Second Meeting of the South Asia Rabies Laboratory Network (SA-RABNET)

23 November 2023, Tokyo Japan

MEETING REPORT

SUMMARY

The World Organisation for Animal Health (WOAH) Regional Representation for Asia and the Pacific (RRAP) in collaboration with Karnataka Veterinary Animal and Fisheries Sciences University (KVAFSU), India, organized the Second Virtual Meeting of the South Asia Rabies Laboratory Network (SA-RABNET) on 23 November 2023. A total of 23 attendees, including 12 Network Members from six South Asian Association for Regional Cooperation (SAARC) Members (Afghanistan, Bangladesh, Bhutan, India, Nepal, and Sri Lanka) attended the meeting. Although registered for the meeting, Members from Pakistan did not attend. During the meeting, a series of presentations were made on topics such as updates from the Members and KVAFSU/WOAH on progress and recent activities on rabies since the last meeting; and technical presentations on phylogeny of rabies virus circulating in Sri Lanka, potential role of oral rabies vaccination, and Bhutan's success story in achieving 100% sterilisation and vaccination of free roaming dogs. A *mentimeter* session was held to understand the way forward for the Network activities.

Dr Sangay Rinchen from Bhutan chaired the entire meeting as the Chair of the Network.

BACKGROUND

To achieve the global goal of elimination of dog-mediated human rabies by 2030, an important component to focus on is the surveillance of animal rabies to provide accurate data in countries for timely and appropriate control measures. Although rabies poses significant public health

concerns in South Asia, there is a general lack of ground-level surveillance owing primarily to insufficient or total lack of rabies diagnostic capacity across the region.

Since 2020, to support capacity building for rabies diagnosis and surveillance in animals in South Asia, WOAH RRAP jointly with the KVAFSU-WOAH Reference Laboratory for Rabies in India organised virtual training on brain sampling and diagnosis of rabies in animals in 2020, rabies serology in 2021 for the SAARC Member States.

As a follow up to the virtual trainings and as per the demands of the Members, WOAH and KVAFSU jointly organised a virtual workshop on "Proposed South Asia Rabies Laboratory Network" on 14 July 2022 to introduce the concept of establishing a sub-regional rabies laboratory Network for South Asia to strengthen rabies diagnosis, surveillance, and control. Further, as a follow up of the virtual workshop, WOAH RRAP asked the countries for nomination of two Members to initiate the activities of the Network in accordance with the proposed ToR. Afghanistan, Bangladesh, Bhutan, India, Nepal, Pakistan and Sri Lanka have nominated Members of the Network. The first meeting of the Network was held on 6 April 2023 to formally launch the South Asia Rabies Laboratory Network and discuss the scope and activities to be implemented by the Network. At the first Network Meeting, Bhutan was selected as the Chair and Nepal as the Co-Chair of the Meeting.

The 2nd Meeting of SA-RABNET was held with the following objectives:

- Share Members' updates on recent progress and follow-up actions since the 1st SA-RABNET meeting.
- Share findings of phylogenetic analysis of rabies viruses circulating in Sri Lanka and its implications for South Asia.
- Discuss potential role of oral rabies vaccination (ORV) in control and elimination of rabies in South Asia.

OUTCOME OF THE MEETING

OPENING REMARKS

Dr Kinzang Dukpa, Regional Project Coordinator, WOAH RRAP, welcomed participants and introduced the meeting objectives and key topics to be covered. Dr Hirofumi Kugita, WOAH Regional Representative in his keynote address emphasised the role of this Network in sharing information, resources, and expertise across the sub-region in joint effort in controlling and eliminating dog-mediated rabies.

Network activities

Adoption of the Meeting Report of the 1st SA-RABNET

Following the Chair's introduction of the topic, the Meeting Report was adopted with no further comments from the Members.

Members' updates on follow-up actions from 1st SA-RABNET and other recent actions/progress on rabies diagnosis, prevention and control activities

The Chair invited the Members of the Network to share their country updates since the last Network meeting.

Afghanistan

Dr Hamidullah and Dr Sayed Abol Hussain joined the meeting despite connectivity issues. Owing to poor internet connectivity, it was difficult for the two Members from Afghanistan to clearly explain the updates. However, it was understood that central veterinary laboratory undertakes rabies surveillance in collaboration with laboratories in the provinces. However, in recent times, surveillance is very weak due to lack of resources, especially diagnostic kits. Afghanistan used to use direct fluorescent antibody (DFA) test in the past for animal rabies diagnosis. However, recently, they have run out of the test kits especially the conjugates for the DFA. Although samples are being collected and preserved, testing could not be done due to lack of DFA conjugates They requested WOAH and KVAFSU to support supply of chemicals and reagents for

functioning of their laboratories. The representatives from Afghanistan was informed to send request letter from WOAH Delegate to WOAH RRAP for any support needed.

Bangladesh

Dr Shukes Chandra Badhy and Dr Md Golam Azad from the Central Disease Investigation Laboratory (CDIL) joined. Dr Shukes updated that recently the cases in both humans and animals have been decreasing due to the ongoing mass dog vaccination organised regularly. The CDIL has diagnosed 278 cases of animal rabies in 2022 in species such as cattle, goats, cats, foxes and dogs. At CDIL, rabies positivity rate is around 73% and CDIL also confirmed 3 human rabies cases using PCR. Bangladesh want to do serological monitoring of the dog vaccination program and inquired about the best ELISA kits to use. Bangladesh is interested in sending brain samples to KVAFSU, India and undertake proficiency testing with KVAFSU.

Bhutan

Dr Sangay Rinchen updated that although Bhutan is moving towards elimination of dog-mediated rabies, the country is seeing some cases in few pockets owing to open and porous borders with neighbouring States of India where there is unrestricted movement of animals including dogs. He also appreciated the efforts made by India through its national animal disease control program whereby there is large scale vaccination program against most of the TADs. Bhutan recently completed 100% sterilisation and vaccination of free roaming dogs and micro-chipping of pet dogs. In 2023, one human case was reported from a bordering town, and this is the first case since 2020. The patient contracted infection despite completing the post-exposure prophylaxis against rabies.

It was informed that Bhutan is moving very well towards rabies prevention and control through implementing mass dog vaccination and dog population management targeting zero death of dog mediated human rabies by 2030. Bhutan has established very comprehensive surveillance system with strong well equipped laboratory network at the national and sub-national settings.

India

Dr Susan Abraham informed that Kerala State of India had been in news in 2022 due to increasing rabies cases in humans and animals, including rabies in vaccinated humans. In 2022, 343 animal rabies cases were confirmed of which 283 were in dogs. The department of animal husbandry included free roaming dogs also in the vaccination program. In 2023, human and animal cases are still being recorded. But cases in humans were only in the unvaccinated population. Kerala government has started collaboration with Mission Rabies in 2023 and now rabies control program is being run under technical guidance of Mission Rabies. Another collaborative project among the Kerala government, an NGO and Indian Immunologicals is going on in Trivandrum. The department of animal health is in the process of developing an online data portal called as e-samudra which will also cover rabies surveillance. They also want to undertake molecular studies in collaboration with KVAFSU.

The Institute of Advanced Virology is developing oral rabies vaccines.

Dr Durlav Bora from Assam Agricultural University informed about a atypical form of rabies seen in a pet dog that was subsequently confirmed as positive. Dr Isloor updated that six States in India recently developed their State Action Plan for Rabies Elimination (SAPRE). He also informed that India is interested to submit SAPRE for WOAH endorsement.

Nepal

Dr Barun Sharma informed that they have recently drafted the national strategic plan which is a multisectoral plan involving all relevant stakeholders. The plan is yet to be endorsed by the government. There is not much change in the diagnostic tools used for rabies diagnosis. The lateral flow assays are used in the peripheral laboratories and confirmation is done using DFA at the central laboratory which also has PCR facilities. Following the WOAH training in January 2023, the two trainees are confidently conducting brain sampling and therefore enhancing rabies surveillance. In the past whole animal head used to be sent to the laboratories. The CVL is also supporting the public health laboratories in Nepal to establish rabies diagnostic capacity.

Pakistan

No one attended from Pakistan.

Sri Lanka

Dr Anushika from the Veterinary Research Institute informed that in Sri Lanka, rabies control at national level is being led by the Public Health Veterinary Services (PHVS) under the Ministry of Health in which awareness programs, mass dog vaccination and dog sterilisation are undertaken. The national strategic plan was released in 2023. They are still reviewing the proposal for piloting of oral rabies vaccination in Sri Lanka which will soon be submitted to WOAH for funding. The Department of Animal Health and Production trained its staff on rabies diagnosis. In 2022, 28 human deaths were recorded. Besides vaccination undertaken by PHVS, rabies vaccination is also being provided by private veterinarians throughout Sri Lanka.

Updates from WOAH RRAP

Dr Kinzang Dukpa provided the following update:

- Finalisation of pilot studies proposal for oral rabies vaccination in Cambodia and the proposal from Sri Lanka is awaited.
- Release of Tripartite guideline on oral rabies vaccination in dogs.
- 5-8 September, Asia Pacific Quadripartite One Health Workshop, Bangkok in which a presentation was made.
- 26 September, Tripartite Rabies Webinar organised by the Regional Tripartite.
- 33rd Regional Conference of the WOAH Regional Commission for Asia and the Pacific, New Delhi, India at which WOAH and KVAFSU made a joint presentation on rabies.
- 22 November, Rabies MET information sharing session (led by Lesa Thompson, WOAH RRAP).

Updates from KVAFSU

Dr Sharada made the updates as follows:

- Virtual meeting of Technical Working group of the WOAH Rabies Country Partnership Programme (31st May, 2023) Experts from WOAH HQ, France; APHA, UK; CVRI, China and KVAFSU, India participated
- G20 Technical Workshop on "One Health Opportunities & Challenges" 29-30th Aug. 2023, Bengaluru, India.
- Dr Isloor attended (virtually) the United Against Rabies (UAR) Stakeholder Meeting 2023 6th – 8th November, 2023, Rome, Italy. Dr. S. Isloor participated virtually and presented on ' Validation of LFA with DFA and PCR'.
- Dr Isloor attended the One health Conclave for control of zoonoses – Orissa, 21-22nd Nov, 2023.
- Dr Isloor attended the 33rd Conference of the WOAH Regional Commission for Asia & Pacific 13th -16th November, 2023 at New Delhi and made a presentation.
- APRICON 2023 – 23rd National Conference of APCRI, Pre Conference Workshop - 7th July, 2023 "Brain Sampling and Diagnosis of Rabies in Animals". Dr. Isloor was honoured the prestigious Louis Pasteur Oration Award for Contribution towards rabies prevention.

There were several other activities undertaken by KVAFSU to support initiatives on rabies control in India.

Technical presentations

Three technical presentations were made to present issues of topical interest to the Network Members.

Phylogeny of the rabies viruses circulating in wild and domestic animals in Sri Lanka and its implications on rabies control – Dr Shrikrishna Isloor

Following the rising cases of rabies in domestic and wild animals, especially in jackals, in Sri Lanka in recent years, the Sri Lankan authorities sent 41 brain samples collected from variety of animals including jackals to the WOAH reference laboratory in India in January 2023. The samples originated from both domestic and wild animals from places such as Trincomalee and Polonnaruwa in northeastern part, Monaragala in south east and Gampaha and Kalutara in south

western part. All 41 samples tested positive to rabies using one step PCR and only 16 samples passed quality control tests for further sequencing. Phylogenetic analysis was conducted for the 16 isolates with the rabies virus isolates from *Genbank*. The virus isolates were found to be related closely with the Indian sub-continent lineage viruses that are circulating in the southern Indian States of Kerala and Tamil Nadu. In conclusion, the rabies virus circulating in the wild animals of Sri Lanka appear not to be maintained in the wildlife and therefore presence of sylvatic cycle is ruled out. The viruses present in the wildlife appear to be due to spill-over infection from domestic into wildlife. Therefore, the findings suggest that Sri Lanka should continue to focus on mass dog vaccination of domestic dogs, especially along the village-forest corridors. The use of oral rabies vaccination may be looked into especially to cover the free-roaming dogs and wild animals along the fringes of villages bordering forests.

Potential role of oral rabies vaccination (ORV) in complementing rabies vaccination – Dr Kinzang Dukpa

The presentation discussed the potential use of ORV in the control of dog mediated rabies. It is important to understand the dog ecology and the profile of dog population before embarking on vaccination approaches. In areas where the dog population is largely free roaming type, it is difficult and expensive to use capture-vaccinate and release method. Therefore, ORV can be considered as an option to complement parenteral vaccination program especially targeting the free roaming dogs.

The oral rabies vaccines have been traditionally used in the successful control and elimination of fox-mediated rabies in Europe. However, in recent years, a lot of research and studies has gone into developing safe and effective oral rabies vaccines for use in dogs. The third generation live modified vaccines, in particular, have shown acceptable safety and immunogenicity properties in line with WOAH's Standards. Recent field studies with this vaccine in Thailand and Indonesia has shown promising results in terms of safety and immunogenicity when used in dogs. As of now, there appears to be only one vaccine that meets WOAH's Standards for use in dogs and countries

are actively piloting this vaccine (Rabitec® from Ceva®) to provide further data regarding its safety and immunogenicity in field conditions. This oral vaccine has been officially registered for use in Indonesia. WOAH has been supporting initiatives on ORV in Thailand and Indonesia and will soon support a pilot study in Cambodia, and possibly in Myanmar and Sri Lanka. Parenteral vaccination program should continue as the foundation for rabies control. However, for inaccessible dog populations (free-roaming dogs), ORV has a potential role to change the equation of vaccination coverage. The tripartite (FAO-WOAH-WHO) recently released a guideline document on oral vaccination of dogs against rabies which provides comprehensive information on all aspects of ORV in dogs. At the end, MSs were encouraged to contact WOAH if any country is interested to take up pilot studies on ORV.

Bhutan's nationwide accelerated dog population management and rabies control program – Dr Sangay Rinchen, Bhutan.

Bhutan has been grappling with issues related to dog population in terms of increasing incidences of dog bites, social nuisance, environmental littering and noise, and rabies outbreaks. Many measures were tried including killing, small-scale sterilisation, impounding of stray dogs and catch-neuter-vaccinate-release protocol. However, there was no end to the issues related to increasing dog population.

Thus in 2021, under the direct command of His Majesty the King of Bhutan, officials of the Royal Secretariat and the Department of Livestock, the De-suung Organisation (Guardians of Peace) launched the Nationwide Accelerated Dog Population Management and Rabies Control Programme (NADPM&RCP) in March 2022. A nation-wide dog population survey was undertaken before the start of the program. A total of 61,680 dogs were sterilised, 56,251 (91%) of them being totally free-roaming dogs (others were pets). Along with the sterilisation coverage, 58,581 (95%) free-roaming dogs were vaccinated against rabies, and 32,544 pet dogs were microchipped and registered. During the programme, dogs were also treated for skin problems, wounds, worm

load and issues related to reproductive system such as mammary tumor, pyometra, transmissible venereal tumor, etc. According to the Department of Livestock, the numbers were independently validated by a third-party. The current estimated dog population in the country is 106, 201 dogs. An agreement was signed between the Department of Livestock and Local Governments (20 Districts and four Municipalities) to sustain these achievements with commitment, collaboration, and dedication. With the completion of the programme, number of rabies outbreaks have drastically decreased, and containment has become easier with most dogs having been immunized already.

Thus, Bhutan has achieved a global feat, becoming the first country to sterilise its entire free-roaming dog population. However, to conserve the native dog population (and prevent extinction), a gene pool is maintained in the form of a farm where breeding will be continued. The Royal Government of Bhutan spent around 3.4 M USD from its national budget to implement the nation-wide dog sterilisation and rabies vaccination program in a period of 3 years (2021-2023). An exit strategy was also developed to ensure sustenance of the program wherein the governors of the 20 districts committed to continue the work in their respective districts with technical support of the central government. The veterinary infrastructure along the southern borders have been provided with equipment and capacity for catching of free roaming dogs along the open and porous borders with India.

Mentimeter session

A short mentimeter session was held to make the meeting more interactive and to understand the needs and priorities of the Network Members. There were suggestions to make the meeting as an in-person meeting to facilitate better interaction and bring rapid progress. For the topics, the Members suggested to include molecular epidemiology, laboratory proficiency testing, role of PEP in animals, updates on oral rabies vaccines, etc. It was observed that there has been some changes in the portfolio of some of the Members and therefore there is a need to follow-up with WOAH Members for re-nomination of new Members, if any.

Key issues and follow-ups

Issues	Follow-ups
1. The lack of diagnostic kits and reagents for DFA and LFA in Afghanistan	1.1 Afghanistan to send formal request for support to WOAH RRAP through the WOAH Delegate 1.2 WOAH RRAP to explore for coordination with FAO/WHO in Afghanistan
2. Rabies as a transboundary issue. The need for cross-border collaboration and harmonisation rabies control across South Asia, especially amongst countries sharing borders	2.1 Members to continue communicating bilaterally through official platforms. For example, Bhutan WOAH Delegate could reach out to Indian Delegate and AHC for possible harmonisation of dog vaccination along the international borders so as to sustain the recent efforts in Bhutan (100 percent sterilisation and vaccination of free roaming dogs).
3. Changes in the portfolio of Network Members and its effects	3.1 WOAH RRAP to follow up with WOAH Delegates in reconfirming the list of Network Members and for nomination/renomination of Members
4. Enhance rabies surveillance and generate quality data for better	4.1 KVAFSU and WOAH to continue to provide hands-on training to SAARC MSs and support transfer of technology and capacity building.

understanding of rabies situation in South Asia	4.2 KVAFSU to develop SOPs for process/procedure of shipment of rabies suspected samples from Members to KVAFSU. 4.3 Countries to ship rabies-suspected brain samples to KVAFSU for disease confirmation and further molecular studies to understand the epidemiology of rabies in South Asia. 4.4 Countries to store rabies-suspected brain samples in -20°C and below cold chain before shipment to KVAFSU.

Next Meeting of the SA-RABNET

- The Network meeting will be held after six months, April/May 2024.
- At least one virtual and another physical meeting in a year.
- The topic of the next meeting will be decided in consultation with all Members, WOAH and KVAFSU.

Closing of the SA-RABNET Meeting

The Chair, Dr Sangay Rinchen, closed the meeting by extending his appreciation to the Members of the Network for their active participation and support. He mentioned that the current Chair and Co-Chair has another 6-months tenure as per the TOR of the Network and therefore they will hand over to the next Chair/Co-Chair at the next meeting.

MEETING MATERIALS

The agenda and presentations are available at the WOAH Regional Representation website at https://rr-asia.woah.org/en/events/the-launching-of-south-asia-rabies-laboratory-network-sa-rabnet/

Table 1: List of meeting participants

Members	Name	Designation and Affiliation	Remarks
Participants from the countries of South Asia			
Afghanistan	Dr Sayed Abol Hussain Qanee	Head of Epidemiology Department of Animal Health Directorate	Attended
	Dr Hamidullah Tawfiqe	Head, Diagnosis Laboratory, General Directorate of Animal Health and Production	Attended
Bangladesh	Dr Amalendu Ghosh	Director, Livestock Research Institute, Department of Livestock Services	Apologies
	Dr Md Golam Azam Chowdhury	Principal Scientific Officer Central Disease Investigation Laboratory Department of Livestock Services	Attended
	Dr Shukes Chandra Badhy	CDIL, DLS	Attended (new)
Bhutan	Dr Sangay Rinchen	Deputy Chief Veterinary Officer National Centre for Animal Health Department of Livestock	Attended
	Dr Nirmal Kumar Thapa	Head, Laboratory Services Unit National Centre for Animal Health Department of Livestock	Attended
	Mrs Puspa Maya Sharma	Laboratory Services Unit National Centre for Animal Health Department of Livestock	Attended
India	Dr Jyoti Misri	Principal Scientist Indian Council of Agricultural Research (ICAR) Ministry of Agriculture and Farmers Welfare	Apologies
	Dr Swapna Susan Abraham	Disease Investigation Officer State Institute for Animal Diseases Kerala	Attended
	Dr Durlav Prasad Bora	Department of Microbiology Assam Agriculture University	Attended
Nepal	Dr Sharmila Chapagain	Chief Veterinary Officer (Joint Secretary), Central Veterinary Laboratory	Attended

Members	Name	Designation and Affiliation	Remarks
	Dr Pragya Koirala	Senior Veterinary Officer, Central Veterinary Laboratory	Apologies
	Dr Barun Kumar Sharma	Central Veterinary Laboratory	Attended
Pakistan	Dr Khurshid Ahmad	Director General National Veterinary Laboratory	Apologies
	Dr Ali Raza Nizamani	Senior Research Officer (Virology) Central Veterinary Diagnostic Laboratory, Sindh Province	Apologies
	Dr Muhammad Abubakar	Senior scientific officer National Veterinary Laboratory, NARC Gate 2, Park Road Islamabad, Pakistan	Apologies
Sri Lanka	Dr E. R. R. Wimalasinghe	Veterinary Investigation Officer Department of Animal Production and Health	Attended
	Dr W. M. A. D. Wanninayake	Veterinary Research Officer Department of Animal Production and Health	Attended
Organisers			
Karnataka Veterinary Animal & Fisheries Sciences University	Dr Shrikrishna Isloor	Professor and Laboratory Director, WOAH Reference Laboratory for Rabies Veterinary College, KVAFSU	Attended
	Dr Sharada Ramakrishnaiah	Associate Professor and Quality Manager, WOAH Reference Laboratory for Rabies, Veterinary College, KVAFSU	Attended
	Dr Rathnamma Doddamane	Professor and Head, Department of Microbiology, Veterinary College, KVAFSU, Bengaluru	Attended
WOAH	Dr Hirofumi Kugita	Regional Representative, WOAH RRAP	Attended
	Dr Kinzang Dukpa	Regional Project Coordinator, WOAH RRAP	Attended
	Mr Basilio Valdehuesa	Regional Communication Officer, WOAH RRAP	Attended
Observers			
Hong Kong SAR	Dr Ka Long Lao	WOAH RRAP Intern Food and Environmental Hygiene Department (FEHD)	Attended
WOAH	Thitiwan Patanasatienkul	WOAH RRAP	Attended
WOAH	Basilio Valdehuesa	WOAH RRAP	Attended
Chinese Taipei	Dr Alpha Cheng	APHIA	Attended
WOAH	Jacqueline Lusat	WOAH RRAP	Attended

Figure 1: Participants attending the virtual meeting