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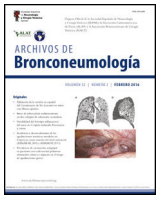

Editorial

Atmospheric Episodes Linked to Climate Change and Their Impact on Respiratory Health

Climate change is a growing problem. The last seven years have seen the highest mean global temperatures on record,[1] due mainly to the increase in greenhouse gas emissions caused by human activity. Owing to climate change, meteorological and atmospheric phenomena of unprecedented frequency and intensity have taken place in recent years. The rise in the mean temperature has been accompanied by an increase in the intensity, frequency and duration of heat waves. Between June and July 2021, North America experienced a 6-day heat wave that caused over 500 deaths in British Columbia (Canada).[2] Various states of the USA recorded more than 1000 heat-wave-related health emergencies, a figure 69 times higher than that of the previous year.[3] In 2022, there was a heat wave here in Spain to which 5827 deaths were attributed, tripling the estimated average number of heat-related deaths in the last 5 years.[4] In addition, the high temperatures and drier seasons have led to droughts and an increase in the number of wildfires. In 2019 and 2020, Australia was ravaged by wildfires that caused more than 450 deaths, 1120 hospital admissions due to cardiovascular disease, and 2030 admissions due to respiratory disease.[5] In Spain, over 300,000 hectares were burnt in 453 fires in 2022, tripling the number of hectares burnt in previous years.[6] Moreover, there is speculation that the episodes of Saharan dust intrusions (haze or *calima*) that are becoming ever more frequent on the Spanish and Portuguese mainland, might be related to climate change.[7]

Climate change and the above-mentioned succession of related atmospheric events pose a threat to health in general and to respiratory health in particular, whether directly, by exacerbating pre-existing diseases in the population, especially those of a respiratory and cardiovascular nature, or indirectly, by interfering with wildlife and plant life.[2] Climate change increases exposure to risk factors or factors that trigger exacerbations of respiratory disease (ash from fires, Saharan dust, pollution), without considering the effect which sustained extreme heat may have on a frail elderly population suffering from respiratory disorders, or even a younger population with multimorbidity.[8] Global warming, through droughts, wildfires and rising energy costs for air conditioning, will inevitably have an influence on rising air pollution, with an ensuing increase in ozone, particulate matter (PM2.5 and PM10) and greenhouse gases.[8] It is estimated that seven million people die every year as a result of cardiovascular events, COPD exacerbations, lung cancer, and acute respiratory disease attributable to air pollution.[9] In the short term, the effects of fire-related air pollution include the development of asthma, COPD and respiratory infections, and a deterioration in lung function, observable up to 10 years after exposure.[10,11] Some 339,000 persons are estimated to die annually as a consequence of exposure to smoke generated by wildfires.[9] The presence of suspended dust particles (haze or *calima*) also worsens air quality, thus being associated with the development of respiratory diseases.[12] A number of studies have linked a rise in mean temperatures to risk of hospitalisation among patients diagnosed with COPD.[13,14] Furthermore, a worsening of asthma has been reported in previously diagnosed persons who have been exposed to smoke and particulate matter from fires, and in children during heat waves.[8,15] Climatic variations modify the pollinisation cycle of some plant species, thus increasing the presence of allergies.[9]

It is estimated that the frequency, intensity and duration of atmospheric events linked to climate change will continue to increase with the rise in temperatures,[2] leading to excess morbidity and mortality caused by respiratory diseases, among others. Moreover, climate-change-related effects on respiratory health tend to affect vulnerable populations in particular, including people over the age of 65, those with pre-existing diseases, children, and pregnant women.[2,10] In addition, it should be borne in mind that as life expectancy increases, so does the number of people with pre-existing respiratory diseases, and there is a high likelihood that the impact of the harmful effects of such events will intensify by virtue of the phenomenon sometimes referred to as “depletion of susceptibles”.

Health systems must necessarily be strengthened to ensure an appropriate response to foreseeable increases in the demand for healthcare. Professionals involved in the care of patients with chronic respiratory diseases need to take an active part in climate change mitigation by, among other things, restricting the prescription of pressurised metered dose inhalers (pMDI) (which contain hydrofluorocarbons as the propellant) to the small group of patients who, by reason of their characteristics, are unable to use other inhalers. These pMDI generate a carbon footprint of 26 kg of CO_2 per inhaler.[16] For their part, respiratory patients can contribute to mitigating the environmental impact of pressurised inhalers, by making proper use of them and recycling them at pharmacies.

Climate change is the greatest threat to global health in the 21st century. In this context, it is essential that pulmonologists take the initiative in the prevention and monitoring of the effects of increased temperatures on susceptible patients, beyond what is normally accepted in current clinical practice. Patients should be informed of and advised about possible adverse effects arising from episodes of wildfires, episodic phenomena of increased pollution, Saharan dust intrusions or extreme heat waves, as well as the best

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way of preventing or neutralising such effects. It should be borne in mind that respiratory health is exposed to the influence of climate, environment, wildlife health, and lifestyle. Having access to and distributing guidelines on these aspects would help prevent or reduce the possibility of decompensation of respiratory patients.

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Conflict of interests

The authors declare they do not have conflicts of interest regarding this publication.

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