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Moderate and Extreme Temperatures Could Increase the Risk of Occupational Injuries

Cold and heat increase the risk of occupational injury in Spain by 4% and 9%, respectively

Barcelona, 8 June, 2018. - **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 ([ISGlobal](#)), a centre supported by the "la Caixa" Banking Foundation. 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 half a million of the 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% of all work-related injuries in Spain**. Extremes of cold and heat increased the risk of injury by 4% and 9%, 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 judgement**, 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% 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.

Reference

Èrica Martínez-Solanas, María López-Ruiz, Gregory A Wellenius, Antonio Gasparrini, Jordi Sunyer, Fernando G Benavides, Xavier Basagaña. Evaluation of the impact of ambient temperatures on occupational injuries in Spain. *Environmental Health Perspectives*.

- **For journalists only:** [Access to full study \(watermarked PDF with embargo\)](#)
- **The paper will be available online on June 11 on the following link:** <https://ehp.niehs.nih.gov>

About ISGlobal

The Barcelona Institute for Global Health, ISGlobal, is the fruit of an innovative alliance between the “la Caixa” Foundation and academic and government institutions to contribute to the efforts undertaken by the international community to address the challenges in global health. ISGlobal is a consolidated hub of excellence in research that has grown out of work first started in the world of health care by the Hospital Clínic and the Parc de Salut MAR and in the academic sphere by the University of Barcelona and Pompeu Fabra University. The pivotal mechanism of its work model is the transfer of knowledge generated by scientific research to practice, a task undertaken by the institute's Education and Policy and Global Development departments. ISGlobal a member of the CERCA programme of the Generalitat de Catalunya.

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