Partners for Rabies Prevention

Banna Meeting, 3rd - 6th May 2011

Meeting Minutes

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SESSION 1 – Introduction

1.1 Louis Nel – Opening Remarks

Welcome to all participants. During the meeting we will be revisiting the 5 pillars of the PRP: Advocacy, Communications, Capacity Building, Pilot Projects and Research & Development. The new challenge that we have this year is to consider how the Millennium Development Goals relate to rabies, and to brainstorm and debate this issue as a means for the group to approach the big players in Global Health.

Members of the group then introduced themselves.

1.2 Jakob Zinsstag – Global Development and Rabies

Good health is an important factor in what pastoralists want, but other factors (eg. peace, grazing, education) are also important, so there are other agendas to take into consideration. We need to consider integrating rabies into wider development agendas, integrating horizontally into other programmes, not just focusing on vertical, disease-specific programmes. We have to look for 'running trains' that we can put rabies onto. Health is a determinant of development, but the reverse is also true, and the true meaning of 'One Health' puts health into the context of environmental and social sciences. We don't need new initiatives, the one health model is a good one if interpreted correctly – and we need to show the 'added benefit' of integrating veterinary and public health in project proposals. The work of Calvin Schwabe (a model with zoological, animal and medical components to show the connections between medicine ecology and the natural environment) and Peter Rabinowitz ('Canary' database of animal sentinels to assess risks to human health) demonstrate how complex interactions may be, and there needs to be an attitude change that the risks are not just from animals to humans, but both ways.

The modern fragmentation of medicine into specializations has reduced our ability to think about complexity, however there are signs of reversing this trend – in systems biology, in social science and in economics, linking health into the wider contexts of environment. There are now formal models in which to start investigating these processes. Sustainability is not a very useful term, as systems are usually in flux. Resilience and adaptive management are more useful terms. There is an opportunity to increase rabies' profile in this context at the 2012 EcoHealth Conference.

In practice what we need is to create community equity, and to consider that each step in a process may act multiplicatively. For example, we may have a 100% efficacious treatment, but if each stage of the implementation is only 70-80% effective, then the end result can be a practical efficacy of less than 20%. We must focus on critical parameters to efficacy, so for example to ensure high coverage, dog vaccination must be provided free to the owner.

In conclusion, we need to consider where rabies can be integrated into larger programmes and address the benefits of good rabies control to health (including how it will affect other diseases), to agriculture, to the economy etc. Can we fit the Blueprint within other programmes? for example. The international organizations have a role, and WHO has already switched the focus to integrated control of all neglected zoonotic diseases. We need to involve all stakeholders, especially the governments and communities themselves at the planning stage, as we can't do it without them. Great progress has been made in malaria control through the Global Fund and we should be working to allow countries to apply to a Global Fund for many different health options, not just a few key diseases.

Discussion:

LN – Jakob should circulate details of the 2012 EcoHealth Conference to participants.

DB – For sustainability we really need to plan with the community to see what their available resources are for a particular project.

ChaR – Free vaccination to owners is only possible with large scale global funding, when it is up to the governments this is just not possible.

JaZ – No rabies free status has ever been achieved without massive global financing, we can't rely on a community-driven approach to work.

ChaR – This is true for wildlife rabies in the US, but not for dog rabies, owners paid for that.

JaZ – There is no future for effective payment by owners in Africa.

LN – The language of running trains is nice, but they can be derailed by other priorities, eg a Foot and Mouth Diseases outbreak.

DB – Clear that priorities will be different in different countries.

FXM – Governments not left alone, they have help from organizations such as WHO and GAVI that are said to be sustainable.

ChaR – What will happen in Mexico? They are approaching the asymptote and it's not clear what will happen.

TM – The final phase of elimination is critical. How do you convince people of the importance of eliminating the last few cases?

ChaR – How do we get governments not to be selfish?

AW – There is a notion that we must go to communities – but local scale is not enough, and we must go to regional or continental control to make it work.

SESSION 2 – Research and Development

2.1 Katie Hampson – Highlighting Knowledge Gaps for Evaluating the Global Burden of Rabies

The motivation for this study is that local and even larger successes in rabies control are still not giving rabies global priority, and that a more accurate assessment of the burden may help this situation. The work is based in a 2005 study by Knobel *et al.* with 2 components – a probability model to estimate human deaths and PEP costs, and a linked calculation of the cost of preventing human deaths. It focused on Africa and Asia. The new study aims to incorporate all aspects of rabies globally, including in wildlife.

Laurent Coudeville broke the world into clusters of countries within continents, based on socio-economic status and current rabies epidemiology. This approach should allow the use of the best available data. Data such as GDP is taken from UN databases, and that on rabies is being collected primarily through online questionnaires focusing on Public Health, Veterinary Public Health and Surveillance Laboratories, and available in several languages. At the recent SEARG meeting, paper copies of these were distributed with considerable success. Country reports from meetings, and published literature has also been used to gather data. However, Laurent's process of feedback and timelines needs to be revised by the group. Data from the questionnaires was good in some areas (vaccines, regimens, costs of governments of PEP), but very poor in others (incidences, probability of receiving PEP, probability of rabies exposure). There is huge spread in incidence rates across countries. However, the best data were used to populate the model for each cluster, with assumptions made for incomplete areas.

Analyses to investigate factors that might explain the variation suggest that reported exposure incidence rises as GDP rises, indicating that wealthier countries have better reporting, and this is not true exposure data.

DB – Wonder if government sponsored PEP affects the data.

HB – Data needs to be checked carefully and US/Europe would lie almost on the GDP axis

FXM – In general, seeking PEP does not equate to exposure rate. People on the ground may not be good sources of data (eg. Pakistan report came back with less than 1 rabies death per million population).

AW – In Sri Lanka we went door to door and 1-10% people bitten in last 12 months, but these figures are really unrelated to rabies.

DB – But without surveillance all dog bites have to be treated as potential exposures, it's a dilemma.

FXM – Old model started with dog bites and made assumptions about how this relates to rabies exposures. Other studies show that 2% of Indians are bitten each year – huge PEP costs.

ChaR – The key is that the economics are underestimated based on the old WHO model alone.

FXM – But the cost of bite treatment will not go down with decreasing rabies.

DB – The vision is what we can do with the data, and their wider use in cost/benefit calculations.

The issues with the data will highlight gaps in knowledge, if nothing else. If we can establish consensus on inter-relationships in the data we can try and work out how to proceed. The data on the probability of receiving PEP was very poor, so I used a method based on country GDP to better estimate this. Lots of countries reported running out of PEP every 3 months, and not many people are aware of how widespread this problem is. To explore the probability of being bitten by a rabid dog, we could assume it is related to dog vaccination coverage. We have good market data on animal vaccine usage from Merial. Other assumptions were used as in the Knobel paper.

The preliminary analysis suggests the burden to be 65,000 deaths globally each year, and 1.857 million DALYs and the data are presented for each cluster. Some assumptions may not be valid, and China comes out with a burden of 7,000 deaths annually – twice that reported. Overall the surveillance/animal costs are a small fraction of the total costs.

In practice, PEP is usually given according to demand, not as an urgent requirement, so it would be interesting to explore how costs rise if PEP is really prioritized. However, the data shows that PEP costs vary enormously across countries. If the clusters are ordered according to DALYs lost due to rabies, then per capita costs of dog rabies control and PEP costs show no clear trends. Where high deaths occur, it shows that PEP is not meeting demand. Taken together the data do show that savings in PEP could pay for control in dogs, but only if countries are investing in sufficient PEP to meet demand in the first place. So, the data are poor, but some analysis is possible, and we should explore the model uses of the data collected that go beyond the burden model.

Discussion:

FXM – The million household study in India estimated 10,000 deaths per year for rabies.

SAR – There is a new Right to Information Act in India, and animal welfare organizations are demanding rabies data, however, many deaths still under-reported. We must have mandatory reporting.

ChaR – No-one is going to the rural poor and asking. In many places like Haiti even rabies symptoms not fully understood.

FW – In China, vaccine quality is not good, so may not be able to relate vaccination coverage to other parameters.

JaZ – Should be using Bayesian distributions for the modeling. Human Development Index may be a better indicator than GDP.

KH – Even an indicator of inequality within a country may be useful.

JaZ – Could explore dog vaccination and PEP costs in a different model (not transmission model) with data from the best countries to understand more fully.

HB – It is surprising that the burden for Africa was lower than the previous attempt. Extrapolating from a small area of a country to the whole country is difficult and more complex models produce less meaningful results.

KH – We need a simple verifiable model in the end.

FXM – The old model considered that 100% of urban population was at risk, which is oversimplified – not true for Beijing for example. Rural / urban split is very difficult to get accurate.

KH – We need expert opinion on the parameters, especially the variable ones and they can be circulated to PRP. The debate is important.

LN – The Amazonias figure you showed is a low burden.

KH – The model only includes dog rabies so far and does not include bat or other wildlife rabies.

ChaR – A lot of the data are not there yet, and this is a much harder study that the Blueprint. It doesn't need to be done immediately.

LN – Getting it right is important.

TM – But the timeline cannot be ignored.

KH – Only the SEARG questionnaires and some online and literature sources in place so far.

SAR – The source of the data is critical and in India there is no official database. The surveys will be the closest to scientific data that we have.

KH – We need to be transparent over the data and model, or we will be criticised

LN – No model is perfect, and this can be updated over time. What do you need from the PRP?

KH – Completed questionnaires are the highest priority. Questionnaires will be online by the end of this month, then we need all PRP partners to distribute and get responses within a month (by end June)

MV - I will send them via PAHO channels.

ChaR – Official channels may not be best sources – these are neglected diseases. We should explore other expert opinions too.

KH – Jacques Barrat involved in the workshop in SEARG – ask him to do the same at AfroREB meeting.

BD - Participants have already been told to bring data with them.

LN – OIE meeting in Korea, September. APCRI meeting in India. Rabies in Asia in November. These are all opportunities.

SAR – Can help with the Indian meetings and also distribute through Commonwealth Veterinary Association (54 member countries).

TM – Are the WHO regional bureaux involved? I can look into contacting them.

LK – OIE has a network of focal points for each country, but if data are lacking these may not be much help.

KH – In those cases we need to know how inaccurate they estimate their data to be.

BD – I have a list of other key people that may be able to contribute, esp in Middle East.

KH – How can we acknowledge everyone who contributes?

ChaR – Use general publishing guideline categories, authorship only for the people who did the work, acknowledge those who gave data.

TL – But we need more staff to compile the data and analyse it.

ChaR – Delegate, many of us have study students that could be used.

LN – Katie must tell the group what she needs

ChaR – Lets have an update at the RITA meeting.

2.2 Tiziana Lembo Update on the Blueprint for Rabies Control and Prevention: Part 1 – Canine

The concept was first agreed upon at the Banna meeting in May 2009, and the idea was not to create anything new, but to make information accessible to help countries to implement it more easily. Within 1 year there was a draft and now going to update everyone on the progress over the last year.

Feedback from in country testing was very successful and the Blueprint was launched in June 2010, in English and French. It links to existing guidelines and case studies. There has been lots of promotional activity through the PRP and elsewhere; announcements, at meetings, vet associations and clinics, Promed, New York Times article, webinars. Five papers are already published, or in development. CD is available thanks to Novartis. Usage is monitored through emails to the website and Google analytics – there have been 29,000 hits from 130 countries since the launch. FAO Bamako will host the website for another year, and after that we need to renegotiate.

GARC is responsible for further translations into Spanish, Portuguese, Arabic, Russian, and these mostly completed by DG SANCO and awaiting review by rabies experts. Translation into Farsi will be done independently. Many more languages have been suggested / requested.

It should be annually updated, but not many people reviewed it this year. Revisions that were submitted for consideration include:

- Include updated OIE maps of notifiability in animals
- More detail on vaccine handling (for imperfect cold chain etc)
- more emphasis on cat vaccination (esp in wildlife rabies areas)
- more detail on dog household studies for owned dogs
- Communications plan not as well developed as other sections
- Blueprint on Dog Population Management could be developed and added into the Rabies Blueprint
- Need to update links to WHO, CDC recommendation changes.
- DG SANCO will translate revisions sections.
- Any other suggestions?

Discussion:

ChaR – This meeting is the deadline for revision suggestions, so anything further goes into next year's list.

LK – Need to be careful about taking on any more languages, as work to update it them is too much.

It was decided that we don't have the ability to do these right now.

FW – Could consider an executive summary in further languages that will not be updated.

BD – French translation that is in place is not very good in places – it was not done by rabies specialists.

PC – To improve the Communications section we should emphasize the target groups and the 8 step plan which are currently attachments. I can also put together a sample plan. Will have these revisions ready by RITA meeting.

AW – The Dog Population Management blueprint should be a separate document, written by that group and linked to from the rabies one. Rabies control is not dog population control. I am surprised that the existing guidelines are not enough.

TM – People doing their independent translations should be responsible for hosting those documents also.

LT – Using the version numbers is key to managing the updates and translations of them.

BD – The french translation needs a lot of work, which I will work through when I have time.

ChaR – We need to incorporate the KwaZulu Natal study as a case study.

TL – I was concerned that focusing on the cat vaccination issue would take emphasis away from the dog vaccinations issue.

AW – Where there is lots of dog rabies, we still don't see much in cats, so it is not so important.

LN – Reviewed action points (already highlighted above). Group decided that cat and dog ecology points don't need revising. New guidelines and documents to be linked to will be sent to the group before incorporation for everyone's approval. We will add Briggs' paper in Bull. WHO.

ChaR – I would recommend not to change advice on vaccine handling requirements, and I'm sure vaccine manufacturers would say the same. Send section to C. Schumacher and Ad Vos to comment on by RITA.

LK – I will check the links to the OIE database.

JaZ – What does it cost? Section and cost-effectiveness section is brief, as studies are lacking.

DB - We should include the recent Hampson paper.

2.3 Alex Wandeler – Blueprint Chapter 2 Fox Rabies Control

The decision at the last RITA was to restrict this blueprint to Red Fox Rabies as a starting point. It will be based on the dog rabies chapter, but needs a new introduction. It is aimed at Government officials (who need to know how to implement it) and the public (who want to be better informed and have an input into government policy).

The introduction so far contains sections on what wildlife rabies is, what hosts it affects (ie not only foxes), fox ecology, history of fox rabies, the prevention of wildlife rabies in humans (is this necessary?), education of the public about the risks, domestic animal vaccination in wildlife rabies areas, and legislation issues including what vaccines can be used and where.

Discussion:

AW – The legislation is a crucial part, as existing legislation may need to be amended.

LK – Should a second Blueprint be a stand alone document?

TL – It will stand alone, but use general information from the canine blueprint, and then be amended accordingly.

ChaR – Fox rabies is the first example of wildlife rabies, but document not restricted to fox rabies.

2.4 Thomas Muller – Fox Rabies Prevention Blueprint - Operational part update

A core group of 12 people was decided at the RITA Mexico meeting, however a draft was circulated to this group and no feedback received within the timescale set. So, we decided to continue with a reduced core group of 5 people.

We now have a draft focusing on oral rabies vaccination (ORV). It is hard to stick to facts and not be biased by personal (European) experience. Some questions needed to be rephrased as the answers are too long at present. A brief overview of the chapters was presented with their status as not dealt with (red), not completed (orange), or completed (green). Basic epidemiology, reservoir species, surveillance, vaccine baits and ORV planning are all completed. Training requirements, quality control and human component sections are not completed. Information needed prior to planning, evaluation, sustainability components have not been dealt with yet.

There is some outsourcing needed (the human component Hervé Bourhy will help with). A full draft will be completed by the core team of 5 by the next RITA meeting and presented there to identify gaps and discuss further, which is likely to need some time. There are challenges to present a balanced international picture, maybe we could summarise comments by their regional perspectives. Again links to case studies and position papers will be incorporated.

Discussion:

DB – I will book a room for a workshop before the PRP meeting for half a day on the Sunday morning or afternoon prior to the opening reception.

ChaR – will contribute to the US human perspective. NEPA document may be helpful for the recombinant vaccine. The legal section may take some time.

FXM – The core group should also incorporate Jacques Barrat and the Reference centre for European Wildlife Rabies.

TM – Everyone will have a chance to contribute during the discussion process.

ChaR/AW – For now all documents focus on red foxes – we can expand from that afterwards.

TL – The consultation process for canine section was extensive

LK – Re. the legal section, the OIE terrestrial code has to be implemented within the individual countries' legal situation. Keep the blueprint along similar 'guidelines' approach.

TM – ORV can be aimed at elimination or containment.

2.5 Charles Rupprecht – Update in Research Pillar

Out of 4 grants recently applied for only one granted, so funding is a problem.

A) Haiti Response

Haiti was seriously challenged even before the earthquake. It has allegedly the highest rabies incidence in the US, but there is no surveillance, data, infrastructure, diagnostic capacity, vaccination coverage is unknown, no vaccination programmes, no PEP outside the capital, not even a bulb for the microscope. Requests for help were received, but the interventions were uncoordinated, even amongst the CDC projects. The CDC Rabies team trained in dRIT and did formal lectures on prevention, set up a zoonotic disease lab which will be evaluated, supplied biologics to do testing, but the health department were not interested in post mortem testing. A KAP study suggests that knowledge on zoonotic diseases was very low.

This year the CDC was contacted by the department of Pignon (~30,000 people and 2,000 dogs) with maybe 4-5 rabies deaths per year. A 3 year program has been set up based in the regional hospital; and from there mobile veterinary clinics and human services will reach out. Merial has donated vaccine, and the Rotary group are helping to coordinate vaccine import. The plan is to base intervention on the blueprint as a test case, and incorporate better KAP and dog surveys. Within 3 years we aim to get dog vaccination level >70%, a lab network in place, and no human deaths, and to showcase the blueprint as a useful document. I invite all PRP members to come and get involved.

LN – Who is completing the KAP analysis?

ChaR – The local people. We need to be careful not to violate the human subject legislation.

B) Vampire Bat Outbreaks in Amazonias

Vampire bat rabies is endemic from Mexico to Argentina and people in poor housing are at nightly risk of attack. There is some evidence that outbreaks are increasing. An outbreak in Peru started in February of this year and 19 children have died so far, maybe from a population of 50,000. It is not clear why children are most at risk. The population is very remote, far from health services, and have a lack of rabies awareness (they blame cases on witchcraft), and they also have a dislike of foreigners. Access is only by (expensive) helicopter, so it is difficult to work there. Trying to calculate incidence, define geographical areas, and establish case histories are challenging. We are trying to promote PreExposure vaccination, but we really need shorter regimens. We have no idea if the response to vaccination will be adequate in this population. You do find rabies antibodies in people who have not developed rabies, so maybe this exposure would act similarly to booster doses. These are extraordinary circumstances that need us to think out of the box. We are also collecting bats for virus analysis, but this is difficult because once researchers get there the bats and outbreak has moved on.

Discussion:

DB – What regimen are you considering?

ChaR – We will look at IM, 3 doses or even less and see what antibody responses we get.

PC – Are there any educational initiatives to combat the witchcraft beliefs?

ChaR – There's a whole PhD in that. We first need to understand what it is based on.

HB – The French have dependencies in the Amazon where when vaccination teams and educators arrive, the locals run away. There is a risk that they will stop reporting the disease altogether. However, there is a political argument that these people should have access to the same health care as those living in larger cities.

JaZ – Why are only children dying? Is there a hierarchy in who gets to use bednets?

LN – How many people die of vampire bat rabies in L. America? There are very few epidemiological data available. It seems like we have no idea, but reports seem to be increasing with time. This lack of data really impacts on our appreciation of the burden of the disease.

LK – We could estimate bat rabies deaths from the proportion of canine to bat cases – both likely to be under reported in remote communities.

MV – There are now more cases from bats than from dogs in L. America.

HB – Most people in the rainforest have been bitten in the last few months. Once people settle for a few days, the bats find them. Is any RIG being used?

CR – Not in this outbreak.

JaZ – The reporting procedure takes a while to deliver the news to Lima, so laboratory confirmation of cases is very hard.

KH – How does the delivery of regular childhood vaccines work in these communities?

ChaR – The Expanded Programme of Immunisation (EPI) scheme works quite well. Dates are agreed in advance and

the cold chain is OK. Could we add rabies to this program?

HB – You would have children presented for immunisation, but the adults would not turn up for vaccinations.

LK – It is clear that globally, many people at occupational risk of rabies still don't get PreP as it is not offered free.

AW – Wildlife bites do not always lead to rabies, which makes it easier to believe the witchcraft theories.

C) Direct Rapid Immunofluorescent Technique (dRIT)

Several groups are now biotinolating monoclonal Antibodies (mAbs), and sending them to the CDC. These now need to be tested against the Direct Fluorescent Antibody (DFA) technique. We are looking to develop an OIE prescribed technique for dRIT. We now have pan-reactive mAbs and are trying to demonstrate that light based microscopy can be acceptable to OIE standards.

D) Gonadotrophin-Releasing Hormone (GnRH) work

The aim is to develop a one shot rabies and immunocontraception vaccine – a horizontal strategy to deliver protection and an alternative to spay-neuter at the same time. GnRH vaccine is already licensed in deer, so it is a good candidate, and rabies virus is a good expression vector. We are working to insert the GnRH gene into rabies virus, using different insertion points and multiple copies. We now have encouraging results in mice (the trial vaccine produced pregnancy in 20% females compared with control group of 90%). We need to look at males as well as females, dose responses to the vaccine, and how long the protection lasts. In dogs and the timescales for the experiments will be longer, and it may not work.

Discussion:

DB – If we had a feasible contraceptive how would regulations work?

ChaR – Pregnancy is not a disease therefore in the US the regulations would fall under the FDA. Hopefully we could market it as a rabies vaccine with the side effect of sterility.

TM – The KwaZulu Natal project is planning a Gonacon trial later this year with USDA. However, Gonacon is not yet mass produced, GnRH cannot be synthesised and the adjuvant is rather unusual and difficult to obtain.

JaZ – Could we go for a large international validation of dRIT against DFA to then get it commercially available?

ChaR – I would like to see international trials.

LN – It was suggested at the Mozambique meeting that it would be validated in the 6 OIE reference labs.

ChaR – CDC would donate the antibodies to that project.

TM – Could we also pursue alternative tests such as Lateral Flow Devices (LFDs)?

ChaR – The problem is that there are 4 commercial interests are already involved, and so the chances of ensuring it is available at a reasonably low cost are not likely.

DB – what role could the PRP play in international validation efforts?

TM – Maybe sensitivity issues could be tolerated if the test were available free.

LN – We need to discuss how we could move forwards. TM, LN and ChaR will put together an approach to evaluate and report on LFDs in a formal manner.

ChaR – We will share biologics with the OIE reference labs by the next RITA meeting.

JiZ – Historically, hepatitis, polio and measles immunization programmes have had huge public relations problems due to rumors that the government is trying to sterilise little girls. It would be poetic if the reason for a rabies vaccine's success was precisely because it caused sterility, albeit of dogs. Also the value of working with service organizations like Rotary International and Lions Clubs International is really very high, so long as you understand their strengths and limitations.

2.6 Jim Zingeser – Dog Population Management Meeting Report

This meeting was held in Banna in May 2011, following on from an online consultation process that started the September before. The consultation involved 230 participants from 69 countries, and case reports from 31 countries, and the emphasis is now on dog population management for animal welfare and public health. 120 applications for the Banna meeting were received and 12 experts and 7 resource people were selected to attend. The objective was to assess the options for control and develop best practices for animal birth control, dog handling, euthanasia and dog population modeling studies. Particular attention was paid to the role of public awareness and education in promoting responsible pet ownership.

Conclusions were that dog population management should: be a one health initiative, including the environmental and economic impacts; identify the sources of unwanted dogs; seek consensus between kill and no-kill policies. The group recommended the formation of a dog population management forum and network to share and standardise recommendations (ie create a type of blueprint for these issues), discuss legal issues surrounding management and discuss how to combine surveillance and disease control issues into dog population management practices. Recommendation: “While ideally no healthy animal should be euthanized, euthanasia of an individual may be necessary once all practicable alternatives have been carefully considered and ruled out. The decision to euthanize should be taken on the grounds of health, behaviour, inadequate guardianship or to prevent unavoidable inhumane death.”

The meeting presentations and supporting documents are available online at www.fao.org/ag/animalwelfare.html and the meeting report will be available later in 2011 online. Anyone can access and contribute to the dog population forum.

Discussion:

AW – A Dog population management blueprint should stand alone from the rabies blueprint.

JiZ – If the recommendations are followed through, the FAO will be responsible for such a document.

RM – The ICAM report is like a blueprint.

LK – OIE also has standards in place which are complimentary.

AW – There was not much discussion on how to amalgamate the different guidelines.

SAR – There is a need to have clear implementation guidelines, otherwise different government departments will try to implement different things.

FW – The Cairo meeting focused on stray dogs, and the ICAM guidelines really focus on owned dogs. Trade of dogs is not covered by either.

LK – The chapters structure of the OIE recommendations is not all that clear, and the disease specific chapter regarding dog movements is being rewritten. Trade in dogs is covered, but there is very little data available to base standards on.

SESSION 3 – Advocacy and Communications

3.1 Peter Costa - WORLD RABIES DAY Achievements and Aspirations

A history of the WRD logo, website and objectives shows how the WRD campaign has evolved over the last four years. The WRD website now has large collection of educational tools, featured activities, 4 languages and media and social networking tools. Each year web hits increase and from 8,484 in Sept 2007, we expect around 34,000 hits in Sept 2011. Google analytic allows us to analyse where visitors are coming from, and what they are accessing.

Summaries of highlights for each year were presented. The 2007 campaign attempted to involve 55,000 people, yet actually we had 400,000 people mobilized, with major partnerships developed and attention from a major foundation. In 2008, all US vet schools and 70 more worldwide were involved as well as some medical colleges. Educational messages were delivered to all 600 schools in Puerto Rico, events were held in every state of Mexico, radio outreach took place in Nigeria and 22,000 posters were delivered to 21 African countries. By 2009 the website had been accessed by more than 200 countries and the “It's this easy to pick up rabies” educational posters were launched. Events were held in Iraq and Afghanistan, a commemorative stamp was issued in Peru and we had a large and valuable donation of RIG that we arranged to deliver to Pakistan. By 2010 WRD had generated over 1,200 reported events in 135 countries, we had 50,000 doses of animal vaccine donated and held the WRD webinars. For the first time we conducted feedback questionnaires about our impact. 90% of respondents felt that WRD was making a difference and 96% felt that rabies education was saving lives.

In 2010 a global Webinar involving 24 international speakers were accessed by 2,000 different listeners, and deemed a huge success. 15% of people reported some technical difficulties, but 98% said that they would attend again. For 2011 there will be a call for abstracts and a review process. Information will be circulated to the PRP first, and available online shortly afterwards.

Overall since 2007, 150 million people have received educational information about rabies prevention and 4.6 million dogs vaccinated as a result of WRD. Such rapid progress can be attributed to Communication and Partnerships. So to face the ancient challenges of poor communication, public mistrust, misguided beliefs and superstition we have used modern approaches such as technology to unite a community, collaboration and partnership, and an understanding that data does not equal information unless the educational messages are right. Information needs to be available, accessible and actionable. The Latin American Country award rewards the best

events held to mark WRD in these areas, and recognizes best practice, innovation and sustainability. This year modifications will allow all scales of events to be recognized. The African posters outreach is a perfect example of coordination between partners working to deliver results. There remain challenges of course. We do not have the resources to supply everything that people want, local language translation is always an issue, coordination across timezones is difficult. Finally making educational messages fun and exciting for children remains a challenge.

This year we are launching a Notifiability campaign to increase the pressure for political change, and to free rabies from the cycle of neglect due to poor investment in surveillance and control. The first step is to list countries by their status of notifiability, then to identify barriers to notifiability and finally to design a roadmap to increase the number of countries where rabies is notifiable. Using guidelines for evaluating public health systems, a questionnaire has been designed which starts with: is rabies notifiable? and then broadens out into wider issues such as what reporting systems are in place for rabies or other diseases? how many people are surveyed for rabies? and how is data handled? We need to make it clear that every death counts and notifiability is a vital part of control efforts. The data will hopefully deliver a better understanding of the rabies landscape and help to set goals for improvement.

So why has WRD been successful? It provides a platform for the community to stand on, recognition of everyone's efforts, and support for people to engage in the issue. Tremendous momentum is in place due to the annual World Rabies Day initiative. It has a new focus on rabies prevention and control globally, and together we can continue to move forwards.

Discussion:

LK – World Veterinary Year is this year, and the focus is on rabies, so events planned and a competition for the best WVD rabies effort is being held.

PC – Coordinated media between GARC and OIE would be a good idea.

TM – Who do you want to respond to the notifiability questionnaire? Ministries of health?

LK – OIE has good data on notifiability in animals. The recommendation is that rabies is also notifiable in wildlife, but implementation of this is a different matter.

TM – How do you cope with the demand for posters?

PC – It's impossible. We have them online and those that request them can print them out themselves or find sponsors to help defray the cost.

SAR – Rabies in Asia printed 25,000 posters for WRD also.

3.2 Louise Taylor - “Think globally, act locally” Rabies Control at the Community Level

Rabies is a global problem, but I want to focus here at the other end of the scale – on local, community lead projects. These are typically run by NGOs, companies, sometimes by a few dedicated individuals. They often have very few resources, and attract little media attention, but can play a vital role in the communities that they serve. Several projects featured in the GARC newsletter illustrate this, including; A folk artist spreading responsible pet ownership messages, ID PreP for rag pickers in India, Teaching children to be safe around dogs, Dog managed zones in Sri Lanka, ABC programme in Chennai, India. Two extraordinary rabies champions who are running extensive programmes in their countries are Dr Gudush Jalloh (Sierra Leone) who runs mobile veterinary clinics to promote rabies vaccination, sterilization and responsible pet ownership and Mr Mady (Mauritania) who responds to phone calls about dog bite victims to ensure that people receive PEP and that samples are collected for lab testing. Even where government rabies control programmes exist, there is still work to be done and the Zach Jones Foundation has spread educational messages to every school in Texas about bat rabies prevention. The Bali Animal Welfare Organization has played a pivotal role in the control efforts in Bali and continues to be heavily involved today. Following the dog culling in China, ACT Asia brought together partners to write new humans guidelines on dog population management, and in Mozambique, an NGO was been invited to help draft a rabies control plan for the country after running educational programmes. Also, we should not forget the more mundane achievements, in vaccinating dogs against rabies at reduced cost, or even free, that would not otherwise have been vaccinated.

These programmes were running before GARC came along, but our role is to help build them into a community. This provides them with connection, motivation, support, access to information, a chance to learn from each other, a role in wider advocacy and importantly, recognition of their efforts. We aim to empower our community of over 7,500 people to take action against rabies, by supplying the GARC and WRD websites (almost 40,000 and over 162,000 hits last year respectively) and their resources. Visits to our WRD education bank, the Blueprint site and the WRD Webinars show that these resources are used frequently. Google analytics allows us to assess how these resources are used, and we can see responses in the graphs of web hits corresponding to WRD and the release dates of the GARC newsletter. The WRD campaign has given a focus and motivation to everyone's efforts and attracted media attention which is important to small organizations. It also allows them to participate in a wider global movement. We

receive email requests for advice, training, funds, media support and even offers of biologicals. We cannot supply all that everyone needs, but we can direct them to help, and this interaction allows us to assess what people need. Taken together, all of these small community organizations combine to produce a global movement. The WRD statistics speak for themselves, and all the community efforts demonstrate that there is demand for better rabies control, and that there are people willing to make the change happen. These people are showing what can be done, in all types of communities worldwide. Several examples mentioned had started to influence local and national government. Local noise attracts Global attention.

Discussion:

ChaR – The CDC grand rounds managed to attract a very wide audience through GARC contacts.

3.3 S. Abdul Rahman – Adopt-A-Village program and WRD 2010

The Adopt-A-Village programme is a one health experiment, with many supporting organizations involved. Previously, veterinary and medical vaccination programmes have not been coordinated, and the departments have been working in isolation. The programme is operating in two different areas: 6 villages around Bangalore and others around Pune. The objectives are to reduce human and animal rabies through education, to increase medical knowledge about correct PEP treatment, to determine the cost-benefit of educational awareness, to develop a new model which public health authorities elsewhere can follow, and to assess the safety, acceptability and immunogenicity of pre-exposure intradermal rabies vaccination in school children and other risk groups.

Before the start of interventions, a KAP survey was designed, approved by the authorities, validated in communities, and then carried out by volunteers visiting every household to provide baseline data for all villages. Hands-on training for the dRIT technique was also provided to the surveillance laboratories. The intervention part of the project has now started in half of the villages, with villagers educated about the project and about rabies prevention using large posters (modeled on political campaigns) and many other educational tools, including calendars, children's painting competitions, training posters for professionals, and a snakes and ladders board game for children. Rabies educational films, for both the public and professionals were screened in the villages. A local animal welfare association was responsible for a further component to the project where pets were collared, dewormed and vaccinated against rabies. Stray dogs were vaccinated against rabies, injected with ivermectin and dewormed also. WRD 2010 was observed in the study villages, and Dr Briggs of the Alliance conducted an assessment of progress in November 2010. The educational and other interventions are currently ongoing, and will be followed by an evaluation to assess the impact of the interventions in the study villages compared to the controls.

The WRD campaign has had a huge impact in India and rabies awareness is much higher than before the campaign started. For 2010 there were many events including a human chain of medical students in front of the Mandya Institute of Medical Sciences, poster competitions and PreP vaccination of rag pickers that we already heard about. A very popular film star and a former Indian cricket captain were enlisted to read prepared short, simple rabies awareness messages in English and in 10 local languages. These messages were telecast every day between 21st to 28th September, 2010 by all TV channels in the country, mostly during prime time. On the 25th August, 2010 an intersectoral meeting on the Prevention and Control of Rabies in India was held at the Veterinary College Bangalore, including representatives from Veterinary and Medical professionals, animal welfare organisations, and NGOs. A press conference was held to highlight rabies awareness and a new educational film was released and shown on TV around Bangalore on the 27th September.

3.4 François-Xavier Meslin – Report from Interagency meeting on Neglected Zoonotic Diseases (NZD)

This meeting was held at WHO, Geneva, in November 2010, and had more than a 100 participants. Rabies had significant attention with presentations from Philippines, China, Sierra Leone and Peru. At the end a statement about neglected diseases and a road map were released. This contained 10 points, one of which was that organizers should set up an interagency meeting to develop a business plan for dealing with NZDs. This plan will be discussed in early July 2011 where experts from major zoonotic diseases will be invited to comment (Dr Briggs has been contacted for her input to a rabies control business plan). For rabies, there are already some international targets in place, eg Human Dog Rabies to be eliminated from Latin America by 2015, 10 ASEAN countries and three others (including China) have issued a call to eliminate canine rabies by 2020. China has put in place plans to cut rabies deaths by half by 2015 and eliminate them by 2020. There is a need to identify intermediate steps to reaching these goals, for example in Africa, strengthening capacity and diagnostic capabilities, making PEP available across the continent, and identifying how much money and how long it will take to reach these goals. Working documents are needed before this meeting.

There has also been a suggestion that the WHO/FAO/OIE and GARC should be co-hosting WRD events.

Discussion:

ChaR – Will there be a postmortem if these goals are not met? This did not happened with previous goals for Latin America.

FXM – Goals are useful even if not met, they have helped in the polio eradication programme.

3.5 Betsy Miranda – Report from Mission to Nias, Indonesia

The mission was completed by Betsy Miranda, Debbie Briggs and Joanne Maki. Funding had been secured from Merial for a dog rabies vaccination study. Several possible places were explored, including Bali, but Nias was chosen as the need was greatest there. A rabies outbreak first reported in February 2010 had claimed 26 lives by December. The outbreak was recognized when the deputy health minister for the island died of rabies after being bitten by his own dog. The island, with a population of 756,000 and an estimated 76,000 dogs was hit hard by the earthquake and tsunami and much of the infrastructure such as roads are still in a very poor state. The authorities were pleased to receive a proposal to help Nias instead of Bali which had been the focus of many offers of assistance. For the current outbreak, an incidence of 35 deaths / million population was calculated, much higher than for Bali (19/million), Bohol (10/million) or Indonesia as a whole (0.31/million).

The island has very few animal health personnel and no vets. Only one case (in a stray dog) has been lab confirmed. Other islands in N. Sumatra are also reporting rabies deaths. The emergency response from the government was to deliver 45,000 dog vaccines, and to eliminate 28,243 dogs (not with strychnine as the locals eat dogs). PEP is available in one district hospital, an education campaign has been started and the provincial government has developed a roadmap for rabies elimination by 2014. Some of the challenges include difficult terrain, no rabies awareness or surveillance, no local diagnostic facilities, and that government vets are unwilling to be posted there. However, in terms of opportunities the locals are very interested in a rabies control programme, government money has already been allocated to imported vaccines, there is the opportunity of lab twinning regionally and nationally to improve surveillance, local mission schools could be involved in one health educational activities including rabies awareness, a vet school in Aceh, N. Sumatra could be used to supply people to run such a programme. Finally it provides something of a blank canvas for control activities, and novel operational studies are possible.

Discussion:

ChaR – Did the one sample collected get typed? Where did this outbreak originate?

FXM – Overall rate for Indonesia more like 1/million, not the 0.31 quoted.

BM - The sample was not typed. Rabies had possibly killed more people on Nias before the death of the health minister, but rabies was discovered on the island because the Health minister traveled to a mainland hospital for treatment and was diagnosed as having rabies.

SESSION 4 Capacity Building and Fund Raising Issues

4.1 Miloud Kaddar – Overview of the major players in global health

The economics of human vaccine and immunization is integrally linked to mobilizing resources. In an economic analysis there are several stages:

1. A situation analysis (what are the problems? what is the burden and distribution of disease?);
2. Priority setting (what are the priorities? what effective interventions do we have?);
3. Cost analysis (what are the most cost effective interventions? What are the benefits of these?); and finally
4. Financing (who will pay? what are the sources of funds? What mechanisms will be used to pay for interventions? what are the gaps in funding?).

Generally in these analyses, 3 criteria are used to decide on the strategy: Efficiency, Equity and Sustainability.

Within the WHO there is an iterative cycle of economic thinking, which starts with the burden of disease, goes through a cost effectiveness analysis for interventions, then an assessment of the financing of the intervention and supply of the necessary materials, then a policy decision, and back again to burden. The success of interventions will depend on the political, social and cultural context of the country in questions, and all stages are reassessed periodically and adjusted as necessary. Costs are divided between investment (eg in infrastructure) and recurrent (eg vaccines, salaries), and may be financed locally or externally to the country in question.

From the mid 1900s to the late 1990s there was a rapid increase in international, national and NGO Organizations tackling health issues, and much international cooperation. Aid was very focused on particular

diseases. Since the late 1990s there has been a huge increase in the number of partnerships and funding of health intervention with very humanitarian motives. Health is a priority in G8 and G20 meetings as the global significance of disease has been recognized, and countries have put health into their national priorities. The focus has been on equity and sustainability with increased transparency. However there has also been a lot of fragmentation and inconsistency in health interventions.

There are now 3 main types of organization playing a role in global health:

1. Multinational (UN, or Non-UN) which often have lots of member countries, regional and country offices,
2. Bilateral (between two governments) and
3. NGOs (Not for Profit, For profit or Research based).

UN Organizations dealing with health include, WHO, UNICEF, UNFPA, UNDP, FAO, UNESCO and others. The WHO's role is setting priorities, policies and norms , advising countries, forming advisory committees, providing technical assistance, publishing guidelines and organizing specific interventions and meetings. Its current priorities are mainly on maternal and child mortality, chronic non-communicable disease, improving health systems, implementing international health regulations, improving WHO performance and building efficient partnerships. Its 195 member countries give it legitimacy, expertise and cross-national statistics and data. It has a large infrastructure and a very wide set of issues to deal with. The whole of the WHO has an annual budget barely larger than a large US hospital, and 80% of its funds are given voluntarily, usually for specific projects. In 2009-10 the most important funder of the WHO was the USA, and after that the Gates Foundation. It can be hard to evaluate the results of its funding and activities as an impact on health outcomes is hard and difficult to measure.

Linked to the UN are organizations like GAVI (founded in 2000) and the Global fund for Malaria, TB and HIV/AIDS (founded in 2002), which mobilise a lot of funds for specific purpose and priority interventions.

The World Bank is heavily involved in supplying grants, loans and debt relief packages, but many Ministries of Health may not know what is available to them. Financial institutions often attach conditionalities to their funds, often external consultants do the work, and they can undermine the national authorities. Development Banks are very sensitive to corruption, and can pull out funds if corruption is detected, derailing investment projects.

Many of the 34 OECD countries have government Aid departments (eg USAID, DFID, CIDA, NORAD), and these can be very complex, for example the Global Health Initiative of the US government. Such agencies can supply Bilateral Aid to countries, and many have substantial budgets (US has a development budget of $26bn). They can be more flexible than multilateral agencies and have highly qualified staff, but maybe with more turnover so long term evaluation of interventions is more difficult. However, bilateral organizations are subject to political pressures, may compete with NGOs (eg. for expert staff). Sometimes they insist that materials (eg drugs, medical equipment) are bought in-country which may increase costs. SWAP (sectoral wide approach) is now being promoted more, which involves money for a country being put into a common pot, so that the recipient country decides its own priorities.

NGOs can be very specialized and as a group are extremely varied in their foci, lengths of commitments, their methods of working. NGOs can be very flexible and respond fast, have lower operational costs and be very focused in their objectives. The down side is that they can also have poorly qualified staff and high turnover, may not collaborate very well and have low sustainability of their interventions due to limited capacity building.

The Gates Foundation has a huge budget for health each year (cf WHO which has $4bn). There has also been a rapid increase in the involvement of academic institutions in global health projects, contributing expertise and neutrality.

Overall there is lots of initiative in Global Health Funding, but also much fragmentation and confusion. It is a challenge to coordinate these efforts to maximize their impacts, and difficult for recipients to deal with too. In response to ineffective aid, the 2005 Declaration of Paris attempts to harmonize and align aid efforts. It aims to improve donor/aid coordination, give the recipient country the power to decide its own development priorities, ensure accountability both to and from donors, manage aid for results, and avoid replicative monitoring and report writing. The emphasis is on assessing the true results - lives saved, rather than hospitals built. Building on this progress, we need to strengthen basic health system infrastructure, include the millennium development goals in decisions, ensure equity and sustainability are taken into account, and that policies are coherent.

Discussion:

LN – We need to use this information to find opportunities for us and rabies. From my perspective, the regional offices of WHO are not always a strength of the WHO, and can be a hindrance rather than a help.

FXM – And the trend seems to be to move to a more regionalised approach.

MK – Reform for increased performance is being debated and underway in WHO to increase performance and responsiveness and also to solve the significant current funding gap

ChaR – With PAHO there is a more open system of accountability which seems to help.

TF – What other global success stories can we learn from? Rinderpest was driven by FAO, Smallpox was more multi-institutionally driven

JiZ – We need to appreciate that FAO and WHO respond to country requests, and balance that with global perspectives. Smallpox, Polio and Rinderpest eradication were agreed at the World Health Assembly as a global priority. At this meeting all ministries of Health sign up to the decisions. For effectiveness we need a global resolution.

ChaR – Like PAHO's decision to tackle rabies. Why can this not be done for Africa and Asia by WHO regions? Why are we trying find alternatives instead?

MK – But resolution is the first step to get governments to comply with requirements. In Africa consensus and more importantly implementation are not as easy as in Latin America.

LK – There are regional initiatives on the animal side. Eg Foot and Mouth Disease regional initiative. This is supported from outside the region, but originated from within it, and it is making progress.

LN – A continent-wide approach may not be the right scale for interventions in all cases.

TK – For some diseases though, country-wide foci are not enough, at least regional control is crucial.

4.2 Miloud Kaddar – The Millennium Development Goals (MDGs)

This presentation will focus on what they are, and then François will focus on how they might relate to rabies. So why do they matter? Because the world's poor die earlier, the MDGs aim to reduce poverty and increase basic human rights. They were set at the World Summit in Sept. 2000, were to be achieved by 2015 and so far, progress has been mixed. It is hoped that accelerated progress will be seen. Effective interventions exist, but are being used too little and in many countries more resources to build basic capacity are needed. We need more money to deliver on the MDGs, but they must be integrated into country plans to ensure that efforts are coordinated and focused. The eight MDGs have very specific target indicators that were intended to be measures of development. There was also international consensus on how to evaluate progress, and yearly progress reports are generated. The goals are interlinked and overlaps between social, economic and health sectors exist within them.

Goal 1: Eradicate extreme poverty and hunger. Targets include to Reduce by half the proportion of people living on less than a dollar a day (in some places this is 50-60% of the population), and Reduce by half the proportion of people who suffer from hunger. Overall, progress in development countries (from 1990 to 2005) has been a reduction in poverty from 46% to 27%, but across the regions there is huge variation (for example in E Asia if has fallen from 60% to 16%, but in sub-Saharan Africa only from 58% to 51%). Across all developing countries, the proportion of people undernourished has fallen from 20% to 16% and again regional variations are very large.

Goal 2: Achieve universal primary education. The target is to have all children complete primary school. This has risen from 82% to 89% for developing countries, but again huge disparities occur, with sub Saharan Africa rising from 58% to 76% compared to Latin America rising from 94% to 95%. It is very hard to reach 100%.

Goal 3: Promote gender equality and empower women. The target is to eliminate gender disparity in primary and secondary education preferably by 2005, and at all levels by 2015. Here there is a long way to go, and statistics from the proportion of women in the lower houses of parliaments worldwide are not encouraging.

Goal 4: Reduce child mortality. The aim here was to reduce under 5 mortality by ⅔. By 2008 across all developing regions child mortality had fallen from 100 to 72 deaths per 1,000 live births, for North Africa from 80 to 27 per 1,000 live births, but in sub Saharan Africa it fell from 184 to 144 per 1,000 live births.

Goal 5: Improve maternal health. The target was to reduce maternal mortality by ¾, and to have skilled personnel present at all births. In developed regions, 99% of births are attended by skilled personnel, in developing regions this increased from 53 to 63% from 1990 – 2008, but again variation across regions is huge. In S Asia the figures increased from 30-45%, in E Asia from 94-98% in Latin America from 72-86%.

Goal 6: Combat HIV/AIDS, malaria and other diseases. Targets include to halt the progress of HIV, ensure universal access to treatment. The number of new cases of HIV globally has been falling since the late 1990, and the total number of people living with HIV is only slowly increasing now. Great progress has been made in malaria control, largely through the use of insecticide treated bednets.

Goal 7: Ensure environmental sustainability. A target is increasing environmental stability in order to reverse the loss of resources and biodiversity. Whilst the rate of deforestation is decreasing slightly, loss of forested areas is still alarmingly high, especially in SE Asia. A second goal was to halve the proportion of people living without sustainable access to clean drinking water. Progress towards this is generally good, and the target has been exceeded in E Asia,

but sub Saharan Africa again lags behind.

Goal 8: Develop a Global Partnership for Development. Official development assistance from developed countries has been dramatically increased between 1990 and 2009, especially since 2005, with bilateral aid being about 50% of the total, and debt relief programs a small, but significant portion of the total. Health has received a large proportion of this money (with spending increasing from $6-26 bn annually), and new players such as GAVI are now included. Graph of the % of national income dedicated to International Health in 2008 – Amongst the highest was Luxembourg (0.144%), with Japan nearer to the other end of the scale at 0.013%. Developmental Assistance for Health (DAH) varies by country, with allocations of funds between different schemes differing widely (eg. the US has a huge proportion of its funds tied to NGOs). Some funds may have strict conditions on how the money should be used, others the country decide their priorities.

In 2010 there was an in-depth review of progress towards the MDGs, and how to improve performance by 2015. The news is very mixed. 80% of the world's population lives in countries which are on track for the MDG1, but under five mortality rates are falling slowly and progress is getting slower. Maternal mortality has fallen dramatically in some regions, but not all. For all indicators, progress is not uniform across the regions. With a few notable exceptions (eg Tanzania and Ghana) progress in sub Saharan Africa is lagging behind. In general, there is a problem that the poorest countries are hardest to generate improvements in, so are getting reduced investment, and losing out as a result. Within countries, poor populations are also doing the worst. With regards to health, MDGs 4,5 and 6 obviously interrelate and there are many aspects of health (especially non-communicable diseases) that are not being tackled well. Many different approaches will be needed to scale up action to address these goals.

4.3 François Meslin – Rabies and the MDGs

In the NZD sector we are seeing more and more private sector contributions, both in cash and in kind. In WHO there have been worries about conflicts of interest and the WHO legal department assesses the acceptability of all donations. WHO prefers unspecified funds as these allow flexibility in funds allocation according to WHO's priorities, but it is likely that NZDs will suffer as a result as they may not rank high enough internally. The Gates foundation donation was earmarked for rabies, largely due to rabies consultative group 's efforts. Another threat on the horizon for NZDs is the increased emphasis on non-communicable diseases diverting funding away from (non new, emerging) communicable diseases.

The following is a brief analysis of how rabies may fit into the MDG framework. MDG1 - We can argue that rabies impacts this through its effect on livestock and therefore productivity. MDG2 – poor health is one of the main reasons that kids do not go to school, so rabies has an impact there, whilst PEP is being sought. Paying for education also means selling livestock. MDG3 – Women are usually the ones who tend to the livestock, so if these are affected by rabies, the women lose income sources. MDG4 – clear impact of rabies on childhood mortality, and there may be indirect effects of the loss of livestock products due to rabies in livestock. MDG5 – Women are usually the ones who take children for PEP. MDG6 – We could argue that rabies has a place beside the big communicable disease threats to health. MDG7 – Rabies as a zoonosis has an impact on wildlife species. MDG8 – Rabies control needs an interdisciplinary control strategy.

Discussion:

JiZ – The FAO has to balance the agricultural sector and institutional mandates. Compared to the WHO and OIE, the FAO is more of a development organization. If you want buy-in from FAO, it helps to show how this programme advances the MDGs. For academics, “development” may mean teams of experts doing studies and written reports. For development organizations, it is usually linked to capacity building and self-sufficiency for countries. My question to the room is: is fitting rabies into the MDGs a useful exercise to be going through?

HB – Do we treat the 8 goals as separate or together?

MK – They are interlinked, and the ultimate goal incorporates all of them. It may be cost effective to tackle more than one at the same time, but they are also independent targets.

LN – Our focus will likely fall within a few goals, but show the links between them.

PC – Are programmes that tackle more than one goal judged better than those that tackle just one?

MK – I would say aim for a core of MDGs 4,5 and 6, but show how your project links to other goals too.

LN – We need to be sensible and realistic about what we claim to impact.

TM – Besides, HIV, TB and malaria is there a list of other major health threats?

A-MS – WHO did list other NZDs in there, but the original declaration was a bit vague.

TM – If rabies is ranked top amongst the NZDs, then MDG6 should be the top goal for us.

A-MS – One of the reasons that malaria has done so well is because of their advocacy work, with simple, clear

messages. 1 kid dies of malaria every 30 secs – this makes donor interest very high. The TB messages have been more muddled and donors have been less interested. The trend is also towards bundling diseases together. Can we bundle rabies with others in a single programme?

SAR – The Commonwealth Veterinary Association has chosen the MDGs as part of its strategy, and they have been used to get funding for projects in Ghana, Nigeria and Pakistan. The Director of the Commonwealth Foundation noted that 6 MDGs relate to the work of veterinarians. They can be used as a source to seek funding from other agencies.

LK – Rabies could be bundled together with other livestock diseases.

FXM – David Molyneux calculated that only 0.64% of international assistance for health is devoted to neglected tropical diseases, and NZDs are only about 10% of this, therefore only about 0.064% of the health budget. Competition between diseases is high, rabies is only 1 of 17 listed as important NZDs by WHO. Bundling together has obvious advantages for assessing their burdens, and therefore project impacts.

ChaR – Cost effectiveness is important. From an animal perspective, 1 dose of vaccine is close to 100% effective for livestock, and costs 30c. Dogs also shepherd and protect livestock.

HB – We could push rabies as a problem in cattle, or as a NZD from dogs and link it to Leishmaniasis.

MK – Several arguments should be made: 1. Make the case in terms of the burden of disease. Show that effective interventions exist, and that they are cost-effective. 2. Bundle rabies to other diseases. 3. Create simple messages. 4. Use country voices – are the countries clearly stating what the problem is and where they want to go? If you can make a good case with strong arguments, then money will come.

FXM – But the support from the countries is not coming. WHO has never heard from a ministry of health about rabies. We tried to engage China when rabies was peaking there, but never heard back. India's situation is improving, so it is less likely to come to the attention of the WHO. Regional approaches to rabies control in SE Asia have been rejected by India.

SAR – It is often easier to achieve progress through NGOs than through government programmes. The Rabies in Asia groups have been helped by vaccine manufacturers.

The participants split into 2 smaller groups to discuss how rabies may fit into the MDG Framework in more detail.

4.4 Group 1 Discussion Summary (Thomas Müller)

1. Make the case – clear objective Burden; cost effectiveness, cost benefit, objective, target, funding gaps, advocacy with clear and simple messages.
2. Build a model – with projections for intervention outcomes; Build teams – vocal in local, national and regional areas who will be champions for rabies control; direct and indirect effect.
3. Integration with other programs and how they will help to serve the MDGs – multiple and cumulative effects; each region or country may have different priorities or bundles, if there are moving trains already in place they could be used, or rabies could begin the moving train – initiating vs benefiting – multiplying the effect; find partners and champions (people, teams, rabies could be a champion for other diseases, private sector).
4. We need to look for pilot projects where integrated disease control could be shown to work.

4.5 Group 2 Discussion Summary (Jim Zingeser)

Group 2 began by asking ourselves if there were any benefits to having the PRP do this exercise of discussing "common and effective approaches to meeting the MDGs and how to include rabies prevention in global development." The group agreed that this discussion is useful and would benefit the program.

Next, we sharpened our focus in the examination of rabies' relationship with MDGs by articulating how we see rabies prevention fitting into global development. We concluded that:

Rabies is principally a disease of poverty, and preventing rabies will help to break the vicious cycle of poverty and disease. In addition, by improving animal health and management practices, rabies prevention programs can reduce hunger. Because of the reach of the program into hard-to-access populations, the potential ancillary benefits of rabies prevention programs are enormous (e.g., through integration with other child health programs, animal and human health education programs, and building laboratory and zoonosis control capacity).

Further details of the group 2 discussion on each MDG are in the Appendix.

Additional comments/discussion:

LN – The groups have taken two quite different approaches, with more bundling apparent in group 1.

A-MS – Group 2 did consider it important too.

TM – Groups differed in the importance in fitting rabies into the goals. Group 1 did not feel that rabies impacted poverty all that strongly.

ChaR – But poor people survive on agriculture, so rabies is important to them.

AW – But reducing rabies will not necessarily have an impact on poverty.

A-MS – Any argument needs to have evidence of the size of the impact.

AW -Using MDGs too much may not be good for us, compared to some diseases, such as brucellosis, rabies does not have a huge impact.

ChaR – What about dogs guarding livestock? We need to go into a winnable battle.

LN – We are looking for opportunities to make a difference here.

RM – To be effective we need to look at the customer (in this case whoever is responsible for moving the indicators towards the set goals). How effective will rabies control be at moving the indicators towards those goals?

A-MS – Some indicators need to be measured, others maybe not, we could just make the point that rabies control makes a contribution towards those goals.

MK – The first group was missing the clear country commitments, and more business-like arguments. We need a more product related landscape analysis, for example looking at vaccine demand and supply chains if implementation were to occur.

SESSION 5 Global Projects

5.1 Betsy Miranda – Bohol Rabies Project Update

This was GARC's first funded project, and started in 2007 with a goal to eliminate canine rabies on Bohol by 2010. The components included integrating expertise, resources, all relevant sectors and legal aspects into one project. Since project implementation, animal bite cases which were rising steeply have stabilized, and human and canine rabies cases have dropped. The project is sustainable due to the collection of dog registration fees, which in 2010 generated $40,000 US of income for the project from nominal fees. Annual vaccination reached 50% despite election disruptions and resulting changes in government officials. These new officials are now committed to continuing the project, and the newly elected village paralegal personnel have been trained. Rabies education was integrated into the curriculum of schools, and on the suggestion of teachers, more aspects of public health are being added such as Dengue fever and road safety. The 30 coastal municipalities now have a focus on reintroduction prevention, through removal of unmanaged dogs, dog registration and early response to disease reports. In terms of surveillance, the dRIT technique was introduced onto Bohol by the CDC in August and the previously trained National Reference Laboratory staff act in support and as quality control.

The last reported clinically diagnosed human rabies case was in Oct 2008, but sadly in Nov 2010, a suspect human case was investigated. Emergency measures were implemented, and the case was traced back and forwards. In April 2011 one dog was confirmed rabid, from the same vicinity as the human case. The Nov 2010 human case was a 4 year old child from a very poor home, bitten after provoking a nursing dog. They were seen by an attending physician at the district hospital and sent home. The April 2011 case was a young, unvaccinated dog that bit 2 people, including a 7 year old. It was tested and found positive. The emergency responses were started within 72 hours of the first case report and were still active in April when they found the rabid dog. PEP was started for all bite victims, mop-up vaccination campaigns were started within a week and radio and house-to-house educational work was initiated. These incidents have been a reminder of the continual threat of rabies in the region.

Many scientific products are forthcoming, with publications focusing on the curriculum work, the use of the paralegal system , dog demographics, KAP analysis, evaluation of different diagnostic kits, animal bites and PEP, health economic analysis, and social science aspects of community engagement.

Discussion:

ChaR – Why were antemortem tests not done on the child that died?

BM – It was a very remote area, and the child died at home. They had seen a physician, and did have some symptoms at that stage, but still was sent home. The child was buried before samples could be collected.

ChaR – Need to learn from this, to get antemortem samples in future, you can ask for help from CDC for this. Could also do viral typing to see where the virus comes from.

FXM – I have a copy here of the report from the emergency room of the Don Emilio Del Valle Memorial Hospital where the human case was seen on 26 November 2010 and diagnosed as rabid. It states that there was hydrophobia

and hypersalivation before death – clear indications of rabies.

ChaR – But it was not confirmed, so we don't know if it was rabies.

FXM – Under the WHO definitions it is a suspect case.

5.2 S. Abdul Rahman – Update on Projects in India – Education and Campaign to make Rabies Notifiable

As a legacy from the British, India has a series of isolation hospitals that are far away from cities, where rabies patients are sent. These places are not well funded or equipped, and rabies patients are basically told that they are going to die. Knowing that transporting a body is more expensive than a living person, the patients go home and die there without post-mortems being carried out. Physicians also do not like to do post mortems on rabies patients. Under these circumstances, making rabies notifiable would make this practice illegal, and should improve the reporting of rabies cases.

The education programme for school children is developing new educational materials and trying to integrate rabies education into the curriculum. Kids are disproportionately affected by rabies, they tend to provoke dogs and worried about repercussions, often don't report dog bites. The objective here is to reduce the burden of rabies. The idea is to develop APCRI and RIA elementary school education modules, to expand their use in schools, to identify kids to be peer educators, and to asses the impact of this education on rabies awareness, incidence of the disease and responsible pet ownership. Many Indian advertisers now appeal to kids as a way to educate less literate parents. The goal is to show proof of concept to persuade the department of education to integrate the material into the curriculum. One of the problems has been to justify why this is only for rabies education. We need to prepare a syllabus, translate it appropriately and make posters and hand bills to distribute.

The Alliance will help with publicity and a media campaign to make rabies notifiable in India. There are 36 states in India, and the goal is to have rabies notifiable in 14 by 2013, and all of them by 2015. The plan is to use contacts with the highest influence, and contact all 554 members of parliament (MPs). A 2 page document about rabies has been written and translated into 12 different languages. Important industrialists, such as those at TATA and Ambani are also being approached. The deans of the 36 veterinary colleges, leaders of 120 animal welfare organizations, APCRI and RIA members are all using their personal contacts in political and other circles, and all have been asked to write to the Minister of Health. Now a media campaign in both electronic and print formats using celebrities will call for rabies to be made a notifiable disease.

Discussion:

ChaR - Have there been vaccine failures in India?

SAR – We tell everyone to start PEP is they have been bitten. We have no idea if the dog has been properly vaccinated, titres are never tested, power failures can affect the cold chain, and there have been issues with spurious vaccines. There is no published work on PEP failures.

HB – Post mortem skin biopsies can be used to confirm diagnosis.

5.3 François Meslin – Update on the Gates Projects

The goal is to prevent human rabies through canine rabies control in 5 years, 2009 onwards. The projects also aim to show viability and sustainability, cost-effectiveness (in terms of reduced PEP costs) and the validity of a paradigm shift towards vaccination dogs to protect people. The results should also catalyse initiatives elsewhere in Africa and Asia.

SE Tanzania. This area has 5 regions, with 6.5m people and about 430,000 dogs. It exploits natural boundaries and includes urban, rural and wildlife areas (it contains the Selous Game reserve). The area is large enough to demonstrate the establishment of rabies-free areas.

KwaZulu Natal. This project covers the whole country, 92,100km^2 with 9.5m people and about 1m dogs. It has several international borders.

Western Central and Eastern Visayas, Philippines. This area is comprised of many islands, with 17m inhabitants and 2m dogs. At the start of the project it had 25% of the animal rabies cases, 28% of the human rabies cases and 27% of the animal bite cases in Indonesia.

The budget is divided between the projects, with 47% ($4m US) going to Tanzania, and about half of this to each of the other two areas. Budget allocations vary between the projects and across the years within a project for 2 of the 3. There are 6 main objectives over which the budgets are divided; baseline data collection (which is mainly complete), prevention in humans using PEP, control in dogs by vaccination, surveillance, sustainability and evaluation phases.

In Philippines, the 3 areas covered by the project are all in the top 10 for rabies cases in the country. So far

there has been no decrease in rabies cases. Vaccination of dogs has started in region 6, and overall coverage is 79%, but across provinces this is variable, and in some cases dog estimates have been too low. There are still rabies cases occurring despite the vaccination. The project has been formally launched in all areas and press releases were made to highlight vaccination campaigns, although some vaccination campaigns (eg in Cebu) are only just starting. In Negros Oriental, 72.5% of dogs have been vaccinated, yet 11 dog and 1 human cases have occurred.

In Tanzania, the official launch was held last year with minister of Livestock present. Tiziana has been training lab technicians and 144 health staff have been trained in the use of the IntraDermal (ID) PEP regimens. As a result of this, ID delivery is now national policy. Dog and cat vaccination is very delayed with only 7 districts out of the planned 24 completed. Only about 36,000 dogs have been vaccinated and the reasons for this are being investigated. There is probably around 50% vaccination coverage, in areas where it has started but this is being investigated as a priority.

In KwaZulu Natal, the official launch happened in March 2011, with the minister of agriculture vaccinating two dogs herself. There is still rabies in the country, but the situation is improving. In some regions, such as Zululand, vaccination has decreased due to vaccine supply issues, staff or vehicle shortages. In other areas, fewer dogs than expected or well organized campaigns have led to dramatic decreases in rabies after vaccination. Training in primary animal health care has been conducted.

There has also been an evaluation of animal welfare issues in all the projects by ICAM/WSPA at the request of WHO. Their terms of reference were to discuss and observe all aspects of the project with the potential for negative animal welfare consequences, to recommend changes and provide necessary training for these. The reports for 2009/10 are now completed. KwaZulu Natal is doing well, some recommendations were made, but generally the project is exceeding standards. The Tanzania project received some training on dog handling, and future work is needed as there is a potential for suffering. Standards are not being fully followed and a new assessment will be carried out in April 2011. The Visayas was assessed to be currently below minimum animal welfare standards, with dog population management going beyond that necessary for effective rabies control. Some of the euthanasia methods used do not meet international standards in animal welfare. Future assessments will be made and training made available.

In conclusion, the 3 projects are all progressing at different speeds. Tanzania is very delayed, but has genuine government commitment. Rabies surveillance is very poor. ID PEP is now accepted, but not widely used, so more training will be given. The mass dog vaccination needs to be speeded up, and the evaluation of coverage is a big issue. KwaZulu Natal need to address vaccine coverage issues in some key areas, dog population estimate were not found to be very accurate, but they are implementing a large scale dog health project. In Philippines, the Phase 1 provinces have high vaccine coverage, and the next year will be critical for the other areas. We should see a reduction in cases by the end of 2011.

Discussion:

TF – Do dogs vaccinated in 2009 still have measurable antibody levels?

FXM – They are not being followed, as this is generally not a recommendation.

AW – Antibodies don't need to be maintained over long periods

LN – The KwaZulu Natal strategy is to vaccinate every year.

DB – Is it possible to have Standard Operating Procedures for testing samples from suspect human cases? And to connect with WHO reference labs for training in the techniques?

LN – In Tanzania the diagnosis is all clinically based.

FXM – We can suggest that, but governments have to accept it.

MV – How was the size of the dog population assessed?

FXM – Each site had a different method. KZN did a full ecological survey, Tanzania did it along with a livestock survey.

MV – Your figures show about 1 dog to 8 or 9 people, in Latin America we usually find 1 dog to 4 or 5 people.

FXM – In the Philippines we found lots of variation between years, and not sure where the dogs went to.

HB – In the dog studies did they look at the turnover of dogs? We have had to suggest 6 monthly vaccinations in Africa due to high turnover.

LN – For KwaZulu Natal we estimate a 2 year turnover.

ChaR – What were the criteria for the selection of these 3 sites. How do you feel about the sustainability of the project in Tanzania?

FXM – That will be a challenge. Optimism about the intentions of the Tanzanian side has grown in the past year.

5.4 Hervé Bourhy – Morocco

This project has been undertaken without any external funding, as it was not selected for one of the Gates project sites. Morocco is a country of 31.2m people, and has a 2,018km border. It has 26m ruminants, 2m horses and an estimated 1.6m dogs. The proportion of strays is unknown, but probably around 10%. Rabies is a notifiable disease, and there are 120 PEP treatment centres across the country. About 20,000 PEP treatments / year are given free of charge at a cost of about $70 each. Total rabies control costs (direct and indirect) in 2007 were $1.35m. There are 7 regional and 1 national veterinary laboratories and the Pasteur Institute, Casablanca handles all the human rabies cases. Animal cases are mostly on the coastal plains, dogs comprise only 37% of reported animal cases and are probably under-reported as cattle, equines and cats are better surveyed. Between 1986 and 2010 there was a 55% reduction in the number of animal cases (from 572 to 259) due to vaccination campaigns starting in 2003. Now 48% of human cases and 79% of animal cases are lab confirmed. 250,000 dogs are vaccinated each year, but human cases are still not really dropping.

Genetic analysis of the viruses indicates distinct geographical separation. Viruses are not exchanged across the border with Mauritania, or the border with Algeria, suggesting that human movement is a strong component in viral transfer. A large dog survey was carried out from 2007-2010 across the whole country and parts of Algeria to help the national campaign. More than 30,000 questionnaires were collected. The ratio of dogs:households was calculated as 0.5 in tourist areas, but 2.2-2,4 in areas where there are a lot of cattle. Nearly 80% of the dogs are male, turnover is high and 49% roam free all the time. A smaller KAP study on rabies awareness was also conducted and 700 questionnaires completed in several areas. 80-86% of people were aware of the risks, the mode of transmission, and what to do if exposed.

In conclusion, rabies could be eradicated from Morocco. Virus transmission is geographically isolated, the legislation, political will and infrastructure are in place along with qualified people who perform sophisticated lab techniques well. Local vaccine production also occurs and could supply a campaign. The emphasis next is to reinforce education and to reinforce and adapt control methods (possibly changing to 6 monthly vaccinations). Help is also needed to attain sustainability. The study has been exclusively funded by the Kingdom of Morocco, with small supplementary projects funded by the Pasteur Institute.

Discussion:

ChaR – What is the duration of immunity of the locally produced vaccine?

HB – That could be a problem and it should be compared to imported vaccine.

MK – The vaccine is competitively priced compared to the imported vaccine.

HB – A full economic analysis is important.

ChaR – But need to factor in the cost of salaries in the vaccine manufacturing units also.

MV – PAHO supports national labs and promotes technical co-operation amongst countries.

TF – Are there controls on animals crossing the borders?

HB – The borders have very few official crossing points, and economic exchanges are few.

5.5 Thomas Müller – Global Projects – European Union (EU) and Surrounding Areas

There is a co-financing programme between individual countries and the EU for oral rabies vaccination (ORV) programmes in the EU. All member countries can apply, and in 2010, the level of support was increased from 50% to 75% of the cost of laboratory tests (with a per test limit) and vaccine purchase and distribution costs. So, rabies is very high on the agenda. Bulgaria started an ORV campaign in the north of the country in spring and autumn 2010 and and as a result, rabies cases have been very dramatically reduced.

There has been a resurgence of rabies in Poland (the virus came from Romania, Russia and Ukraine, but the reasons are unclear and it is currently being debated how it got into an area of high vaccination). There was also a resurgence of rabies in Northern Italy which was brought under control in 2010, but a further outbreak occurred 70km further west where no surveillance was being carried out. An emergency vaccination plan was put in place in December 2010 and January 2011. This was aimed at containing the outbreak and seems to have been successful. Veterinary authorities have implemented ORV campaigns more frequently and this seems to have worked well.

For countries outside the EU, the EU has dedicated €19m over the next 5 years to rabies and classical swine fever control. Kosovo and Serbia started programmes in 2010 and Macedonia, Montenegro, Croatia, and Bosnia-Herzegovina will start in 2011. Kaliningrad has a plan (with Russian help) to eliminate fox rabies in 3 stages: 2007-8, 2009-12, and 2013-15. Until 2010, annual campaigns in autumn have not impacted rabies, so now they are trying a twice yearly campaign. When we look at a map of confirmed rabies cases in Europe, it is clear that the ORV areas are protecting the Western areas from rabies. Romania is the only member state without an ORV programme, and a lot of

pressure is being put upon it by the EU to start one.

Turkey ran an EU funded (€13m) project from 2007-2010. Dog vaccination coverage is now much improved, but still there are areas of low coverage, in particularly Istanbul and areas in the East of the country. An ORV programme ran in the Aegean region aimed at eliminating fox rabies. Vaccinating twice yearly did have a large impact on rabies in this 44,00km^2 area, but it spread inland and there are already financial issues with this programme. They will apply to the EU for funds to tackle the problem.

The Germany-Turkey twinning project has developed and standardized Standard Operating Procedures for diagnosis. Three new labs have been built in Ankara and been moved into and they are now conducting the first Turkish national Fluorescent Antibody tests, with training provided by laboratories in Germany. The lab entered into the international FAT/RTCIT/RT-PCR diagnostic quality assurance testing programme and diagnosed all of the test specimens correctly. Annual meetings with the provincial veterinary services have been arranged, and bat rabies surveillance has started. A rabies surveillance database has been started which combines virus archive and sequencing data, so that epidemiological, GIS and phylogeny analyses can be conducted. Members of the lab attended the OIE Reference laboratory conferences. WRD was celebrated. The next steps will be to continue virus isolation studies, retrospectively collect rabies data from 2000, continue fox ORV campaigns, increase bat surveillance and to hold a third twinning meeting. This time we want to invite neighboring countries to come for training in Turkey. We want to extend the twinning project and support an application for the Turkish lab to get OIE reference laboratory status.

Discussion:

ChaR – Has any serology work been done on the bat samples?

TM - Not yet, but the blood samples have been collected.

BD – Why does Istanbul have such low vaccination coverage?

TM – It's a huge city and very complex – different areas have different mayors and infrastructure. There has been a problem with information transfer between the provincial and national veterinary services. Data collated by the ministry was never passed back to the provinces, so they could never use it for analyses. Now that has improved, overlaying vaccination and rabies cases data is possible, to show where problem areas are.

BD – How did this change come about?

TM – There was a system where reference laboratories needed to have permission from the ministers to do analysis of data. The German collaboration has helped to stimulate self-initiative at the reference lab level, and finally the ministers have recognised the advantages of letting labs do their own analysis.

BD – There really is a lot of very good work going on in rabies control in Europe, and much of it is not recognised.

TM – The EU is negotiating a 100km wide vaccination belt along the Western border of the EU, but there is no news of exactly what the situation is right now.

5.6 Ray Mitchell – Update from Bali

Bali was a rabies free island for 2 decades. Then in 2008, a 4 year old child died of rabies, after being bitten by a dog from Flores island which is endemic for rabies and inhumane culling. The response in Bali was an inhumane culling of dogs using strychnine. A low level of vaccination was also carried out, but not enough to have an impact. In 2009, a delegation from WSPA, concerned about the culling, went to the authorities to discuss alternative strategies. In March last year, a pilot project was launched in one regency, and >70%of dogs were vaccinated. After this success, the authorities signed a Memorandum Of Understanding in Sept 2010, involving all regencies, apart from one which continues to carry out a culling-based policy with some vaccination. The Balinese authorities and Bali Animal Welfare Organization (BAWA) launched an island-wide vaccination campaign, with funding from WSPA, AusAID and others, with WHO and FAO in an advisory role. The aim was to vaccinate 70% of all the dogs, originally estimated by the government at 280,000, but found later to be more like 210,000.

Vaccination was carried out as quickly as possible, with emergency vaccination around any suspected rabies cases. In October 2010, there were 11 vaccination teams, by March there were 45, and BAWA underwent a huge increase in size, which increased pressures on the management. The island-wide vaccination was completed in exactly six months (March 2011), on time and on budget. Comparing the last 4 months with the 4 months before the programme started, there has been a 48% decrease in human cases, a 45% decrease in dog cases and a reduction in dog bites also. One vet who was with BAWA from the start has vaccinated 50,000 dogs during the campaign – the process is really very fast, and each team vaccinated on average 350 dogs per week.

Human deaths have so far reached 130 during the outbreak. People were not seeking treatment at the outset, and even this week there is a report of a teenage boy dying after a bite in December. Education was being delivered

through the vaccination campaign, but it is clearly not totally effective. One person bitten by a puppy did not appreciate the risk, and even a teacher has died of rabies in the last few months. There has been some localized culling occurring during the last 6 months, in areas where rabies deaths have occurred, and strychnine supplies are still around. The BAWA teams respond immediately with more vaccinations to try and prevent the culling but, where they have not been able to intervene, vaccinated dogs have been culled.

Throughout the vaccination campaign, efforts were made to ensure that a second vaccination campaign would follow. These discussions were difficult at times and made more complex by dog nuisance and dog population management issues. There is a law saying that all dogs must be chained up, but 85% of them are not, and actually the vaccination teams would prefer if they were not chained as netting them is much easier as they are less aggressive.

So, 70% of the dogs are currently vaccinated, and this was done largely humanely. The provincial government has agreed to do a second campaign, with mainland and Balinese funding with FAO and AusAID providing further contributions. Sustainability continues to be a huge challenge.

Discussion:

BD – Was there a shortage of vaccine?

RM – Not really. It was not clear whether it was a problem with supply or releasing them. No deaths have been attributed to vaccine shortages.

5.7 Fiona Woodhouse – Rabies in China - an Update

Four agencies are involved in rabies control in China; the Ministry of Agriculture oversees it, with the Ministry of Health (and CDC units), the Public Security Bureau and the Food and Drug Administration are involved also. The trend in rabies cases up to September 2009 has peaks in the 1950s after the war, in the 80s, post political changes, and most recently 2000 onwards. These first two, but not the third also occurred in Hong Kong. However, the data are not always consistent, sometimes with 100s of cases of difference. In 2003, the 4 departments worked on a multi-sectoral plan to strengthen rabies control – Public Safety Bureau (dog registration and management), Ministry of Health (human surveillance, PEP and education), Ministry of Agriculture (doc surveillance, vaccination and capacity building), FDA (vaccine production and quality). In some provinces, 10% of the population is exposed to the risk of rabies, 1% are exposed in Beijing, and it is now estimated that 5% of the population suffer a grade II or grade III exposure. Recently, rabies has always been in the top three cases of infectious disease deaths, but there is some debate about this. Human PEP costs in China are between 250 and 350 rmb per vaccine course, and 300rmb (antiserum) - 1200rmb (Immunoglobulin), so complete treatment for a category III exposure is around 1500rmb (around €150), and paid for by the victim. Traditionally, rabies is most prevalent in the southern area where dogs are eaten regularly, 70% of victims are farmers, mostly men, and the reasons for this remain unclear. There is a slight seasonal trend with more cases towards the end of the year, again it is not clear why this is so.

The reality of PEP in China is that 34% of wounds are not cleaned at all, 72% receive no PEP, and only 1% received rabies immunoglobulin. There have been 34 cases who received 5 doses of vaccine and still died of rabies. The source of this vaccine is unclear. In general treatment at a regional hospital is much better than at village clinics. Why are there such problems? In some rural areas, only 50% of people knew that rabies was a fatal disease, PEP is expensive (compared to an average annual rural income of approx 5,000rmb in 2009) and people are unwilling to spend the money, or simply can't afford it. Health and veterinary care capability and capacity is low, many farmers say they have no access to veterinary care and many are unwilling to engage. Often vets are unqualified.

Around 95% of rabies cases are from rural dogs, with the contribution of cats, wildlife and other domestic animals unknown. A 2006 survey showed an incidence of 2.2% in bats, but generally, data on rabies in animals is very scarce. There are maybe 80 – 140m dogs in China, with 900,000 registered dogs in Beijing alone. The rest are owned, unowned, in the pet trade, the dog meat trade or in rescue centres. Rabies is high in areas where there is a dog meat trade, though which is ‘cause’ and which is ‘effect’ is hard to know. Generally these dogs are unvaccinated, may be shipping 500 dogs at a time, and the official paperwork is usually no indication that they are healthy. These are being shipped into cities from rural areas, and a 2005 CDC survey of 3,000 restaurant meat dogs found 3% had rabies. Tracing animal movements in the pet trade is very hard, with many dogs moving from the west to coastal cities and smuggled into Hong Kong, and these again are unvaccinated. The Ministry of Agriculture provides rabies vaccination free, apart from the cost of labour (about 10rmb), but sometime availability is limited. Private vets are more expensive (around 200rmb). In rural areas dog vaccination is around 10-20% and many owners are ignorant of or unconcerned about rabies. One study showed that 54% of rabies cases were caused by dogs known to the owner. The priority of rural vets is food security and therefore they are not interested in rabies control, and may be poorly educated themselves (many vets perceive a risk in working in rabies control, and vaccines are not usually provided for vets of animal shelter workers). Poor vaccine quality and dog culling has undermined public trust in rabies prevention

policies.

There are educational tools and messages being used, but these tend to focus on dog population management, responsible pet ownership, and social conflict due to dogs, rather than the risk of rabies itself. The emphasis of dog registration (500rmbs in places) is largely to deal with dog nuisance issues. Overall, the problems are recognized, and the authorities are working together to make improvements. A goal of rabies elimination by 2020 has been set, but this is a huge task.

Discussion:

ChrR – The exposure figures you present from the CDC are very high compared to Katie's burden estimates (around 2m).

ChaR – At recent meetings we've been hearing that rabies exposures are 10m per year in China alone, and underestimated in rural areas. Surveillance is very poor (dogs are not traced, microscopes are not used).

TF – None of the statistics can really be believed, even after a lot of training has been carried out.

ChaR – It's very frustrating that some vaccines are not at all potent, the situation is out of control.

FW – Rabies is a notifiable diseases, and it should be reported within 6-12 hours.

ChaR – What happens if the patient cannot pay?

TF – The people were promised cradle to grave health care and it's not happening.

FW – The Ministry of agriculture wants / needs more money, but it seems is not getting it. Politically these issues can be sensitive and perceived foreign influence is not always welcome.

ChaR – There are even reports of vaccine-induced rabies.

TF – There are studies showing that local veterinary vaccines are totally useless. Human vaccines I'm not so sure about.

FW – There are groups in the various departments starting to bring up such issues, but there is still concern over embarrassment at top level

LN – Does the group want to think about ways in which we could help out?

FW – The China Veterinary Medicine Association is a new organization, with the ex- Chief vet at the head. They may be useful collaborators for WRD

LK – China is an OIE member state now, and starting to report and open up, but the situation is highly political. They have to adopt international standards, but progress is very slow and they find it hard to admit to outbreaks. The figures reported for animal rabies cases are just not believable.

FW – In many cases farmers know that dogs are rabid and just kill them, so they are never reported.

5.8 Marco Vigilato – Rabies situation in Latin America

The Pan American Health Organization (PAHO) has 35 member states, and is the oldest public health organization in the world. It is part of the UN system and a regional office of the WHO with 7 specialized centres. PANAFTOSA was created as a foot and mouth specialist centre, but today has many more activities, including zoonoses, other livestock diseases and food safety. It also has a role in promoting technical cooperation. The Americas are the world's most unequal region with areas of high poverty, high livestock areas, high industrialization, and rainforest. Even on small scales it can be very diverse. PAHO's health agenda is based on the MDGs and it is very important to reach them.

Since 1970, rabies cases have fallen dramatically, but whilst domestic animal rabies has declined sharply, wildlife rabies, particularly from bats is increasing (Data are from SIERVA, a voluntary reporting system). Human rabies cases from dogs follows the downward trend in canine cases very closely, but human rabies from bats has clear peaks in 2005 and 2007, and recently for the first time human cases due to bats were higher than those due to dogs. In 2006 there were 29 human rabies cases from dogs compared to 5 from bats; in 2007 there were 16 cases from dogs and 27 from bats; in 2008 there were16 cases from dogs and 6 from bats; in 2009 there were 12 cases from dogs and 6 from bats; in 2010 there were 4 or 5 from dogs and 6 from bats and provisional figures for 2011 show 10 cases from dogs and 14 from bats. So bat rabies deserves some attention.

Some achievements include the generation of a risk map for canine rabies in Latin America, which highlights to governments were the problems are (Bolivia, NE Brazil, El Salvador, Cuba, Dominican Republic). The same needs to be done for bat rabies. The biennial REDIPRA meetings for directors of the national rabies control programmes are in themselves an achievement. Here, technical information is exchanged between countries and political support for control measures is made. The HINSA meetings are for ministers of agriculture and health, the only ones in the world

where intersectoral action and collaboration are the main focus. The PAHO documents for canine rabies eradication still have a deadline of 2012 on them, and the director of PAHO, Dr Mirta Roses has written to all ministers of health to remind them of their commitments to this goal. PAHO has contributed to many technical resources including PAHO guidance for vaccine campaign planning (currently only in spanish) and national rabies control programme evaluation, and a consultation on vampire bat transmitted rabies. SIRVERA is the system used for reporting rabies data and will be available for online data submission from all countries later this year. SIEPI is the interface for output of reports from this database. PAHO also works with many partners and collaborators. The newly developed RELABRA laboratory network comprises 22 labs in 16 countries linked to reference labs (CDC in Atlanta and the Pasteur Institute in Sao Paulo) for help with diagnostics, virus typing, training, research and development and quality control issues. Technical cooperation between countries is really encouraged by PAHO, and 3 groups based around high risk areas for rabies have been approved, but sadly budget cuts mean that they are very limited in their work for the moment.

There are concerns for the sustainability of rabies control efforts, as countries are investing less money into rabies control. Finally PAHO is involved in creating virtual seminars for training on zoonotic disease control. 17 have already been recorded and are being used to attract zoonoses centres around the world into a network.

5.9 Conference Activity Updates:

RITA (Charles Rupprecht)

The next meeting will be in Puerto Rico, and after that in Brazil. There are now 12 countries on the planning committee which has gone far beyond the original remit of countries involved in ORV campaigns against rabies. Abstracts are being requested for Puerto Rico, there will be trips into the rainforest and it promises to be a great meeting. It is not too late to submit workshop proposals.

LN – The PRP meeting will be the Sunday before the RITA meeting starts with a workshop on the Blueprint as we discussed earlier.

Rabies Expert Groups: AREB, AfroREB and MEEREB (Betty Dodet)

These informal networks were set up to link clinicians, laboratory workers, epidemiologists, ministries of health/CDC/Pasteur Institutes and researchers who wanted to help the rabies situation in their countries and regions. The objective is to contribute to rabies control and elimination in their region, through adaptation of measures to the local situation. The blueprint has been an important component of these discussions. An unconditional grant from Sanofi Pasteur supports the groups' meetings.

AREB (Asia) was established in 2004 with 11 countries represented and members meet annually to discuss updates, problems, review guidelines, and rabies data and reports from the meetings are published. AfroREB (mostly W Africa) was established in 2007 with 15 African francophone countries and biennial meetings. The focus of the group has been on how to improve surveillance (5 countries now have rabies as a notifiable disease), awareness of rabies and PEP availability. More rabies prevention centres are needed in these countries, and the next meeting will discuss how the blueprint may be used to help. There are interactions with SEARG and the RITA meetings so that members report back important information from these to the AfroREB group. MEEREB was founded in 2010 and currently has representatives from 7 countries. This group is more oriented to human rabies, but there tend to be vets involved from the country where the meeting is held. The rabies situation has been reviewed, and is very varied across these countries; some countries have very little data to present. Ways of improving rabies awareness have been discussed, and the meeting was the first to test the blueprint, so this will be used to guide awareness campaigns along with WRD events. Efforts are being put into identifying experts from other countries that the network could also include.

After each meeting, reports have been published, primarily in the journal Vaccine, and press conferences are held around each meeting to increase local awareness of rabies and its control.

SEARG (Louis Nel)

A large meeting was held at the end of January 2011, with lots of international participants, including some from the Congo basin. There was also a visit to the KwaZulu Natal project. The end of meeting report is available online at http://www.searg.info. The next meeting will be in Tanzania in January 2013, and will plan to visit the Gates project there during that time.

OIE Global Conference on Rabies Control (Lea Knopf)

This meeting, subtitled 'Towards Sustainable Prevention at the Source' will be held 7-9th September 2012 in Korea, and will focus on dog rabies control and how elimination is feasible. The conference will be attended mainly by chief veterinary officers, but also NGOs and representatives from industry. The preliminary programme is being prepared, and registration is now open. There will be a poster session, though the call is not out for that just yet, and there are plans for a large display of educational and awareness materials. It is planned to be a unique, one off event and everyone is invited to look at the programme. Details are available from a link on the OIE homepage, www.oie.int.

SESSION 6 Final Wrap Up

6.1 Louis Nel – Summary and Thanks

We have had a productive meeting, revisiting the Blueprint and setting timelines for the next stages. We have explored the burden study and again action points were decided. A list of action points will be distributed by email shortly. Today's very useful and informative discussions have shown us a bigger picture of rabies control in the context of health and development. The process of breaking up into two discussion groups lead to two very different approaches to exploring the issues, and Jim has summarized those for us. We can move forwards, keeping these issues in mind.

I'd like to thank all the presenters and other participants for their input. Thanks to Louise for being the meeting rapporteur. And finally I'd like to thank Kim Doyle for all his work on the logistics of this meeting and his attention to detail.

6.2 Deborah Briggs – Closing remarks

The dates of the next Banna meeting are 21st - 25th May 2012, and this will be half a day longer than previous meetings. I really appreciated everyone making the time to come here. I have learned a lot, and I think that we have become a very dynamic force, and I especially appreciate the new people who joined us this time. Our accomplishments have been very impressive and we have achieved much. I'd like to thank Louis Nel for an excellent job chairing the meeting and Louise Taylor for being the Rapporteur.

Louis Nel formally closed the meeting.

Appendix – Further details from the Group 2 discussion (see p16)

MDG 1 Eradicate extreme poverty and hunger

Opportunities

Rabies prevention can have an important impact through:

- deaths averted
- freeing up health and agriculture funds for other animal/public health programs
- reducing misuse of health funds for expensive PEP treatments by promoting inexpensive animal vaccination programs
- integration with animal and human vaccination, treatment and education/communication programs

Implications

- The program must measure burden of disease
- Measure costs, including PEP and dog vaccination
- Measure impact
- Communicate findings in a clear and concise manner to all stakeholders in a timely manner
- Design better strategies and tools to move programs from PEP treatment to prevention and measure impact

MDG 2 Achieve universal primary education

Opportunities

- Rabies prevention would increase community and household monies available to pay school fees
- Decreasing potential danger for children walking to school frees adults to focus on livelihoods
- Reduce the amount of time and money lost to treating school children for bites and/or travel and expenses for PEP treatment
- Potential to use rabies educational materials to strengthen primary education and integrate other health/animal management lessons

Implications

- Measure baseline on opportunity costs of dog bites and rabies treatment

Brilliant idea - Answer the question: How many school books can be bought with money lost to PEP treatments?

- Explore and exploit opportunities to integrate school-based rabies prevention activities with other animal/public health programs.

MDG 3 Promote gender equality and empower women

Opportunities

- In India, data suggest that more women die of rabies than men.
- In many communities in India, women decide which family members will be taken for medical treatment, including dog bites and PEP

Implications

- Educational programs targeting women should be designed and implemented
- Explore bundling rabies education lessons in other programs targeting women

MDG 4 Reduce Child Mortality

Opportunities

- High number of preventable injuries and deaths establishes this as an important pediatric disease.
- Rabies prevention supports this MDG, and because children and their caretakers are targeted by rabies control programs, opportunities to integrate other human and animal health education materials and health care interventions are great.

Implications

- Baseline measurement should include age
- Target children with appropriate interventions
- Explore and exploit opportunities to integrate with other childhood disease programs

MDG 5 Improve maternal health

Opportunities
- Pregnant women may be at increased risk for dog bites
- Some caregivers are reluctant to treat persons who have been exposed to rabies virus, putting some pregnant women at risk for being refused health care

Implications
- The risks to maternal health should be investigated
- Health education programs should target caregivers to debunk myths
- Explore and exploit opportunities to integrate key rabies prevention messages targeting women into maternal health programs
- Look for opportunities to integrate maternal health education into rabies activities targeting women.

MDG 6 Combat HIV/AIDS, malaria and other diseases

Opportunities
- Rabies is a fatal, yet 100% preventable disease. It fits here.
- Potential ancillary benefits to other animal/public health programs are enormous.

Implications
- Combating disease is what we do. We have to do it better and seek opportunities to bundle and integrate with other programs.

MDG 7 Ensure environmental sustainability

Opportunities
- Rabies is inextricably linked to environment, which links it to the human and animal health components of environmental health programs, including:
  - rabies in urban and peri-urban slums
  - rabies in wildlife

Implications
- Measure the burden of disease by environment
- Do dog ecology and dog ownership studies
- Do wildlife ecology studies
- Implement programs to reduce risk of rabies transmission through environmental improvement
- Implement dog population management programs, particularly in urban and peri-urban slums
- Measure the impact of interventions

MDG 8 Develop a global partnership for development

Opportunities
- Rabies prevention networks and programs have been designed and sustained as partnerships for improving health and development

Implications
- Document the global alliances for rabies prevention
- Communicate successes and challenges to stakeholders
- Learn from the experience of other partnerships