CCGHR CCRSM
Canadian Coalition for Global Health Research
Coalition canadienne pour la recherche en santé mondiale

BRIEFING NOTE
Climate Change and Infectious Diseases: Linkages and Gaps
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Climate change refers to the consequences of changing energy inputs to the earth-atmosphere system. The movement of air and moisture around the globe are driven by these energy inputs. As a result, temperature and rain/snow patterns will continue to change in intensity over space and time beyond regular seasonal and inter-annual changes. Infectious diseases are sensitive to environmental conditions including temperature and moisture. These conditions can affect replication, virulence, and infectivity of pathogens, the breeding and survival of vectors, and disease transmission.

Specific linkages between climate change and infectious diseases include:

- Changes in evolution, virulence, and infectivity
- Range expansion of vectors and pathogens into higher elevations with increasing air temperatures (e.g. malaria in Nairobi)
- Overlaps in pathogen and vector ranges
- Interactions between chemical pollutants and pathogens, especially in warmer temperatures
- Range contraction of vectors and pathogens with rising temperatures (e.g. expansion of desert areas)
- Movement of human reservoirs (environmental and political refugees)
- Natural and human disasters, evacuation centres and camps, and spread of infections (esp. respiratory)
- Natural and human disasters and compromised public health infrastructure (e.g. water and wastewater treatment; sanitation; healthcare systems)

Topics of concern and gaps in knowledge:

- Leptospirosis
- Vulnerable life stages (e.g. child, pregnancy)
- Confounding pathogen species (e.g. dengue)
- Role of human perceptions and behaviours (e.g. food practices and foodborne diseases; vector breeding habitats)

Perspective from the Caribbean:

- The Caribbean region has recently seen the emergence of vector-borne disease such the Chikungunya outbreak in 2014 (with some persistent arthralgia symptoms), and the Zika virus in late 2015-2016 and its associated complications such as microcephaly. Climate change presents optimal conditions for breeding of vectors (such as *Aedes aegypti* and *Aedes albopictus*).
- Following the recent floods, there has been an increase in Leptospirosis—another vector-borne disease.
- Again following the recent hurricanes, people are displaced and live in shelters and camps, thus creating an environment for the spread of respiratory diseases.
- With hurricanes and flooding, water systems, waste disposal, the management of debris and the preparation and storage of food—all are compromised including more flies and roaches.

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[1] This note was prepared by members of the CCGHR Working Group on the Health Impacts of Climate Change: Corinne Schuster-Wallace (Independent Consultant, Dundas, ON), Rosmond Adams (Caribbean Public Health Agency) and Vic Neufeld (CCGHR Special Advisor, BC).