Food and Agriculture Organization of the United Nations

World Health Organization

World Organisation for Animal Health

Asia-Pacific Rabies Meeting

Bangkok, Thailand, 16–18 July 2024

Report of the meeting

SEA-CD-342

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Abbreviations and acronyms

ARCG	ASEAN Rabies Coordination Group
ARES	ASEAN Rabies Elimination Strategy
ASEAN	Association of Southeast Asian Nations
CNVR	capture, neuter, vaccinate, release
DPM	dog population management
EWARS	(WHO) Early Warning, Alert and Response System
FAO	Food and Agriculture Organization of the United Nations
GMP	good manufacturing practice
IBCM	integrated bite case management
IEC	information, education and communication
KVAFSU	Karnataka Veterinary, Animal and Fisheries Sciences University
LFD	lateral flow device
MDV	mass dog vaccination
NAPRE	National Action Plan for Rabies Elimination
NGO	nongovernmental organization
NTD	neglected tropical disease
ORV	oral rabies vaccination/vaccine
PEP	post-exposure prophylaxis
PrEP	pre-exposure prophylaxis
RACE	Rabies Action Centre of Excellence
RIG	rabies immunoglobulin
RmAbs	rabies monoclonal antibodies
SAARC	South Asian Association for Regional Cooperation
SA-RABNET	South Asia Rabies Laboratory Network
SOP	standard operating procedure
SRR-SEA	WOAH Sub-Regional Representation for South-East Asia
STARC	settlement type, area, road connectivity
UAR	United Against Rabies
UNEP	United Nations Environment Programme
WHO	World Health Organization
WHO-SEARO	WHO Regional Office for South-East Asia
WHO-WPRO	WHO Regional Office for Western Pacific
WOAH	World Organisation for Animal Health

Meeting at a glance

On 16–18 July 2024, 42 representatives from both animal and human health sectors across 14 rabies-endemic or at-risk countries in the Asia-Pacific region convened in Bangkok, Thailand, for a three-day rabies meeting organized by the regional Tripartite. They worked together to strengthen, innovate, and sustain intersectoral coordination and collaboration across the sectors.

This effort is part of a broader initiative to accelerate the prevention, control and elimination of dog-mediated human rabies in the Region, with the ultimate goal of achieving zero human dog-mediated rabies deaths by 2030. The representatives were joined by rabies experts, Tripartite colleagues, and other agency and partner representatives.

Highlights

Session 1: Global and regional perspectives, and updates on elimination **efforts** set the scene and provided an overview of the latest progress and priorities, emphasizing the importance of strategic plans and collaboration across sectors. Despite progress, rabies remains a significant challenge in many countries across the Asia-Pacific region, necessitating accelerated efforts to meet the 2030 goal.

Session 2: Surveillance and integrated bite case management as a prime example for One Health focused on the critical role of data for rabies control and elimination, with specific country examples showcasing effective capacity-building programmes and surveillance efforts. Integrated bite case management was discussed as a method to enhance rabies case detection and investigation, and inform treatment plans and programmatic actions.

Session 3: Innovation in prevention, control and elimination of rabies at the source highlighted the importance of adequate mass dog vaccination and the use of quality vaccines. Updates on oral rabies vaccination were presented as an additional tool for vaccinating free-roaming dogs, with examples of implementation from countries.

Session 4: Public awareness, community and stakeholder engagement centred on the importance of education and community buy-in and ownership in rabies programmes. The need for collaboration among various stakeholders was emphasized to ensure effective rabies control.

Session 5: National Strategic Plan development, governance and implementation provided updates on the revised Association of Southeast Asian Nations (ASEAN) Rabies Elimination Strategy, and highlighted the importance of multisectoral engagement and resource mobilization. Strategies for securing sustainable funding and the importance of quality data for advocacy were discussed.

A poster session provided an opportunity for countries to present updates, innovations and challenges in rabies elimination and actively engage through facilitated poster walks. Hands-on mini workshops and opportunities to ask experts detailed questions fostered further collaboration.

A World Café exercise encouraged interactive discussions among participants on priority areas, as identified during the meeting, and led to the following recommendations:

For countries

- Identify rabies focal points in both sectors to enhance coordination at all levels.
- Innovate advocacy efforts to keep the momentum, and sustain political commitment and resources for rabies elimination.
- Ensure availability of costed and endorsed national strategic plans, updating them as needed.
- Strengthen rabies surveillance at all levels, including diagnostic and laboratory capacity.
- Ensure functional intersectoral collaboration using the One Health approach, engaging stakeholders and communities.
- Ensure the use of quality human and animal vaccines and biologicals.
- Strengthen cross-border coordination and collaboration to prevent rabies incursion and spread through dog movement.
- Explore the use of oral rabies vaccines to complement parenteral vaccination of free-roaming dogs based on disease epidemiology.

For Tripartite and partners

- Support the development, update and implementation of costed national multisectoral strategic plans.
- Support capacity-building in countries for rabies diagnosis, case management, surveillance, mass dog vaccination and dog population management.
- Promote cost-effective intradermal human rabies vaccination to ensure available, accessible and affordable post-exposure prophylaxis.
- Strengthen laboratory capacity in the Asia-Pacific region by leveraging existing networks, such as SA-RABNET, ASEAN Rabies Coordination Group and others, for facilitating coordination between human and animal health sectors and supporting epidemiological data-sharing.
- Facilitate intersectoral and cross-border coordination and collaboration at bilateral, subregional and regional levels to address rabies transmission risks through dog movement.
- Assist countries in assessing vaccine quality and accessing quality rabies vaccines both for humans and animals.
- Continue to organize regional and subregional rabies workshops to keep the momentum and accelerate the progress towards Zero by 30.
- Involve the United Nations Environment Programme (UNEP) and the environmental sector more actively, as part of successful Quadripartite collaboration efforts.
- Continue the high-level advocacy efforts to keep the momentum, and sustain political commitment and resources for rabies elimination at the national and regional levels.

1. Introduction

Rabies, despite being entirely preventable, remains a significant public health concern in the Asia-Pacific Region. The disease is predominantly transmitted by domestic dogs; it is almost invariably fatal once clinical signs appear. Successful rabies control includes:

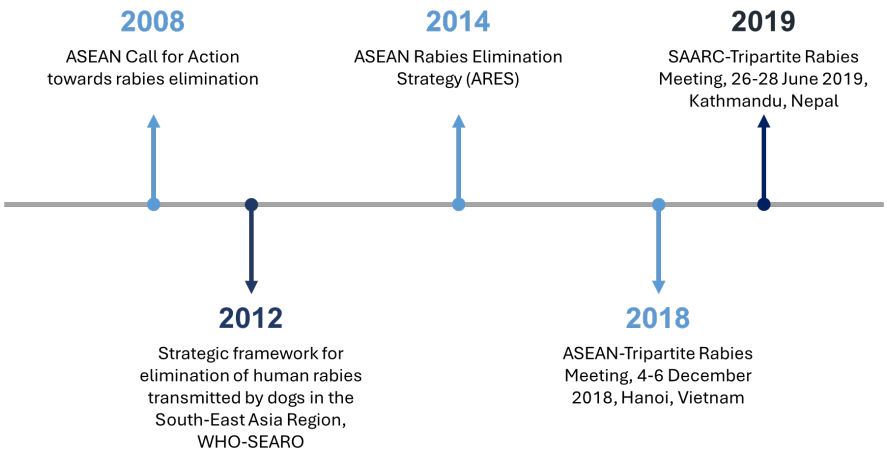
(i) prompt access to post-exposure prophylaxis (PEP) following an exposure, including through wound washing, a series of rabies vaccines and in some cases, rabies immunoglobulin (RIG)/rabies monoclonal antibodies (RmAbs);

(ii) mass dog vaccination to prevent disease transmission at its source; and

(iii) community awareness and engagement.

Collaborative efforts to eliminate rabies in the Region are based on multisectoral coordination and strengthening the fight against rabies over more than a decade (Fig. 1).

Fig. 1. Collaborative strategies and meetings to coordinate efforts across sectors, countries and the Region to eliminate rabies in the Asia-Pacific



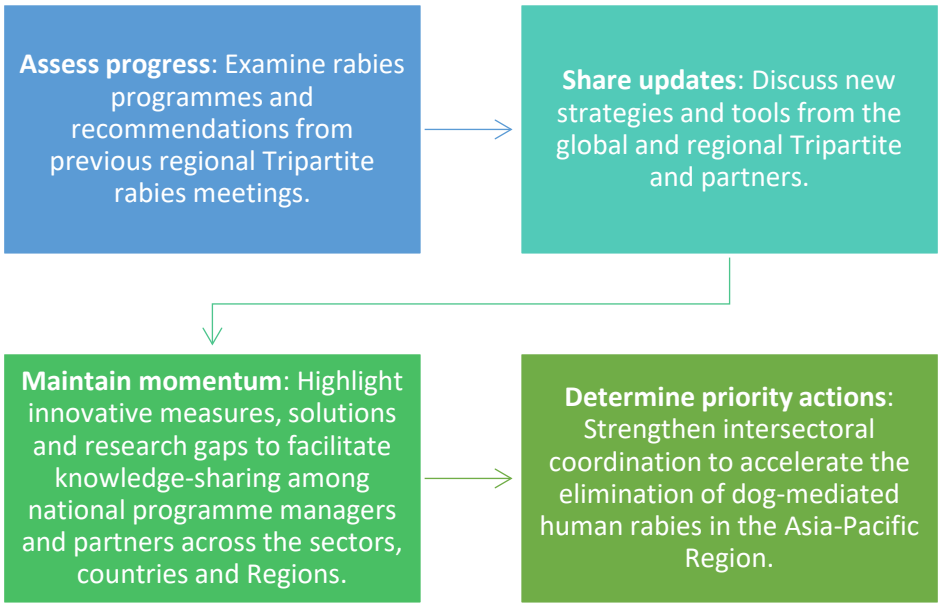
Since the last Tripartite rabies meetings, substantial progress has been made. All endemic countries in the Region have established national control programmes. Most also have official multisectoral national strategic plans, endorsed by different ministries, demonstrating increased awareness of the importance of collaboration and implementing a One Health approach. Countries have also improved their capacity for intradermal vaccinations, laboratory diagnosis of human and animal rabies, and effective dog vaccination programmes. Additionally, new tools and innovations have emerged.

However, the COVID-19 pandemic has stalled progress and many challenges persist. To reach the global goal of zero human deaths from dog-transmitted rabies by 2030, programmatic progress needs to be accelerated and efforts continued. With only six more years till 2030, the regional Tripartite, composed of the Food and Agriculture Organization of the United Nations (FAO), WHO and the World Organisation for Animal Health (WOAH), convened a meeting to bring together both human and animal health sectors to jointly assess progress, promote cross-learning and intersectoral discussion, and reinvigorate the dynamics among relevant partners to advance towards meeting the Zero by 30 goal.

2. Objectives of the meeting

The general objective of the meeting was to strengthen, innovate and sustain intersectoral coordination and collaboration between human and animal health sectors to accelerate prevention, control and elimination of dog-mediated human rabies through the One Health approach in the Asia-Pacific region, and achieve the goal of Zero by 2030. More specific objectives are highlighted in Fig. 2. The full agenda can be found in Annexure 1.

Fig. 2. *Specific objectives of the meeting*



The meeting convened national programme staff responsible for rabies control in human and animal health sectors, and experts from WHO collaboration centres, reference laboratories of WOAH in the Region and the Tripartite workforce at global, regional and country levels in endemic countries across the Asia-Pacific. The full list of participants can be found in Annexure 2.

3. Overview of meeting sessions

3.1 Global and regional perspectives, and rabies elimination updates

Global as well as regional Tripartite representatives highlighted the updates and priorities for the Tripartite organizations to support countries in their efforts to reach the global goal of Zero by 30.

Despite the tremendous progress made over the past few years such as the development of multisectoral strategic plans, rabies is endemic in most countries in the Asia Pacific Region. The regional Tripartite offers guidance and recommendations. They are also actively supporting projects in countries; these include strategic planning, capacity-building and scaling up efforts to accelerate progress. Regular awareness campaigns, especially around World Rabies Day, are used to increase awareness and advocacy for rabies control and elimination. Each organization presented some of the concrete work it had carried out and the country support it had conducted recently.

Global activities benefit from strong collaboration among stakeholders through the United Against Rabies (UAR) forum, launched by the Tripartite. Many guidance documents have been produced, and the Tripartite and partners actively support countries in implementing them. These include:

- the launch of the Global Neglected Tropical Diseases (NTDs) Roadmap 2030;
- newly released material and guidance on introducing human rabies vaccine to national immunization programmes;
- a protocol for a well-performed rabies post-exposure prophylaxis delivery;
- expanded use of monoclonal antibodies against rabies;
- WHO's Regional Technical Advisory Group for dog-mediated rabies;
- recommendations for field application and integration of oral vaccination of dogs against rabies into dog rabies control programmes;
- digital tools for real-time monitoring of dog vaccination campaigns and for One Health surveillance;
- guidance on communication and public information; and
- support to draw from the recently released GAVI investment for human rabies vaccines.
- Quarterly webinars provide information on various topics and recordings can be found online. To become a UAR member or to recommend activities, countries can find contact information on the UAR website.

3.2 Surveillance and integrated bite case management: prime example for One Health

Rabies surveillance in animals and humans

Surveillance is a cornerstone of rabies elimination and data are one of the biggest assets of any programme. From assessing the burden, advocacy, evidence-based decision-making to monitoring and evaluating the progress, without data, there is no option to ensure that resources are spent effectively and efficiently, and achievements cannot be validated as well.

Capacity-building on rabies surveillance is a focus area in the Region. The WOAH Reference Laboratory at the Karnataka Veterinary, Animal and Fisheries Sciences University (KVAFSU) in Bengaluru, India, spotlighted the positive effect proper training in surveillance activities, including animal sampling, field-level rabies detection and reporting in collaboration with the human health sector, can have. Trainings are conducted either as part of pre-conference workshops or as dedicated training for interested institutes, mainly on-site but also virtually hosted to increase the number of people who can be trained.

The impact of training has been effective, especially with regard to the ease of animal brain sampling by the occipital foramen route in the field. Further confirmation of samples, tested in the field using rapid diagnostic tests [lateral flow devices (LFDs)], is subsequently offered by the laboratory itself. Since test characteristics are prone to false negative results, especially those results should be verified by a laboratory. No human PEP decisions should be made on currently available LFD tests.

Capacity-building on the ground increases competency and confidence in taking samples and testing animals on the field with little effort, and accelerates surveillance of animals.

That LFDs can increase surveillance activities was further confirmed by the country experience in Nepal, where prior to 2022, opening animal skulls to obtain brain samples was a hindrance due to difficulties and safety concerns, especially in the field. After the training for collection of samples through the occipital foramen route, surveillance has increased substantially. Non-invasive WOAH-recommended brain sampling techniques has now been taught in veterinary colleges throughout the country; for remote areas, virtual guidance on sample collection in the field is offered.

Samples are mainly collected from dogs; however, this also covers cats, livestock and wild animals. Now rapid diagnostic tests are used and samples confirmed at the central laboratory. Future collaborations with WOAH reference laboratories are planned to further increase the capacity of the rabies programme. At a reference laboratory, the work includes not only confirmation of animal cases, but also phylogenetic analysis of rabies virus to increase information on distribution, transmission source and spread across countries and borders. Examples in this regard were highlighted by the WOAH Reference Laboratory at the Changchun Veterinary Research Institute at the Chinese Academy of Agriculture Science in Changchun, People's Republic of China.

To increase surveillance activities for animals and detection of human cases, most of the countries have already declared human rabies a notifiable disease. However, the minimum recommended data collection does not only cover the number of human rabies cases, but also key information that further includes the number of human rabies exposures (for example, the number of humans with WHO-classified Category II or III wounds from suspicious animals) and the number of people receiving PEP. Disaggregation by sex, age and offending animal provides additional information for targeted response and actions. WHO is collecting key indicators with regard to rabies from countries annually. More information on how to participate in this to improve global data collection can be found online.

Most of the reported animal exposures across the Region are attributed to dogs. Countries have often reported collecting human rabies data through DHIS2 (exposures) or through event-based reporting or the Early Warning, Alert and Response System (EWARS, for rabies cases) of WHO. However, underreporting and laboratory diagnosis are still a significant problem across the Region. Even if data are collected, these may be incomplete or inadequate.

Both animal and human surveillance systems need to be strengthened. Capacity-building for system users is equally important to ensure complete and good-quality data. Common platforms to share timely data across sectors are still needed. Complementarily, rabies awareness programmes accelerate rabies surveillance on the ground.

Ideally, rabies surveillance should be embedded in national routine health information systems, as illustrated by an example from the People's Republic of China, where the national Information System for Disease Control and Prevention encompasses all human infectious diseases, including human rabies cases from hospitals, triggering

epidemiological investigation. Data on reported human rabies cases are publicly published every month. Similarly, the Chinese Centre for Animal Disease Control and Prevention has established an animal information system to report cases to the national system. Data are also available monthly through open access and compiled in frequently published bulletins.

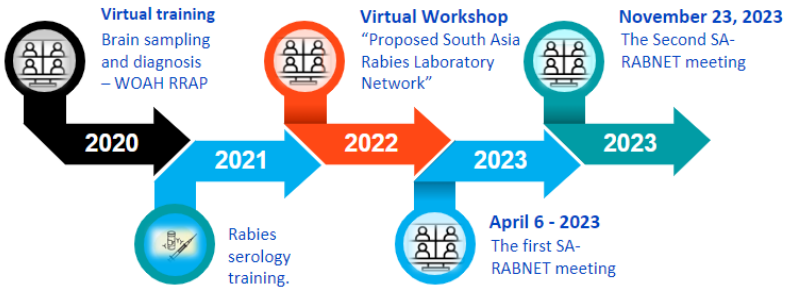
Box 1. *The birth of the South Asia Rabies Laboratory Network (SA-RABNET)*

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

Laboratory diagnosis of rabies in the Region still has limited capacity, funding and political support. Additionally, reagents are missing in some countries. Furthermore, there is a lack of harmonization across different countries. Most cases can only be confirmed clinically.

As diagnostics are a core component of effective rabies surveillance, more extensive exchange of information and closer connections are frequently discussed at workshops and trainings. Hence, a laboratory network in the Region has been established to provide a platform for sharing information and experience, facilitate capacity-building and technical assistance for network members, encourage collaborations, and foster partnerships with other laboratories and networks beyond the Region. Quick communication channels have been created to share information and assistance rapidly.

SA-RABNET plans to further expand its network by integration with other initiatives, such as the South Asian Association for Regional Cooperation Epidemiology Network (SAARC EpiNet) and other laboratory groups; conduct trainings; expand to other regions such as ASEAN as well as the human health sector; and secure political commitment and funding to champion high-quality diagnostic services in the Region.



Integrated bite case management: a prime example of One Health implementation

Integrated bite case management (IBCM) is a method of passive disease surveillance, wherein animal exposures (such as scratches or bites) are used as an "alert" or "event" to trigger a rabies case investigation. In IBCM programmes, implementation requires close coordination between health clinics and veterinary professionals to ensure that trigger events are reported quickly by health clinics, investigated thoroughly by a veterinary professional and then, the outcomes of the investigation used to inform the exposed

victim's treatment plans and dog vaccination practices. Integrated bite case management may seem like a new concept, but in reality, most upper-income countries operate IBCM programmes every day, often under the terms of "Animal control programmes" or "Rabies surveillance systems".

Implementation of a highly accurate IBCM programme, wherein the health assessment of the offending animal informs human treatment decisions, can lead to drastic reductions in unnecessary use of human vaccine. These resources can then be diverted to people who are more likely to have had a true rabies exposure. At its core, IBCM is quite simple. The goals are to:

- identify all animal exposures in the community;
- evaluate the offending animal for signs of rabies;
- quarantine healthy offending animals (dogs, cats and domestic ferrets for 10 days and all other animals for 14 days);
- test sick offending animals for rabies; and
- ensure that exposed victims meeting certain risk criteria have access to life-saving rabies PEP.

Achieving a high-functioning IBCM programme requires participation of both human health and veterinary sectors, and qualified, well-trained workforce. Country examples have shown that training, diagnostic capacity and systems building, including feedback mechanisms, are at the centre of implementing IBCM. Funding and cooperation are needed to ensure sustainability. However, systems building is worth the effort as it saves resources, strengthens cross-sectoral collaboration for outbreaks of other zoonotic diseases as well as deepens trust of communities in human and animal health services.

IBCM is a potent advanced surveillance method allowing for risk-based PEP decision-making, using available vaccines rationally. IBCM can be an additional tool to, for example, detect further exposures, allow for targeted responses and dog vaccination campaigns, inform community awareness, and increase compliance and buy-in of vaccinations, including PEP completion and other programmatic activities. IBCM programmes are built on strong case definitions and implementation of proper PEP guidelines and decision-trees by well-trained individuals to make risk-based decisions for each patient. This includes supervision and quality control mechanisms to ensure evidence-based decision-making, minimizing the risk some countries were concerned about.

Mini workshop: Map your ideal One Health rabies communication and response pathway

To deepen the understanding of IBCM and stress the importance of cross-sectoral coordination and collaboration, participants of the meeting were provided with two different trigger events to be used as the basis for creating the flowchart of an ideal response.

- Trigger event 1: A person with a suspected rabies exposure is seeking treatment at the local health facility.

- Trigger event 2: A community member reports a suspected rabid dog to the local government.

Participants were encouraged to consider concrete actions, responsible parties, time frames, stakeholders involved and already existing systems, where available.

Discussions among the professionals from both human and animal health sectors across the participating countries as well as technical country staff who facilitated and supported this activity were lively; these allowed for a deeper understanding of different systems and benefits of intersectoral collaboration and effective communication. Additionally, gaps and challenges in existing systems and the need for well-defined standard operating procedures (SOPs) were identified.

Many of the flowcharts created could be expanded beyond just the investigation and assessment of a suspected animal to include broader response activities, such as community engagement, targeted mass dog vaccination (MDV) and dog population management (DPM) activities, including waste management. Clear responsibilities and concrete timelines are key. Mechanisms to share information as well as to deliver feedback on time need to be established and/or strengthened.

3.3 Innovation in prevention, control and elimination of rabies at source

Vaccination of dogs against rabies

Vaccinating dogs is a main component of rabies elimination as not only is it more cost-effective than (reactive) human vaccination, but it also prevents disease transmission at the source. To successfully eliminate rabies, vaccinating single dogs is not enough. The established herd immunity breaks the transmission cycle only when a large population of dogs in an area is successfully vaccinated. The effectiveness of MDV campaigns is correlated with programme success and its pace. Free-roaming dogs are the most critical for vaccination.

However, studies have shown that some commercially available vaccines may not be sufficiently potent. Vaccine production should follow good manufacturing practices and include batch testing of products as well as sufficient protection of staff involving adequate pre-exposure prophylaxis (PrEP). WOAH reference laboratories have recently published a statement on the matter and further guidelines on how to procure potent animal vaccines are available.

WOAH further offers concrete support for countries through procurement of rabies vaccines via the WOAH vaccine bank. If there is uncertainty about the vaccine quality, WOAH reference laboratory members are available to support countries in decision-making. Investment in already established quality vaccines may be more beneficial than investing in local vaccine production lines and ensuring to meet the quality standards and production recommendations for rabies vaccines.

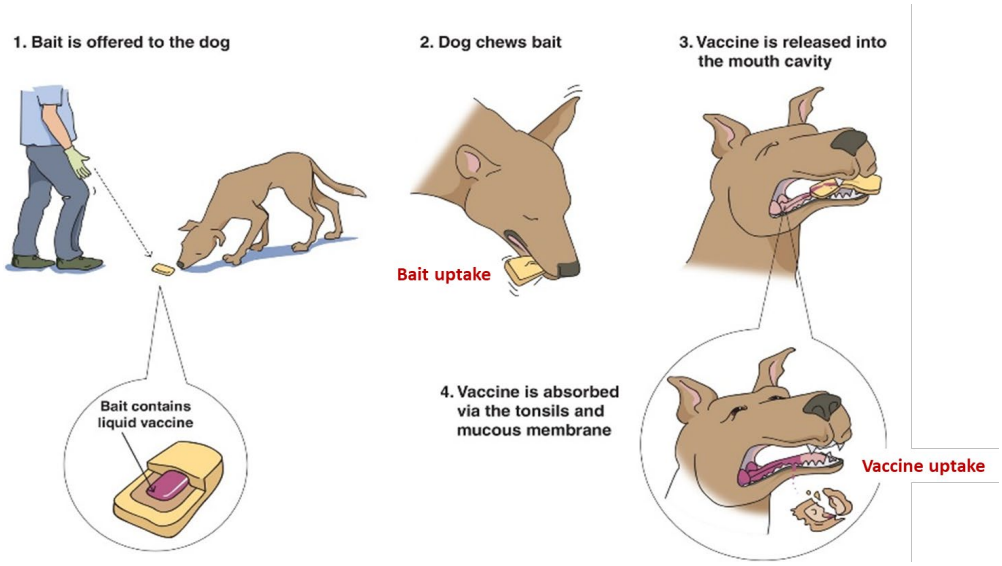
Unqualified vaccines jeopardize and undermine rabies programmes; in the longer run, purchasing low-quality vaccines wastes money and resources. The actual cost of a vaccine is only a small part of the cost of a dog vaccination programme. Human resources account for the biggest part of the cost of vaccinating a dog. Hence, trying to save vaccine costs is a faulty endeavour and counterproductive.

The focus on quality vaccines with the longest possible duration of immunity was also highlighted as a core component of Bangladesh's "Leave no dog behind" vaccination strategy. As part of the Rabies Action Centre of Excellence (RACE), the Zoonotic Disease Control Programme of the Ministry of Health and Family Welfare in Bangladesh conducted national try-outs for selecting national vaccination teams; these were to ensure that dog vaccination efforts led to the highest possible vaccination coverage for as long as possible. The goal is to retain well-trained, skilled vaccination teams to conduct each vaccination campaign better than the last. The campaigns should cover free-roaming dogs in every village and every ward each year. Awareness-raising activities and a special focus on children and puppies complement the efforts.

Oral rabies vaccination (ORV) marks the revival of an old idea, but it is a promising tool for vaccinating free-roaming dogs. A blister containing the vaccine is offered in a bait to a dog. While chewing on the bait, the blister breaks, and the vaccine is released and taken up via the oral cavity (Fig. 3). As oral rabies vaccines (ORVs) contain live virus (either attenuated or recombinant), the safety of targeted and non-targeted species, including humans, is of paramount importance. New recommendations for implementation have been published by the Tripartite to integrate ORV into dog rabies programmes, along with answers to frequently asked questions and the recording of a webinar around the topic. As the first country, Indonesia has licensed a commercial ORV for dogs. In addition, the European Medical Agency has recently approved an oral suspension for rabies vaccination for dogs.

Thailand had already started piloting and studying ORV in dogs in 2017, making it the largest research study in the Region. Distinct project phases included research on bait preferences, immune response, feasibility and effectiveness nationwide. No adverse events in dogs or humans have been reported since then and success rates are high, with vaccination coverage in areas where parenteral vaccination is not possible increasing from 0% to 65%. Sometimes, dogs swallow a bait without chewing on it or spill it, which will not lead to an immune response; hence, these dogs have to be considered as not vaccinated.

Fig. 3. Oral vaccination of a dog: blisters containing the vaccine offered to dogs in a bait



Source: https://www.who.int/publications/i/item/9789240082731

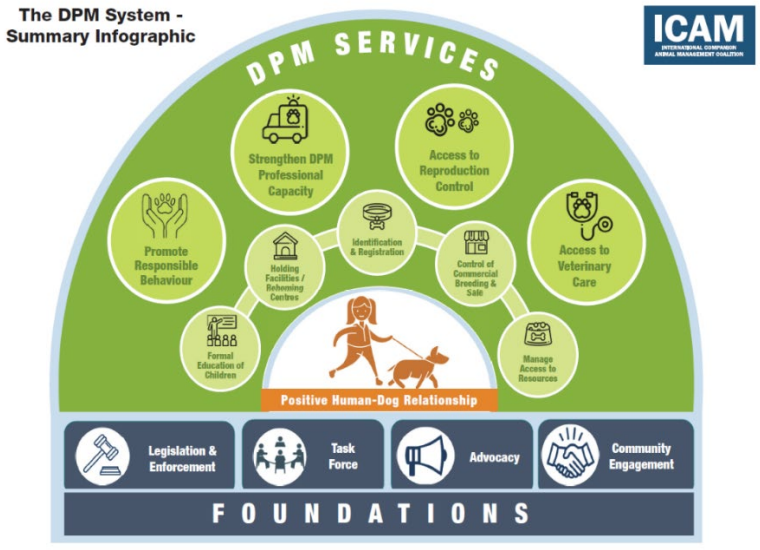
Participants were highly interested in ORVs, especially their safety profiles, availability, licensing and cost-efficiency, in comparison to parenteral vaccines. Overall cost calculations not only include the vaccine but also the distribution system and the achieved vaccination coverage, providing an increase in vaccination of otherwise hard-to reach dogs. Costs of vaccines and baits may also decline with further licensing of ORV in the future.

Strategic planning of MDV programmes, including dog population estimates, target populations, logistics and resources, is of utmost importance, no matter if parenteral vaccines or ORVs are used. Proper electronic data collection during campaigns is also of utmost importance for monitoring and evaluation purposes, and should be preferred to any resource-intensive serosurveillance study. Awareness raising and community engagement for vaccination campaigns build trust and encourage participation. ORV may offer a solution to increase vaccination target with regard to free-roaming dogs. The main pillars to consider in ORV campaigns include the vaccine itself, the bait and the distribution system.

3.4 Dog population management

Managing dog populations can be an additional tool for rabies control. DPM is a comprehensive set of services and measures to mitigate the risks posed by current free-roaming dog populations (Fig. 4). Local dog population dynamics and relationship between communities and dogs dictate the design of DPM programmes.

Fig. 4. All dog population management systems are based on four fundamental services; additional services will be needed depending on the local context.



Many studies have shown that dog culling does not reduce rabies transmission; most of the dogs culled will be the healthy ones. When conducted following a vaccination

campaign, it even undermines the efforts and resources spent because often the dogs that were catchable for vaccination are also caught for culling. In addition, dog population numbers tend to rebound quickly. It further leads to people relocating their dogs and disengaging from control activities. Overall, dog culling reduces the critical vaccination coverage of the dog population.

A comprehensive DPM programme, on the other hand, supports reaching and maintaining vaccination targets by sustainably reducing dog density [for example, through capture, neuter, vaccinate, release (CNVR) efforts], improving dog welfare, increasing access of dogs to vaccination, reducing bites and traffic accidents, and raising community comfort regarding free-roaming dogs.

Experience in Bhutan has shown that successful sterilization campaigns are possible but need to be underpinned by proper data, strategic planning, and dedicated funding and commitment. Several efforts to control the free-roaming dog population were unsuccessful until the government decided in 2021 to bring together all stakeholders and invest in a comprehensive strategy. The allocated funding allowed for a nationwide survey and tremendous capacity-building activities, leading step by step to a 100% sterilization coverage of free-roaming dogs in 2023.

DPM is a comprehensive system of services depending on the local context that can accelerate programmatic efforts to control rabies. DPM itself does not impact rabies transmission directly; however, it reduces dog population turnovers and dog density. This decreases the number of susceptible puppies and increases both access of dogs to vaccination as well as survival chances of those vaccinated dogs. Successful DPM programmes support the achievement of necessary dog vaccination rates to break rabies transmission cycles.

Regulations on registrations or other relevant dog-related legislations should consider the goal of vaccinating free-roaming dogs and not burden or overwhelm owners to avoid dogs being kept hidden. Vaccinated dogs are an asset for rabies control; hence, encouraging and supporting pet owners and communities to provide better care (for example, food, water and parasite control) is more beneficial. Using images of aggressive dogs on rabies information, education and communication (IEC) material should be avoided so as to not demonize dogs in general.

3.5 Public awareness, community involvement and stakeholder engagement

Public awareness, community involvement and stakeholder collaboration are essential for effective rabies control. Educating the public about rabies prevention empowers individuals to take protective measures and actions. Engaging local communities ensures culturally appropriate interventions and fosters a sense of responsibility. Collaboration between government agencies, nongovernmental organizations (NGOs), veterinary services and health-care providers enables a coordinated and comprehensive response, addressing both human and animal health aspects of rabies control. Together, these efforts enhance the effectiveness and sustainability of rabies prevention programmes. This has been confirmed in Lao PDR where information on rabies has been successfully

integrated into the school teaching curriculum and community-based surveillance piloted. However, challenges include turnover of staff and funding constraints to scale up activities. To effectively utilize community-based surveillance, the animal laboratory capacity needs to be further strengthened.

Community involvement has also been proven successful in detecting and responding to rabid animals in Pune, India, where animal reporting mechanisms have been established by a locally active NGO, Resqct. The project started from the grass-roots level and has now been taken over by the local municipalities, demonstrating ownership and ensuring sustainability of efforts. However, for achieving success, a high number of human resources working in dedicated shifts was needed to respond to all the reports received, educate communities and spread awareness. Reporting numbers steadily increased over time, as people began to realise that their calls would be taken seriously and the animals concerned investigated. Such a broad response especially aids in detecting non-stereotypical rabies cases.

Integrating rabies education into school curriculums can raise awareness about the disease and preventive measures. Additionally, involving communities in reporting suspected animals and facilitating rapid response not only accelerate efforts, but also empower communities and foster ownership and buy-in for control activities.

To successfully engage communities and various other stakeholders, especially when developing multisectoral strategies, many different perspectives and systems must be managed. Often, there will be various challenges on the way; these will need to be overcome. While developing its National Action Plan for Rabies Elimination (NAPRE), India successfully engaged not only key stakeholders but also supporters, private partners and international organizations. Many rounds of consultations were held. Clearly identifying and defining core areas for the strategy proved to be extremely important for bringing all stakeholders together. Support from the highest political levels as well as relentless advocacy efforts were important for the success as well.

Positive benefits of the process are summarized in Fig. 5.

Fig. 5. *Important effects of multistakeholder engagement, as experienced during the development of India's National Action Plan for Rabies Elimination*

Effective multisectoral engagement begins with an initial assessment and stakeholder mapping to develop an engagement strategy. Building relationships and trust is essential for successful collaboration and planning.

Panel discussion: How to unlock the power of champions and leaders, and engage multiple stakeholders

The discussion emphasized the critical importance of coordination, online databases for reporting and engagement with other agencies, alongside the need for improved border control. It highlighted positive deviance in government systems and committees, focusing on collaboration to vaccinate dogs and integrate with communities using village funds. Multistakeholder involvement was stressed, integrating risk communication, community engagement and social behaviour changes into the disease elimination plan. Insights from affected populations were deemed essential to secure national funding, addressing the imbalance in investment between animal and human health. The importance of community engagement for reporting suspected animals and establishing a system to track and trigger rapid response actions was underscored.

Community engagement and sensitization are paramount for sustainable rabies control programmes, advocating for direct engagement on rabies reporting and first aid, and structured government outbreak response systems. By creating awareness, disseminating success stories and removing barriers to accessing PEP facilities, communities can be encouraged to report more cases, thereby improving data quality and enhancing the rabies control programme.

3.6 Development, governance and implementation of national strategic plans

The session commenced with an update on the Association of Southeast Asian Nations (ASEAN) Rabies Elimination Strategy (ARES). In 2021, the ARES revision process was officially endorsed and with support from the WOAH Sub-Regional Representation for South-East Asia (SRR-SEA), the Nossal Institute for Global Health was contracted to provide technical assistance. A dedicated Working Group was established to guide the process. Virtual consultations took place, culminating in a consultation meeting in May 2023. The revised version of ARES was circulated among stakeholder groups. There was a strong consensus on maintaining the STOP-R framework (comprising sociocultural, technical, organizational and One Health pillars, including considerations for resource mobilization).

Key updates include:

- a more comprehensive definition of rabies elimination;
- introduction of a Theory of Change;
- updates to technical activities;
- emphasis on a One Health approach and community empowerment;
- recommendations for regional resource mobilization; and
- an annexure with key resources.

The way forward involves endorsing the revised ARES, drafting an implementation plan and establishing the ASEAN Rabies Coordination Group (ARCG). The ARCG will coordinate and execute the regional strategy, monitor its implementation progress and harmonize national rabies strategies with the regional elimination approach.

Panel discussion: Resource mobilization and sustainable funding

During the panel discussion, the importance of strategic plans and governance for successful resource mobilization was further underlined. Panelists shared diverse examples of communication activities, engaging successfully with national authorities, supporters and funders to unlock resources and funding. Media coverage may further bring political attention.

Overall, it was agreed that while the inclusion of development partners is valuable, long-term sustainability requires government commitment and funding. Aligning strategies with already existing government resources ensures cost-effectiveness. Sensitizing relevant ministries and fostering open discussions are critical steps. For this, the need for quality data emerged as a key theme. Without robust evidence, discussions remain superficial. Stakeholders can be better convinced when presented with data highlighting the impact of the disease on various levels. Monitoring and evaluation frameworks, along with milestones, further enhance engagement by demonstrating impact.

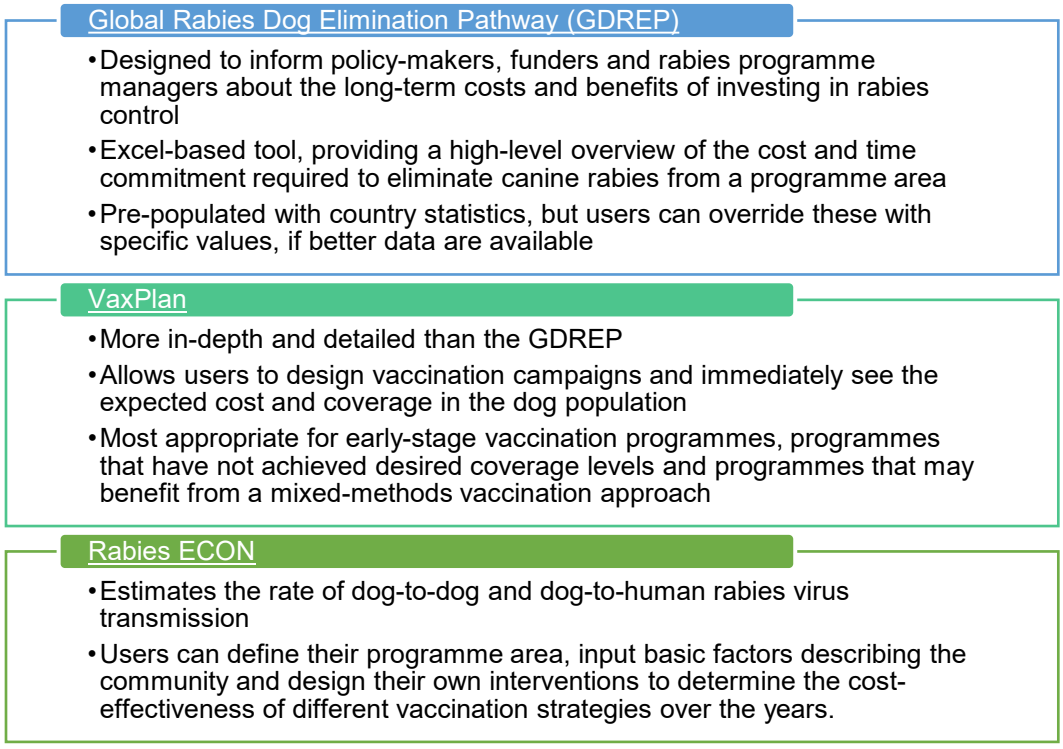
Multistakeholder engagement was also seen as vital for securing funding from central governments. Translating national priorities further into local programmatic activities encourages local authorities to take ownership and responsibility, thereby facilitating funding. Understanding stakeholders well and good relationship between them allow for exploration of various funding avenues.

Resources play a crucial role in every part of a rabies elimination programme. Given the multitude of competing priorities, funding gaps are frequently observed, particularly in the animal sector. The panelists unanimously agreed that costed programmes are essential to effectively raise awareness and advocate for funding. This is especially crucial where other communicable diseases can easily divert attention and resources. For sustainable rabies elimination, government ownership and a dedicated budget are necessary.

Costing of rabies programmes and prioritization of resources

To make an informed investment case for rabies programmes, different tools available for costing were presented (Fig. 6). Those tools are based on models and a generic set of assumptions and data underpin the output but can be adjusted if more accurate country data are available.

Fig. 6. Publicly available key tools supporting costing of rabies programmes, particularly of dog vaccination campaigns



Rabies incursion through cross-border movement of dogs poses a significant public health risk. Recent cases, such as those in Timor-Leste, a non-endemic country that shared its experience of detecting its first human fatality from rabies in March 2024, highlight the importance of vigilance and preventive measures.

During the meeting, different risk pathways for rabies incursion were discussed and the Settlement Type, Area, Road Connectivity (STARC) geospatial mapping and planning tool was introduced. Areas can be categorized by their STARC code, based on publicly available data on human density and road connectivity. This can help in spotting risk areas and clusters beyond political boundaries, allowing detection of potential hot spots and prioritization of resource allocation. A case study combining spatial risk assessment with mapping of risk factors for rabies control in Malaysia arrived at a similar conclusion. Despite removing incursion as a factor from the model, the hot-spot areas identified were all along the main roads, confirming the fact that dogs usually move with humans.

3.7 Poster session

Posters, developed jointly by animal and human health sector participants, were displayed during the entire meeting. In addition, facilitated poster walks engaged participants, and allowed for a more interactive and organized experience. A moderator led groups of participants to each poster; presenters were able to provide an overview, and participants could ask questions and connect and exchange inputs with country representatives. Common themes as well as key progress and challenges across the Region have been identified (see the box below).

***Box 2.** Summary of country posters presented at the meeting*

Key progress observed across the Asia-Pacific Region:

- rabies in animals and humans made notifiable;
- action plans developed in several countries, including subnational plans;
- increasing government-led initiatives on mass dog vaccination, surveillance and DPM;
- establishment of the South Asia Rabies Laboratory Network (SA-RABNET) to enhance collaboration among veterinary laboratories and potential expansion;
- availability of various tools to facilitate IBCM and rabies surveillance;
- expansion of pilot and programmatic introduction of oral rabies vaccination (ORV) to complement parenteral vaccination of free-roaming dogs;
- increasing collaboration between human and animal health sectors;
- success stories of DPM, community engagement and integration of rabies into school curriculum; and
- introduction of subnational rabies-free initiatives.

Common challenges observed across the Asia-Pacific Region:

- lack of political commitment and resources for rabies elimination;
- suboptimal intersectoral collaboration;
- lack of diagnostic capacity and surveillance, especially at the field level;
- issues with quality of human and canine vaccines;
- insufficient vaccination coverage in dogs;
- cross-border incursion and spread of rabies;
- lack of quality data and indicators for monitoring and evaluation;
- use of adequate and functional electronic surveillance and data-sharing systems;
- gaps still existing in community awareness and engagement; and
- lack of access to human brain samples for postmortem diagnostics.

3.8 World Café

During the World Café activity, participants engaged in dynamic discussions on four key topics, identified as important during the meeting so far:

1. national coordination and cross-border/regional collaboration;
2. surveillance;
3. vaccines and vaccination in dogs; and
4. stakeholder engagement and resource mobilization.

National coordination and cross-border/regional collaboration

Participants discussed the importance of collaboration and coordination in eliminating rabies. They highlighted the need for multisectoral, cross-border and regional collaboration to share resources, knowledge and best practices, and accelerate programmatic progress.

Priority areas: The main challenges identified were the differences in government management structures across countries, the lack of formal mechanisms for information-sharing and the varying priorities of different countries. These challenges often lead to inconsistencies in rabies control measures and hinder effective collaboration.

Actions: The participants recommended development of multisectoral rabies control plans that involve all relevant stakeholders. They also suggested setting up regular cross-border meetings to facilitate exchange of information and collaboration. Additionally, establishing a regional information-sharing platform was proposed to foster collaboration, and disseminate the best practices and lessons learnt.

Surveillance

The group focused on the role of surveillance in early detection of and response to rabies exposures and rabid animals. They examined current surveillance systems, identified gaps and proposed enhancements. The importance of data-sharing and use of technology in surveillance were the key points of discussion.

Priority areas: Immediate notification of rabies cases was identified as a priority area. The participants also emphasized the need for taking up WHO and WOAH standard case definitions and capacity-building for effective surveillance.

Actions: The participants proposed the implementation of rapid diagnostic tests to enable timely detection of rabies cases. They also suggested establishing hotlines for reporting suspected cases and conducting targeted awareness programmes to educate the public about the importance of reporting.

Vaccines and vaccination in dogs

This topic centred on the critical role of quality vaccines for both humans and animals as well as dog vaccination campaigns to prevent rabies transmission at the source. Participants discussed the current available vaccines and dog vaccination strategies.

Priority areas: The participants identified weak regulation of vaccines, poor cold chain management and lack of financial support for dog vaccination programmes as major challenges.

Actions: To address these challenges, the participants recommended strengthening regulatory systems for vaccines and considering the use of oral vaccines for dogs. They also highlighted the need to improve dog population management and secure sustainable financing for vaccination programmes.

Stakeholder engagement and resource mobilization

The final topic addressed the need for engaging all stakeholders – from government agencies to the general public – in rabies programme initiatives. Participants brainstormed strategies for effective engagement and for mobilizing resources, especially in the animal health sector.

Priority areas: The participants discussed the importance of data-driven policy recommendations, media campaigns for raising public awareness and international support for rabies control.

Actions: The participants suggested task-sharing among stakeholders to optimize resource utilization. They also proposed integrating rabies control into existing public health initiatives to leverage resources. Furthermore, they recommended mobilizing sponsorships through public–private partnerships to secure additional funding for rabies control.

The World Café was a productive platform for discussing challenges and sharing ideas and experience. The discussions and insights gained guided the recommendations.

4. Recommendations

For countries

- Identify rabies focal points in both sectors to enhance coordination at all levels.
- Innovate advocacy efforts to keep the momentum, and sustain political commitment and resources for rabies elimination.
- Ensure availability of costed and endorsed national strategic plans, updating them as needed.
- Strengthen rabies surveillance at all levels, including diagnostic and laboratory capacity.
- Ensure functional intersectoral collaboration using the One Health approach, engaging stakeholders and communities.
- Ensure the use of quality human and animal vaccines and biologicals.
- Strengthen cross-border coordination and collaboration to prevent rabies incursion and spread through dog movement.
- Explore the use of oral rabies vaccines to complement parenteral vaccination of free-roaming dogs based on disease epidemiology.

For Tripartite and partners

- Support the development, update and implementation of costed national multisectoral strategic plans.
- Support capacity-building in countries for rabies diagnosis, case management, surveillance, mass dog vaccination and dog population management.
- Promote cost-effective intradermal human rabies vaccination to ensure available, accessible and affordable post-exposure prophylaxis.
- Strengthen laboratory capacity in the Asia-Pacific region by leveraging existing networks, such as SA-RABNET, ASEAN Rabies Coordination Group and others, for facilitating coordination between human and animal health sectors and supporting epidemiological data-sharing.
- Facilitate intersectoral and cross-border coordination and collaboration at bilateral, subregional and regional levels to address rabies transmission risks through dog movement.
- Assist countries in assessing vaccine quality and accessing quality rabies vaccines both for humans and animals.

- Continue to organize regional and subregional rabies workshops to keep the momentum and accelerate the progress towards Zero by 30.
- Involve the United Nations Environment Programme (UNEP) and the environmental sector more actively, as part of successful Quadripartite collaboration efforts.
- Continue the high-level advocacy efforts to keep the momentum, and sustain political commitment and resources for rabies elimination at the national and regional levels.

Annexure 1

Agenda

Programme	Presenter/facilitator
Day 1: 16 July 2024	
Registration of participants	
Opening session	**Facilitator: WHO**
Welcoming remarks	Dr Hirofumi Kugita, WOAH Regional Representative for Asia and the Pacific *(recorded remarks)*
Objectives of the meeting	Regional Tripartite (led by WHO)
Administrative announcements	
Session 1: Global and regional perspectives, and updates on rabies elimination	**Facilitator: WHO** **Co-Chairs: Thailand, Bangladesh**
Zero by 30: Global updates and priorities	Global Tripartite (led by FAO)
Zero by 30: Regional updates and priorities	Regional Tripartite (led by WOAH)
Questions and answers	
Session 2: Surveillance and integrated bite case management as a prime example for One Health	**Facilitator: WOAH/WHO** **Co-Chairs: Bhutan, Cambodia**
Enhancing animal rabies surveillance – by capacity-building	Dr Sharada Ramakrishnaiah, WOAH Ref Lab, India
Enhancing ground level rabies surveillance in Nepal	Dr Naresh Prasad Joshi and Dr Hemant Chandra Ojha, Nepal
Country example – surveillance and information management	Professor Changchun Tu, WOAH Ref Lab, China (recorded presentation)
South Asia Rabies Laboratory Network (SA-RABNET) and the way forward	Dr Sangay Rinchen, Chair of SA-RABNET
Questions and answers	
Continuation of Session 2	**Co-Chairs: India, Indonesia**
IBCM as a tool and how to map your One Health IBCM programme	Ms Yasmeen Ross, US CDC

Programme	Presenter/facilitator
Country example – IBCM	Dr Yi Sengdoeurn, Cambodia
Questions and answers	
Mini workshop: Map your One Health rabies communication and response pathway	All countries
Presentation of workshop outcome	Volunteer countries
Country updates on rabies elimination – updates, innovations and challenges (facilitated poster walk) – Session 1	Seven countries
Day 2: 17 July 2024	
Session 3: Innovation in prevention, control and elimination of rabies at the source	Facilitator: FAO/WOAH Co-Chairs: Lao PDR, Malaysia
Safe and effective canine rabies vaccines: the importance of quality control	Dr Yu Qiu (FAO) and Dr Rachel Tidman (WOAH)
Country example – no dog left behind: Bangladesh	Dr Abul Kalam Azad, Bangladesh
Accelerating MDV efforts with ORV: updates on recommendations	Dr Thomas Müller, WOAH Reference Laboratory and WHO Collaboration Centre, Germany (recorded presentation)
Country example – ORV	Dr Onpawee Sagarasaeranee, Thailand
Questions and answers	
Break time and 'Ask the Pro'	Topics: Rabies diagnosis/IBCM
Dog population management as an additional tool for rabies control	Dr Elly Hiby, ICAM
Country example – dog population management	Dr Jamtsho, Bhutan
Questions and answers	
Flash talks: tools and innovations	• Dr Kim Patrick Tejano (Philippines) • Dr Debalina Mitra (India) • Dr Trimaharani (Indonesia) • Dr Pradeep Lakpriya Kumarawadu (Sri Lanka) • Dr Frederic Lohr (Mission Rabies)
Session 4: Public awareness, community and stakeholder engagement	**Facilitator: WHO** **Co-Chairs: Mongolia, Nepal**
Country example – rabies in schools	Dr Watthana Theppangna, Lao PDR
Utilizing communities to report rabies-suspected animals and rapid response	Ms Neha Panchamiya, Resqct Pune, India *(recorded presentation)*

Programme	Presenter/facilitator
Mastering stakeholder management and overcoming challenges in multisectoral strategic plan development	Dr Simmi Tiwari, India
Questions and answers	
Panel discussion: How to unlock the power of champions and leaders and engage multiple stakeholders **Facilitation**: Dr Frederic Lohr, Mission Rabies	4 experts/5 min. each + Q&A • Dr Ho Ai Chia (Malaysia) • Dr Arief Wicaksono (Indonesia) • Dr Kim Patrick Tejano (Philippines) • Dr Monil Singhai (India)
Break time and Ask the Pro	**Topics: PrEP, PEP, and human case management/MDV and dog vaccines**
Country updates on rabies elimination – updates, innovations and challenges (facilitated poster walk) – Session 2	Eight countries
Day 3: 18 July 2024	
Session 5: National Strategic Plan development, governance and implementation	**Facilitator: WHO** **Co-Chairs: Philippines, Sri Lanka**
ARES update	Dr Kinley Choden, WOAH SRR
Panel discussion: Resource mobilization and sustainable funding **Facilitation**: Dr M.K. Sudarshan	4 experts/5 min. each + Q&A • Dr Hemant Chandra Ojha (Nepal) • Dr Nguyen Thi Thanh Huong (Viet Nam) • Dr Marie Shella Ordinario (Philippines) • Dr Prahors Ung (GIZ Cambodia)
Investment case for rabies programmes: costing and available tools	Dr AJ Beron, US CDC
Risk pathways for rabies incursion and risk mapping	Dr Frederic Lohr, Mission Rabies
Questions and answers	
Break time and Ask the Pro	**Topic: dog population management**
Continuation of Session 5	**Co-Chairs: Timor-Leste, Viet Nam**
Case study on spatial risk assessment and risk mapping for rabies control	Dr Leonora Tuah, Malaysia
Experience of ongoing rabies outbreak in Timor-Leste	Dr Joanita Bendita da Costa Jong, Timor-Leste
Questions and answers	

Programme	Presenter/facilitator
Summary of regional gaps and priorities from posters	WHO (on behalf of the Tripartite)
World Café (facilitated by FAO) Priority actions and support needs	Four topics of importance as identified during the meeting
Break time and wrap-up reflections: share your insights	
Summary of World Café – priority actions and what is missing?	Rapporteur from each group (10 min. each)
Closing session	
Recommendations and next steps	WHO (on behalf of the Tripartite)
Closing remarks	FAO (on behalf of the Tripartite)

Annexure 2

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