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Climate Change and the Amplification of Agricultural Worker Health Risks

Work in agriculture is hard, and it is about to get harder. Hired farm labor is a form of highly precarious employment, due to various contingencies, with significant degrees of insecurity and poorly paid wages. Work schedules and hours can also vary unpredictably for which workers have little control.[1,2] Most hired farm work in the United States is now done by immigrants, with seven of ten born in Mexico and an additional 6% migrating from Central America. The majority have arrived since 2000. Many are without documentation and less than half have health insurance.[3]

Climate change can be seen as a process that amplifies health risks in agriculture, along with creating new hazards for certain worker populations.[4] Climate change is associated with higher temperatures in the Western United States, leading to a higher frequency of extreme heat days. Extreme heat can have serious consequences for agricultural workers, including heat-related illness, increased risk of injuries, and long-term chronic health effects. Climate change can also increase the probability of catastrophic events such as wildfires. Amplification of worker health risks due to climate is clearly discernible today. Our session at the Western States Agricultural Safety and Health Conference explored how: 1) changes in climate are affecting outdoor work; 2) what adaptive strategies for climate change are available; 3) the acute and chronic health effects of extreme heat; and 4) the health impacts to agricultural workers due to air pollution from wildfires.

Dr. Heidi Roop (University of Washington Climate Impacts Group) kicked off the session with an overview of climate change science. Average temperatures in the Western United States have already increased compared to the middle of the last century and are projected to increase an additional 1–3°F (0.6–1.7°C) by 2050. Precipitation in Western mountain ranges is gradually shifting from snow to rain, posing major challenges to water resource management. It is estimated that human-caused climate change has contributed to an additional 4.2 million hectares affected by wildfires between 1984–2015 across the Western United States. Dr. Roop called for proactive adaptation strategies to protect farm workers and other vulnerable populations from the impacts of climate change. Successful adaptation will require major changes in our current economic, environmental and social policies.

Dr. June Spector (Pacific Northwest Agricultural Safety & Health Center) focused her presentation on heat stress, citing a number of health outcomes that have been attributed to heat stress in agriculture, including heat-related illness, kidney injury, adverse pregnancy and birth outcomes, and mental health effects. She subsequently reported on research linking heat stress with increased traumatic injuries among agricultural workers in the state of Washington.[5,6] Increased risks were most notably found during cherry harvest duties in the June to July time period. Of the 20 U.S. counties with the greatest number of agricultural workers, 5 are in Washington State, 13 are in California, and one is in Oregon. In many of these counties, excessive heat, above safety limits, occurs on multiple days. With increasing temperatures (+2°C; +3.6°F) due to climate change, it is possible that some counties will experience over 100 days of excessive heat in the future. How can workers adapt to these conditions? A number of changes have been proposed at different levels of the industrial hygiene hierarchy of controls and at different social-ecological levels (i.e., community, workplace, interpersonal, individual). Work changes include: 1) increase rest time (decrease min/hr worked); 2) reduce pace (lower metabolic rate); 3) wear single-layer clothing; and 4) rest in air-conditioned spaces. However, some of these changes could affect farm productivity, farm worker earnings, and/or labor costs. Safeguarding the health and well-being of

U.S. crop workers will require additional systemic change beyond the worker and workplace.

Dr. Marc Schenker (Western Center for Agricultural Health & Safety) presented findings from the California Heat Illness Prevention Study. The study included approximately 500 workers from 30 different farms. All farms studied complied with the current California regulations requiring yearly training, as well as shade and water in the workplace. Nonetheless, 6–7% of workers in the study were found to be at risk for heat-related illness. Environmental temperature and work rate were associated with elevated core body temperature (CBT), and increases in CBT were associated with piece rate work. Dehydration was found in 16% of men and 3% of women.

Dr. Kai Zhang (Southwest Center for Agricultural Health, Injury Prevention & Education) discussed heat effects among migrant and seasonal farmworkers. Health data were collected from clinics across four states (CA, CO, MI, NY) from May to September 2013. A regression analysis of elevated heat days and clinic visits revealed positive associations at two of the centers and more pronounced effects among male farm workers.

Dr. Jesse Bell focused his presentation on health hazards associated with drought. He noted from 1900 to 2013 the percentage of disaster-deaths due to extreme weather events was highest for droughts (60%), compared to deaths from floods (35%), storms (5%), heat, landslides and wildfires (all <1%). From 1980 to 2018 droughts in the U.S. were estimated to cost 241 USD billion, with nearly 3,000 lives lost. A recent study of 45–64 year old white males and females in Nebraska found that droughts were associated with increased mortality. Death by suicide is a particular concern for agricultural producers during droughts. The health effects of drought are of growing concern in the United States.

The session ended with a panel on air pollution from wildfires. Dr. Coralynn Sack, a University of Washington pulmonologist and researcher, discussed both the acute and chronic effects of wildfire smoke on the respiratory system. Dr. June Spector, an occupational medicine physician and researcher, talked about the simultaneous stress of heat and wildfire smoke on outdoor agricultural workers and emphasized the need for clear, evidence-based, and practical guidance on protecting and managing the health of agricultural workers for employers, workers, healthcare providers, and other stakeholders. Dr. Roger Ottmar from the USDA Forest Service Pacific Northwest Research Station outlined the challenges posed by more frequent and severe wildfires to forest management professionals and to the men and women who are on the ground fighting these wildfires.

Dr. Kent Pinkerton, Director of the Western Center for Agricultural Health and Safety, described a recent study of perceived impacts among farm workers and farm owners on occupational safety and health due to exposure to wildfire smoke. The goal of the study is to develop safety awareness campaigns, best practices, and safety resources for the agricultural industry. Farmworkers indicated that they would likely continue to work during high wildfire smoke events out of economic (financial) necessity. They did not see masks or respirators as a solution, partly due to the need to maintain productivity. Workers felt supervisors would not tolerate absences or the slowdown of work due to wildfire smoke. Farmers acknowledged that this was a new challenge and that they do not have the means of measuring air quality. California issued in July 2019 an emergency regulation on wildfire smoke exposure for outdoor workers. Dr. Pinkerton and colleagues will be evaluating the impact of this regulation in the coming years.

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