



# TECHNICAL BULLETIN

Central Veterinary Laboratory (CVL)

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# Rabies in Livestock and Pets

## Introduction

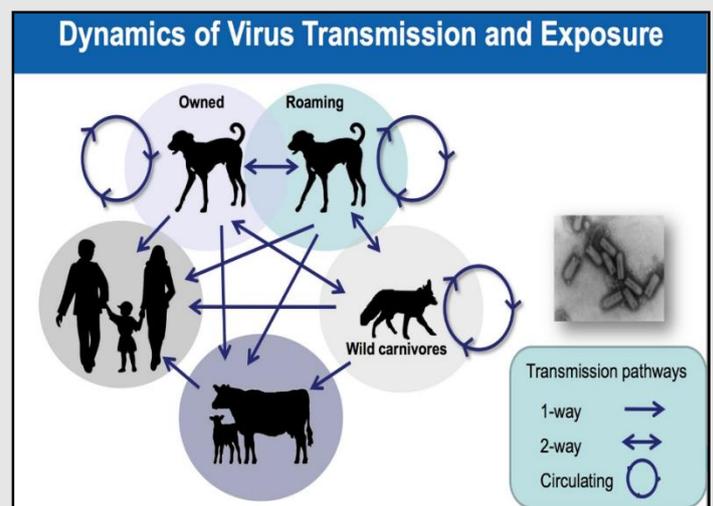
Rabies is a neurological disease of mammals that is almost invariably fatal once the clinical signs develop. Rabies is caused by neurotropic RNA viruses of the genus *Lyssavirus* in the family *Rhabdoviridae* of the order *Mononegavirales*. It is a zoonotic disease with the highest documented case-fatality rate, close to 100%.

Carnivores circulate different rabies virus (RABV) variants and act as a reservoir for rabies, with occasional transmission to humans. Dog-mediated rabies transmission is the most important mechanism of rabies transmission. Despite being 100% preventable, canine-mediated rabies is one of the most important zoonosis and is estimated to cause up to 70,000 human deaths per year mostly affecting people in rural areas. In Nepal, it is estimated that the incidence of human rabies cases is about 100 cases per annum. Rabies has important social costs due to human mortality and high economic consequences due to the losses in livestock and

cost of the implementation of preventive and control measures in both animals and humans.

## Epidemiology and transmission

Rabies is maintained in two epidemiological cycles, one urban and one sylvatic. In the urban rabies cycle, dogs are the main reservoir host. This cycle predominates in areas where the proportion of unvaccinated and semi-owned or stray dogs is high and is the prevalent cycle in Nepal.



The sylvatic (or wildlife) cycle is present simultaneously with the urban cycle in some parts of the world and complex. In any ecosystem, often one and occasionally up to 3 wildlife species are responsible for perpetuating a particular strain of rabies. The disease pattern in wildlife can either be relatively stable, or occur as a slow moving epidemic.

Rabies virus is primarily transmitted through the saliva of an infected animal. Saliva becomes infectious a few days prior to the onset of clinical signs. Infection occurs primarily via bite wounds, or infected saliva entering an open cut or wound or mucous membrane, such as those in the mouth, nasal cavity or eyes. Occasional, although rare, transmission by inhalation of infected aerosol has been described.

## Disinfection

The rabies virus can be inactivated by lipid solvents (soap solutions, ether, chloroform, acetone), 1% sodium hypochlorite, 2% glutaraldehyde, 45-75% ethanol, iodine preparations, quaternary ammonium compounds, formaldehyde or a low pH. This virus is also susceptible to ultraviolet radiation or heat of 1 hour at 50°C. It is rapidly inactivated in sunlight, and it does not survive for long periods in the environment except in a cool dark area.

## Clinical symptoms of Rabies

Rabid animals of all species usually exhibit typical signs of CNS disturbance. Behavioral changes may include sudden anorexia, signs of apprehension or nervousness, irritability, and hyperexcitability (including priapism). The animal may seek solitude. Ataxia, altered phonation, and changes in temperament are apparent. Uncharacteristic aggressiveness may

develop—a normally docile animal may suddenly become vicious.

## Canine and Feline

There are two clinical forms namely, furious form and dumb form of rabies in carnivores such as dogs and cats. Animals with **furious rabies** exhibit clinical signs of behavioural changes including increased aggressiveness and barking, fearfulness, restlessness, aimless wandering, biting anything encountered, and convulsions in the body. Animals with **dumb rabies** display more dazed-like clinical signs such as partial or complete paralysis of different parts of the body including the tongue, and throat and respiratory muscles.

Animals with both furious and dumb forms of rabies die within a few days after the onset of clinical signs.

## Herbivores (Cattle, Buffalo, Goat, Sheep and others)

Clinical signs of rabid herbivores include off food and water, frequent pressing of the head against hard objects such as walls or trees, etc., excessive salivation, frequent unusual vocalisation, frequent straining to urinate and/or defecate, unexplained hind-limb lameness and partial or complete paralysis of hind-limbs, coma and death.

## Equines

Horses and mules frequently show evidence of distress and extreme agitation. These signs, especially when accompanied by rolling, may be interpreted as evidence of colic. As in other species, horses may bite or strike viciously and, because of their size and strength, become unmanageable in a few hours. These animals frequently have self-inflicted wounds.

## Rabies diagnosis in CVL

Rabies samples – CVL is receiving both the dead animal and brain samples for Rabies diagnosis. Preferred sample for Rabies diagnosis is brain sample. From the dead animals, brain sample is collected by occipito-foramen method where the skull is just anterior to the atlas joint and a straw is passed through the foramen to receive the brain samples.



Figure. Sample collection (Insert straw through occipital foramen).

## Rabies Diagnostic tests

Currently, these tests are being employed for Rabies diagnosis at CVL.

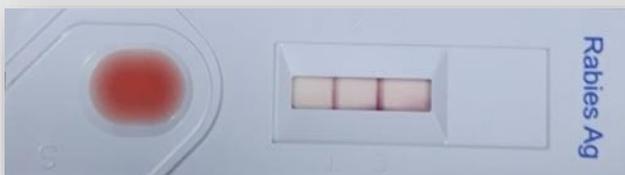
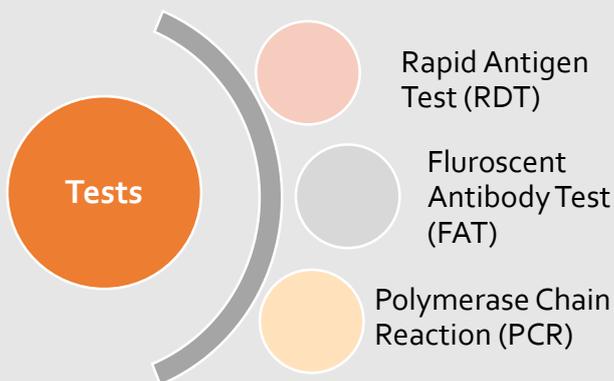


Figure. Rabies positive RDT test.

FAT is the gold standard tests for Rabies diagnosis and confirmation. CVL is confirming samples for Rabies using FAT.

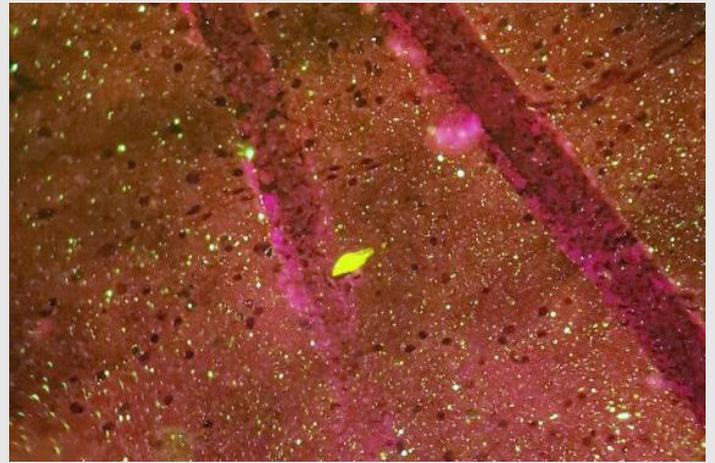


Figure. Diagnosis of virus via FAT test.

## Rabies Cases in CVL from Ashad to Chaitra 2078

Total number of 56 animals or samples were brought at CVL for the diagnosis of rabies, of which 57% of the samples were positive.

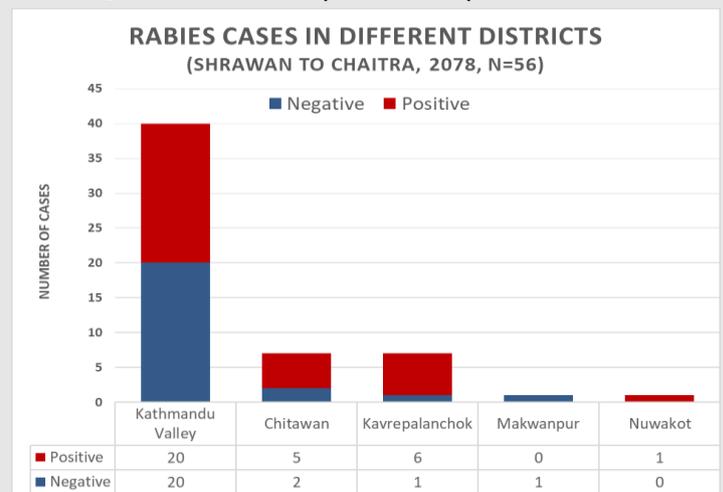


Figure. District wise rabies cases.

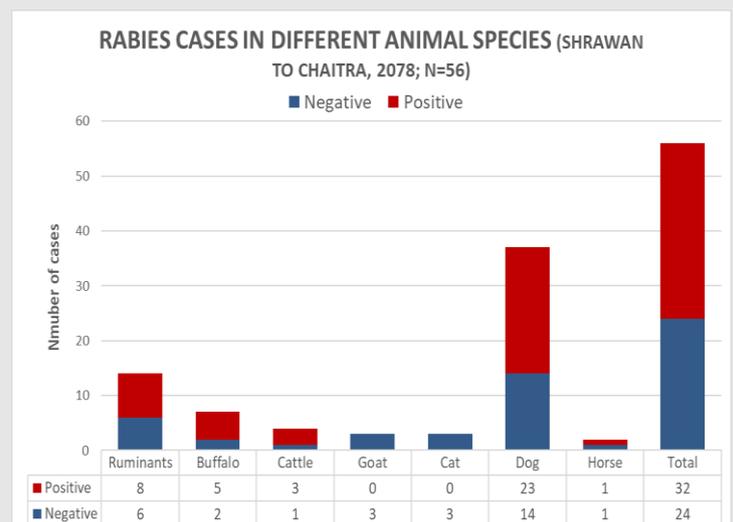


Figure. Species wise rabies cases

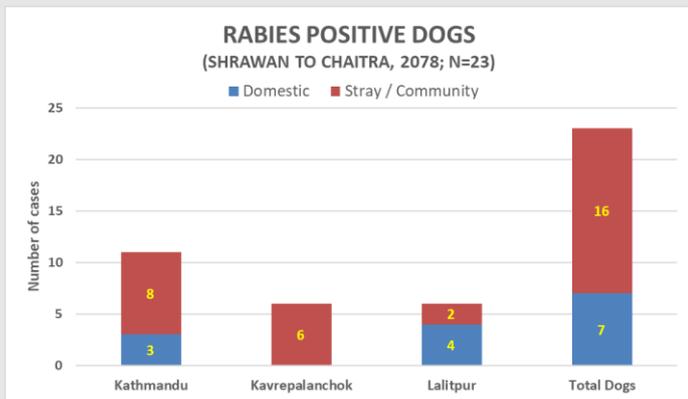


Figure. Community vs Domesticated dogs.

## Prevention and Control

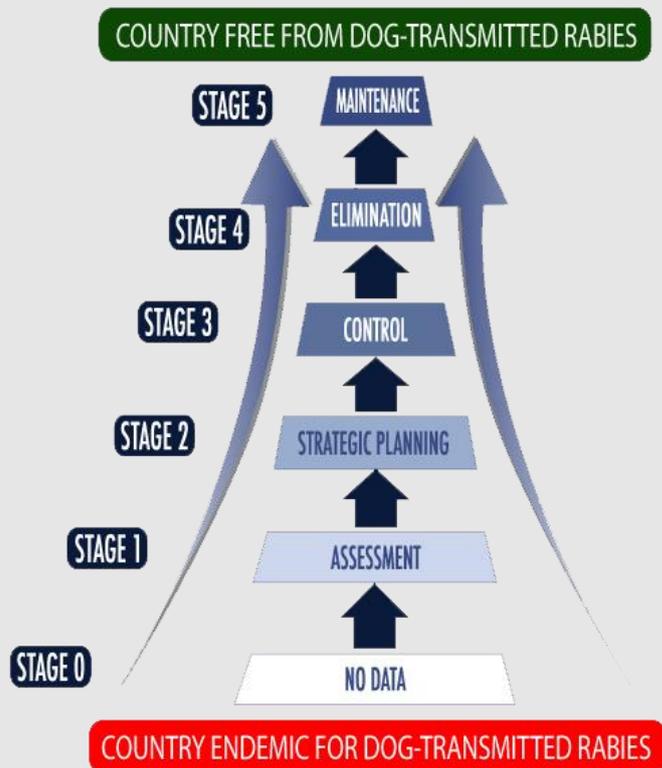
To achieve the goal "Zero by 2030", Department of Livestock Services (DLS) has recommended following activities.

- Establishment of Rabies Elimination Coordination Committee at central and provincial level
- Finalization of National Action Plan as soon as possible and develop other legislative documents.
- Formation of intersectoral working committees
- Public awareness and school education
- Dog population survey
- Intensive Vaccination Campaigns- 70% dogs must be vaccinated before 2026
- Dog Population Management- Neutering programs in all 753 local levels
- Immune belt in buffer zones
- International/Regional collaboration especially in bordering areas
- Regular surveillance of disease
- Monitoring, evaluation and regular update of rabies control activities.

## Stepwise Approach towards Rabies Elimination (SARE)

Global Alliance for Rabies Control (GARC), an international organization, is working to eliminate human deaths from dog rabies by

2030. GARC has developed Stepwise Approach towards Rabies Elimination (SARE) as a practical planning, monitoring and evaluation tools to guide, develop and refine rabies control programs. SARE has envisaged following steps for the elimination of rabies from the country.



## Tripartite Coordination

Tripartite coordination between Food and Agriculture Organization (FAO), World Organization for Animal Health (WOAH) and World Health Organization (WHO) has prepared Tripartite Zoonoses Guide (TZG) to provide countries with operational guidance and tools for the implementation of a multisectoral, One Health approach to address zoonotic diseases (including rabies) and other shared health threats at the human-animal-environment interface.



## Acknowledgements

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