Report from the LACANET One-Health Communication Workshop

26th February 2015
Vientiane, Lao PDR

Project Supported by the European Union.
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Summary
The LACANET One Health Surveillance and Laboratory Network project (‘LACANET’) is an EU-funded project which brings together partners in the human health, wildlife health and animal health sectors to create capacity to survey, diagnose and understand the drivers of disease at human-animal-environmental interfaces. Currently 75 per cent of emerging infectious diseases are caused by pathogens originating in animals. Zoonoses kill 2.2m people annually at significant economic expense to people’s livelihoods, the environment and the health system. Mitigating the risks of further outbreaks demands intersectoral collaboration and coordination among public health, animal health and wildlife health professionals.

The Lao PDR partners to LACANET - Lao Oxford Mahosot Wellcome Trust Research Unit (LOMWRU), Wildlife Conservation Society (WCS) and the National Animal Health Laboratory (NAHL) – came together in Vientiane on February 26th 2015, with other key players in the One Health system. The purpose of the workshop was to assess what routine mechanisms of coordination exist across the three sectors, and to identify where there may be gaps that the LACANET project could attempt to fill.

The workshop discussed lessons learnt from case studies from Bolivia and the US, where intersectoral collaboration had been successful and less so, respectively. Participants then mapped current channels of communication in the Lao system and discussed where there was room for broadening those mechanisms. Lastly, participants worked on the simulated Nipah Virus outbreak timeline to identify how communication channels could be optimized between the three sectors to respond to this type of situation.

The lessons learned from the workshop, listed below, will inform the next steps of the LACANET project:

1. Effective intersectoral communication and collaboration requires open channels of communication among the animal health, wildlife health and human health sectors.
2. Good communication among public health agencies and between public, livestock, and wildlife health sectors (including zoos and those working with free-ranging animals) is essential for an effective response.
3. In general, the previous initiatives to develop stronger One Health collaborations between sectors, such as the Communicable Disease Committee, NAHICO, and NEIDCO, are essential structures to build on
4. In particular, links exist in Lao PDR between the human and animal health sectors, at least in part due to the collaborative working methods developed during previous responses to outbreaks (e.g. Avian Influenza). These links have been formalized in the National Zoonotic Disease Coordination Mechanism in 2011 by NEIDCO. These
guidelines for a joint human/animal communication, investigation and provide an excellent starting point for integrating the wildlife health sector into the system.

5. The natural resources sector is still absent from these committees and from guidelines on coordination mechanisms.

6. Those model guidelines envisage feedback of information back to the local level, but that feedback loop does not always function effectively.

7. Mortality reporting by forest ranger patrols, with sampling and testing to identify pathogens circulating in wildlife is an effective strategy for early detection of new and re-emerging pathogens.

8. LACANET support to the safe storage and transportation of samples is necessary and welcomed.

9. Wildlife can act as sentinels, indicating a disease outbreak.

10. The disconnection between the natural resources sector and the other 2 sectors does not currently allow for this essential link between wildlife disease surveillance and the surveillance of disease in livestock and humans.

11. In order to improve this connection between wildlife health surveillance and the detection of emerging diseases in livestock and humans, it is therefore essential:
   a. To include the natural resources sector in the existing NEIDCO structure.
   b. To update the coordination mechanism to include the wildlife disease surveillance conducted by the natural resources sector (including NGOs) and connect it to surveillance activities of the livestock and public health sectors.
   c. Ensure that coordination mechanisms are described at all levels (local, district, provincial and central), and that steps are taken for the implementation of these mechanisms in the field.

12. In further working on the integration of the natural resources sector, it will be essential to clearly define the respective roles and responsibilities of this sector and of the livestock health sector. In particular, it will be important to identify how redundancy can be avoided, but also if and when overlap could be beneficial.

13. The absence of focal points designated in each sector was identified as a major limitation to establish direct communication and collaboration at a technical level.

14. Although cross-sectoral groups exist at the central level, it was broadly supported by participants that focal points should be designated at all levels to be key contacts in the coordinated management of One Health issues, and in particular zoonotic diseases.

15. The durability and continuity in the staff involved in the management of disease outbreak, as well as a long term plan for building their capacity is a critical aspect of building a sustainable system.

16. Along with the updated framework for coordinated disease surveillance between the three sectors, and the designation of key focal points at all levels, the methods of
communication will need to be clearly defined, using existing tools (such as phone, emails) or newly developed interfaces (e.g. websites, mapping tools)
**List of Acronyms and Abbreviations**

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>AI</td>
<td>Avian Influenza</td>
</tr>
<tr>
<td>APSED</td>
<td>Asia Pacific Strategy for Emerging Diseases</td>
</tr>
<tr>
<td>DAFO</td>
<td>District Agriculture and Forestry Office</td>
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<td>DHO</td>
<td>District Health Office</td>
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<tr>
<td>DLF</td>
<td>Department of Livestock and Fisheries</td>
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<tr>
<td>DOHP</td>
<td>Department of Hygiene and Prevention</td>
</tr>
<tr>
<td>IEC</td>
<td>Information, Education and Communication</td>
</tr>
<tr>
<td>MoAF</td>
<td>Ministry of Agriculture and Forestry</td>
</tr>
<tr>
<td>MoH</td>
<td>Ministry of Health</td>
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<tr>
<td>NAHC</td>
<td>National Animal Health Centre</td>
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<tr>
<td>NCLE</td>
<td>National Centre for Laboratory and Epidemiology</td>
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<tr>
<td>NEIDCO</td>
<td>National Emerging Infectious Disease Coordination Office</td>
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<tr>
<td>NGO</td>
<td>Non-Governmental Organization</td>
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<tr>
<td>PAFO</td>
<td>Provincial Agriculture and Forestry Office</td>
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<tr>
<td>PHO</td>
<td>Provincial Health Office</td>
</tr>
<tr>
<td>SEARO</td>
<td>South-East Asia Regional Office (of WHO)</td>
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<tr>
<td>VHV</td>
<td>Village Health Volunteer</td>
</tr>
<tr>
<td>VWW</td>
<td>Village Veterinary Worker</td>
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<tr>
<td>CIEH</td>
<td>Centre of Information and Education for Health</td>
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<tr>
<td>FAO</td>
<td>Food and Agriculture Organization</td>
</tr>
<tr>
<td>IPC</td>
<td>Institut Pasteur du Cambodge</td>
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<tr>
<td>HC</td>
<td>Health Centre</td>
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<tr>
<td>LACANET</td>
<td>Lao PDR-Cambodia One Health Surveillance and Laboratory Network</td>
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<tr>
<td>NAHL</td>
<td>National Animal Health Laboratory</td>
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<tr>
<td>MoH</td>
<td>Ministry of Health</td>
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<tr>
<td>OIE</td>
<td>World Organisation for Animal Health</td>
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<tr>
<td>PPE</td>
<td>Personal Protective Equipment</td>
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<tr>
<td>RRT</td>
<td>Rapid Response Team</td>
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<tr>
<td>SOP</td>
<td>Standard Operating Procedure</td>
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<tr>
<td>US CDC</td>
<td>United States Centres for Disease Control and Prevention</td>
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<tr>
<td>WCS</td>
<td>Wildlife Conservation Society</td>
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<tr>
<td>LOMWRU</td>
<td>Lao Oxford MahosotWellcome Trust Research Unit</td>
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<td>WHO</td>
<td>World Health Organization</td>
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Introduction to LACANET
The LACANET One Health Surveillance and Laboratory Network project (hereinafter referred to as ‘LACANET’) is an EU-funded project which brings together partners in the human health, wildlife health and animal health sectors to create capacity to survey, diagnose and understand the drivers of disease at human-animal-environmental interfaces. In Laos the project partners are the Wildlife Conservation Society (WCS), the National Animal Health Laboratory (NAHL) and the Lao Oxford MahosotWellcome Trust Research Unit (LOMWRU). The project aims to support a bi-national, cross-sectoral Lao PDR-Cambodia One Health Surveillance and Laboratory network, focusing on the following four strategic objectives:

1. Build capacity for surveillance and field investigations for zoonotic diseases
2. Improve laboratory capacity to detect zoonotic diseases
3. Establish a One-Health surveillance and laboratory network
4. Conduct strategic research on two important drivers of disease emergence – Wildlife trade and land-use change

Workshop Objectives
Effective intersectoral communication and collaboration requires open channels of communication among the animal health, wildlife health and human health sectors. It is often the case that channels of communication exist between the human and animal health sectors, but that the wildlife health sector is less well integrated into the system, despite many diseases first occurring in wildlife. Another common problem is that communication systems develop in a hierarchical and linear manner, feeding information into the human health sector with limited information feeding back to the animal and wildlife health sectors.

LACANET will support mortality reporting by forest ranger patrols and sampling and testing to identify pathogens circulating in wildlife. The purpose of this communication workshop was to assess what routine mechanisms of surveillance currently exist and how the outcomes of such reporting, sampling and testing can be best communicated to the wildlife, animal and human health sectors. The LACANET project will look to build on existing coordination mechanisms, as opposed to replicating what is already working. Similarly, where gaps do exist the aim of the workshop was to identify new initiatives which could be trialed during the life of the project.

See Appendix 2 for the presentation of the workshop objectives, and Appendix 4 for the detailed presentation of the each exercise’s instructions.

Workshop Agenda
See Appendix 1 for workshop agenda and objectives of each sections
Case Studies of Inter-Agency Collaboration: West Nile Virus Outbreak in US and 2012 Outbreak in Bolivia

Dr Mathieu Pruvot, LACANET Project Lead at WCS, presented two case studies highlighting issues encountered in intersectoral communication. The first revealed challenges faced by a developed country (the US) in staging an effective cross-sectoral response to a zoonotic disease outbreak, and the second demonstrated a successful response in Bolivia to yellow fever, which was originally detected by wildlife rangers.

In 1999 New York experienced its first outbreak of West Nile virus. Initially it was misdiagnosed as the endemic St Louis Encephalitis. State authorities saw no link between the human outbreak and the sudden death of many birds in the region. The veterinary pathologist at the Bronx Zoo was convinced the human and bird outbreaks were connected and suspected a misdiagnosis. It took considerable effort on her part to find a government laboratory willing to conduct the required tests. But once they did, her suspicions were confirmed and West Nile virus was diagnosed.

In 2012, wildlife rangers in Bolivia, trained as part of a program similar to LACANET, raised the alarm when five Red Howler monkey deaths were discovered in their project area. Necropsies were conducted at the municipal zoo and yellow fever was detected, all within a matter of days. This enabled an effective and efficient public health awareness and vaccination campaign, as well as vector control, preventing any human cases. (Presentation slides available in Appendix 3)

Lessons learned from these case studies show the following:

- local disease surveillance and response is critical for identifying abnormal disease clusters;
- performing full examinations (necropsy and autopsy) is critical for accurate diagnosis – laboratory technicians need to be prepared to diagnose something new;
- Individuals should be ready to optimize the use of resources, for instance by establishing between-sector collaboration on diagnostic procedures;
- individuals within the system need to know what, when, and to whom they should report;
- animals such as the Red Howler monkey can act as sentinels, indicating a disease outbreak;
- sharing routine surveillance information allows people to draw connections between seemingly disconnected events;
- trusting professional opinions of people working in other sectors is essential in establishing inter-sectoral collaboration;
• Good communication among public health agencies, as well as between public, livestock, and wildlife health sectors (including zoos and those working with free-ranging animals) is essential for an effective response.

Mapping Cross-Sectoral Communication
Participants formed five working groups to diagrammatically represent the current communication channels that exist among the human-, animal- and wildlife-health sectors in Lao PDR. The purpose of the exercise was two-fold: to identify existing channels that the LACANET project can build on; and secondly, to identify any gaps which the LACANET project could aim to fill on a trial-basis. Groups were asked to describe their diagram and discuss it with other participants (Appendix 5).

Below is a summary of the key points as they relate to LACANET (note that recommendations listed below are a transcription of participants’ opinions, and not necessarily recommendations from this report’s authors):

a. Human health sector was perceived as having the most resources to respond to outbreaks and therefore, as having a critical role in leading/coordinating the joint rapid response. Participants mentioned the existing network and reporting system from villages to central levels, including a hotline and rapid response teams, which “should be used in the coordination mechanism”.

b. On the other end, both animal health and natural resources sectors “should have support and budgets allocated to outbreak response”. It was perceived that the lack of equipment, particularly at the provincial level, would hinder any type of response.

c. Participants highlighted that there was no existing coordination between the ministry of natural resources and environment and the two other sectors. The natural resources sector is still considered as a “new comer” in the field of disease surveillance. If there is existing or intended communication between public health and animal health, the natural resources sector seems isolated from this network, at all levels (observation supported by all groups).

d. The different groups proposed several explanations for the “weakness” of the network:
   - Lack of equipment
   - Lack of trained staff, in particular staff changes and staff shifting was highlighted as an issue to build capacity
   - Lack of financial resources (people don’t want to work for nothing)
   - Lack of coordination and proper reporting system: people are working separately

e. Several groups indicated the need to clearly identify each actor’s mandates and areas of action, so that the natural resources sector can be involved without overlapping with other sectors. They also mentioned that establishing clear coordination mechanisms
was necessary to include the MoNRE (or the equivalent at the provincial level) into the disease surveillance and reporting strategy.

f. Participants highlighted the existence of NEIDCO and of coordination mechanisms developed between human health and animal health sectors, but that these should be updated to also include the natural resources sector, with a clear definition of each sector’s roles.

g. Previous MoU, describing coordination mechanisms between the public health and the animal health sectors, were referred to. These were written in order to address AI outbreaks. However, it was highlighted that these mechanisms were not suitable to respond to outbreaks at the local level, because the circulation of the information through the central level imposes too much delay. Clear coordination mechanisms and capacity (including diagnostic capacity) at the provincial level is needed to respond efficiently.

h. In regard to surveillance activities involving wildlife trade, participants highlighted the importance for the commerce and industry sectors to be involved too, as they represent the entities managing and regulating markets and trade countrywide.

i. Some participants indicated that tools, such as phone, email and/or websites should be used to share information on sector coordination, surveillance, monitoring, control, education and treatment between ALL sectors.

**Limitations of the exercise**

The exercise met its objectives of initiating a conversation about the existing coordination mechanisms and frameworks, and identifying gaps. One limitation of the outcome is that the discussion stayed at a conceptual level and only occasionally addressed the more detailed concrete mechanisms on the ground.

A second limitation was the difficulty to tease apart conceptual mechanism (only formalized in documents), actual mechanisms (implemented on the ground), and ideal scenarios (suggested by the participants). However, further discussions have, in most cases, allowed clarification of these aspects.

**Outbreak Timeline Exercise**

Workshop participants were provided with the timeline of a fictitious Nipah virus outbreak (loosely based on the simulation conducted in Cambodia). Only the major events of the outbreak were reported on the timeline (detection of sick animals, wildlife, livestock and, human mortality, laboratory results, etc.). The objective was to complete the timeline by adding the most likely actions or communication steps to be taken. Participants were to discuss
the optimal responses to the events based on existing protocols and capacity (also including field level). If no mechanism was in place, they were encouraged to suggest some options contributing to improving cross-sectoral integration. This was aimed at generating a list of proposed procedures for improved communication and collaboration among the One-Health sectors that we could then test as pilot procedures during the LACANET project. Participants formed five groups comprising representatives from wildlife health, human health and livestock health sectors. Each team was given a large poster showing the timeline with the different events (see Appendix 6)

Below is a summary of the lessons learnt from the simulation as they relate to LACANET:

a. Some groups initially suggested that the initial detection of the outbreak by the natural resources sector should be reported to agriculture and forestry sector, which would then report to the public health sector. However, subsequent discussions suggested that a more horizontal communication between sectors was required to allow rapid response, and that this hierarchical perception of the collaboration between sectors was likely detrimental to the coordination of actions.

b. Participants highlighted the need to have routine mechanisms allowing the submission of both wildlife and livestock specimens to laboratories for analysis, requiring the coordination of local natural resources and animal health actors in the field.

c. There was further need to involve the fisheries and livestock sectors at district and provincial levels in the coordination of animal carcasses’ proper disposal and biosafety protection measures, including for wild animals in collaboration with the natural resources sector.

d. Participants indicated that the public health sectors should have a prominent role in leading the response, given their higher capacity and resources, but that coordination between the 3 sectors was essential at all levels (local, district, provincial and central).

e. Further discussions indicated the need to designate focal points within each sector and at all levels, to address issues involving multiple sectors. Indeed, there was a general agreement that communicating with other sectors was complicated in the absence of key people designated within each sector as key representative for One Health issues.

Limitations of the exercise

Most groups presented a very standard response to the outbreak, probably more based on general guidelines than actual field capacity. Reactions were usually artificially early and strong, due to the fact that participants had seen the entire timeline, as well as the Nipah virus diagnosis, from the beginning of the exercise.
Lessons Learned for LACANET
The objective of this workshop was to gain a better understanding of how One-Health communication works in Lao PDR, and how the LACANET project can support and possibly even strengthen these coordination mechanisms. The lessons learnt from the workshop, listed below, will inform the next steps of the project.

1. Previous initiatives to develop stronger One Health collaborations between sectors, such as the Communicable Disease Committee, NAHICO, and NEIDCO, are essential structures to build on.
2. However, the natural resources sector is still absent from these committees and from coordination mechanisms guidelines.
3. This disconnection between the natural resources sector and the two other sectors hinders the existence of an essential link between wildlife disease surveillance and livestock and human disease surveillance.
4. In order to improve the connection between wildlife health surveillance and the detection of emerging diseases in livestock and humans, it is therefore essential to:
   a. Include the natural resources sector in the existing NEIDCO structure.
   b. Incorporate the wildlife disease surveillance, conducted by the natural resources sector (including NGO’s), in the coordination mechanisms and connect it to surveillance activities of the livestock and public health sectors.
   c. Ensure that coordination mechanisms are described at all levels (local, district, provincial and central), and that steps are taken for the implementation of these mechanisms in the field.
5. In further working on the integration of the natural resources sector, it will be essential to clearly define roles and responsibilities within this sector and the livestock health sector. It will be of particular importance to identify how redundancy can be avoided, but also if and when overlap could be beneficial.
6. The absence of focal points designated within each sector was identified as a major limitation to establish direct communication and collaboration at a technical level. Designating focal points in all relevant sectors is a key step in coordinating the response to zoonotic disease threats.
7. Although cross-sectoral groups exist at the central level, it was broadly supported by participants that focal points should be designated at all levels to be key contacts in the coordinated management of One Health issues, and especially zoonotic diseases.
8. Continuity in the staff involved in the management of disease outbreaks, as well as a long term plans for building their capacity is a critical aspect of building a sustainable system.
9. Along with the updated framework for coordinated disease surveillance between the three sectors, and the designation of key focal points at all levels, means of communication will need to be clearly defined, using either existing tools (such as phone, emails) or newly developed interfaces (e.g. websites, mapping tools).

Conclusion

Participants were very positive about the usefulness of the workshop, and that important questions had been addressed. The major recurring themes during the workshop were the need for a clear definition of roles and responsibilities, in particular to allow the integration of the natural resources sector in the surveillance of zoonotic diseases. The designation of focal points was highlighted as high priority for all sectors and at all levels, in order to facilitate One Health collaboration at practical and technical levels. These are in line with previous recommendations established by NEIDCO in its April 2011 National Zoonotic Disease Coordination Mechanism report. The outcomes of this workshop clearly point out to the need to implement this strategy. In addition, given the critical importance of wildlife disease surveillance as an early warning for emerging infectious diseases, we strongly encourage all sectors to consider updating these mechanisms to allow the integration of the natural resources sector and the wildlife disease surveillance activities that LACANET will contribute to develop. In an initial step toward this integration, we indicated in Appendix8 the anticipated structure of wildlife disease surveillance developed under the LACANET project, and provide in Appendix 9 some suggestions as to the type of information that should be shared between the 3 sectors based on the initial plan mentioned in the 2011 NEIDCO report.

In concluding this workshop, project leaders noted that this was still the beginning of the process, and that they were committed to pursue the training, to ensure that any system established as part of LACANET was sustainable. They noted that the workshop had revealed some solid links between animal and human health sectors, and hoped it had also contributed to a greater inclusion of wildlife health in the One Health approach. They thanked all participants for their active participation in the workshop, and thanked the EU for their generous support and funding.
### Appendices

#### Appendix 1: ‘One Health workshop agenda and objectives

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Presenter/Facilitator</th>
<th>Content</th>
<th>Exercise</th>
</tr>
</thead>
<tbody>
<tr>
<td>1330-1340</td>
<td>Introduction and objectives of the workshop</td>
<td>Mathieu Pruvot</td>
<td>Explain the need for wildlife disease surveillance, and the basic structure of the surveillance mechanism. Explain that integration of this surveillance to broader system is needed via communication channels. Introduce workshop objectives and program</td>
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</tbody>
</table>
| 1340-1410  | West-Nile outbreak in the US, Yellow Fever in Bolivia: case study of inter-agency collaboration | Mathieu Pruvot                 | West-Nile outbreak in the US, Yellow Fever in Bolivia: case study of inter-agency collaboration  
Objective: to stimulate discussions on the need for cross-sectoral collaboration | 30 min presentation and 10 min Q&A           |
| 1410-1540  | Mapping cross-sectoral communication                                     | Mathieu Pruvot, Soubanh, DrWatthana | Objectives: to identify existing pathways that LACANET can build on  
Map current state of collaboration to highlight that wildlife surveillance is not currently well integrated | Participants from the 5 working groups were randomly selected to diagrammatically represent current communication channels among the three sectors, identifying the actors involved in the communication process, the frequency of their interactions, communication |
Maps were stuck on wall. Participants made observations while standing in an arc around them.

<table>
<thead>
<tr>
<th>Time</th>
<th>Event Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1540-1555</td>
<td>Coffee break</td>
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<tr>
<td>1555-1575</td>
<td>Outbreak timeline Exercise</td>
<td>Mathieu Pruvot, Soubanh, DrWatthana</td>
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<tr>
<td></td>
<td>Objectives: discuss about existing communication channels or potential ones in response to concrete events. Generate an action list for piloting improved/new channels to improve communication and collaboration among relevant sectors</td>
<td>Participants were presented with the timeline of a Nipah virus outbreak. Based on this timeline, each group was required to make decisions on how communication should be established between the different sectors to efficiently build on existing communication pathways and integrate all sectors. At the end of the exercise, participants reported on the modifications they had made to the timeline to highlight these communication channels.</td>
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<td>1715-1730</td>
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Appendix 2 “Introduction to the workshop objectives”, Presentation by Dr Mathieu Pruvot, Veterinary Epidemiologist, Wildlife Conservation Society, Cambodia and Laos
Strategy for wildlife disease surveillance

Overall objectives

- Identify existing communication channels and gaps
- Contribute to setting up routine mechanisms of wildlife disease surveillance
- Ensuring efficient communication of surveillance outcomes between wildlife health, livestock health and human health
- Building on existing communication mechanisms to integrate wildlife disease surveillance into general surveillance strategy

ynamo will contribute to these objectives

LACANET - One Health Surveillance and Laboratory Network

Workshop agenda

- West Nile virus outbreak in the US and Yellow Fever in Bolivia: case studies of cross-sectoral collaborations
- Mapping cross-sectoral communication
- Coffee break
- Outbreak scenario simulation
- Wrap up

LACANET - One Health Surveillance and Laboratory Network

Project funded by the European Union
Appendix 3: “West Nile Virus Emergence in North America: A Case Study of Inter-agency Collaboration”, Presentation by Dr Mathieu Pruvot, Veterinary Epidemiologist, Wildlife Conservation Society, Cambodia and Laos
The beginning: suspicious human illness...

- Late August 1999, 6 people admitted to a community hospital in Queens, N.Y. all with:
  - High fever
  - Altered mental status
  - Headache
  - Unusual muscle weakness
  - Suspected encephalitis or meningitis
- Within 3 weeks, 3 elderly patients had died.

Looking back, suspicious wild animal illness...

- By mid-August dead birds (at least 40) were submitted to the wildlife pathologist at the New York State Department of Environmental Conservation
- No clear cause of death was identified
- Initially no further action

Looking back, suspicious wild animal illness...

- In late June a Queens, NY veterinary clinic had received several wild birds with nervous system disorders
- Citizen reports of dead birds to local authorities increased through July and into August.

Timeline

Project funded by the European Union
Meanwhile, suspicious zoo animal illness...

- August through September 1999, exotic birds began dying at the WCS Bronx & Queens Zoos in New York
- Over one weekend, the zoo lost:
  - 1 Guanay Cormorant
  - 3 Chilean flamingos
  - 1 Asian pheasant
  - 1 bald eagle
- Zoo keepers report that “birds seem to be dropping out of the sky”

Meanwhile, suspicious zoo animal illness...

- 10 Aug, to 23 Sept. 1999: 27 birds (8 orders, 14 species) die at the Bronx and Queens Zoos
- Primary clinical signs = neurologic disease
  - Ataxia, tremors, abnormal head posture, circling or convulsions
  - Weakness, altered recumbency, easily caught
- Necropsy Exams
  - Severe pathologic changes in multiple tissues including central nervous system
  - Samples collected: blood, tissues in formalin and frozen and stored at -80 °C

Timeline

Zoo Animal Disease Investigation

- Convinced the human and bird outbreaks were linked
- And suspected the initial diagnosis of SLE virus was wrong
  - All birds affected were species native to the Western Hemisphere
  - SLE virus infection = no clinical signs

Cracking the Case

- Department of Agriculture’s National Veterinary Services Laboratory & USGS
  - Flavivirus detected
  - Biosafety Level 3 required so CDW contacted
- US Army Medical Research Center
  - Provided mobile BSL3 to Bronx Zoo
  - Diagnostic support

Cracking the Case: West Nile Virus (WN-NY99) Confirmed

<table>
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<tr>
<th># Birds</th>
<th>Species</th>
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<tbody>
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<td>Crows, magpie</td>
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<td>6</td>
<td>Flamingo, night heron</td>
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<td>Cormorants*</td>
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<td>Gulls</td>
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</tr>
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<td>Pheasants, lagopan</td>
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<td>1</td>
<td>Bird eagle</td>
</tr>
<tr>
<td>1</td>
<td>Owl</td>
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*New threatened

Project funded by the European Union
West Nile Virus Confirmed in Birds & Humans

- October 1st, 1999

Lessons Learned

- Local disease surveillance and response system is critical
  - Identifying abnormal disease clusters
  - Performing full examinations (autopsy/necropsy)

Lessons Learned

- Uncertainty existed about WHAT to Report, WHEN to Report and to WHOM
  - Better communication among public health agencies
  - Links between public and animal health agencies are becoming more important
    - Domestic animals
    - Wildlife (Zoo and Free-Ranging)

Lessons Learned

- Laboratory capacity and improvement of linkages among laboratories are needed
  - “Expect the Unexpected”
  - Veterinary laboratories did not have the antigen to test for West Nile virus
  - CDC did not initially test for West Nile virus because it had never before been seen in the Western Hemisphere.

Lessons Learned

- Often requires one person, who have all the information, to make the connection...
  ... but the more information sharing there is, the more likely the connection will be made

Project funded by the European Union
2012 outbreak in Bolivia

Post-mortem findings included jaundice and numerous small hemorrhages found on liver.

Samples sent for PCR analysis (flavivirus and arenavirus testing).

Impact

Humans:
- 8 days between first and.gov't notification
- Preventative measures = no human cases

Non-Human Primates:
- Reinforced alliances of conservation and human health partners and One Health approach
- Appears to be 1st description of Yellow Fever in Bolivian monkeys
- Build support for howler conservation efforts - e.g. "Protect our Guardian Angels"
- Prevent/mitigate harmful environmental transformations (e.g. deforestation and agricultural development)

April 5 - Notification of health authorities (MoH & PAPK)

WSL/PREDICT responsible for outbreak investigation.

April 7 - Public health vaccinations, education, vector control campaign launched.

2012 outbreak in Bolivia

March 28 - outbreak report by local porcine. No clinical signs of disease in other animals or humans in the affected area.

WSL/PREDICT coordinates outbreak response.

March 29: Dr. Erika Amada, Fabiola Suárez (WSL/PREDICT) and Robert Baer (Zoological Society of San Diego) necropsy 2 dead monkeys of Municipal Zoo "Vesty Parco" (La Paz).

April 4 - Laboratory PCR confirmation that samples were positive for flavivirus.

National crime lab later ran sequencing to confirm yellow fever and to determine specific strains.

Project funded by the European Union
Acknowledgements

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- University of British Columbia, Dr. D. P. J. C. MacLachlan, Dr. A. J. A. McNeil, and Dr. S. J. Lawrie
- University of Cambridge, Dr. D. E. W. Price, Dr. A. J. A. McNeil, and Dr. S. J. Lawrie
- University of Florida, Dr. S. J. Lawrie, Dr. A. J. A. McNeil, and Dr. D. E. W. Price

Conclusions

- Importance of communication and collaboration between sectors
- Importance of building capacity and coordinating the use of resources
- Importance of trusting opinions/contributions of other sectors
- Importance of routine notification system and passive surveillance, in particular for wildlife diseases
Appendix 4: Slides introducing the different exercises of the workshop

**Workshop agenda**
- West Nile virus outbreak in the US and Yellow Fever in Bolivia: case studies of cross-sectoral collaborations
- Mapping cross-sectoral communication
- Coffee break
- Outbreak scenario simulation
- Wrap up

**Mapping One Health Communications**
- Objectives:
  - Identify current communication channels among the three sectors
  - Identify who communicates what, with whom, and how
  - Identify who is isolated and how gaps can be filled
- Break in small groups of 5-7 persons
- Use flip chart to create a representation of communication between livestock health, public health and wildlife/environmental health

**Workshop agenda**
- West Nile virus outbreak in the US and Yellow Fever in Bolivia: case studies of cross-sectoral collaborations
- Mapping cross-sectoral communication
- Coffee break
- Outbreak scenario simulation
- Wrap up

**Outbreak scenario simulation**
- Objectives:
  - Assess response to a outbreak scenario
  - Use existing capacity to optimize response
  - Propose solutions for additional communication channels
  - Suggest options for improved integration of sectors
- Break in groups of 5-7 persons
- You will find a timeline describing different events of an outbreak scenario
- Start at the beginning, and progress through the event
- Discuss the optimal response to the events on the timeline based on existing protocols and capacity (also include field level)
- If no mechanism is in place, suggest some options
- Write down on the timeline the actions that were taken
Appendix 5: Examples of conceptual maps obtained during the "Mapping Cross-sectoral Communication" exercise
Appendix 6: Examples of timelines obtained during the “Outbreak Timeline” exercise

[Images of timelines]
Appendix 7: List of workshop participants

Central government and organizations

<table>
<thead>
<tr>
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Appendix 8: Anticipated structure of wildlife disease surveillance mechanisms developed under the LACANET project
Appendix 9: Suggestions for the integration of the natural resources sector in zoonotic diseases surveillance based on existing mechanisms and on the 2011 “National Zoonotic Disease Co-ordination Mechanisms” NEIDCO report

NATIONAL CENTRAL
- NCDCC
- NCLE
- NAHL
- DFRM
- DOFI

Communication through focal points

- Lab. Testing + Confirm.
- Reporting
- NAHC-Investigation
- Press Release
  (including wildlife mortality, wildlife testing)

PROVINCES
- PCDCC
- PHO
- PLFS
- PAFO
- PoNRE
- POFI
- NGO (e.g. WCS site managers)

Communication through focal points

- Data collection
- Investigation
- Routine reporting
- Real time reporting
  (including wildlife mortality, necropsy)

DISTRICT
- DHO
- DAFO
- DOFI

Communication through focal points

- Data collection
- Investigation
- Routine reporting
- Real time reporting
  (including wildlife mortality)

VILLAGES
- Head of Village
- Volunteers
- VVW
- VHW
- Rangers/WCS monitoring teams

Communication through focal points

- Detection
- Routine reporting
- Real time reporting
  (including wildlife mortality)