Rabies deaths from dog bites could be eliminated

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Someone in the developing world - particularly in rural Africa - dies from a rabid dog bite every 10 minutes.

But global elimination of this horrific disease appears to be possible, according to a team which includes scientists from McMaster University, Britain and the United States.

In a paper in the current issue of *PLoS Biology,* they report their analysis of data on rabies transmission in two districts of rural Tanzania (Serengeti and Ngorongoro) and suggest that with "sustained, international commitment, global elimination of rabies from domestic dog populations, the most dangerous vector to humans, is a realistic goal."

Jonathan Dushoff, an assistant professor of biology at McMaster University, and a member of the Michael G. DeGroote Institute for Infectious Disease Research, analyzed the data. "The paper provides important evidence that the elimination of canine rabies may be possible."

Rabies is an acute viral encephalitis that is spread through the saliva of infected animals. Human rabies deaths from domestic dogs are rare in North America, but the disease causes over 24,000 deaths a year in Africa, mostly in poor rural communities and, most often, in children. Globally, 55,000 people die annually from canine rabies.

During a rabies outbreak in northern Tanzania, the team of scientists was able to directly trace case-to-case transmission of rabies. From this data, they generated a detailed analysis of rabies transmission biology and found evidence for surprisingly low levels of transmission.

The scientists also analysed outbreak data from around the world and found the transmission of canine rabies has been inherently low throughout its global historic range, explaining the success of control efforts in developed countries.

"Achieving vaccination coverage of 60 per cent or more in dog populations in Africa is both logistically and economically feasible through annual vaccination campaigns," the scientists said in the PLoS paper.

Given the success of the current research, Dushoff said a larger study is planned. "If the (larger study) works, we hope that the World Health Organization and the Gates Foundation will decide to tackle rabies world-wide. Canine rabies may well be a disease we can get rid of."

The cost of rabies both in terms of the 55,000 deaths a year and post exposure vaccination treatments is very significant, Dushoff said. "If it really is a disease that can be eliminated, our group believes we should go and get it. This paper is one step along the route of trying to figure out whether canine rabies is controllable, how it can best be controlled and promoting the idea it's a disease we can eliminate."

Dushoff's theoretical biology lab at McMaster is a "dry" lab - with no laboratory benches, chemical reagents or biological specimens. Its main tools are computers, pencils and chalkboards. Scientists working there use statistical, computational and mathematical techniques to engage a broad range of biological questions.

The lab's main focus is on a broad range of questions surrounding the evolution and spread of infectious diseases of humans - including rabies, influenza, malaria and HIV.

Source: McMaster University