

## RABIES ELIMINATION IN TAMIL NADU- WHERE WE STAND?

Selvavinayagam T S <sup>(1)</sup>, Sudharshini Subramaniam <sup>(2)</sup>

(1) Directorate of Public Health &amp; Preventive Medicine, Chennai

(2) Institute of Community Medicine, Madras Medical College

Abstract

This article explores the strategies, challenges, and progress towards rabies elimination, focusing on Tamil Nadu. Despite a decline in rabies-related deaths, achieving the goal of zero deaths remains challenging. Strategies include ensuring timely post-exposure prophylaxis for humans, emphasizing vaccine availability and healthcare professional training. The animal component involves mass canine vaccination and birth control, with challenges in estimating stray dog populations and implementing systematic vaccination. Legislative frameworks related to rabies control are presented, emphasizing a One Health approach. Successful models from states like Goa and Sikkim illustrate the feasibility of elimination. The environmental component stresses effective solid waste management to reduce human-dog conflicts. This holistic approach, involving collaboration and urgency, is crucial for successfully combating rabies in Tamil Nadu.

**KEY WORDS :** Rabies Elimination**INTRODUCTION**

Rabies is a vaccine preventable zoonotic viral disease which is highly fatal. Globally, 59000 deaths due to rabies is estimated to occur in 150 countries, with 95% of cases coming from Africa and Asia. India contributes to 1/3rd of these deaths.<sup>2</sup> All states/union territories are endemic for rabies except Andaman and Nicobar, and Lakshadweep Islands.<sup>3</sup> Although Rabies affects people of all age groups, children are the most vulnerable which constitutes 40% of people exposed to dog bites in Rabies-endemic areas.<sup>2</sup> Dogs are the major cause of human rabies death contributing to 99% of all rabies transmission to humans.<sup>1</sup> Countries are categorized as rabies free, controlled, and high risk depending on the rabies burden in domestic and wild animals. Some countries have achieved rabies elimination in both domestic and wild animals and are categorized as rabies free. There are certain countries which are categorized as rabies controlled, which still has rabies disease in the wild animals. India falls under high-risk category with high burden of rabies in domestic/wild animals.

Rabies control in the country has a long history starting with the creation of Pasteur Institutes in India. Neural tissue vaccine was replaced by cell culture vaccine since National guidelines for rabies prophylaxis was to establish uniformity in pre and post exposure prophylaxis since 2002. Rabies was identified as a priority zoonotic disease by Planning Commission of India in 2007 following which a pilot Rabies control program was implemented by Ministry of Health And Family Welfare through National Centre for disease control. Madurai was one of the pilot cities. Based on the success of this program, National Rabies Control Program was upscaled in the 12th five year plan. Chennai was one

among the two pilot cities wherein Animal component of Rabies control was piloted through Animal Welfare Board of India, under the Ministry of Environment, Forest and Climate Change. This was the first time, wherein there was a mention about animal vaccination, animal birth control etc. Globally, in 2015, the world has set a goal of “Zero deaths due to dog mediated rabies by 2030”.<sup>4</sup> India, in alignment with this goal conceptualized “National Action Plan for dog mediated Rabies Elimination from India by 2030” (NAPRE) in the year 2018.<sup>5</sup> In this line the states are supposed to frame the State action plan in this regard.

WHO has divided countries into 5 different stages of elimination namely endemic stage, control stage, stage of zero human rabies death, elimination stage and maintenance stage. Rabies elimination is defined as interruption of rabies transmission among humans and no canine case.

*Table.1. Animal Bites and rabies death in Tamil Nadu*

Year	No of dog bites reported in Tamil Nadu	Death due to rabies
2023	639468	20
2022	883213	28
2021	819779	19
2020	714447	20
2019	755980	23
2018	598077	31

Source: Office of Directorate of Public Health and Preventive Medicine



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Corresponding Author : Sudharshini Subramaniam

e-mail: sudharshini.subramaniam90@gmail.com

In Tamil Nadu, there were around 8.83 lakhs animal bites reported for the year 2022 and 121 deaths related to rabies from 2018 till 2022. The trend shows that Tamil Nadu is showing a declining trend in the deaths due to rabies, however, we are nowhere closer to the goal of zero deaths due to rabies. Tamil Nadu has committed itself to eliminate rabies. In this article, we will discuss regarding the various strategies that are adopted for achieving rabies elimination, challenges and the roadblocks ahead in implementing these strategies and the way ahead, with specific focus to Tamil Nadu.

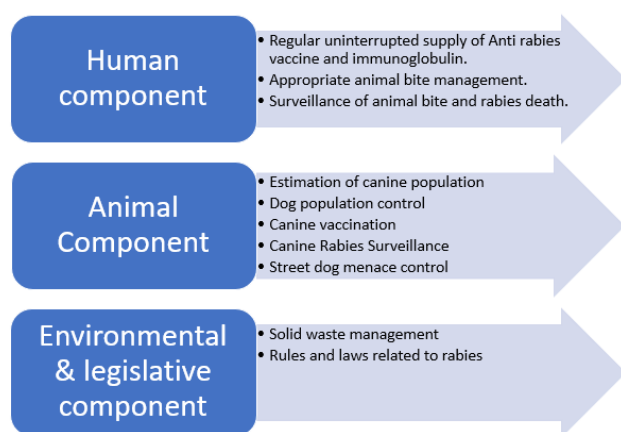


Figure 1: Interventions targeted at dog mediated rabies elimination

### HUMAN COMPONENT

One of the key strategy for prevention of rabies among humans is post exposure prophylaxis with cost effective intra dermal anti-Rabies vaccine and anti-rabies immunoglobulin. Both are included in essential drug list at all levels.<sup>6</sup> Financial assistance to procure ARV and immunoglobulin is provided under state budget and by Government of India, under National Free Drugs initiative scheme.<sup>5</sup> Tamil Nadu has also issued state specific instructions to ensure that the ARV and immunoglobulin is administered to any animal bite victims based on the category of bites in any government hospitals irrespective of the time of arrival of the patient. This initiative enables the early initiation of animal bite management without requiring any delay in terms of referral for need for vaccine or immunoglobulin. Inventory management of these drugs are essential to avoid stock out. In Tamil Nadu, the Tamil Nadu Medical Service Corporation is monitoring the inventory through Drug distribution management system portal (DDMS portal) which enables remote monitoring of stock availability in all government hospitals. The state has also issued orders to ensure availability of minimum 20-30 doses of ARV and immunoglobulin availability at any point of time in the PHC. The other key component in animal bite management is availability of trained manpower. Rabies

prevention is one of the core competency in the preservice training of medical and nursing curriculum.

Despite all such efforts, evidences on compliance to animal bite management done in different parts of Tamil Nadu, have shown inadequacies in animal bite management. In a study done in Coimbatore, only half of the animal bite victims had received their 1st dose of ARV on the same day of animal bite. The most common reason quoted was the low risk perception by the victims and unavailability of vaccines in the hospitals.

Table 2: ARV stock position as on 23/11/23 in Tamil Nadu from DDMS portal

S.No.	District	Stock on Hand
1	ARIYALUR	1054
2	CHENGALPATTU	2838
3	COIMBATORE	5438
4	CUDDALORE	776
5	DHARMAPURI	3544
6	DINDIGUL	8429
7	ERODE	2476
8	KALLAKURICHI	1715
9	KANCHIPURAM	652
10	KANNIYAKUMARI	2699
11	KARUR	2962
12	KRISHNAGIRI	2865
13	MADURAI	1412
14	MAYILADUTHURAI	1512
15	NAGAPATTINAM	4036
16	NAMAKKAL	3332
17	NILGIRIS	2832
18	PERAMBALUR	3854
19	PUDUKKOTTAI	2964
20	RAMANATHAPURAM	3894
21	RANIPET	885
22	SALEM	3971
23	SIVAGANGAI	1746
24	TENKASI	2926
25	THANJAVUR	3509
26	THENI	450
27	THOOTHUKUDI	2346
28	TIRUCHIRAPPALLI	4286
29	TIRUNELVELI	3010
30	TIRUPATHUR	1541
31	TIRUPPUR	3676
32	TIRUVALLUR	3739
33	TIRUVANNAMALAI	4374
34	TIRUVARUR	1839
35	VELLORE	3664
36	VILUPPURAM	494
37	VIRUDHUNAGAR	5697
	<b>Total</b>	<b>107417</b>

The study also reported that there was mis categorisation of animal bites, with many category 3 bites being categorised as 1 or 2.<sup>7</sup> This discrepancy highlights the need for training of HCPs on the anti-rabies guidelines. This highlights the need for strengthening the implementation of the Animal bite management protocol and build in mechanisms to monitor the same. Undue efforts should be taken to create awareness among common people regarding rabies and animal bite management. The strategy on Information Education and communication (IEC) for increasing awareness about the diseases and the importance of seeking timely and appropriate treatment for animal bites, should be further strengthened. Role of multimedia in increasing awareness should be utilized.

Pre exposure prophylaxis for professionals exposed to an environment conducive for rabies virus transmission is also recommended. However, there exist no data on who

is getting pre-exposure prophylaxis and there is no mandate for providing proof of vaccination in any occupation. NAPRE recommends Indian Academy of Paediatrics to promote pre-exposure prophylaxis among children as part of routine immunization.

The other key intervention is a stronger surveillance for notifying animal bites and rabies incidence under Integrated Health Information Portal. There has been an inclining trend in the notification of animal bite cases over years. In the year 2008, the reported dog bites in Tamil Nadu was 300/100000 population.<sup>8</sup>

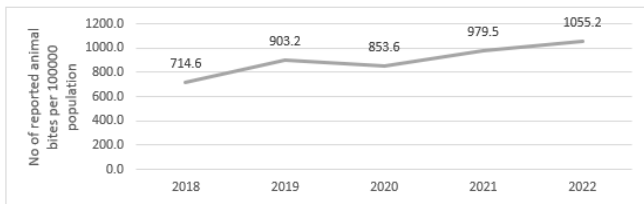


Figure 2: Reported dog bites per 100 000 population in Tamil Nadu, India, 2018–2023.

Source – Office of Directorate of Public Health and Preventive Medicine

There are variations within the districts in terms of reported animal bite, with Chengalpet, Cuddalore, Thanjavur, Tiruvallur, Salem reporting the highest numbers. However, the current surveillance mechanism is not robust especially with regards to animal bites, as not all private institutions notify in the IHIP portal.

To strengthen diagnostic capacity of Rabies, NAPRE recommends establishing of one laboratory at the district level to do anti rabies antibody titre. Among the 10 laboratories for diagnosis of human rabies, enlisted in NAPRE document, none is from Tamil Nadu. Currently the diagnosis of Rabies is based on clinical findings with history of animal bite. Hence there is a possibility that rabies is under-reported, mis- and under-diagnosed. With control programmes scaling up towards elimination of dog mediated rabies, surveillance is expected to increase leading to subsequent improved data quality.

### ANIMAL COMPONENT

The guiding principle of the entire NAPRE document is its high reliance on ONE HEALTH approach, wherein it is strongly believed that human rabies elimination can happen only if canine rabies is addressed appropriately. Under animal component, the following interventions are recommended.

**Estimation of canine population** ( number of free roaming dogs, community owned dogs and pet dogs)

is essential for calculating the logistics requirement for vaccinating these animals. The local body administration is vested with the responsibility of estimating the stray dog population. In Tamil Nadu, ad hoc surveys are conducted by local bodies to find an estimate of the stray dog population. Greater Chennai Corporation had the latest census in 2018 and reported to have 57,366 canines and it has projected the canine population to be between 90000 to 1,20,000, which is a gross underestimate as per the experts in the field. Stray dog population census should be undertaken every 4 year once.<sup>9</sup> Coimbatore corporation used geo-tagging technology to count the canine population and estimated to have 3.5lakh stray dogs. There is no public data available on the stray dog population census in other districts of Tamil Nadu.

Table 3: Intervention strategy for rabies control – animal component

Estimation of canine population	Local Body administration
Mass Canine Vaccination	Department of Animal Husbandry, Dairying
Dog population control	Department of Animal Husbandry, Dairying
	Local body administration
Canine Rabies surveillance	Department of Animal Husbandry, Dairying

Pet dog licensing is a legal mandate as per the Tamil Nadu Panchayats (Licensing of Dogs) Rules, 1999. However, only around 1% of the estimated pet-owning population in the city had obtained license for their pet dogs.<sup>10</sup> Most dog owners lack awareness of the requirement for a pet license. Obtaining a dog license involves certification by a veterinarian and ensuring that the dog receives the anti-rabies vaccine. Securing licenses, available for an annual fee of Rs 50, not only grants pet owners access to complimentary anti-rabies vaccination but also entitles them to free treatment at corporation clinics. In an effort to encourage more registrations, the Greater Chennai Corporation has opted to facilitate online registration.<sup>11</sup> However, in other places it is a cumbersome process. While the rule states that the pet owner is responsible for licensing the dogs, there is no punitive action taken on people who do not abide by the rule. Hence, the local body does not know the pet dog population estimate, which further hinders planning logistics for animal vaccination and birth control. Counting the canine population is a crucial step for prioritizing geographical areas for intensive intervention like mass dog vaccination and animal birth control.

### CANINE VACCINATION

The canine population should be protected from rabies by providing them anti-rabies vaccination. According to

NAPRE, a minimum of 70% of the dog population should receive annual vaccinations for three consecutive years to establish sufficient protective herd immunity. Additionally, NAPRE recommends the implementation of sero-monitoring for the vaccinated dog population. To support these efforts, the Department of Animal Husbandry, Dairying, under the Ministry of Fisheries, Animal Husbandry, and Dairying, has introduced the "Assistance to States for Animal Diseases" scheme. This initiative aims to provide grant aids to states for activities such as animal anti-rabies vaccination, the establishment of state biological production centres, state diagnostic labs, and the capacity building of manpower in the field. Animal Welfare Board Of India (AWBI) has a separate scheme for supporting registered NGOs and civic bodies for mass dog vaccination.

Mass dog vaccination in Tamil Nadu is a weaker link in the Anti-rabies control program. Currently, vaccination is done for all dogs that come for sterilisation and based on dog menace complaints.<sup>9</sup> There is a dire need for policy on implementation of mass dog vaccination strategy in Tamil Nadu. The other challenge with mass dog vaccination is, the vaccine should be repeated annually for 3 consecutive years. Currently there is no mechanism in place to identify which dogs have been vaccinated especially among the free roaming dogs.

Certain successful models of mass dog vaccination have been tried in places like Goa and Nilgiris of Tamil Nadu. The One Health program of Goa consisted of three core areas of activity: dog vaccination; rabies education; and intensified human and animal rabies surveillance. A combination of door-to-door (DD) and capture-vaccinate-release (CVR) methods were used to access dogs for parenteral vaccination. DD vaccination involved teams walking house-to-house offering owners an opportunity to have their dog vaccinated, whilst CVR consisted of teams using nets to catch and vaccinate dogs that could not be restrained manually. Remote vaccination teams were spatially directed through assigned polygons displayed on a smartphone app, enabling managers to deliver vaccination resources to a specific geographic area at the sub-village scale. The GPS and details of each dog vaccination were recorded offline in the app.<sup>12</sup>

In Nilgiris, vaccination of dogs against rabies was implemented alongside other public sector field programs, accessing large numbers of dogs in rural settings without specialist dog-catching equipment. Canine rabies vaccination teams collaborated with a bi-annual bovine foot-and-mouth vaccination program coordinated by the Animal Husbandry Department (AH-collaboration) and with a

village health program by the Public Health Department (PH-collaboration) in Nilgiris, Tamil Nadu, to vaccinate dogs during the implementation of these government-led health initiatives and achieved a vaccination coverage of >70%.<sup>13</sup>

### ANIMAL BIRTH CONTROL

To limit the man -dog conflict and to reduce the stray dog population dog population control through Animal Birth Control should be done. NAPRE recommends states to establish a robust dog population management. AWBI also supports registered NGOs and Civic Bodies for stray dog sterilisation. As per the Animal Birth Control (Dogs) Rules, 2023, stray dogs should be picked up and sterilized and then returned to their locality. The right ear of the dog is clipped to indicate sterilization.<sup>14</sup> Currently the approach in Tamil Nadu is to ABC is based on complaint to sterilising stray dogs.

The ABC amendment in 2023 has laid down guidelines to standardise the ABC process and it requires all organisations to apply for a fresh registration and obtain a project recognition certificate.<sup>14</sup> Currently there are no animal welfare organisations that have permission from the Animal Welfare Board of India (AWBI) to engage in sterilisation, making it tougher for both the organisations and municipalities to do ABC.<sup>15</sup> The basic requirements to be fulfilled for any organisation to get the recognition certificate makes it cumbersome. This has led to lack of facility for performing ABC surgeries. The Tamil Nadu AWB, to tackle this issue, has decided to train veterinarians and dog catchers to help with the ABC.<sup>15</sup>

### CANINE RABIES SURVEILLANCE

Rabies in animals is a notifiable disease and any animal suspected to have rabies should be confined and contained as per Prevention and Control of Infectious Disease Act, 2006. To strengthen rabies diagnostics in India, World Organization for Animal Health (OIE) had recognized the veterinary microbiology lab of KVAFSU, Hebbal, Bengaluru as the OIE rabies reference laboratory. Tamil Nadu Veterinary and Animal Sciences University in Chennai is one of the recognised laboratory for diagnosis of animal rabies.

### ENVIRONMENTAL COMPONENT

Effective management of solid waste is crucial, as improper disposal of domestic garbage attracts stray dogs, leading to an escalation in their population and an increase in incidents of dog bites. Strategically controlling the environment to manage stray dog populations involves limiting access to food through proper disposal of food waste. In solid waste management (SWM), the following two activities are

essential:

- Identifying hotspots in the community where congregations of dogs are common.
- Raising awareness among communities about waste management and its connection to the increase in the dog population.

During the disposal of dead animal carcasses, it is imperative to adhere to regulations outlined in the Prevention and Control of Animal Disease Act 2009, Central Pollution Control Board Guidelines 2020, and Section 393 of the Indian Pen

Table 4: Legislations and public health laws related to Rabies control

S.no	Legislation	Implementation Agency
1	The Prevention & Control of Infectious and Contagious Diseases in Animals Act, 2009	Rabies is considered as a scheduled disease and any person who believes that the animal is to be infected by such a scheduled disease, should report to the Village officer, who in turn will report to the nearest available Veterinarian.
2	Municipality Act (which varies for different Civic Bodies)	<ul style="list-style-type: none"> <li>- Registration and control of dogs</li> <li>- Destroy or confine animals suspected of rabies</li> <li>- No ferocious dog shall be allowed to be at large without being muzzled.</li> </ul>
3	The Epidemic disease act, 1897, The Act No. 3 OF 18971	Prevention of spread of dangerous epidemic diseases
4	Prevention of Animal Cruelty Act-1960' and the 'Animal Birth Control (Dogs) Rules', 2023	Prescribes humane methodology for street dog population management, ensuring Rabies eradication, and reduction in man-dog conflicts.
5	The Clinical Establishments (Registration and Regulation) Act, 2010	hospital shall maintain health information and statistics in respect of national programmes, notifiable diseases and emergencies/ disasters/epidemics and furnish the same to the district authorities in the prescribed formats and frequency.

## SUCCESSFUL MODELS FROM INDIA

States such as Goa and Sikkim have effectively implemented rabies control measures. The approach adopted by Goa<sup>16</sup> has been outlined previously. Sikkim, on the other hand, implemented the Sikkim Anti-Rabies and Animal Health (SARAH) program in 2005. This state-wide initiative, which combines animal birth control (ABC) and anti-rabies (AR) efforts, has seen no human deaths from rabies since 2006-2015. SARAH is a collaborative project involving the Department of Animal Health, Livestock, Fishery & Veterinary Services (Government of Sikkim), the France-based NGO Foundation Brigitte Bardot (FBB), the Australia-based NGO Vets Beyond Borders (VBB), and the Sikkim Society for Prevention of Cruelty to Animals (SSPCA). The key components of the SARAH program include surgical

sterilization for dog population control, an annual mass anti-rabies vaccination program, provision of medical, surgical, and hospital care for sick and injured domestic animals and wildlife, animal welfare and rabies advocacy and training, introduction of legislation for human and animal rabies notification, compulsory registration and identification of pet dogs and cats, mandatory annual rabies vaccination for all dogs and cats, and rabies vaccination with permanent identification for dogs and cats brought into Sikkim.<sup>16</sup>

These successful models underscore the feasibility of achieving rabies elimination in Tamil Nadu as well

## CONCLUSION

In conclusion, achieving the elimination of rabies in Tamil Nadu necessitates a concerted effort involving collaboration among various departments such as local body administration, animal husbandry, and health. The key to success lies in executing actions with a sense of urgency and on a mission mode. To move forward effectively:

- Prioritizing and advancing both the animal and human components simultaneously is essential for comprehensive rabies elimination efforts.
- Providing rigorous training to all stakeholders is imperative to ensure a well-informed and coordinated approach, emphasizing the importance of their roles in this mission.

- Involvement of multiple stakeholders, including support from non-governmental organizations (NGOs), is essential for a successful rabies elimination strategy.

Recognizing that dog-mediated rabies deaths are indicative of failures at multiple levels emphasizes the need for a holistic strategy addressing various aspects of rabies prevention and control. In essence, a strategic, collaborative, and mission-oriented approach, coupled with continuous training and awareness, is crucial for the successful elimination of rabies in Tamil Nadu.

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