GLOBAL ELIMINATION OF DOG-MEDIATED HUMAN RABIES

GLOBAL CONFERENCE
10-11 DECEMBER 2015
GENEVA, SWITZERLAND

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BACKGROUND

Rabies remains an under-reported and neglected zoonosis with a case fatality rate of almost 100% in humans and animals.

Dog-mediated human rabies causes tens of thousands of human deaths annually despite being 100% preventable. Over 95% of human cases are caused by the bite of a rabies-infected dog and disproportionately affect rural communities, particularly children, from economically disadvantaged areas of Africa and Asia, where awareness of the disease and access to appropriate post-exposure prophylaxis is limited or non-existent. Unlike for many other zoonoses, the appropriate tools to eliminate dog-mediated human rabies already exist. Dog-mediated rabies can be eliminated at the source by vaccinating dogs, in conjunction with dog bite prevention and bite management, raising of public awareness and improved access to timely post-exposure prophylaxis.

It is in this context that the World Health Organization (WHO) and the World Organisation for Animal Health (OIE) in collaboration with the Food and Agriculture Organization of the United Nations (FAO) and supported by the Global Alliance for Rabies Control (GARC) are organising the Global Conference on the ‘Global elimination of dog-mediated human rabies: The Time Is Now’.

The conference will convene key participants from Ministries of Health and Veterinary Services, national rabies coordinators from Member Countries, experts from the veterinary and the human health sectors and international organisations, policy-makers, other experts, non-governmental organisations, donors and the private sector.

OBJECTIVES

1. Disseminate results of the proof of concept for the elimination of dog-mediated rabies in different settings and explore expansion and sustainability into other endemic areas;

2. Build support and the case for investment to progress towards dog-mediated rabies elimination from national, regional, global and other stakeholders including the private sector;

3. Promote a ‘One Health’ inter-sectoral collaboration approach between the human and animal health and other sectors;

4. Shape the forward vision agenda with shared purpose in collaboration with donors and stakeholders for the elimination of dog-transmitted human rabies.
ORGANISATION OF THE CONFERENCE

STEERING COMMITTEE
> Dr Brian Evans (OIE)
> Dr Bernadette Abela-Ridder (WHO)
> Dr Gregorio Torres (OIE)
> Dr Daniel Chaisemartin (OIE)
> Dr Alain Dehove (OIE)

SCIENTIFIC COMMITTEE
> Dr Bernadette Abela-Ridder (WHO)
> Dr Brian Evans (OIE)
> Dr Gregorio Torres (OIE)
> Dr Katinka De Balogh (FAO)
> Dr Louis Nel (GARC)

ORGANISING COMMITTEE
> Dr Daniel Chaisemartin (OIE)
> Ms Ingrid Arias (OIE)
> Dr Bernadette Abela-Ridder (WHO)
> Ms Naoko Obara (WHO)
> Ms Anne-France Carrichon (WHO)
GENERAL INFORMATION

PRESENTATIONS
The abstract, in English only, for each presentation is included in this book of abstracts.

Some posters will be presented during the conference.

Following the conference, the abstracts, PowerPoint presentations and the final recommendations will be made available on the OIE website.

VENUE
The conference will be held at the Maison de la Paix, located at Chemin Eugène-Rigot 2, in the heart of International Geneva, a few minutes’ walk from the United Nations headquarters (Palais des Nations).

The Maison de la Paix is part of a complex that holds the Graduate Institute of Geneva and other international organisations that are distributed in six buildings called ‘Pétales’ as per their shape. The buildings have easy access from the city center: Cornavin Central Station is about 5 minutes ride by tram or 15-20 minutes by walk. The local train station Genève-Sécheron is just one minute walk. The airport is 15 minutes by bus or taxi arriving at the corner of Avenue de France.

LANGUAGE
Speakers will give their presentations in English, French and Spanish with simultaneous translation into the other two, and also into Russian.
# AGENDA AND PROGRAMME

## WEDNESDAY, DECEMBER 9, 2015

17:00 – 19:00 REGISTRATION

## DAY 1: THURSDAY, DECEMBER 10, 2015

08:00 – 09:00 REGISTRATION

### SESSION 1: WELCOME AND SCENE SETTING

**OBJECTIVE:** To show high level leadership support for rabies and One Health.

**TARGET OUTCOME:** Identify critical issues to be discussed during the conference towards rabies elimination.

09:00 – 10:30
- OPENING WELCOME BY WHO ASSISTANT DIRECTOR GENERAL – Winnie Mpanju–Shumbusho [5 minutes]
- ADDRESS BY WHO DIRECTOR GENERAL – Margaret Chan [10 minutes]
- ADDRESS BY OIE DIRECTOR GENERAL – Bernard Vallat [10 minutes]
- REMARKS BY FAO DIRECTOR OF ANIMAL PRODUCTION AND HEALTH DIVISION – Berhe Tekola [5 minutes]
- REMARKS BY EXECUTIVE DIRECTOR OF GARC – Louis Nel [5 minutes]
- REMARKS BY INSTITUT PASTEUR DIRECTOR GENERAL – Christian Brechot [5 minutes]
- REMARKS BY EUROPEAN COMMISSION – Bernard Van-Goethem [5 minutes]
- INTRODUCTORY REMARKS, SCENE SETTING AND OBJECTIVES – Co-Chairs Brian Evans (OIE) and Bernadette Abela–Ridder (WHO), and Daniel Normandeau, Facilitator [10 minutes]
- KEYNOTE ADDRESS: DOG-MEDIATED HUMAN RABIES ELIMINATION IS FEASIBLE – Bernard Vallat [20 minutes]

10:30 – 11:00 COFFEE BREAK AND POSTER SESSION

### SESSION 2: PROOF OF CONCEPT FOR ELIMINATION

**OBJECTIVE:** To disseminate the results with different starting points, including economic aspects, success stories, best practices and lessons learned including private-public partnerships considering cross sectoral collaboration.

**TARGET OUTCOME:** Demonstrate and disseminate country level success stories and lessons learned on how to break the *status quo*.
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<td>SOUTH AFRICA – KWAZULU-NATAL EXAMPLE&lt;br&gt;Kevin Le Roux [15 minutes]</td>
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<td>PHILIPPINES&lt;br&gt;Raffy Deray [15 minutes]</td>
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<td>FACILITATED Q&amp;A AND PANEL DISCUSSION&lt;br&gt;Daniel Normandeau [40 minutes]&lt;br&gt;Sarah Cleveland (Glasgow University), Bhutia Thinlay (India), Veronica Gutiérrez Cedillo (Mexico)</td>
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<td><strong>OBJECTIVE:</strong> To showcase success stories on how regional approaches and strategies are implemented and linked.</td>
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<td><strong>TARGET OUTCOMES:</strong> Highlight improved coordination and identify regional needs to achieve regional elimination goals.</td>
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<td>PROGRESS IN THE AMERICAS&lt;br&gt;Ottorino Cosivi (PAHO) [10 minutes]</td>
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<td>PROGRESS IN ASIA&lt;br&gt;Mary Joy Gordoncillo (OIE) [10 minutes]</td>
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<td>PROGRESS IN AFRICA&lt;br&gt;Louis Nel (GARC) [10 minutes]</td>
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<td>FACILITATED Q&amp;A AND PANEL DISCUSSION&lt;br&gt;Daniel Normandeau [50 minutes]&lt;br&gt;Changchun Tu (OIE Ref Lab), Valentina Picot (Fondation Mérieux), Hervé Bourhy (Institut Pasteur)</td>
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### SESSION 4: OPERATIONALISATION OF DOG–TRANSMITTED RABIES ELIMINATION THROUGH PREVENTION AT THE SOURCE

**OBJECTIVE:** To demonstrate various operational approaches to achieve rabies elimination.

**TARGET OUTCOMES:** Dog vaccination as the main and most cost–effective intervention. Recognise the role of inter-sectorial collaboration.

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| 16:15 – 17:45 | OVERVIEW BY CO-CHAIR  
BERNADETTE ABELE–RIDDER (WHO) |
| TACKLING MASS DOG VACCINATION  
Be Nazir (Rabies in Asia Foundation) [10 minutes] |
| DOG BITE PREVENTION FOR RABIES ELIMINATION  
Daniel Stewart (South Africa) [10 minutes] |
| ONE HEALTH: INTER SECTORIAL COLLABORATION  
Eric Osoro (MoH Kenya) [10 minutes] |
| EDUCATION OF ‘AT RISK’ COMMUNITIES  
Deepa Balaram (GARC) [10 minutes] |
| FACILITATED Q&A AND PANEL DISCUSSION  
Daniel Normandeau [50 minutes]  
Luke Gamble (Mission Rabies), Rubina Cresencio (CVO Philippines), Eric Brum (FAO) |
| CO-CHAIRS’ WRAP-UP  
BERNADETTE ABELE–RIDDER (WHO) and BRIAN EVANS (OIE) |

### DAY 2: FRIDAY, DECEMBER 11, 2015

### SESSION 5: STRATEGIES TO CATALYSE ACTIONS

**OBJECTIVE:** To identify existing strategies and tools to support country efforts in rabies elimination and challenges to be overcome.

**TARGET OUTCOME:** Demonstrate available tools to support country efforts in rabies elimination.

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| 09:00 – 10:45 | RECAP OF DAY 1 AND OVERVIEW OF DAY 2  
DANIEL NORMANDEAU [15 minutes] |
| OVERVIEW BY CO-CHAIR  
BRIAN EVANS (OIE) |
| VACCINE BANKS AND QUALITY OF VACCINES  
Alain Dehove (OIE) [10 minutes] |
| IMPACT OF THE RABIES VACCINE BANK FROM THE RECIPIENT COUNTRY PERSPECTIVE: THE PHILIPPINES  
Rubina Cresencio (Philippines) [10 minutes] |
| ACCESS TO VACCINES AND IMMUNOGLOBULINES  
BERNADETTE ABELE–RIDDER (WHO) [10 minutes] |
| THE ROLE OF PRIVATE VETERINARIANS IN RABIES ELIMINATION  
René Carlson (World Veterinary Association) [10 minutes] |
SESSION 6: THE GLOBAL CAMPAIGN FOR RABIES ELIMINATION

OBJECTIVE: To describe strategies to increase awareness and political will.

TARGET OUTCOME: Highlight the importance of community engagement in rabies elimination.

11:15 – 12:45 OVERVIEW BY CO-CHAIR
Bernadette Abela–Ridder (WHO)

THE IMPACT OF RABIES AND THE BENEFITS OF ITS PREVENTION
Katie Hampson (Glasgow University) [10 minutes]

LOCAL GOVERNMENT AND MUNICIPALITIES: MOTIVATING COMMUNITIES
Eduardo Pacheco de Caldas (Mexicol) [10 minutes]

CROSS-BORDER COLLABORATION: THE INFLUENCE OF THE CHAMPION COUNTRY
Bavukile Kunene (Swaziland) [10 minutes]

AN EFFECTIVE COMMUNICATION CAMPAIGN: SEVEN YEARS OF WORLD RABIES DAY & END RABIES CAMPAIGN
Deborah Briggs (Kansas State University) [10 minutes]

FACILITATED Q&A AND PANEL DISCUSSION
Daniel Normandeau [45 minutes]
Be-Nazir (Rabies in Asia Foundation, Bangladesh), Sivasothy (Sri Lanka)

CO-CHAIR’S WRAP-UP
Bernadette Abela–Ridder (WHO)

SESSION 7: AIMING FOR SUCCESS

OBJECTIVES:
> To better understand donors’ motivations to invest in rabies.
> To identify gaps and opportunities for investment in human rabies elimination.
> To identify actions needed to achieve effective rabies elimination in the context of a global strategic framework.
> To determine the performance measures required to demonstrate progress and success.

TARGET OUTCOME: Determine the way forward for the elimination of dog-mediated human rabies.
14:00 – 16:00 OVERVIEW BY CO-CHAIR
Brian Evans (OIE)

ROUND TABLE – FACILITATED DISCUSSION WITH DONOR GROUPS
Andrea Ellis (Canada), Jean-Pierre Halkin (European Commission), Ann-Marie Sevcisk (UBS Optimus Foundation), Judith Kallenberg (Gavi, the Vaccine Alliance), Molly Mort (Bill & Melinda Gates Foundation) [30 minutes]

A WAY FORWARD FOR DOG-MEDIATED RABIES ELIMINATION
Bernadette Abela–Ridder (WHO) [15 minutes]

FINAL CONCLUSIONS AND RECOMMENDATIONS [60 minutes]

OFFICIAL CLOSING
Winnie Mpanju-Shumbusho and Bernard Vallat [20 minutes]

16:00 END
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SOUTH AFRICA – KWAZULU-NATAL EXAMPLE

K. Le Roux
Department of Agriculture and Rural Development, Veterinary Services KwaZulu-Natal, South Africa

BIOGRAPHY
Mr Kevin Le Roux (Rabies Project Manager KwaZulu-Natal [KZN]) has worked for the department of Agriculture (Veterinary Services) for 25 years as an Animal Health Technician. He initiated the original Rabies Project in 2005, which lead to KZN being awarded the grant from the Bill & Melinda Gates foundation, and has managed the project to its successful conclusion.

‘Although notable progress had been made in various aspects of rabies, there is still a splintering of efforts in research and control and a great need to bring these efforts together.’

George M. Baer

SUMMARY
The Bill & Melinda Gates Foundation (BMGF) project in KwaZulu-Natal (KZN) has achieved this by combining the influence and support of global organisations (World Health Organization [WHO], World Organisation for Animal Health [OIE], Global Alliance for Rabies Control [GARC], etc.) with partial financial support from the BMGF, and an existing scientific relationship with the University of Pretoria. This project was able to demonstrate the value of unity of purpose. It is from this example of shared purpose that a ‘One Health’ model of disease control emerged. This model, which was both a demonstration and a challenge when applied to contiguous provinces and countries, showed that rabies in Africa ‘CAN’ be eliminated.

The KZN project achieved a 93% reduction in diagnosed animal cases, with a corresponding decline in human rabies, to only a single case in the final two years of the project. This multisectoral approach has gathered momentum in southern Africa, which, supported by a vaccine bank and stimulus packages, has initiated similar projects across the region.

KEY LESSONS
> Champions – Are central to bringing all sectors together and maintaining effort.
> Global Support – Global role players attached to projects bring status and create political opportunities.
> Strategic Vaccinations – Vaccinating 70% of an entire dog population often scares authorities into doing nothing. Strategic vaccination of source areas works and makes the task more attractive to governments and investors.
> Start small and scale up – Starting small allows for incremental growth while systems are developed. ‘Success breeds support’.
> Get ‘EVERYONE’ involved – A multisectoral approach is foundational.
> Vaccine Banks – Stability of supply ensures continuity of effort, and stimulates growth.
> Taking the vaccine to the people – Systems must be designed to best serve resource poor communities.
> ‘It can be done’ – A basic belief through demonstration that what seemed impossible, can be done is important.
> Get the basics right – Practical innovation, support and equipping field staff, is critical.
> Sustainability – There must be a plan for self-sustainability.

Keywords: Champion – Multisectoral – Strategic – Sustainability – Vaccine Bank.
TANZANIA

E.-A. Mpolya
School of Life Sciences and Bioengineering, Nelson Mandela African Institution of Science and Technology (NM-AIST), P.O. Box 447, Arusha, Tanzania

BIOGRAPHY
Dr Emmanuel Abraham Mpolya is a lecturer in biostatistics and epidemiology at the Nelson Mandela African Institution of Science and Technology (NM-AIST) in Arusha, Tanzania. Since February 2015 he has been assisting the WHO Country office – Tanzania and the ministries involved in the rabies elimination project with data management, data analysis and training of ministry personnel in the same.

SUMMARY
The rabies elimination demonstration project in Tanzania was launched in 2010 and implemented in 28 districts of the southeastern mainland Tanzania as well as in Pemba Island. More than 100 veterinary and health units comprising 150 workers from the veterinary and health sectors were involved. The project covered a total of about 8 million people. Project activities included: prevention efforts such as mass dog vaccinations and post-exposure prophylaxis (PEP) administrations; reporting of animal and human cases and bite exposures; sample collection and laboratory confirmation of cases whenever possible; documentation; and dissemination of information across sectors and stakeholders. The mass dog vaccination campaign improved as the project continued. When the project started in 2010 only about 1,250 dogs were vaccinated. The number of dogs vaccinated increased 17 times in 2011 when about 22,283 dogs were vaccinated. The number increased further in subsequent years, reaching about 45,000 in 2014. Vaccination coverage across districts ranged between 34% and 80% with only two districts attaining <50%.

Throughout the project duration there were marked improvements in the collection, detection and documentation of suspect rabies cases and samples. The overall number of samples analysed increased with time while the number of positive samples decreased with time. The demand for PEP was lowest when the project started and increased as a result of increased awareness about rabies. In 2011 about 3,800 PEP doses were consumed but in 2012 this number rose to 8,000 doses and fell monotonously in subsequent years. The mode of administration of PEP also changed over time. When the project started more PEP administration was done intramuscularly. The trend changed in subsequent campaign years when almost all districts adopted administration of PEP through the intradermal route. The economic analysis showed that the cost per dog vaccinated ranged from USD 2.50 to USD 22.49 across districts and phases, with the phase average ranging from USD 7.30 to USD 11.27. These figures were influenced by over purchase of vaccine in the early phases of the program and the significant costs associated with purchasing equipment for a program starting from scratch. The cost per PEP course administered was approximately USD 24.41 with the average patient receiving 2.5 of the recommended four doses per suspect bite. Despite several challenges, a clear fall in the demand for PEP, number of rabies cases and number of positive samples for rabies resulted from mass dog vaccination campaigns.
PHILIPPINES

R.A. Deray
Programme Manager, National Rabies Prevention and Control Programme, Department of Health, San Lazaro Compound, Tayuman, Sta. Cruz, Manila, Philippines 1003

BIOGRAPHY
Dr Raffy A. Deray is a Doctor of Medicine with a Master’s Degree on Public Health. He is the National Program Manager of National Rabies Prevention and Control Programme (NRPCP) of the Department of Health in the Philippines, and the International Coordinator for the World Health Organization (WHO)–Bill & Melinda Gates Foundation project for human and rabies elimination in the Philippines.

SUMMARY
In the Philippines, rabies is considered a public health concern, responsible for the death of at least 200 Filipinos annually. In 2005, the Department of Health (DOH) identified rabies and four other infectious diseases for elimination as part of its disease-free zone initiative. The country being an archipelago, the National Rabies Programme adopted the island approach of eliminating rabies, prioritising small islands. Joint DOH and Department of Agriculture (DA) declaration of rabies-free zones started in 2008.

To support the objectives of the disease-free zone initiative, the DOH submitted a proposal to the World Health Organization (WHO) in 2007 to implement a rabies elimination campaign in the Visayas. The Philippines was eventually selected as one of the three demonstration sites for the WHO–BMGF (Bill & Melinda Gates Foundation)-supported rabies elimination projects. In collaboration with the DA and local Government Units, project implementation started in 2010. Dog vaccination started in 2010 in Phase I areas (Western Visayas and half of Central Visayas), followed by Phase II areas (second half of Central Visayas and Eastern Visayas).

In 2014, Rabies was included in the priority diseases of the DOH-KP (Kalusugang Pangkalahatan [Universal Health]) Road Map. The initial results of the WHO–BMGF-supported dog vaccination campaign in the Visayas was used to justify the importance of supporting the DA’s dog vaccination campaign in order to achieve the objectives of the roadmap for rabies elimination. The result demonstrated that dog-mediated human rabies can be controlled and eventually eliminated by improving dog vaccination and access to post-exposure prophylaxis (PEP). The overall outcome was that the Secretaries for Health and for Agriculture signed a Memorandum of Agreement to strengthen their cooperation to eliminate rabies, and the DOH transferred PhP 69.5 million to the DA for the procurement of additional dog vaccines.

Unfortunately, implementation of the project was severely affected by typhoon Yolanda (Haiyan) in 2013. The damage was so severe that dog vaccination stopped for almost two years in Eastern and Western Visayas. Recovery and rehabilitation from the effects of the typhoon was prioritised by local government units. Catch-up dog vaccination finally started in 2015 in most of the Yolanda-affected areas, even in areas that have yet to fully recover from the devastation of Yolanda.

To date, three provinces, five island municipalities and five smaller islands in the Visayas have been declared jointly by DOH and DA as rabies-free zones. Out of the 362 cities/municipalities in the Visayas, 19 still have human rabies. For this reason, the theme of the project’s culminating activity, the Rabies Dissemination Forum in the Visayas was ‘The Fight is Not Over’, to encourage local government units and all partners to continue what has been started, until all the municipalities and cities in the Visayas are free from human-rabies.
PROGRESS IN EUROPE

T. Müller (1), C.M. Freuling (1), P. Rosado-Martin (2), C. Bertrand (2), F. Cliquet (3), A.R. Fooks (4) & T.C. Mettenleiter (1)

(1) Friedrich-Loeffler-Institut, Federal Research Institute for Animal Health, 17493 Greifswald-Insel Riems, Germany
(2) European Commission, DG SANTE, Unit for Food Chain and Animal Health Expenditure, B-1049 Brussels, Belgium
(3) Anses, Nancy Laboratory for Rabies and Wildlife, 54220 Malzéville, France
(4) Animal and Plant Health Agency, Weybridge, New Haw, Surrey, KT15 3NB, UK

BIOGRAPHY

Dr Thomas Müller is a veterinarian and has worked for the Friedrich-Loeffler-Institut, Federal Research Institute for Animal Health, Germany, for 25 years as an epidemiologist and virologist in the field of rabies. He is in charge of the national and OIE Reference Laboratory for Rabies and head of the WHO Collaborating Centre for Rabies Surveillance and Research. Areas of research are laboratory diagnosis of rabies, rabies epidemiology including in new carnivore host species & bats as well as oral vaccination of wild carnivores & domestic dogs.

SUMMARY

Rabies in Europe has a long history dating back to antiquity. For millennia, the disease had been considered a scourge for its prevalence. There is ample evidence that both domestic and wild carnivores played an important role in the epidemiology of the disease resulting in frequent spill-overs into livestock and other animal populations with devastating effects on human health. While until the Early Modern Times ancient sources do not allow any conclusions as to whether the disease was independently circulating both in dogs and wildlife, dog-mediated rabies was predominant in the 19th and 20th Centuries. While rabies had already been successfully controlled in a few countries at the beginning of the last century by implementation of strict sanitary measures, tremendous progress was only achieved with parenteral mass vaccination and registration of dogs. In the 1970s, widespread elimination of dog-mediated rabies was achieved in Europe. Although at present there are still rabies cases reported in dogs in Eastern Europe, apart from in Turkey there is currently no evidence of independent circulation of rabies virus strains in dogs.

At about the same time when canine rabies elimination approached its final phase, the emergence of fox rabies posed a new public health challenge. The establishment of an optional supra-regional rabies database in the 1970s was a prerequisite for transparency and monitoring of the unfolding fox epidemic. Unfortunately, attempts to drastically decimate the reservoir population to control fox rabies completely failed requiring fundamental changes in control strategies. It was only with the advent of oral rabies vaccination (ORV) of foxes that the problem could be successfully tackled. The pioneering spirit and strong political commitment of affected European countries to control the disease using this novel and innovative strategy was remunerated by a substantial co-financing policy of the European Union (EU). The EU set itself a target to become free of rabies by 2020. To reach this goal, the EU provides enormous support even for neighbouring third countries with the aim of establishing cordons sanitaires along common borders and stimulating implementation of ORV programmes.

The significant achievement of rabies disappearance from large parts of Europe is unprecedented in history and a result of a successful stepwise approach. To accomplish this, it was essential to stay focused on dog rabies elimination at first followed by extermination of fox-mediated rabies.
THE LONG AND TORTUOUS WAY TO RABIES ELIMINATION: EXPERIENCES FROM THE AMERICAS COUNTRIES

O. Cosivi
Pan American Health Organization, 525 23rd Street NW, Washington, DC 20037, United States of America

BIOGRAPHY
Dr Ottorino Cosivi is the Director of the Pan American Foot-and-Mouth Disease Center (PANAFTOSA) of the Communicable Diseases and Health Analysis Department of the Pan American Health Organization. Dr Cosivi started his WHO career in 1993 as a Veterinary Public Health Officer working on zoonotic diseases; he then leaded the bioterrorism program at WHO, in 2008 was Acting Director of the WHO’s Mediterranean Centre for Health Risk Reduction, Tunis and in 2009 Cosivi moved to PANAFTOSA.

SUMMARY
Each and every case of human rabies is not only a tragic event for the family and community, it is also the most obvious indicator of the failure of the health system and services: the tools to prevent such terrible deaths have been available ever since 6 July 1885. In the past 30 years the countries of the Americas have reduced by more than 95% the incidence of human rabies and by more than 98% the incidence of canine rabies. This success was facilitated through a regional action plan coordinated since 1983 by the Veterinary Public Health programme of the Pan American Health Organization (PAHO), now based at the Pan American Foot-and-Mouth Disease Center (PANAFTOSA). The action plan has four priority deliverables:

a) access to timely post-exposure prophylaxis for the population at risk
b) dog mass vaccination
c) robust human and dog disease surveillance
d) community mobilisation.

Instrumental to the success of the regional action plan has been its governance mechanism in the form of the fifteen Meetings of Directors of National Programs for Rabies Control in America (REDIPRA from its Spanish acronym). Its first meeting was held in 1983, with the decisions of REDIPRA been endorsed by the Inter-American Meeting, at Ministerial Level, on Health and Agriculture (RIMSA), along with the technical cooperation provided to the countries by PAHO in response to requests from REDIPRA and RIMSA. Another characteristic of the region is that in all the Latin American and Caribbean Countries but one (Haiti), the Ministries of Health bear the weight of the rabies program, including the provision of free canine rabies vaccine, with the mass vaccination campaigns implemented through intersectoral arrangements, including different levels of government and partners. The Region now faces the challenge of moving towards targeted approaches for the identification and control of the remaining few pockets of disease, and also constructing a process of declaration of areas free of canine rabies-mediated human cases. Steps to this effect were discussed at the last REDIPRA 15 meeting held in September 2015 in Brazil. Among other outputs, the countries agreed to define the new regional elimination goal only after an exhaustive evaluation of the countries’ capacities following a standard regional framework founded on evidence based on canine surveillance.
REGIONAL APPROACH IN THE PREVENTION AND CONTROL OF RABIES IN NORTH AFRICA AND MIDDLE EAST

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BIOGRAPHY
Dr Mohammed Bengoumi, Moroccan born in 1962 in Rabat. Veterinary doctor in 1986, he joined the IAV Hassan II as teacher and researcher. He obtained several degrees including a PhD in 1992. He has over 60 publications and 200 scientific communications. He joined the Food and Agriculture Organization of the United Nations (FAO) in 2008 as responsible for animal health and production in the Middle East and North Africa (MENA) region and since 2010 he is the FAO animal production and health Officer for North Africa.

SUMMARY
Over one century after the first human vaccination against rabies, the disease remains present on all continents and kills tens of thousands people each year, 40% of whom are children under 15 years, mainly in developing countries (Asia and Africa). Although control methods exist, several constraints are impeding eradication of the disease, mainly limited coordination among stakeholders, inadequate communication and awareness of the population at risk, and limited human and financial resources.

This communication focuses on the epidemiological evolution of rabies in the Middle East and North Africa (MENA), and national strategies for the control of the disease. In the MENA region, the disease affects more domestic carnivores (50% of cases) than farm animals (40% of cases). Farm animals are mainly infected by dogs, resulting in economic losses, negative impacts on food security and a risk for farmers, their families and workers in the livestock industry.

In the MENA region, rabies is mainly urban (street rabies), transmitted to humans by free-roaming dogs, the population density of which is highly correlated to the evolution of enzootics and possible epizootic outbreaks. More than 30% of the free-roaming dog population in the region is under the age of one year. The density of the stray dog population is estimated to be between 0.6 and 1.5 /km² in urban areas and 1.2 to 2.6/km² in peri-urban and rural areas. More than 80% of dog rabies cases occur in rural areas.

In North Africa (Algeria, Libya, Morocco and Tunisia) the average annual number of confirmed cases of human death from rabies is 47 and highly correlated to animal cases with an annual average of 1,442 confirmed cases. In the Middle East, only a few rabies cases are officially declared.

National rabies control strategies include vaccination, control of stray dog populations and raising awareness among the at-risk human populations. These strategies are only partially implemented because of limited human and financial resources and the lack of coordination among all stakeholders in the field. Eliminating rabies requires a coherent and sustainable long-term strategy, backed by robust human and animal health systems.

The regional strategy for the prevention and control of rabies should be based on a participatory approach and coordination of interventions of all stakeholders.

The FAO, in close collaboration with the World Organisation for Animal Health (OIE) and World Health Organization (WHO), supports member states in developing and implementing coordinated strategies among the Ministry of Agriculture, Ministry of Health, the Ministry of Interior, local Authorities, Ministry of Education and NGOs (non-governmental organisations).
RABIES IN ASIA: REGIONAL APPROACH AND PROGRESS

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SUMMARY

Rabies continues to be endemic in most parts of Asia, causing more than 30,000 human deaths annually and contributing to almost 50% of the estimated global rabies burden each year. Although effective tools for its prevention and control are available, human rabies continues to persist in Asia, where approximately 94% of cases are associated with dog bites. Annually, more than 11 million people also receive post-exposure rabies prophylaxis following a dog bite. Rabies continues to be a challenge in many parts of Asia particularly in areas of poverty, political instability, suboptimal national health and veterinary services, and those where cultural influences impact the societal roles of dogs, their ecology, and interactions with humans.

Despite the challenges, progress continues to be made in the region, particularly in regional cooperation, inter-sectoral collaboration, and addressing rabies at its source through dog vaccination. The Association of South-East Asian Nations (ASEAN) Rabies Elimination Strategy (ARES) has recently been jointly endorsed by both Health and Agriculture Ministers from ASEAN Member States fostering strong political support. The South Asian Association for Regional Cooperation (SAARC) has also come together to initiate a regional coordinated rabies elimination programme. The Regional Offices of the Food and Agriculture Organization of the United Nations (FAO), World Organisation for Animal Health (OIE) and World Health Organization (WHO) also established a coordination mechanism at the regional level to provide technical support for rabies control or elimination in highly endemic countries. The Regional Vaccine Bank for Asia has also become operational, benefitting the region through its established mechanism for procurement of cost-effective, quality dog rabies vaccines. In the past few years, various rabies initiatives in the region contributed to the improvement of awareness and capacities on practices relevant to rabies elimination, such as mass dog vaccination. The introduction of cost-effective intradermal rabies vaccination in endemic countries helped to improve availability, affordability and accessibility of human rabies vaccine on a sustainable basis. It also helped phase out the production and use of rabies vaccine of nerve-tissue origin, addressing animal welfare issues.

Thus, while the region continues to foresee challenges where rabies is concerned, substantial achievements in the past few years have improved Asia’s fighting stance against rabies. It has seen evolved mechanisms and stronger cooperation, now backed by a substantial pool of documented information, methods, materials, and experiences earned throughout the region on which future work can be built as Asia continues to progressively advance its fight against rabies.
PROGRESS IN AFRICA

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BIOGRAPHY

Professor Louis Nel is based at the University of Pretoria where he has focused on improved understanding and control of lyssaviruses and rabies. His research relies on state of the art methods in molecular biology and includes diagnostic development, vaccinology, immune contraception, viral pathogenesis, host/virus ecology and molecular epidemiology. Prof. Nel assisted the Global Alliance for Rabies Control (GARC) in various capacities since 2008. In July 2014, he became the Executive Director of GARC.

SUMMARY

Despite being a classic preventable zoonosis with an almost 100% case fatality ratio, rabies remains one of the most neglected diseases in the modern world. To address this neglect, a first major realisation is the need for the effective execution of the ‘One Health’ concept, in this instance requiring close coordination between animal and human health sectors at the national, regional and continental levels. In the case of Africa, the continent where the per capita death rate from rabies is the highest in the world, a coordinated pan-continental approach to rabies control has been non-existent. To attain a coordinated, inclusive and unified network for rabies control across Africa, the Pan-African Rabies Control Network (PARACON) was established in 2014/2015. It is envisaged that this network will provide a platform to facilitate and promote coordinated and sustainable rabies control strategies and programmes towards the elimination of canine rabies in Africa. PARACON meetings will take place at regular intervals and will be centred on the One Health approach, among others, by inviting the involvement of key focal persons from both the medical and veterinary sectors from the participating nations. The inaugural PARACON meeting was held in South Africa in June 2015 and was focused around interactive discussion sessions and workshops, whilst updating country representatives on the tools available to aid countries in their efforts towards developing and implementing sustainable rabies intervention strategies. Experts from various global organisations, institutions and industry participated in the discussions and shared their experience and expertise during the workshop sessions.

The workshops focused on the latest format of the rabies blueprint platform (www.rabiesblueprint.com), which in the broadest sense assists with various aspects of a control and elimination campaign, including:

1. an educational and advocacy drive,
2. the improvement of surveillance and diagnosis,
3. the systematic monitoring of progress, together with the stepwise approach towards rabies elimination, a planning tool for assisting countries to pursue freedom from human rabies transmitted by dogs.
TACKLING MASS DOG VACCINATION

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BIOGRAPHY

Dr Be-Nazir Ahmed is currently Professor of Microbiology and the Head of Department of Parasitology of the National Institute of Preventive and Social Medicine, Dhaka, Bangladesh. He has more than 30 years of experience in public health including research, outbreak investigation and rabies elimination strategies at national and international levels. As the director of rabies elimination program of Bangladesh he has developed a unique expertise in rabies and especially in mass dog vaccination and has proved him as a champion of rabies elimination.

SUMMARY

Rabies is mainly transmitted by roaming dogs, and the rabies virus is also believed to be harboured by them. Gangs of stray dogs often inflict injuries during fights with fellow members, some of which are also rabid. The newly infected victims develop signs at various incubation times and thus, in turn, transmit the virus to other stray dogs at different times. In this way, the transmission of the virus is sustained in an area, region or country.

The roaming dog is a common feature of dog populations of many countries of Asia and Africa, where the disease is highly endemic. The dogs are either not owned or loosely owned, leading to little or no care. Almost all roaming dogs therefore have no chance of being vaccinated against rabies, keeping them vulnerable to the disease while simultaneously exposing humans and other animals to this disease.

With this background in mind, the regional and national strategies for rabies control and elimination are now targeting mass dog vaccination (MDV) as the most important component. Scientific and other evidence has shown that MDV can result in herd immunity at a level that can contribute to consistent reduction and elimination of rabies. In countries of South America and some countries of Asia and Africa, MDV campaigns have generated evidence of success in rabies elimination. However, many rabies endemic countries of Asia and Africa have yet to adopt this approach and also face problems in prioritisation, planning and mobilisation of resources. Stray dog vaccination also belongs in the ‘no man’s land’ between health and livestock departments; while the public health problem lies with human health services, the responsibility of MDV lies with livestock services. Unfortunately, vaccinating ‘unworthy’ dogs is not a priority for livestock, so many countries are yet to initiate or scale up MDV.

To be effective and feasible, a MDV campaign must have a few characteristics: be of short duration; the vaccine should be of quality; the target coverage must be achieved; the campaign should be cost effective, affordable and reproducible. It is also important to have capacity building through piloting and scale-up campaigns to ensure coverage of a whole country or a whole region within the shortest possible time. The financial resources needed to complete three rounds of MDV are one of the most important components of a campaign; international development organisations and partners should come together to realise this important public health initiative. Vaccine banks for animal rabies have contributed significantly to scaling up in countries such as Bangladesh, Sri Lanka and the Philippines. To achieve a rabies-free world, we need to apply MDV campaigns globally.
DOG BITE PREVENTION FOR RABIES ELIMINATION

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BIOGRAPHY

Mr Daniel Stewart has an extensive career in animal welfare and an advanced diploma in companion animal behaviour. He joined the KwaZulu-Natal (KZN) Rabies Elimination Project in 2009 to run the welfare, research and training component of the project. His expertise has been utilised by several organisations globally, with the emphasis being on dog population management, rabies elimination programmes and animal handling training.

SUMMARY

Despite the ancient symbiotic relationship between dogs and humans, conflict between the two is inevitable and dog bites are as old as the relationship itself. Biting is usually driven by natural instincts, but sometimes a disease such as rabies plays a role.

With society’s understandable fear of rabies, and 99% of human rabies deaths resulting from dog-mediated rabies, treatment of dog bites has become both necessary and common. However, large numbers of unnecessary treatments are administered annually to ensure that a small percentage of in-contact people are saved from the disease. These treatments form part of the global burden of the disease.

With the successful control of canine rabies in KwaZulu-Natal (KZN), the number of potential contacts with humans has dramatically decreased. Paradoxically however, with the increased public awareness and improved post-exposure prophylaxis (PEP) distribution within the province, there has been an increase in demand for PEP.

Part of the KZN project mandate was to demonstrate a decrease in the demand for PEP by controlling rabies in dogs. This did not happen and other avenues needed to be explored to reduce the financial burden of PEP.

Consequently, the following questions were asked:

> Why do dogs bite?
> What human behaviour elicits bites?
> How can these be avoided?
> Can bites from rabid dogs be avoided?

Education about bite prevention in KZN became an extension of the disease control project, and should, in future, be a part of all rabies vaccination projects. This will decrease both the incidence of the disease as well as the financial burden of treating dog bites.
Despite a global focus on the number of children dying from rabies, a far higher percentage of adults (66%) are bitten by dogs in KZN each year.

Rabies education, which usually focuses on children, thus needs to be expanded to be more inclusive of the whole of society and broadened in scope to include information on both dog behaviour and bite prevention.

A ‘One Health’ approach to removing the burden of rabies on society must consider all aspects of the relationship between humans and dogs in order to nurture that valuable relationship while also removing rabies from our societies.
IMPLEMENTING ONE HEALTH INTERSECTORAL COLLABORATION AT COUNTRY LEVEL

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SUMMARY
Background
A ‘One Health’ approach that integrates human, animal and environmental approaches to the management of zoonotic diseases has gained momentum globally in the last decade as part of a strategy to prevent and control emerging infectious diseases. However, there are limited examples of institutionalised ‘One Health’ approaches. We describe Kenya’s roadmap and implementation of a sustainable ‘One Health’ system.

Methods
In 2006, the Government of Kenya created a multisectoral working group to manage zoonotic outbreaks and to deliberate on mechanisms of maintaining ‘One Health’ practices. The multisectoral National Influenza Taskforce (NIT) was established in response to the global threat of H5N1 avian influenza epidemics. In 2010, the NIT was renamed the Zoonotic Disease Technical Working Group (ZTWG) to reflect an expanding mandate. In 2010, the ZTWG established an ‘One Health’ coordinating unit referred to as the Zoonotic Disease Unit (ZDU). The ZDU bridges between the ministries of livestock and human health, with an epidemiologist deployed from each ministry.

Results
The country has developed a five-year strategic plan to guide implementation of the ‘One Health’ approach.

With the ‘One Health’ approach, outbreaks of zoonotic diseases, including Rift Valley fever (RVF), rabies and anthrax, were detected more rapidly, effectively responded to, probably resulting in fewer deaths, better documented, and the understanding of animal–human linkage of the diseases improved. Risk maps have been developed for RVF to guide targeted surveillance and interventions.

A prioritised list of zoonotic diseases has been developed using a semi-quantitative approach.

The ZDU has coordinated the development of a national strategy for the elimination of dog-mediated human rabies that incorporates the ‘One Health’ approach and the implementation of which is based on the Stepwise Approach to Rabies Elimination. Implementation of synchronised activities has started in a pilot county to demonstrate success before extending to the rest of the country.
**Conclusion**
A ‘One Health’ approach entails having better coordination between human and animal health sectors (and environment) in responding to outbreaks of zoonotic disease, routinely sharing surveillance and outbreak data on zoonotic and unknown diseases between the sectors and developing integrated (human–animal) plans for preventing and controlling priority zoonotic diseases.

**Keywords:** Collaboration – Kenya – One Health.
EDUCATION OF AT RISK COMMUNITIES

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BIOGRAPHY
Dr Deepashree Balaram is the Campaigns Director at the Global Alliance for Rabies Control (GARC), working on World Rabies Day coordination, partner campaigns, communications, and End Rabies Now campaign development. A veterinarian by training, previous roles include Companion Animals Director for WSPA (now World Animal Protection), International Development Director for Animal Defenders International and co-founder of ACTAsia for Animals.

SUMMARY
Increasing awareness of rabies prevention and control in communities is an integral part of any successful rabies control or elimination programme.

At the most basic level, individuals cannot stay safe if they do not know that they need to keep their dogs vaccinated to prevent rabies; how to prevent dog bites; and what to do if bitten, including washing the wound and getting post-exposure prophylaxis, if needed. At a broader level, engagement or even ownership of the programme by the community will ensure that key messages reach all community members, appropriate action is taken to prevent deaths, and implementation is supported or led by the community.

Community engagement should ideally start before a canine vaccination programme is implemented. Once a programme is underway, this continued engagement is fundamental to the success of an intervention to help access and vaccinate the dogs in the area. Better understanding of community attitudes towards rabies and their dogs can also help avoid adverse community reactions that can occur, for instance to culling, that may destroy trust in programmes and have counterproductive effects on rabies control.

The Global Alliance for Rabies Control (GARC), with its project partners, has implemented an intersectoral approach to building and maintaining community engagement, empowering at-risk communities in the Philippines and Indonesia to take responsibility. It has developed stakeholder-specific messages on rabies to not only raise awareness but also advocate for behaviour change within the community. The educational interventions focus on rabies prevention, bite prevention and responsible pet ownership, and target school-goers, pre-schoolers and out of school youths.

Approaches include integration of rabies education into the school curriculum; training teachers, school nurses and Girl Scout leaders to provide lifesaving information, and ‘edutainment’ tools such as storytelling, community theatre and colouring books; lectures for parents; community engagement through participatory planning; and involvement of village volunteers to vaccinate dogs and conduct dog surveys, and also to establish early warning and rapid response systems at the village level.

To further increase community awareness outside its project areas, GARC has set up online Rabies Educator Certificate and Animal Handlers and Vaccinators Education Certificate courses that can significantly increase rabies focal points in the community with the capacity to share life-saving information down to the village level.
VACCINE BANKS AND QUALITY OF VACCINES

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BIOGRAPHY

Dr Alain Dehove (DVM, MSc) joined the World Organisation for Animal Health (OIE) in July 2006, as Coordinator of the World Animal Health and Welfare Fund, a multi-donor trust fund collecting voluntary contributions for projects of international public utility relating to the strengthening of veterinary services and the control of animal diseases, including zoonosis. Dr Dehove has contributed to the establishment of the OIE Regional Vaccine Banks.

SUMMARY

Vaccinating at least 70% of dogs in endemic areas breaks the cycle of transmission in dogs and to humans, thereby preventing rabies in humans most efficiently. Countries require easy access to high quality dog vaccines to successfully eliminate rabies in dogs.

The OIE World Animal Health and Welfare Fund collects voluntary contributions from public and private donors allowing for a multi-donor approach, with possible earmarking of funds by region, country and/or disease. An international call for tender procedure in line with OIE intergovernmental standards and calling on internal and external international experts precedes the setting up of an OIE Regional Vaccine Bank. The OIE then negotiates a formal service contract with selected supplier(s) for OIE deliveries but also foresees the possibility of direct purchase by Countries or International Organisations such as the World Health Organization (WHO). In kind donations are also accepted when appropriate.

Since 2012, the OIE has provided over 13 million doses of rabies vaccines for dogs, in seventeen countries (mainly in South-East Asia). Initially funded by the European Union, financial support from Australia, France and Germany has allowed for additional deliveries, including to Africa. Moreover, five countries have purchased vaccines directly through the OIE Vaccine bank. Furthermore, WHO has officially recognised the OIE procurement process and has purchased 7,850,000 doses (in 2014 and 2015) for the Philippines and South Africa.

OIE Delegates submit official requests to the OIE Director General with support from OIE regional representations and the Utilisation Guidelines developed. Countries are requested to confirm that the appropriate cold chain is maintained at all times. Orders are then confirmed by the OIE Headquarters. Flight details and shipping documents are handled by the vaccine supplier(s) and provided to the country by OIE Headquarters. The major burden of storage lies with the supplier(s) rather than the countries or international organisations.

OIE Regional vaccine banks operate with virtual stocks, production on demand and replenishment mechanisms. This ensures optimisation of shelf life, facilitates use of emergency stocks in line with needs and enables delivery of small or large quantities.

Countries are invited to provide progress reports to the OIE, including information on vaccination campaign periods, quantities used, number of animals vaccinated, geographical areas covered and post-vaccination surveillance.

Regional vaccine banks enable economies of scale, synergies and leverage effects, whilst contributing to harmonisation and coordination of regional control programmes. In addition, they allow for multi-party vaccination campaigns, public-private partnerships and involvement of NGOs.
IMPACT OF THE RABIES VACCINE BANK FROM THE RECIPIENT COUNTRY PERSPECTIVE: THE PHILIPPINES

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BIOGRAPHY
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SUMMARY
An average of 200 Filipinos die annually from rabies, with about 98% attributed to bites from rabid dogs. Pursuant to the Republic Act 9482, otherwise known as ‘Anti-Rabies Act of 2007’, the National Rabies Prevention and Control Program (NRPCP), a multi-agency effort in controlling and eliminating Rabies in the country, was created. The Department of Agriculture (DA), through the Bureau Animal Industry, spearheads the implementation of the NRPCP in close coordination with the Department of Health (DOH) and other national agencies. One of the key NRPCP strategies is the vaccination of at least 70% of the total dog population. However, the cost of rabies vaccines, the substantial dog population estimated to be at about 10 million, and the very limited annual DA budget for the procurement of animal rabies vaccines, presented major drawbacks in achieving this coverage.

In February 2013, initially as part of the European Union (EU)-funded Highly Pathogenic and Emerging Diseases (HPED) Project, the Philippines became one of the first recipients of the World Organisation for Animal Health (OIE) Rabies Vaccine Bank for Asia, with a delivery of 500,000 doses. Shortly after its distribution in select priority areas, a dramatic reduction in dog rabies cases, and later in human rabies cases, was documented demonstrating the importance of good vaccination coverage, high quality vaccines, and an efficient procurement process. Building on this initial success, the Australian-funded Stop Transboundary Animal Diseases and Zoonoses (STANDZ)’s Rabies Project committed further support in the delivery of 940,000 more doses of rabies vaccines for 2014–2016, through the same vaccine bank mechanism.

Recognising the value of addressing the disease at source and the critical importance of nationwide mass dog vaccination to achieve rabies elimination, the DOH provided PhP 69.5 million additional funds to the annual DA budget for rabies vaccine procurement. Further to this, the World Health Organization (WHO) provided assistance in the procurement of animal rabies vaccines through its reimbursable procurement scheme, also tapping the established OIE Vaccine Bank mechanism. With the combined budget from DA and DOH, and through the WHO scheme and the OIE Vaccine Bank Mechanism, the Philippine government in 2015 was able to order more than 7 million doses of dog rabies vaccines, 4.22 million of which will have been delivered by December 2015.

The experience of the Philippines demonstrates that invaluable platforms, such as the Regional Rabies Vaccine Bank, can help any country to achieve what may initially seem to be an ambitious goal, particularly when forces are brought together in the true spirit of ‘One Health’.
ACCESS TO VACCINES AND IMMUNOGLOBULINES

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BIOGRAPHY

Dr Bernadette Abela-Ridder is the Focal Point for Rabies at the World Health Organization. She is also the team leader of neglected zoonotic diseases in the Department for the Control of Neglected Tropical Diseases. She dedicates her full energy and wide experience to mobilise countries and stakeholder in attaining shared purpose for improved impact on the health and livelihoods of people in underserved communities.

SUMMARY

Rabies is 100% vaccine preventable. Optimising the supply and access to safe, efficacious and affordable dog and human rabies vaccines and rabies immunoglobulin (RIG) is key to achieving zero human rabies deaths.

While safe vaccines currently exist, needs of at-risk communities remain un-met. Through better forecasting and planning, optimised procurement practices and the support of the private sector, access to vaccine can be improved. The successful neglected tropical disease (NTD) model for medicines could be adapted to rabies by bringing vaccines and RIG to where they are most needed. A coordination mechanism is needed with strong regional participation to assist countries in developing action plans and identifying vaccine needs.

Provision of vaccine can provide stimulus to start up rabies control and elimination programmes, which in turn demonstrate success and trigger interest and further local or foreign investment. Funding strategies should support stimulus packages beyond vaccines. Support is also needed for capacity and awareness building, planning and initiation of local/national/regional programmes and activities, animal handling and communication equipment and implementing standard operating procedures for bite management including shifting to dose and cost sparing intradermal vaccine administration in healthcare centres.

Improved access will accelerate discontinuation of nerve tissue-based vaccines that cause frequent and severe adverse events. Through these activities, data are generated that provide the evidence to feed into national policies and encourage political commitment at the country level.

The World Organization for Animal Health (WHO) encourages its Member States to engage in forecasting their vaccine and RIG needs and participate in a bulk procurement mechanism, and investors to support countries in need of stimulus packages.

With joint leadership from the WHO and the OIE, that link the human and animal sectors, optimisation of supply and coordination will assure improved access of quality-assured, safe and affordable dog and human rabies vaccine and RIG to reach rabies elimination.

Each death from the horrifying disease of rabies is one too many, we have the tools to act, the time is now!
THE ROLE OF PRIVATE VETERINARIANS IN RABIES ELIMINATION

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BIOGRAPHY

Dr René Carlson was in private veterinary clinical practice for 35 years in the United States, working in large and small animal hospitals in both rural and urban referral and emergency centers. Dr Carlson served on the AVMA’s Council on Education and then as the 2011-2012 President of the American Veterinary Medical Association. She is currently the Director of International Affairs for the AVMA. In 2014 she was elected President of the World Veterinary Association for the 2014-2017 term.

SUMMARY

The World Veterinary Association (WVA), which represents over 500,000 veterinarians around the world, recognises dog-mediated human rabies as a neglected, under-reported fatal, yet preventable disease that needs the full attention of the international veterinary (and non-veterinary) community. Many of the services necessary for effective rabies prevention are already described by the World Organisation for Animal Health (OIE), World Health Organization (WHO), Food and Agriculture Organization of the United Nations (FAO), Global Alliance for Rabies Control (GARC), and Partners for Rabies Prevention (PRP) and are provided by a variety of groups. These services include mass canine vaccination programmes, dog population management, surveillance and monitoring, and public education for rabies awareness. However, many times the varied services are independently provided and many times provided on a temporary or intermittent basis.

Engagement of private sector veterinarians has been difficult, possibly due to lack of workforce, lack of resources, general apathy, or perceived or real competition from freely donated services from outside volunteers. Barriers to the successful engagement of the private sector of veterinarians must be identified and resolved so as to fully engage community veterinarians and paraprofessionals in a One Health community approach for sustainable progress in the global fight to end the needless suffering and deaths by rabies in both humans and animals.

This presentation will introduce the concept for regional WVA Member veterinary associations taking a leadership role in coordinating a comprehensive approach with needed private–public partnerships in such a way as to engage and coordinate a long-term sustainable community-based canine rabies prevention programme.
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BIOGRAPHY
Dr Katie Hampson is a Wellcome Trust research fellow based at the University of Glasgow. Dr Hampson works on the dynamics of rabies and strategies for effective rabies surveillance, control and elimination. She collaborates with a network of practitioners and policy-makers in rabies endemic areas to collect and analyse data on rabies transmission and the impacts of control effort.

SUMMARY
Rabies is a notoriously under-reported and neglected disease. Here, the impacts of rabies in terms of public health and economic costs are described and an overview of published data and accompanying modelling to generate estimates of the costs of rabies is provided. We estimate that globally canine rabies causes approximately 59,000 (95% confidence intervals [CIs]: 25–159,000) human deaths, over 3.7 million (95% CIs: 1.6–10.4 million) disability-adjusted life years (DALYs) and 8.6 billion USD (95% CIs: 2.9–21.5 billion) in economic losses annually. The largest component of the economic burden is due to premature death (55%), followed by direct costs of post-exposure prophylaxis (PEP, 20%) and lost income whilst seeking PEP (15.5%), with only limited costs to the veterinary sector due to dog vaccination (1.5%), and additional costs to communities from livestock losses (6%). Overall, the burden of rabies impacts on public health sector budgets, local communities and livestock economies, with the highest risk of rabies in the poorest regions of the world. Moreover, the impacts of the disease on the poorest communities are not revealed by official statistics, which has contributed to the neglect of the disease. Most progress in the control and elimination of rabies around the world has been achieved through sustained investment in dog vaccination. However, in most rabies endemic areas, investment in dog vaccination has been inadequate and availability and affordability of PEP needs improving. Collaborative investments by the medical and veterinary sectors are therefore urgently needed to reduce the currently large and unnecessary burden of rabies on affected communities. Moreover, engagement of these communities will be essential to the effectiveness and sustained momentum of dog vaccination programmes that should ultimately lead to the elimination of disease.
LOCAL GOVERNMENT AND MUNICIPALITIES: MOTIVATING COMMUNITIES

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BIOGRAPHY
Dr Eduardo Pacheco de Caldas holds a degree in Veterinary Medicine and a bachelor degree (Bel) in Economics from the Federal University of Rio Grande do Sul, Brazil. He holds a Master degree in Veterinary Epidemiology and has special interest in zoonosis. He is currently the Head Coordinator of the National Program for Control and Prevention of Rabies, Coordinator of the Technical Surveillance in Zoonosis and Substitute Coordinator of the Department of Transmissible Diseases for the Ministry of Health, Brazil.

SUMMARY
The control of human rabies transmitted by dogs in the Americas is carried out by the Health Sector.

Brazil has reduced cases of dog-transmitted human rabies by more than 90% over the past decades. The Ministry of Health (MoH) is in charge of policy formulation, and for the elaboration of technical guidelines and standards for the National Program of Rabies Control (NPRC). The MoH is also responsible for the acquisition and distribution, free of charge throughout the country, of major strategic inputs – biopharmaceuticals such as canine rabies vaccines (CRV) used in dog vaccination campaigns, human rabies vaccines (HRV), as well as heterologous rabies antiserum (HRA) and human rabies immunoglobulin (HRI) used in rabies prophylaxis.

The positive results were made possible through surveillance, prevention, control, and prophylactic measures directed at people at risk. The timely prevention of canine rabies transmission, education and massive animal rabies vaccination (dogs) campaigns were also planned in a sustainable way. These rabies vaccination campaigns are carried out by Municipal Health Departments with the support of state governments and the MoH.

In 2015, Brazil invested USD 33 million in the human rabies control programme: USD 14.4 million in dog rabies control and USD 16.5 million in acquisition of immunoglobulins and vaccines for human use. In the period from 2010 to 2015, data from the Health Surveillance Department of the MoH demonstrated an annual average of 578,398 patients receiving rabies prophylaxis, with an annual average of 1.3 million doses of human rabies vaccine applied.

In 1996, 1058 cases of canine rabies were reported, a figure that has dropped to 15 cases in 2014. Between 2008 and 2014 there were no cases of human deaths from dog-transmitted rabies. In the same period, however, there were ten deaths from rabies transmitted by wild animals or herbivores. In the year 2015, an epizootic in two municipalities in the border with Bolivia caused 67 cases of canine rabies and one human death from rabies was reported.

The decentralisation process in Brazil ensures the financing of surveillance actions and rabies control in the states and municipalities; this has made it possible to achieve a significant decrease in the incidence of human rabies and canine rabies. At present, such actions still exist in some vulnerable municipalities where there is viral circulation and persistence of canine rabies epizootics, leaving the project still unfinished.
CROSS BORDER COLLABORATION:
THE INFLUENCE OF THE CHAMPION COUNTRY:
RABIES IN SWAZILAND

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BIOGRAPHY
Dr Bavukile Siphosethu Kunene, graduated as Doctor in Veterinary Medicine and Zootecnia (Husbandry) at the Agrarian University of Havana (Cuba) in July 2013. Employed by the government of Swaziland as a Veterinary Officer in the department of Veterinary Field Services under the Ministry of Agriculture, where serving duties of disease surveillance, prevention and control, and livestock movement control. Swaziland’s representative in the first Pan African Rabies Control Network meeting in Gauteng, RSA.

SUMMARY
Rabies still continues to kill people every day, a high proportion of them being children. In Swaziland there is a statutory requirement for annual vaccination of all dogs, which also stipulates that in case of an outbreak, infected areas should be declared rabies guard areas followed by vaccination campaigns. It has been proven that the most effective way to prevent dog-transmitted rabies in humans is by vaccination of dogs, and, with over seven years on national vaccination campaigns, Swaziland has not recorded human deaths due to rabies for over two years.

People in Swaziland value dogs for security, yet many fear them with animosity and do not develop a companionable bond. Domestic dogs accounted for 75% of all animal rabies laboratory-confirmed cases during the past five years. Prevention and control of canine rabies is therefore key as it is known that humans are accidental victims of rabies, with dogs being the main vector.

The Government of Swaziland, in collaboration with other stakeholders, is striving towards elimination of dog-mediated human rabies, through various rabies control programmes: Annual World Rabies Day Commemoration Events since 2007, annual vaccination campaigns by mobile teams countrywide and continuous vaccination points in all four regions of the country, animal bite reporting and outbreak declaration, annual spay/neuter clinics hosted by Swaziland Animal Welfare in collaboration with Swaziland Veterinary Association, post-exposure prophylaxis to dog bite victims and reporting of rabies cases to the World Organisation for Animal Health (OIE).

Swaziland and South Africa continuously engage in cross-border collaboration meetings where issues such as rabies control are deliberated. The two countries amongst other Southern African Development Community (SADC) member states have a common Movement Permit for Dogs and Cats, which requires compulsory rabies vaccination for cross-border movements and further prohibits movement from rabies outbreak areas.

The country has also been working in collaboration with the KwaZulu Natal Rabies Elimination Project (WHO/Gates Foundation), which has funded rabies vaccine supplies for the country for the past three years, giving a total of 147,000 dogs vaccinated to date from this project. Other stimulation packages have been useful to veterinary officials during vaccination campaigns, and the response from the public with regards to turn-out numbers of dogs at vaccination centres has generally increased in areas where these stimulation packages have been in use.

Swaziland aspires to a rabies elimination target of 2030 in line with the Sustainable Development Goals.
AN EFFECTIVE COMMUNICATION CAMPAIGN: NINE YEARS OF WORLD RABIES DAY & END RABIES NOW CAMPAIGN

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BIOGRAPHY
Dr Deborah J Briggs is a global expert in the field of rabies prevention and control. She is currently Chair of the Board of Directors of the Global Alliance for Rabies Control. Dr Briggs continues to teach and serve on graduate student committees at Kansas State University where she is an Adjunct Full Professor. Dr Briggs has numerous publications focusing on rabies prevention.

SUMMARY
The Global Alliance for Rabies Control’s (GARC) first major partnership initiative, with, among others, the Food and Agriculture Organization of the United Nations (FAO), World Organisation for Animal Health (OIE), World Health Organization (WHO), the United States Centers for Disease Control and Prevention (CDC), and the Pan American Health Organization (PAHO), was the creation of an annual World Rabies Day (WRD) in 2007 as a global day of action against rabies. The principal objective and achievement of WRD has been the generation of widespread awareness of key rabies prevention messages. WRD has now been coordinated annually for nine years on 28 September by GARC. It is observed globally by people and organisations that are involved in rabies prevention efforts, including international agencies, national and local governments, NGOs, animal and human health professionals, educators, and others. WRD has been a focal point for thousands of rabies prevention events in over 200 countries, promoting awareness of rabies prevention to potentially millions of people, through resources, events and media outreach.

The tripartite organisations (FAO/OIE/WHO) have strongly supported WRD in a unified manner, contributing meaningfully to its success. Their encouragement of member states to participate in WRD has enabled many governments to use this opportunity to launch or support rabies control improvements. Regional networks like Association of Southeast Asian Nations (ASEAN) and Pan-African Rabies Control Network (PARACON) have included WRD coordination in their action plans and meetings as part of their rabies elimination strategies.

As World Rabies Day moves towards its tenth anniversary, efforts will focus on supporting governments and organisations in rabies-endemic countries that are part of the regional networks, to raise in-country awareness of rabies prevention and provide support for implementation efforts.

It is the opportune moment to unite programmatic activities and the experience from WRD, drawing upon the networks developed over the past 9 years to build a comprehensive campaign, End Rabies Now, calling for global elimination of human deaths due of canine-mediated rabies by 2030.

The End Rabies Now campaign aims to significantly raise the profile of rabies as a global neglected tropical disease. Among its objectives are to support achievement of a target set by Sustainable Development Goal 3 that aims to end the epidemics of NTDs by 2030; put rabies control on the agenda of foundations, donor governments and international institutions; increase financial resources for rabies-endemic countries; and gain the commitment of politicians to advocate for and support rabies elimination in endemic countries.

By highlighting the progress made towards rabies elimination across the world, the campaign aims to show policy makers and decision makers that rabies is an urgent priority that must be tackled today.
GLOBAL ELIMINATION OF DOG-MEDIATED HUMAN RABIES

GLOBAL CONFERENCE
10-11 DECEMBER 2015
GENEVA, SWITZERLAND

BOOK OF ABSTRACTS