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Abstract

The spread of viral and parasitic diseases due to climate change

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Since the beginning of the industrial age, energy demand for manufacturing, transport and heating has continued to grow at unprecedented rate. Today's life styles are energy dependent and energy intensive. For example in 2004 the daily global consumption for petroleum was 82.6 million barrels/ day. The growing world population demands intensive agriculture and produces massive waste. These human activities produce gases such as carbon dioxide, methane, nitrous oxides and fluro-carbons, known as green house gases and which are deposited in the atmosphere. These gases contribute in maintaining a stable climate. However due to their excess production, the earth can no longer maintain an emission and sequestration balance and as a result the climate is warming. Evidence of climate change includes an increase in the mean temperature and larger magnitude in departures from the mean temperature. Extremes have also been observed in precipitation and these include floods, storms and droughts.

Whereas human and mammals can regulate their body temperatures, insects and micro-organisms cannot. Their biological activity such as reproduction and feeding rates is dependent on external temperature. A number of insects such as mosquitoes, ticks, mites and snails carry human diseases. The rate of increase of insect populations is dependent on environmental temperatures and large insect population are related to high prevalence of insect-borne parasitic and viral diseases.. Some of these insects cannot survive in low or very high temperature and because of this some disease have been absent in regions that experience long periods of low temperatures. However as the earth's climate continues to change the insects are adapting to the new world.

In recent years changes have been observed in the distribution of insect-borne diseases such as malaria, dengue, Lyme disease and West Nile Fever. Moreover the intensity of disease transmission has been associated with El Nino events characterised by abnormally warm and wet weather. Evidence of changing disease patterns from Africa, Europe, North and South Americas and Asia indicate that this is a global phenomenon where the common factor is climate change. In Eastern Africa the frequency of malaria epidemics in the highlands and the spread of the disease to new areas have been observed. Ticks that transmit Lyme disease have shifted northwards in Europe as a result of milder winters. The rate of spread of West Nile Fever in the US has been associated with very warm summers. Outbreaks of Dengue Fever in Asia and Rift Valley Fever in Eastern Africa have been associated with El Nino events.

Having recognized the link between weather, parasitic and viral diseases it is now possible to forecast the occurrence of such disease events and put intervention strategies in place and thus reduce harmful impacts. As we straggle to reduce the increase of green house gases to prevent further global warming and climate change we shall need to adapt to changing disease distribution and occurrence.