

Societal drivers of disease emergence - the consequences of human actions and activities.

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It is becoming increasingly clear that there is a strong human dimension to emerging and re-emerging diseases, and that most outbreaks or epidemics of emergent diseases are due in large part to human activities and/or human actions. Thus a better understanding of the underlying causes or mechanisms that predispose to disease emergence is crucial for improving our ability to predict future disease outbreaks, and also to prevent or mitigate their emergence. In this context, it is important to recall that emerging viral diseases are defined as either novel diseases not previously recognised or known viral diseases which are increasing, or which threaten to increase, in incidence or geographic range. The major human activities and actions which predispose to disease emergence are those which bring humans closer to the source of virus, or which increase the environmental opportunities for transmission. These include changes in human demographics and urbanisation, changes in land use and agricultural practices, increases in globalisation of food supplies and trade, and the phenomenal increase in international travel and tourism. Added to these activities, genetic variation and mutations can change the transmissibility and/or the virulence of viruses. Thus changes in human demographics, such as increased urbanisation as a consequence of a movement from rural to urban areas leading to the development of shanty towns, often without water or sewage resources, or increased population growth leading to over-crowding, poverty and migration, are examples of the activities which predispose to viral disease transmission and spread. Similarly, changes in agricultural practices including intensive agriculture, deforestation, and increased irrigation also provide a potential for transmission as we struggle to feed an ever increasing world population. Indeed the globalisation of food supplies may also lead to virus transmission causing food poisoning. Travel and tourism provide an excellent avenue for the rapid spread of viral diseases, bringing exotic viruses from distant continents, and spreading viral diseases across national borders. Globalisation of trade may also spread mosquito vectors between continents, leading to the possibility of local transmission of exotic diseases. For all of these, societal pressures for improved quality and quantity of safe food and water supplies, for exotic and distant places to go for business or holidays, and for the potential of an improved future with respect to jobs and education in increasingly large urban centres, all serve to increase the potential for the spread and transmission of known and novel viral disease threats. Unfortunately, there are also examples where a breakdown of societal values can occur with increased transmission of some vaccine-preventable viral diseases, as exemplified by a reduction in public health programs leading to reduced levels of immunisation, resulting in the re-emergence of viral diseases such as measles and rubella. In addition, a reduction in public health measures may also lead to inadequate vector control and thus increased incidence of mosquito-borne disease. Finally, the economic consequences of emerging disease outbreaks can be significant, as seen from the emergence of SARS coronavirus in 2003 in China, and the spread of West Nile virus to North America in 1999.