

Rabies Eradication Strategies in India

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Introduction

Rabies is zoonotic viral disease of warm-blooded animals, and causes immense public health significance. The disease induces encephalomyelitis and is 100% fatal without effective post-exposure prophylaxis (PEP). The virus is spread to humans from animal bites since the virus is excreted in the saliva of the infective animals. In developing countries, dogs are the predominant reservoir of infection (canine rabies) while other animals like bats, raccoons and foxes are main reservoirs of infection (sylvatic rabies) in developed countries. The maximum incidence of Rabies has been reported from India with over 20,000 deaths per year. The World Health Organization (WHO) considers the disease burden estimate in developing regions to be understated due to factors including inadequate surveillance, underreporting, frequent misdiagnosis, and a lack of intersectoral coordination. Moreover, it is particularly problematic amongst the rural poor, owing to insufficient management with PEP following dog bites, stemming from ignorance, illiteracy, and limited availability and accessibility of affordable rabies PEP services. Rabies

disproportionately affects children aged 5-14 years especially males due to their propensity for greater contact with canines and who thereby constitute almost 40% of the rabies PEP recipients.

Eradication strategies

1. Washing wounds thoroughly with soap and water after a bite is an effective way of preventing infection, while both pre-exposure and post-exposure vaccinations for humans exist. Global elimination of the disease is feasible through mass vaccinations of dogs, which can transmit 95% of rabies cases to humans.
2. Around 59 000 people die from rabies across the world each year, with around 90% of these deaths occurring among children living in rural areas in Africa and Asia. In India, estimates range between 18000 to 20000 human deaths from rabies each year. Many of these deaths are children, often dying outside of medical facilities – meaning their deaths go unrecorded. the true burden of rabies in India is not known. The reported incidence is probably an underestimation because in India rabies is still not a notifiable disease
3. In December 2015, countries from across the world met with WHO, the World Organization for Animal Health (OIE), the

Food and Agriculture Organization of the United Nations (FAO) and the Global Alliance for Rabies Control (GARC), and agreed to end human deaths from dog-mediated rabies by 2030. Dr. Margaret Chan, WHO Director-General, acknowledged that elimination of rabies is within reach by using her own words: "Rabies belongs in the history books".

4. Under the One Health Initiative, WHO, OIE, FAO, and GARC are working on simultaneous campaigns to eliminate canine rabies through the vaccination of dogs, the treatment of human rabies exposures with wound washing and post-exposure prophylaxis, and the improvement of education about rabies prevention where it is needed most.
5. Ending human deaths from dog-mediated rabies by 2030 will require an active role from India, which has a high concentration of the disease but is also empowered by its rich technical expertise and resources to drive cooperation of other countries in the region.
6. The elimination of rabies in India is a daunting task, but not an impossible one. Control of canine rabies through vaccination and dog birth control is imperative, although with 25 million stray dogs in the country this is a formidable task.
7. While the sheer size of India's dog population is a significant obstacle but collaborative efforts between the medical, veterinary, and public health sectors have already made a significant difference. So

Key interventions for rabies control and elimination include vaccination for high risk individuals, surveillance of human cases, post-exposure prophylaxis following animal bites, vaccination and/or culling of the canine population and other animal reservoirs.

8. There has been a considerable amount of research on rabies in India, but key questions remain unaddressed. For example, while policy-makers need evidence for social, political and economic outcomes of control programmes, most rabies research is done in the basic sciences.
9. Over the past decade, intradermal administration of rabies vaccine for post-exposure prophylaxis has heralded a major change in rabies-control measures. The World Health Organization recommends this route when vaccines are in short supply, citing the 60–80% reduction in direct costs and vaccine consumption, compared with standard intramuscular injection. Canine vaccination is the suggested strategy of choice towards elimination of rabies. The cost of a canine vaccination programme is three to 10 times higher than the cost of human prophylaxis. Modelling of pilot canine vaccination interventions in India showed that a coverage of 70% would have to be sustained over two decades in order for the intervention to be effective. Even at a cost of 0.13 US dollars (US\$) per vaccinated dog, the total cost per year for a national programme of canine vaccination would be

US\$ 23 million – 27% of the total budget of the State Department of Animal Husbandry in 2012.

Important facts

1. India states such as Lakshadweep and Andaman have no rabies because no dog population is there.
2. With 5.2 lakh children and 23,000 school teachers educated on the virus in four years, with close to 1 lakh dogs vaccinated annually, and 106 positive samples between 2017 and 2018, Goa is the first state that did not report a single human death due to rabies since 2019.

Tamil Nadu has pioneered the establishment of a One Health coordination committee, which brings together leaders from the human health, veterinary, and animal welfare sectors to develop rabies control strategies that transcend sectoral boundaries. If successful, this committee could set an example for effective rabies control throughout India. The state has also committed to the provision of PEP for all dog bite victims with suspected rabies exposure in practice, PEP is only administered to victims of dog bite who present for medical care. From 2014 to 2015, the local Tamil Nadu government procured 551,664 vials of anti-rabies vaccine, which is able to provide 10 doses of the intradermal regimen or 1 dose of the intramuscular