ASEAN
RABIES ELIMINATION
STRATEGY

RABIES

Rabies is a widespread, neglected and under-reported zoonosis with an almost 100% case fatality rate in animals and humans. The disease causes a significant social and economic burden in many countries worldwide. Every year, between 50,000 and 70,000 people die of rabies in atrocious conditions. The majority of rabies cases globally occur in children.

Rabies is endemic in the canine population in the majority of ASEAN Member States and nearly all of the human rabies cases are due to bites from rabid dogs. Controlling the disease in dogs is the most cost effective way to prevent rabies in humans.

In addition to rabies control in dogs, humans bitten by dogs need to be treated appropriately. Such treatment involves immediate wound cleaning and the provision of rabies vaccine and immunoglobulin. It is important that people requiring treatment can access services that can deliver vaccine and immunoglobulin soon after being bitten. Poor people are generally more vulnerable to rabies infection because they do not seek timely treatment due to a lack of understanding about the disease. In addition, minor ethnic groups are particularly vulnerable due to both a lack of understanding about the disease and their remote location.

Given that highly effective rabies vaccines and diagnostics are presently available, successful eradication of canine and human rabies can be achieved with commitment, resources, proper planning and coordination. This has been proven by successful efforts in several countries, including eradication in Malaysia in 1999. In the Philippines and Indonesia, rabies campaigns are also leading to a drastic reduction in cases and good progress towards elimination in selected provinces.

Governmental commitment, adequate resources, and well-planned rabies control programs are keys to rabies elimination. Strong political and interdisciplinary support from ASEAN Member States will save human lives and suffering, and decrease the resources spent on human post-exposure treatments.

ACKNOWLEDGMENTS

This strategy is the product of cooperation among ASEAN partners and colleagues who share the vision of eliminating rabies from the Region. The thinking behind this strategy has been evolving for many years, but it was the call to action 'Towards the Elimination of Rabies in the ASEAN Member States and the Plus Three Countries' in 2008 that gave the vision real focus. At that workshop, participants resolved to submit the Call for Action for adoption at the next Meeting of the ASEAN Sectoral Working Group on Livestock (ASWGL), Senior Officials Meeting on Health Development (SOMHD), the 30th Meeting of the ASEAN Ministers on Agriculture and Forestry (30th AMAF), the 8th Meeting of ASEAN Ministers on Agriculture and Forestry Plus Three (8th AMAF +3), 9th ASEAN Health Ministers' Meeting (9th AHMM) and the 3rd ASEAN Plus Three Health Ministers' Meeting (3rdAHMM +3). Since then, subsequent meetings of officers from various ASEAN Member States have progressively worked towards developing a regional strategy for rabies elimination.

This work has been led by various resolutions and reports. Of note is the work that international organizations such as World Health Organization (WHO), World Organisation for Animal Health (OIE), United Nation's Food and Agriculture Organization (FAO), the World Animal Protection (formerly the World Society for the Protection of Animals) and the Global Alliance for Rabies Control (GARC) have undertaken in this area. There are also many dedicated officers from many ASEAN Member States who have contributed to the development, delivery and review of rabies activities on the ground. The lessons learned from implementing rabies prevention and control strategies have been immensely important in continually improving these strategies.

Finally, the commitment of Ministers in ASEAN who now recognise the importance of neglected zoonotic diseases such as rabies must be acknowledged. Without their continued support, it will not be possible to deliver this ASEAN rabies elimination strategy. The Ministers can take pride in pursuing the vision and as a result—saving many thousands of human lives in AMS.

EXECUTIVE SUMMARY

The ASEAN Rabies Elimination Strategy (ARES) has been developed to provide a strategic framework for the reduction and ultimate eradication of rabies in ASEAN Member States. The strategy describes an integrated 'One Health' approach that brings together the necessary socio-cultural, technical, organizational and political pillars to address this challenge.

Rabies is a neglected zoonotic disease. However, the tools are available and it is the neglected zoonotic disease most amenable to control. Accordingly, rabies is the first zoonosis on the list of neglected diseases targeted for regional and eventually global eradication.

The 2008 ASEAN Call for Action towards the Elimination of Rabies in the ASEAN Member States and the Plus Three Countries (China, Japan and Korea) by 2020 demonstrated the key importance attached to rabies control at a political level. The ARES is designed to complement the existing sub-regional frameworks developed to control and eliminate human rabies, such as those developed by the ASEAN Expert Group on Communicable Diseases (AEGCD) in 2010 and by the WHO South-East Asia Regional Office (SEARO) in 2012.

ASEAN endorsement of the ARES and commitment will be sought through the ASEAN Sectoral Working Group for Livestock (ASWGL), ASEAN Expert Group on Communicable Diseases (AEGCD), Senior Officials Meeting on Health Development (SOMHD) and AMAF processes. Once the strategy is endorsed, implementation will be the responsibility of National Governments. The World Organisation for Animal Health (OIE), the United Nations Food and Agriculture Organization (FAO), the World Health Organization (WHO) will oversee developments and provide advice.

Success will be dependent on effectiveness of interdisciplinary and inter-sectoral collaboration. A wide range of organizations, such as medical services, the community, scientists, academics, policy makers and non-government organizations (NGOs) will need to be kept engaged to ensure the successful implementation of the ARES at the Member State level. Political support will be essential as will the provision of adequate resources. The ARES is consistent with contemporary One Health approaches and the management of zoonoses in general. The populations of rabies endemic and non-endemic countries will benefit from the concerted efforts outlined in the Strategy.

ACRONYMS and ABBREVIATIONS

AEGCD	ASEAN Expert Group on Communicable Diseases
AHMM	ASEAN Health Ministers' Meeting
AMAF	ASEAN Ministerial Meeting on Agriculture and Forestry
AMS	ASEAN Member States
ASEAN	Association of Southeast Asian Nations
ARES	ASEAN Rabies Elimination Strategy
ASWGL	ASEAN Sectoral Working Group for Livestock
AusAID	Australian Agency for International Development
DDC	Department of Disease Control
DLD	Department of Livestock Development
EU-HPED	European Union Regional Cooperation Program on Highly Pathogenic and Emerging and Re-emerging Diseases in Asia
FAO	Food and Agriculture Organization of the United Nations
GARC	Global Alliance for Rabies Control
GF-TADs	Global Framework for Transboundary Animal Diseases
IEC	Information, education and communication
IBCM	Integrated Bite Case Management
IDRV	Intradermal Rabies Vaccination
MARD	Ministry of Agriculture and Rural Development
NGO	Non-government organization
OIE	World Organisation for Animal Health
OIE SRR SEA	OIE Sub-Regional Representation for South-East Asia
PDSR	Participatory Disease Surveillance and Respone
RIG	Rabies Immunoglobulin
SEACFMD	South-East Asia and China Foot-and-Mouth Disease Campaign

SEARO	WHO Regional Office for South-East Asia
STANDZ	Stop Transboundary Animal Diseases and Zoonoses
SOMHD	Senior Officials Meeting on Health Development
STANDZ SGF	STANDZ Small Grants Facility
S.T.O.P	Socio-cultural, Technical, Organizational and Political
PEP	Post-Exposure Prophylaxis
WAHID	World Animal Health Information Database
WHO	World Health Organization

INTRODUCTION

Rabies is a zoonosis that continues to be a significant cause of human and animal deaths in many parts of the world. Over 90% of human rabies deaths today occur in Asia and Africa. It is widely recognised that the number of human deaths officially reported is a gross underestimate. Reliable data indicating the true incidence of human rabies is scarce or non-existent in many countries. However, the WHO reports that due to the growing dog and human populations, the number of human deaths from rabies and the associated economic costs will continue to increase without more concerted efforts and investment for control.

To date, rabies remains a neglected disease in most countries of the region due to competing priorities and multifaceted nature of control activities involving public health and Veterinary Services. This neglected disease status contributes to the perception of policy-makers that rabies is insignificant. This perception ultimately leads to little motivation to support and implement disease control measures. Additionally, it is the poorest of the population that are most at risk of exposure and death from rabies, and this segment of society is often overlooked.

Although rabies is preventable, the high cost of modern human rabies vaccines, compounded by the lack of education and awareness about rabies, limits use of post-exposure prophylaxis (PEP). Recent studies show that most rabies patients were victims due to negligence, ignorance and lack of access to primary health-care services. As a result, human rabies incidence has remained stable in most rabies-endemic countries.

Rabies is one of the few communicable diseases that can possibly be controlled by currently available tools for veterinary and public health interventions. Progressive control and eventual elimination is an attainable goal. It is well recognised that although the burden of rabies is primarily on human health, disease control needs to be focused on the animal source. However, progress in preventing human rabies through control of the disease in the dog reservoir has been slow. This has been due to a number of barriers—technical, inter-sectoral, organizational and financial. In addition, there has been poor implementation of efficient dog rabies control campaigns and dog population control programmes. Lethal methods of mass dog population control have been used in some countries. These methods have been expensive and raised sensitive issues with stakeholders. Critically, these methods are ineffective and counterproductive to vaccination programmes.

Successful elimination of human rabies requires a multi-sectoral, collaborative approach. Prevention of animal rabies through dog management, better public awareness and improved access to cost-effective and high-quality rabies vaccines are essential for the elimination of human rabies.

A. Rabies Situation in ASEAN Member States

Dog rabies is endemic in most of South-East Asia, where about 608 million people are at potential risk. Cats, cattle, buffaloes, horses, pigs and other domestic and wild animals are also rabies-susceptible and have been reported in the region. However, dogs are considered to be the most important maintenance host and transmitter of rabies to humans. Indeed, about 96% of documented rabies cases are attributed to contact with infected dogs. Seven

out of the ten ASEAN Member States (AMS) are presently endemically infected with rabies: Cambodia, Indonesia, Lao PDR, Myanmar, the Philippines, Thailand and Vietnam.

Table 1 describes the human and animal rabies occurrence and status of certain animal rabies control measures. According to the OIE World Animal Health Information Data base (WAHID), rabies is a notifiable disease in dogs in AMS. Although there are no reported wildlife rabies cases, these would also be notifiable in Indonesia, Malaysia, Singapore and Thailand. Indonesia, Myanmar and Vietnam reports are limited only to specified zones or regions.

Three countries are considered historically rabies free or have successfully eliminated rabies in domestic animals. Brunei and Singapore have not reported any occurrence of animal rabies and have specific surveillance, vaccination, quarantine and precaution procedures at the borders. The last case in domestic animals in Malaysia was in 1999, and 1953 in Singapore.

Table 1. Regional human and animal rabies occurrence and status of certain animal disease control measures, 2011 (Data sources: Ministries of Health, WHO SEARO, OIE WAHID)

Country	Reported Number of Human Cases	Rate Per Million Population Per Year	Presence of Dog Rabies	Rabies Notifiable to the OIE			General Surveillance and Monitoring	Dog Vaccination Programme
				Dog	Cat	Wildlife		
Brunei	0	0	No	Yes	Yes	Yes	Yes	No
Cambodia	800*	56	Yes	No	No	No	Yes	No
Indonesia	116	0.48	Yes	Yes	Yes	Yes	Yes	Yes
Lao PDR	1	0.16	Yes	Yes	Yes	No	Yes	Yes
Malaysia	0	0	No	Yes	Yes	Yes	Yes	Yes
Myanmar	1000*	21	Yes	Yes	Yes	No	Yes	Yes
The Philippines	219	2	Yes	Yes***	Yes***	Yes***	Yes	Yes
Singapore	0	0	No	Yes	Yes	Yes	Yes **	No
Thailand	8	0.12	Yes	Yes	Yes	Yes	Yes	Yes
Vietnam	110	1.27	Yes	Yes	No	No	Yes	Yes

**estimate only*

***targeted surveillance only*

**** Rabies was made notifiable in the Philippines in January 31, 2012*

Details of the situation in each country are summarized in **Appendix 1.**

B. The development of the ASEAN Rabies Elimination Strategy

In April 2008, the ASEAN launched a Call for Action towards the elimination of rabies in the ASEAN Member States and the Plus Three Countries (China, Japan and Korea). United by a common desire to address rabies and aware of the need for high-level political support to advance and achieve this goal, recommendations for necessary action at national and regional levels were put forward. This included the development of a regional strategic framework for prevention and control of rabies in the ASEAN Plus Three Region.

Analysis of the current human and animal rabies situation and existing activities on rabies among AMS were conducted at the ASEAN/FAO/OIE/WHO Rabies Workshop in January 2012 in Chiang Mai, Thailand. During this workshop, the step-wise approach to rabies control was also introduced and the attending participants made contributions to its refinement.

During the meeting of the OIE Delegates from AMS back-to-back with the 18th South East Asia and China Foot and Mouth Disease (SEACFMD) Sub-Commission meeting in Lijiang, China on 9 March 2012, the country Delegates endorsed the Guidelines for use of the OIE Rabies Regional Vaccine Bank for Asia (Eligibility Criteria for use of the OIE Rabies Vaccine Bank for Asia (Injectable vaccines), and agreed to develop a South-East Asia strategy to control rabies, and requested the SRR to coordinate the drafting of this strategy. During the ASWGL Meeting in Nay Pyi Taw, Myanmar, on 9-11 May 2012, the meeting requested that the OIE Sub-Regional Representation (OIE SRR)—through the AusAID-funded Stop Transboundary Animal Diseases and Zoonoses (STANDZ) initiative–assist in the development of a Regional Rabies Control Strategy.

The STANDZ Initiative, which includes both an emphasis on One Health approaches and a component on technical support to disease management, supported the OIE SRR to provide Vietnam, the ASEAN lead country on rabies prevention and control, in September 2013 with an early draft version of the ASEAN Rabies Elimination Strategies. This draft focused on the animal health aspects of rabies control.

To follow up the above-mentioned Call for Action, during the 7th SOMHD in the Philippines, an ASEAN work plan on rabies was proposed by Vietnam in support of elimination of rabies by 2020 in the ASEAN Member States. Vietnam as a leading country on rabies prevention and control hosted the ASEAN Inter-sectoral workshop on Rabies Prevention and Control to formulate an ASEAN Rabies Elimination Strategy as well as to identify regional activities for its operationalization.

In October 2013, under the facilitation of ASEAN Secretariat, AEGCD and ASWGL worked together to combine the animal and human regional strategies on rabies elimination.

This initiative is aligned with the regional goal of eliminating rabies in the ASEAN Member States by 2020 as stipulated in the 2008 ASEAN Call for Action towards Elimination of Rabies in the ASEAN Member States and the Plus Three Countries (China, Japan and Korea) by 2020.

C. Guiding Principles of the ASEAN Rabies Elimination Strategy

The ARES was designed following the international guidelines and standards on disease control, rabies diagnosis and vaccination, and animal welfare. Its design and implementation will also be guided by the following established facts and collated lessons learnt from various countries working on rabies control both in human and dog populations:

1. Call for Action for Rabies Elimination by 2020.
2. One health approach
3. Harmonization with other regulation, strategy and standard guidelines
4. Vaccination and PEP
5. Dog population management
6. Capacity building
7. Stake holder engagement

GOAL AND OBJECTIVES

Aspirational Goal

To control and eliminate rabies in ASEAN Member States by 2020 and to maintain region freedom.

The objectives are:

1. To increase ASEAN cooperation to eliminate[1] rabies and maintain rabies-free status in rabies-free areas of ASEAN.
2. To strengthen capacities of the Veterinary Services and Human Health Services to support technical activities that support rabies prevention and control.
3. To establish and continuously strengthen the coordinating and supporting mechanisms among stakeholders involved in rabies prevention and control.
4. To obtain and sustain high-level governmental engagement, providing an enabling political environment in support of rabies elimination initiatives that involve community, civil society, government and non-government sectors and international partners.

1 Elimination (interruption of transmission) is the reduction to zero of the incidence of rabies in a defined geographical area as a result of deliberate efforts; continued actions to prevent re-establishment of transmission may be required (source: Second WHO Report on Neglected Tropical diseases, 2013).

THE ASEAN RABIES ELIMINATION STRATEGY

The ARES builds on lessons learnt from the rabies control programmes in the region and the constraints identified by ASEAN Member States in previous meetings to develop the socio-cultural, technical, organizational and political (S.T.O.P.) pillars. The strategy provides directions to progressively develop these four pillars into a structurally sound foundation for the successful elimination of dog-mediated human rabies in ASEAN.

A. SOCIO-CULTURAL framework for rabies elimination

As a zoonosis primarily involving companion animals, involvement of a wide range of stakeholders—including the general public—is an important aspect of the rabies control strategy. Elimination strategies should be devised taking into account the socio-cultural context of the target human population. This means understanding the motivations of the various stakeholder groups who will need to work together toward rabies elimination. It also means understanding the potential challenges and tensions that may exist between various stakeholder groups when working on the prevention and control of rabies. Importantly, understanding the socio-cultural context will help communication planners to deliver the most appropriate messages to the communities that share a common view about the role of dogs.

As a general principle, any approach used should aim to protect animal welfare, animal health and human health. One of the most enduring and powerful approaches to change behavior involves integration of rabies programmes into the school curriculum for children. This is because longer-term behavior change in societies is often most effectively delivered via the young. In addition, many of the human deaths due to rabies occur in children less than 15 years old. In each of the elements below, consideration should be given to involving schools—or at least school age children—in these activities.

A1. Communication on rabies and rabies control efforts.

Supported by communication experts (including AEGCD, ASWGL Focal Points, and other International Agencies for communication from national Veterinary Services, Human Health Services and in collaboration with animal health experts, international agencies) the country should develop an audience-focused communication strategy. This will often involve a range of approaches to address any differences in socio-cultural context across the country.

The establishment of a multi-stakeholder committee that includes a very broad range of stakeholders will often quickly identify the range of approaches that may be necessary for a successful communication strategy. The strategy should seek not only to raise awareness, but also to persuade the public to take positive actions to prevent and control rabies in the community. Awareness campaigns should focus on explaining that rabies is a disease that can be prevented, and should highlight best practices for preventing rabies by dog vaccination. As part of the same awareness campaign, the public health risks associated with animal bites need to be covered. The critical importance of appropriate bite management and PEP should complement the messages about dog control and vaccination. The overarching objective of the communication strategy should be to translate research information into behaviour change in the community.

A2. Responsible pet ownership.

The country promotes responsible pet ownership that covers both providing adequate care for animals plus also exercising the duty as an owner to minimize potential risks to humans and other animals. This approach to responsible pet ownership also supports activities that are covered in the section dealing with dog population management (Section B5), particularly in reducing stray dog populations.

A3. Behavior change towards control of rabies in both animal and human health.

As dog ecology, animal welfare and animal health are closely linked to human behavior, plans should also be put in place for promoting positive behavior that creates a healthy environment for humans and animals alike. This approach should promote cooperation between animal and human health sectors in developing behavior change communication strategies for rabies prevention and control.

A4. Support the celebration of World Rabies Day.

September 28 is World Rabies Day; it is an initiative of GARC, started in 2007 to create a global opportunity for people to focus on rabies prevention and control. There are many activities implemented in AMS countries to use this day within September as a focal event. The day is a great opportunity to remind governments and the community about the devastating impact of the disease and call for action to fight against rabies. Concentrated efforts at this time around rabies can act as a catalyst to maintain momentum within all stakeholder groups. World rabies day can also be used to continue to foster closer inter-sectoral collaboration and cooperation.

B. TECHNICAL framework for rabies elimination

At the Member State level, important cornerstones of rabies control are good and competent Human Health and Veterinary Services, capable of addressing the technical needs that support rabies elimination. Rabies elimination involves the prevention and control of rabies in dog populations plus public health interventions to treat those humans who may have been bitten by a rabid animal. To effectively control rabies, the following technical areas, relevant to rabies control and eradication, should be in place, continuously strengthened, and bridged where there are gaps, in accordance with the provisions in OIE Terrestrial Code[2] and WHO documents that provide detailed guidance, such as the WHO Expert Consultation on Rabies from 2013[3]. GARC has prepared a very useful guidance document that brings together a comprehensive set of operating procedures for developing a programme for preventing human rabies[4].

2 see OIE Terrestrial Animal Health Manual at http://www.oie.int/fileadmin/Home/fr/Health_standards/tahm/2.01.13_RABIES.pdf and OIE Terrestrial Animal Health Code at http://www.oie.int/index.php?id=169&L=0&htmfile=chapitre_1.8.11.htm

3 see WHO Expert Consultation on Rabies at http://apps.who.int/iris/bitstream/10665/85346/1/9789240690943_eng.pdf

4 see at Canine rabies blueprint at http://canineraabiesblueprint.org

B1. Vaccination.

Dog vaccination is the most cost-effective single measure to protect humans from rabies. Completion of a mass dog vaccination drive, covering at least 70% of dog population, within the shortest period possible (e.g. within 1 months) is preferred. A well-prepared vaccination plan based on thorough understanding of the rabies epidemiology in target areas, and knowledge of dog ecology—including the degree of ownership (owned and confined, owned and roaming, community owned and ownerless)—must be documented. Procedures to estimate dog populations are well developed and available[5]. It is also critical to decide whether parenteral vaccination alone will be adequate to vaccinate the population of interest. In some cases, it may be necessary to include oral rabies vaccination approaches as part of the overall plan.

The plan should be shared and implemented so as to identify the most critical areas to target and the best time to undertake a vaccination programme. A detailed, logical approach to operationalise the vaccination programme also needs to be developed and documented. The programme plan should ensure that supporting funds, infrastructure and technical capacity are adequate to undertake the vaccination task. In addition, the programme plan should document a monitoring and evaluation procedure.

Post vaccination monitoring in rabies endemic settings should be carried out to ensure that sufficient vaccination coverage is achieved. Methods to estimate vaccination coverage are well described[6]. The importance of identification of vaccinated dogs becomes obvious when trying to assess vaccination coverage. If coverage is less than 70% of the total dog population in an area, further vaccination must be carried out in that area until 70% coverage is reached. Monitoring of the reduction in rabies incidence in the area targeted should also be carried out.

Once an animal infected with rabies has bitten a person, the only way to potentially save that person's life is to provide PEP and rabies immunoglobulin (RIG) coupled with proper wound management. Therefore, access to sites that can deliver the appropriate treatment in high-risk areas is critical. People in high-risk areas need to be aware of the importance of seeking prompt treatment and need to know where such treatment is available. Experience internationally has shown that in many countries most people who die from rabies are either poor and or are from ethnic minority communities. In both cases, lack of awareness coupled with poor access to treatment and lack of resources lead to human deaths from rabies.

Protocols for pre- and post-exposure prophylaxis are well documented and should be followed[7].

5 see at Canine rabies blueprint at http://canine rabiesblueprint.org

6 see Canine rabies blueprint at http://canine rabiesblueprint.org/5-4-13-How-can-the-level-of

7 see WHO Expert Consultation on Rabies at http://apps.who.int/iris/bitstream/10665/85346/1/9789240690943_eng.pdf

The vaccines used must be of high quality and meet international standards. For animal vaccines, the OIE code clearly details requirements for rabies vaccines. For human vaccines and RIG, documents from the WHO provide guidance on standards.

Appropriate storage of vaccines is important to maintain the quality and efficacy of vaccines. Appropriate storage must be maintained at all times.

B2. Surveillance and epidemiology.

Rabies should be notifiable in the entire country and cases reported to international organizations. The country should possess sufficient surveillance capacity for the early detection of rabies cases. A good understanding of the epidemiology of rabies in the country will assist in establishing a targeted and sensitive surveillance system. A robust system for the investigation and reporting of suspect rabies cases should be in place.

All dogs involved in human bite cases should be identified, quarantined for observation (i.e. for healthy dogs and cats) or euthanized for laboratory examination. If the animal dies or is euthanized, samples should be shipped and submitted to the laboratory for confirmation. Although wildlife rabies has never been confirmed in the region, surveillance to verify whether this is relevant to the local rabies epidemiology context may be considered.

All countries with rabies in ASEAN should develop an integrated bite case management (IBCM) protocol that details how communication and cooperation between human and animal health sectors will be triggered. All dog bite cases should be reported to responsible human health agencies to provide consultation and PEP if required. The IBCM protocol should also detail how follow–up joint investigations of dog bites cases and suspected animal and human rabies cases will be conducted.

Ideally, a dog bite registry should be established and maintained. This will become a key data collection source when reviewing the success of the rabies elimination strategy.

For countries and areas that are rabies-free, preparedness plans should be in place to quickly deal with any rabies incursion. A rapid, thorough and effective response will be the key in containing the disease and stopping any further spread.

B3. Laboratory diagnostic capability.

As there are neither gross pathognomonic lesions nor specific and constant clinical signs for this disease, accurate rabies diagnosis can only be made in the laboratory. The country should therefore have accessible, sufficiently equipped and trained laboratory personnel for standard rabies diagnosis following internationally accepted guidelines. For diagnosis in humans, refer to the WHO Expert Consultation on Rabies documentation[8] and for diagnosis in animals, refer to the OIE Manual[9].

8 see WHO Expert Consultation on Rabies at http://apps.who.int/iris/bitstream/10665/85346/1/9789240690943_eng.pdf

9 see OIE Terrestrial Animal Health Manual at http://www.oie.int/fileadmin/Home/fr/Health_standards/tahm/2.01.13_RABIES.pdf

Countries lacking adequate human diagnostic capacity may seek assistance and guidance from WHO Collaborating Centres on rabies. Countries lacking adequate animal rabies diagnostic capacity may seek assistance and guidance from regional experts based at OIE reference laboratories. Communication between personnel working at human health and animal health based diagnostic laboratories is encouraged. The IBCM protocol could clearly detail information sharing procedures between diagnostic laboratories and field staff working in both human and animal health.

B4. Access to quality pharmaceuticals including vaccines and immunoglobulin.

The quality of vaccines and immunoglobulin is critical to the success of any rabies elimination plan. The WHO clearly describes those pharmaceuticals that provide safe and effective pre- and post-exposure prophylaxis. In addition, the WHO details the classes of biological product available for passive immunization (i.e. rabies immunoglobulins). Rabies immunoglobulins are in short supply worldwide and new approaches involving the use of monoclonal antibody cocktails are being investigated for post-exposure prophylaxis. The OIE clearly details the requirements for the production of rabies vaccines for parenteral and oral use.

In addition to having access to high quality pharmaceuticals, a country should also have a mechanism, strategy, and/or a plan as to how it can gain access to quality rabies vaccines and diagnostic tests. These are critical elements to support the control and eradication of rabies.

For animal rabies vaccines, an option for ASEAN Member States would be to make a request to the OIE Regional Rabies Vaccine Bank for Asia (funded under the European Union Regional Cooperation Programme on Highly Pathogenic and Emerging and Re-emerging Diseases in Asia – HPED – Programme).

The cost and accessibility of human rabies vaccines is a constraint to preventing human deaths. In particular, it is critically important that PEP be much more accessible, especially in remote areas. This will mean that more sites with a capacity to deliver PEP will be required, especially in areas with high rabies incidence. Ideally, rabies vaccine should be available at these sites at all times. In some countries, options to make vaccine available for free to poor people in some areas could be investigated as a part of the overall country strategy.

Using the Intradermal Rabies Vaccination (IDRV) schedule can decrease the cost of rabies vaccination. The IDRV can be used for both pre- and post-exposure prophylaxis and it will save health ministries money.

People with significant occupational risk for rabies exposure should receive pre-exposure prophylaxis. This will include anyone who is at continual, frequent or increased risk of exposure to the rabies virus as a result of his or her residence or occupation. Specifically, laboratory workers dealing with rabies virus (or other lyssaviruses) veterinarians and animal handlers should be vaccinated. Animal handlers include people involved in dog population control or rabies vaccination programmes. In particular, dog-catchers should be vaccinated before commencing high risk activities in the field.

B5. Dog population management.

Rabies control can be one of the benefits of a robust and comprehensive dog population management plan. There is an extensive set of resources available to design and implement such plans[10]. In essence, humane dog population control is an effective strategy for reducing the turnover within a population and creating a healthy and sustainable population. This may assist in the delivery of a rabies vaccination programme. In some countries, the rabies vaccination and population control programmes are combined e.g. in Bhutan the Capture, Neuter, Vaccinate and Release (CNVR) programme seems to be delivering good results to date in eliminating rabies.

Population management involves all sectors of the dog population including owned and stray dogs. There is a great deal of planning and community engagement required before implementing a dog population management plan. Any dog population management plan must give full consideration to animal welfare. Promotion of responsible pet ownership and positive behavior upholding animal health as described under the socio-cultural pillar should also be highlighted as being complementary to this component.

B6. Monitoring and control of animal movements.

With shared borders and the constant movement of people and their companion animals between countries, dog rabies can easily be transferred from an infected country to another country. Countries should therefore have a mechanism to protect its borders from the entry of an infected animal. This will require both improving import control procedures for legally imported dogs and increasing screening to detect illegal dog imports. It will be critical to understand the likely drivers for illegal imports so that resources can be appropriately and efficiently allocated to this work. The prevention and detection of illegal imports is a very important challenge for countries that are rabies free.

Legal imports of animals should follow the OIE code requirements[11].

B7. Research.

National plans should be grounded on evidence-based strategies. For rabies control, operational research can be conducted during interventions (e.g. vaccination, dog population control) to collect, analyse and interpret data to better inform future strategies and policies. For human health interventions, research areas focused on PEP options and education and awareness strategies are relevant.

The main areas that have been identified for operational research include:

- KAP (knowledge, attitudes and practices) surveys;
- multi-disciplinary anthropological, socio-cultural, and economic studies;

10 see Canine rabies blueprint at http://caninerabiesblueprint.org/Guidelines-for-dog-population which includes link to http://www.oie.int/index.php?id=169&L=0&htmfile=chapitre_1.7.7.htm

11 see OIE Terrestrial Animal Health code at http://www.oie.int/index.php?id=169&L=0&htmfile=chapitre_1.8.11.htm

- dog ecology studies;
- dog population control studies;
- rabies vaccination in combination with dog population control studies;
- research into new, cost-effective biologicals and shorter PEP regimens; and
- studies to better define the economic burden of rabies in communities and countries.

C. ORGANIZATIONAL and ONE HEALTH framework for rabies elimination

Although various sectors, groups, and organizations may initiate rabies control initiatives, Veterinary Services and Human Health Services should take leadership in their overall coordination and promotion in the country. This will facilitate the streamlining of activities to effectively eliminate rabies. Importantly, a shared approach should lead to a more transparent and balanced distribution of available logistical and resource support. This will in turn support a coordinated, well-directed and tactical implementation strategy. For example, the integrated case bite management should demonstrate coordination on the ground where both sectors are involved every time a rabies case in a dog or a human is reported.

Nevertheless, the problem at source in the dog population must be the primary target to prevent human cases. This approach coupled with improved awareness, reporting and case treatment must involve the participation of regional, national, sub-national and other partners-including international organizations, non-government organizations (NGOs), private and related stakeholders. The work required to maintain and support these wide-ranging networks should not be under-estimated. It is the glue that holds the integrated strategy together. This work underpins the One Health framework, which explicitly recognises the interconnected nature of disease challenges that are rooted in the combination of socio-cultural, economic, policy and technical areas.

There is a need to formally engage with the broader group of stakeholders involved in any rabies elimination strategy. This can often most easily be achieved by creating a multi-stakeholder committee.

C1. Regional, National and Sub-National coordination.

At the regional level, the cooperation and leadership already shown in ASEAN between Ministries of Health and Agriculture is evidence that the One Health approach is being activated and implemented. This shared collaborative approach is relevant to many diseases in the region including neglected zoonotic diseases.

At the country level, the elimination of rabies will require numerous actions directed towards disease surveillance, diagnosis, control, and prevention, a good coordination mechanism led by a clear chain of command will be necessary within the Veterinary Services and Human Health Services. This will be critically important for the effective and strategic implementation of rabies control activities in the country.

Sub-national coordination will focus on the relevant elements—most often at municipal level—where local staff from a range of Ministries and the community will work together. This will include staff from human health, animal health, education, local government, NGOs and civil society.

C2. Inter-sectoral coordination.

As rabies is clearly a One Health issue, implementing control methods towards controlling the disease must involve—at the very minimum—genuine collaboration between animal and human health sectors. In the joint meeting of the AEGCD and ASWGL held in November 2012, it was reiterated that such close collaboration between animal health and public health is essential in the implementation of rabies control programme. In addition, in the 3rd FAO-OIE-WHO Zoonoses workshop held in Bali in November 2012, the development and strengthening of a national inter-sectoral coordination mechanism in Member Countries was one of the identified One Health priorities for the region. For some countries, this inter-sectoral coordination mechanism has since progressed. Ideally, the country's national inter-sectoral coordination committee for rabies should be subsumed under this broader One Health coordination mechanism for zoonoses and other One Health issues.

Another benefit of a joint inter-sectoral coordination approach is that it will be in a better position to more strongly advocate for the appropriate financial support for integrated strategies from the national government and international funding bodies.

C3. Public-private partnership.

A consistent rabies control strategy will benefit from the contributions, engagement and support of stakeholders across all sectors, including other government departments, the private sector and municipalities. A strong public-private partnership will provide a more enabling environment in establishing and sustaining vigilant measures against the disease. In some cases, a multi-stakeholder committee structure at sub-national levels will be of benefit. This will certainly be the case when pilot rabies programmes are implemented in geographically distinct areas. Making sure the right set of people from the relevant stakeholder groups are involved from the very beginning is essential.

It is worth noting that a number of countries have mature arrangements that bring together a wide range of public and private stakeholders as part of the rabies elimination strategy[12]. Other countries can certainly learn from the experience in other ASEAN Member States and adapt some of the approaches to suit their particular situation.

12 see ,The national rabies prevention and control program – the Philippines, at http://www.doh.gov.ph/sites/default/files/FINALMOP6.4.13WORDRADMay30.pdf

D. POLICY AND LEGISLATIVE framework for rabies elimination

D1. High-level political support.

Governments should recognise rabies control as a high priority zoonosis and ensure that its control is supported by national legislation or sub-national ordinance/decree, where applicable. Rabies has the highest case fatality ratio of all infectious diseases. Although the exact costs associated with the presence of rabies are difficult to establish (due to underreporting mostly), Governments need to recognise that much of the cost of rabies is associated with the loss of children's lives. The disease is preventable with current technology. All that is required is political will and adequate resources.

Once canine rabies is eliminated, the overall cost of PEP should decrease in the longer term. It must be recognised though, that in the short-term, costs associated with PEP will likely increase. This is because improving the awareness about the risks associated with dog bites should lead to increase demand for PEP. However, as rabies elimination proceeds via dog vaccination, and people are more aware of rabies and dog bite prevention, the demand for PEP should decrease. Economic studies conducted to date show that the benefits of rabies elimination are clear over a time frame of about ten years. The government can support programmes to improve understanding of rabies through advocacy, awareness, education and operational research.

As a neglected zoonotic disease, integrated approaches to prevent and control rabies at the human-animal interface make perfect sense. There is a need to leverage resources and commitment from National and International communities to eliminate rabies. A number of recent reviews have highlighted the feasibility of eliminating dog-mediated human rabies because effective and proven solutions exist now.

D2. Legislation and Enforcement.

Malaysia and Singapore have demonstrated that legislation regarding rabies prevention, control and eradication does help to reinforce programme implementation and render such initiatives sustainable. AMS should consider rabies control as a high priority and ensure that national legislation allows for rabies to be a notifiable disease. Legislation can also support strong prevention and control measures involving multi-sectoral agencies. Ideally, legislation should see that a programme is implemented sustainably. This will include legislation that covers the responsibilities of both government and people in terms of dog ownership, dog management, rabies vaccination and dog exports and imports. Some of the necessary legislation is often directed at sub-national levels. For example, in many countries local government agencies are responsible for the development and enforcement of legislation relating to dog ownership (e.g. registration, microchipping, vaccination, leash laws, abandonment) and the control of stray dogs (e.g. dog catching and shelters).

D3. Resource mobilization.

The elimination of human rabies is clearly possible with the appropriate inter-sectoral

coordination and technical, political and public support. Translating this support into action means mobilizing resources—both human and financial. The successful implementation of national rabies control programmes requires a multi-stakeholder approach with involvement of the local government, veterinary services, human health services, Education Department, other government departments including the Finance Department, NGOs and civil society.

Ideally, national strategies will be developed with clear descriptions of the roles and responsibilities of the various sectors involved. Importantly, a budget needs to be prepared so that resources can be mobilized to deliver the relevant components of the strategy. Political leadership at the highest levels will be required to gather the necessary support from across government for a rabies elimination plan. For many countries, the most direct way to achieve this goal is to establish an Intersectoral Coordination Committee or equivalent. Again, a number of ASEAN Member States have set up mechanisms such as this to support their respective rabies elimination programmes.

This pathway makes sense whether the programme is commencing as a pilot project or a more detailed national strategy. In each country, decisions will need to be made about which Ministry is the lead agency. In many cases, the Department of Health will be the lead agency, although much of the programme delivery will be controlled either via the Veterinary Services or Local Government/Municipal Authorities. Under the One Health framework, the critical element will be that all sectors are working together toward the common goal of rabies elimination. Working together means that regulations, strategies and guidelines are harmonized and aligned to contribute to this common goal.

Countries can take advantage of a range of resources that will assist in the development of a resource mobilization plan. In addition to seeking assistance for other ASEAN Member States that are currently conducting successful elimination plans (such as in the Philippines and Thailand), AMS can draw on documents published by a wide range of stakeholders including WHO, OIE, FAO, Asian Rabies Expert Bureau, World Animal Protection and the Global Alliance for Rabies Control. There is no lack of information or advice available about how to develop an integrated strategy. This ARES should act as catalyst for countries to advance in the direction of rabies elimination.

IMPLEMENTATION TIMEFRAME

Although the ARES goal extends to 2020, it is proposed that the Strategy be divided into three phases—Phase 1 (2014-2017), Phase 2 (2018-2020) and Phase 3 (2021-2023)— with the last phase being a post-elimination phase. This is because it is accepted that a number of ASEAN Member States may find it very difficult to achieve the aspirational goal of rabies elimination by 2020. However, reviews at the end of 2017 and end of 2020 will clearly highlight not only progress, but also the critical areas for improvement in each country. This will act to maintain political engagement and momentum toward rabies elimination in ASEAN.

Country level implementation

At the country level, the relevant activities within each of the phases of implementation will vary. This variation is determined primarily by a combination of:

- the current incidence and spatial distribution of rabies cases (this may be based on expert opinion as the disease is often under reported);
- the human capacity to implement components of the STOP pillars;
- the level of government commitment to rabies elimination; and
- the level of financial resources available and applied to rabies elimination.

For rabies free countries (Brunei, Singapore and Malaysia), the primary focus will be on maintaining freedom. Import controls and emergency preparedness planning will be the primary tasks.

For endemically infected countries, the level of progress will dictate the focus of activities within each phase. For countries that have mature rabies prevention and control programmes such as Indonesia, Thailand and the Philippines, phase one will likely focus on continuing the implementation activities that have already commenced. For other endemic countries, it will be more beneficial to implement one or two pilot rabies control projects in selected areas.

Pilot projects will allow countries to establish solid systems in each of the STOP pillars.
It makes no sense to embark on a national programme until the systems are functioning very well on a small scale in the pilot projects. The pilot projects allow the identification of problems, barriers or obstacles to implementation that need to be addressed. The lessons learned in this phase will ensure that the longer term scaling up process is more manageable and effective. For this reason—for some countries during phase one—only pilot projects will commence and be evaluated.

In any case, decisions about what activities will be undertaken within each of these phases are the responsibility of individual AMS.

OPERATIONALISATION OF ASEAN RABIES ELIMINATION STRATEGY

A. Implementation mechanism

At a sub-regional level, the implementation of this strategy will be coordinated by AEGCD and ASWGLunder the ASEAN Socio-Cultural Community umbrella, with support from the key international development partners and other international agencies.

The implementation mechanism will build on current initiatives to strengthen Veterinary Services, Human Health Services and manpower generally to address zoonotic diseases. This should include the following:

- Strengthening of infrastructure and good governance for the delivery of essential Veterinary Services, Human Health Services;
- Enhancing the number and skills of veterinary and public health manpower (including veterinary para-professionals and community health workers);
- Equipping veterinarians, public health workers with the system, facilities, tools, material and skills for preventing, detecting and responding to rabies outbreaks early; and
- Enhancing the surveillance system and accessibility to rabies vaccine.

Roadmaps for national and inter-country rabies control and elimination programs with country- and regional-level projects will be implemented through existing mechanisms. The collaboration with the relevant sectors at the animal-human health interface should be consistent and reflect an over arching One Health approach. Regional meetings will be organized for the elaboration of proposals for specific work plan/s and projects with institutional arrangements, mechanisms and identification of funding sources. This elaboration and implementation of work plan(s) will be carried out in collaboration with key international development partners and donor agencies. The collaborating organizations and sectors will detail specific mechanisms and organizational roles. The existing regional coordinating mechanism will oversee the commitments of agencies and the rabies control and elimination programmes in AMS.

B. Resource Mobilization at ASEAN level

An advocacy strategy will be developed to gain political, financial and legislative support to implement the Regional Strategy. The mobilization of funds will focus on mechanisms and sources at both country- and regional-levels (e.g. the continuation of project-/programme-implementation through grants from dialogue partners, conducting regular donor-consultations and setting up an collaborative arrangement of key international development partners for project implementation). Programme and project implementation will be carried out through national resources and multi-agency donor support. National rabies control plans will be developed, identifying the activities, roles, responsibilities, time-frame, and resource requirements to attract and coordinate funding from different sources as described in section D3.

C. Monitoring and Evaluation/Reporting of Outcomes

Monitoring and evaluation is integral to the implementation of the regional rabies elimination strategy. An M&E system, allowing progress to be monitored against the objectives, will be developed. An M&E plan, identifying responsibilities, time-frames for specific actions, and that keeps track of lessons learned through process documentation, as well as the reporting of findings and outcomes will be designed. Evaluation will include an assessment of factors that contribute to a partial or complete achievement of the programme/project objectives at country and regional levels. External and self-evaluation tools will be developed for this purpose.

At the regional and country levels, a number of indicators have been proposed that could be monitored over time. These include:

C1. Regional Level.

- Number of countries with a comprehensive rabies elimination programme and implementation plan
- Number of countries with human rabies surveillance with mandatory reporting
- Number of countries with zero human rabies case reporting
- Number of countries introducing IDRV with national guidelines and protocols
- Number of Regional Resource Centres supporting rabies elimination programme at Regional and country levels
- Number of countries with animal rabies surveillance with mandatory reporting
- Number of countries reporting at least 50% dog rabies cases with laboratory confirmation
- Number of countries estimating dog populations and having proper dog population control plans in place

C2. Country Level.

Input indicator

Human Health

- Budget allocated;
- Human resources available (medical service providers for PEP and vaccination); and
- Logistic (availability of vaccine, RIG, diagnostics).

Animal Health

- Budget allocated;
- Human resources available (dog vaccinators, dog catchers, social mobilisers); and
- Logistic (availability of dog rabies vaccine, diagnostics).

Performance indicator

Human Health

- Proportion of peripheral health facilities with availability of rabies vaccines and RIG and trained human resources
- Number of pre-exposure vaccinations delivered per year

- Number of people receiving post-exposure vaccination after dog bites
- Number of people receiving RIG after dog bites

Animal Health

- Number of dog samples received by rabies laboratory
- Percentage of dog rabies cases confirmed in laboratory
- Dog vaccination coverage
- Number of districts estimating dog populations and having proper dog population control plans in place
- Percentage of female dogs sterilized

Impact indicator

Human Health

- Number and incidence of human rabies per year
- Proportion of districts/provinces with zero human rabies case reporting

Animal Health

- Number of dog rabies cases per year
- Percentage of dog rabies cases confirmed in laboratory

Other indicators may be developed during the course of the ARES.

Appendix 1 – Rabies situation in each ASEAN country

1. Brunei Darussalam

Brunei Darussalam is free from a number of zoonoses, including rabies. As such, the country does not advocate rabies vaccination in animals, but continues to exert efforts to prevent the importation of such a disease and maintain its freedom from rabies.

2. Cambodia

Rabies is a major public health problem in Cambodia. Rabies has been included in the early warning system for the early detection, investigation and response, but the system still get a low number of detection every year.

There are some activities that happen every year, such as the yearly rabies day and discussions on the role and responsibility of institutions involved. Institute Pasteur in Cambodia (IPC) Phnom Penh has been the only source of free post-exposure prophylaxis (PEP) and post-mortem diagnosis since 1998. Consequently, diagnosis and treatment is more accessible to residents in Phnom Penh than those from other areas. For example, of the 14,475 patients receiving PEP in Cambodia in 2007, 95% were from Phnom Penh or its five neighboring provinces.

From 1998-2007 a total of 63 fatal human cases presenting encephalitis following a dog bite were reported, of which 73% were confirmed positive for rabies. During this period, IPC also tested a total of 1,255 animal brain samples, and 610 (49%) were positive for rabies. However, rabies rates in humans and dogs in Cambodia continue to be under-estimated. Every year, there are many patients with encephalitis following dog bites, but these patients are rarely hospitalized, die at home and are not captured in official statistics.

The National Veterinary Service does not have a rabies control programme. There is no data available about the dog population or vaccination coverage among dogs.

3. Indonesia

Rabies is present in 24 of 34 provinces in Indonesia, where dogs are the main reservoir. Although certain islands have been historically free of dog rabies, newly infected areas have emerged in the last five years: Bali (2008), Nias Island (2010), Larat Island (2010), Dawera Island (2012). The average number of recorded human cases per year in the last five years was 162 with 122 cases in 2008, 195 cases in 2009, 206 cases in 2010, 184 cases in 2011 and 137 in 2012.

Current rabies activities in Indonesia include: vaccination, rapid response and observation of rabies-susceptible animals, the delivery of information, education and communication (IEC) campaigns, surveillance, movement control, dog population management, capacity building, integrated bite case management and post-exposure treatment in humans.

Some of the key accomplishments include: (1) eradication of rabies in four provinces (Jakarta, Central Java, East Java, Yogyakarta) and maintaining five Provinces as areas being rabies-free; (2) coordination mechanism for priority zoonosis has been achieved and is in place; (3) successful reduction of animal and human rabies cases with an integrated

programme for rabies control (Bali); (4) better information sharing, coordination and action from Central to district levels in Bali and increased capacity for control through the Participatory Disease Surveillance and Respone (PDSR) programme.

Identified constraints include: (1) limited budget for Veterinary Services for rabies control activities; (2) limited human resource capacity (veterinarians and veterinary para-professionals) in terms of both quality and quantity; (3) cultural differences about how dogs are treated in different parts of the country; (4) difficulties in monitoring and controlling animal movement; and (5) chain of command from the central government to local governments not being properly executed.

4. Lao PDR

From 2004-2011, a total of 17 human rabies cases and 639 laboratory-confirmed animal rabies cases have been recorded in Lao PDR. The government considers rabies as one of the top five priority diseases for inclusion into their national strategy for zoonotic disease control programme, which is a joint collaboration between the Ministry of Agriculture and Forestry and Ministry of Public Health of Lao PDR.

Control measures are currently being implemented in Lao PDR with vaccination against canine rabies virus, but vaccination coverage remains very low. There has been no active surveillance programme for canine rabies, and human rabies cases are reported through event-based surveillance. Currently there is only one central animal laboratory in Vientiane that performs rabies diagnosis in animals. On average, the laboratory receives about 157 samples annually. Most samples are received from nearby provinces and some from provinces with good access to the central laboratory. In the last eight years, the average positive rate of submitted samples has been 51%.

Identified constraints on rabies control in Lao PDR include: (1) unclear rabies programme management; (2) limited human resources and experts to support policy, strategy and activity work plan development for animal and human rabies programme (3) limited rabies surveillance and information sharing; (4) limited financial support for vaccination, sterilization, and rabies research; and (5) lack of access to laboratory confirmation.

In September 2012, Lao PDR received 50,000 doses of vaccine from the OIE Rabies Regional Vaccine Bank funded by the European Union (HPED programme). The delivery of 120,000 additional doses is under preparation.

5. Malaysia

The last recorded animal rabies case in Malaysia was in 1999. The National Rabies Control and Eradication Programme was initiated by the Department of Veterinary Services in accordance with OIE standards in 1998 and no cases have been detected to date. With State and federal funding, Malaysia continues to implement initiatives that are relevant to rabies, including: annual dog licensing, an annual rabies vaccination programme and animal movement control in the immune belt, management of dog bite cases, and a national surveillance programme. The activities have been supported by sufficient legislation at local and national levels. Specifically, the Laws of Malaysia Act 647 (Animal Act of 1953) cover special provisions relating to dogs in connection with rabies. This includes licensing (Section 38), management of rabies-infected areas (Section 39), destruction or detention of an animal suspected to be infected with rabies (Section 40), detention of any dogs that have bitten a person (Section 41) and anti-rabies vaccination in dogs (Section 42).

6. Myanmar

From 2004 to 2011, 45 laboratory-confirmed animal cases were reported in Myanmar. Thirty-nine of these were from dogs, three from cats and one each from a cow, a horse and a pig. Human rabies cases in Yangon General Hospital (YGH) are estimated at 60 per year, with about 50,000 people bitten by rabid or suspected rabid dogs per year.

Identified constraints with regards to rabies control include: (1) Lack of a National Rabies Control Strategy; (2) low levels of public awareness about the impact of rabies and need for dog population control; (3) limited technical capacity on rabies, particularly laboratory and surveillance aspects; (4) limited funding for rabies control efforts; and (5) limited coordination and collaboration mechanisms.

7. The Philippines

Rabies is an endemic disease and remains as a serious public health concern in the Philippines. Many Filipinos are exposed to rabies and significant number of them developed rabies. In 2013, at least 522,4200 Filipinos were exposed to rabies of which 187 died due to rabies. From 2009-2013 alone, an average of 233 cases per year were recorded in humans while laboratory confirmed animal rabies cases had an average of 560 cases per year. Approximately 98% of animal rabies cases in the Philippines were found in dogs, while the remaining 2% is attributed to cats and other domestic animals.

The Philippines has the National Rabies Prevention and Control Program (NRPCP) mandated under Republic Act No. 9482 "An Act Providing for the Control and Elimination of Human and Animal Rabies, Prescribing Penalties for Violation Thereof and Appropriating Funds Therefor" or the Anti-Rabies Act of 2007. This Act defines a multi-agency effort in controlling and eliminating rabies in the country. Under the NRPCP, the National Rabies Prevention and Control Committee (NRPCC) was created with the Bureau of Animal Industry of the Department of Agriculture as Chair and the National Center for Disease Prevention and Control (now the Disease Prevention and Control Bureau) of the Department of Health as Vice-Chair.

Current rabies activities in the Philippines include mass registration and vaccination of dogs; establishment of a central database for registered and vaccinated dogs; impounding, field control and disposition of unregistered, stray and unvaccinated dogs; conduct of information and education campaign on the prevention and control of rabies; provision of pre-exposure prophylaxis to high risk personnel and post exposure prophylaxis to animal bite victims/rabies exposure; provision of free routine immunization or Pre-Exposure Prophylaxis (PrEP) of school children aged five to fourteen in areas where there is high incidence of rabies; and encouragement of the practice of responsible pet ownership. To reduce the incidence of animal bites and rabies in the country, the Departments of Health and Education developed the module on the " Integration of the Rabies Prevention Program into the Grade School Curriculum. This was initially implemented in Bicol Region and later on expanded and localized to some parts of the countries like Bohol. Pre- Exposure Prophylaxis is also provided to school children from high risk areas as provided for in the "Anti- Rabies Act of 2007". In 2008, the Philippines was selected by WHO as one of the 3 countries to implement the BM Gates Foundation supported Project for Human and Dog Rabies Elimination. The project, locally known as the " Rabies Free Visayas Project" was implemented in 2010 and will end in 2015. From 2008-2013, the Philippines has already declared fifteen (15) islands and localities as Rabies free zones.

In February 2013 and February 2014, with the assistance of the OIE Sub Regional Representation for South East Asia (SRR SEA), the Philippines also received 500,000 doses and 300,000 doses of vaccines respectively from the OIE Rabies Regional Vaccine Bank funded by the European Union-Highly Pathogenic Emerging Diseases Programme (EU-HPED programme). This vaccine was used for rabies control in Masbate and other selected provinces, with financial support for operations through the AusAID-funded STANDZ Small Grants Facility (SGF).

Rabies control in the Philippines continues to be challenged by various constraints including: (1) limited funding for programme implementation; (2) lack of support and commitment from local Chief Executives; (3) limited number of vaccines; (4) lack of awareness on rabies prevention and control; and (5) lack of support from other sectors.

8. Singapore

Singapore has been free from rabies since 1953. One of the last outbreaks recorded was in two dogs in May 1953, whose origin of infection was unknown. Compulsory vaccination on a limited scale was introduced, which effectively contained the disease. This success prompted legislation to be modified to cover provisions for dog movement, dog identification, quarantine and vaccination. Today, with multiple prevention strategies in place, Singapore continues to maintain its freedom from rabies, a disease that remains notifiable in the country. Singapore has established a contract with a rabies vaccine manufacturer to rapidly supply Singapore with rabies vaccines for mass vaccination of dogs and cats in case of reintroduction of rabies into the country. Singapore is also reviewing its rabies contingency plan in case of a rabies incursion.

9. Thailand

Rabies is considered to be an important zoonotic disease and public health issue in Thailand. Human and animal cases are recorded every year. Dogs remain as the main reservoir (90.05%), followed by cats (4.59%), cattle (4.38%) and other species (0.98%). Human rabies cases have steadily and dramatically reduced from the reported 370 deaths in 1980 (78/10 million population) to 7 in 2011 (1/10 million population). In the last three years, most cases were from bites of their own animals (74.42%), most of which had never been vaccinated (98%) and 32.5% were bites from puppies. The number of animal rabies cases in Thailand has also decreased from 4,263 cases in 1993 to 243 cases in 2011.

The Department of Livestock Development (DLD) and Department of Disease Control (DDC), and local administrative organizations are the main organizations, which implement rabies control activities. Such activities include immunization, dog population control, post-exposure treatment in humans, and public relations. Key accomplishments include: (1) development of guidelines for rabies free areas based on the criteria of the WHO and OIE; (2) development of a National Rabies Control Strategy; and (3) transfer of the rabies control strategy to a local administrative organization.

The major constraints on rabies control include: (1) limited vaccination not reaching the country's goal of 80% coverage; (2) issues concerning dog population management and control; and (3) lack of engagement by some local administrations.

10. Vietnam

Rabies is an endemic disease in Vietnam. From 1991 to 2010, there were 3,523 fatal human rabies cases and more that 40% of these cases were in people under 15 years of age. On average each year around 300,000 people receive PEP. In 2011 alone, 110 fatal human rabies cases from 20 of the 63 provinces were recorded. Two large outbreaks were recorded in recent years. One was in September 2010 where 165 suspected rabid dogs were found in 17 communes of Lao Cai province. A total of 156 locals were bitten and treated, three of whom died. Another outbreak was recorded in May 2011, when nine dogs in five communes of the three districts of the Lao Cai province were infected, biting 22 locals. This resulted in one death. Dogs account for 96.4% of the recorded rabies cases, while the remaining 3.6% were in cats.

In November 2011, the Ministry of Agriculture and Rural Development (MARD) endorsed the National programme on rabies control and elimination for the period 2011-2015. In recent years, the local government of mountainous areas in the North of Vietnam also reallocated budget to supply free rabies PEP to the poor and the minority ethnic people in this area. The main constraints to the rabies control and prevention programme in Vietnam include: (1) limited access to vaccination; (2) numerous scavenging dogs; and (3) lack of awareness about rabies by the poor and those in remote and mountainous areas.

Vietnam also received (in December 2012) 200,000 doses of vaccines from the OIE Rabies Regional Vaccine Bank funded by the European Union (HPED programme). An expert mission coordinated by the OIE/FAO Crisis Management Centre was also requested to visit Vietnam in May 2013 to assess the disease situation in the country and the control measures being implemented.