

OCCUPATIONAL HEAT STRESS IN OUTDOOR WORKS: THE NEED FOR REGULATION

Strenuous work in extreme heat costs both employers and workers. Protection measures are cost-effective and can increase productivity.

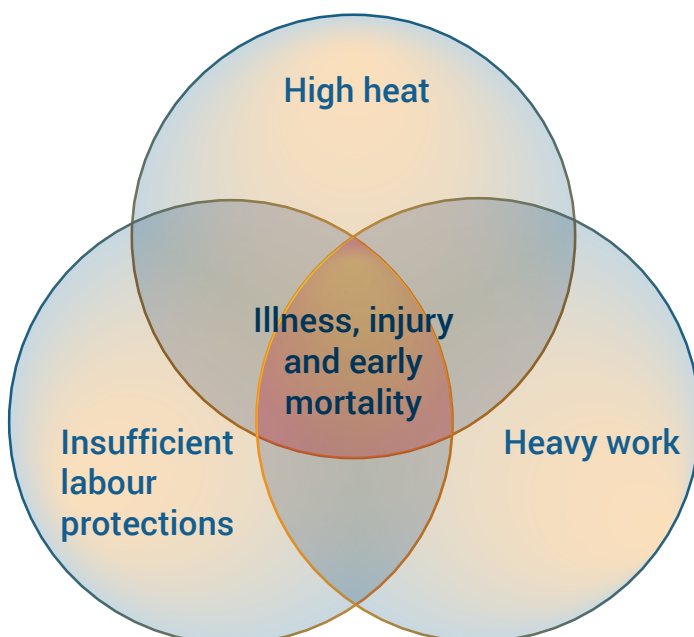


*Sugar cane workers in the fields of the Ingenio San Antonio, or San Antonio Sugar Mill, in Chichigalpa, Nicaragua.
Credit: Ed Kashi/VII*

Key messages

- Heat stress causes a significant burden on the health of workers, in the short and the long term: heat illness, accidents, mental health, acute and chronic kidney failure, cardiovascular events and death.
- Workplace interventions, such as adequate water supply, shaded rest, improved sanitation, and ergonomic improvements to reduce physical effort can improve health along with productivity.
- A large portion of the costs associated with occupational heat stress (e.g. treating kidney disease, work days lost) are borne by families and low-income households and fuels the decision to migrate for some workers.
- Prevention is cost effective with a positive return of investment for businesses and increased productivity for workers.
- Evidence-based new legislation and occupational heat-health guidelines are needed to protect workers, requiring private and public sector coordination.
- Monitoring of the implementation of workplace interventions and labour practices is essential to ensure compliance.

Confluence of factors leading to heat affecting working populations



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**HEAT
SHIELD**

This policy brief summarises new research from the Prevention, Resilience, Efficiency, and Protection (PREP) project funded by Belmont Forum and the EU-funded HEAT-SHIELD project. PREP researchers evaluated workplace improvements at sugarcane plantations in Nicaragua that were developed in partnership with the sugarcane company.

Heat is often an issue of equity with more disadvantaged communities lacking access to cooling measures. Many workers lack protections for their health and safety, and that can include risks from heat.

Heat impacts on worker health

Heat is known to lead to illness from headache to cramps and exhaustion, up to fatal heat stroke, and often amplifies existing chronic illness including cardiovascular, respiratory, renal- and diabetes-related conditions. High temperatures also affect cognition increasing the risk of accidents. Heat exposure can also lead to various chronic health effects, importantly chronic kidney disease of non-traditional origin (CKDnt).

Strenuous work in hot environments without adequate protections is a key risk factor for CKDnt in manual outdoor workers. CKDnt is an increasing global public health issue, with high prevalence reported in countries in

Mesoamerica, Southeast and South Asia. Treatment of kidney failure is expensive and access to proper health care in affected low- and middle-income countries (LMICs) is very limited.

The health of outdoor women has drawn recent attention, especially pregnant women. In low-income households, women may have to work continuously throughout their pregnancies, which exposes them to heat-related risks such as preterm births and stillbirths.

Economic and social costs of heat-related illness in outdoor workers

Economic

- Unless addressed, heat stress is projected to reduce total working hours worldwide by 2.2 per cent and global GDP by US\$2,400 billion in 2030 according to a 2018 study conducted by the International Labour Organisation.
- A socioeconomic study in a Nicaraguan community indicate:
 - Almost a third households surveyed had a member diagnosed with CKDnt.
 - CKDnt households are significantly more deprived of income than non-CKDnt households, particularly those that do not receive a social security stipend.
- CKDnt households living in extreme poverty shift their expenditure from education to medicines.
- Workplace improvements designed to reduce CKDnt cost approximately one-tenth of the amount spent by the state on social security payments to CKDnt households.
- Businesses reap a positive return from interventions designed to address CKDnt, with one study finding a 22% return from investments in water, rest, shade, and sanitation.
- Preventing occupational disease keeps primary earners in the labour economy.
- Preventing occupational disease prevents extremely high costs related to treating occupational illnesses and injuries. This is especially relevant in LMICs.

Social

- Initial data from PREP suggest healthy workplaces can reduce migration pressures as adults are less likely to move away to seek work if their workplace is not linked to illness and injury.
- In the Nicaragua community survey:
 - 13% of children had left school to enter the workforce, bringing with it the perpetuation of the intergenerational cycle of poverty as they replaced sick or dead parents.
 - 17% of the surveyed households were widowed (triple the national rate of 5.5%) and 80% of these were due to CKDnt. Widows due to CKDnt were on average 10 years younger than widows due to other causes.
 - The community had a higher rate of household dependence on social security as compared to national statistics.

PREP intervention activities for sugarcane workers in Nicaragua

Workplace improvement:

- Rest, shade, water and sanitation program which included:
 - Stopping all heavy work at noon or as shortly after as possible, as well as regular rest breaks that varied by job type based on workload
 - A shade tent along with a water reservoir and electrolyte solution for each work group that is movable to remain close to where the workers are
- Health assessments among workers at risk of heat stress to measure the efficacy of workplace improvements and aid in the early detection of kidney injury
- Education and training for workers and supervisors on the importance of heat stress prevention measures
- Development of an instrument to monitor systematically the implementation of the workplace improvements.

Rest



Shade



Water

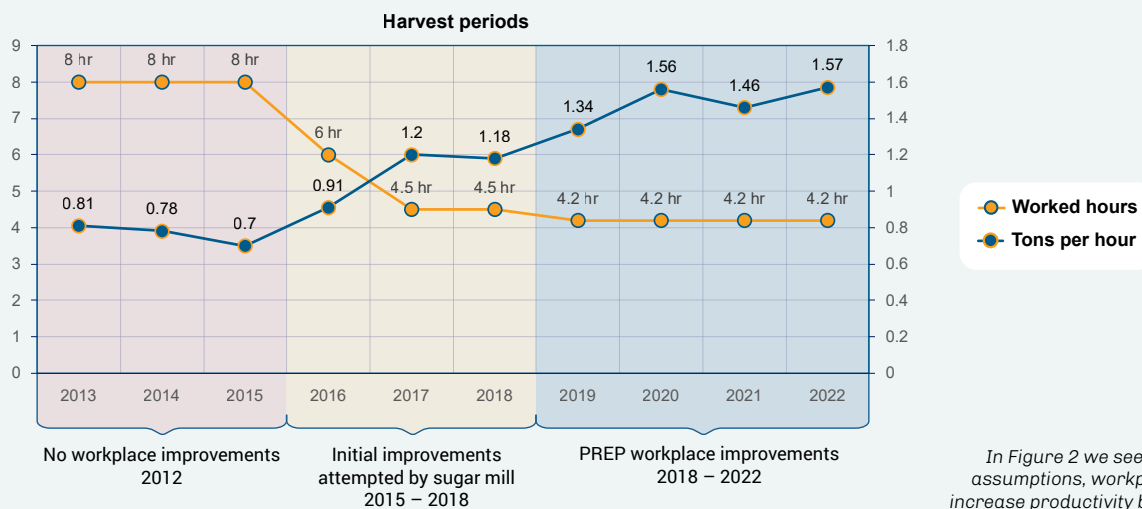
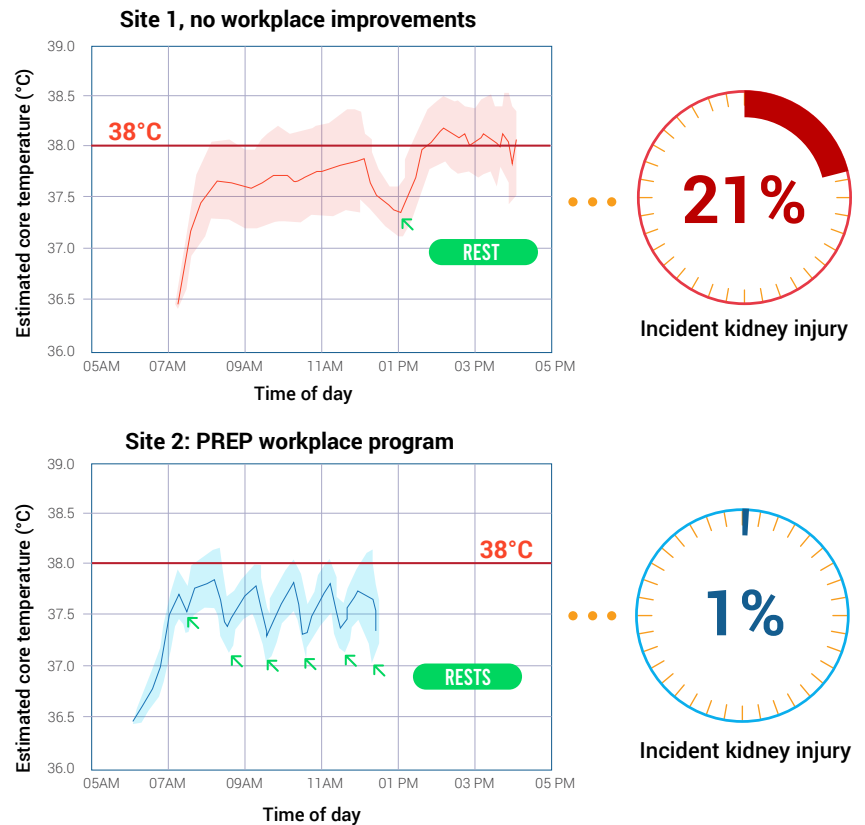


Sanitation



Relationship between heat, internal body temperatures and kidney health in settings with and without workplace improvement programs

Figure 1 illustrates the association between insufficient heat stress protections and kidney injury (site 1) and the protective effect of adequately designed and implemented programs (site 2).



In Figure 2 we see that, contrary to traditional assumptions, workplace improvements actually increase productivity by hour and day per worker.

Key messages for employers / companies

- Investment in occupational heat stress prevention programs yield positive returns, though an integrated culture of health and safety is required for successful implementation.
- Making workplace improvements feasible and adaptable is essential to employees' health and well-being.
- Provide adequate resources to the field implementation of shaded rest and hydration, the education of workers and supervisors, and appropriate management incentives designed to ensure worker health is adequately prioritised.
- Ensure workers are involved in the process of improving their health and safety in the workplace for long-term success and sustainability.
- The interventions developed via PREP are effective and achievable in all settings, but more advanced cooling options are possible for workers in more static and well-resourced work locations such as construction, mining and manufacturing workers.
- Work with policymakers and occupational health professionals to address the root causes of occupational injuries and illnesses, and develop, implement, and test workplace improvements to prevent avoidable burdens for workers, their communities and the health and social security system.
- Brands and end users of key commodities should ensure workers are protected against heat stress and heat illness throughout their supply chain.

Recommendations for legislators and labour and health ministries

- Ensure through policy and legislation that workers in key commodity supply chains are protected from preventable heat illness.
- Expand information systems to include surveillance of heat-related illness in the population.
- Improve surveillance of health outcomes from heat-related illness among essential and vulnerable workers.
- Provide sufficient funding for oversight support and enforcement of policies.

Recommendations for the development community

- Support the development of mechanisms that aid employers and governments in their struggles to address occupational risks related to climate change.
- Ensure that development initiatives:
 - dedicate more resources to prevent occupational illnesses and injuries given their outsized impact on economic development.
 - consider the occupational risks often overlooked but inherent in the supply chains and the infrastructure projects supported by multilateral development banks and development finance institutions.



Empowering labourers to self-pace is the basis of heat mitigation, while tailored strategies focusing on hydration, work-rest cycles, ventilated garments, and mechanisation can further reduce the physiological heat strain experienced by workers under certain conditions (Ioannou et al, 2021).



Sugar cane workers cutting in burned fields at the Ingenio San Antonio, or San Antonio Sugar Mill, in Chichigalpa, Nicaragua.
Credit: Ed Kashi/VII

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