Climate change: A call to action for the united nations

1 | INTRODUCTION

In recent decades, increased burning of fossil fuels for electricity, heating, and transportation have led to increases in greenhouse gases (eg, carbon dioxide [CO_2], methane, nitrous oxide, and fluorinated gases) while deforestation and decreased biodiversity have reduced the Earth's ability to remove CO_2, the major greenhouse gas emission. Greenhouse gases trap the sun's energy leading to fundamental shifts in the physical and chemical nature of our planet. They also increase global temperatures both on land and in the oceans and increase acidification of the ocean. More than 90% of the warming that happened on the Earth between 1971 and 2010 occurred in the oceans. In the 141 years that the National Oceanic and Atmospheric Administration (NOAA) has tracked global heat, the 10 warmest years on record have occurred since 2005.[1] The 2020 Annual Climate Report by the NOAA reported that the combined land and ocean temperature has increased at an average rate of 0.08°C per decade since 1880; however, the average rate of increase since 1981 (0.18°C/0.32°F) has been more than twice that rate (0.18°C).[1] The oceans, by absorbing the excess CO_2, have increased in acidity, which is now around 25% higher than they were during preindustrial times. Increased acidity of rainfall has also been another consequence of global warming.[2] These developments are having tremendous effects on the Earth's climate. Rising temperatures have resulted in increased frequency and ferocity of forest fires, dust storms, hurricanes, flooding, heat waves, and droughts.[3,4] Global warming and climate change deleteriously affect many aspects of planetary and human health (Figure 1).

2 | CLIMATE CHANGE AND ALLERGIC DISEASE AND ASTHMA

Climate change explicitly or implicitly affects key aspects of human health, including allergic and respiratory diseases. Increasing CO_2 and global temperatures have been linked to longer duration of pollen season, pollen concentration, and geographical distribution of pollens leading to increased duration and severity of seasonal allergic rhinitis and allergic asthma.[5] Higher CO_2 levels increase photosynthesis in plants leading to increased production of pollen.[6] An association between thunderstorms and asthma, termed thunderstorm asthma, has been observed. During thunderstorms, pollen and/or mold spores are swept up into the clouds, where they are fractured (either by electric charge or by absorption of moisture) into smaller more allergenic fragments.[7] In addition, thunderstorms also alter the distribution of these pollen-derived particles making them more concentrated at the ground level. Thunderstorms during the pollen season are linked to increased asthma exacerbations and emergency room visits.[8] In November 2016, a catastrophic and deadly thunderstorm asthma epidemic struck Melbourne, Australia, and overwhelmed health services, leading to loss of many lives.[9] Wildfires and dust storms increase air pollution and indirectly enhance health risks. Wildfire smoke contains gases, particulate matter, complex hydrocarbons, trace minerals, and several other toxic and carcinogenic compounds. In a study investigating health effects of a 2013 wildfire season in Oregon, USA, a 10 $\mu g/m^3$ increase in wildfire smoke increased risk of asthma diagnosis.[10] A 5-year study in Kuwait found that dust storm events (defined as events with PM_{10}>200 $\mu g/m^3$) were associated with respiratory disease in children.[11] In the aftermath of hurricane Katrina in New Orleans, USA, higher fungal counts were recorded indoors and outdoors.[12] Higher temperatures and increased CO_2 also promote fungal growth. Increased exposure to mold and fungi has been associated with allergic exacerbations.

3 | GLOBAL COOPERATION FOR CLIMATE CHANGE ACTION

There are three very important meetings planned in 2021 to bring solutions to most of the above-mentioned problems. The UN General Assembly will meet on the 6th of September to tackle the global environmental crisis. The biodiversity summit will take place in Kunming, China on the 11th of October, and the climate conference (COP26) will start on the 31st of October, in Glasgow, UK. These events are critical for initiating collective action in efforts to save Planet Earth and sustain Human Health. With this editorial, we desire to join health professionals worldwide who have already called for rapid action.[13-15] It is imperative that these meetings conclude with a unanimous agreement to reduce emissions to net zero in the shortest possible time.

Climate action and mitigation strategies to reduce and stabilize greenhouse gases are directed either at reducing greenhouse gas emissions or at storing greenhouse gases in “sinks,” which consist of natural reservoirs, such as forests, oceans, or soil, for absorbing and storing carbon. Another important goal of climate action is to increase resilience by monitoring and preparing for extreme climate

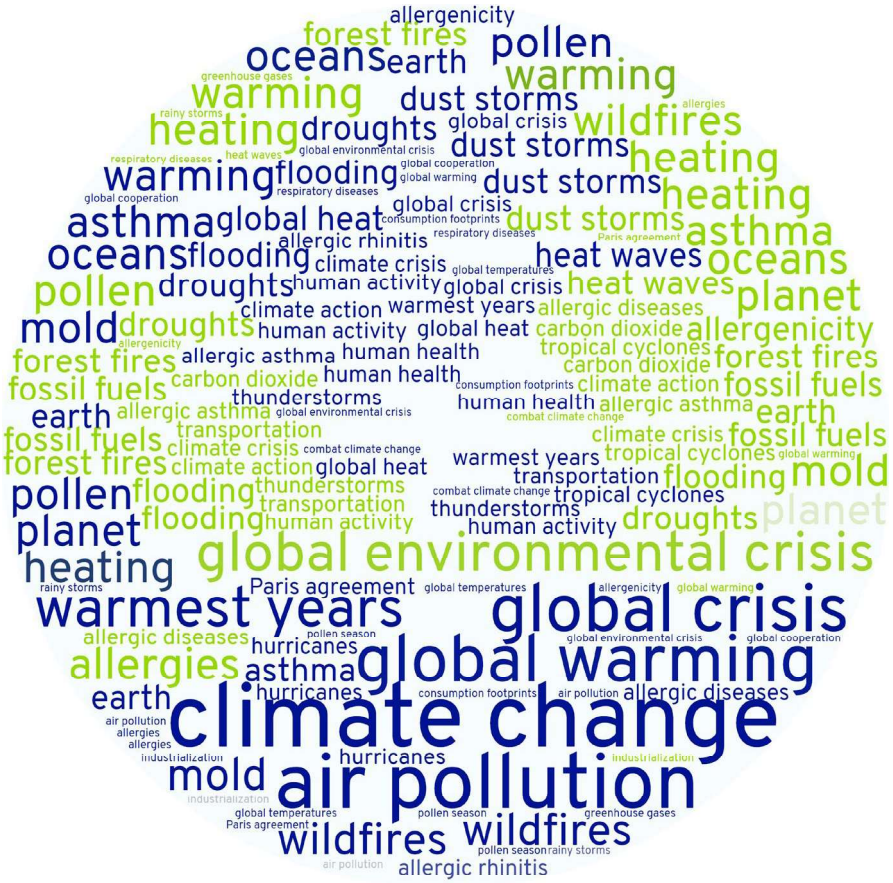

FIGURE 1 Wordcloud that brings together keywords related to global warming and climate change

FIGURE 2 Call for emergency action to limit global temperature increase, restore biodiversity, and protect health

events. The Paris Climate Accord represents the world's desire to combat climate change through reduction of greenhouse gas emissions. In 2015, this historic climate agreement was signed by 196 nations. The main aim of this international cooperation is to enforce the global response to climate change by limiting global temperature rise to 2°C above preindustrial levels by the end of the century and to pursue efforts to hinder temperature increase to below 1.5°C.[16] However, substantial health burdens and health risks due to climate change may be unavoidable, even if we stay within these limits. Suggestions of proportional reduction of greenhouse gases by all nations have met with resistance from developing countries. There are many ways to compare national responsibility for climate change: current emission rates, cumulative emissions since industrialization, current or historical emissions per capita, or consumption footprints. Greenhouse gas emissions have steadily increased from the time of the industrial revolution, and it is the cumulative effects of these

emissions that have led to the global climate change crisis. The uneven national emission contributions to the climate crisis complicate the finding of an effective and equitable solution to global warming. Using this reasoning, developing countries have argued that long-term polluters need to take the larger burden of reducing emissions. The nations that are historically major contributors to climate change should assist and compensate vulnerable nations in their efforts.

Although there is still no consensus on the role of individual countries and their responsibility for climate change, some progress has been achieved. Every country that signed up to the Paris Agreement has put forth a nationally determined contribution (NDC) for reducing greenhouse gas emissions by around 2030. These pledges, which are renewed every 5 years, are formulated by the countries based on their own priorities and needs and are non-binding. Currently, 192 parties have submitted their first NDCs.[17] However, based on the probability of fulfilling the NDCs, the estimated probability of staying below 2°C of warming by 2100 is only 5%.[18] Much stronger action of all stakeholders, from nations to communities to individuals, is necessary to meet the goals of the Paris accord.

The evidence of current climate change caused by increased industrialization and human activity is irrefutable. The authors of this editorial strongly suggest that we join and act now to build a healthier planet for the future (Figure 2). We must all strengthen our efforts to create a fairer and healthier world. The accountability and responsibility of the international community, state governments, business leaders, and most importantly, all of the planet Earth's citizens to uphold basic human values and priorities in health care should be consistently reiterated and acted upon. Our consolidated work includes regular monitoring of environmental changes using advanced technologies and scientific research. We can then translate our findings from environmental research into sound policies that can create sustainable solutions for the health of the planet and human health. The power of equitable and democratized artificial intelligence could be harnessed for real-time monitoring, rapid assessment of climate-related events, and deployment of mitigation strategies.[19] Early warning systems should be integrated with public communication systems to help communities prepare for hazardous climate-related events.

CONFLICT OF INTEREST

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