

# Study finds vaccination is the most cost-effective way to reduce rabies deaths in India

11 January 2017

Every year in India, 20,000 people are estimated to die from rabies. Most of the victims are children. Nearly all of the deaths occur after victims are bitten by rabid dogs. For years, experts have debated the best strategy to reduce this burden.

Now, a new study has identified a cost-effective way to reduce death due to rabies. The research, led by a scientist at the University of Maryland School of Maryland (UM SOM) Center for Vaccine Development (CVD), was published recently in the journal *Proceedings of the National Academy of Sciences*.

The study focused on the Indian state of Tamil Nadu, in the south of the country. Researchers found that over the course of five years, vaccinating 200,000 stray dogs a year would reduce rabies incidence by 90 percent. They estimated this strategy would cost about \$1.27 million annually.

"We wanted to evaluate the cost-effectiveness of different rabies control strategies," said the lead researcher on the study, Meagan C. Fitzpatrick, a post-doctoral fellow at CVD. "Our goal was to maximize the impact of vaccination and/or sterilization on human health outcomes in the real world, where policymakers operate within cost constraints."

The research team also included scientists from the Yale School of Public Health, the Public Health Foundation of India, the Harvard School of Public Health, and the London School of Hygiene and Tropical Medicine.

India accounts for more than a third of the world's rabies deaths. Stray dogs are common and comprise approximately 42 percent of the total canine population in Tamil Nadu.

Dr. Fitzpatrick and her colleagues examined a range of strategies aimed at stray dogs, including vaccination as well as combined vaccination and sterilization. They also looked at different numbers of dogs captured and treated per day, to identify the most efficient scale for the program. The ten-year cumulative cost of these programs ranged from \$12 million to \$72 million. Indian decision-makers face competing health priorities, and as a result, reducing rabies must be cost-effective.

The researchers used a measurement known as Disability-Adjusted Life Year, or DALY, to compare the efficiency of each approach. A DALY is defined as a lost year of healthy life. Dr. Fitzpatrick measured how many DALYs each strategy would save, allowing her to compare costs. Based on this approach, a strategy of vaccination without sterilization was the most efficient way to reduce death from rabies.

Rabies is a viral disease of mammals that is usually transmitted via the bite of a rabid animal. In the U.S., most rabies cases involve wild animals such as raccoons, skunks, bats, and foxes. The rabies virus attacks the central nervous system, eventually causing disease in the brain and death. Death usually occurs within days of the appearance of symptoms (symptoms may not appear for a month or longer following a bite from a rabid animal). If people are treated within two or three days of being bitten, the [human rabies](#) vaccine is highly effective, and victims usually survive. As a result, [rabies](#) deaths are extremely rare in the U.S. Being bitten by a rabid animal is also very rare in the U.S. because nearly all domesticated animals are vaccinated. In India, however, victims often do not get treatment, either because they don't know they've been infected, or don't have the means to get to a clinic or to pay for treatment.

**More information:** Meagan C. Fitzpatrick et al.  
One Health approach to cost-effective rabies  
control in India, *Proceedings of the National  
Academy of Sciences* (2016). DOI:  
[10.1073/pnas.1604975113](https://doi.org/10.1073/pnas.1604975113)

Provided by University of Maryland School of  
Medicine

APA citation: Study finds vaccination is the most cost-effective way to reduce rabies deaths in India  
(2017, January 11) retrieved 22 January 2018 from [https://medicalxpress.com/news/2017-01-vaccination-  
cost-effective-rabies-deaths-india.html](https://medicalxpress.com/news/2017-01-vaccination-cost-effective-rabies-deaths-india.html)

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