

6<sup>th</sup> Partners for Rabies Prevention meeting  
Wolfsberg, Switzerland, July 16-18<sup>th</sup> 2013



**Meeting minutes**

Participants list:

Abdul Rahman (AR) Commonwealth Veterinary Association, Association for the Prevention and Control of Rabies in India, World Society for Protection of Animals, India  
Ad Vos (AV) IDT Biologika GmbH, Germany  
Alain Dehove (AD) World Organisation for Animal Health, France  
Alasdair King (AK) Merck Animal Health, USA  
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Ann-Marie Sevcsik (AMS) UBS Optimus Foundation, Switzerland  
B.J.Mahendra (BJM) Rabies in Asia Foundation and Asian Rabies Expert Bureau, India  
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Deborah Briggs (DB) Global Alliance for Rabies Control, Canada  
Deepa Balaram (DBa) Global Alliance for Rabies Control, UK  
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Jennifer Villagarcia (JV) Sanofi Pasteur, France  
Joanne Maki (JM) Meril, USA  
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Kim Doyle (KD) Global Alliance for Rabies Control, Switzerland  
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Victor Atienza (VA) Government of the Republic of the Philippines  
Wilfred Marissen (WM) Crucell, Netherlands

**For a list of abbreviations used, please see appendix**

## **Day 1 – Tuesday 16<sup>th</sup> July**

### Session One – Introduction

Deborah Briggs thanked the UBS foundation for hosting the meeting, noting that they have become a valuable partner, helping with advice and problem-solving. She welcomed past and new participants for taking time to attend the meeting, and looked forward to their contributions.

All participants introduced themselves.

Sarah Cleaveland, chairperson for the first day, also expressed her appreciation to UBS Optimus Foundation on behalf of the GARC board, and noted that the participants are trying to look at rabies from a global perspective, and that we have a lot to learn about how we start rabies control from scratch and progress towards the end stage. There is a need to talk across disciplines and respect each other's opinions. She finished by thanking all of the GARC team for their ambitious objectives, despite the organization's small size.

### Session Two - Towards rabies elimination worldwide

#### Session 2.1. The vision and the roadmap

#### **Rabies Prevention and Control: Moving Forward - Deborah Briggs**

The PRP is a working group, so we are not just here to listen, but to contribute – and no ideas are stupid.

Rabies control can serve as a model for zoonotic disease control. The concept of One Health is enthusiastically embraced, but the reality of how to implement it on the ground is harder. This group is already ahead in many respects, but this has advantages and disadvantages as we are trying to achieve what has not been done before and we need to learn as we progress.

All dog bites in rabies endemic areas are potential exposures, and a risk assessment can help to decrease costs, notably of unnecessary PEP. We need also to increase diagnostic capacity. If we could eliminate canine rabies, we could reduce human rabies by ca. 95%. Part of the problem is a lack of awareness on washing wounds and PEP, the lack of responsible pet ownership, part is due to vaccine inaccessibility. How do we approach these various problems?

We have learnt a lot from the Bohol experience. We need One Health, but there is much more to it than just human and animal health component – education, legal changes, funding leadership, advocacy work are all key to saving lives. In Bohol, there was no top down implementation of the program, they built it from the community who understood what was in it for them – resulting in a huge volunteer effort. Sustainability is critical, because external funding will not be there for ever. Bohol almost eliminated rabies in 1990s, but the funds were taken away and rabies resurged. This time, community involvement and improving law enforcement helped to achieve sustainability for many years.

At the start of the Alliance, rabies was not even on the “radar”. GARC and PRP have brought it back. GARC began as voluntary organisation, and now has a small core staff who have built up a network to be able to put people in contact with one another across the world. WRD made available free educational resources online which are used worldwide, and the campaign is now moving from a single day to a year-round initiative.

Further the PRP brought together all international stakeholders in rabies control, initially in Banna (Italy). The first year was difficult, but slowly consensus has been built. In the second year, the Blueprint was developed as a web-based resource, and now other organisations are looking at establishing similar platforms. Currently we need to know what the burden of rabies is, and GARC have put together a health economics group to predict savings due to canine rabies control. Programmes such as in Bohol and the “Adopt-A-Village project” enabled us to work with government and communities to approach practical rabies control in a different way. We wish to adapt and replicate these projects elsewhere as a proof of concept.

There is still more that needs to be done, better surveillance, impact models and to look realistically at what happens after elimination in an area. We need to remain open-minded and assess what we have learnt along the way and in the different activities. Everyone should take a step back and view problems from a different angle. What have you learned in the last 8 years?

#### **Discussion:**

**SC** – the theme of this meeting is lessons learned – we mostly learn from things that have gone wrong, and we need to be as open as we can about this.

**LN** – As a result of research in the KZN program, we learned that even with a good surveillance system, only 50% of canine cases were being detected. Without good surveillance, we can't measure successes accurately.

**BJM** - In India, diagnostics are now beginning, but lab-confirmed surveillance of human cases is not a reality in the near future, so clinical diagnosis will continue. The most important thing is to increase the priority given to rabies prevention. After a long time, rabies is now on the radar. Using the One Health approach is easier said than done, with polarised stakeholders “fighting to agree”. We now have to build awareness amongst the planners, with a united front in terms of messages. The first steps towards a national programme for India have been taken.

**BM** - Rabies is just one of the many responsibilities of a provincial veterinary officer. But when all sectors come together rabies can be a top priority.

**VA** – From FMD eradication we learned the value of monitoring and surveillance. We need to connect provincial offices to report to a single central office.

**BM** – we are looking into more judicious use of PEP, by following a cohort of people coming into bite centres, and looking at the clinical and epidemiological characteristics of every consultation. Observation of dogs is being used a lot more now, and PEP is being discontinued as a result. Responsible pet ownership has improved, but the law still says that you must begin PEP for all cases. Physicians are not yet convinced, they need to see data and the study on more judicious use of PEP should help that. The Government is starting to shift spending from human PEP to dog vaccination.

**SK** - In Kenya we are putting together a national strategy, addressing poor surveillance and lab diagnosis (currently all done in veterinary labs) is a challenge.

**AD** – The long term strategy is that we can reduce PEP by vaccinating dogs, but we need to protect dogs *and people* for some time – it is expensive at country level at the beginning (accumulation of costs). How can we mobilise funds for dog vaccination without prejudice to the human side?

**AR** – In India we now have the first diagnostic lab dedicated to rabies, in Bangalore. Publicity around this new centre resulted in samples from a rabid wolf being submitted and a strain of rabies never before found in India being detected.

**SC** – How do we engage the field workers and facilitate systems for them to submit samples to labs? They're the front line for sample collection.

**MT** – Cameroon's data collection is hampered by who covers the cost of sample submission.

### **The PRP roadmap of critical steps towards global rabies elimination – Louis Nel**

When GARC started, as a group of volunteers, the politicians were not interested in rabies. The first WRD sought to involve 55,000 people and it far surpassed that. The first PRP meeting brought together people with diverse skills to do some collective strategic thinking on the global problem of rabies. Five pillars were identified (Advocacy, Communications, Research, Capacity building, Pilot projects) and the main focus was on the canine rabies problem in the developing world.

The original roadmap had seven elements and I want to look at how we have moved towards these goals and where we go next.

- (1) Generating the evidence base. The global burden revaluation carried out by Katie and the health economics assessments have elaborated on this and we are also providing tools to evaluate ongoing rabies projects. We have learned that rabies is costing us a fortune.
- (2) Developing control strategies. The rabies blueprint was a great achievement, with a spectrum of collaborators and has been a big success. Now we have both canine and fox rabies blueprints.
- (3) Defining rabies advocacy messages – for example “Human rabies: invariably fatal, eminently preventable.” The WRD campaign is all about advocacy and as Debbie once said “I think we have changed the way the world thinks about rabies”.
- (4) Eliciting political support and commitment. This can be stimulated by press around rabies cases or outbreaks. There's a need for key people such as ministers to engage and publicize rabies and its control.
- (5) Involving civil society. Globally, WSPA, Blue Paw Trust and RSPCA are now involved as we had hoped. We have shared agendas and have collaborated successfully. Where we have identified individual rabies champions, this has made a huge difference. This should be a major aim for the PRP – to identify and support champions.
- (6) Mobilising resources. We need to describe project success and show sustainability, especially to mobilise the resources from within the countries struggling with the disease. External funding such as from the Gates foundation does not last forever, but increased government resources committed in KZN demonstrates success and sustainability of funding there.
- (7) Demonstrating efficacy. We need to mobilize the population to vaccinate their dogs but also expand and improve human treatment options. Intra-dermal vaccination is a huge cost saving, can we also now shorten the regimen? Ideally, we want to see animal rabies go down and then human rabies as the ultimate measure of success, as has demonstrated in KZN.

The PRP has catalysed large scale change and increased tools and advocacy for rabies control. I consider the PRP has been successful, because we have a set of shared values, and have participated by giving our own time. Meetings have been kept simple, with a purpose and an outcome.

“Next Generation Network Evaluation” is about aligning theories of change across partners and levels. Increasingly, networks are used as a vehicle for social change. The World Bank is funding a large range of such networks. Governments, donors and practitioners are feeling the pressure to demonstrate and report on the impact of their work. There are increasing numbers of tools and metrics for evaluating networks, such as measuring vibrancy, connectivity and the progress being made.

#### **Comments:**

**KD** - one of the PRP's strengths is that we came together ourselves and we're not pushed together. This was noticed by the Gates foundation.

## **Building and uniting a community: campaigns and communication networks – Deepa Balaram and Jane Coutts**

The GARC Communications expert has created a map all for rabies stakeholder groups and mapped out their influences. Our communications focus on three categories of stakeholders – (1) The general public and dog owners who generally receive information; (2) The professionals, educators and policymakers where information flows in both directions and (3) Key opinion leaders who are our top level source of information. GARC has activities and initiatives focused on each group, for example:

The Rabies Educator Certificate (REC) initiative is designed to give skills and knowledge to non-specialized people. It was a direct result of a survey of PRP members and will be a distance learning exercise where the PRP can contribute with advice, facilitation and promotion.

The One Health challenge was built upon the PAHO competitions to encourage people to work within their communities and in particular across sectors, to promote rabies awareness and control. Teams of veterinary and medical students will compete and we are looking for prizes to offer the best teams.

Webinars: In 2013–14, these will be smaller and more frequent, focusing on different professional stakeholder groups and we will be looking for PRP expert speakers.

WRD: Since 2007, WRD has reached more than 200 million people with events in more than 200 countries. We have many partners involved but could always use more support especially for promotion and with translation. A wider discussion on how to build campaign networks is needed, especially how we can bring in new organizations or sectors into the groups that we have.

*African Campaigns (JC).* I am trying to transfer my experiences working with the PAHO partnership to Africa. We have no physical base in Africa so are completely dependent on collaborations with partners. This is a two way process where we can learn from them as much as we can offer, and we have developed a stepwise approach to strengthen collaboration. In 2012, the first year, we focussed on the delivery of generic posters. At the beginning this was logistically difficult and we are learning to streamline the process. In 2013 we are still building the network and offering posters but transferring the printing to in-country businesses and collaborating more intensively on the development of additional materials. In Kenya, a rabies fact sheet specifically for hospitals was developed, looking at that needs of the community. GARC can help in this case by supplying technical help and pictures. In Nigeria we're working on posters with information designed for border areas.

Next year we intend to build impact evaluation into the planning, adapt more information to the localities, and build more local capacity. We need to focus on the process more than the materials, evaluate the contexts and the needs of target groups. Checklists have been developed to enable us to do this, asking: Who needs to learn? How and where should messages be delivered? Who in the community can help? And how do we measure success?

### **Discussion:**

**BM-W** - We should let communities set the questions rather than as go to them with information.

**JV** – We found in marketing that one poster to fit everybody, actually fits nobody. In the end we had several key messages (e.g. wound care messages) and countries picked the messages they wanted to use.

**SC** – For different steps along the process you need different messages.

**OC** – WHO uses communication for behavioural change (e.g. for dengue and influenza). We could use their expertise.

**SK** – We can work together through networks to share messages across borders. We need a Pan African Group to create these messages.

### Session 2.2. Progress and evidence collected

#### **Intersectoral collaboration for rabies control - Katinka de Balogh**

Communication with policy makers is vital but what level is the most appropriate – local, national or international? We have seen a lot of intersectoral meetings, but not so many specifically on rabies

We need cross-sector messages not just from the human health side or the animal health sector, and integrated dog bite management can really make people work together.

FAO recently held a stakeholder consultation in Cameroon which lasted for five days and focused on capacity building for rabies control. On days one and two we visited high level ministers, private sectors and animal welfare groups, and funders. On days three and four we had the actual workshops, then on day five we went back to the MoH and MoA to provide feedback. FAO has carried out several of these over the past 2 years, usually with 25 to 35 people from various sectors, and a two day interactive meeting. Often people even within the country didn't know each other before, but have identified constraints and come up with an action plan from the meeting. We now have a toolbox on how to develop these stakeholder consultation meetings, and found that we can create a lot of energy by connecting these people.

There have also been several rabies advocacy meetings in recent years, and in November 2011 there was a high level technical meeting to discuss health risks at the human-animal-ecosystem interface, which was held in Mexico City. This had more than 100 participants, with many ministers, technical, regional and donor organizations represented. The subject was the technical and policy aspects of how to engage in cross-sectoral communication and coordination. Rabies was one of the three topics used as entry points to the discussion. The top three key supporting elements of cross-sector collaboration were found to be political will and commitment, trust and common objectives and priorities.

*A Kenya Scenario (SK):* There is a one health unit in Kenya. It was driven by the need for contingency planning against H5N1 and established the national avian influenza task force in 2005. Following the Rift Valley Fever outbreak in 2006-07, the government formed a zoonosis technical working group in 2008. This group meets every quarter with the chair rotating between public health and veterinary services. Zoonotic diseases were being ignored amongst the long list of diseases, so a prioritized list was developed including rabies, anthrax and brucellosis. Discussions were held on how to move things forward and now we have an implementation strategy for the one health approach in Kenya.

A national rabies control strategy, based on the stepwise approach to rabies elimination is being developed, to lead towards elimination in the region, with the objective to have no human rabies cases by 2023. There are many partners involved, and we acknowledge the help of GARC and especially the Rabies Blueprint in its development.

*KdB:* There are other examples of one health in rabies, such as Mr Madhi in Mauritania who has a one health approach to vaccinating dogs and the follow up of dog bites - advising both on human and animal health sides. In DR-Congo, there is one centre (that is part of the MoA) that has both human and animal vaccines together. But they have no fridge, just a coolbox.

In Vietnam there is no contact between medics and vets in the case of dog bites. They have developed a national control strategy, but there is no budget for PEP or dog vaccination. In Latin America, bite centers are working well. In Bali, after a slow response and lots of rabies cases, they now have integrated bite management. The veterinary side is involved at the start and at the community level they now follow up all of the dogs, and this system is working well. Building trust is very important for cross-sectoral collaboration.

The measurement of trust =  $\frac{\text{credibility} \times \text{responsiveness} \times \text{intimacy}}{\text{Self-interest}}$

#### **Discussion:**

**JV-G** - In Kenya, how do the MoA and health come together regarding funding ?

**SK** - The one health office has funding from a donor and this gives credibility. The staff are paid for by the government and the long term plan is to get the government to fund it. It is already an office owned by the government.

#### **Effect of Linking Experts into Regional and Community Networks - Abdul Rahman**

There are international organizations (e.g. WHO, OIE, FAO, GARC, CVA), Regional organizations (e.g. SAARC, WHO-SEARO, CVA Asia, RIA), National organizations (APCRI, AWBI, NCDC and central government). Then there are state government, and local government agencies right down to the village level. Coordination of all these agencies is very difficult. WHO deals with the MoH and OIE and FAO deal with the MoA, and there is no cross-linking. Lots of agencies within the government are involved in rabies control, and NGOs (Such as RIA, APCRI, GARC) can be very valuable as they can link across these structures.

The Adopt-A-Village program in 10 villages surrounding Bangalore and Pune involved many medical and veterinary partners, and has empowered local people to provide rabies education, not outsiders. We used the existing networks to propagate messages and devised novel awareness materials (including a calendar with rabies messages each month, a snakes and ladders game and an awareness video). National service volunteers have also been trained to enhance surveillance efforts.

There is a pilot education project in Karnataka state which will integrate rabies education into the school curriculum. 252,000 primary school teachers will be trained and will reach 8.5 million students.

Change at government level is very slow. Often ministers move away and you have to start the convincing work again. With GARC funds we have been sensitizing 545 members of parliament with translation of rabies information in 12 different languages, and a media campaign, both to highlight the need to make rabies a notifiable disease in India.

Now we're seeing animal bite centres maturing into one stop rabies prevention centers (E.g. Abhay Clinics which advertise on buses how to get vaccinations). DIYA (Disease Information for Young and Adults) is playing a role both at schools and at clinics.

The impact of WRD has been really tremendous, and champions are getting press attention, such as Dr Bharti in Shimla giving pre-exposure vaccine to disadvantaged, socially marginalized rag pickers. In India there are two main religions - Cricket and movies. We got the captain of the Indian cricket team and also movie stars to donate time and record messages about rabies prevention which were broadcast on prime TV around WRD.

A model rabies prevention program would involve inputs from both the medical and the veterinary sides which are integrated into a single prevention method that results in behavioural change. In the Indian subcontinent the challenges are many. Rabies is not a priority disease and there is inadequate data, political support or consensus on a strategy. Neither the vets nor the medics accept responsibility for dogs and there is weak inter-sectoral coordination. There is inadequate management of control methods and a lack of public corporation. Diagnosis is becoming a key issue and more labs are being established to collect more samples. However there is as yet no work on the role of wildlife in rabies in India.

We really need to address the enforcement of legislation and increase the priority of rabies control for all governments, and increase public awareness levels. There must be active contribution of the veterinary services to the goal of eliminating human rabies and comprehensive sustainable national programmes for elimination that are harmonized between neighbouring countries.

**Discussion:**

**SK** - How do you manage stray dog populations in India?

**AR** – Animal welfare organizations are paid by the government to carry out ABC programs.

**Technical improvements with a practical impact - Charles Rupprecht**

How do you manage dog populations? There is progress in the concept of no-kill-clinics and ABC programmes, but the evidence is that these impacts are not large enough to reduce population sizes. A research priority of GARC is to look at immunocontraception, which need not be permanent. There is a \$25 million prize for solving this problem for both sexes and this is bringing advances. A product may be around in five years, and after five more years be ready to be used in the field. A one stop shop for rabies could be to combine an immunocontraceptive with rabies vaccine, and we need to communicate and advocate for this progress. It may be possible to use chemical castration with Gonacon (a deer product) in dogs, eventually combined with rabies vaccine.

PEP regimens are too complex, too long and the schedules are too confusing. Evidence could be used to guide regimen recommendations without needing more clinical trials. We're not promoting PreEP enough as most vaccinators and diagnosticians do not have PreEP. We can affect policy without changing labels. A shortened, multi-site ID regimen within a week may be possible.

For diagnostics it would be good to focus on saliva, but for quality assurance you need samples you can see. dRIT is one test and we're currently engaging with OIE rabies reference labs to validate it compared to DFA. We have completed the dRIT training in Chad, in Bangalore and are looking for pan-reactive mAbs. There's a need for decentralized diagnostic centers with less infrastructure. To ensure sustainable production, the dRIT kits could be produced by WHO, in the commercial sector, or could continue as before and the "research" phase continues until rabies is eliminated.

**Discussion:**

**JM** – The dog population issue is really getting priority. The prize is for a one-shot, permanent solution. But is this not scary? What about species specificity? Pregnant dogs are not a disease.

**SC** – Some communities may not want immuno-contraception. At the start of rabies control we should focus on vaccination first and responsible pet ownership, then maybe sterilization later.

**TM** – We should not forget how lateral flow devices are becoming much more popular for diagnostics now. We don't want rabies to be left out and have to recognize these new developments. These devices can be very sensitive and very specific.

**SC** – The purpose of the diagnostic test is critical to determine which tests we consider – tests for monitoring and surveillance at different stages of the control pathway may have different performance requirements.

**CR** – We need diagnosticians to have control over the test, not just grab something out of a box.

Session 2.3. Where will we be in 5 years' time

**Speaking with one voice – appropriate communication strategies - Deepa Balaram**

We try to encourage two-way communication, and positive messaging as an atmosphere of panic is not in anyone's interest. In order to affect behaviour change, our messaging is designed to move people from ignorance to understanding, from fear to empowerment, and then from inaction to action, building trust in GARC along the way. Our new website has merged the old rabiescontrol.net and worldrabiesday.org websites. There are several new elements, including the ability to add a WRD event to an interactive map and upload photographs. We also have started a social media campaign focusing first on global messaging, that we now need to facilitate more local messaging. We are also looking into promoting the rabies blueprint more widely to policy makers.

However, a lot of our target audience is offline, and we need an intermediary network who is online to use these materials offline in their communities, so we are very dependent on networks. We also consider to explore mobile phone technology more.

We are trying to increase media coverage and want to integrate key opinion leaders from different countries e.g. in TV show spots. In the Philippines we are training journalists, and we want to give people local experts to talk to. Awards such as GARC's recent charity award also help promote rabies and our efforts. We need greater collaboration with the media for rabies related events.

In five years' time, we hope to have developed the rabies educator certificates fully, have more collaborative outreach in target countries, and more regional and country-specific websites. Where these already exist we would like to know about them. Having networks of experts to help with advice and resources to direct people to will be key.

Finally, in our new website we have the ability to develop a password-protected PRP area where we can add resources and presentations such as these presentations. We would like everyone to update their links within their networks to our new website: [www.rabiesalliance.org](http://www.rabiesalliance.org) and [www.rabiesalliance.org/world-rabies-day](http://www.rabiesalliance.org/world-rabies-day) to link directly to WRD section.

**Discussion:**

**AD** - We need to work on increasing political will at national level, and to invite countries to mobilise funds in their national budgets for dog vaccination campaigns.

A password-protected platform for the PRP was welcomed, with a simple login process.

**KdB** - We should ask Brad Pitt (in recent World War Z rabies-like film) to be an advocate for rabies prevention.

### **The potential role of regional networks or platforms in driving rabies control Southern & Eastern African Rabies Group - Louis Nel**

At the recent 11<sup>th</sup> International SEARG meeting (12-15 Feb, DAR, TZ), the global session was very well received and we also explored the PCP with Katinka. The new SEARG website has lots of resources from the meetings and about rabies and its diagnosis together with national reports presented at the meetings and a publication list relating to the African rabies situation. The whole website is also available in French ([www.searg.info](http://www.searg.info))

#### **Discussion:**

**BD** - Can anyone register for SEARG meeting?

**LN** - They have a system. Someone officially representing a country and delivering the country report can apply for support if they've tried in their own country and can't get it. We are trying to get people to find their own support to attend.

**AD** - The OIE does not support the PCP approach to rabies elimination, preferring to put the emphasis on better dog vaccination coverage. The epidemiology is very different compared to other diseases (FMD, PPR) with PCP frameworks or PCP frameworks under development, the populations at risk are also very different. There is no official recognition for national rabies control policies.

**LN** - Can we not work with all partners and adapt it for rabies?

**AD** - The PCP is additional bureaucracy, too complicated for work at field level, and not necessary.

**SC** - This should be discussed at a side meeting.

### **Rabies Experts Bureaux - Betty Dodet**

AREB was started in 2004 by Sanofi Pasteur, as an informal group of rabies experts on the human side. It aimed to maintain regional links and discuss practical issues and problems encountered. It was successful and the idea was expanded to AfroREB (for francophone Africa) in 2008 and MEEREB (for Middle East and Eastern Europe) in 2010.

The idea is to have informal discussions which lead to practical regionally appropriate steps to support advocacy and awareness. The national authorities of the country where the meeting is held are also invited and press conferences and scientific publications are produced. We now want to avoid fragmentation and encourage integration with other networks such as SEARG and GARC. Historically, funding from Sanofi supported the human side only. With funding from Merial we have managed to bring in some vets also. However, there are issues of sustainability and also conflicts of interest. We need to widen out the funding base from industry and evaluation of the groups is very important.

### **The AREB network - B J Mahendra**

There are a lot of Asian networks for rabies control at the national level. India has three (APCRI, APCRB, CAR) and there are national chapters of the Rabies in Asia (RIA) group in 9 neighbouring countries. There also regional networks (AREB, SEA REF, RIA) and many have industry partners. The role of multinational companies and more local companies cannot be underestimated for example one company has started an SMS system to text reminders for subsequent PEP doses.

There have been many good experiences, for example (i) the rabies burden work in 2004 (APCRI), (ii) the ending of NTVs in India using a multidisciplinary approach, (iii) WRD has had a huge role in raising awareness, (iv) the ID technique has really reduced costs and allowed clinics to stop turning people away, (v) Many intersectoral meetings have a good, (vi) Awareness programmes have been successful (vii) The one health approach, such as in the "adopt-a-village programme", has gained ground (viii) The Bohol success story.

However there are concerns. Duplicity is one big issue. We have seen lots of conflicts of interest, particularly with animal welfare activists. Rabies is still rarely a priority for medics or vets and there is a resource crunch. What we need is a convergence of approaches, clearly defined roles, and platforms for conflict resolution. The focus should be on the bite victim, not self-interest or competing agendas. It is time for science to prevail over emotion, or we will lose focus. Clinical planning and implementation are required.

#### **Discussion:**

**BM** - But rabies is an orphaned disease, and data is *not* enough. Until a celebrity dies of rabies, the press will not wake up. The downside of WRD is that it is forgotten the day after.

In South Africa, it took a well-known person to die before policy-makers got engaged.

There is a hidden population - the technocrat doesn't have access to politicians - it's the bureaucrat. We need to target bureaucrats.

### **The MEEREB network - Firouzeh Farataq**

MEEREB is only nine countries and many rabies-endemic countries surrounding Iran are not included. Although a lot of money is spent to stop rabies in Iran, we still have 4-5 human cases each year, uncoordinated control efforts, under-reporting, a lack of awareness in rural areas and a constant threat of reintroduction from neighbouring countries.

Regional networks can allow the exchange of information between countries, and countries where rabies can be or has been eliminated can help guide other countries. Experiences can help to develop interdisciplinary communications and collaborations. MEEREB is a great initiative, but more countries need to be included, we need more activity between meetings and more interaction with the AREB network.

**Discussion:**

**BD** – maybe it would be useful to have Iran with the AREB group. However, the politics of including countries in this region is very difficult. The next meeting in Jordan will have representatives from Middle Eastern countries not on the map in the presentation.

**BA-R** – There is scope for coordinating everyone's meetings.

**OC** - the REDIPRA (meeting of national directors of rabies programmes in each country) is very valuable, and I am surprised that this is not repeated elsewhere. Each region has its own government process – with their own priorities – and this can really influence national MoHs.

**BD** – with the REB groups, it was always more informal, not political. Now we are looking more at strategy and approaching it at different level. They still have to evaluate whether this approach is helpful – as opposed to WHO and MoHs joining together.

**JV-G** - GARC is coming on board for the REB steering committee. Sanofi Pasteur are looking to open networks to new sponsors and perhaps could all come together and rationalise the meetings. GARC could play a key role here.

**The AfroREB Network: Mathurin Tejiokem**

AfroREB is a great initiative which helps countries sharing information and expertise, updating their expertise and strengthen collaboration. It has also played a role in raising awareness, members are empowered to do sensitization of the media and politicians. Five out of eight AfroREB countries have made rabies a notifiable disease, which is a concrete success.

The network has increased visibility of rabies and information about it, through websites and publications. However there is no collaboration between meetings. The networks are still consultants and country authorities are not applying the members' recommendations. They are receptive, but have competing priorities and are waiting for donors to do it or to fund it. Network members have difficulties fulfilling their missions. There is also low representation of animal health experts in the network, a handicap to intersectoral collaboration.

**Discussion:**

**SC** – We need to look at ways of supporting individuals in taking the aims into their own country, perhaps by a PRP mentoring system.

**LN** – How about using the concept of a country report, to really look at the numbers? You can collate data on cases, tests, infrastructure to have something tangible from the meetings, and to look for improvements.

**MT** - Things are getting better and we have started reporting data, but it's not representative of the whole country yet.

**TM** – You could have public domain bulletins to publish country reports on a website may be on a quarterly basis, with short articles on interesting aspects of rabies as well. You can ask for improvements to be reported.

**BJM** - In addition to the country report, the REB networks' objective is to bring a focus to rabies. The information is accessible, but the aim is to support, to interact.

**HB** – Who do you invite? and why?. This will affect the data that you will receive.

**SC** - Interaction is critical – collectively, we're stronger.

**Refining the strategy - From data to policy changes (and sustainability) – Lea Knopf**

A lot of data is produced, but how does the PRP see its role? It has identified gaps, agreed strategy on how to fill them. It has created networks to do something about it. Then we have tried to demonstrate that the gaps are filled and demonstrate success.

So why is rabies still a problem? It is not enough to fill gaps with data. How do we trigger policy changes and make them last? Affecting policy is hard and usually lags behind the evidence. Technical people are often not familiar with political frameworks, and different levels may need different approaches. We need consensus based on common interests, a clearly defined problem and clear policy recommendations. Finally we need the trained personnel and funding required.

Rabies control and its stakeholders are extremely complex, including aspects of regulations, values, attitudes / expectations, and culture and religion. There are many different ways of looking at moving evidence to policy changes. One way is to take research results (e.g. arguments for dog vaccination), develop policy options and then find ways for these to be sustainably adopted. The PRP so far has been very strong at gathering evidence and advice and growing public campaigns and advocacy. We have really been missing so far lobbying and negotiation and these are the PRP's long-term goals that we need to work towards.

Is it really possible to create one model that fits all? We need to look at generalizability for some insights. How do we measure our impact on policy changes? We need to strengthen regional networks and the stepwise approach to rabies elimination tool may be helpful with this. There is a need to assess the sustainability of programmes and projects. Finally our lobbying for rabies prevention, specifically targeting decision makers should be improved.

**Building on the 'one health'-momentum – C. Rupprecht**

One health is a very old concept to vets, but we need to break down the barriers in other sectors. Why have the Americas been so successful with rabies control and not Africa? Perhaps public health recognition of rabies has been the key. Rabies is not accessing one health money for emerging diseases enough. If a human, animal and wildlife surveillance system is working for rabies, it is useful for everything else.



The ethics of animal euthanasia in the interests of human vaccination is a problem, and we have not talked about livestock issues enough. What are the relative roles of WHO, FAO and OIE in livestock disease?

For some people one health has become "passé", but others, particularly in public health haven't yet really understood what it means.

### **Cultural factors influencing rabies control – Monique Lechenne**

Lots of preparation studies had suggested in Chad that we could get a citywide vaccination campaign to reach 70% of the dog population. In the pilots we chose Christian quarters (with the highest density of dogs) and these were very successful. However, when the citywide campaign began, in the Muslim quarters we did not reach 70% coverage.

Different cultures have very different attitudes towards dogs. In Mali dogs sell for \$12 for meat. In Abidjan (Ivory Coast), a singer said, "Can you imagine, white people even have doctors for dogs?"

In Hinduism and Buddhism, the concept of reincarnation means animals are very similar to humans. In Judaism and Christianity there are specific rules to protect dogs and humans and animals should live peacefully together. Modern animal welfare has its roots in southern German Pietism. In the Quran, animals are considered close to humans. There are rules for handling animals, slaughtering and consuming them. In the Hadith (Sayings of Mohammed, used together with the Quran) different verses are followed by different religious traditions. Some verses consider stray dogs ritually unclean, but others say dogs need to be treated well.

In Chad, some people say a dog must never be in the house because it is unclean, and dogs prevent angels coming into the house. Images of a dog being held can put off Muslims, some people cannot handle dogs and others will not admit to having a dog. Some people ask why we're treating dogs when children are sick. The consequences can bias data, and we saw much lower attendance at vaccination points, and a higher proportion of genuine strays in Muslim quarters. We cannot set a single standard, and the impact of cultural differences needs to be acknowledged. We have to understand that, in some communities, the scientific argument might have limited meaning.

### **Discussion:**

**AR** - The OIE commissioned an article on animal welfare and Islam which I wrote. 1,500 years ago the Prophet knew that the saliva of the dog transmitted rabies. So he said, if a dog licks you, you should wash seven times, and this is the basis of dogs being considered taboo. Many religious leaders do not understand the animal welfare and rabies issue and we need to address this.

**SC** – We need to reconnect Muslims with pride in their epidemiological understanding.

**KdB** – There are also different perceptions about rabies vaccine – for example not being able to drink after post exposure or vaccinated dogs don't make good guard dogs. Cultural differences are not just about religion – also social structures, but we can also collaborate with these structures and processes.

**JC** – We are good about explaining *what* to do about rabies, but not so good at *why*. Perhaps this will help break down some barriers.

**CR** – We need some rabies champions to talk about these sensitive issues.

**AV** – It is dangerous to only pinpoint religion – there are other cultural effects too.

**AD** – Joining efforts on communication would be very useful, with different messages at different levels - to the community to encourage vaccination, and globally to encourage funding.

**CG** – In the Philippines where dogs are eaten, vaccinated dogs were thought unsuitable for eating

**\*AP\*** Could we develop a potential list of belief systems which could impede rabies control and publish it? Or include it in the blueprint?

**CG** – It used to be in India that it was impossible to share data because it was a national security issue.

**AR** – We have moved past that now.

**SC** – At SEARG meetings the data is already 'approved'. This seems to be less sensitive for rabies than for the other diseases.

**JV-G** – There was a lot less willingness to share Cholera data.

There can also be issues over privately imported vaccine being in conflict with the government's policies.

**\*AP\*** **AR** – I would like a one-page on what has been decided at the meeting, to take to my government. What will we do after the meeting? What can the CVA do to help?

**CR** – It was a frustrating process trying to get letter written to get rabies on the WHA agenda.

**DB** – But we are now making progress with GAVI. GAVI has now included rabies, and has approached GARC for information. They may come back for more, and have said they'll look at rabies in terms of a pilot project.

Organizations such as CVA has GAVI eligible countries, and they should be encouraged to send written support. There is a survey currently open – looking for input from rabies endemic countries. **\*AP\*** Louise will send people the link.

**LT** – We also need to be realistic about timescales when we ask for letters of support.

**BA-R** – We could begin a resolution at regional level, and the following year, work towards bringing it up to the political level. **\*AP\*** Do we want to get letters in support of a side event on rabies at the next WHA?

**AD** – There is good momentum for a true tripartite agreement, in partnership with GARC.

**SC** – Does anyone have any good examples of rabies integrated with other disease control?

**AR** – WRD was a catalyst for the one health platform in Bangalore, but the government is not interested, so it is up to NGOs like GARC.

**AD** – At the global level, one health started in influenza control, and the tripartite concept note from 2010.

Capacity building is very important. Instead of merging with other diseases, basic surveillance and intersectoral support is more important.

**KdB** – in most parts of Africa, they never had influenza but the money meant they put one health committees together. But as interest waned, things fell apart and now only Kenya and Ethiopia do it. Inter-ministerial meetings are very expensive and usually only driven by emergencies. ICONZ (integrated control of zoonosis) incorporated rabies and echinococcosis control.

**SC** – Diseases have different parties, different distributions and different control strategies. I don't see integration of control being easy, or all that big a priority. As you have more diseases you get more hurdles and barriers and regulatory issues are harder to resolve.

**AD** – The animal health sector is still not engaged enough. OIE continues to push for more support, and the silo issue will disappear.

**CR** – Smaller examples of one health projects have worked (e.g. dip tanks in South Africa for livestock and dogs, ABC programs with vaccines and sterilization, rabies and worming dogs at the same time)

**LN** – In South Africa small intersectoral national rabies advisory or action groups have been set up and we're trying to promote these in surrounding countries.

**LK** – who are the other partners we need to take on board. Ministry of Finance? Budgetary issues between MoH and MoA can be insoluble.

**BM** – Occasionally the light goes on – I recently heard that half of the country's canine vaccine will be paid for by MoH, because they realised the imbalance.

### **Summing up of Day 1 – Sarah Cleveland**

As an entry point we need to make the seemingly impossible possible, by moving incrementally forwards. Several themes emerged, including the need for surveillance, and especially champions of surveillance, the need to assess the impact of rabies control efforts (networks, programmes, projects, both qualitative and quantitative), and to incorporate these assessments from the start. Intersectoral collaboration including all relevant policy partners is critical, and local variations and cultural differences will have an impact. We need to be open-minded and learn from each other as much as we can.

## **Day 2 - Wednesday July 17<sup>th</sup>**

Session Three - Progress and challenges

Session 3.1. Gathering information & providing tools

### **Update on global rabies burden study & notifiability survey – Lea Knopf and Louise Taylor**

The global rabies burden study is being completed by Katie Hampson. It is based on the study by Knobel in 2005 but uses more data sources, including specific survey responses, international databases and biologics' industry sales data. This is also a truly global analysis, it is parameterized by country, not continent level and represents a more complete up-to-date view. It is very difficult to have exact data for each country therefore clusters of countries (around 20) have been used where necessary. The outputs are crude number of deaths, exposures and PEP treated, direct and indirect costs of rabies and rabies control and DALYs due to deaths, exposure and adverse effects of vaccination.

The manuscript has been delayed that is now almost finalized and a draft will be circulated with meeting minutes. A final run of the model is needed.

Compared to the results of the Knobel analysis, deaths are almost equivalent, but confidence intervals are a bit smaller with this data there is a significant increase in burden for China, and a slight reduction for India. The overall economic costs of rabies are estimated to be an order of magnitude larger (in billions not millions) as this study included indirect costs such as missing work. This aspect is important for advocacy as the figures are shocking and convincing.

There are a number of refinements underway including reviewing the clustering, improving the livestock analysis and quantifying the YLDs relating to the stress of exposure. Compared to 2013 figures, the figures used here (2010) may be an overestimation of NTV use. For large countries, such as India and Brazil, sub-national data may be more appropriate.

This data has already been used, for example in the GAVI discussions, providing information not available elsewhere and it has great further potential.

### **Discussion:**

**LK** – we are looking for PRP feedback on the manuscript.

### **Human rabies notifiability survey – Louise Taylor**

This survey was designed to deliver on the WRD goal of increasing political will, by focusing on surveillance issues. A country-by-country assessment aimed to map countries according to whether rabies was notifiable, determine the barriers, assess how surveillance operates and how effective it is around world. If rabies was not nationally notifiable, follow-up few questions were asked including what the barriers were thought to be. If rabies was nationally notifiable, we asked for more information about case definitions in place, specific legislation, how surveillance was carried out and whether it was deemed effective. The data was collected via an online survey in four languages. 146 responses from 91 different countries (17 of the least developed countries) were collected, with pretty even coverage across different rabies risk categories and across the regions. Rabies was notifiable in 83 out of 91 countries, and these usually had a case definition and specific legislation in place. However many

respondents, all in high or moderate rabies risk categories, reported that surveillance systems were not effective.

This is the first global survey of rabies notifiability and the manuscript is almost ready. Rabies is often a notifiable disease, but surveillance systems are very variable. The effectiveness assessment used here is subjective, but ineffective systems were usually in countries where the burden was high. Making rabies a notifiable disease is clearly only the first step in designing an effective surveillance system.

#### **Rabies surveillance – Challenges - Thomas Müller**

Surveillance is making good decisions with limited data, and surveillance is a critical step in judging the success of rabies Elimination programs. But are we all talking about the same type of surveillance (Prevalence, incidence, reportable, passive/active, monitoring, notifiable)? People who have to take decisions based on data, vets at local and national level, may not know what we are talking about. Too many definitions and interpretations leads to confusion. Do we need to come up with our own definitions for rabies surveillance? According to OIE animal health code, monitoring is an ongoing program of observation with no response, surveillance is continuous investigation relating to a response. Most countries say that they do surveillance, but don't really.

Surveillance critically depends on political willingness, education, vigilance, laboratory capacity, data collection and management systems. The probability of detection depends on prevalence, awareness and vigilance. Vigilance needs to be higher when incidence is low, but this is not understood by vet authorities. In reality, true surveillance for rabies is only in developed countries. In developing countries often there is no infrastructure, records are kept for reporting only, timelines are missing and there is no data analysis. There are many questions about designing a sampling approach, e.g. Randomized, opportunistic, over what scale, laboratory support, and which indicators (eg more unreliable clinical case data, bite victims nos.) are reported. In remote areas there are greater challenges. There are different options also for the diagnostic approach and which agencies to involve. Perhaps there's a need for a rabies surveillance blueprint.

There are lots of international rabies databases - but which ones are accurate? The OIE database is different from the WHO database, and the EU is going to collect its own data, which will not be comparable to Rabies Bulletin Europe. Would regional databases be better? The rabies bulletin Europe (RBE) could be used as a template, and we could encourage a snowballing effect to new regions. But who will conduct the data analysis and feedback? The RBE is a voluntary reporting system, how does this compare to the reliability of data in mandatory systems? Ideally data analysis is structured to the question e.g. location is important in an outbreak situation and there is a need for good surveillance before during and after a control campaign.

#### **Discussion:**

**HB** – Human and animal surveillance are different and will have different constraints, e.g. concerning shipping samples.

#### **Rabies surveillance in Africa - Sarah Cleaveland**

There's very little ongoing surveillance and diagnostics in Africa, with a wide range of experiences and starting points. We need to consider this and plan accordingly. Surveillance is critical, especially when moving towards elimination, but it is only just beginning in most African countries. There is clearly a need to establish lab based tests and generate data on laboratory-confirmed cases, but engaging people in the field and in hospitals to report cases is critical at the start. A lack of lab diagnostics should not deter the start of control or surveillance programs, but be developed and improved over time.

Rabies is often recognized, but this information is not getting to the policy makers. Clinical case reporting is used for many diseases (E.g. rinderpest, polio) and is very important as an entry point for engagement of field staff, even if it is not totally accurate. Once a report is made, this should initiate a response (e.g. vaccine could be allocated to initiate control efforts in response to a report), and is a really useful way to encouraging participation, and to engage new 'champions'. At the very least, a report from the field should initiate a response that includes acknowledgement and thanks for submitting the report, with advice provided on management of cases, including human exposures, and follow-up.

In the Serengeti, Only 5 to 10% of cases get laboratory confirmed. However even at this low level, it is possible to predict when it is safe to stop vaccinating (after six months with no reported cases). If no further cases are seen in two years, modelling suggests you can be relatively sure that rabies is eliminated. Instead of asking how many dogs do we need to sample, the question should be what proportion of rabies cases are detected.

#### **Discussion:**

**CR** – what is the incentive for people to report cases?

**SC** – This is the critical issue – a report needs to be followed up with a response that is meaningful/beneficial for those reporting – at the very least, we should provide acknowledgement and thanks for reporting the cases and provide advice on euthanasia, confining or observing animals involved in bite incidents.

**CF** – If the non-Tanzanians all leave, will this work?

**SC** – The plan is not in place yet. In Kenya we're working to include this in the national plan

**LN** – The moment you increase awareness, sample numbers increase.

**KdB** – 98-99% cases reported are based on clinical grounds. We found at stakeholder meetings that having to pay for sample analysis is a huge disincentive.

**HB** – Clinical case definitions are a good starting place, but we should move to lab-confirmed as soon as possible.

**AR** – the Crucell project in Bangalore highlighted the presence of the lab. They paid courier charges and could pay incentives to people bringing in samples. The number of submissions went up very quickly and we're trying to replicate this with training and other labs. Networking is very important.

**MT** – In Cameroon we're trying to improve animal bite reporting and sample collection outside the capital. So far we cover one region, but we pay for sample transport (Sanofi support) but human samples are much harder to get than animal and we are trying saliva samples for diagnosis.

**BM** – In the Philippines, village and animal health workers need to be involved in all aspects of the programme. When they are sensitized, vigilance is high and reporting is high and they are praised for their efforts. Social responsibility is very high in the Philippines.

**CR** – This is now self-sustaining system, without external aid. What is the role of the lab in this?

**BM** – We always said that without laboratory submissions, they will not get rabies free status. New cases also serve to heighten awareness. Sample submission is paid for by government funds.

**DB** – The community figured out their own methods and there's a lot of awareness to understand what is in it for them.

**HB** – I am a strong supporter of lab diagnosis as the only reliable way to define cases. But clinical definitions can complement this data when the dog is not available and you can choose to use it or not.

**RF** – Clinical data makes more sense in humans than animals, but the critical component is whether vaccine is available or not. If there is no vaccine there is no incentive and there may even be ethical issues raised.

**VA** – We have incentives in most local government units, such as celebrations, cash, vet drugs etc. The surveillance workers are given PreEP and dog food and other incentives. National government is trying to encourage more diagnostic labs, so conjugates are given free from the government to the laboratories, and there is no charge to bring samples to the lab.

#### **Update on the Rabies Blueprint, collaborating on resources and messages - Tiziana Lembo**

The blueprint aims to provide resources to help countries develop national programmes. It was designed to be simple, online, available to policy makers and ground workers with clear concise messages and case studies. The website was recently redeveloped to accommodate the fox rabies component. The canine version was launched in 2010 in English and French with a second version live in November 2012. Translations (into Russian, Spanish, Portuguese and Arabic) were finished in June 2013. We now have a Chinese version which we're looking for a proof-reader for. The fox blueprint went online in November 2012 with the same structure as the canine blueprint.

The canine blueprint has had 6,424 visitors from 145 countries in the last three months. Usage in the Americas is highest followed by Asia, but Africa is still under represented. Within Africa, visits are highest from the north, then east, then west, middle and finally Southern Africa.

The fox blueprint has had 348 visitors from 69 countries in the last 3 months. The blueprint publications are not well cited yet, and it is hard to assess the impact on developing or revising control strategies, that we know anecdotally, several examples where it has been used.

It is a valuable resource but there remain some challenges. We need more promotion, especially to African countries and should reference it in official strategy documents. A program of the yearly revisions is very time consuming especially in a multilingual website. We need to increase the interval between revisions and distribute the reviewing burden amongst more reviewers. Finally, assessing the impact is hard as it is not an academic resource. We need to design a simple survey to reach out to our mailing list and also users of the website.

#### **“Negotiating a common language” Finding a way to understand the context – Jane Coutts**

I have a social anthropology background, and education and outreach imply something is being done to someone. We need to look more at a two way process. The dynamics of context are not easy with so many cultures and situations.

Recently an American intern tested the *All About Rabies* package in Ghana. This was an activity based resource on rabies, and we sought to evaluate these in a scientific way. However we started with the materials instead of designing them. There's a need to identify the target audience and context and negotiate a common language for messages during this design process.

We need to learn about those being given the information. Here, the context was an international school in the capital, because it was available, but rural areas may have no schools. Lots of the teachers said that they could access the materials, but they didn't have a generator all printing facilities. The activity-based form of teaching was unfamiliar in Ghana, and some of the evaluation was asking the wrong questions. We need to develop a set of questions to ask before the program is started. We need a tool like blueprint, but raising socio-economic questions. Like a checklist for context.

We're now looking at other collaborations in Africa, in rural Tanzania, in Kenyan schools and working with the Institut Pasteur in Dakar (Senegal) for market research about infrastructure in Africa, to help develop this checklist. We can learn from other disease interventions, too. This would be nothing as large as the blueprint, and information could be gathered from other health campaigns. We need to negotiate a common language.

#### **Discussion:**

**B A-R** – I can check for a Chinese proofreader among the WHO network.

**CR** - Should we have a blueprint for bats as we have fox? If we're talking about human prevention

**AV** – We need a bat blueprint – I'd find it very helpful.

**TM** - We could set up a small core group, as that was very effective for the fox blueprint.

**DB** – There are a few bat people who could put it together. We need to think of challenges of keeping it updated, and when number of languages added it's a challenge.

**DB** – how can we improve access so that it's an available tool for everyone? Do we have a hard copy for OIE to send to vets?

**OC** – like this new approach of doing guidelines. WHO process is very expensive. You could perhaps convert documents into FAO or WHO guidelines without much work if you are interested in getting an endorsement. Because quality assurance, could become policy

**TL** – but then it becomes a paper-based document again.

**CR** – The blueprint is beyond the limitations of OIE, FAO, WHO.

**KD** – how do we formalise the handling of extensions and updates of the blueprint for the group?

**OC** – If we want government endorsement it needs to be formalized.

**DB** – maybe we could think about endorsement– but how do we do that online?

**KdB** – We can link to it and maybe promote it to vet schools

**DB** – if the OIE had a hard copy – how would we get it out to the field in countries?

**KD** – we have had a lot of demand for CD versions of it from their developing world.

**BA-R** – GARC is an NGO with a collaborative status at WHO – we can link to website, but endorsement is complicated.

**TL** – Asia is using it more than used to, but what is blocking use in Africa ?

**SK** – We had no problems using it, but West Africa is not using it.

**ML** – in Chad the government has no IT support – no access to internet. A lot of staff in the Chad authorities are not used to new technologies.

**DBa / HB** – should the blueprint have an expiry date?

**TL** – Nobody's reviewing the whole blueprint. We should assign sections to different PRP members – to review every two years?

**SC** – we can build in a working session into the next meeting.

**SK** – we found a very useful and very clear and found everything that we wanted.

**TL** – surveys could help us evaluate it. The problem is that we don't have someone to manage the website full time, and we have to go out to DG Sanco for translations.

**LT** – There are two ways to do a survey – 1) ask everyone we know if they've heard of it and 2) Ask users to respond to a survey embedded in the website.

**AD** – We could distribute paper copies to OIE delegates with the agreement of the director general. To contribute to the review, and could help with the Chinese translation.

#### **Update on the Stepwise Approach to Rabies Elimination - Katinka de Balogh**

The idea of a stepwise approach towards rabies elimination was first suggested in 2011, and discussed at the PRP meeting in May 2012 when it was called 'GRAPES'. In Rome in Nov 2012, we first called it a progressive control pathway (PCP), and develop this idea further at the SEARG meeting (Feb 2013).

The purpose is to provide practical steps to help countries to progress towards canine rabies elimination. This makes it different from the FMD PCP – which was about certification. Developing a national strategy requires an understanding of the epidemiology, identification of stakeholders, assessment of the impact, costing the control options and identifying funding possibilities, developing capacity and identifying the objectives of the strategy.

The approach identifies specific activities that need to be carried out by both animal and human health sectors. Vaccinating dogs is one of main tools. PEP and lab diagnostic capacity are also important.

There were lots of discussions on how to define the Steps. Do we go from zero to 5, 5 to 0, reducing risk?. Decided people want to move up levels, and nobody wants to be stage 0. So, to move to stage one a country must report the occurrence of rabies to international organizations. Stage 1 is gaining an understanding of epidemiology of rabies. Stage 2 is to develop a national rabies prevention and control strategy. This then needs to be endorsed and funded. Then stage 3 is to reduce the rabies risk by implementing the control strategy. We have not developed beyond stage 3 at this point, but at stage five a country has no canine cases any more.

#### **Working Towards Rabies Elimination – experiences from Kenya - Sarah Cleveland and Stella Kiambi**

The development of national plans can be supported by both a stepwise approach tool (to guide) and the blueprint (for the operational details). But the first step is to have a national rabies task force and many places need help with this. Progress is envisaged through initial steps that include development of a funding plan, review of legislation, identification of focal areas for pilot campaigns,, and building public engagement.. Rather than attempting to cover the whole country at the outset, it is better to start in focal areas, building on ongoing activities but also identifying representative sites to start developing expertise and experience. Success in these focal areas will also build enthusiasm and confidence.

Step 1 (2013-15). We are underutilising data that we have. We need to combine all sources of information into a database, and obtain less formal information about how people perceive their rabies situation in their area. If we train vets, medics and wildlife officers together from the focal areas, effective inter-sectoral relationships can be established and these people can also act as trainers and champions for other areas in future years. Post vaccination surveys can be used to gather coverage data and refine SOPs. Dog population management and registration considerations don't need to start on day one - mass dog vaccination campaigns are the first priority.

Step 2 (2015-7) The program is expanded, aiming for lake to coast coverage, more training and the initiation of cross-border engagement. Dog ownership issues should be addressed, with population management requirements considered.

Step 3 (2017-20) Expand program to all provinces, and establish international border controls. With surveillance you can identify disease free zones where vaccination effort could be discontinued. Effective surveillance and provision for emergency response is critical.

This is not a prescriptive plan, rather an evolving process. It is important to start with a range of ecological areas to guide future work. The experience from Kenya is likely to provide valuable experience and impetus for rabies control programmes across the region.

#### **Discussion:**

**SK** –After the SEARG meeting, the one health group really started talking and realized it was possible to eliminate rabies. So we ask for help with applying the stepwise approach. We have great buy-in from the government and the plan is an official government document and will roll out next year. The government is ready to take up the project proposal so we need to work on external donors and NGOs and to develop a funding plan. We need to consolidate the activities ongoing already and we will start with a big meeting in January 2014 and hope to start the program in March 2014.

**SC** – The key is that we don't need everything in place at the start, but there does need to be a funding plan and plans for rolling out control and surveillance activities.

**SK** – we have chosen some areas with good geographical barriers where they are already sensitized.

**LN** – there are already government diagnostics and control projects, hopefully building on these existing structures will work.

**SK** – we have replicated the idea to test across all regions now with the Kenyan Veterinary Association spearheading most activities. The government gets vaccine every year and distributes it. There is lots of good will e.g. from NGOs as vaccine donations need to be coordinated.

**RF** – The community is small and it is good to know what is going on elsewhere and linked training to ongoing efforts.

**JM** – Could the rabies task force be used for monitoring and reporting of vaccine usage?

**AV** – In some countries e.g. Germany nobody knows how many vaccines are used for humans. For a lot of countries the data is not there.

#### Session 3.2. Project progress, updates

##### **Philippine extension projects – Betsy Miranda**

These 'Communities Against Rabies Exposure' extension projects were designed to test the replicability and sustainability of the Bohol model, to extend rabies free areas. Due to government delays the Indonesian project (Nias) has not started, but those in Illocos Norte (an island), Sorsogon (non-island area) and Metro Manila (urban) are underway. All are in rabies endemic areas, and together will cover 3.5 million people. The projects involve the same components as the Bohol model (dog bite management, sustainable diagnostics and surveillance, community awareness and school education, and all aim to eliminate canine rabies.

There are a huge number of partners at all levels of government, and PRP and GARC are involved for consultation. Funding is from UBS Optimus foundation, together with WSPA (for the urban project) and OIE in Bangkok is helping with a vaccine bank donation. The departments of health and agriculture are involved, university students are helping with practical aspects and the private sector is also involved. We are empowering local governments to contribute to the national elimination goals. The urban setting is particularly challenging because of the constant threat of reintroduction, cross border issues and very different dog owning practices. One unplanned opportunity was that Marikina asked to be included in our project last year and offered 2/3 costs of vaccination to spread out the programme province wide.

Laboratory capacity building at sub-national levels was enhanced with dRIT training in April. Three labs for the dRIT will be set up, and will compare locally produced and international mAbs. There is a large advocacy communication and education component, with KAP analyses for all sites completed and WRD celebrations planned. Materials in local dialects have been prepared and there's a program to sensitize the media and improve scientific reporting. Educational materials have been developed for the schools and they have been lots of requests for these. The dog tags themselves play a large role in creating awareness for the projects.

**Bohol Follow-up Study.** This year, Bohol will establish freedom from rabies, based on animal bites centre records. This project will determine the surveillance procedures necessary and quantify the economic benefits of more judicious use of PEP in the transition to rabies freedom. We are currently collating the bite patient data with the status of the dog, and interviewing to fill in gaps where necessary. We want to quantify the current costs of PEP, and compare this to alternate models. There will be outbreak investigation for high risk bites and we want to look at the criteria necessary before reducing PEP usage.

**Children against rabies project.** We have just finished a trial of PreEP (three doses ID) given in schools on El Nido. This is a remote island with 36,000 people and they had two cases in 2009, both due to incomplete and delayed PEP. The site was selected by the Head of the national rabies management team. The children were vaccinated in Jan-Feb 2012 and there was also integrated rabies education in the schools. 4,700 children (age 5-14) were enrolled in 27 schools and 84% received a complete PreEP course. Education was assessed by Pre- and post-intervention KAP analysis and the results were very encouraging. We now want to extend the educational work across the province of Palawan.

### **Towards rabies elimination in N'Djaména, Chad – Monique Lechenne**

This project has been completed by the Swiss TPH, with very good local partners. Local government managed the storage of vaccine, transport logistics, personnel, media and communications and a local NGO managed the medical supervision and the communication with town authorities. We started with a preliminary meeting with town leaders, trained 30 vaccinators (given PreEP) and launched the project on WRD 2012. The first dog vaccinated was featured on TV and we also had a rabid dog report on day one.

Each week the plan was the same with Monday and Tuesday completing household and transect surveys to assess coverage, Wednesday for a planning meeting for the next zone, Thursday to plan with village chiefs and make preparation announcements and Friday to Sunday for vaccination and radio broadcasts. After each Tuesday a decision was made to stay in the same sector or to move on to the next one. 10 vaccination teams carried vaccines in coolers and there were three cars with supervisors overseeing three teams each. Vaccination points were at the houses of the quarter chiefs and here we put up a banner and vaccinated, gave the dogs blue collars and completed the paperwork. Some dogs were very easy to handle others were caught in bed nets, and some days were very busy and others not so. After each day the data was entered into the computer to record vaccination numbers. The assessment of coverage was hard because owned dogs are often free roaming, and there are many strays also. Confinement was assessed by counting the numbers of compound doors that were open. Random transects within each vaccination zone were carried out for household surveys and we collected data on all dogs seen, vaccinated or not. We found that vaccination certificates were not kept long at all. Overall we reached 70% coverage, but this was very variable across quarters some areas have less than 50%, usually where they will more strays. Usually high vaccination coverage was achieved in Christian areas compared to Muslim areas.

Educational work started on week 0 of the project, with vaccination of dogs starting in week 18 of the project and peaking at week 25. Rabies incidence in dogs first rose with awareness, then fell very rapidly after week 25, and human exposures also fell. We have reached the point (at week 55) where there are no cases any more, but we will start another campaign in October.

The real problem is surveillance outside the towns. For the rest of the country we have no data and are trying to raise surveillance and trained vets from 17 out of 22 outposts who were enthusiastic. But none of the veterinary outposts can do the dRIT test, and most lack electricity. We found microscopes full of water. In the south they are keeping records of biting dog incidence and they are observing dogs but the data stays at the outposts. The government is not supporting even enthusiastic reporters of data, and they expect outsiders to bring in money. It is hard to incentivise the government to start the reporting process because there is no data to raise their awareness.

### **Bill & Melinda Gates projects - Bernadette Abela-Ridder**

Rabies is embedded within the NTD roadmap with targets for elimination of 2015 and 2020 for different regions. There is a strategic advisory group for NTDs chaired by a vet who reports directly to the director general of WHO. WHO is recommitted to rabies elimination, and we have lots of strategies so let's try to work together. We need to look at different contexts and dynamics and complete an overall analysis. We don't want to just report on the Gates projects, but translate the information into national plans and programmes (e.g. in Kenya). As soon as we have elimination embedded into national programmes, FAO can help us to move forwards. My Director, Lorenzo Savioli is also committed.

There are other ongoing projects, such as the GARC cost analysis which will use data from the WHO projects to show economic impact. This will collate the data to motivate governments to do something. The WHO system needs to be used in the best way possible. We can bring things to government meetings, but resolutions need to be prompted by requests from countries.

May I ask you what is your vision for next WHA ? We could do a press release with the NTD group, and give people information at the annual coordination meeting of the Gates projects in Tanzania, and even distribute information through the GARC newsletter.

### **KwaZulu Natal - Louis Nel**

In 2013, rabies incidence is at a 26 year low with a steady decline since the control program started. A recent high profile human case generated much public interest and wide media coverage. One of the factors contributing to the hype was an uncertainty about the geographical origin of the infection. This provided an opportunity to highlight the importance of increased regional surveillance and basic phylogeographical analyses in rabies control and elimination strategies. It was necessary to elucidate the origins of the virus responsible for this case, as the patient was from a well-vaccinated area of KZN that had been free from dog rabies cases for many years. The most likely origin of our case was shown to be from outside the disease free area and indeed from outside the country of South Africa. We conclude that phylogeographic techniques can provide rapid and statistically rigorous answers to epidemiologically pertinent questions that impact on disease control strategies and resource allocation, but this will require coordinated regional surveillance practices. An outbreak in Bergville also attracted attention as one child died and a person was killed by a rabid bull. These incidences prompted political involvement, including prominent advertisements by the Minister of Agriculture. The above incidences led to vastly increased submission. However, the number of positive results did not rise, and we believe that this is indicative of an effective surveillance system. Animal rabies is now declining and dog ecology studies show we're approaching 70% vaccination coverage. As an important future objective, alternatives to the surgical sterilization of dogs, which is expensive and invasive, should be developed. In this regard immuno-contraception is really promising and should be thoroughly explored.

There has been a huge push for health field staff in KZN over the last decade. There are now 13,000 public health staff, but only 154 animal health technicians. However the Department of Health has agreed that those public health staff (community health workers) can be deployed on animal control issues. We have many areas that have been rabies free for more than 1 year. In addition, the idea of the Gates programmes initially was that we'll start somewhere and replicate it, so it would roll out to neighbouring regions. We are trying very hard to get other provinces – e.g. bordering provinces of Mpumalanga and Eastern Cape and neighbouring countries of Swaziland, Lesotho and Mozambique being involved. As we get towards elimination, i.e. there are few cases only we can use genetics to identify where they came from, identify hot spots to focus control measures. Transmission pathway analysis suggests that we detect between 50 and 90% of all rabies cases.

Finally, the Gates project budget has risen from 12,000,000 to 55.25 million South African Rand from 2010 - 2012, with the Gates component falling from 23% to 4% over this period, demonstrating increased government commitment. We have excellent rabies control champions in Kevin le Roux and Daniel Stewart and in future hope to further the issue of rabies control as a social responsibility of the peoples of KZN. The objectives of the Gates programme were to show that human rabies can be eliminated by eliminating dog rabies. In a perfect world we would have eliminated rabies in five years. While not there yet, we believe that we are steadily closing in on that objective in KZN.

### **Collection and analysis of data to support rabies control and elimination programs – Sarah Cleaveland**

The role of the University of Glasgow is to provide technical support to the WHO/Bill and Melinda Gates Foundation program in Tanzania and help with the analysis of data generated from the project. The project is in a transition phase with a change of coordinators and a shift from the MoH to the MoA and so far, collaboration seems better. The project is in the southeast, the most remote difficult area of the country. The program has been delayed but has a no cost extension. Two full vaccination campaigns have been completed and a third is underway with confidence and expertise increasing with vets beginning to shape the project.

For estimating dog populations, existing methodologies all demonstrated clear limitations.. Household surveys will miss 'ownerless' dogs and extrapolation from human to dog ratios (HDR) is heavily influenced by sampling error.. In the Serengeti, the HDR is relatively consistent (~ 7:1) and has been used to provide estimates of the dog population with reasonable accuracy. However, in coastal and urban areas, the HDR can vary widely and estimates derived from extrapolations from relatively small samples can be misleading. For example, despite information on HDRs from a range of different settings (coastal/urban/inland) from preliminary studies, the dog population size in the WHO/BMGF project area was greatly over-estimated. The initial estimate of 350,000 dogs based on setting-specific HDRs has since been revised to between 140,000 and 222,000 dogs. In urban areas, the low dog ownership patterns make it difficult to generate a representative sample, and uncertainties also remain in the projections that are used to estimate the human population, with wide variation in growth rates between districts.

Although good estimates of dog population are needed for some methods of estimating vaccination coverage (e.g. using the number of vaccine doses given), over-estimating the dog population size at the start of the programme is not usually problematic as extra vaccine doses can be used in successive campaigns. Furthermore, as post-vaccination household surveys can provide additional information on vaccination coverage of the owned dog population. Recent work indicates that it is important to obtain information on vaccination coverage at quite high levels of spatial resolution (as even small gaps in coverage can delay control and elimination of rabies). Consideration needs to be given to using other methods, such as mark-recapture methodology, or community surveys (e.g. through primary schools) that could be implemented at relatively low cost within most/all communities where campaigns are conducted.

With funding from the UBS Optimus Foundation, other systems of data collection and surveillance have been trialled, including mobile phone reporting, and this is showing a considerable improvement over paper-based data reporting methods. For example, a trial using SMS messages to remind people about their remaining PEP doses has increased compliance for completing the full course of PEP. Further progress has been shown with the implementation of intradermal PEP, with almost 100% of PEP courses administered in 2013 in the project area now being administered intradermally.

So the lessons learnt from a 'starting from scratch' project are that there are substantial challenges, but as confidence rises, momentum builds. A rabies task force is necessary, it is too much for one person to lead, and attempting to tackle too large an area at the outset with no baseline expertise or experience can be very difficult. The suggestion is that it may be more feasible to start in focal areas to build confidence and establish champions, and then expand from there, with people from these areas helping to train others. Advisory phone lines can both capture cases and help with a follow-up response. Building surveillance in parallel with control measures makes clinical surveillance an entry point to lab diagnostics. The project is now engaging with colleagues across borders.

### **Project and other activities on health economic aspects of rabies - Charles Rupprecht**

The question is how much will canine rabies elimination cost? Some of the best historical data came from the Philippines in 1991. There is no data from the Americas. We also have nice estimates from Chad and Tanzania. Can we use existing pilot projects to estimate costs?

Canine rabies elimination is a very ambitious plan without any data. Do we even have enough vaccine? How should aid flow to carry out such a project – Via academics? Through NGOs, WHO? I don't have an answer.

The next best method is to estimate how many dogs there are in the world (Roughly 0.75bn?) then the proportion at risk of rabies (around 50%) and the cost of vaccinating each of these dogs (\$2-5?). Over time we



will want to shift from using public funds to a private practice system of paying. And what is the role of vaccine donations and vaccine banks? There is a range of costs for vaccine, depending on the assumptions. For sustainability we need to know about these costs.

#### **Discussion:**

**AD** – We should stay focused on the vaccination of dogs in developing countries. There are economies of scale with global or regional vaccine banks – there are leverage effects, and this is not the commercial price of rabies vaccine on the market when bought through large scale international call for tenders.

#### **RABIES PREVENTION: Opportunities and Challenges to universal care for the people of Latin America and the Caribbean - Ottorino Cosivi**

This presentation aims to present data from the region, not from individual countries. PAHO, has a kind of independence from WHO, and was established 50 years before WHO. It has 35 member states, with huge inequality and a very strong urbanisation process. PAHO has a headquarters in Washington, and has taken on the coordination of rabies and FMD control as flagship programmes. We are reviewing rabies data ahead of the 14<sup>th</sup> REDIPRA which will be held at the end of August.

The situation is currently very reactive, without a very good proactive plan, and we want to formulate this at REDIPRA.

We started with up to 20,000 cases of dog rabies a year, now we have 52. There have been 4 cases of human rabies from dogs in 2013 (2 in Brazil, 1 from Dominican Republic, 2 and one case imported from Guatemala to US). There are usually more human cases from bats than from dogs now (particularly in Peru and Ecuador). There have been several bat rabies outbreaks, in very remote areas recently and we now have a management plan for bat rabies. Most vet services control bat populations due to economic cost of cattle rabies.

Only 14 first level administration units have reported human rabies in the last four years. Work is mostly concentrated in these areas as we're losing a lot of political momentum and technical support is decreasing. There's a lot of turnover and rabies is losing political priority. We had 115 human rabies cases from 2006 -13. If we miss this opportunity to reach elimination in South America we have missed a great opportunity. Very few people are responsible for a hugely important goal.

#### **DB** - What can PRP do as a group?

We need the governments to commit to but buy the vaccine. Most countries did buy vaccine, but some were late. Brazil is buying a lot of vaccine and we're using Brazil as a vaccine bank for places like Haiti.

OIE donates vaccine to the chief veterinary officer. In PAHO, the MoH buys the vaccine. This focus on the MoH taking charge has been very successful. However sustainability is an issue because of the funding mechanisms for buying vaccine. It is a tricky cycle, because less human rabies means less dog rabies control, so there is a risk of resurgence of canine rabies and more human cases. But we are in the last mile and we should intensify our activities – so we will try to use REDIPRA to achieve this.

We have a roadmap for intensifying the campaign with eight goals and associated targets: GOAL 1: Ensure timely access of exposed people to quality biologicals. GOAL 2: Keep appropriate levels of vaccination coverage in dogs in high risk areas. GOAL 3: Strengthen national action plans against rabies based on the available evidence. GOAL 4: Strengthen the REDIPRA network to ensure collaboration between countries. GOAL 5: Strengthen the surveillance system for human rabies transmitted by dogs. GOAL 6: Implement an Inter-American Network of Diagnostic Laboratories (REDILAR) to facilitate rapid diagnosis, particularly in high risk areas. GOAL 7: Implement education and communication about rabies and advocate in priority countries to take the necessary political decisions for canine rabies elimination. GOAL 8: Develop and adopt guidelines for declaring countries or areas free of dog-transmitted rabies.

We'll circulate this plan at REDIPRA (20-22August), and start to implement it.

#### **Rabies Free Philippines 2020 – Victor Atienza**

Our goal is to have a rabies-free Philippines by 2020 and we're encouraged by the falling canine rabies cases. But we need field workers to be vigilant and send samples to prove they have no incidence of rabies. Provincial offices send data to the central office immediately. The existing national rabies legislation is used (Animal Welfare Act, 1998 and the Rabies Act, 2007). The program is facilitated by NGOs and animal welfare organizations.

There is cooperation between the departments of education and health to educate schoolchildren about rabies prevention. The program is facilitated with help of animal welfare groups, and other agencies within these laws.

We have been able to declare 4 rabies free zones in our country – regions 2, 6, 7, 10. And there is good intersectoral collaboration with different ministries sitting at the same table. Quezon City has the highest incidence of rabies, so we collaborated with the DoH, the CVO and held a rabies summit in 2012 with Provincial City and Municipal Veterinarians to undertake assessment of existing programmes. Now the local government is using spay/neuter programmes to tackle the stray dog population.

Education and awareness is increasing even in remote areas where it is hard. There is international support from FAO who provided Applied Veterinary Epidemiology Training. We have also received a donation from the OIE vaccine bank, and we have other international partners such as Humane Society International that trains local vets, and also WSPA and BMGF who are funding projects. Local partners include animal welfare NGOs and the Philippines Veterinary Medical Association (who have adopted three municipalities to help).

We also have a project run by the Japan International Corporation Agency (JICA) where local officials and Governors are very involved. This has moved one area to elimination and is making progress with others. A Japanese vet (Dr Tsukat) also comes in the Philippines every year, donates vaccine and helps to vaccinate dogs. In May he brought 70,000 doses.

We want to protect islands for the locals and tourists. This year for WRD, Borocay and several other small island provinces will be declared rabies-free. Vaccines from the OIE has been used in several areas.

**AD** – Can I take this opportunity to say that the EU, the donor for the OIE rabies vaccine bank in Asia is very happy with the work in the Philippines (500,000 doses donated by the OIE, funded by the EU). We have just put 200,000 doses on a plane to Bangladesh, 200,000 doses will go to in Indonesia and we have ordered another 500,000 doses to replenish the vaccine bank.

#### **Foundations' point of view on impact of the projects - Charles Gardner**

I have been on both sides –having donor's money to spend and asking for money.

Foundation boards are not accountable like a government, but there's still accountability to their donors. The program officer is your contact with the foundation, and he/she usually covers lots of programs. They can only recommend that a project goes forward, the board makes the decision. Debates within foundations overwrite programming all the time bringing in consulting groups to develop new strategies, programme office is do not always agree with them.

To prepare for foundation board meetings you need to prepare well, have all the answers, exude competence and confidence, and have a plan that they can take back to their organisation that makes them look good. You need to convince them that you can get there with this money. From my perspective, GARC has succeeded in this.

#### **The Merieux Foundation - Valentina Picot**

Our foundation does not work directly in rabies, but our history links us to rabies. Marcel Merieux was a student of Pasteur, and his son, Charles Merieux established the foundation in his father's honour.

The foundation aims to strengthen local capacities in developing countries to reduce the impact of infectious diseases on vulnerable populations. We have a network of diagnostic research laboratories around the world that participate in epidemiology work. The three areas of work are (i) national, global and local advocacy, (ii) epidemiology (surveillance and monitoring), (iii) disease management and control and all work towards the goal of disease elimination. This work needs projects to generate the data, and the foundation would welcome a partnership with the PRP. The foundation also conducts training of professionals.

We will be holding a meeting on rabies in September to mark WRD, entitled "New Concepts in Rabies Vaccines & Vaccinology" with discussions with stakeholders focusing on the science and current state of rabies, interfaced with regulations and industrial concerns.

### **Session 3.3. Success and challenges of rabies control programmes on the ground**

This exercise tried to find generalizations amongst the reasons for success or challenges for rabies control programmes. Participants brought to the meeting their top 3 reasons why projects were successful or challenging from their various experiences, and these were collated. Two groups reviewed the successes and two groups the challenges.

#### **Group 1 – Successes – presenter BJ Mahendra**

Ranking of importance:

1. Intersectoral/cross-sectoral cooperation
2. Availability of vaccines, immunobiologicals – (especially involvement of OIE, oral vaccine for animals, end of NTV and ID route for human rabies prevention)
3. Involvement of NGOs –(special mention for WSPA) and regional networks for rabies experts both national and international in moving rabies control agenda forwards area of rabies control
4. Political support

#### **Group 2 – Challenges – presenter Joanne Maki**

Ranking of importance:

1. Operational – how to deal with rabies prevention in the field
2. Sociological and cultural barriers
3. Resources and human resources  
Generation of scientific data
4. Legislation/enforcement, policy

#### **Group 3 - Success – presenter Boonlert Lumlerdatcha**

Ranking of importance:

1. Cross sectorial cooperation, and one health approach
2. Authentic data
3. Financial support
4. Self-sustaining programmes
5. Access to vaccine banks

6. Political will
7. Clear message about the importance of dog vaccination

#### **Group 4 - Challenges – presenter Ottorini Cosivi**

Mutually reinforcing barriers

1. Political will and coordination (and involvement of vet services)
2. Technical aspects of diagnostics/surveillance and vaccine availability
3. Social awareness and understanding of the disease and the value of its prevention

It was noticed that the reasons for success were the inverse of the reasons for failure, thus several critical elements to effective control are apparent, such as intersectoral collaboration, political will, funding sources. When these elements are put in place, success follows. Without them, programmes struggle.

There was a suggestion to look at this exercise again when defining the objectives and priorities of the next meeting and when looking at communications strategies. It should also be included in the summary of the PRP meeting to be distributed to government departments.

How we address these challenges should form the work plan for the PRP group going forwards.

#### **Summary of the second day – Ad Vos**

The draft of the burden study emphasized the need for an increased emphasis on surveillance and translating awareness into reporting. This will also be important for the designation of rabies free areas. Vaccine usage could be a valuable part of data collection.

Updating the blueprint will not occur every year and we should look at its endorsement by international organizations and its promotion. There are limitations regarding the availability of the internet. Richard and Thomas could lead to a group to draft of bat rabies blueprint. There was an uncomfortable feeling about the lack of communication early on in the WHO projects, but now more data sharing is occurring. There are also very encouraging country initiatives with the development of a national rabies control strategy in Kenya.

#### **Day 3 – Thursday 18th July 2013**

Session four - Basic and Research needs

#### **Social Science Aspects of Rabies Control and Elimination Programs – Betsy Miranda**

The objectives of this project were to analyse the role of the key stakeholders and to map the factors that affected compliance with and success of the program. Focus group discussions were held in high and low performing villages, group interviews with mayors, municipal authorities and children were held.

*Factors contributing to the project's success.* Political will and leadership was critical to motivate everyone involved, and the cost sharing between different sources was also deemed important. Rabies control was regarded as a global public good and a social service. The dog registration fees were at first controversial, but after the program and repeated consistent messaging they were accepted. As Bohol is a tourist destination, the rabies program was felt to be useful and there was a sense of pride in carrying this out. There was genuine concern for poor people especially when they need PEP. Awareness of the rabies problem was improving responsible dog ownership practices. The program also invoked a sense of shared responsibility amongst the leaders and the community to work together. Accomplishments are given recognition during provincial health and veterinary congresses.

*Factors contributing to the community's compliance.* The main reason here was awareness of the rabies issue. Putting the management structures in place and using existing village workers was also important. Strict and consistent enforcement of the law was critical.

11 groups of stakeholders were analysed according to three characteristics: power, interests and legitimacy and within these characteristics each was given a high medium or low ranking.

In conclusion this was a successful community based program and most people change their behaviour. Most stakeholders have a sense of pride from their involvement with the program, and many people cared about both the public health aspects and protecting dogs. Promoting the program as a benefit to tourism de-politicized the program which also helped compliance. Program sustainability remains an important concern, and continued advocacy for it is necessary.

#### **Surveillance, health systems, health economics aspects – Charles Rupprecht**

People value something when they have to pay for it, even if vaccine is donated, someone pays for it. Part of the BMGF project is assessing the direct and indirect costs of vaccination programs. We're trying to derive the cost to individual dog or human protected. Eventually, disease control needs to shift to private payments and in all developed countries this is the case.

Our vision is to provide technology transfer to allow local production of diagnostic biologics and vaccines. We have other biologics under development in collaboration with USDA.

The US thought that they had eliminated grey fox rabies in Texas, but they recently found it again. In other areas dog viruses have been reintroduced. Taiwan has recently identified rabies when it has been rabies-free for a long time. These examples demonstrate the need for effective surveillance.

In Haiti rabies control started with goodwill but not much planning and no assessment of the burden. Initial efforts were not very successful, but there is now a programme established.

And again there is a role for contraception and immunocontraception in dog population management.

### **Tools and practice around dog population management, impact on rabies control – Dennis Slate**

Dog rabies has many impacts, on public health, animal health, a financial and societal burden, on wildlife. It will not be easy to get rid of, but an integrated approach has proven successful. It is clear that one model will not fit all and local knowledge is vital. However, dog population management is likely to be integral to canine rabies elimination in all cases. We need to understand the dog ecology at the start or learn this as we go along. Dogs may be individually owned, community dogs, free roaming, or guard dogs for sheep.

Dog population management can focus on birth rates, death rates, animal movements (by people) or the carrying capacity of the environment. We know that indiscriminate culling is ineffective, but removing strays by euthanasia is more acceptable. Managing the habitat and trash piles needs consideration, or animals can get aggressive so we need to do it slowly. Regarding contraceptive methods, we know that surgery is not very cost-efficient. Injectable Zeuterin (zinc gluconate) has a permanent contraceptive effect, but requires sedation, and works in males only. Injectable GonaCon (GNRH vaccine) has an immunocontraceptive effect which lasts for 3 to 4 years and is effective in both sexes. Some captive trials have been completed (on feral animals and wildlife) but more are needed. GonaCon is licensed by the EPA for use in horses and whitetail deer (where it works less perfectly) so far.

There have been three publications using GonaCon in dogs. Initially, injection site reactions (trials in Navajo nation and Nepal) were bad, but a new formulation has removed this problem. The new product has been trialled in Mexico where fewer, low intensity, adverse reactions were found. The anti-GNRH antibody response was strong, progesterone was suppressed and immunogenicity was not affected by simultaneous rabies vaccination. Next we need to assess the reproductive potential of the vaccine, and this may be possible in South Africa. There is a new project leader in wildlife services, USDA, and that evaluating and new formulation which has shown no adverse reactions to date. A two year study with emphasis on fertility is being planned.

Rabies impacts at the dog –wildlife interface. Some of the rarest wild canids are endangered by canine rabies. In the US, coyotes got rabies from dogs in Mexico, and in Puerto Rico mongooses are cycling canine rabies. By pushing coyote infection out of Texas, the US was declared canine rabies free in 2007.

The science on developing a combined immune-contraception and rabies vaccine is behind expectations it may take five years to have such a vaccine available, and we need to manage expectations. For distribution, we could use ORV distribution by hand, although aggressive dogs are a concern. Feeding stations could be used to monitor bait consumption, and collect a neat and baits. The broadcast method is very expensive and we're worried about non target species in brackets in e.g. humans. We're also looking for good bait flavours to increase uptake.

So the basic needs are to understand dog ecology, together empirical fertility data on GonaCon in dogs, to model likely outcomes of such immunocontraceptive strategies, explore the potential role of ORV in large populations of roaming dogs. More work is needed on a combined immunocontraceptive and rabies vaccine together with optimal oral delivery systems.

#### **Discussion:**

**SC** – There is also another research question. How does rabies vaccination + contraception/sterilisation affect population turnover and control of dog rabies compared with mass dog vaccination alone?

**LN** – Assessing the effect at population level is a longer term plan.

**BD** – What about management of the environment?

**AR** – Solid waste management is a huge driver of stray dog populations (eg. Outside butcher shops). After the festival of Eid, when everyone is killing animals on the street, we have found an increase in bites. We're using an education campaign to prevent this.

**ML** – also Waste Management of liquids is important, we see dogs feeding in open sewers.

**KdB** – Municipalities often manage stray dogs by killing them. They need guidance on better practices.

**AR** – is Gonacon available for trials in India in collaboration with municipal corporations? In Bangalore we have a system and could pilot Gonacon trials as an alternative, through GARC it would work well.

**DS** – we are open to collaborative efforts. In the US we don't work on dogs.

**CR** – The time is right for GonaCon-Dog. It has good potential but is research grade only, and we need more data to attract commercial producers.

**BM** – often animal welfare groups and local government are in conflict over stray dog management.

**VA** – our stray dogs are kept in dog pounds, but after 3 to 4 days they must be adopted or they are euthanized.

**BM** – one improvement has been the temporary re-homing of pets and evacuation centers where people are displaced by disasters. Mobile cages are available to keep dogs near the owners.

**CG** – In Ilocos Norte there was very creative use of prizes and recognition to encourage success.

**BM** – the best practices prize is a very important and everyone needs to play their role.

**BL** – stray dogs can be captured only once, so we need a permanent solution. Will Gonacon be a lifelong contraceptive? In Thailand we castrate them which is very quick.

**DS** – In the Navajo nation, dogs are easy to handle, but will Gonacon work where dogs are not easily handled?

**SC** – Effective dog population management should really be about stabilizing the populations, reducing turnover and improving health of dogs, not about reducing the density of dogs. Is it possible to take the emphasis on density out of the dog population management discussions?

**CR** – \*AP\* perhaps we should have an adjunct to the blueprint on this?

**TM** – Do international organizations all use the same language around dog population management?

**ML** – The dog owner's point of view is also very important. Often they need guard dogs, and nice puppies can be stolen.

**BM-W** – In Zanzibar we try to reduce dogs on the island and did a community census. The community actually wanted more dogs, so we try to improve dog welfare and health and allowed them to have more, but built a rabies vaccination program into this. Suspected rabid dogs need to be euthanized. What do you recommend to a government with an outbreak situation? If you humanely euthanized 500 dogs is that OK?

**SC** – In an outbreak, the density of dogs doesn't play a major role in the spread of dog rabies. The focus therefore should be on managing dogs that can't be accessed for vaccination, not reducing densities *per se*.

**AR** – Stray dogs are a problem aside from rabies, which is an adjunct issue. The priority should be control of animal bites or control of nuisance behaviours.

**BM** – When we reduced dogs we found that there were fewer traffic accidents.

**CR** – The communities should dictate what they want.

**AV** – There are places in Greenland with a very high dog density (more dogs than humans), mostly chained, but dog rabies is very rare. This underscores SC's remark that the importance of dog density on rabies should not be overemphasized.

**SC** – there is an upcoming WSAVA/OIE conference on rabies and dog population management [in Paris, early November](#).

#### Session five – Advocacy

##### **Advocacy for rabies in Africa – opportunities and challenges – Mathurin Tejiokem, Stella Kiambi**

Africa has half of the world's rabies burden, and dogs are the most important reservoir. The data on rabies and advocacy are low and therefore there is low political commitment. Limited access to bite management and vaccine, limited or fragmented control programs, weak health systems and surveillance and low intersectoral collaboration all contribute to a vicious cycle of indifference.

There's scope for advocacy at all levels from local to international. The challenges are (i) to increase awareness amongst the public and health professionals (ii) to generate sustained political commitments (eg legislation and budgets), (iii) to ensure the proper collection of data, establishment of effective surveillance systems and access to vaccines (iv) management of dog populations, through registration and birth control (v) to encourage closer collaboration between ministries and sectors (vi) international cooperation over border areas (vii) to encourage involvement of associations and NGOs.

The opportunities are (i) the benefits of the raised profile of one health (ii) the renewed commitments to NTDs and rabies by international organizations (iii) new potential donors for rabies control (iv) the growth of African economies (v) the presence of regional networks (vi) the existence of organized the story associations as a platform for rabies sensitization (vii) the media.

##### **Discussion:**

**JV** – Regarding vaccine access, Sanofi has sponsored the establishment of new dog bite centers in Africa. We use existing facilities, at a table of vaccine and some training and it doesn't cost a lot. The idea is that Sanofi sponsors it for now, and governments take on responsibility later.

**DB** – this is a great example of how to tackle the vaccine access issue.

**KdB** – we also need to involve the veterinary side in the centres.

**JC** – how many more people can access the centers?

**LK** – this was a question from GAVI, and if you open a center patients do really use it quickly.

**BD** – we have real data to advocate for more of these.

**SK** – it is really important for patients to know where vaccine is available.

**HB** – the problems are in training, supply chain, cold chain and RIG availability. Can it work everywhere?

**JM** – if a bite center is near two Medical Care, we may not want dog care of their and locating nearby may be better. Would the association of both services be useful?

**KdB** – procedures may be linked. You may need to get a paper from vet before you can get a paper to see the Doctor.

**SC** – There can often be reluctance among medical authorities in sharing fridges or laboratory space with veterinarians. This is a One Health idea that often doesn't work in practice. Does anyone have experiences like this or recommendations?

**ML** – you could give victims a paper so that if the dog is positive you can human vaccine free.

**MT** – In Cameroon we had only 1 bite center, then we opened another in a new region (supervised by the EPI program). The person trained is a government vaccinator. Now the authorities are asking us for the costs so they can provide other facilities.

##### **Experimental models toward rabies elimination in Thailand – Boonlert Lumlertdacha**

Thailand's rabies workgroup was started in 1992 and is a legacy of an old, very top down, approach. Now the mechanism has changed with administration decentralization in 2000. Most funding now goes to municipalities, and we have a new 4 ministry MOU, and a shortcut for remote areas to get access to Rabies control funds.

The rabies group can provide tools and access to guidelines and publications, for example on rabies-free status. We have a new national database of surveillance data, booklets of WHO advice on how to handle clinical cases and lab diagnostics. For example getting a brain sample is difficult because of social factors around the handling of dead bodies. So we have instructions on how to take a sample from the corner of the eye. We have a CD with songs about rabies and cartoons with rabies control messages. So the rabies team has a different role,

to support the community to run their own programmes. Some communities are very active and others are not. Every year we do a small competition and push ideas on how to help.

There are 77 provinces, 9 livestock regions in Thailand, and Over 2000 municipal governments. 80% of the administrative areas have received money for rabies control from the government and this should rise to 100% by 2016. Human rabies cases have fallen dramatically from over 90 in 1993 to just 3 in 2013. PEP is free at public hospitals and costs around \$1.00 at private hospitals (even with RIG). There are around 600,000 animal bites per year and the annual cost of human and animal rabies control is \$30million. From 2008-09 there was a small resurgence, with cases clustered in low income areas where people are ignorant of the risks and cannot afford to stop working, even if PEP is free. Up to 2008, dog vaccination coverage was around 50 to 60% and 80% of dogs have owners but are not usually confined. We need to get herd immunity to reach 80% and try to control excessive dogs. We're approaching all high schools in the country to educate them about rabies and using small societies to propagate the messages about Actions needed if you are exposed. WRD has been used a lot and we put plays on TV at night about rabies. For 2013 we have a theme of rabies-free communities, following the WHO/OIE recommendations. Communities are classified at level C, B or A, According to their rabies cases and can apply to be an award winner for rabies control.

### **Advocacy for rabies in Asia - opportunities and challenges - BJMahendra**

I am representing a region, but mostly India, where the magnitude of the rabies problem is huge. Some countries are very far ahead and others very far behind.

*Opportunities:* In 2004, India was found to have around 20,000 deaths and 17.4 million exposures each year. The data really shook people up. The fear of rabies also works in our favour. We have the tools to control rabies, what we need is the will. There are successes, WHO SEARO has achieved wonders and NTV is being stopped despite being very popular. Animal welfare organizations were demanding cell culture vaccine for dogs, so we argued. I sincerely thank GARC, WRD, industry and everyone here for contributed to moving us forwards. The donor and industry support showed that they are not just in it for the bottom line.

*Challenges:* India has 1.3 billion people, and there is a lack of awareness amongst planners, professionals, the public and activists. There are diverse and great health needs so allocation of health budgets is terribly hard. Most victims end up at the desk of a quack because of the poverty and we're trying to get them informed because they won't go away. We have a problem of veterinary services focusing on livestock – the dog is nobody's child. Private sectors tend to serve in the urban areas only and the public sector cares for rural populations and some urban areas. In some urban areas the public sector hospitals have 15 to 300 bite victims a day, receiving ID vaccination.

The data is almost a decade old, we need to reassess the burden again, because people are claiming all sorts of figures. The next burden assessment is coming together.

We need to focus on replicating successes. We have prevented human deaths from dogs in five cities and awareness of this is critical, and one huge region around Jodhpur is almost rabies free. How do we replicate this? There is a lack of consensus. Dr Gongal at WHO SEARO is training people and went recently to Bhutan to help with their national strategy. Political support is not to be expected but to be gained, and *who* educates the politician matters. If he is educated by westerner, it is not a good idea.

One health can also be a problem. We need to prevent human deaths first and start on the reservoir of infection next.

There are many challenges ahead, including how to reach 70% vaccination coverage in dogs and for how long. How do we deal with cross-border movements? How do we make vaccine accessible and change people's health seeking behaviours? how do we assess the role of sylvatic rabies? and how do we encourage lab confirmation of human cases?

Many people still apply chilli pepper or coffee powder to wounds. Until recently for 1.3 billion people we had 3 rabies labs. Now we have the first one in the veterinary sector and six more are planned which are badly needed. If the number of 1.3 billion people in India is debatable, then we have no idea about the number of dogs - for a while we said 28 million.

### **Discussion:**

**TM** – Veterinary authorities often think wildlife reservoirs are very important and they need guidance. Even when 80% of cases are in dogs they still say wildlife is the biggest problem.

**SC** – the focus on wildlife issues can act as a barrier to implementing any form of dog rabies control – it can be perceived as futile to tackle dog rabies if the main source of infection is in wildlife. However, the best way to determine whether there is an independent wildlife reservoir is to control rabies in domestic dogs through mass vaccination and then, if needed, tackle the wildlife problem at later stages.

**CR** – we need to focus on controlling canine rabies first and worry about wildlife second.

**BD** – But we need data in order to be able to evaluate.

### **Measuring the impact of the PRP's work on Advocacy for Rabies Control – Louise Taylor, Jane Coutts**

The PRP has set out to identify and fill gaps in information and to develop resources and tools for rabies control. But, we need to focus not on just what we have done but also what difference we have made. Now there are codes of conduct written for charities trying to focus more on assessing not just what they're doing but how well as working both in the short and long term. You can assess your activities by asking different questions: but how do you know you are creating change, and how are you learning and improving are key to assessing your impact. There's a cycle: Plan – Do – Assess – Review which keeps going around. The PRP does a reasonable

job of measuring our inputs, activities and outputs that are measuring our impact and the experiences of our audiences and partners is lacking. We have focused on statistics for WRD such as 150million people educated and more than 150 participating countries. This shows we have united a community and are trying to make a difference. But have people change their behaviour as results of WRD? Large scale vaccination campaigns are the hardest to implement, but at least impact assessment is built and from the start. We know we manage to achieve what we hoped in Bohol and this has been sustainable, the remaining questions may be what aspects were critical to its success and had transferable are these? We can easily measure access to our Internet based resources. However, we don't really know what people do with that information. How many people actually read our newsletter? The PRP has written several scientific publications, but have they affected government policy? The canine blueprint has had 6424 visitors in the last three months and it is being accessed globally but is it being put into practice? We need to build the evidence of where it is being used.

*Jane:* Assessing the socio-economic context as part of the planning stage will give us an idea of how to measure change. This will help us to assess how we have contributed to change, clarify any misperceptions, understand reasons for a lack of success, and recognise and interpret unexpected data and spin-off benefits

Going forwards we need to build in as much assessment of impact as possible into our work and be creative in collecting evidence. We need communities using our resources to let us know how they are being used.

#### **General Discussion:**

We should ask what projects would have happened without GARC and the PRP. We can collect quotes and anecdotes related to all work. \*AP\* We could analyse press around rabies over the last 10 years and look before and after WRD to see if interest in and attention to rabies increases at that time.

**DB** – We need to pin in our activities to other events to generate more news.

**OC** – We need to identify how to sell advocacy efforts to politicians.

GARC's presence at the world health assembly was important and a tripartite statement for WRD will be important.

#### **General supporting and advocacy activities by the Tri-partite organisations:**

##### **FAO – Katinka deBalogh**

How do you see us supporting the aims of the PRP? We have huge country networks and for operational research, and can help facilitate and replicate messages. We can pass on our knowledge of effective programming, such as Mr and Mrs Rabies in Thailand, and the Animal Health Clubs in Sierra Leone. Let's see whether these might be transferable elsewhere.

Assisting countries with assessing their priorities plays into the education system. OIE is working on educating young vets for example. In Latin America the emphasis on rabies control is very clear, but elsewhere it is little reported. We need to move rabies into the "rural poverty" area and choose our arguments.

##### **OIE - Alain Dehove**

OIE has recently updated its standards in the Terrestrial Animal Health Code (contains chapters on stray dog population control and infection with rabies virus) and the Manual of Diagnostic Tests and Vaccines (has a chapter on rabies). In general veterinary services have not been engaged enough in rabies control, stressing this issue was one of the intentions of the OIE global conference on rabies in 2011 (Incheon, South Korea). We're trying to push veterinary services to improve reporting. The new chapter on infection with rabies virus has a new definition of a case (**any** animal infected with rabies). We need to really emphasize the message that vaccination of dogs is key, but also not forget the need to prevent human cases. There are also new definitions for rabies-free countries, and fixed guidelines that veterinary or authorities should implement: (i) making rabies a notifiable disease (ii) effective surveillance (iii) specific regulatory measures around vaccination, identification and importation (v) a program for the management of stray dogs. An imported human case of rabies does not impact a country's rabies-free status. There are recommendations for importation of domestic and wild animals from both rabies-free and rabies-infected countries.

The OIE rabies vaccine bank in Asia is now operational (1.8 M doses already delivered) and veterinary services can contact them about vaccine donations.

##### **WHO – Bernadette Abela-Ridder**

Over the past two days the needs are becoming clear. We need to move evidence into policy changes and start to affect political will. How can an international agency facilitate this process? Last year there was a request for a WHO strategy on the elimination of canine rabies, so now we have a document from GARC. We also have an NTD roadmap, strategic plans from SEARO and PAHO. If we want to get intersectoral support, any strategy needs to be tripartite. Maybe instead of a global strategy for rabies elimination, a policy brief for ministers is needed more, because now is the time to draw up national strategies. To develop a global strategy could take a long time and policy makers may never even read it. A document that fits countries into a global vision and brings everyone together might be more successful.

#### Session six - Review of the PRP experiences

**DB** – We have many lines of evidence : the burden reassessment, the economics subgroup, projects, WHO strategies, the OIE vaccine bank. Maybe it's time to build a document linking these things together like the stop

TB campaign. However the stop TB document is huge, maybe there are other examples like the Stamp out Sleeping Sickness or the one that exists for polio.

**OC** – This could be progressive, starting with a short document and the risk and follow. If we want to set a elimination dates we need to say how much it is going to cost and the potential gains.

**LK** – it could be a good test to build a document step by step. It is too early for a global strategy right now and better to go slowly but surely. It is too late to go for the next WHA.

**BA-R** – we would need to have the documentation together by September this year. It will be better to wait and motivate countries more first. We could have a good draft by mid-September of a policy brief.

**OC** - Because the NTD resolution is already a multi disease document, the WHA may not consider just a single disease resolution.

**BA-R** – the NTD department and its head are ready to help get to rabies agenda going. It's OK to go by disease

**OC** – any country can propose a resolution. We need to pass such everything to be timed perfectly and have say five key countries on board – Tanzania, Philippines, etc.

**AM-S** – and then we could have a support document to present to the executive board.

**OC** – perhaps the PRP could pay for two people to go to the Indian and Chinese MoHs.

**\*AP\*** We should have a political action committee within the PRP, to brainstorm on the best strategy

**DB** – we should nominate people here to work on a strategy going forwards.

## Session seven - Wrap up, closing

There was a brainstorming session around a whiteboard to set the next steps to be taken by the PRP group. See the list of action points for specific details, but the main areas to be developed include:

- The establishment of a political action sub-group of the PRP, which will collaborate with countries on how to build political communication and move it forward. It will investigate the best mechanisms for moving rabies policy forwards internationally, and look into how best to approach the WHA in future.
- From the tripartite group, a WRD statement will be prepared for WRD 2013, and a draft policy briefing document will be prepared next year.
- GARC will send a representative to the REDIPRA meeting in August 2013, to look into how the PRP group can best support PAHO in their final years to rabies elimination.
- Further questions from GAVI are anticipated, and we need to look at countries who would be good partners in helping us answer these from a country perspective, or even to develop pilot project proposals.
- A review of the cultural anthropology literature relating to rabies control should be initiated.
- The existing Rabies Blueprint will undergo 2 yearly revisions, and will be reviewed again at the next PRP meeting. More major could include the integration of the stepwise approach for rabies elimination, a bat rabies blueprint based on Latin American experiences (dependent on further financial support), more emphasis that dog density is not the critical factor in dog population management.
- The challenges and successes exercise should feed into the PRPs communications strategy.
- Documenting the successes and impacts of the PRPs work needs to have more emphasis.
- Publication of the burden study and notifiability survey are priorities.
- Collation of surveillance data currently in regional databases will be investigated, with WHO taking the lead.

Deborah Briggs closed the meeting by thanking all of the participants for their valuable insights and contributions, and Kim Doyle announced that we have been given the privilege of holding the next PRP in Wolfsberg, again.



## **Appendix: Abbreviations Used In the Document**

AfroREB (African Rabies Expert Bureau),  
APCRB (Association for Prevention and Control of Rabies in Bangladesh)  
APCRI (Association for the Prevention and Control of Rabies in India)  
AREB (Asian Rabies Expert Bureau)  
AWBI (Animal Welfare Board of India)  
BMGF (Bill and Melinda Gates Foundation)  
CAR (Consortium Against Rabies)  
CVA (Commonwealth Veterinary Association)  
CVO (Chief Veterinary Officer)  
EPA (Environmental Protection Association)  
FAO (Food and Agriculture Organization of United Nations)  
GARC (Global Alliance for Rabies Control)  
GAVI (Global Alliance for Vaccines and Immunization)  
GNRH (Gonadotropin-releasing hormone)  
ID (intra-dermal)  
KZN (Kwa Zulu Natal)  
MoA (Ministry of Agriculture)  
MoH (Ministry of Health)  
NCDC (National Centre for Disease Control)  
NGO (Non-Governmental Organisation)  
NTD (Neglected Tropical Disease)  
NTV (Nerve Tissue Vaccine)  
OIE (World Organisation for Animal Health)  
PAHO (Pan-American Health Organization)  
PANAFTOSA (Pan American Foot and Mouth Disease Center)  
PCP (Progressive Control Pathway)  
PEP (Post-Exposure Prophylaxis)  
PrEP (Pre-Exposure Prophylaxis)  
PRP (Partners for Rabies Prevention)  
REDIPRA (Meeting of Directors of National Programs for Rabies Control in Latin America )  
RIA (Rabies in Asia)  
RSPCA (Royal Society for the Protection of Animals)  
SAARC (South Asian Association for Regional Cooperation)  
SEARG (Southern and Eastern African Rabies Group)  
WHO (World Health Organization)  
WHO-SEARO (World Health Organization South East Asian Regional Office)  
WRD (World Rabies Day)  
WSPA (World Society for the Protection of Animals).