA

Glossary of acronyms:

S/K - Senior/Key

Cal - Person Months (Calendar)

Aca - Person Months (Academic)

Sum - Person Months (Summer)

Foreign Org - Foreign Organization Affiliation

SS - Supplement Support

RS - Reentry Supplement

DS - Diversity Supplement

OT - Other

NA - Not Applicable

D.2 PERSONNEL UPDATES

D.2.a Level of Effort

Not Applicable

D.2.b New Senior/Key Personnel

Not Applicable

D.2.c Changes in Other Support

Not Applicable

D.2.d New Other Significant Contributors

Not Applicable

D.2.e Multi-PI (MPI) Leadership Plan

Not Applicable

E. IMPACT**E.1 WHAT IS THE IMPACT ON THE DEVELOPMENT OF HUMAN RESOURCES?**

Not Applicable

E.2 WHAT IS THE IMPACT ON PHYSICAL, INSTITUTIONAL, OR INFORMATION RESOURCES THAT FORM INFRASTRUCTURE?

Not Applicable

E.3 WHAT IS THE IMPACT ON TECHNOLOGY TRANSFER?

Not Applicable

E.4 WHAT DOLLAR AMOUNT OF THE AWARD'S BUDGET IS BEING SPENT IN FOREIGN COUNTRY(IES)?

NOTHING TO REPORT

G. SPECIAL REPORTING REQUIREMENTS SPECIAL REPORTING REQUIREMENTS

G.1 SPECIAL NOTICE OF AWARD TERMS AND FUNDING OPPORTUNITIES ANNOUNCEMENT REPORTING REQUIREMENTS

NOTHING TO REPORT

G.2 RESPONSIBLE CONDUCT OF RESEARCH

File uploaded: G.2. responsible conduct of research.pdf

G.3 MENTOR'S REPORT[CDA]

File uploaded: Mentor report_final.pdf

G.4 HUMAN SUBJECTS

G.4.a Does the project involve human subjects?

NA

G.4.b Inclusion Enrollment Data

File(s) uploaded:
Shared ladership_CumulativeInclusionEnrollmentReport.pdf

G.4.c ClinicalTrials.gov

Does this project include one or more applicable clinical trials that must be registered in ClinicalTrials.gov under FDAAA?

G.5 HUMAN SUBJECTS EDUCATION REQUIREMENT

Are there personnel on this project who are newly involved in the design or conduct of human subjects research?

G.6 HUMAN EMBRYONIC STEM CELLS (HESCS)

Does this project involve human embryonic stem cells (only hESC lines listed as approved in the NIH Registry may be used in NIH funded research)?

No

G.7 VERTEBRATE ANIMALS

Does this project involve vertebrate animals?

G.8 PROJECT/PERFORMANCE SITES Not Applicable
G.9 FOREIGN COMPONENT No foreign component
G.10 ESTIMATED UNOBLIGATED BALANCE G.10.a Is it anticipated that an estimated unobligated balance (including prior year carryover) will be greater than 25% of the current year's total approved budget?
G.11 PROGRAM INCOME Not Applicable
G.12 F&A COSTS Not Applicable

G.2 Responsible Conduct of Research

I completed CITI human subjects research training in September 2021. Throughout this award period, I received mentorship from Dr. Lee Newman on research ethics, protection of worker rights, health inequities, and related topics. I attended CU Anschutz Medical Center's Responsible Conduct of Research Monthly Seminar Series during October 2020 – June 2021. This fulfills the requirements set forth by NIH's NOT-OD-10-019.

Mentor's report

Dr. Natalie Schwatka made significant career progress during this career development award, meeting all expectations both in research as well as professional development. Throughout the project, we were committed to the required minimum professional effort by the awardee to the career development award. To support her research project plans, we provided her with administrative as well as research support as described in the original proposal.

Professional development. Dr. Schwatka met our expectations for her professional development plans during this award period. She took five graduate level courses, participated in responsible conduct of research training, and worked one-on-one with a professor of business to learn how to write a business case study.

K01 Research project. Dr. Schwatka met our expectations for her research plans during this award period. The COVID-19 pandemic presented significant challenges for her ability to address both aims of her research project. The data collection plans outlined in the specific aims were altered due to the COVID-19 pandemic. However, she was able to pivot by devising new studies that aligned with her research questions and aims, using existing data from my research as well as collecting new data that was feasible to collect during a pandemic. She authored eight published studies that address aim 1 and has an additional one in preparation. For her second aim, Dr. Schwatka devised four separate but intertwined studies using the relationships and resources she had with our support. To aid in some of aim 2's work and to gain supervisory experience, Dr. Schwatka hired a professional research assistant to assist with these research projects. Her aim 2 work resulted in two published peer reviewed papers, one under review, and another in preparation.

Publications. Dr. Schwatka met our expectations for her publications during this award period. During this award period, she published ten peer reviewed papers directly related to this career development award. She has one manuscript currently under review and two others in preparation directly related to this career development award.

Other research effort. Dr. Schwatka met our expectations for participating in other research efforts during this award period. She successfully completed the aims of a CPWR: Center for Construction Research & Training grant in Fall 2019. She contributed to the Small+Safe+Well study funded through our NIOSH-funded Center of Excellence in Total Worker Health U19 cooperative agreement by assisting with data analyses and manuscripts. She has gained experience in the Center by participating on an international Total Worker Health research project in Central America, collaborating on intervention development and evaluation as well as manuscripts. Finally, she completed a two-year research project focused on mental health integrated emergency preparedness in public schools using a shared leadership approach that was part of the U19.

Future grant funding. Dr. Schwatka met our expectations for grant writing during this award period. She successfully received a NIOSH ERC training grant to fund our Certificate in Total Worker Health program and a two-year research pilot project as part of our NIOSH Center of Excellence in Total Worker Health renewal application. She is also a Co-I on an American Medical Association study with collaborators from the CU School of Medicine. Finally, one of her mentees received a pilot grant from CPWR: The Center for Construction Research and Training and she serves as a mentor on this grant. During the last year of her career development award, she has submitted three grants to further her research program on the intersection between leadership and workforce health. Two of these grants represent collaborative efforts

that she is leading with physician collaborators in the CU School of Medicine and the other grant represents a collaboration with another NIOSH TWH Center of Excellence.

Presentations. Dr. Schwatka met our expectations for presenting her research during this award period. She presented her research at 11 conferences. She organized a session at the Third International Symposium to Advance Total Worker Health on the topic of TWH interventions for those in caregiving professions and served as session chair. She also submitted a proposal (as session chair) to the Preventative Medicine Conference in May 2020, but this conference was cancelled due to COVID-19. In addition to presenting at these conferences, she gave several webinar presentations as well as presented internally within our department and center research-in-progress seminar series'.

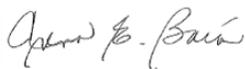
Teaching. Dr. Schwatka met our expectations for teaching during this award period. Throughout the award period she taught a 2/3-credit course on occupational safety and ergonomics. She taught a 1-credit course on the spectrums of professions in health protection and health promotion in the beginning of the award period. Finally, in the latter half of the award period she developed and taught a 3-credit course on occupational health psychology. She also directed the NIOSH MAP ERC's Certificate in TWH program during this award period.

Service. Dr. Schwatka has met our expectations for her service to the University during this award period. She has attended departmental meetings and provided advising to Master of Public Health and Certificate in Total Worker Health students.

Sincerely,



Lee S. Newman, MD, MA, FACOEM, FCCP
Director, Center for Health, Work & Environment
Distinguished Professor, Department of Environmental and Occupational Health and Department of Epidemiology
Colorado School of Public Health
Distinguished Professor, Department of Medicine, School of Medicine
University of Colorado



Anna E. Barón, PhD
Professor, Department of Biostatistics and Informatics
Colorado School of Public Health
University of Colorado Denver

Cumulative Inclusion Enrollment Report

This report format should NOT be used for collecting data from study participants.

Study Title:

Comments:

Racial Categories	Ethnic Categories									Total
	Not Hispanic or Latino			Hispanic or Latino			Unknown/Not Reported Ethnicity			
	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	
American Indian/ Alaska Native										
Asian										
Native Hawaiian or Other Pacific Islander										
Black or African American										
White										
More Than One Race										
Unknown or Not Reported										
Total										

I. OUTCOMES

I.1 What were the outcomes of the award?

The intent of this career development award was to expand my knowledge and skills on how organizational-level factors affect safety and health outcomes in small businesses across a range of industry sectors, with particular emphasis in the design and evaluation of interventions that enhance Total Worker Health™ (TWH). During my career development/training activities, I took several courses in statistics, business, and health as well as received mentoring from a business professor on how to write case studies. I have already and plan to continue to use the knowledge and skills I gained in these educational efforts in my research as well as in my education responsibilities at my University. I also engaged in a diverse array of research activities that resulted in four broad findings. First, businesses vary in their practices to support employees' safety, health and well-being. The best employee engagement in workplace TWH efforts happen amongst businesses with strong TWH business strategies and organizational leadership. Second, when trying to assist businesses with changing their TWH business strategies and organizational leadership, my work uncovered the opportunities and challenges that businesses and their leaders experience. My work on the topic of mental health, specifically, demonstrates a particular need for leaders to understand how to focus on workforce mental health. Third, there is a significant opportunity for employers to adopt a shared leadership approach to TWH to combat the challenges that businesses have in implementing sustainable TWH solutions. My research uncovered the working conditions that might give rise to shared leadership for TWH in both the construction and healthcare industries. Finally, the COVID-19 pandemic began early in this award period and presented an opportunity to understand employee perceptions of their organization's commitment to safety and health (i.e., organizational climate) over the course of the early months of the pandemic. I found that perceptions of health and safety climates remained stable across all timepoints. However, employee well-being scores declined between the pre-pandemic period and subsequent COVID-19 timepoints. These findings suggest that while small organizations continued to be viewed as supporting employees' health and safety over the course of the pandemic, well-being scores declined, indicating that other factors contributed to decreased well-being.