
Prevention and Control of Rabies in SAARC Countries

Report of the workshop
Colombo, Sri Lanka, 11–13 August 2015

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Acronyms

BCC	behaviour change communication
CNVR	catch-neuter-vaccinate-release
DALY	disability-adjusted life-year
dRIT	direct rapid immunohistochemical test
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GARC	Global Alliance for Rabies Control
HPED	highly pathogenic and emerging diseases
HIS	Humane Society International
IEC	information, education and communication
MDV	mass dog vaccination
MoH	Ministry of Health
NDPM & RCP	national dog population management and rabies control programme
NGO	nongovernmental organization
NTD	neglected tropical diseases
OIE	World Organisation for Animal Health
PAHO	Pan American Health Organization
PARACON	Pan African Rabies Control Network
PEP	post-exposure prophylaxis
REC	Rabies Educator Certificate Programme
RIG	rabies immunoglobulin
SAARC	South Asian Association for Regional Cooperation
SARE	step-wise approach towards rabies elimination
SDF	SAARC Development Fund
VBB	Vets Beyond Borders
WAHIS	World Animal Health Information System
WAP	World Animal Protection
WHO	World Health Organization

1. Introduction

Rabies has been identified by member countries of the South Asian Association for Regional Cooperation (SAARC) as a priority communicable disease of public health and economic importance (SAARC Rabies Consultation, Colombo, 2003; SAARC Rabies Meeting, Mysore, 2011; SAARC Technical Workshop on Highly Pathogenic and Emerging Diseases, Thimphu, 2011, and SAARC Rabies Meeting, Dhaka, 2013). The SAARC Health Ministers' meeting held in Malé in 2012 has recognized rabies elimination as a "regional public good".

The SAARC Region is one of the most densely populated regions of the world. All countries except Maldives are rabies endemic and the magnitude of the disease burden differs from country to country. More than 1.5 billion people are at potential risk of rabies infection in this part of the world. The SAARC countries contribute 45% of the global burden of human rabies.

Epidemiological trend of human rabies is stable due to the lack of political commitment and weak rabies control activities in high-burden countries. Each year, an estimated 4 million people receive rabies vaccination after being exposed to animals that are rabid or suspected of rabies in this Region. The economic impact of rabies in livestock production is considered high but surveillance data are missing. Existence of large number of dogs in densely populated urban areas in the absence of effective dog population control and rabies vaccination activities only aggravates the disease situation. Sri Lanka has registered a sharp decline in the number of human rabies deaths through mass dog vaccination campaigns, improved accessibility to human post-exposure prophylaxis (PEP), and an effective vaccine delivery system. All SAARC countries except Pakistan have phased out production and use of nerve-tissue rabies vaccine by introducing tissue-culture rabies vaccine or cost-effective intradermal rabies vaccination.

A Global Conference on Rabies Control held in Seoul in September 2011 recommended control of rabies at the source and appealed to

international partners and donors to support countries in need of funding to initiate and sustain control programmes for rabies. Elimination of human rabies is feasible and sustainable if rabies is controlled at the source that is, the dog. The rabies elimination programme focused mainly on mass vaccination of dogs, which is largely justified by the future savings on cost of human post-exposure rabies prophylaxis (WHO, 2013). Partner organizations namely the Food and Agriculture Organization of the United Nations (FAO), World Organisation for Animal Health (OIE), World Health Organization (WHO), World Animal Protection (WAP), Humane Society International (HSI) and Vets Beyond Borders (VBB) are supporting rabies endemic countries of the SAARC Region to institutionalize a comprehensive rabies control/elimination programme using the “One Health” approach. The annual event of ‘World Rabies Day’ in SAARC countries since 2006 has had a positive impact on rabies awareness and education at the policy, professional and public levels.

Regionally coordinated efforts are necessary for elimination of rabies on a sustainable basis. The feasibility of rabies elimination has been demonstrated through implementation of the regionally coordinated rabies elimination programme by the Pan American Health Organization. Regional cooperation and political commitment are prerequisites for successful elimination of rabies as a public health problem, especially when endemic countries share common land border and socioeconomic activities take place in cross-border territories.

Considering the magnitude of the rabies problem and the need for coordinated activities to eliminate rabies in the SAARC Region, the Government of Sri Lanka hosted a SAARC-level workshop on rabies elimination in 2003, which recommended the formulation of regionally coordinated rabies elimination activities under the auspices of the SAARC Secretariat. The WHO Regional Office for South-East Asia has been advocating for a regionally coordinated rabies elimination programme in the SAARC Region.

SAARC countries requested WHO to draft a ‘SAARC Rabies Elimination Project’ during the SAARC technical workshop on highly pathogenic and emerging diseases (HPED) in Thimphu in August 2011. The draft proposal was discussed during the SAARC Consultation on Epidemiological and Laboratory Networking held in Colombo in March 2012, and Sri Lanka was identified as a lead country. The SAARC Health Ministers’ meeting held in Malé in April 2012 recommended the

finalization and submission of the project proposal to the SAARC Development Fund for consideration. FAO, OIE and WHO facilitated the development of the 'SAARC Rabies Elimination Project' by SAARC Member countries in 2012, which is a first milestone towards regional cooperation. FAO came up with a step-wise approach for rabies elimination, and OIE has established a regional dog rabies vaccine bank, which is accessible for rabies endemic countries. The WHO Regional Office for South-East Asia has also developed a regional strategic framework for elimination of human rabies transmitted by dogs in the South-East Asia Region.

In the light of recommendations of the SAARC-level rabies consultations and meetings, it is the right time for SAARC Member countries to develop a roadmap for rabies elimination on the basis of a regionally coordinated rabies elimination initiative, which aims at elimination of rabies as a public health problem by 2020. The roadmap is planned to identify technical and resource gaps and explores the possibility of international partnerships and resource mobilization. This exercise will provide opportunities for mapping of regional resources and expertise, and building national capacity for planning and execution of a comprehensive rabies elimination programme through training and sharing of expertise and best practices. It will contribute to operationalize the "One Health" approach to tackle other public health problems of regional importance, which require multidisciplinary and multidimensional approaches.

The rabies workshop for SAARC countries held on 11–13 August 2015 in Colombo at the request of the Ministry of Health, Sri Lanka to discuss the future dimensions of the SAARC Rabies Elimination Initiative with international partners. The workshop also aimed at developing a roadmap for rabies elimination by rabies endemic countries of the SAARC Region. FAO, OIE and WHO in collaboration with World Animal Protection and Global Alliance for Rabies Control (GARC) provided technical and financial support to this workshop.

2. Objectives of the workshop

The objectives of the workshop were to:

- review the rabies situation and control activities and identify gaps in rabies elimination and share best practices and lessons learnt in rabies control/elimination in SAARC countries;

- update global and regional initiatives for rabies awareness, and bolster education and partnership for rabies elimination;
- discuss the ‘SAARC Rabies Elimination Project’ proposal for submission to the SAARC Development Fund or potential funding agencies; and
- draft national roadmap elements for rabies elimination by individual SAARC countries for the next four years.

3. Opening session

Dr Palitha Gunarathna Mahipala, Director General of Health Services, Sri Lanka, inaugurated the workshop. The opening session commenced with the lighting of the ceremonial lamp followed by the national anthem.

Dr Jacob Kumaresan, WHO Representative to Sri Lanka, delivered the welcome address at the workshop. Dr Kumaresan also delivered the message of the WHO Regional Director for South-East Asia. The Regional Director thanked the Government of Sri Lanka for hosting this workshop in Colombo and welcomed all participants. She also emphasized on the global and regional burden of rabies, especially the fact that SAARC countries contribute 45% of the global burden of human rabies. She noted the importance of strong political commitment and the presence of sound control activities for the elimination of rabies. The Regional Director reiterated the commitment of WHO and partner organizations towards supporting rabies endemic countries of SAARC to institutionalize a comprehensive rabies control/elimination programme using the One Health approach. She wished everyone a very successful meeting and hoped that the experience and knowledge of international rabies experts and sharing of best practices from other regions and countries will be helpful for SAARC countries to draft a roadmap for rabies control and/or elimination by 2020.

Dr Katinka de Balogh, representing FAO, welcomed all participants and thanked the Government of Sri Lanka for hosting the workshop. She advocated the “One Health” approach and stressed the importance of intersectoral collaboration.

Dr Hirofumi Kugita, regional representative of OIE, reiterated the commitment of OIE towards rabies elimination. He also stressed upon the need to ensure high coverage of dog vaccination in the community. This

would reduce the rabies incidence and contribute towards reducing the use of PEP in humans. He also mentioned that OIE has developed a vaccine bank for global use. He thanked the Government of Sri Lanka and wished the participants a fruitful workshop.

Ms Fathimath Najwa, representing the SAARC Secretariat, stated that rabies was considered important and highlighted how rabies still remains a neglected tropical disease and a major health problem in the SAARC Region. She also emphasized that WHO and SAARC collaboration is a great platform for rabies elimination and wished that the workshop would provide an ideal opportunity to discuss issues, share views and go forward.

Dr RPM Pathiratne, Additional Secretary, Ministry of Livestock Development, Sri Lanka, thanked all participants for the opportunity to conduct the workshop in Sri Lanka. He reiterated the need for such a workshop in the Region as rabies is endemic in most countries and is a burden to the human and animal sector. He highlighted the great progress made by Sri Lanka and outlined some challenges as well. He stated that the animal health sector became involved in rabies control in Sri Lanka since 2012. He thanked the OIE for providing 300 000 vaccines and also acknowledged the tripartite (FAO, OIE and WHO) role in assisting the animal health sector of Sri Lanka in capacity-building.

The Chief Guest, Dr P.G. Mahipala, in his address stated that Sri Lanka is extremely privileged to host this workshop. The workshop would provide the necessary focus in progressing towards rabies elimination by 2020. He stated that Sri Lanka has witnessed a gradual reduction in human rabies deaths over the years, though it has not yet achieved the expected 70% dog vaccination coverage. Hence, the PEP still remains a key strategy for rabies prevention and control, resulting in high costs. He emphasized the importance of team work and intersectoral coordination. He wished fruitful deliberations and hoped for a productive outcome.

4. Session I: Setting the scene

4.1 Rabies case for global elimination: Dr Bernadette Abela-Rider

WHO has identified rabies as one of the neglected tropical diseases. Neglected tropical diseases contribute to over 20% of the infectious disease burden globally. The roadmap for rabies elimination, it is identified for elimination in the Region of the Americas in 2015 and the South-East Asia and Western Pacific regions in 2020. The purpose of rabies elimination in endemic countries is to achieve zero human deaths. Dog mediated rabies is endemic in most Asian and African countries whereas only few countries having it as endemic with control in the Region of the Americas.

The European Region and Australia are currently free of dog-mediated transmission. FAO, OIE and WHO are in a tripartite collaboration for the elimination of rabies. This collaboration is mutually engaging in a coordinated effort to solve animal and public health risk attributes for zoonosis and animal diseases. The tripartite collaboration, in itself, is a cross-sectoral partnership with shared goals and works with a high degree of negotiation, interactivity and interdependence. In addition to the tripartite, it is important to mutually engage and coordinate with other sectors such as education.

For rabies control and prevention, it is important to have an enabling environment where the “One Health” concept is practised at the international, regional and national levels and a legislative framework along with communication and advocacy are available. It needs to be done with collaboration, accountability and sustainability and should be country led, regionally grouped and globally aligned. Technical capacity in areas of dog vaccination, bite prevention, responsible dog ownership, surveillance and PEP needs to be developed through resource allocation, training and capacity-building. Small projects have gradually shown effective results, ensuring expansion and promoting government funding. The success of these measures has ensured that they developed and evolved in to larger and sustainable programmes and activities. Therefore, it is important to at least start small to make a case. Previous experience and lessons learnt have demonstrated the importance of thinking big, starting small and scaling up. It is also important to keep the key players such as the community engaged, as they are the essential building blocks to elimination.

Surveillance information could be used for making a case for advocacy. For example, demonstrating decreased dog bites through responsible dog ownership, resulting in decreased PEP, saves money and also decreases rabies. This would also make a strong case for advocacy to governments. Surveillance data needs to be used for planning, monitoring, evaluation and verification. It helps in knowing the extent of the problem and facilitates breaking the transmission in high-risk communities and corridors. Surveillance also helps in forecasting of vaccine needs (animal and human), monitoring and evaluation of interventions, and their impact.

A global conference is scheduled in December 2015, with the participation of the FAO, OIE, WHO and international partners in Geneva on the theme ‘Global elimination of dog-mediated human rabies – The Time Is Now’. The objectives of the conference are as follows:

- to share the proof of the concept that dog-transmitted rabies can be eliminated;
- to build support for investment;
- to promote a “One Health” intersectoral collaboration approach; and
- to shape the forward vision agenda with shared purpose, including of donors and stakeholders, for the elimination of dog-transmitted human rabies.

The theme “Freedom from dog-mediated human rabies is a global public good” is the rationale for case investment for rabies control and prevention. Rabies is a disease which disproportionately burdens the poor rural communities, highlighting an equity issue. In spite of rabies being a preventable disease with its elimination being feasible, it continues to kill humans. Dog vaccination can help eliminate dog-mediated rabies, and post-exposure prophylaxis is a lifesaving intervention. These are key messages in building a case for investment in rabies. WHO, FAO, OIE and GARC have united to eliminate human rabies and control the disease in animals.

4.2 OIE standards, guidelines and reference laboratories for rabies control: Dr Yooni Oh

The general mandate of the World Organisation for Animal Health is to improve animal health and animal welfare worldwide. One of the main objectives of OIE is to ensure transparency in the global animal disease situation, including zoonosis. All OIE Member countries have an international commitment to notify and provide epidemiological information on diseases specified by OIE. The official notification reports of OIE include six-monthly reports on presence or absence of certain conditions, animal reports and wildlife reports. In addition, reports such as immediate notification, follow-up reports and final reports are requested for OIE's monitoring and early response system for rapid response. The World Animal Health Information System (WAHIS) is one official single source used by all Member States to upload information, and it serves as an important early warning and a monitoring system.

Rabies still kills despite being 100% preventable and mainly affects children in poor rural areas of Africa and Asia. Freedom from dog-mediated human rabies is a global public good, and elimination is feasible with current tools. The Terrestrial Code to improve terrestrial animal health and welfare worldwide, including safe international trade, and a Terrestrial Manual to provide internationally agreed diagnostic laboratory methods and requirements for the production and control of vaccines and other biological products is developed and made available by OIE reflecting OIE standards. The Terrestrial Code of OIE has a chapter on general provisions, control of rabies in dogs, or a rabies-free country, and recommendation for importation. The aim is to mitigate the risk of rabies to human and animal health and prevent the international spread of the disease.

OIE international standards on rabies and relevant information such as rabies notification and surveillance are available on the OIE website. The section on control of rabies in dogs focuses on notification, surveillance, prevention and control, and management of stray dogs including welfare and sustainability. For the purpose of self-declaration of a rabies-free country by a Member State, the disease should be notifiable and ongoing surveillance needs to be present for at least the past two years. Preventive measures have to be in place and there should be no indigenous or imported case for the past two years.

Recommendations for importation are given by OIE in the Terrestrial Code. This includes recommendations for importation of dogs and other animals from rabies-free as well as rabies-infected countries. The manual for diagnostic tests and vaccines for terrestrial animals, published by OIE enumerates diagnostic techniques and requirements for vaccines for relevant diseases including rabies. Control of stray dog populations addresses the humane methods for the control of dog populations and prevention of important zoonotic diseases such as rabies and hydatidosis.

Dog ecology is a key area in rabies control. It is linked with human activities and the control of dog population has to be accompanied by changes in human behaviour. Dog population control takes into consideration the different types of dog population and not merely the numbers. For example, having responsible dog ownership ensures less stray dogs, resulting in fewer incidents of rabies. Control of dog population and dog ecology needs a dedicated programme. Various factors such as identifying the sources, estimating the existing numbers, distribution and ecology of stray dogs need to be considered. Rabies control measures such as vaccination, environmental control, and regulation of dog shelters need a regulatory framework and resources such as human resources, financial resources, tools, infrastructure and good public-private-NGO partnerships.

Dog population management programmes also need involvement of multiple stakeholders such as the state veterinary services, public health authorities, dog owners, local governments, international organizations and mass media. Control measures need to be applied considering the national context and local circumstances. Control measures include education and legislation for responsible ownership, dog registration and identification (licensing), reproductive control, environmental controls, control of dog movement, regulation of commercial dog dealers, reduction in dog bite incidence and euthanasia. Euthanasia alone is not an effective control measure and, if used, should be done humanely and in combination with other measures for long-term control.

Rabies outbreaks and cases in domestic animals reported to OIE from South Asia in 2014 demonstrated that India had the highest number of reported outbreaks (243) and rabies cases. A total of 2149 cattle cases, 3226 goat and sheep cases, 2588 dog cases and 119 buffalo cases have been reported by India. The SAARC Region has reported more than 5500 livestock cases and 2500 dog cases. Of the eight SAARC countries, there is no information from Bangladesh and Pakistan.

Only few countries in the South Asia Region are reporting the status of rabies in wildlife. In 2014, four countries (Afghanistan, Bangladesh, India and Nepal) did not provide information in this regard. Pakistan and Sri Lanka have indicated the presence of rabies in wildlife and Bhutan reported the rabies status in wildlife as absent. The delegates nominated a National Focal Point for Animal Disease Notification. The focal point is responsible for gathering animal health information and submitting it to OIE through WAHIS. The focal point works very closely with the OIE Animal Health Information Department and participates in WAHIS trainings. The national focal point for wildlife helps focal points for animal disease notification by providing them information on OIE-listed diseases in wild species, verifying data in the six-monthly reports for wildlife, and preparing annual reports. The national focal point for rabies should coordinate with delegates and focal points for better notification to the OIE through WAHIS.

The scientific network of OIE serves as a reference centre and supports Member countries in solving scientific and technical problems relating to various issues or diseases including rabies. The network also provides scientific and technical training and coordinates scientific studies in collaboration with other laboratories or organizations. As of May 2015, the scientific network of OIE had 49 OIE collaborating centres in 26 countries on 46 diseases or topics. It also has 252 reference laboratories spread across 39 countries on 118 diseases or topics.

The OIE rabies vaccine bank for dog vaccination is a great asset in rabies control. Vaccine banks help to guarantee high-quality vaccines complying with international standards. It also facilitates direct purchase by countries or donor funds (multi-donor trust fund) and ensures cost reduction per vaccine unit thus leading to economies of scale. Hence, the vaccine banks help in reducing administrative delays and costs, and give the countries incentive to engage in dog vaccination. Though the European Union funded Highly Pathogenic Emerging Diseases (EU-HPED) programme was completed in December 2014, the vaccine bank mechanism still exists and continues to operate with funds provided by countries or other donors. Up to March 2015, the OIE rabies vaccine bank has delivered over 3.7 million doses of canine rabies vaccine across Asian countries.

4.3 Step-wise approach towards (dog-transmitted) rabies elimination (SARE): Dr Katinka de Balogh

Rabies control requires a multidimensional approach, especially cooperation between animal, human health and wild life sectors. It is an ideal example of the One Health approach.

Rabies control requires different actions to be undertaken in the animal and human health field and also requires political will for its success. For example, some activities such as surveillance and laboratory diagnostics are conducted by both the animal and human health sector while dog vaccination is by the animal health sector and post-exposure prophylaxis by the human health sector alone. Both sectors need to coordinate and exchange surveillance and other relevant information among them. Municipality and community involvement is very important in the modern context.

The global rabies burden is a public health concern. Large scale under-reporting of rabies may exist, masking the true burden of the problem. It is also inextricably linked to poverty. Due to the competing priorities in the current global scenario it is not given the required prominence. Challenges such as lack of available and accessible PEP and low vaccination rates for dogs exist.

When comparing current data from Africa, Latin America and Asia, it is clearly revealed that investments in mass dog vaccination provide a cost-effective approach to human rabies prevention.

When rabies breaks out in countries or within municipalities, it is often accompanied with fear and political and social pressure. Lack of resources, lack of available and accessible PEP, low vaccination rate of dogs and lack of clear rabies strategy and procedures are also observed

The goal of the step-wise approach towards rabies elimination is to provide a structured approach and tools, enable countries to define the “stage” of rabies control they are in, provide defined “keys” to move to the next stage (measure progress), and indicate links to relevant sections of the rabies blueprint.

The step-wise approach has six stages to move from rabies endemic to free from human rabies transmitted by dogs. A list of achievements, which

are identified as keys, is essential to move to the next stage. The six stages are identified as stage 0 to stage 5. Various themes are considered for evaluating achievements and activities. Stage 0 is when rabies is suspected to be present in a country but no information on rabies is available.

The key to move from stage 0 to stage 1 is to ensure reporting of rabies in any species to international agencies. Stage 1 is when a country has an assessment of local rabies epidemiology and elaboration of a short-term rabies action plan. Stage 2 involves the development of the national rabies prevention and control strategy. The key to move from stage 1 to stage 2 is the presence of a functional intersectoral rabies task force, and rabies being made a notifiable disease. Stage 3 envisages the full scale implementation of the national rabies control strategy. Stage 4 involves maintenance of human rabies freedom and elimination of dog rabies. Stage 5 is achieved when a country is free from human and dog transmitted rabies in the presence of an effective monitoring system. The key to move from stage 4 to stage 5 is to have no dog-to-dog transmitted rabies for a consecutive 12 months.

Although these stages and keys are stated in general, a description of each stage and the key to move from the given stage to the next higher level is given in detail on the website under different themes. The themes considered for the activities and achievements are legislation, data collection and analysis, laboratory diagnosis, information, education and communication (IEC), prevention and control, dog population-related issues and cross-cutting issues. Therefore, identifying the current stage of a country and assessing the movement of each country from one stage to another through identifying keys (achievements) is a detailed and well-established process. In addition to identifying the stage and expected achievements for moving to each stage, the website gives an opportunity to identify weaknesses to be rectified for each theme.

In summary, it should be noted that step-wise approach has been developed to assist countries to progress with their rabies prevention and control activities. It is a structured approach, linked to the rabies blueprint, which can serve as the basis for the national rabies roadmaps. SARE as a tool is made available at caninerabiesblueprint.org.

4.4 Global Alliance for Rabies Control, international partnership and networking: Dr Louis Nel

Rabies is a disease that affects neglected populations. It lies within a “circle of neglect”, which is compounded by poor laboratory diagnosis. Rabies control needs a “One Health” approach, and this needs to be essentially meaningful. To be meaningful it has to unite the global community and all stakeholders in rabies control activities to complement each other’s role and responsibilities. It is important that we look beyond the general community that is involved with rabies and make others aware too.

The global rabies elimination campaign needs improved coordination and can make things happen by taking positive steps and initiation. Tools which are used, need to be tested and feedback used for ensuring improvement. A self-assessment of the countries on their current stage in relation to the SARE tool was done at the Pan African Rabies Control Network (PARACON) meetings. Similar feedback from other countries would be helpful in improving the tool.

Different interventions need to be assessed for cost-effectiveness. The Bi economic model will make a case for cost of intervention, thereby affecting the cost-effectiveness. The model will indicate as to the current cost of rabies control and future prospects with different interventions.

4.5 Rabies situation in SAARC countries: Dr Gyanendra Gongal

SAARC is an economic and geopolitical organization of eight countries of South Asia. SAARC nations comprise 3% of the world's area and 21% (around 1.7 billion) of the world's total population. Within the SAARC group, India makes up over 70% of the area and population.

SAARC countries contribute 45% of the global burden of human rabies and more than 1.5 billion people in these countries are at potential risk of the disease. More than 95% of all human rabies cases in the SAARC Region are attributed to dog bites. The mongoose, jackal and fox have been involved in rabies transmission in rural areas and may serve as a wildlife reservoir. The economic impact of rabies on the livestock production in the Region is also considered high.

Based on an estimated number of human cases, Afghanistan has the highest incidence at 5.7 per 100 000 population followed by India with 3 per 100 000 population. India has the highest estimated human rabies deaths, or about 18 000–20 000 deaths per year. Maldives is the only country in the Region that has no cases of endemic rabies. In most countries in the Region, the majority of rabies is due to dog bite.

Up to now, all countries in the Region have stopped using nerve tissue vaccine for PEP, except Pakistan. Pakistan has committed to stop production and use of nerve tissue vaccine by December 2015. Sri Lanka was the first country to stop this vaccine in 1995, followed by Bhutan in 1998. The introduction of cost-effective intradermal rabies vaccination in SAARC countries was a driving force to phase out nerve tissue vaccine. It is important to note that there will be no country in the SAARC Region producing and using nerve tissue vaccine beginning from 2016. This is a great achievement.

A rabies questionnaire survey for countries was conducted through a standard questionnaire adapted from the GARC/PARACON model. FAO, OIE and WHO agreed to modify it to consider region-specific issues. The questionnaire has rabies diagnosis, rabies surveillance system, dog bite, human rabies, animal rabies, legislation and policy support, prevention and control, rabies outbreak investigation and response, cross-cutting issues and IEC as content material.

However, there are limitations of the questionnaire survey. The survey depends on existing infrastructure and resources. There is limited access to factual data and information resulting in incomplete data.. Some information was also not available from the government (human and animal health sectors).The outcome of the survey relies on data provided by national authorities and we have no means to verify the functional status of available information. Professional judgment and bias may prevail in some instances and large countries may have limitations in accessing data and information as it is often fragmented.

It is important to assess different areas of rabies control in the SAARC Region. Legislation and policy regarding rabies is an important area. The Rabies Control Act is non-existent or outdated in most countries and the legislation for dog registration, compulsory dog vaccination is non-existent or not enforced. Of the seven SAARC countries, the national policy and strategy for rabies control/elimination does not exist in four countries.

Rabies is not notifiable in most countries and if it is notifiable, it is not functional in technical terms. Different stakeholders are involved in rabies control and they often work in isolation and dog rabies control is underfunded or not prioritized by the animal health sector.

Surveillance and laboratory diagnosis is another key area. Among countries of the Region, human and animal rabies is notifiable in two countries and not notifiable in five. Most human and animal rabies cases were reported on clinical background in all countries. No standard surveillance system exists in most countries. Public health laboratories in most countries have no rabies diagnostic facility. Veterinary laboratories are active in rabies diagnosis, and rapid diagnostic test is used at the peripheral level. Though adequate laboratory professionals have been trained, the retention of trained manpower is a problem. Dog rabies surveillance does not exist in six countries.

Human rabies prophylaxis is an important area for rabies control. All countries in the Region use rabies vaccine of tissue culture origin or egg embryo origin. The high cost along with availability and affordability issues of rabies vaccine for intramuscular use are a challenge, and cost-effective ID vaccination schedule has been practised in Bangladesh, India and Sri Lanka. WHO has facilitated training on application of intradermal rabies vaccination in Afghanistan, Bhutan, Nepal and Pakistan. The number of people taking PEP is increasing every year in all countries. The use of rabies immunoglobulin (RIG) is limited even in category-III bites in most countries due to various factors.

Rabies vaccine and quality control is also a critical area. Although the drug regulatory authorities are responsible for vaccine quality control it is rarely done for rabies vaccine. In countries of the SAARC Region, rabies vaccine is purchased following the government procurement policy and managed by the logistics unit. Among SAARC countries, only India produces commercial rabies vaccines, which are marketed in neighbouring countries. Shortage of vaccine and RIG and delay in release of government budget are key challenges in this regard.

Dog rabies control is not a priority programme under the animal health and is underfunded. In most countries, dog rabies control is the responsibility of different stakeholders. However, the availability of dog rabies vaccine from OIE is an incentive to initiate dog vaccination

campaigns by the animal health sector. In some countries, animal birth control is better funded than the mass dog vaccination programme.

Dog vaccination coverage is important for assessing herd immunity among the dog population. However, the dog population of the country should be known to assess the coverage correctly. The size of the dog population is still unknown and no standard methodology is available in most countries of the Region. Further, dog registration and vaccination are not mandatory in most countries. House-to-house and fixed point vaccination is launched after public awareness campaigns in countries of the Region. The dog vaccination coverage is not satisfactory in most countries. The increasing stray dog population along with paucity of human resources and logistical problems can be attributed as the reason behind low dog vaccination coverage.

Though an intersectoral coordination committee exists in some countries at the central level, it is non-existent or non-functional in most countries, and joint outbreak investigation and response is rarely done. A comprehensive rabies control programme exists in three countries, but there is no ownership of dog rabies control in two countries of the Region. The study on burden of rabies was carried out in a systematic way in Bangladesh, India and Pakistan under the technical support of WHO. The One Health movement and World Rabies Day have been used as a platform in all SAARC countries for joint rabies control activity at the national level with transient success.

Rabies is not a priority disease and is considered a public health issue in the Region. Key issues in rabies control activities in the Region are:

- lack of disease surveillance and laboratory diagnosis facilities;
- inadequate data and information;
- lack of ownership of dog rabies control activities;
- cost and sustainability of dog population management;
- difficulty in conducting intersectoral coordination; and
- lack of public cooperation.

To improve rabies control and prevention in the Region, rabies should be a notifiable disease and a functional surveillance system with laboratory

backup should be established for it. In addition, each SAARC country should develop a roadmap for rabies elimination/control considering the country-specific situation. A regionally coordinated rabies elimination programme should be made available to guide SAARC countries, including the rational use of available resources and expertise. Priority should be given for mass dog vaccination and public awareness with the involvement of major stakeholders. The key message that “everyone can contribute in rabies control/elimination” should guide the way forward for rabies control in the SAARC Region.

5. Session II: Getting to know each other

5.1 Guided poster viewing session: Dr Mary Joy Gordoncillo

Guidance for poster presentation was circulated prior to the meeting. All participating countries had posters displayed for the poster session. A guided and interactive poster presentation was organized with all participants being divided into four groups. Each group was requested to look at all posters and identify the key issues for their responsible area. The four areas identified were rabies surveillance, coordination mechanisms, good experiences and lessons learnt, and major challenges and possible solutions. Guided questions for further group discussions were provided for each area. Following the guided session, each group presented their key findings to the forum. These presentations provided the platform for the plenary session to discuss good practices and lessons learnt for rabies control/elimination. They also served as a catalyst to develop the roadmap for rabies elimination.

5.2 Intersectoral collaboration in rabies elimination in the Philippines and the use of vaccine bank (presentation made through Skype): An animal health expert from the Philippines

The National Rabies Prevention and Control Committee at the national level and the quarterly meetings with regional rabies coordinators are used as platforms to discuss the distribution and use of vaccines. In 2014, a rabies stakeholder forum meeting was held, which included private–public partnerships, and the involvement of drug companies.

The Philippines has a Zoonosis Interagency Committee, which is utilized for discussions and advocacy on rabies. Intersectoral collaboration is also strengthened by regular consultative meetings. The key message for the animal health programme is that when it comes to rabies control there are many agencies that are eager to contribute. Successful implementation is a matter of coordinating efficiently and working together.

5.3 Opportunities and challenges for rabies elimination in Sri Lanka: Dr PAL Harischandra

A government-supported dog rabies control programme already exists in Sri Lanka and it is an islandwide activity engaging the provincial and district health authorities and local municipalities. Activities conducted for rabies control include mass vaccination, animal birth control, stray dog vaccination and proper garbage disposal. Public health staff are well-trained on planning, organizing and implementing all rabies control strategies.

Over 150 000 female dogs are subjected to ovariohysterectomy annually as part of animal birth control. These programmes are organized by public health staff. The key rabies control strategy is dog vaccination. About 150 000 stray dogs and 1.35 million domestic dogs are vaccinated islandwide annually.

Rabies control activities in Sri Lanka receive significant community support. It acts as a catalyst for the rabies control programme. More than 1 million families present their dog for rabies vaccination to public health staff each year. The vaccination is done free of charge. Selected premises are made available by the people for domestic dog vaccination to be used as a centre. In addition, community support is also extended to the public health staff for stray dog vaccination.

Over the years, dog vaccination has increased gradually with about 400 000 vaccinations in 1990 to about 1.5 million vaccinations in 2014. PEP for dog bites has also increased from less than 100 000 in 1992 to more than 400 000 during 2002–2004. Now, it is about 300 000 annually. With these interventions, human rabies cases have decreased over the years from more than 350 cases in 1975 to about 20 cases annually in 2014. Though most districts report a few scattered cases every 1–2 years, the districts of Mannar, Kegalle, Nuwaraeliya, Hambatota and Ampara have been rabies free since 2012.

Multisectoral cooperation is a vital area in planning, implementing and monitoring rabies control strategies. Important activities such as dog vaccination and sterilization need contribution from the animal health and local governments to complement public health activities. These activities are currently being implemented with the support from human health and animal health sectors. A National Steering Committee and a National Technical Committee with the participation of relevant stakeholders have already been established and are functioning.

Dog rabies vaccination, which was conducted only by the public health sector in the past, is now been implemented in collaboration with the animal health sector. Amendment of rabies ordinances has been initiated in collaboration with the Ministry of Local Government. Veterinary Investigation Officers have been trained on direct rapid immunohistochemical test (dRIT) through the WHO-supported joint training programme.

There are few challenges in the rabies control activities in Sri Lanka. The rapid turnover and dog population dynamics are challenges to achieve sustained high herd immunity. Though conducting a mass islandwide mop-up campaign is important to improve dog vaccination coverage, mobilizing logistics and resources for such a mop-up mass vaccination campaign (short-term for three months) is difficult. In addition, there is lack of an islandwide rabies surveillance network and lack of stray dog control settings, which affects the control activities.

The way forward for Sri Lanka is to practice the One Health approach with effective cooperation among the major stakeholders. The commitment for rabies control should be at all levels, including good coordination among partners, joint planning and implementation and joint monitoring and evaluation.

5.4 Intersectoral collaboration and resource mobilization for rabies control in Bangladesh: Dr Benazir Ahmed

In Bangladesh, prior to 2010, there were reports of children dying of rabies and due to negligence following dog-bites. Dogs, too, were killed as a rabies control measure in an inhuman way. However, after 2010, rabies control was conducted humanely. The introduction of cost-effective intradermal rabies vaccination was crucial to improve accessibility,

availability and affordability of tissue-culture rabies vaccine. It also established a case for phasing out production and use of nerve-tissue vaccine in Bangladesh.

The involvement of the Ministry of Local Government and Local Development and city corporations in rabies control activities was vital to fund rabies control activities, including mass dog vaccination and dog population management. Bangladesh has been celebrating World Rabies Day since 2007 with schoolchildren and professional organizations. This helped in advocating multisectoral collaboration for rabies control. WHO and animal welfare organizations supported a pilot project for rabies control in Cox Bazaar. The project was replicated in other city corporations in subsequent years.

Today, mass dog vaccination has been conducted as the main rabies control measure and inhuman killing of dogs has been stopped. Dog killers working under municipal corporations are now trained as dog catchers for mass dog vaccination. The final outcome of these efforts is that fewer children are dying of rabies. It shows that vaccination of the dog population is more effective, feasible and humane than the inhuman killing of dogs for rabies control.

Dog population management needs to be done in a scientific manner to improve dog vaccination coverage and ensure stability of dog population. An initial estimate has to be made of the number of dogs in the region/locality and dog population management needs to be implemented in such a way that this target is achieved.

5.5 Catch-neuter-vaccinate-release campaign and its impact rabies control in Bhutan: Dr Pasang Tshering

Traditionally, dogs are culturally and socially accepted as companions of humans in Bhutan. Feeding dogs is believed to earn good “*karma*”. Feeding of stray dogs is common in Bhutan. It is believed that in the cycle of rebirths, dogs are the closest to attaining human birth. In addition to serving as pets and companions, they guard homes in the urban areas and also help in guarding crops from wild animals and herding of livestock in rural areas.

However, the presence of dogs poses a problem as well. Increasing numbers of free-roaming dogs in public places causes littering, nuisance, bites and accidents. About 5000 dog-bite cases in humans are reported annually. The average expenditure on human rabies PEP vaccine is US\$ 91 000 per annum.

Rabies was present in most parts of Bhutan until the early 1990s. Since 1993 it is mainly confined to four southern border districts. However, it emerged in eastern Bhutan during 2005–2007. From 1996 to 2014, about 979 animal rabies cases have been reported mainly in dogs and cattle, and from July 2006 to July 2015, 16 human rabies deaths have been reported in Bhutan.

In the 1970s and 1980s, dog control was done through poisoning and shooting. It failed as it was not accepted by the community. In the 1990s, translocation was done but that also created animal welfare and social issues. In the early 2000s, impounding was carried out, which resulted in poor animal welfare and disease outbreak, and the activity was not sustainable. In addition, ad hoc sterilization was carried out during the above-mentioned period. Therefore, in general the strategies implemented from the early 1970s to the early 2000s resulted in limited coverage, higher incidence of zoonosis and poor welfare issues.

Therefore, to pursue a long-term and sustainable programme, the national dog population management and rabies control programme (NDPM & RCP) initiated a joint programme in 2009 in partnership with Humane Society International. The programme focuses on the catch-neuter-vaccinate-release (CNVR) protocol for animal welfare and social acceptance. This results in maintaining a sustainable nationwide animal-birth control and anti-rabies programme. The programme has both the political and key stakeholder support. It also ensures national public awareness on dog population management and rabies control and scientific research and publications. The CNVR project, which initiated the catch-neuter-vaccinate-release activity in 2009, embarked on mass dog vaccination in 2014. The purpose was to ensure coordinated effort to reduce and eliminate rabies. The process adopted for the CNVR protocol is carried out through scientifically approved and socially acceptable techniques and animals are handled in humane methods. Dogs are caught from the community in a humane way and transported to the clinic. Then, they are sterilized by skilled veterinarians and vaccinated against rabies.

Once they recover they are released in the same location that they were initially caught.

Mass dog vaccination is being done along the high-risk border towns to create rabies immune belts and prevent cross-border transmission. It was carried out in the border towns in 2013 and 2014. In addition, awareness, education and sensitization activities are carried out as part of the programme. World Rabies Day is observed every year on 28 September in high-risk towns with the support of MoH and supported by the international partner organizations such as OIE, FAO and WHO.

Phase 2 entails a community-focused approach for dog population management, with a shift in responsibility from “NDPM&RCP/Department of Livestock” to “social responsibility”. The local government and the community take ownership of the activities to ensure sustainability. It resulted in high coverage and low incidence of zoonotic diseases and an active involvement of the community and stakeholders. It is operational in 18 of the 20 districts. In each district, the team consists of a veterinarian, five para-vet support staff and two dog catchers. The total coverage achieved for CNVR since 2009 is 64% in urban areas.

The project also ensured human resource capacity-building. A total of 33 veterinarians and 100 para-vets were trained on surgical techniques, animal handling and welfare by HSI. Eighteen districts have teams that are well trained and equipped to conduct CNVR. The impact of the project is observed not only through vaccination and decrease in zoonotic diseases but also through observing a reduction in the dog population. There is a sharp decrease in lactating female canines in the CNVR implementing districts. The density of dogs has also been reduced from 6.6 per 100 people in 2012 to 6 per 100 people in 2015 in Thimphu (10% reduction). Community surveys conducted in 2012 and 2015 demonstrated a sharp increase in the community’s knowledge and understanding of rabies, and increased acceptance regarding CNVR. Human deaths due to rabies have also decreased with the last human rabies death reported in 2013.

In general, rabies control in Bhutan in the recent past has become more focused and achieved very good results through adopting humane along with scientifically and culturally acceptable rabies control methods. This has been made possible by the implementation of the CNVR project.

6. Session III: Gearing towards rabies control/elimination at the regional and country levels

6.1 Principles of effective dog vaccination and lessons learnt from Bali: Dr Eric Brum

Rabies is commonly spread by dogs throughout all continents except for Australia and Antarctica. The virus sustains itself in dogs mostly because they are social animals and they interact with the world through their teeth. To control an infectious disease, the rate of new infections should decrease.

The reproductive rate (R_0) is the secondary infections resulting from one single infection in a completely susceptible population. For example, if R_0 is above 1, the number of new infections will increase over time and if $R_0=1$ then the number of new infections will remain stable over time. Therefore, to decrease the infection, the R_0 should be less than 1 over time. Since the R_0 is 0 in humans, as they are a dead-end host, the R_0 cannot be decreased only through dealing with humans. Dogs are the rabies virus reservoir host and source of 99% of the infections in humans and other non-flying mammals.

Three factors directly proportional to rabies transmission in dogs are the transmissibility, contact rate and duration of infection. Activities that can be used for rabies control in dogs are rapid response to suspect dogs, sterilization, vaccination and stamping out. Of these, the most effective is mass dog vaccination, as it directly influences the transmissibility and duration of infection.

Due to the long incubation period, it is challenging to rely on case detection to control rabies in dogs. Clinical rabies is actually quite difficult to detect as biting may be the only obvious sign. Culling of dogs to control rabies is not an appropriate measure as it leads to only a temporary decrease in the contact rate. Moreover, since dogs are social animals, the contact rate does not decrease in direct proportion to the decreased density. Furthermore, it decreases community support for rabies control activities, thus making disease elimination difficult.

Mass dog vaccination is the best approach to control rabies. It requires efficacious vaccines giving long-lasting immunity and sufficient numbers of dogs need to be vaccinated to ensure herd immunity. Access to the target population is crucial in this regard. Once high vaccination coverage is achieved, it is important to ensure that the herd immunity in the dog population is kept high by reducing the dog population turnover. This can be done by decreasing the death rate through providing better care and ensuring that the dogs are not killed intentionally and decreasing the birth rate through surgical and chemical sterilization.

The best control would happen if the dogs that are most likely to be infected with the rabies virus are vaccinated such as free roaming and stray dogs. The best way to vaccinate these dogs would be to vaccinate them when they are puppies and use collars for detection. For catching and vaccinating dogs, nets can be used and team work is essential. Once vaccination is done, in addition to assessing the coverage, the number of human rabies cases can be used as an impact indicator. Though dog vaccination involves a high expenditure for the animal health sector, rabies elimination in a country can affect huge savings made from human post-exposure prophylaxis. This was demonstrated in Bali. Hence, it is more proven to be cost-effective.

6.2 Dog population management: the way forward: Mr Pankaj KC

Globally, rabies causes an estimated 59 000 human deaths with more than 3.7 million disability-adjusted life-years (DALYs) each year. The majority of human deaths occur in Asia (59.6%) and Africa (36.4%). India accounts for more casualties than any other country with an estimated 35% of all human rabies deaths annually.

Inhumane culling of dogs is a method adopted when large free-roaming dog populations are considered a threat to the public in many countries. The World Animal Protection is launching a new campaign, bringing together governments, communities and NGOs, in all parts of the world, to support and implement sustainable and humane dog population management as an alternative to needless culling.

Components of a dog population management programme include education, primary dog health care, identification and registration,

legislation, setting up holding facilities and rehoming centres, controlling access to resources, and euthanasia. Euthanasia is done only for the welfare of the animal. Dog population management needs a holistic approach. The *human dog management* guide explains all components in detail. Issues such as irresponsible dog ownership and illegal trade continue to pose challenges for the human dog management.

World Animal Protection is part of the Government of Kenya Zoonotic Disease Unit. It has come up with a strategy to eliminate rabies by 2030. This was launched on World Rabies Day in 2014. Five out of 26 counties are currently piloting rabies vaccination in dogs.

In Latin America, World Animal Protection is mostly involved with responsible dog ownership. World Animal Protection is working with Pan American Health Organization at the regional level in the Americas promote humane dog management strategies. These are mainly focused on education and awareness. In collaboration with GARC and PAHO, World Animal Protection has produced all five keys for dog bite prevention resource, which is currently being utilized globally. World Animal Protection carried out a workshop with Peruvian teachers on dog bite prevention with the five keys for the prevention of dog bite. It included a training of trainers and was supported by the Ministry of Health and the Pan American Health Organization.

Since 2012, World Animal Protection has been collaborating with the China Animal Disease Control Centre. A pilot programme was formally launched in Jiashou city of Anhui province on 12 September 2013, and later in Tongzhi county of Guizhou province and Hancheng city of Shanxi province. During the next two years, World Animal Protection will develop and promote scientific rabies prevention and control solutions in centres throughout China, based on the achievements and experience gained in these pilot vaccination areas. About 90 000 dogs had been vaccinated in 2013 and 2014 at the three pilot sites, reaching over 70% of the estimated total dog population in these areas.

World Animal Protection is also operational in other Asian countries. In Flores Island, Indonesia, WAP is collaborating with the Food and Agriculture Organization of the United Nations to support local authorities and communities deliver a humane rabies control solution. In the SAARC Region, World Animal Protection is actively involved in Bangladesh.

6.3 Blueprint for rabies control: Dr Louis Nel

Globally, about 59 000 people die each year from rabies, and more than 99% of human rabies cases are due to dog bites. All rabies deaths are preventable. Investing in dog rabies vaccination is the single most effective way of rabies prevention. Globally, the annual economic burden due to rabies is around US\$ 8.6 billion.

The current rabies blueprint has three sections. The canine rabies section is the biggest and the initial component. The second section is the fox rabies blueprint, which is about wildlife rabies control through oral rabies vaccine campaigns. In addition, a separate module on rabies surveillance was added last year, which is applicable to any host species. The rabies blueprint is into its third version. Though initial versions were translated into many languages, with continued updates, it was found to be difficult. Hence, it is now limited to English, French and Spanish. It is not intended to replace existing materials and guidelines, and neither is it designed to replace any rabies control measure already in place in a country. It acts as a central access point where anyone looking for information about rabies control can find what they need and use that information to design or improve their own interventions. An outcome of collaborative effort, the third version was completed in September 2014. It is freely available online and is promoted through the networks.

The website rabiesblueprint.org has a range of information relevant for rabies control and prevention, including operational activities, communication plans and step-wise approaches to planning and evaluation. Any person can navigate through the website using menus and also get results through search keywords.

The website is very pragmatic and user- friendly. It has practical advice for situations where the ideal may not be possible because of limited resources or time. For example, although estimating the dog population is really useful to plan a vaccination campaign, it is not essential before going ahead and vaccinating dogs. In an emergency situation, there may not be enough time. The website provides there is advice on how to best guess the number of dogs that may need to be vaccinated. What is more important is to assess the vaccination coverage achieved after the vaccinations, and there is advice on how you can use this data to produce a dog population estimate that can be useful for future campaigns. The style of the question-and-answer format is quite brief. It gives a short description of the ways you

might collect data. Links in orange lead the visitor to other sections of the blueprint, or provides more details that could be accessed if needed.

Supporting documents are made available as much as possible. PDF files are often made available and their links lead to online resources. In addition, case studies depicting real situations are given on the website. Such scenarios help in understanding practical challenges and ways to overcome them. There are tools that could be used for advocacy, especially funding purposes. GARC also has an Educator Certificate programme. The key point is that the course is for anyone who is interested and not just professionals in the field. A step-wise approach to planning and evaluation is available on the website where countries could measure their progress towards rabies elimination.

The Rabies Surveillance Blueprint is new information and a learning module. It brings together relevant information from specific international health organizations, published data from the field and expert knowledge. It is not meant to replace existing material or guidelines but meant to serve as an easy-to-use guide. It contains clear and concise key messages, links to specific documents and websites for more information if required, and is regularly updated by experts. All these technical information, resources and practical situations made available on the website enable the people to learn more on rabies control activities that would help in global rabies control and prevention.

6.4 Rabies-free South Asia: Professor Benazir Ahmed

Though countries of South Asia have been moving forward socioeconomically, they continue to bear a major global burden of rabies. The Region has eliminated or controlled a number of diseases of public health importance and countries of South Asia have initiated rabies elimination. Bhutan and Sri Lanka have only a few cases of rabies and the rabies elimination programme is on the right track. Bangladesh has been on track in implementing the rabies elimination programme and has achieved significant reduction in human rabies incidence.

The South Asia Region expects to reduce human rabies by 90% within 2020. Strategies for rabies elimination include advocacy, communication, social mobilization, dog-bite management, mass dog vaccination, dog population management, and rabies surveillance and research. To achieve

rabies elimination countries such as Bangladesh, Bhutan and Sri Lanka have to continue their activities in line with their national rabies elimination programmes. Afghanistan, India, Nepal and Pakistan need to develop functional national strategies for rabies elimination and set up a national multisectoral steering committee and technical committee. International development partners such as WHO, FAO, OIE, GARC, WAP and HSI should provide technical support to develop and/or strengthen the national rabies elimination programme in SAARC countries. The South Asia Region needs to believe that rabies elimination is possible and needs to ensure that each country has a national strategic plan for rabies elimination to move forward.

6.5 Downward plan to eliminate dog rabies from Sri Lanka: Dr Desika Jayasinghe

Sri Lanka has embarked on mass dog vaccination and dog population management since decades to eliminate canine rabies from the country. However, there are certain issues to be addressed in this regard. Coverage is not sufficient to reach herd immunity and is further reduced due to the high dog population turnover rate. The dog vaccination programme takes a year to completely cover an area and therefore, there is no opportunity for newborn and missed dogs to receive vaccination. Poor surveillance of positive cases and poor intersectoral coordination at the district level are issues that need attention.

Hence, the work plan includes seven outputs. For each output, indicators and activities have been identified. For example, output1 is to achieve the herd immunity throughout the country by vaccinating and marking 80% of the dogs in a targeted area in three months' time. Activities identified to achieve this output include establishing standards related to the mass vaccination campaign, training of vaccinators at the district level, conducting post-vaccination surveys, collecting and analysing data to assess the development and implementation of mass vaccination, and conducting re-vaccination in areas with low coverage.

Similarly, six more outputs are identified as part of the work plan. The remaining outputs identified are as follows:

- maintaining herd immunity through ongoing vaccination;
- establishing islandwide rabies diagnostic capacity;

- establishing the “One Health”-based detection and management system;
- managing outbreaks through rapid response; and
- maintaining herd immunity through comprehensive management of the dog population and improving public awareness.

Each output has output indicators to assess the progress, and a set of activities that are identified to achieve the outputs that would finally ensure that Sri Lanka’s goal of eliminating canine rabies is met.

6.6 Multisectoral coordination for rabies prevention and control programme in Bangladesh: Dr Md Abdul Baset

Though rabies is 100% fatal, it is the most neglected communicable disease in Bangladesh. An estimated 2000 deaths are recorded due to rabies annually in Bangladesh. In Bangladesh, about 5000 animal cases (cattle, sheep, goat, dog and buffalo) with rabies/rabies-like symptoms are identified through the passive surveillance system of the Department of Livestock Service. About 3–4 million dog-bite incidences are reported every year. Bangladesh has adopted a national strategy to eliminate rabies from the country by 2020 through a multisectoral approach.

Multisectoral coordination is established between various sectors, including the Ministry of Health and Family Welfare, the Ministry of Livestock and Fisheries, the Ministry of Local Government and Rural Development (LGRD), city corporations, the Ministry of Primary and Mass Education, and organizations such as FAO, WHO and NGOs. Coordination is done through mechanisms such as the National Steering Committee, Technical Working Group, “One Health” Secretariat and Rabies in Asia Foundation’s Bangladesh chapter.

Key achievements in 2015 include the vaccination of 70 000 dogs under the mass dog vaccination programme covering all municipal areas by the Department of Health Services. World Rabies Day was celebrated jointly with partners, including the human and animal health sector. Through the Department of Livestock Services 200 000 dog vaccine doses received from OIE were utilized and behaviour change communication (BCC) material was developed and disseminated.

Lack of multisectoral coordination and reduced financial assistance to implement the mass dog vaccination are some of the constraints faced. Significant challenges include lack of infrastructure and capacity. Research would complement the control strategy and a strong political commitment is needed for proper control and elimination of rabies from Bangladesh.

6.7 Global Alliance for Rabies Control education platform: Dr Louis Nel

The GARC Education Platform was established after the need for a coordinated approach to rabies education was recognized. The GARC Education Platform is a web domain where various online courses will be hosted. Some courses will be open to all participants, while others will be for those in specific professions. Till now, one course (the Rabies Educator Certificate) has been developed and is available on the website (<http://education.rabiesalliance.org>).

The Rabies Educator Certificate (REC) programme is a free online course for community educators, public health workers and anyone interested in learning how to prevent rabies in their communities.

The course will teach participants regarding rabies, how it is caused, how to prevent it, how to ensure humane treatment of animals and how to communicate this life-saving information to people in the community. It comprises five modules with each module having specific contents pertaining to rabies and its prevention. The entire course can be pursued on the GARC Education Programme website or it can be downloaded from the GARC Education Platform.

The final assessment for the course is conducted through multiple choice questions on all the material covered in the REC programme. Participants are allowed two attempts to score more than 85% for the final assessment to pass the REC programme. Since the REC was formally launched in February 2015 there have been 424 enrolled users, 209 attempts made and 160 rabies educators certified until now. The 160 REC certified users are spread across many countries.

Humane animal handling and proper administration of vaccine are essential techniques that need to be cultivated and refined by all people actively involved with dog handling and vaccination. Therefore, GARC is

planning to launch a new course for animal handlers and vaccinators titled “Animal Handler and Vaccinator Education Certificate”. The new course will be profession-specific imparting very specific information to professionals that are involved with routine dog vaccination. This free online educational course would supplement the educational resources that are available. Its contents would be easy to understand and are developed in partnership with an experienced vaccination coordinator. This Certificate course will rely on the same structure as the REC to ensure continuity within the GARC Education Platform. The entire course can be taken online or the material can be downloaded and studied offline. The final assessment would be done in line with the REC course.

Five modules of this course are on the role of the animal handler and vaccinator, understanding animal behaviour, effective ways to approach dogs, equipment needed to catch and handle dogs and effective vaccine administrative techniques. Each module is of great practical importance to dog handlers and vaccinators.

6.8 SAARC Rabies Elimination Project: Dr Gyanendra Gongal

SAARC countries have taken a significant initiative for rabies control. The Government of Sri Lanka hosted a SAARC-level workshop on rabies control in 2003 in Colombo. The Rabies in Asia Foundation in collaboration with WHO hosted the SAARC rabies meeting in 2011 in Mysore, India. The SAARC technical meeting held in Colombo in March 2012 recommended Sri Lanka to be a coordinator for the SAARC Rabies Elimination Project. The SAARC Health Ministers’ Meeting held in April 2012 considered rabies elimination as a regional public good.

The foremost step would be to reach consensus among stakeholders to establish a regionally coordinated rabies elimination programme in the SAARC Region. The project will encourage SAARC Member countries to work together with common goals by sharing knowledge, experience and expertise. Rabies-endemic countries will have to set targets for rabies elimination considering the country-specific situation.

The objectives of the SAARC Rabies Elimination Project are to:

- establish a rabies expert group and identify country focal points to guide the rabies elimination programme;

- strengthen the local, national and regional capabilities for surveillance, diagnosis and prevention of rabies;
- strengthen country capacity to provide early and appropriate post-exposure rabies prophylaxis;
- plan and implement sustainable preventive measures for progressive control of dog rabies;
- share best practices in promoting community-based rabies elimination activities in SAARC countries; and
- strengthen local capacity in operational research.

The lead country of the project is expected to advocate political commitment from governments and financial and technical support from international donors and partners. Moreover, targets include identifying and updating roster of experts and resource institutions for capacity-building, and establishing and coordinating a regional alliance for rabies elimination in the SAARC Region. Establishing a functional rabies surveillance system and sharing data and information through publications and websites, and creating a forum for sharing information and best practices on rabies elimination is also on the agenda. It is also expected to provide technical support to Member countries whenever necessary in coordination with technical agencies, and facilitate the availability of vaccines, serums and diagnostic kits and reagents. The project also aims to organize training, workshops and meetings to strengthen the national capacity for rabies elimination in Member countries, promote cross-border collaboration for animal rabies prevention and control, and promote operational research in priority areas for rabies elimination.

The estimated cost for the project is US\$ 10 million nine identified activities. The identified activities are:

- (1) legal framework for rabies elimination (0.25 million);
- (2) advocacy, awareness and education (1.5 million);
- (3) surveillance and networking (1 million);
- (4) laboratory diagnosis (0.5 million);
- (5) human rabies prophylaxis (1.5 million);
- (6) mass dog vaccination and animal birth control (4.25 million);

- (7) wildlife rabies control (0.25 million);
- (8) operational research (0.25 million); and
- (9) project management (0.5 million).

The project proposal has been submitted to the SAARC Development Fund (SDF) through the SAARC Secretariat. It was discussed at the SDF Board Meeting in Kabul in December 2013. However, until now there is no consensus among the SDF Board Members to approve funding for this project. Possible alternatives are to revise the project proposal to have a regional component only, and reduce the estimated budget to US\$ 2–US\$ 4 million.

7. Session IV: Drafting a roadmap for rabies control/elimination

Guidance for drafting a roadmap for rabies control/elimination was provided and key elements for rabies control/elimination were elaborated through spreadsheets. The country poster presentations also created a platform and synergies for developing the roadmap. Following the presentation made on the SAARC initiative for rabies elimination, issues and challenges were discussed in detail by the participants. A group exercise was carried out to identify five priority areas that will need regional cooperation. Following extensive discussions, these five priority areas for regional cooperation were identified. These top priorities for the regional project include:

- laboratory diagnosis (capacity-building including facility, equipment, kits and reagents, access to international reference centres and networking);
- vaccine bank for quality human and dog rabies vaccines;
- cross-country collaboration (cross-border collaboration and database creation);
- regional exchange (information sharing, meetings and sharing expertise); and
- surveillance (software support and capacity-building).

The tripartite group was tasked to assist the lead SAARC country with the development of project proposal of US\$ 4 million for four years to be submitted to the SAARC Development Fund or potential donor for consideration.

8. Session V: Completing the task

All country participants were given an opportunity to discuss the roadmap for rabies control/elimination based on key elements and output indicators. They would continue to work with the national stakeholders once they are back to their respective countries. The draft conclusions and recommendations were prepared by the tripartite group in consultation with resource persons.

These draft conclusions and recommendations were discussed at the forum with all participants. The discussion resulted in amendment of the draft based on valuable inputs provided by the participants. These conclusions and recommendations were finalized and endorsed by all participants.

9. Closing session

Dr Dirk Engels, Director, Neglected Tropical Diseases (NTDs)/WHO headquarters addressed the closing session. He emphasized that rabies is one of the priority diseases under NTDs at the WHO headquarters level. It is important to work together to meet the 2020 elimination targets. The WHO South-East Asia Region serves a good example to other countries on how dog vaccination can be achieved in the poor resource settings. The key to success is good intersectoral approach. He was of the view that dealing with NTDs such as cysticercosis, hydatidosis even among animals contributes to alleviating poverty.

Mr Subrata Biswas from India spoke on behalf of the participants of the workshop. He thanked the organizers of the workshop for the excellent technical presentations and stimulating exercises. He was also full of praise for efficient organization and logistics as well as the innovative poster session, which provided a good opportunity to share experiences between countries. He also emphasized the need to implement the recommendations in the future.

Dr Gyanendra Gongal gave the vote of thanks and Dr Sarath Amunugama delivered the concluding remarks to end the closing session.

A field visit was organized by the Public Health Veterinary Services, Ministry of Health, Sri Lanka. It was attended by 30 participants. They were able to comprehend different organizational and managerial aspects of dog vaccination, animal birth control and community participation during the field visit.

10. Conclusion

This meeting was attended by seven countries of the SAARC Region, development partners and international organizations (WHO, OIE, FAO, SAARC Secretariat, Global Alliance for Rabies Control, Humane Society International, World Animal Protection and Vets Beyond Borders).

The following key points were noted by participants of the workshop:

- Rabies is a priority zoonotic disease in the Region.
- Rabies elimination is a regional public good.
- Rabies elimination requires a focus on three successive rounds of mass dog vaccination covering at least 70% of the total dog population within a short time using high-quality, dog rabies vaccine that confers long-lasting immunity.
- Post-exposure prophylaxis remains important while rabies continues to be endemic; although PEP alone is less effective in rabies control when compared with mass dog vaccination.
- Rabies is inextricably linked to poverty and it is important to ensure that post-exposure prophylaxis is available free of cost or at subsidized cost to all in an equitable manner.
- The rabies elimination programme serves as a model for operationalization of the “One Health” approach in rabies-endemic countries.
- A number of Member countries in the Region are making good progress to eliminate rabies via their current control and prevention activities.

- Development partners, international organizations, civil societies and communities remain a key player in rabies elimination strategies.
- Most Member countries do not have adequate legislation that addresses rabies. Introducing legislation takes time.
- The meeting also noted that progress can be made in the absence of legislation. Lack of legislation should not be used to justify not making progress.

11. Recommendations

11.1 Recommendations to SAARC Member countries

The recommendations to SAARC Member countries included:

- (1) All SAARC Member countries establish and maintain functional multisectoral steering or coordination committees at the national and subnational levels dealing with rabies control/elimination.
- (2) Member countries should have a national strategy for rabies elimination following the step-wise approach. This approach should be used as a framework to assist Member countries to develop their respective roadmaps with detailed outputs that support the overall goal of rabies elimination.
- (3) Rabies surveillance can be improved by:
 - making human and animal rabies cases notifiable (if it is not already);
 - improving the reporting capacity through intersectoral coordination, real-time data reporting and strengthening the diagnostic capacity; and
 - strengthening laboratory and epidemiology linkages.
- (4) Member countries should strengthen animal health services with adequate, appropriately trained personnel, funding, resources and capacity to deal with rabies control/elimination as a priority zoonotic disease.

- (5) Member countries should take advantage of the OIE dog rabies vaccine bank mechanism, which can facilitate the procurement of high-quality dog rabies vaccines for mass dog vaccination campaign.
- (6) Member countries must establish a laboratory network to provide leadership in human and animal rabies diagnosis.
- (7) Animal rabies laboratories in SAARC region are encouraged to collaborate with FAO/OIE/WHO Reference Laboratory for rabies, including twinning and working towards attaining the OIE Reference Laboratory status.
- (8) Dog population management should be undertaken using scientifically sound, humane and culturally acceptable method, including development of national policies for dog population management.
- (9) Member countries are encouraged to access and utilize tools and technical support made available by organizations such as WHO, OIE, FAO, GARC, World Animal Protection and similar organizations (e.g. the “Rabies Blueprint”).
- (10) Member countries continue with advocacy and awareness campaigns and promote the goal of ‘freedom from (dog-mediated) human rabies which is a global public good’.
- (11) Member countries develop or update legislation for rabies control.

11.2 Recommendations to development partners and international organizations

The recommendations to development partners and international organizations were:

- (1) The tripartite group facilitates the development of a project proposal for the regionally coordinated SAARC Rabies Elimination Programme, in consultation with the SAARC Secretariat and a lead SAARC country, for rabies elimination activities.

- (2) Establish a task force overseeing progress of SAARC countries in implementing rabies control activities with a Coordinator.
- (3) The SAARC Secretariat facilitates the submission of the project proposal to the SAARC Development Fund for favourable consideration.
- (4) The tripartite group provides technical support and facilitates intersectoral cooperation, coordination and communication within and among countries and among development partners and organizations.
- (5) OIE continues to maintain the dog rabies vaccine bank facility.
- (6) WHO establish a mechanism for bulk purchase of human rabies biologicals and also consider establishment of a human rabies vaccine bank as well as promotion of cost-effective intradermal rabies vaccination in all SAARC countries.
- (7) Animal welfare organizations support capacity-building for introduction of scientifically sound, humane and culturally acceptable dog population management methods, including responsible dog ownership, and appropriate measures for prevention of dog bites.

Annex 1

Agenda

- (1) Opening session
- (2) Global, regional and country overview of rabies (FAO, OIE and WHO and SAARC Member countries) control/elimination
- (3) Poster presentation and sharing best practices and lesson learnt
- (4) International partnership for rabies control/elimination and Rabies Education Certificate Campaign
- (5) Discussion on the SAARC Rabies Elimination Project
- (6) Group work on country specific roadmap for rabies elimination
- (7) Conclusions and recommendations
- (8) Closing session

Annex 2

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More than 1.5 billion people are at risk of rabies, a disease of public health importance in the SAARC Region. SAARC member countries bear 45% of the global burden of human rabies. More than 95% of human rabies in the region is attributed to dog bites.

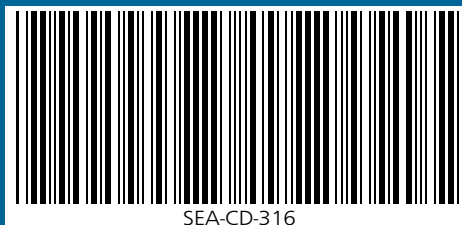
In this backdrop, a workshop on prevention and control of rabies in SAARC Region was organized in Colombo in August 2015. It was attended by representatives from seven SAARC countries, the SAARC Secretariat, World Health Organization, OIE, FAO, Global Alliance for Rabies Control, and World Animal Protection.

The workshop aimed to review the rabies situation, discuss control activities, identify gaps for rabies elimination, and share best practices and lessons learnt among the Member countries. The need for strengthening rabies surveillance, laboratory networks and animal health services was emphasized at the workshop. It also called for new innovative tools and techniques that are both humane and socially acceptable to improve dog vaccination coverage and dog population management.



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