Opinion

Workers and Climate Change: The Need for Academic–Industry Partnerships to Improve Agricultural Worker Health, Safety, and Wellbeing

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Abstract: Climate change will have negative consequences for human health worldwide. Agricultural workers are especially vulnerable to the health consequences of climate change. This communication demonstrates how a Total Worker Health® approach is utilized to protect Guatemalan agricultural workers from the negative health effects of climate change. DrPH researchers work alongside local partners to develop, implement, and evaluate climate adaptation strategies and other interventions to improve agricultural worker health, safety, and wellbeing. Training in public health ethics, communications, and leadership gives DrPH researchers the tools to help create successful academic–industry partnerships that increase local capacity and have sustainable public health impact.

Keywords: climate change; occupational health; Total Worker Health®; public health education

1. Climate Change and Agricultural Worker Health

Climate change is resulting in increasing temperature and humidity, worsening air quality, fluctuations in precipitation, and changes in the frequency and distribution of severe weather events [1]. Through these hazards, climate change is increasing the prevalence, distribution, and severity of known occupational hazards [2]. Agricultural workers labor long hours at high levels of exertion outdoors, making them particularly susceptible to climate related hazards [3]. Climate factors can simultaneously magnify occupational exposures and non-work-related issues such as pre-existing disease and vulnerabilities related to poverty, including a lack of clean water, food insecurity, lack of access to healthcare, and inadequate housing. Continuing research into potential negative health impacts of climate change and the development of effective intervention strategies will require a multifactorial lens, an approach already central to DrPH programs.

Despite the high risk to agriculture workers, and their fundamental importance in combating food insecurity, they are an oft-overlooked population by U.S. researchers and federal agencies [4]. Although national and international efforts to understand the impact climate change has on human health have contributed to existing knowledge [5,6], these publications give workers only a cursory mention. When work is mentioned, authors often fail to acknowledge the impact on occupational health, rather homing in on the economics of lost labor capacity and productivity that result from the changing climate. Although lost work productivity is an important public health outcome for its impact on workers’ wages and global food supplies, focusing on more holistic, humanistic goals that contribute to worker wellbeing can achieve broader and more sustained public health impact. Fundamentally, not only a worker’s ability to produce commodities in the age of neocapitalism [7], but whether they experience injury or illness [8,9], suffer from stress and…
poor mental health [10], experience job displacement [11], reside in communities that suffer environmental injustice [12], and experience health inequity [13] need to be considered.

Although frameworks have been established to understand how climate change will affect workplace hazards [2,14], very little has been done to understand the impact of these hazards on workers, their communities, and society. Sparser still is knowledge of effective adaptation strategies at the individual, workplace, local and national levels to protect workers from the occupational hazards they could face, and are already facing, due to the changing climate. There is a need for employers, NGOs, labor groups, and governmental agencies to partner with academic researchers and public health practitioners to collaboratively develop, implement, and evaluate system-level adaptation strategies to protect workers from the effects of climate change. In this communication, we demonstrate how a Total Worker Health® approach has been utilized to protect Guatemalan agricultural workers from the negative health effects of climate change through academic–industry partnership. We conclude with a discussion on the unique training and skillsets possessed by Doctors of Public Health (DrPH) that are necessary to continue this work.

2. Public Health Practice: Academic-Industry Partnership

The Center for Health, Work & Environment (CHWE) at the Colorado School of Public Health (ColoradoSPH) is a transdisciplinary group of researchers, practitioners, and educators dedicated to better understanding how environmental factors impact the workplace and the workforce. As one of the six CDC National Institute for Occupational Safety and Health (NIOSH) Centers of Excellence in Total Worker Health (TWH), the goal is to develop and implement practical solutions to improve worker health, safety, and wellbeing. TWH is defined as the policies, programs, and practices that integrate worker safety with the promotion of health to advance worker wellbeing [15]. A TWH approach is especially relevant to public health practice when addressing a complex mix of occupational, environmental, social, and personal risk factors that impact health. In 2016, CHWE began a partnership with a Guatemalan sugarcane agribusiness, with the goal of applying a TWH approach to promote and protect the health of the agrarian workforce. As described above, climate change has and will continue to have adverse effects on the health of agricultural workers, both in Guatemala and elsewhere. The TWH framework was applied to conduct research, identify safety and health hazards, and implement and evaluate both hazard reducing and health promoting programs for the workforce.

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2.1. Academic–Industry Partnerships Development

Prior to the start of the collaboration, the agribusiness had existing health screening and education programs in place for workers and families, as well as fully staffed medical and dental clinics on site and clinical personnel stationed in the fields for the workers. All sugarcane field workers at the agribusiness are provided with protective clothing and equipment, as well as clean water, electrolyte solution, and meals for manual sugarcane harvesters living onsite for the duration of the 6-month harvest season [16]. Workers receive health and safety education regularly, including that on the importance of hydration, rest and shade, and the avoidance of behaviors that can exacerbate heat exposure risks such as smoking and alcohol use. The agribusiness also has a no-smoking policy in place. Additionally, the agribusiness had already invested in efforts to strengthen the culture of safety and injury prevention through the adoption and continuous improvement of safety policies, practices, communications, and training [17].

CHWE investigators, including DrPH researchers, work side by side with the agribusiness’s clinical personnel to carry out the research studies in the field, a collaboration based
on shared trust and decision making. In a form of community-based participatory research [18], local partners in the agribusiness are involved in the process of prioritizing health and safety concerns, protocol development, and aspects of data collection. The CHWE team is responsible for interpretation of results and ensures academic independence and integrity in writing of scientific manuscripts for publication. Capacity building and promoting of open exchange of ideas have been fundamental values of the partnership, for example, working with agribusiness clinicians in Guatemala to design pragmatic comparative effectiveness trials of interventions to help reduce acute kidney injury and worker dehydration, while also helping develop the local team’s data analytic skills that they apply in ongoing medical screening programs. Opportunities for training and certification in hearing conservation and introduced new field-based methods of data collection, such as the use of point-of-care devices for kidney health surveillance have also been provided. Following initial training to establish protocols, local partners frequently drive the implementation of projects in the field, with periodic consultation with the CHWE as needed. With the shared goal of improving the health, safety, and wellbeing of the workers in mind, the practice of open communication and shared ownership of projects has allowed potential barriers to be foreseen and challenges overcome together.

Building mutual trust in public health takes time, patience, cultural awareness, curiosity, and humility, in addition to a commitment from all parties to be transparent, flexible and adaptable when a change or pivot is needed. In addition to sharing of the work, the successes are shared: collaborators at the agribusiness frequently serve as co-authors on scientific manuscripts, thus making meaningful contributions to the occupational health and safety literature.

2.2. Academic–Industry Partnerships in Action

The first five years of this collaboration focused on both traditional occupational safety and health areas of concern, such as hearing loss and musculoskeletal work-related injury prevention, and the development of programs in chronic disease prevention, smoking cessation, and mental health [17,19,20]. As an urgent priority, causes and preventive strategies to mitigate the epidemic of chronic kidney disease of unknown origin (CKDu), also known in Latin America as Mesoamerican Nephropathy, were addressed [21]. This avenue of investigation led to the consideration of how climate change impacts agricultural workers’ kidney health, illnesses related to heat exposure, and other work-associated injuries. Findings from the collaboration with the agribusiness, as well as within the field more broadly, have shown a strong relationship between climate factors, such as heat and humidity, and rates of occupational illness such as CKD and CKDu [8,22] and occupational injury [9,23]. Based on this evidence, employee education around hydration practices were designed, implemented, and evaluated, and recommendations for organizational improvements such as providing hydration with water and electrolytes, agribusiness policies on rest breaks, and the recognition of dehydration as a recordable illness were provided [11,19]. Following implementation, the agribusiness is now in the process of maintaining the recommendations, and studies are underway to evaluate long term effectiveness on health outcomes. For example, one recent study found that the rate of recorded injuries has decreased over a 4-year period [23].

Importantly, the findings of this research have been translated into academic papers in both English and Spanish, and practical, actionable recommendations for program, policy, and practice changes for the agribusiness to implement [19,24]. Recommendations to the agribusiness for new protective strategies and interventions are developed as a team to help ensure that they will be adopted and are sustainable. When the agribusiness implements a new program, policy, or practice change based on the recommendations, support is provided to clinical, human resources, and managers to help develop protocols for implementation of the new strategies in practice. Together, the evaluation of the impact of the new strategies in the field is conducted through evaluation studies and trials that incorporate feedback from stakeholders at all levels, from top business leaders to the
workers in the fields and processing mills [24]. The practice of continuous evaluation and quality improvement fits within the agribusiness’s commitment to building and maintaining a strong culture of safety, health, and wellbeing that encourages and promotes active participation among employees [17].

The success of this research-to-practice collaboration and the growing need for more worker-oriented climate and health research has led to the establishment of an additional center within the ColoradoSPH called the Climate, Work & Health Initiative (CWHI). Within CWHI, existing CHWE-agribusiness collaborators and other researchers at the ColoradoSPH apply lessons learned from this partnership to future international TWH research, as well as to agricultural populations within the United States (U.S.).

2.3. Considerations for Academic–Industry Partnerships

There are inherent challenges that arise in the process of establishing and maintaining a successful public-private partnership [25]. One potential challenge is that the agribusiness might not implement recommendations as intended, such as guaranteeing consistent access to hydration for all field workers. In this example, the company welcomed independent audits of the implementation of the hydration recommendations, including by collecting biological data and interviewing workers to ensure compliance in the field, at multiple time points. Consistent, open dialogue with the agribusiness and those implementing the recommendations in practice is critical for the long-term maintenance of such changes and ensuring that they continue to have the intended effects on worker health.

It is vital that the academic freedom to publish research findings, no matter the results, without corporate influence are upheld. A memorandum of understanding executed between the university and the agribusiness clearly delineates roles and responsibilities, including in regard to the sharing of data and necessary guardrails related to interpretation and publication of research. The memorandum of understanding is explicit regarding the principles of academic freedom.

3. The Role of the DrPH

Public health research is inherently applied science. The DrPH not only celebrates this reality but is trained to capitalize on opportunities to shorten the research-to-practice timeline through diverse partnerships and project outputs that are designed to meet the needs of specific communities. Furthermore, the training of the DrPH emphasizes the need for leadership and communication skills to carry forward recommendations developed through research in the field. CHWE’s ongoing partnership with this Latin American agribusiness exemplifies the multi-faceted skillset required of the public health researcher and professional, as novel research is conducted in parallel with the development of practice-oriented deliverables.

Within DrPH programs, students learn the rigorous methods necessary to conduct research in environmental and occupational health through this more holistic public health lens. Required competencies address the breadth of professional development topics essential to impactful careers, such as leadership, historical perspectives in public health practice, ethical considerations, cultural humility, and community-centered research practices. DrPH students learn to apply these lessons through research projects that directly engage communities and the diverse stakeholders within them. Direct relationships not only offer more nuanced insight into the constraints on conditions and resources that may impact the long-term success of workplace interventions at the individual level, but may also allow for more immediate, large-scale application of novel interventions through the modification of organizational practices.

DrPH researchers, being trained in public health ethics, communications, and leadership, are equipped to navigate the potential hurdles that arise with academic–industry partnerships while staying focused on the goal of improving worker health, safety, and wellbeing in the face of extreme working conditions and climate change. Exercising transparency, the DrPH researcher uses communication and relationship building strategies to
bring stakeholders of diverse backgrounds and interests together to inform policies and interventions that will be impactful and sustainable over the long term.

Climate-related health outcomes in agricultural workers is a rapidly evolving area of research, and broader-level institutional or political reforms may continue to lag behind research findings. The ability to navigate inherently complex relationships with industry, workers, and local communities, build coalitions, acknowledge and adapt to technological and resource limitations, and make context-specific recommendations is essential in protecting worker populations in the short and long term.

4. Conclusions

There is a need for researchers, public health practitioners, employees, employers, and policy makers to fully understand the climate risks posed to the workforce and to work together to collaboratively develop effective adaptation strategies focused on building climate change resiliency among the workforce. By taking a TWH approach, programs, policies, and practices can be adapted and utilized to protect the safety, health, and wellbeing of those more vulnerable to the deleterious health effects of climate change. Through their training in leadership, historical perspectives in public health practice, ethical considerations, cultural humility, and community-centered research practices, DrPHs are uniquely positioned to lead the transdisciplinary teams and academic-industry partnerships needed to implement effective system level changes to protect workers.

Author Contributions: Conceptualization, M.D., L.K. and F.M.; resources, K.A.J. and L.S.N.; writing—original draft preparation, M.D., L.K. and F.M.; writing—review and editing, M.D., L.K., F.M., K.A.J. and L.S.N.; supervision, K.A.J. and L.S.N. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Acknowledgments: We would like to thank our colleagues Jaime Butler-Dawson, Diana Jaramillo, Claudia Asensio, Alex Cruz, and Daniel Pilloni whose work and support have been integral to the success of this partnership. Authors Miranda Dally, Lyndsay Krisher, and Francesca Macaluso are DrPH students in the Department of Environmental and Occupational Health, Colorado School of Public Health.

Conflicts of Interest: Pantaleon and the University of Colorado have a memorandum of understanding and a contract for consulting on Total Worker Health programs. It supports part of the salaries for the Center for Health, Work, & Environment authors. University of Colorado and Pantaleon are separate, independent organizations. University of Colorado employed appropriate research methods in keeping with principles of academic freedom, based conclusions on critical analysis of the evidence, and reported findings fully and objectively. The terms of this arrangement have been reviewed and approved by the University of Colorado Denver in accordance with its conflict of interest policies.

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