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Potential Impacts of Climate Change and Variability on Public Health

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Climate change is an important and emerging threat to public health, some of its impacts being related to the reduction of the water quality and quantity, food security, control of infectious disease and protection from disasters. Global warming from rising average temperature and carbon dioxide concentration is likely to make it more challenging to meet environmental quality standards necessary to protect public health and most vulnerable populations [1-3]. There is a global concern that climate change will make certain environments suitable for some vector-borne diseases, worsening their already significant global burden and potentially reintroducing into areas previously eradicated diseases [4-5].

As an example, weather changes and extreme events have led to an increase in airborne allergens and Vector-Borne Diseases (VBD) such as dengue [6-7]. Climatic modeling results point to an acceleration of the hydrologic cycle in a warmer climate with potentially large impacts on the frequency of extreme events. Models have been developed to describe the relationship between vector-borne diseases, temperature and rainfall over time [8-11]. Therefore temperature, precipitation, humidity, and other climatic factors are very well known to affect the reproduction, development, behavior, and population dynamics of the arthropod vectors of these diseases Ndiaye et al.[12], Gage et al.[13], Unašević and Tošić [14], Kuo et al.[15]. Moreover, floods and droughts are the main impacts of climate change on water resources. They also modify water quality by direct effects of dilution or concentration of dissolved substances [16].

For these reasons, it is essential to link climate change and health research to better understand the impacts on vulnerable populations and to mitigate its potential damage by mainstreaming climate change adaptation measures as well as incorporating public health interventions into national policies. In this context, the scientific community is trying to move forward this discipline with several studies and climate models being developed. However, several gaps exist: (a) the current models are based on large heterogeneous areas and do not take into account small areas impacted by climate change; (b) the health impacts of climate change are not usually analyzed trough numerical modeling; (c) regarding the complexity of the whole process (e.g. different hazards, dynamics, processes, dimensions, communities and impacts), climate models usually focus on a specific aspect not understanding the entire system upon which we depend in an integrated manner, or the interrelations among its different dimensions; (d) modeling is usually only applied to the hazard but not to the vulnerability conditions; (e) models usually don't link results with policy options.

In this manner, a modeling approach is essential to understand how the effects of climate change and climate variability could influence emerging diseases. It is essential for societies to mitigate its potential damage by mainstreaming climate change adaptation measures as well as incorporating public health interventions into their national policies. Understanding the interrelations between geophysical and environmental threats will help define their influence on public health.

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