

## Exploring Health Risks Linked to Climate Change

Muhammad Akram<sup>1\*</sup>, Janeeta Yasmeen<sup>1</sup>, Zarqa Iqbal<sup>2</sup>, Muhammad Ishaque<sup>3</sup>, Raeesa Noor<sup>4</sup>, Nargis Rehman<sup>5</sup>, Urooj Rehman<sup>6</sup>, Fatma M. El-Demerdash<sup>7</sup>, Abid Rashid<sup>8</sup>, Amjad Chishti<sup>9</sup>, Fahad Said Khan<sup>1</sup>, Fethi Ahmet Ozdemir<sup>10</sup>, Gawel Sołowski<sup>10</sup>, Adonis Sfera<sup>11</sup>, Muhammad Junaid<sup>12</sup>, Saif ur Rehman<sup>13</sup>, Ali Zafar<sup>14</sup>, Sundleen Jannat<sup>15</sup>, Eisa Yazeed Ghazwani<sup>16</sup>, MESRATI Mohamed Amin<sup>17</sup>, Isaac John Umaru<sup>18</sup>, Agussalim<sup>19</sup>

<sup>1</sup>Department of Eastern Medicine, Government College University Faisalabad-Pakistan.

<sup>2</sup>Department of Biomedical Engineering, Riphah International University Islamabad, Pakistan.

<sup>3</sup>Department of Eastern Medicine and Surgery, Faculty of Natural Science, University of Sindh, Jamshoro, Pakistan.

<sup>4</sup>Department of Eastern Medicine, Islamia University Bahawalpur, Bahawalpur, Pakistan.

<sup>5</sup>Qarshi Foundation Trust, Lahore, Pakistan.

<sup>6</sup>Department of Eastern Medicine, Jinnah University for Women, Karachi, Pakistan. <sup>7</sup>Department of Environmental Studies, Institute of Graduate Studies and Research, Alexandria University, Alexandria, Egypt.

<sup>8</sup>Faculty of Medical Sciences, Government College University Faisalabad-Pakistan. <sup>9</sup>Faculty of Eastern Medicine, Hamdard University Karachi-Pakistan.

<sup>10</sup>Department of Molecular Biology and Genetics, Faculty of Science and Art, Bingol University, Bingol, 1200, Türkiye.

<sup>11</sup>Department of Psychiatry, Patton State Hospital, USA.

<sup>12</sup>Department of Biochemistry, Hazara University, Mansehra, Pakistan.

<sup>13</sup>GEOMAR Center for Marine Biotechnology (GEOMAR BIOTECH), Research Unit of Marine Natural Products Chemistry, GEOMAR Helmholtz Center for Ocean Research Kiel, WischhofstraBe 1-3, 24148 Kiel, Germany.

<sup>14</sup>University College of Conventional Medicine, The Islamia University of Bahawalpur, Punjab, Pakistan.

<sup>15</sup>Department of Biomedical Sciences, SMME, NUST University, Islamabad, Pakistan. <sup>16</sup>Department of Family and Community Medicine, College of Medicine, Najran University, Najran, Kingdom of Saudi Arabia.

<sup>17</sup>Faculty of Medicine Monastir- Tunisia, Department of Forensic Medicine - Taher Sfar Hospital. Mahdia.

<sup>18</sup>Department of Medical Biochemistry, Faculty of Basic Health sciences, Federal University Wukari. Taraba State Nigeria.

<sup>19</sup>Makassar Health Polytechnic, Ministry of Health Indonesian Republic, Indonesia.

### Article Info

**Received Date:** 05 December 2024, **Accepted Date:** 16 December 2024, **Published Date:** 20 December 2024

**\*Corresponding author:** Muhammad Akram, Department of Eastern Medicine, Government College University Faisalabad-Pakistan.

**Citation:** Md Akram, J Yasmeen, Z Iqbal, Md Ishaque, Raeesa N, et al. (2024). "Exploring Health Risks Linked to Climate Change". International Journal of Case Reports and Case Research, 1(2); DOI: <http://doi.org/12.2024/IJCRCR/010>.

**Copyright:** © 2024 Muhammad Akram. This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

### Abstract

This article examines the many health risks associated with climate change, with an emphasis on direct and indirect effects on public health. Heat-related illnesses,

vector-borne diseases, respiratory disorders and mental health problems are on the rise as a result of rising temperatures, severe weather and changing

ecosystems. Low-income neighbourhoods, children and the elderly are among the vulnerable groups most at risk. In addition, food security and water availability are affected by climate change, exacerbating health inequalities. This essay highlights the urgency of improved health care systems, climate action and flexible approaches to reduce these health risks and safeguard the world's well-being.

### Keywords:

environmental degradation; temperature rise; climate change; air quality; extreme weather events.

### Introduction

The slight decline in deaths from cold that is forecast for winter will contribute to none of these. However, once again, as it did last time round, the anticipation of greater elastic responses, including installation of air conditioners etc., will also reduce the anticipated rise in death from extreme heat. One climate indicator likely to change for 2046-2065 relative to the 1981-2000 average in RCP6.0 is the coolest night of the year (upper left) and its warmest day (upper right). The entire country is a sure bet to see increases of 6° to 10°F by mid-century compared with what will likely be the coldest night of the country. The South is in line for smaller changes. Generally, it can increase the warmest day of the year by 4-6°F. In addition, predictions on the wettest day of the year (bottom left) and its longest dry spell (bottom right) are also included. The extreme is also going to be more significant about precipitation with an average increase in the number of precipitates that fall on the wettest day in the year. The "lengthiest dry spell of any calendar year" at most locations will increase, however these increases will likely be small—in most cases, less than two days. (Alexander et al., 2006). Although the US took decades to catch up with the quality of air standard having been attained since 1970s yet still, it has been projected that up to 57 million Americans breathed polluted air within areas that failed to meet the national air quality standards in 2014. (Kaufman et al., 2020). Climate Change Biological Impacts symptomatic to man and animals caused by increasing greenhouse gases, and the overall global temperature. Climate change worsens health problems of humans with heightened heat stress, as vector borne diseases emerge and the quality of air deteriorates. These are very much stressed creatures, and even among those which do not see, impacts of the dynamics of

competition and availability of food. Such changes in the food web and architecture of the habitat bring about implications on the ecosystem service and biodiversity to be kept for ecological balance and human welfare. Other examples include hurricanes, floods, and heat waves as conditions that raise health risks and failure in structures. It shifts species ranges, reproductive behavior, and survival rate of species within natural systems, hence making those that cannot shift or move more vulnerable to extinction. Ecological change also impacts biodiversity and productivity within the ecosystems themselves; this has a ripple-down effect and impacts further down the line of services that these ecosystems provide for human and wildlife populations. The exposed people will lead to unhealthy quantities of polluted air because of climate change that may make it hard for the governments to meet the highlighted standards. Such countries face greater risks of more grievous climate-sensitive diseases due to the low capacity in the prevention and cure from those diseases. Despite the polluted water, there still remains some protection offered towards public health through the US water resources, public health, and environmental agencies. Climate change has set off many monumental and vast biological effects that contribute to the impacts on human populations as well as other animals in the planet. More frequent extreme climatic events with associated impacts on human populations' health outcomes remind us of the need to increase priority public health interventions as well as infrastructure adaptation. Other species outrightly condemn: new distribution pattern, broken cycles of reproduction, and in some cases extinctions. Therefore, proactive conservation for these species is needed. Since, in this regard, health and the environment are interlinked because of the interlink between the ecological and human systems, the two need to be integrated. Thus, we could have teamed up toward conserving biodiversity by ensuring that there was ecosystem service maintenance, protection of humankind by supporting strategies for climate adaptation and mitigation approaches toward safer and more sustainable futures for all.

### Environmental Degradation

Environmental conflicts are also due to mismanagement resulting in degradation whereby the locals form a gang and resist forces believed to be in charge in the management. To this, scientists contradict

and claim that human activity has made it inevitable for the sixth great extinction event on earth to occur.

Human Activities especially overexploitation and intensive agriculture lead to extinction of about sixty-eight percent of vertebrate species since 1970 according to the 2020 world species fund report. For this reason, the costs of unpaid care became the burden of the women due to several environmental limitations and consequences of such fallouts, and maximum have been faced in the rural areas where their versions have to be met. (Tyagi et al., 2014)

### Older Adults

Heat-Related Illnesses in Older persons: During heatwaves, older persons are more susceptible to heat-related illnesses such as heat exhaustion and heatstroke. The body's capacity to effectively control temperature declines with age, and chronic illnesses like diabetes or heart disease might worsen in older persons due to excessive heat (Bouchama et al., 2007). Health Issues That Are Chronic: Extreme weather events have the potential to exacerbate preexisting chronic health issues that older people frequently have, such as diabetes, cardiovascular illnesses, and chronic obstructive pulmonary disease (COPD). Additionally, these long-term illnesses hinder older persons' ability to recover from climate-related calamities (IPCC, 2021).

### Climate Change and Health

Human health is being profoundly impacted by climate change, which affects people's physical and mental health worldwide. Extreme weather phenomena like heat waves, floods, storms, and droughts are occurring more frequently and with greater intensity as the earth warms. These occurrences cause injuries, fatalities, and mass displacement, all of which have a direct negative impact on health. For example, heatwaves, which are expected to increase in frequency as a result of climate change, can worsen respiratory and cardiovascular conditions and cause heatstroke and heat exhaustion. Climate change not only has direct effects on health but also makes indirect hazards worse, such the spread of infectious diseases. As a result of ecological changes and improved conditions for disease-carrying organisms like ticks and mosquitoes, warmer temperatures increase the prevalence of diseases including Lyme disease, dengue fever, and malaria. Furthermore, communities may find it more difficult to recover from climate-related disasters as a result of the disruptions caused by the increased frequency of extreme weather events to vital services and health

systems. Health inequalities are widened as a result of rising health risks for communities, especially the vulnerable. In general, there is a complicated relationship between climate change and health, and addressing these risks calls for a multidisciplinary approach to safeguard communities and individuals from the cumulative consequences of health concerns brought on by climate change (McMichael et al., 2006).

### Air Quality

A city cannot be covered by the data from a single monitoring station. Therefore, the measurements that will be conducted will be different for the readings of other monitors of the same cities as the measurements taken use results made by the US Embassy and Consulates. Cast Algorithm, applied on raw data on air quality collected by the U.S. Embassy and Consulates in Pakistan translate the data into useful information. Based on changes in particle concentration that took place within three to twelve hours, raw PM 2.5 is converted into a number for the AQI which may eventually be applied in making decisions pertinent to health. EPA has standardized PM 2.5. To check out more of PM2.5 and general air quality, check the website of EPA. Other pollutants for which no data is reported but for which data would be useful in evaluating air pollution include PM10 coarse dust particulates, ozone, nitrogen dioxide, sulfur dioxide [SO<sub>2</sub>], and carbon monoxide. For US Embassy or Consulate data, omit any reading reported as " -999", meaning that that data for that location is not currently available. Lyallpur was the old designation of the Pakistani city of Faisalabad. It is the third most populated place in its country and geographically placed in a place of Pakistan, so it comes to be a huge industrial and distribution hub, being through all roads and trains connected toward other cities. It is going through phenomenal economic and demographic growth. This has branded it the "Manchester of Pakistan," because all the different corporations and businesses have set up shop there, much like the industrial boom in the same city in England at the turn of the century. Rank it as the second city in Pakistan and fourth in rankings for cities all over the world. As given in this case, when ranked number four on the entire globe, then this definitely does a lot of harm in terms of pollution, and therefore, this brings about numerous harmful effects on the people dwelling within the city. The most threatening major sources of pollution in Faisalabad are cars and the results of their

pollution. It seems that cars, motorbikes, and big vehicles like trucks and lorries, besides buses congesting roads, form a stiff challenge. First of all, there are still quite many of the older, archaic cars that can still be seen today emitting huge amounts of smoke and fumes far in excess of what a newer car running on cleaner fuel may do so because many of them run on lower-grade fuels or fossil fuels like diesel and often do not have to adhere to the same strict standards that other countries may have in place. But throughout the city are spread thousands of brick kilns and other plants and mills in textiles-thousands of which operate under exemptions under international rules and burn most of the time dirty fuel. Other industrial sites that are also increasing their level of pollution include chemical factories holding casting or foundry, sugar mills, and chicken feed manufacturing. Some of the sources of pollution were trans-border smoke that crept into town from beyond areas and therefore, settled as there were no dispersal avenues, dust accumulated along roadside sections and also wood and other materials, which were burnt in houses.

### Environmental Health Risks

All external environmental factors that have the potential to have a detrimental impact on human health are considered environmental health risks. Many of these dangers are being made worse by climate change, especially in places where natural systems are already under stress. Elevated temperatures exacerbate air pollution, which is one of the biggest concerns. For instance, a significant component of smog, ground-level ozone, is formed more quickly when temperatures rise. High amounts of ozone can cause respiratory issues like bronchitis, asthma, and chronic obstructive pulmonary disease (COPD), especially in young people, the elderly, and people with underlying lung diseases. Climate change is also making water shortages worse and changing precipitation patterns, which can cause droughts or floods. Waterborne illnesses such as cholera, typhoid, and dysentery can spread in flood-prone areas due to contaminated water, while in drought-stricken areas, a lack of clean water can cause malnourishment, dehydration, and heightened susceptibility to infectious diseases. Additionally, prolonged exposure to high temperatures causes heat stress, dehydration, and an increased risk of cardiovascular problems, making extreme heat events a direct hazard to human health. The burden of these environmental health hazards will only increase

with global warming, particularly for the most vulnerable groups.

### Public Health and Climate Change

With climate change serving as a major hazard multiplier for pre-existing health issues, public health and climate change are closely related. Public health systems play an increasingly important role in tackling these issues as climate change continues to impact ecosystems, weather patterns, and human habitats. To safeguard population health, public health initiatives must prioritize both adaptation (increasing resilience to climate impacts) and mitigation (lowering greenhouse gas emissions). One of the main issues is the health effects of heat, like heat exhaustion and heatstroke, which call for efficient early warning systems and cooling facilities in areas that are susceptible. In addition, climate change increases the spread of infectious diseases like dengue and malaria and worsens food instability, which increases the risk of malnutrition, particularly in low-income nations. By bolstering healthcare infrastructure, guaranteeing access to clean water, and creating climate-resilient health systems, public health systems can better manage these mounting demands. Additionally, since vulnerable groups are disproportionately impacted by health hazards associated with climate change, public health strategies must place a high priority on protecting them, including low-income communities, the elderly, and children. Incorporating climate action into health policy is essential for the future of public health because it will guarantee that health systems are not only equipped to respond to immediate climate impacts but also ready to address the underlying causes of climate change in order to prevent long-term health consequences (Field et al., 2014).

### Local Climate and Health Initiatives

The unique effects of climate change on public health at the regional or local level are the main focus of local climate and health programs. These programs seek to strengthen community resilience to the health risks posed by climate change and safeguard vulnerable groups. Since the effects of climate change vary by region, local initiatives are frequently designed to address the particular threats that certain communities confront. Heat action plans may be part of local climate and health measures to lessen the consequences of extreme heat waves, which have increased in frequency

as a result of global warming. For example, local governments have built cooling facilities and early warning systems to notify citizens about impending heat events in areas like Phoenix, Arizona, or Delhi that have high rates of heat-related illnesses. At-risk populations like the elderly, children, and people with chronic illnesses benefit most from these systems (Parker et al., 2014). In addition, a lot of cities are spending money on urban greening projects like building green roofs and expanding tree canopy coverage, which contribute to improve public health by lowering urban temperatures and lowering air pollution. Addressing air pollution, a serious health concern made worse by climate change, is another essential part of regional climate-health programs. To lessen air pollution and enhance respiratory health, several communities are attempting to lower vehicle emissions and expand public transit options (Haines et al., 2017). To improve air quality and reduce carbon emissions, Copenhagen, for instance, has put in place a comprehensive strategy for bike infrastructure. Additionally, local projects can concentrate on enhancing food and water security, which are impacted by climate change more and more. Municipalities have created community-based irrigation systems and rainwater gathering programs to improve water resilience in areas that experience flooding or drought. In summary, tackling the various and regionally distinct health effects of climate change requires local climate and health measures. These initiatives aim to lower climate-related health risks at the local level and enable communities to better address climate-related health issues by emphasizing adaptation, community resilience, and environmental sustainability.

### International Health Response to Climate Change

Since low- and middle-income countries (LMICs) are disproportionately impacted by environmental changes, international cooperation is necessary to reduce the health hazards associated with climate change. As nations address the health issues brought on by a changing environment, the World Health Organization (WHO) and other international organizations are essential in coordinating health activities, encouraging policy integration, and offering technical assistance. International efforts are concentrated on information sharing and capacity building to assist nations, particularly those with low resources, in adapting to the health concerns associated with climate change. The WHO's Health and Climate Change Program, for example, assists nations

in strengthening their health systems to withstand the effects of climate change and incorporating climate adaptation methods into national health policy (WHO, 2018).

Furthermore, low-income countries can receive cash from global financing structures such as the Green Climate Fund (GCF) to assist initiatives that lower the health risks connected with climate change. These initiatives could involve building climate-resilient healthcare facilities, enhancing the monitoring of diseases that are sensitive to climate change, and educating medical personnel on how to identify and manage climate-related disorders. Since promises to limit global temperature rise might lessen the frequency of extreme weather occurrences and ameliorate the related health impacts, international agreements like the Paris Agreement on climate change also include a health component. The global acknowledgment of the connection between health and climate is demonstrated by the inclusion of health considerations in climate negotiations. Last but not least, the global health community contributes to interdisciplinary cooperation across the environmental, climate, and health sectors as well as to promoting climate action and increasing public awareness of the negative health effects of climate change. In order to promote policy change and develop international solutions to safeguard health in the face of climate change, these collaborations are crucial.

### Global Climate Change and Health Interventions

The need for worldwide action to reduce and prepare for the health risks linked with climate change is the main emphasis of global climate change and health initiatives. Coordinated international plans combining adaptation and mitigation techniques are needed to address the health effects of climate change. While adaptation focuses on preparing health systems to deal with the changing environment, mitigation aims to lessen the primary drivers of climate change, such as greenhouse gas emissions. Global initiatives to cut emissions from industries including energy, transportation, and agriculture are examples of mitigation actions. In this regard, encouraging the switch to clean energy sources is a crucial global health initiative. Reducing air pollution through the use of renewable energy sources like wind, solar, and hydroelectric power provides immediate health

advantages by lowering the prevalence of respiratory conditions including lung cancer, bronchitis, and asthma. The United Nations, World Health Organization, and other global health organizations support policies that encourage carbon-neutral economies and facilitate the incorporation of health issues into climate policies (Watts et al., 2015). Interventions in global health that focus on adaptation include initiatives to fortify health systems and increase their ability to withstand the effects of climate change. The creation of early warning systems for health concerns associated with climate change is one significant solution, for instance. By providing prompt alerts and preventive actions, these systems can assist nations in anticipating and responding to heat waves, floods, and storms, reducing the negative health effects. For instance, early warning systems for disease outbreaks and flooding have been included into public health responses in South Asia, saving lives and halting the spread of illnesses like cholera (Dewan et al., 2012). Improving health surveillance systems to track climate-sensitive illnesses like dengue and malaria, which are progressively spreading to new areas as a result of changing climate conditions, is another worldwide intervention. These systems aid public health authorities in controlling the spread of vector-borne diseases and responding more efficiently to outbreaks by monitoring disease patterns and connecting them with climatic data (Lambrechts et al., 2015). Global collaborations are also essential to tackling health and climate change. To address climate-related health issues and promote international policies that put human health and the environment first, initiatives like the Global Climate and Health Alliance join governments, environmental organizations, and medical professionals.

### Climate Change and Public Health Strategies

To safeguard health in a warming environment, public health and climate change measures are crucial. Creating frameworks for public health that include climate resilience into health systems and policy is one of these tactics. Addressing the particular health concerns associated with extreme weather events, food and water security, and climate-sensitive diseases is becoming more and more crucial as the effects of climate change become more noticeable. The creation of health systems that are climate resilient is one of the main components of public health strategy. These systems are made to handle the heightened prevalence of illnesses and ailments brought on by climate change.

Public health systems can, for instance, train medical personnel to identify and manage conditions like heatstroke, starvation, and vector-borne illnesses that are made worse by climate change. Another crucial tactic is to fortify the healthcare system in areas that are susceptible. To guarantee that healthcare services continue to operate during climatic disasters, this may entail constructing clinics and hospitals that are resilient to severe weather conditions. Additionally, a key element of climate change measures is public health education. Governments and medical institutions must inform the public about the health hazards posed by climate change and provide self-defense training. Community-based health initiatives, for instance, can spread knowledge about the value of drinking plenty of water during hot weather or taking preventative measures against mosquito bites during the rainy season. Lastly, public health strategies must incorporate policy. To guarantee that health issues are incorporated into climate action plans, public health organizations must collaborate closely with environmental and climate policy makers. In summary, a multifaceted strategy encompassing mitigation, adaptation, education, and policy integration is necessary for successful public health initiatives that tackle climate change. These tactics are critical for mitigating the negative health effects of climate change, safeguarding people at risk, and making sure health systems are equipped to handle health risks associated with climate change.

### Climate-Health Nexus

The interrelated relationship between human health and climate change is known as the "climate-health nexus." As a result of the direct and indirect consequences of climate change on health determinants like clean air, clean water, food security, and secure living conditions, this relationship is becoming more widely acknowledged as a major public health concern. The nexus emphasizes how changes in climate patterns, such as rising temperatures, altered precipitation patterns, and an increase in the frequency of extreme weather events, are social determinants of health in addition to being environmental problems. For example, as temperatures rise, mosquitoes' ranges are expanded, which aids in the spread of vector-borne illnesses like dengue fever and malaria. Malnutrition and food insecurity are also caused by increasingly severe storms, floods, and droughts that affect agricultural

output. New health risks and difficulties are brought about by climate change's disruption of ecosystems and changes to human habitats, especially for vulnerable groups that lack the infrastructure or means to adapt. Due to the fact that lowering carbon emissions and encouraging sustainable practices can improve air quality and lower the prevalence of diseases linked to climate change, the health sector is also becoming more and more involved in efforts to mitigate climate change. To protect human well-being in the face of a changing climate, the climate-health nexus emphasizes the necessity of integrated approaches that connect environmental, public health, and social justice policies (Ebi et al., 2018).

### Climate-Related Diseases

Diseases that are either directly or indirectly caused by alterations in the climate are referred to as climate-related diseases. These diseases cover a broad spectrum, including respiratory, cardiovascular, and infectious disorders, all of which are on the rise as a result of climate change. Vector-borne diseases—which are spread by insects like fleas, ticks, and mosquitoes—are among the most prominent types of climate-related illnesses. Rising global temperatures cause these vectors' geographic range to increase, spreading diseases like Lyme disease, dengue fever, Zika virus, and malaria to formerly untouched areas. In a similar vein, rising temperatures and more frequent flooding can contaminate water supplies, making waterborne illnesses like cholera and diarrheal diseases worse. Another important cause of diseases linked to climate change is air pollution, which gets worse as temperatures rise. Cardiovascular diseases and respiratory disorders including asthma and chronic bronchitis are associated with exposure to ground-level ozone and fine particulate matter (PM<sub>2.5</sub>). Heatwaves also lead to an increase in heat-related illnesses like heatstroke, heat exhaustion, and dehydration, which are especially dangerous for vulnerable populations like the elderly, small children, and people with underlying medical issues. Additionally, mental health is becoming more widely acknowledged as a climate-related health concern, as those who are exposed to extreme weather events are more likely to suffer from anxiety, despair, and PTSD. In addition to medical interventions, preventing greenhouse gas emissions, enhancing public health infrastructure, and increasing climate resilience are all necessary to address climate-related disorders.

### Extreme weather

Extreme is the consequence of natural climatic variability, for example, El Niño affects the frequency, severity, the spatial extent, length, and timing of such events. These often go unnoticed. Now, finally, change is beginning to be felt in every nook and corner of this earth. Mankind has already influenced nearly each of the changes that are seen in extreme weather and climate events, the IPCC AR6-SPM has decided. For example, it can hold an additional 7% of water vapor that enhances extreme heavy precipitation events for each degree Celsius to limit global warming. These would, for instance, include extreme heat waves and heavy precipitation events as illustrations of how events occur with increased frequencies and intensities and, thus, heavily impact the most vulnerable societies. Human activities may have made it more probable that such complex extreme events—for example, the increasing coincidence of simultaneous heat waves and droughts—increased in the 1950s. Catastrophes have increased five times in the past 50 years primarily due to climatic change, more frequent harsh weather, and better knowledge. About three times more lives are being saved due to early warning systems and advanced catastrophe management. Early warning and early action was the focus for World Meteorological Day 2022 which was based on climate change and extreme weather since extreme weather events have increased sharply. Improvement in awareness and description of effects from extreme weather and climatic changes will be a major importance to integrate them into the processes of disaster risk reduction and decision-making. Such extreme weather or climatic phenomena have the potentiality of creating a destructive degree of impacts on ecosystems, agricultural communities, and natural regions. Telescoping hurricanes, tornadoes, tropical cyclones, heat waves, frosts, and heavy rains come in this category. This may be caused by an abnormally extended interaction of weather or climate conditions, or it may last longer than any other weather event. Examples include wildfires following an unusually wet and fruitful growth season or droughts caused by protracted periods with below-average rainfall. Scientists typically describe an extreme event by one of two methods: This is the probability of occurrence of any given event of a given size to occur during a given reference period such as 1961-1990. An extreme event is very extreme in most cases with a low probability of occurring in a particular region (<10%). This method based on probabilities applies for extreme event

attribution: is the rise in frequency and severity of extreme events connected to global warming? The second is applied directly by the adapting community. This is because the importance of impact-related criteria forms the base of how bad a given event is, thus forming a standard through which adaptive solutions will be drawn. The most current metric applied when quantifying a heat wave is the number of consecutive days that run in which temperatures exceed 100°F. Obviously, impacts of a 100°F threshold depend on location; an extreme event in Burlington, Vermont has much more impact in another location in another corner of the nation like Phoenix, Arizona that occurs well within the realm of normal. Hence, such threshold values depend on sites. Such climate hubs website offers further discussion on the kind of extreme events expected to affect those regions that Climate Hubs engage with. Just like the extreme tropical cyclones, also known as typhoons or hurricanes for other words, bring drought and wild fires on the western states of the American continent; while flooding occurs in both sides of the Atlantic and many of the islands of the Atlantic with extreme rainfalls and hurricanes. More on identification and tracking of extreme weather and climate events, event attribution, and climate change-related extreme events, see these sites.

### Extreme Heat and Heat-Related Illnesses

#### Heatwaves and Rising Temperatures

People all throughout the world are at serious danger for health problems due to heatwaves and rising temperatures brought on by climate change. The frequency, severity, and length of heatwaves are predicted to climb along with global temperatures, especially in urban areas. Heatwaves are extended episodes of intense heat, frequently with high humidity, that can overpower the body's natural cooling systems and cause dehydration, heat stress, and more serious illnesses such as heat exhaustion and heatstroke (Kovats & Hajat, 2008). According to McMichael et al. (2006), vulnerable groups are more likely to be affected, including children, the elderly, people with underlying medical issues, and outdoor laborers. Because the body finds it difficult to sustain regular functions in extremely hot temperatures, heat stress can make respiratory and cardiovascular conditions worse. High temperatures, for instance, can cause respiratory distress, heart attacks, and strokes (Bouchama et al., 2007). Furthermore, the "urban heat island" effect, which causes temperatures

in metropolitan areas—which are frequently defined by a lack of green space and dense infrastructure—to be noticeably higher than in nearby rural areas, exacerbates the hazards (Oke, 1982). Heatwave frequency, duration, and severity are predicted to increase as climate change picks up speed, placing further strain on public health systems and raising the number of heat-related diseases and fatalities (IPCC, 2021).

#### Health Disparities

Differences in health outcomes that are strongly associated with social, economic, and environmental factors are referred to as health disparities. Particularly vulnerable groups are frequently disproportionately impacted by these discrepancies. The disparity in health outcomes between various social and demographic groups is expected to grow as the consequences of climate change intensify. People who are already marginalized or underprivileged are disproportionately affected by climate change, which is not only an environmental or economic problem but also a serious public health one. Because they frequently lack the resources to adapt to the changing environment, vulnerable populations are especially vulnerable and face greater health risks

#### Rural Populations

**Greater Exposure to Extreme Weather:** Because rural and agricultural areas are where people live, people in rural areas are frequently more vulnerable to the consequences of extreme weather events like droughts, floods, and wildfires. While flooding can destroy homes and disrupt livelihoods, especially in communities that depend on agriculture, droughts can lower agricultural yields, resulting in shortages of food and water (Field et al., 2014). **Absence of Emergency Services:** In order to address health issues due to climate change, rural communities frequently lack emergency services and resources. For instance, rural communities may have delays in accessing medical care or evacuation aid during a heatwave or wildfire because of inadequate emergency response infrastructure and transportation networks (Gamble et al., 2013).

#### Conclusion

In conclusion, physical and mental health can be greatly affected by imbalances in humoral balance. Although the idea of humors has changed, it is still important to understand how they have historically maintained

bodily balance. Finding balance is essential for overall health, which underscores the need for holistic medical procedures.

## References

- Alexander LV, Zhang X, Peterson TC, Caesar J, Gleason B, Klein Tank AM, Haylock M, Collins D, Trewin B, Rahimzadeh F, Tagipour A. Global observed changes in daily climate extremes of temperature and precipitation. *Journal of Geophysical Research: Atmospheres*. 2006 Mar 16;111(D5).
- Bolan S, Padhye LP, Jasemizad T, Govarthanan M, Karmegam N, Wijesekara H, Amarasiri D, Hou D, Zhou P, Biswal BK, Balasubramanian R. Impacts of climate change on the fate of contaminants through extreme weather events. *Science of The Total Environment*. 2023 Nov 11;168388.
- Breakwell GM. *The psychology of risk*. Cambridge University Press; 2014 Sep 18.
- Borchers A, Teuber SS, Keen CL, Gershwin ME. Food safety. *Clinical reviews in allergy & immunology*. 2010 Oct;39:95-141.
- Change C. Climate change. *Synth. Rep*. 2001.
- D'Amato G, Baena-Cagnani CE, Cecchi L, Annesi-Maesano I, Nunes C, Ansotegui I, D'Amato M, Liccardi G, Sofia M, Canonica WG. Climate change, air pollution and extreme events leading to increasing prevalence of allergic respiratory diseases. *Multidisciplinary respiratory medicine*. 2013 Dec;8:1-9.
- Emberlin J. The effects of patterns in climate and pollen abundance on allergy. *Allergy*. 1994 Jan;49:15-20.
- Eguiluz-Gracia I, Mathioudakis AG, Bartel S, Vijverberg SJ, Fuertes E, Comberlati P, Cai YS, Tomazic PV, Diamant Z, Vestbo J, Galan C. The need for clean air: the way air pollution and climate change affect allergic rhinitis and asthma. *Allergy*. 2020 Sep;75(9):2170-84.
- Funari E, Manganelli M, Sinisi L. Impact of climate change on waterborne diseases. *Annali dell'Istituto superiore di sanita*. 2012;48:473-87.
- Fraser AM, Brockert JE, Ward RH. Association of young maternal age with adverse reproductive outcomes. *New England journal of medicine*. 1995 Apr 27;332(17):1113-8.
- Haque MA, Louis VR, Phalkey R, Sauerborn R. Use of traditional medicines to cope with climate-sensitive diseases in a resource poor setting in Bangladesh. *BMC Public Health*. 2014 Dec;14:1-0.
- Hernández-Cortez C, Palma-Martínez I, Gonzalez-Avila LU, Guerrero-Mandujano A, Solís RC, Castro-Escarpulli G. Food poisoning caused by bacteria (food toxins). Poisoning: From specific toxic agents to novel rapid and simplified techniques for analysis. 2017 Dec 20;33.
- Jones AP. Indoor air quality and health. *Atmospheric environment*. 1999 Dec 1;33(28):4535-64.
- Kraaijenbrink PD, Bierkens MF, Lutz AF, Immerzeel WW. Impact of a global temperature rise of 1.5 degrees Celsius on Asia's glaciers. *Nature*. 2017 Sep 14;549(7671):257-60.
- Kaufman JD, Elkind MS, Bhatnagar A, Koehler K, Balmes JR, Sidney S, Burroughs Peña MS, Dockery DW, Hou L, Brook RD, Laden F. Guidance to reduce the cardiovascular burden of ambient air pollutants: a policy statement from the American Heart Association. *Circulation*. 2020 Dec 8;142(23):e432-47.
- Luber G, McGeehin M. Climate change and extreme heat events. *American journal of preventive medicine*. 2008 Nov 1;35(5):429-35.
- Lei HY, Ding YH, Nie K, Dong YM, Xu JH, Yang ML, Liu MQ, Wei L, Nasser MI, Xu LY, Zhu P. Potential effects of SARS-CoV-2 on the gastrointestinal tract and liver. *Biomedicine & Pharmacotherapy*. 2021 Jan 1;133:111064.
- Lombardo JS, Buckeridge DL. *Disease surveillance: a public health informatics approach*. John Wiley & Sons; 2012 Nov 9.
- Mirza MM. Climate change and extreme weather events: can developing countries adapt?. *Climate policy*. 2003 Jan 1;3(3):233-48.
- Michener WK, Blood ER, Bildstein KL, Brinson MM, Gardner LR. Climate change, hurricanes and tropical storms, and rising sea level in coastal wetlands. *Ecological applications*. 1997 Aug;7(3):770-801.
- Schiedek D, Sundelin B, Readman JW, Macdonald RW. Interactions between climate change and contaminants. *Marine pollution bulletin*. 2007 Dec 1;54(12):1845-56.
- Tyagi S, Garg N, Paudel R. Environmental degradation: Causes and consequences. *European researcher*. 2014;81(8-2):1491.
- Yoder J, Roberts V, Craun GF, Hill V, Hicks L, Alexander NT, Radke V, Calderon RL, Hlavsa MC, Beach MJ, Roy SL. Surveillance for waterborne

- disease and outbreaks associated with drinking water and water not intended for drinking--United States, 2005-2006. MMWR: Morbidity & Mortality Weekly Report. 2008 Sep 13;57.
24. Bouchama, A., et al. (2007). The 2003 European heat wave and mortality in the United Kingdom. *The Lancet*, 370(9589), 1081-1088.
  25. IPCC (2021). Sixth Assessment Report: The Physical Science Basis. Intergovernmental Panel on Climate Change.
  26. Kovats, R. S., & Hajat, S. (2008). Heat stress and public health: A critical review. *Annual Review of Public Health*, 29, 41-55.
  27. McMichael, A. J., et al. (2006). Climate change and human health: Risks and responses. World Health Organization.
  28. Oke, T. R. (1982). The energetic basis of the urban heat island. *Quarterly Journal of the Royal Meteorological Society*, 108(455), 1-24.