

Formation of the Asian Rabies Control Network (ARACON): A common approach towards a global good

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Abstract

The drive towards the worldwide elimination of dog-mediated human rabies by 2030 is the first step towards the ultimate goal of dog rabies elimination – as dogs account for more than 99% of human rabies cases globally – and has gained considerable momentum since this resolution was taken at a global meeting in Geneva in December 2015. For dog rabies-endemic countries and regions, dedicated regional networks may offer unique opportunities to take advantage of this global momentum. Towards this goal, the Pan-African Rabies Control Network (PARACON) was created in 2015, and the past year has seen the formation of the Asian Rabies Control Network (ARACON). ARACON provides opportunities for member countries to share lessons learnt and challenges faced, while also introducing them to programmatic support tools such as the Stepwise Approach towards Rabies Elimination (SARE) assessment and the Rabies Epidemiological Bulletin (REB). During the inaugural ARACON meeting, member countries evaluated their progress and developed country-specific Practical Workplans based on their SARE outcomes. The results from the national-level SARE assessments were considered at the regional level and, after discussion among countries, consensual agreement was reached that the target date of regional freedom from dog-mediated human rabies by 2020 was not feasible, and a new regional target of 2030 was set. With this new regional target, ongoing support will continue to be provided to countries through regional structures such as ARACON. However, the responsibility remains with the countries to use the available tools and resources to progress towards the new regional goal of dog-mediated human rabies elimination by 2030.

Introduction

Rabies in humans has been inextricably linked to dogs, as evidenced by the fact that dog-transmitted rabies remains responsible for more than 99% of human cases globally (Hampson et al., 2015; WHO, 2018). While the ultimate global goal is the elimination of dog rabies, rabies elimination in humans is considered an initial milestone. To this end, the drive towards the worldwide elimination of dog-mediated human rabies by 2030 has gained considerable momentum since this resolution was taken at a global rabies meeting in Geneva, December 2015 (WHO et al., 2015). For dog rabies-endemic countries and regions, a dedicated regional network may offer unique opportunities to take advantage of this global momentum. Towards this goal, the Asian Rabies Control Network (ARACON) was formed in March 2018, on the same premise as the Pan-African Rabies Control Network (PARACON), created in 2015. The ARACON network provides opportunities for member countries to share lessons learnt and challenges faced, while also introducing them to programmatic support tools such as the Stepwise Approach towards Rabies Elimination (SARE) assessment and the Rabies Epidemiological Bulletin (REB).

In this process, member countries evaluated their progress and developed country-specific Practical Workplans based on their SARE outcomes. The results from the national-level SARE assessments were considered at the regional level and, after discussion among countries, consensual agreement was reached that the target date of regional freedom from dog-mediated human rabies by 2020 was not feasible. Therefore, a new regional target date of 2030 was set. With this new regional target, ongoing support will continue to be provided to countries through regional structures such as ARACON. However, the responsibility remains with the countries to use available tools and resources. This paper describes the formation of ARACON and the guidance and support that it provides to member countries to achieve the new regional goal of eliminating dog-mediated human rabies by 2030.

Background: eliminating dog rabies

Rabies is the oldest known zoonotic disease, with anecdotal evidence suggesting its presence in Mesopotamia and the Mediterranean basin since antiquity (Blancou, 2004). Throughout the ages, rabies was a global scourge of humans until the development of the first effective rabies vaccine, by Louis Pasteur, in the 1870's (Adamson, 1977; Blancou, 2004; Nel and Rupprecht, 2007; Pasteur, 1887). Despite the fact that rabies has been a vaccine preventable disease in humans and dogs for more than one hundred years, dog-mediated rabies – accounting for 99% of all human rabies cases - continues to cause the deaths of an estimated 59 000 people annually (Hampson et al., 2015; WHO, 2018, 2017) and remains

endemic throughout Africa and Asia. The majority (59.6%; 35 000 people) of these deaths originate from rabies-endemic Asian countries, with approximately four billion people being considered at-risk.

Due to the transboundary nature of rabies, those countries that have succeeded in eliminating dog-mediated rabies did not do so without regional collaboration. In this regard, the most recent evidence is from the Pan American Health Organisation (PAHO) and the network of Directors of Rabies Programs in the Americas (REDIPRA) (Clavijo et al., 2013; Velasco-Villa et al., 2017), as well as the North American Rabies Management Plan (NARMP) (Slate et al., 2009).

In an effort to create similar collaborative regional rabies networks within dog-mediated rabies endemic countries, the Pan-African Rabies Control Network (PARACON) was established in 2015 under the secretariat of the Global Alliance for Rabies Control (GARC) (Scott et al., 2015). Since its establishment, the PARACON network has been operational within sub-Saharan Africa and has granted member countries the opportunity to gain hands-on experience in the strategic planning, development, implementation, refinement and evaluation of their national rabies control and prevention strategies using various tools and mechanisms developed by GARC and its collaborating partners, including the tripartite of the World Health Organization (WHO), the World Organisation for Animal Health (OIE) and the Food and Agriculture Organization of the United Nations (FAO), as well as the United States Centers for Disease Control and Prevention (CDC), among others.

Building upon the foundation laid by PARACON for rabies-endemic African countries, GARC and its partners have endeavoured to create a standardised approach towards other regional rabies control efforts. This “regional collaborative network” model was applied to South and Southeast Asian countries, resulting in the formation of the Asian Rabies Control Network (ARACON). Furthermore, the inaugural ARACON meeting was used as an opportunity to showcase new developments and improvements that have been made to the cohort of support tools for rabies-endemic countries and to help these countries assess, refine and progress their rabies elimination strategies.

Establishing the Asian Rabies Control Network (ARACON)

In March 2018, in the spirit of harmonization through a regional collaborative network model that exclusively focuses on rabies control and elimination, ARACON was established under the secretariat of GARC as a platform that provides technical support to member countries of South and Southeast Asia by:

- Promoting a co-operative One Health approach towards rabies control and elimination;
- Creating a platform to showcase successes, lessons learnt, and challenges faced towards achieving rabies control and elimination;
- Advocating for rabies to be classified as a Transboundary Animal Disease (TAD);
- Promoting the development and implementation of tools for rabies control, such as the Rabies Blueprint, Stepwise Approach towards Rabies Elimination (SARE), GARC Education Platform (GEP), Global Dog Rabies Elimination Pathway (GREP), and the Rabies Epidemiological Bulletin (REB).

The inaugural ARACON meeting from 13–15 March, 2018 in Bangkok, Thailand, harnessed support from the WHO, OIE, FAO, CDC, representatives from the industry, and animal welfare NGOs that are operational within the region. The ARACON member countries were represented by government-nominated rabies focal persons from both the animal and human health sectors, with 13/15 regional countries in participation, namely: Bangladesh; Bhutan; Cambodia; India; Indonesia; Laos PDR; Malaysia; Myanmar; Sarawak (autonomous state of Malaysia); Pakistan; Philippines; Sri Lanka; Thailand; and Vietnam (Figure 1). Two of the member countries invited to participate in the ARACON network (China and Nepal) were unable to attend the inaugural meeting (Figure 1), but still had access to all of the meeting outputs through the ARACON sub-section of the GARC website (<https://rabiesalliance.org/networks/aracon>).

The ARACON meeting was focused on the introduction and use of the SARE and REB tools in workshops – an approach that has proven invaluable within PARACON. In preparation, each of the rabies focal persons was tasked with completing a country report containing detailed information on human and animal rabies. This information enabled participants to accurately and efficiently undertake the SARE self-assessment and to submit relevant data to the REB. Additionally, some of the ARACON member countries that had made recent advances towards rabies elimination (Thailand, Philippines, Indonesia, Sri Lanka and Malaysia), presented and discussed their national control programmes. These presentations granted participants an opportunity to familiarise themselves with the work being done by their neighbouring countries while also stimulating discussions on how control and elimination efforts could be applied regionally.

Stepwise Approach towards Rabies Elimination (SARE) workshop

The SARE tool, initially developed in 2012 by the FAO, OIE, WHO and GARC, comprises a self-assessment and a practical guide to the development and implementation of national rabies control programmes (Coetzer et al., 2016; FAO and GARC, 2012). This

Microsoft[™] Excel-based tool relies on user input to assess activities (stated as simple yes/no questions) that have been grouped into different components that directly correlate with the STOP-R framework (WHO et al., 2015), viz. legislation; data collection and analysis; laboratory diagnosis; information, education and communication; prevention and control; dog population-related matters; and cross-cutting issues (Coetzer et al., 2016). The SARE activities provide countries with direct, actionable objectives that have been designed to follow a logical flow that systematically progresses into sustainable national programmes.

The primary output of the SARE assessment is a comprehensive list of both accomplished and pending activities required for an effective disease intervention strategy. The list of accomplished activities is a formidable advocacy tool that can be used to highlight successes, measure progress and lobby for further investment within the country's own rabies control programmes. The pending activities, on the other hand, can help countries focus efforts towards maintaining momentum for the continued implementation of their rabies elimination strategy. With these clear guidelines, countries can allocate their available resources to further their efforts, while also progressing along the SARE score pathway from Stage 0 (endemic for dog-mediated rabies) to Stage 5 (freedom from dog-mediated rabies) (Figure 2).

The SARE tool was first implemented in a regional network context at the inaugural PARACON meeting in 2015 (Scott et al., 2015) and has since been instrumental at all subsequent regional meetings in Africa (<https://rabiesalliance.org/networks/paracon>) and various in-country workshops globally. Through feedback from countries and international stakeholders, the SARE assessment has undergone various revisions and improvements to enhance its utility. While a considerable amount of effort has gone into improving the contents and functionality of the tool, one of the most recent and fundamental improvements was the addition of a 'Practical Workplan' component that automatically creates a unique national workplan for each country. Essentially, the output of a classical SARE assessment provides a list of pending activities that need to be prioritized over the short- medium- and longer-term, which can be a daunting task. With this in mind, the Practical Workplan component was developed to utilize the SARE outputs and, from this, create a document with:

- i) Objectives;
- ii) Outcomes;
- iii) Responsible authorities;
- iv) Timeframes (including Gantt charts); and
- v) Deliverables for each of the pending SARE activities.

The Practical Workplan content is automatically generated from the SARE outputs, but it can be changed and adapted by the user (i.e. adding objectives, modifying the relevant timeframe, customizing the deliverables or key performance indicators (KPIs), altering responsible authorities etc.). Through this approach a comprehensive but country-specific workplan can be generated in a relatively short timeframe. In our experience, the development of national plans can often take years, and this often obstructs the actual implementation of rabies control and elimination activities.

The updated version of the SARE tool, with the Practical Workplan component included, was beta-tested for the first time during the inaugural ARACON meeting. Using country-specific data and the SARE and Practical Workplan tool, each member country worked towards determining its SARE score (representing a specific achievement in its efforts towards rabies control) before generating and editing its own unique workplan. While the completed SARE assessment can be used to showcase programmatic successes within a country (Table 1), the workplan provides operational personnel with a clear list of activities for immediate attention as well as the individual steps towards completing these activities within the allotted timeframe. Beyond ensuring continuous and methodical progress between SARE assessments, these workplans can and should also be used to inform stakeholders and partners of the specific programmatic needs and requirements to ensure timely resource mobilisation, which would result in sustainable and continued progress towards eliminating rabies in humans and dogs. Furthermore, clear and detailed plans that include KPIs, would support efforts to lobby for additional funding and political buy-in from international stakeholders.

Rabies Epidemiological Bulletin (REB) workshop

The REB was developed in 2016 by GARC using the DHIS2 software platform as a tool to facilitate data collection, collation and analyses for improved surveillance in endemic countries (Scott et al., 2017). In an effort towards the standardisation of data collection, key indicators were created in collaboration with the WHO. This ensured that the REB not only serves as a national rabies data collection and surveillance tool, but also enables interoperability between the REB and the WHO's Global Health Observatory (GHO). In this multi-functional REB-GHO collaboration, automated data sharing reduces reporting fatigue, whilst also ensuring data quality and consistency across reporting platforms (Nel, 2013; Scott et al., 2017).

Since its launch, African member countries have routinely submitted data onto the REB, while relying on the automated data outputs and visualizations to provide decision-

makers with accurate, timely data to support national programmatic activities (Scott et al., 2017). At a regional level (within the rabies network), the REB has been designed to facilitate transparency and data sharing among neighbouring countries, in an effort to address the transboundary nature of rabies and facilitate a collaborative One Health approach (Pieracci et al., 2017).

In an attempt to replicate the successful use of the REB in Africa, the system has been expanded to incorporate the ARACON network, providing capacity for national-level data analyses, visualization and reporting to all member countries. As such, the REB is currently being utilised as a dedicated rabies capture, analysis and reporting system by 43 rabies-endemic countries, of which 13 are Asian. With the successful rollout into the ARACON network, the “PARACON Bulletin” (Scott et al., 2017) was renamed the Rabies Epidemiological Bulletin (REB).

Launch of the grassroots-level reporting component of the REB

Two grassroots-level data collection programmes within the REB were showcased at the inaugural ARACON meeting. The first is a ‘bite patient tracker’ component that has been developed to replace the cumbersome and time-consuming paper-based data collection systems that are typically used by healthcare facilities in rabies-endemic countries. Through the collection of relevant bite patient data using the REB, information is automatically analysed and displayed (e.g. plotted locations of bite incidents, disaggregated bite cases at a community level by age or sex, estimated vaccine requirements at a community level). The system can also be set up to ensure that each patient receives automated reminders of their follow-up appointments for vaccination, resulting in a reduction in patient dropout and an improvement in vaccination compliance, without further burdening healthcare personnel (Ahlers-Schmidt et al., 2010; Chi and Stringer, 2010; Vilella et al., 2004).

The second component of the REB was developed to enable interoperability between the GARC Data Logger (GDL) and the REB. The GDL is a handheld data collection device that can be used to effortlessly collect basic, but extremely accurate, vaccination/surveillance data at a grassroots-level. The data output from the GDL is either a Microsoft™ Excel or Comma-Separated Values file that is directly downloaded onto the user’s computer for further analysis. However, data analysis and geographical information systems (GIS) are complex and require professional workers with specialised skill-sets. To address this challenge, the GDL was directly integrated with the REB, enabling the user to easily upload the GDL data onto the REB, after which the REB automatically plots the data on maps and visualizes the

data on graphs. The REB can also automatically aggregate vaccination data for national-level reports, thus greatly simplifying data management and limiting specialised skill-set requirements for programmatic activities.

Towards the elimination of dog-mediated rabies in Asia

The formation of the ARACON network provides the necessary platform to ensure the collaboration and coordination between member countries towards the common goal of dog rabies control and elimination. In support of the ARACON network, representatives from the tripartite alliance (FAO, WHO and OIE) each gave presentations on key initiatives to support rabies control and elimination in Asia, reflecting various programmatic activities of the different member countries. However, to harness international support, it became clear that national governments should be more prominent in taking the lead and shouldering the responsibility for rabies control, if sustainability of national intervention programmes is to be ensured. While harnessing governmental support is not an impossible task, such commitments will be significantly supported by global advocacy campaigns that would elevate the profile of rabies and the call for rabies elimination (Minghui et al., 2018). As such, ARACON is an ideal platform for the dissemination of key advocacy initiatives. These include World Rabies Day (Balaram et al., 2016), the End Rabies Now (ERN) campaign, and the United Against Rabies (UAR) collaboration, all serving to support rabies awareness and to advocate for dog rabies elimination (Minghui et al., 2018).

The primary aim of the ARACON network is to enable the countries of this regional network to steadfastly progress in their control programmes and to achieve dog rabies elimination. We have discussed the benefits of such a regional network as a conduit to provide vital tools and resources designed to support this endeavour. It is of great value that some ARACON countries have advanced more toward the goal of dog rabies elimination than others (Table 1). ARACON should enable these advanced countries to effectively share their experiences and lessons learnt to assist others towards this common goal. Indeed, given its transboundary nature, rabies control and elimination will require regional collaboration – without which individual countries will not be able to reach and indefinitely maintain the end-goal.

Conclusions

With its exclusive focus on rabies, the inaugural ARACON meeting brought together the focal persons from each country of the region. ARACON proceeded to provide member

countries with the opportunity to assess the regional rabies situation. Significantly, consensual agreement was reached that the region would not be able to achieve the initial goal of human rabies elimination by 2020 (Association of Southeast Asian Nations, 2015). As evidenced from the REDIPRA network (Vigilato et al., 2013), the creation of a new target date should not be considered a failure, but rather a re-assessment of the current situation and the needs for success. Therefore, it was agreed that the new goal for human rabies elimination (the first major milestone towards dog rabies elimination) for ARACON should be that of 2030 – in line with the global goal (Minghui et al., 2018).

With this new target date and a clear unified approach, it is recommended that countries conduct in-country SARE assessments in collaboration with all of their relevant stakeholders and line ministries. This approach will allow the countries to update current rabies control and elimination strategies and continue to systematically drive programmatic activities towards the ultimate goal of freedom from dog rabies. These countries can now rely on a standardised approach towards rabies control and elimination that enables their specific needs to be comparably assessed, while also aligning them with the UAR initiative (Minghui et al., 2018). Therefore, the impetus now lies with the nations of the region to take action on the outputs from the meeting, including the execution of their Practical Workplans that set the required steps towards the 2030 rabies elimination target.

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Figure legends



Figure 1. Member countries of ARACON (Asian Rabies Control Network). Two of the member countries invited to participate in the ARACON network (China and Nepal) were unable to attend the inaugural meeting.

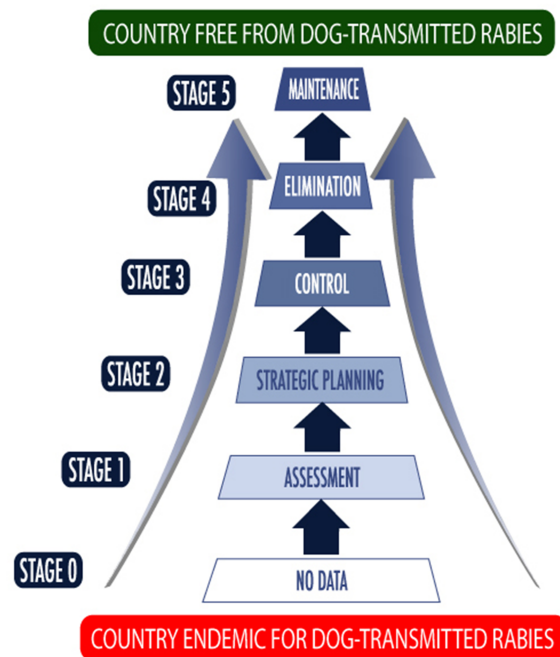


Figure 2. Graphical interpretation of the SARE stages and the primary outcomes associated with each stage.

Country	SARE Stage	Current SARE milestone
Bangladesh	0,5	Situational rabies data collected and analysed for initiation of local-level intervention campaigns.
Bhutan	3,5	Country nearing freedom from dog-mediated human rabies, with concurrent decline in animal rabies cases.
Cambodia	2,5	National rabies control programme being implemented and a decline in human and animal rabies cases is being observed
China	---	---
India	1,5	Foundational requirements in place for the development of a national rabies control programme
Indonesia	2,5	National rabies control programme being implemented and a decline in human and animal rabies cases is being observed
Laos PDR	0,5	Situational rabies data collected and analysed for initiation of local-level intervention campaigns.
Malaysia	2,5	National rabies control programme being implemented and a decline in human and animal rabies cases is being observed
Myanmar	0	Basic information on the epidemiology of the disease is being compiled and rabies recognized as an endemic disease
Nepal	---	---
Pakistan	0,5	Situational rabies data collected and analysed for initiation of local-level intervention campaigns.
Philippines	3,5	Country nearing freedom from dog-mediated human rabies, with concurrent decline in animal rabies cases.
Vietnam	3,5	Country nearing freedom from dog-mediated human rabies, with concurrent decline in animal rabies cases.

Table 1. SARE self-assessment outputs: Stage and broad milestone for each ARACON member country. (--- No SARE self-assessment undertaken due to absence from the meeting.)