WEEKLY EPIDEMIOLOGICAL REPORT

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Early Detection of Rabies in Dogs and Other Animals: Recognizing Behavioral Changes and Clinical Progression for Effective Dog Bite Prevention - Part II

This is the second article of two in a series on "Early Detection of Rabies in Dogs and Other Animals: Recognizing Behavioral Changes and Clinical Progression for Effective Dog Bite Prevention"

Recognizing rabies in animals: From subtle behavioural changes to clinical signs

Globally, **more than 150 species of mammals** have been identified as susceptible to rabies infection, but only a smaller subset (7-8 species) are considered true **rabies reservoirs**; meaning species in which the virus can circulate naturally and be maintained over time without external reintroduction. Worldwide dogs are the primary reservoir, especially in Asia and Africa. In Sri Lanka, unimmunized domestic and stray dogs sustain the domestic/street cycle, while wild carnivores such as jackals, mongooses, polecats, and civets contribute to the sylvatic cycle. Cats are considered a vulnerable (spillover) species rather than a primary reservoir. Rabies has also been reported in squirrels, rock squirrels, monkeys, horses and livestock mammals including cattle. However, rabies is yet to be reported in house rats in Sri Lanka. All these infected animals pose a potential risk of transmitting the disease to humans.

Subtle behavioural changes: Early clues of rabies infection

Following the entry into the body, the rabies virus travels via the nerves to the brain, causing significant behavioural and neurological changes in affected animals. While aggression is a widely recognized symptom, several early behavioural indicators may be subtle and easily overlooked. Recognizing these signs is critical for early suspicion, timely containment, and prevention of human exposure.

- **Unusual friendliness or tameness**: Wild animals that usually avoid humans may lose their natural fear and become abnormally tame. Rabies-infected foxes, raccoons, and bats have been observed exhibiting such behaviour. Domestic pets like dogs and cats may suddenly become overly affectionate or clingy.
- **Sudden aggression or irritability**: Normally calm animals may display unprovoked aggression, biting other animals, objects, or even themselves. Minor irritability or restlessness could be an early sign of infection.
- **Altered activity patterns**: Infected nocturnal animals may become active during the daytime and appear disoriented. Domestic animals may show signs of hyperactivity or, conversely, unexpected lethargy.
- **Difficulty swallowing and vocal changes**: Difficulty swallowing often leads to changes in vocalizations. A dog may howl unusually or sound hoarse, while a cat might meow more frequently or appear distressed. Livestock may produce abnormal or excessive vocalizations.
- **Disorientation and poor coordination**: The virus's effect on the central nervous system may cause unsteady movements or confusion. Animals might not respond appropriately to familiar cues or commands. These impairments can progress to complete paralysis.
- **Self-mutilation or biting**: Due to neurological irritation, some animals may bite at their limbs or body, which could be mistaken for allergic reactions or flea infestations, delaying diagnosis.

Changes in appetite and aversion to water: A sudden loss of appetite or aversion to water (hydrophobia) may be noted. Some animals may drool excessively or foam at the mouth due to impaired swallowing reflexes.

Behavioural and clinical signs across species

Regardless of the host, usually, a rabid animal dies 4 to 8 days after symptom onset, often following a brief period of unconsciousness. The early clinical signs may be nonspecific and mimic other illnesses, complicating early diagnosis.

Carnivores (dogs and cats)

Initial clinical signs: Lethargy, fever, anorexia, vomiting, diarrhoea, excessive salivation, and straining to urinate or defecate. Cats shed the virus in saliva 1–5 days before symptoms appear. In dogs, shedding usually begins 1–5 days before the onset of clinical signs, but in experimental studies with certain virus strains (e.g., Mexican or Ethiopian origin), it has extended up to 13 days.

Clinical forms:

- *Furious Form*: Characterized by restlessness, increased aggressiveness, excessive barking or meowing, aimless wandering, biting objects or other animals, and body convulsions.
- *Paralytic (Dumb) Form*: Marked by subdued behaviour, weakness, and progressive paralysis affecting the tongue, throat, and respiratory muscles.

Behavioural patterns:

- *Dogs* may exhibit either form and are often seen licking wounds excessively or displaying intermittent aggression.
- *Cats* are more likely to develop the furious form, often becoming irritable, hiding in unusual places, and showing dilated pupils.

Herbivores (Cattle, horses, goats, and sheep)
Rabid herbivores often present with vague signs such as anorexia, hypersalivation, and strange vocalizations. Additional features include frequent straining, unexplained hind-limb lameness, and progressive paralysis.

Other species-specific signs:

- *Cattle*: May become excitable, hypersensitive to touch, and display erratic movements.
- *Horses, Goats, and Sheep*: May exhibit unusual vocalizations, aggressive head-butting, or unprovoked attacks on objects or people.

Wildlife reservoirs in Sri Lanka (Jackals, mongooses, civets)
These species contribute to the sylvatic cycle of rabies and show notable behavioural changes when infected:

- *Jackals*: Disorientation, aggression, and reduced fear of humans.
- *Mongooses and Civet Cats*: Erratic behaviour, excessive salivation, abnormal vocalizations, and boldness toward humans.

Bats (global context)

Though not currently a concern in Sri Lanka, bats in rabies-endemic countries may exhibit aggression, daytime activity, vocalizations, and refusal to eat. Clinical signs may progress to coma and death.

Breaking the chain: Effective dog bite prevention

Understanding dog behaviour is a critical component of dog bite prevention, yet it is often underutilized. Effectively preventing dog bites and rabies transmission requires recognizing common dog behaviours and identifying the symptoms of rabies. Dogs may bite due to the following common reasons,

1. Fear or anxiety
2. Protection of territory or owner
3. Pain or illness
4. Maternal instinct (protecting puppies)
5. Surprise or being startled
6. Resource guarding (food, toys, shelter)
7. Predatory instinct
8. Play aggression (especially in puppies)
9. Frustration or being restrained
10. Lack of socialization or training
11. Rabies or other neurological disease
12. Past abuse or traumatic experience
13. Defensive reaction when feeling trapped

Recognizing warning signs such as raised hackles, growling, or a tucked tail can help avoid potential bites. Infected dogs may exhibit unusual behaviours, including aggression, excessive drooling, loss of coordination, and hydrophobia (fear of water).

To reduce the risk of rabies transmission, it is essential to promote responsible pet ownership including proper vaccination. Vaccinating dogs and educating the public on safe dog interactions are key approaches. Enhanced public awareness of identifying both classic and subtle signs of rabies is a crucial strategy for early detection of rabies in dogs. Also, creating public awareness on reading the body language of dogs and safe behaviour around dogs is critical. School-based awareness programmes would be an effective strategy.

Public campaigns can emphasize the importance of timely rabies vaccinations and responsible pet ownership while implementing legislative provisions on rabies control will ensure public compliance Pet owners should be encouraged to seek veterinary care for pets showing unusual behaviour, even if symptoms are mild. Involving local communities in reporting and managing stray dogs, as community engagement in responsible pet ownership initiatives, can significantly enhance rabies control efforts.

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Table 1: Selected notifiable diseases reported by Medical Officers of Health 22nd – 28th Mar 2025 (13th Week)

RDHS	Dengue Fever		Dysentery		Encephalitis		En. Fever		F. Poisoning		Leptospirosis		Typhus F.		Viral Hep.		H. Rabiies		Chickenpox		Meningitis		Leishmania-		Tuberculosis		WRCD	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	T*	C**
Colombo	239	3088	1	12	0	3	0	3	0	5	15	127	0	4	0	5	0	0	14	160	1	19	0	1	57	534	94	100
Gampaha	135	1955	3	18	2	16	0	1	1	45	9	200	1	6	0	5	0	0	20	241	3	37	0	14	82	331	80	100
Kalutara	30	487	1	11	0	1	1	3	0	13	12	186	0	0	0	2	0	0	27	206	0	10	0	1	0	168	89	75
Kandy	56	831	1	20	0	2	0	4	0	8	1	85	0	19	0	5	0	0	11	124	1	10	0	22	32	220	96	100
Matale	32	459	0	8	0	1	0	0	4	18	5	57	2	3	0	4	0	0	2	41	1	2	5	73	6	43	85	100
Nuwara Eliya	4	60	0	24	0	3	0	4	0	44	1	41	5	23	0	0	0	0	12	79	0	6	0	0	6	79	92	100
Galle	31	560	0	19	0	2	0	0	1	27	22	252	1	28	0	4	0	0	25	236	1	49	0	1	10	133	75	100
Hambantota	12	260	1	7	0	2	0	0	0	3	5	115	0	14	1	2	0	0	9	132	1	5	4	79	4	46	100	100
Matara	44	476	1	5	0	2	0	1	0	3	8	144	1	8	0	2	0	0	8	121	2	15	6	33	5	52	94	100
Jaffna	24	466	4	28	0	1	0	3	0	11	1	109	17	249	0	1	0	1	30	121	1	10	0	0	3	49	100	93
Kilinochchi	2	41	0	5	0	0	0	4	0	2	3	46	1	11	0	1	0	0	0	1	0	0	0	0	6	16	100	100
Mannar	4	81	0	0	0	0	0	0	0	1	1	13	0	5	0	0	0	0	0	12	0	9	0	0	1	13	100	100
Vavuniya	1	25	0	5	0	0	0	1	0	20	1	34	1	3	0	0	0	0	2	13	0	6	0	7	4	14	75	100
Mullaitivu	0	24	0	1	0	0	0	1	2	2	3	38	0	4	0	0	0	0	0	7	0	4	0	0	0	6	100	100
Batticaloa	28	720	1	63	0	8	0	0	0	70	0	28	0	1	0	9	0	0	4	74	0	18	1	2	1	40	57	100
Ampara	2	50	0	6	0	2	0	0	1	3	8	58	0	1	0	1	0	0	4	45	1	7	0	9	2	19	71	100
Trincomalee	28	350	4	23	1	2	0	0	0	16	9	58	1	6	0	2	0	0	5	39	0	7	0	3	7	26	100	100
Kurunegala	19	324	0	7	0	7	0	1	0	19	14	237	1	17	0	1	0	1	11	247	4	44	15	161	4	99	79	100
Puttalam	14	273	0	9	0	0	0	0	0	4	9	114	1	22	0	1	0	0	2	51	6	32	4	11	0	48	92	100
Anuradhapura	9	258	1	19	0	5	1	2	0	7	5	157	1	12	0	6	0	0	10	92	2	31	15	219	4	75	65	100
Polonnaruwa	4	72	0	7	0	2	0	1	0	2	2	66	0	0	2	11	0	0	8	58	3	5	5	111	2	21	100	91
Badulla	12	230	1	10	1	3	0	3	0	0	8	104	0	8	1	12	0	0	13	137	0	25	0	9	3	63	81	100
Monaragala	21	258	0	6	0	3	0	0	0	3	30	196	0	19	1	5	0	0	5	47	1	17	3	41	1	28	64	100
Ratnapura	45	669	5	33	0	4	0	3	1	14	42	468	1	13	0	2	1	1	16	151	2	45	1	39	15	126	75	100
Kegalle	24	372	1	24	0	3	1	1	1	16	6	183	1	6	0	6	0	0	13	252	6	29	1	12	3	73	73	100
Kalmunai	10	154	1	8	0	0	0	0	0	7	5	42	0	1	0	1	0	0	5	56	0	8	0	0	5	36	77	100
SRILANKA	**830**	**12543**	**26**	**378**	**4**	**72**	**3**	**36**	**11**	**363**	**225**	**3158**	**35**	**483**	**5**	**88**	**1**	**3**	**256**	**2743**	**36**	**450**	**60**	**848**	**263**	**2358**	**85**	**99**

Source: Weekly Returns of Communicable Diseases (esurvillance.epid.gov.lk). T=Timeliness refers to returns received on or before 28th Mar, 2025 Total number of reporting units 361 Number of reporting units data provided for the current week: 358 C**-Completeness

A = Cases reported during the current week. B = Cumulative cases for the year.

Table 2: Vaccine-Preventable Diseases & AFP

22nd – 28th Mar 2025 (13th Week)

Disease	No. of Cases by Province									Number of cases during current week in 2025	Number of cases during same week in 2024	Total number of cases to date in 2025	Total number of cases to date in 2024	Difference between the number of cases to date in 2025 & 2024
	W	C	S	N	E	NW	NC	U	Sab					
AFP*	00	01	00	00	01	02	00	00	00	04	01	19	19	0%
Diphtheria	00	00	00	00	00	00	00	00	00	00	00	00	00	0 %
Mumps	01	01	00	00	00	00	01	00	04	07	03	63	72	-12.5 %
Measles	00	00	00	00	00	00	00	00	00	00	09	01	177	-99.4%
Rubella	00	00	00	00	00	00	00	00	00	00	00	00	01	-100%
CRS**	00	00	00	00	00	00	00	00	00	00	00	01	00	0 %
Tetanus	00	00	00	00	00	00	00	00	00	00	01	02	01	100 %
Neonatal Tetanus	00	00	00	00	00	00	00	00	00	00	00	00	00	0 %
Japanese Enceph-alitis	00	00	00	00	00	00	00	00	00	00	00	04	01	300 %
Whooping Cough	00	00	00	00	00	00	00	00	00	00	00	08	01	700 %

Key to Table 1 & 2

Provinces: **W**: Western, **C**: Central, **S**: Southern, **N**: North, **E**: East, **NC**: North Central, **NW**: North Western, **U**: Uva, **Sab**: Sabaragamuwa.

RDHS Divisions: **CB**: Colombo, **GM**: Gampaha, **KL**: Kalutara, **KD**: Kandy, **ML**: Matale, **NE**: Nuwara Eliya, **GL**: Galle, **HB**: Hambantota, **MT**: Matara, **JF**: Jaffna, **KN**: Killinochchi, **MN**: Mannar, **VA**: Vavuniya, **MU**: Mullaitivu, **BT**: Batticaloa, **AM**: Ampara, **TR**: Trincomalee, **KM**: Kalmunai, **KR**: Kurunegala, **PU**: Puttalam, **AP**: Anuradhapura, **PO**: Polonnaruwa, **BD**: Badulla, **MO**: Moneragala, **RP**: Ratnapura, **KG**: Kegalle.

Data Sources:

Weekly Return of Communicable Diseases: Diphtheria, Measles, Tetanus, Neonatal Tetanus, Whooping Cough, Chickenpox, Meningitis, Mumps., Rubella, CRS,

Special Surveillance: AFP* (Acute Flaccid Paralysis), Japanese Encephalitis

CRS =**Congenital Rubella Syndrome

NA = Not Available

Take prophylaxis medications for leptospirosis during the paddy cultivation and harvesting seasons.

It is provided free by the MOH office / Public Health Inspectors.

Comments and contributions for publication in the WER Sri Lanka are welcome. However, the editor reserves the right to accept or reject items for publication. All correspondence should be mailed to The Editor, WER Sri Lanka, Epidemiological Unit, P.O. Box 1567, Colombo or sent by E-mail to **chepid@sltnet.lk. Prior approval should be obtained from the Epidemiology Unit before publishing data in this publication**

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