Can Travel and Trade Affect the Global Epidemiology of Rabies?  
A Short Review

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ABSTRACT

Rabies is an acute, progressive, universally fatal encephalitis, caused by a zoonotic Lyssavirus belonging to the family Rhabdoviridae. Although an infectious disease, traditionally, it has not been considered to be spread through international trade and travel owing to the absence of human-to-human transmission. However, cross-border animal migration, animal trade, and travel to areas endemic for rabies pose a chance of emergence of travel-associated rabies as a public health threat. Additionally, the fact that the developed world has eradicated canine variant of the rabies virus impresses the imperative that adequate surveillance is maintained to prevent re-entry and re-establishment of the virus. The current review looks at evidence around outbreaks of travel-associated rabies and examines the various levels at which travel-associated rabies poses a threat and proposes policy recommendations which could be adopted in a local setting to combat the emerging public health challenge.

Keywords: Epidemiology, Globalization, Rabies, Trade, Travel, Zoonoses

INTRODUCTION

Rabies is an acute, progressive, universally fatal encephalitis, caused by a zoonotic Lyssavirus belonging to the family Rhabdoviridae. All mammals are potential reservoirs for rabies, with certain domesticated animals such as cats and dogs, along with sylvatic wildlife (foxes, skunks, raccoons, monkeys, coyotes, etc.) and bats being the major agents that keep the virus in circulation. The canine variant of rabies has been largely eradicated from the developed world. Therefore, the possibility that international travel can disrupt the present control and alter the epidemiology of rabies remains a palpable reality.
The number of international travelers has increased exponentially, from 277 million international travelers in 1983 to 983 million international travelers in 2011 (UNWTO, 2012). In this scenario, global travel poses risk for rapid dissemination of diseases on an international scale. Rabies has been identified as a disease that has the potential for international dissemination through travel (National Research Council, 2010). Travelling to, from, or through rabies enzootic areas poses special threats, especially for canine variant rabies, which has been largely eradicated from the developed world. The movement of animals, either owing to natural migration, or as a result of trade and transactions, poses a risk of geographical translocation of the virus (Lankau et al 2011).

**PURPOSE OF REVIEW**

The current review seeks to examine the issues in the context of rabies in a globalized world; the focus is on analysis of the epidemiology of travel and trade associated rabies outbreaks, along with a brief examination of the epidemiological difference of the rabies reservoirs in the developing and the developed world. This review also seeks to examine the various levels at which travel-associated rabies poses a threat and proposes to recommend a policy framework, which can be adopted in principle, to meet an emerging challenge.

**EPIDEMIOLOGICAL DIFFERENCES IN RABIES: DEVELOPING VERSUS DEVELOPED WORLD**

A fundamental difference exists between the epidemiology of rabies in the developed and the developing world. The major epidemiological difference between the developed and developing nations is that in the former, canine variant of the virus has been eliminated; only the sylvatic or chiropteran reservoirs remain (CDC, 2007).

Animal migration, either naturally, or human-mediated, could also lead to diversification of the biological reserves.

**IMPLICATIONS FOR DEVELOPING NATIONS**

This raises the legitimate question: is canine variant rabies an issue solely for the developing world? The truth could not be further from this, as, in today’s global village of a world, it is no longer correct to state that infectious diseases affect (or do not affect) any one country or region in particular. In the developing world, the severity of canine rabies pushes every other issue to the background, thus making it appear as though there are no other issues besides it. While this does not mean that the focus should shift from the control of canine and feline rabies virus variants, especially in domesticated animals, this should not also blind us to the fact that non-canine and non-feline reservoirs of rabies are also an epidemiological reality that needs to be kept in mind when developing any policy framework.

This review reaffirms the apprehension that unless there is elimination of disease from all nations, no one country is safe. Thus, it is as much the responsibility of the developing world to fight the scourge as it is of the developed countries.
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