



# CLIMATE CHANGE AND ITS IMPACT ON THE HEALTH

Today, worldwide, there is an apparent increase in many infectious diseases, which reflects the combined impacts of rapid demographic, environmental, social, technological and other changes in our ways of living. Climate change will affect infectious disease occurrence in humans. It is a known fact that climatic conditions affect epidemic diseases from long before the role of infectious agents was discovered, late in the nineteenth century. Changes in infectious disease transmission patterns are a likely major consequence of climate change. Climate changes include alternations in one or more climate variables including temperature, precipitation, wind, and sunshine. These changes may impact the survival, reproduction or distribution of disease pathogens and hosts, as well as the availability and means of their transmission environment. The health effects of such impacts tend to reveal as shifts in the geographic and seasonal patterns of human infectious diseases and as changes in their outbreak frequency and severity. Climate change is the prime health threat facing humanity and health professionals worldwide. Countries are already responding to the health harms caused by this unfolding disaster. Abundant literature addresses the factorial and potential impacts of climate change on many types of infectious diseases, including vector borne, water-borne, air-borne, and food-borne diseases.



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## Introduction

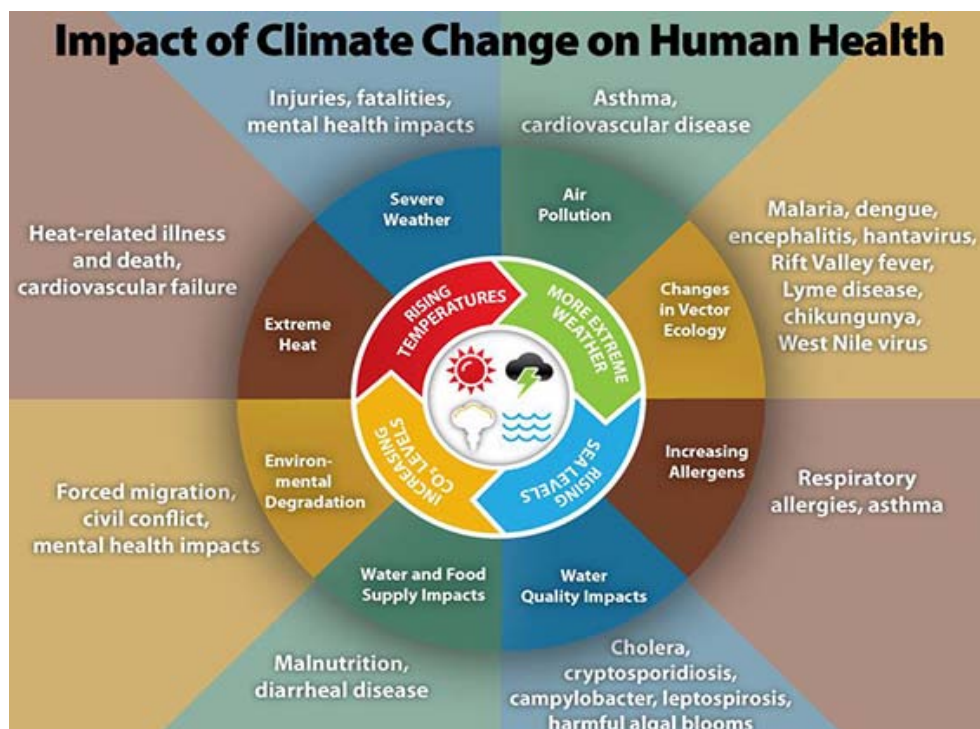
Climate is an average weather conditions that continue over multiple decades or longer, at the same time as the weather can change in minutes or hours. Climate change includes increases and decreases in temperature as well as changes in rainfall, changing risks of certain types of severe weather occurrences. Certain existing health threats will exaggerate and new health threats may emerge due to climate change. "Wellbeing of human has always been inclined by climate and weather". Climate change is impacting human lives and health in a variety of ways. Climate change is crashing health in a countless of ways, including by deaths and illness from more and more frequent severe weather events, such as, hurricanes and floods, increase in zoonoses and food, water and vector borne diseases and mental health issues. It also threatens the vital elements of good health, clean air, safe drinking water, nutritious food supply and safe shelter and has the prospective to weaken decades of progress in universal health. In addition, climate change is undermining many of the social determinants for good health, such as occupations, parity and right to use the health care and social support structures. These climate responsive health risks are mostly felt by the most weak and poor, including women, children,



poor communities, older populations, and those with primary health conditions.

### What effects does climate change have on health?

The controls of weather and climate on human health are noteworthy and different. The effects may vary from small organisms to large animals. For instance, weather and climate affect the survival, distribution and behavior of mosquitoes, ticks and rodents that carry diseases. Climate may also have an effect on water and food quality in some areas, with inferences for human health that may cause contamination of water and food. In addition, the consequences of global climate change on mental health and welfare are integral parts of the overall climate related human health impact.



Many of the sources of climate change also boost the risk of pandemics. Building dams and cutting down of trees which take places for agricultural purposes, is the prime cause of habitat loss globally. Habitat Loss forces animals to move around and get in touch with other animals or community and share germs. Large farm animals can also serve as a source for spread out of infections from beasts to people.

### Environmental Crisis: The deadliest threat to mankind's well-being

The health effects of these interruptions include raised respiratory and cardiovascular disease, injuries and premature deaths related to intense weather events, changes in the prevalence and geographical distribution of food and water borne illnesses and other infectious diseases and threats to mental health too. Mosquitoes and other piercing insects transmit many of the most important, shocking and ignored human infectious diseases, including malaria, dengue fever and chikungunya. Climate change is the prime health threat facing humanity and health professionals worldwide are already responding to the health harms caused by this unfolding disaster. The people whose health is being injured first by the climate disaster are the people who contribute least to its causes and who are least able to protect themselves and their families against it. The Intergovernmental Panel on Climate Change noted in its 2007 report that climate change may contribute to expanding risk areas for infectious diseases such as dengue and may increase diarrhoea diseases, putting more people at risk. The climate crisis threatens to undo the last fifty years of progress in development, global health and poverty reduction and to further widen existing health inequalities between and within populations. It severely jeopardizes the realization of universal health coverage (UHC) in various ways including by compounding the existing burden of disease and by exacerbating existing barriers to accessing health services, often at the times when they are most needed. Over 930 million people around 12% of the world's population spend at least 10% of their household budget to pay for health care. With the poorest people largely uninsured, health shocks and stresses push around 100 million people into poverty every year.

### Climate-Sensitive Health Risks

Global climate change is a phenomenon that is now considered strongly associated with human activities. Atmospheric carbon dioxide levels, which have remained steady at 180-220 ppm for the past 420,000 years, are now close to 370 ppm and rising. The effect of climate change on human health in India is a broad topic, covering areas from extreme weather events to shifts in vector-borne diseases. In South Asia, scientists predict an increased frequency of floods due to greater intensity of rainfall events and to glacier lake outburst floods (GLOFs) in mountainous regions. Floods create conducive environments for numerous health consequences resulting from disease transmission. For example, if flood waters become contaminated with human or animal waste, the rate of faecal oral disease transmission might increase, allowing diarrhoeal disease and other bacterial and viral illnesses to flourish. Faecal-oral transmission of diseases is of particular concern in regions



such as South Asia because of limited access to clean water and sanitation. Flooding can also contribute to increased vector and rodent-borne and other infectious diseases. For example, collections of stagnant water provide breeding grounds for mosquitoes, potentially aiding in the spread of malaria. In developed countries, flood control efforts, sanitation infrastructure, and surveillance activities to detect and control outbreaks minimize disease risks caused from flooding. In developing countries, increase in diarrhoeal disease, cholera, dysentery and typhoid is of specific concern.

Causes and consequences of Climate and weather changes on Wellbeing of humanity:  
Changes in temperature and precipitation and occurrence of heat waves, floods, droughts and fires directly impact health of people.

### **Heat-Stress**

Climate change may badly influence human health through a number of ways, but the usual occurrences are amplified frequency and strength of heat waves, rise in heat linked illnesses and deaths, increased precipitation, floods and droughts, affecting lives immensely. High temperature is notorious to increase the level of 'ground level ozone' and other 'climate altering pollutants' other than carbon dioxide, which further worsen cardio-respiratory and allergic diseases and certain cancers. Water borne and Food borne illnesses due to contaminated water and food are usually seen following flood, drought, religious or other mass gatherings.

### **Drought, Storms and Floods**

The climate change is identified to elicit other intense events such as drought, floods, tsunamis, and hurricanes that are linked with negative human health impacts. Urban drought and floods caused by varying climate due to shortage or surplus of rainfall indirectly affects human health. Drowning, hypothermia, and trauma are some physical effects of floods on human health (Ahern et al., 2005; Du et al., 2010). Severe drought conditions resulting in scarcity of food caused high number of deaths due to starvation in India (Dutta and Chorsiya, 2013). Also, the high rainfall causing floods lead to damage of crops that in turn causes famine of food leading to malnutrition and public health issues. The malnutrition can further cause anemia from which about 70% children, 55% women, and 25% of men population are suffering, in India (Majra and Gur, 2009). The change in temperature and precipitation causing severe heat, extreme cold, and unpredictable rain linked with climate change increases health related issues; as these climatic changes further induces water and air-borne infections, vector borne-infections, malnutrition, incidence of diarrhoeal diseases, and heat related morbidity and mortality (Haines et al., 2006; Dutta and Chorsiya, 2013). Children, elderly people, and urban residents are more vulnerable to these health impacts (Haines et al., 2006; Ebi and Paulson, 2010; Filippelli et al., 2020). Nearly 150,000 deaths and about 5 million illnesses have been reported per year due to climate change (Dutta and Chorsiya, 2013).

### **Ozone**

Ozone is a powerful oxidant that has been persistently associated with damage to structure of airway or lung





tissue. It contributes to more severe symptom of asthma, increase in other respiratory illnesses and deaths. High concentration of ground-level ozone accompanied with Heat waves result in higher frequency and severity of cardio-pulmonary attacks.

### **Air Pollution**

Air pollution is a primary environmental hazard to wellbeing. The development, transfer and spreading of many air pollutants is determined partially by climate and weather factors such as temperature, humidity, wind, storms, droughts, precipitation and partly by human activities. It is thus valid to imagine that climate change will persuade the dynamics of air pollution. By reducing air pollution levels, countries can reduce the burden of disease from stroke, heart disease, lung cancer, and both chronic and acute respiratory diseases, including asthma.

### **Ultra-Violet Radiations**

The excess of exposure to solar ultraviolet radiation (UVR) even within the ambient environmental range may result in sunburn, photo-ageing, cataracts, immune suppression and skin melanomas.

#### **Indirect Impacts of Climate and Weather on Health:**

Indirect impacts are due to ecological disturbances, rising sea level, changing temperatures and precipitation patterns which leads to changing patterns of disease' vectors, water-borne disease and vector-borne diseases.

#### **Air-Borne and Cardio- Respiratory Illnesses:**

Climate change influences various illnesses including respiratory tract infections like asthma, rhino-sinusitis, chronic obstructive pulmonary diseases (COPD), respiratory viral diseases and circulatory collapse of cardiac patients. The quoted reasons are poor air quality, high ozone, dust storms, extreme heat, desertification, alteration of allergens. Further the other contributory factors are demographic factors (age, sex, immunity status, pregnant women, prevailing endemic illnesses etc) low socio-





economic status, overcrowding, poor hygienic conditions, accessibilities to health care facilities, population with tuberculosis, immune-compromised level, or mentally or physically challenged people.

#### Vector-Borne Diseases(VBD):

Climate change and other weather parameters have significant impact on vector borne diseases such as Malaria, Dengue, Chikungunya, Japanese Encephalitis, kala-azar, and filariasis. The known parameters are temperature, humidity, wind, rainfall, flood and drought, affecting 'distribution of vector' and 'effectiveness of transmission of pathogen' through vectors. The temperature affects: vectors' survival, population growth, feeding behaviour, susceptibility to pathogen, incubation period, seasonality of vector activity as well as pathogen transmission. The roles of rainfall on vectors are: increase in breeding sites due to increase in surface water, increase vegetation and expansion of vertebrate hosts, flooding bring vertebrate host close to human population.

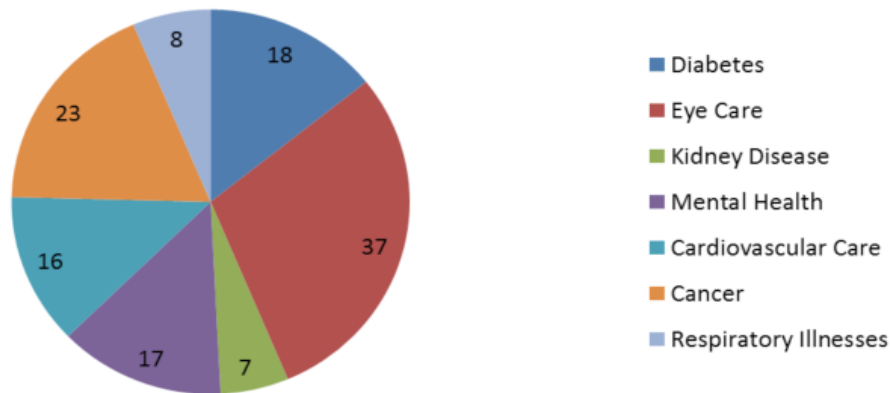
#### Waterborne & Foodborne Diseases:

Waterborne and Foodborne diseases such as typhoid, hepatitis, dysentery, and others caused from micro-organisms such as *Vibrio vulnificus* and *Vibrio cholera*, *E.Coli*, *Campylobacter*, *Salmonella*, *Yersinia*, are some climate-dependant infectious diseases. The increase in temperature is seen to be associated with increased survival and abundance of micro-organisms. The decreased precipitation, flooding and drought result in decrease availability of safe-water, reuse of wastewater, contamination of water sources, transmission from vertebrate to human or human to human etc. Flood causes contamination of water source.

#### Malnutrition:

Malnutrition and consequent disorders, like retarded child growth and development have been identified as one of the health threats. Climate variability and extremes of weather events affect food quantity and quality through reducing production, poor storage, pathogen infestation, disrupted supply chain, hike in market price. These factors reduce overall food consumption, and may therefore lead to macro as well as micronutrient deficiencies.

## Number of Profiled Programs by Non-Communicable Disease Focus



### Non-Communicable Diseases (NCD) & Mental illness

Non-communicable diseases and mental disorders have been found to be closely associated with variation in climate, exposure to various types of pollutants and type of occupation.

#### Conclusion:

The risk of emerging diseases may increase due to changes and survival of pathogens in the environment, changes in migration pathways, carriers and vectors, and changes in the natural ecosystems. Most often, extra pressure is placed on health care services by

increased demands resulting from weather-related natural hazards such as floods and land-slides. Disruptions of social networks are not uncommon. Climate change will affect, in profoundly adverse ways, some of the most fundamental prerequisites for good health: clean air and water, sufficient food, adequate shelter and freedom from diseases. Climate change is thus emerging as a major threat to health and adding pressure on public health systems.

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