

FLOODS, WILDFIRES, AND OTHER DISASTERS IN THE CONTEXT OF CLIMATE CHANGE: PREVENTION FROM A PLANETARY HEALTH PERSPECTIVE

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An interesting article by Romano et al. in *Medicina (Buenos Aires)*¹ reminds us that the environment, climate change, and health are related. The occurrence of natural disasters, such as the floods in 2023 in Argentina (also affecting Uruguay), whose severity claimed dozens of lives, led us to think about the health, socio-economic and agro-environmental impacts on human and animal populations. Some researchers² stated that these disasters would increase due to climate change, overpopulation in some risk areas and terrorism or other human actions². These natural disasters seem more frequent in Latin America every year. This Letter focuses on floods, wildfires, and other disasters in the context of climate change, highlighting prevention and education from a Planetary Health perspective.

Floods are not new disasters in Argentina. These extreme events are associated with increased mortality and morbidity. In April-May 2003, the central-eastern province of Santa Fe suffered the most devastating flood ever recorded for the Salado River (considered the worst environmental disaster in the recent history of Argentina)³, caused by heavy rains in its lower basin. During the flooding of a third of the city, almost 120 000 people were suddenly displaced from their homes; 23 people died as a flooding direct result, and another 43 are suspected of having died from post-traumatic distress³. For its part, these events are not uncommon in Chile. An investigation⁴ studied the psychological effects of the floods produced by the extreme

hydro meteorological event observed in March 2015 in Northern Chile, especially in the Atacama Region, which left around 30 dead (several children and adolescents) as well as dozens of missing people⁴. As a result, the exposed-susceptible groups that presented a significant subjective severity were older adults, people with disabilities/chronic disease, females, with low income and without higher education, adding those who were in a condition of partial damage in their homes and did not receive support for their reconstruction⁴. Recently, the winter was particularly harsh in Chile. In June and August 2023, precipitation and wind affected several cities and towns between the regions of Valparaíso and Biobío, causing rivers to rise and overflow, floods, and activation of streams (Fig. 1A).

It is known that climate change would alter some ecosystem elements, causing droughts⁵, floods, and wildfires, which disturb human life, e.g., food or water availability⁶, impacting the population's health and well-being⁵, all this again mediated by the social determinants of health⁶. Animal and environmental health are also affected (Fig. 1B). Further research could determine if winter 2023 floods in Chile or those produced in December of the same year in Argentina (flooding of the Río de la Plata above 3 metres, affecting various locations of the City of Buenos Aires and its suburbs) correspond to effects of the El Niño phenomenon or climate change impacts. Educating the population on these topics, e.g., about places susceptible to being flooded and the risks of building homes near streambeds, is relevant.

Figure 1 | Floods and wildfires in Chile, 2023. A: Floods are a permanent risk (Las Perdices ford, La Florida, Santiago). B: Farm animals are also affected by wildfires (Curalí). C: Building houses on agricultural land, with yards without weed control, is risky (Huaquén). - Source: Author's archive



Regarding wildfires, those produced during the summer of 2023 in Chile were particularly severe, claiming the lives of around 26 people. These disasters are also associated with increased mortality and morbidity. However, there are gaps in knowledge about their effects on health⁶. An investigation⁷ studied the psychological consequences of the 2017 “Las Máquinas” wildfire (Empedrado, Chile), characterised by its intensity and destruction. Among 292 adolescents affected, a significant proportion showed mental health problems, with women being more affected than men⁷. Another study has highlighted the worrying fact that the exposure of older adults to heat waves, reasonably associated with wildfires, has increased worldwide, which entails a greater risk of adverse health events⁸. There is a potential reinforcing feedback loop between climate change, wildfires, and human and animal health risks⁶. Besides mortality, fires can cause serious burns and severe poisoning with their consequent respiratory sequelae⁵. The long-term effect of fire exposure could be associated with cancer. Although most victims present transient psychological symptoms, a minority develop long-term psychopathologies², post-traumatic stress disorder and major depression being the most frequent².

On an individual level, there is little that people can do to reduce the adverse health consequences of wildfire exposure⁶. However, much

can be done about preventing fires, *e.g.*, keeping weeds in yards under control (Fig. 1C), not making recreational bonfires or smoking in areas with vegetation, creating “firebreak” zones, and communicating the evacuation routes. Each country’s respective labour legislation establishes fire prevention and protection measures, which workers and companies should responsibly respect. However, social action is a requirement⁶. Without immediate action to limit the rise in global temperature, the interaction between wildfires and climate change will likely establish a reinforced feedback loop, causing wildfires to have increasingly severe health consequences⁶. Wildfires affect people’s health, pets, farm animals (Fig. 1B), and endemic fauna and flora. A recent Argentinean study published in *Frontiers in Forest and Global Change*⁹ showed that continuing, unplanned housing expansion in wilderness areas without appropriate vegetation management would likely increase wildfire risk and human environmental conflicts further⁹. Effective land use planning, wildfire prevention, and risk management are crucial for sustainable housing expansion in the Chubut province (Argentinean Patagonia)⁹. Public policies should increase interest in housing planning and expansion to avoid floods, wildfires, and other disasters.

Finally, it is relevant to know that more than a century ago, Rudolf Virchow (1821-

1902) emphasized the need for multifocal and transdisciplinary thinking on the determinants of health and disease¹⁰. He pioneered the One Medicine (One Health) concept, i.e., the health and well-being of humans, animal populations and environmental systems are complex interconnected events shaped by biosocial contexts¹⁰. We should consider this

approach to minimise their impact on preventing natural disasters such as floods and wildfires. These global health issues should be considered from an integrative Planetary Health perspective.

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