

Moderate and extreme temperatures could increase the risk of occupational injuries

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Moderate and extreme ambient temperatures increase the risk of occupational accidents. This is the main conclusion of a new study by the Barcelona Institute for Global Health. The study analysed data on nearly 16 million occupational injuries that occurred in Spain over a 20-year period.

Heat and cold are believed to be associated with a higher risk of occupational [injury](#), but the existing scientific evidence consists of only a handful of studies with a small number of cases and a limited geographic scope, and the economic impact has never been analysed in detail.

The new study, published in *Environmental Health Perspectives*, is the first to analyse data from an entire country and evaluate the economic impact. Researchers analysed data related to nearly 16 million [occupational injuries](#) in Spain between 1994 and 2013 that resulted in at least one day of sick leave. This information was analysed in relation to the daily temperatures in the province where each injury occurred.

"Exposure to moderate to extreme temperatures may have played a role in over a half-million workplace injuries that occurred during the study period," commented ISGlobal researcher Èrica Martínez, lead author of the study. The analysis found that, on average, some 60 [temperature](#)-related injuries leading to at least one lost workday occurred each day, accounting for 2.7 percent of all work-related injuries in Spain.

Extremes of cold and heat increased the risk of injury by 4 percent and 9

percent, respectively.

The biological mechanisms that link exposure to extreme ambient temperatures with the risk of occupational injury "are not yet fully understood," explained Martínez. The most common types of injuries analysed in the study were bone fractures and superficial injuries. "This suggests that the underlying mechanism could be related to impaired concentration or judgment, which would affect occupational safety," noted the researcher. Moreover, temperature-related effects were not limited to the day of exposure; a "pattern of delayed impact," possibly caused by cumulative fatigue and dehydration, was observed in the days following exposure.

The study also concluded that women appear to be more vulnerable to cold and men more vulnerable to heat. This difference could be explained by the fact that women have lower sweat rates than men in hot climates. The youngest workers were the most vulnerable to heat, possibly because they tend to do more physically demanding work.

As for the [economic impact](#) of nonoptimal temperatures, the study found that temperature-related loss of working days had an annual cost of more than €360 million, representing 0.03 percent of Spain's gross domestic product in 2015. Moderately high temperatures contributed the most to the economic losses.

"In the present context of climate change, these results indicate that public health interventions are needed to protect workers," concluded ISGlobal researcher Xavier Basagaña, the study coordinator. "Most workplace injuries can be attributed to moderate heat and moderate cold. This shows us how important it is for public health policies and plans to take moderate temperature ranges into account, since they are more common than [extreme temperatures](#) and account for a larger share of total injuries."

Preventive measures that could be incorporated into public health policies include restricting work during the coldest and hottest hours, taking rest breaks, ensuring proper hydration and wearing appropriate work clothes.

Provided by Barcelona Institute for Global Health

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