



Consultation on sustainable laboratory biosafety and biosecurity: OIE, Paris

Laura Roberts

The Consultation on Sustainable Laboratory Biosafety and Biosecurity was attended by State Veterinarian; Epidemiology, Laura Roberts, at the OIE headquarters in Paris from 1-2 March 2018. The meeting was held with support from Global Affairs Canada and their Weapons and Materials of Mass Destruction (WMD) Threat Reduction Program, and in association with the Chatham House initiative, 'Safe and Secure Biomaterials'. Biosafety was defined as the prevention of accidental infection or intoxication of animals or humans by a biological material and biosecurity as the prevention of deliberate misuse of biological materials. The aim was to discuss these two topics in relation to sustainable laboratories. The meeting had over 50 attendees from at least 35 countries.

The World Organisation for Animal Health (OIE) (www.oie.int) is an intergovernmental organisation that deals with animal diseases. It was formed in 1924, which makes it older than the United Nations. The OIE is governed by a World Assembly of Delegates, which meets once a year and comprises delegates from each member country. A Director General is elected by the Assembly and is in charge of the day-to-day running of the OIE, which is undertaken by staff at the headquarters in Paris.

The Council, consisting of the president of the World Assembly of Delegates (currently Dr Modisane, our national Chief Director: Animal Production and Health), the past president, vice-president and six delegates from the different regions, is elected by the World Assembly for a three-year term. They represent the Assembly and meet more often.

Specialist commissions include (to use their short names) the Terrestrial Code, Scientific, Laboratories and Aquatic Animal Commissions. Members are elected by the Assembly for a three-year term. They study epidemiology, prevention and control of animal diseases and ensure that the OIE's international standards are up to date and in line with current scientific knowledge. The Laboratories Commission is responsible for the Terrestrial Manual, which contains standards for diagnosing animal diseases and recommends the most effective vaccines. Part of the function of the Scientific Commission is to consider a country's applications for recognition of freedom from an animal disease. Three permanent working groups focus on issues related to wildlife, animal



Figure 1: The OIE headquarters in Paris (Photo: L Roberts)

welfare and food safety, respectively, and *ad hoc* groups, convened by the Director General, answer questions in their field of expertise to support the specialist commissions. Delegates can nominate experts to join these *ad hoc* groups.

Regional commissions and regional representatives work closely together to identify and tackle region-specific issues.

The meeting in Paris started with case studies from seven OIE member countries, outlining the status of their laboratory services and challenges faced. Challenges that recurred in country presentations included lack of: government funding, trained personnel, equipment maintenance and calibration, laboratory reagents, reliable power supply and formal protocols to ensure biosafety and biosecurity. A common complaint was related to the drain of trained personnel away from state laboratory services and another was about the dependence on outside funding for new infrastructure. When funding and support is removed, the remaining facilities and equipment often cannot be maintained and used effectively. Dr Abdul Conteh from Sierra Leone described their newly-renovated laboratory where waste disposal, transportation and quality management is still not in place and dust from the near-by road cannot be excluded. Dr Sangay Letho, Bhutan, described an impressive laboratory network of national, regional,

satellite and district laboratories but only one, national, bio-safety level (BSL) 2 laboratory, and a lack of personal protective equipment (PPE) and training in and funding of biosafety and biosecurity. An additional challenge is that all state laboratory services are provided free of charge, which cuts off a potential revenue stream. Drs Tony Joannis and Pam Luka from Nigeria described the challenge of selecting and using suitable laboratory equipment and Dr Amira Nachi Mkaouer from Tunisia discussed the need for a national legal framework and adequate communication around biological threats. She also proposed that diagnostic services be separated from research in their laboratories, to control spending on laboratory testing. Pastor Alfonso Zamora, from Cuba, described a need for expansion of biosafety and security culture.

I was invited to present on the drought and concurrent functioning of veterinary services, including laboratory services, in the Western Cape. I spoke generally about the progress of the drought and the change in mind-set and behaviour that it has forced in our population, and how, with global climate change, many other areas may find themselves in similar situations. I gave examples of how veterinary services is trying to save water with flow-reducing tap fittings, rainwater tanks, hand wipes and limited lavatory flushing. I presented measures taken by PathCare laboratories to save and recycle water, as a case study. They have installed a complex system of storage tanks, to allow them to recycle water from the laboratory into the lavatories and to store borehole water sourced from pathologists' private boreholes and transported with a tank on a trailer. I also talked generally about machinery in laboratories that can cause unnecessary water waste, such as reverse osmosis units and autoclaves and any equipment that requires running water for cooling. A group of Stellenbosch University students were featured in the news last year for saving 3000 litres of water a week in their laboratory. They altered the cooling system on an evaporator to recycle ice water, rather than using single-pass cold water.



Figure 2: OIE reception (Photo: L Roberts)

Trevor Smith attended the meeting to represent Global Affairs Canada, which became involved with laboratory practices from the aspect of weapons and materials of mass destruction through their membership of the G7. Canada is the current chair of the G7 and there is now more focus by G7 on biosecurity, related to the threat of misuse of pathogens. Laboratories with poor infrastructure and a lack of biosafety and biosecurity measures are seen as a potential threat. The aims are to control materials that represent threats, develop risk-reduction strategies, including safe handling of materials in laboratories, and increase preparedness for a potential event involving misuse of biological agents. Global Affairs Canada has been assisting with building and upgrading of laboratories but feel that there are obstacles preventing full success of these projects. These include over-expectation on the part of the partner country as to what the laboratory will achieve, but limited input on design and planning to assist with the sustainability of the laboratory. The laboratories lack government support and commitment, and personnel battle to obtain funds after donor funding runs out. There is also a challenge with over-sophisticated equipment being supplied by donors, which cannot then be maintained without enormous cost after donor support is withdrawn. Global Affairs Canada has a concept for a sustainable, "green" laboratory that is as simple as possible, but includes necessary installations to ensure biosafety and biosecurity and the necessary functions.

David Harper, from Chatham House: Global Health Institute, gave a presentation on their relevant activities. Chatham House is also known as the Royal Institute of International Affairs and was established after the 1919 Peace Conference. Prof Harper spoke about their multisectoral and multidisciplinary approach and about how they have been working since 2012 to assist with creating appropriate laboratories, matched to local risk assessment and requirements, rather than very high-tech facilities. They aim for facilities to be affordable, functional in the local environment, efficient and resilient and to build required skills in the communities. They would like to help with a tool to aid decision-making to provide core specifications for a sustainable laboratory and to work towards regional training facilities.

The rest of the presentations covered different aspects of planning and decision-making for "fit for purpose", sustainable laboratories.

Alfonso Clavijo presented a case study of the Canadian Science Centre for Human and Animal Health and its maintenance costs and requirements. The facility contains both the National Microbiology Laboratory (Public health Agency of Canada) and the National Centre for Foreign Animal Diseases Laboratory (Canadian food inspection agency). The state-of-the-art complex is the only facility in Canada with a biosafety level (BSL) 4 laboratory, which cost an average of \$2000/m²/year to run from 2010 to 2014.

Jennifer Lasley is based at the OIE and is involved with laboratory capacity building. She spoke about assessing the demand for laboratory services, as part of the PVS

(Performance of Veterinary Services) sustainable laboratories mission. She focussed on the problem of insufficient government funding for laboratory services and the lack of understanding of all costs involved by those requesting funding. The PVS sustainable laboratories tool will be able to assist with cost assessments, analysis of services supply and demand, strategic planning and decision-making.

Mehdi El Harrak, a member of the Laboratories Commission, presented on biological risk management. It is important to identify, quantify, manage (sustainably) and communicate risk. Management should include administrative, engineering and operational aspects such as waste disposal and use of PPE.

Kazunobu Kojima from the WHO spoke about the revision of the WHO Laboratory Biosafety Manual (last edition was published in 2014). An important aim is to align international approaches to biosafety and biosecurity and to focus on evidence-based biosecurity. For example, in a study on "Surveillance of laboratory exposures to human pathogens and toxins: Canada 2016", a total of 100 people were exposed in a year and standard operating procedures (SOP) were identified as the weakest area, rather than, for example, equipment malfunctions.

Nick Nwankpa spoke about the African Union Pan-African Veterinary Vaccine Centre (AU-PANVAC) and its role in quality control of vaccines imported into Africa. The organisation is expanding to standardize vaccine production, communicate new vaccine technology, provide training and support services, and produce and distribute biological reagents. They have harmonized vaccine registration for East Africa, and are working towards training trainers and developing a laboratory network, maintenance schedules, providing auditing and registration services and developing an MSc degree in vaccine production and quality control.

Sam Yingst from the US Centres for Disease Control (CDC) presented a case-study of biosafety cabinets and the difficulty involved with their maintenance and certification in under-resourced countries. Biosafety cabinets are perceived as vital for handling certain contagious diseases but he postulated that other, less sophisticated alternatives can achieve the same goals, if one performs a "context-appropriate risk assessment".

Patrick Ferran is chief sales officer in Europe and North America for an open or networked innovation company called NineSigma. They assist in finding innovative solutions. His tips on how to solve your problem include: be visible to the right people, frame your problems differently and be open to solutions from other fields.

Philip Astley is an architect involved with healthcare planning and design and is currently an honorary research fellow at University College London, and director of a course titled "Planning for Biosafety Environments". He is also involved with the Biosafety Design Initiative, a cross-disciplinary initiative to incorporate infection control into facility design.

Ben Davies went through the six "foundations for sustainability": resourcing, appraisal, design, delivery, support services and communications. He discussed some case studies where one or more of these foundations was not given due attention and this resulted in huge waste.

Heather Sheeley, from Public Health England, presented her vision of safe and secure laboratories in under-resourced countries. These will be suited to the local context and needs, and will focus on safety measures that will have the greatest impact, but will not necessarily be the most costly. These laboratories should be self-sufficient with regard to, for example, accessible maintenance staff, locally-sourced building materials and independent power sources. There should also be sufficient organisational structure to accommodate career development and promotion for staff.

Discussion in smaller groups on the last day led to conclusions that current efforts are headed in the right direction. There should be a back-to-basics approach, to determine what is required from a laboratory and the simplest and cheapest way to achieve it, while maintaining biosafety and biosecurity. Training and education is vital to ensure that the laboratories can be self-sufficient with regard to both quality control and maintenance. However, there also needs to be education at a national and international level, to highlight the vital role that these laboratories play in veterinary services and their need for adequate government funding and support.



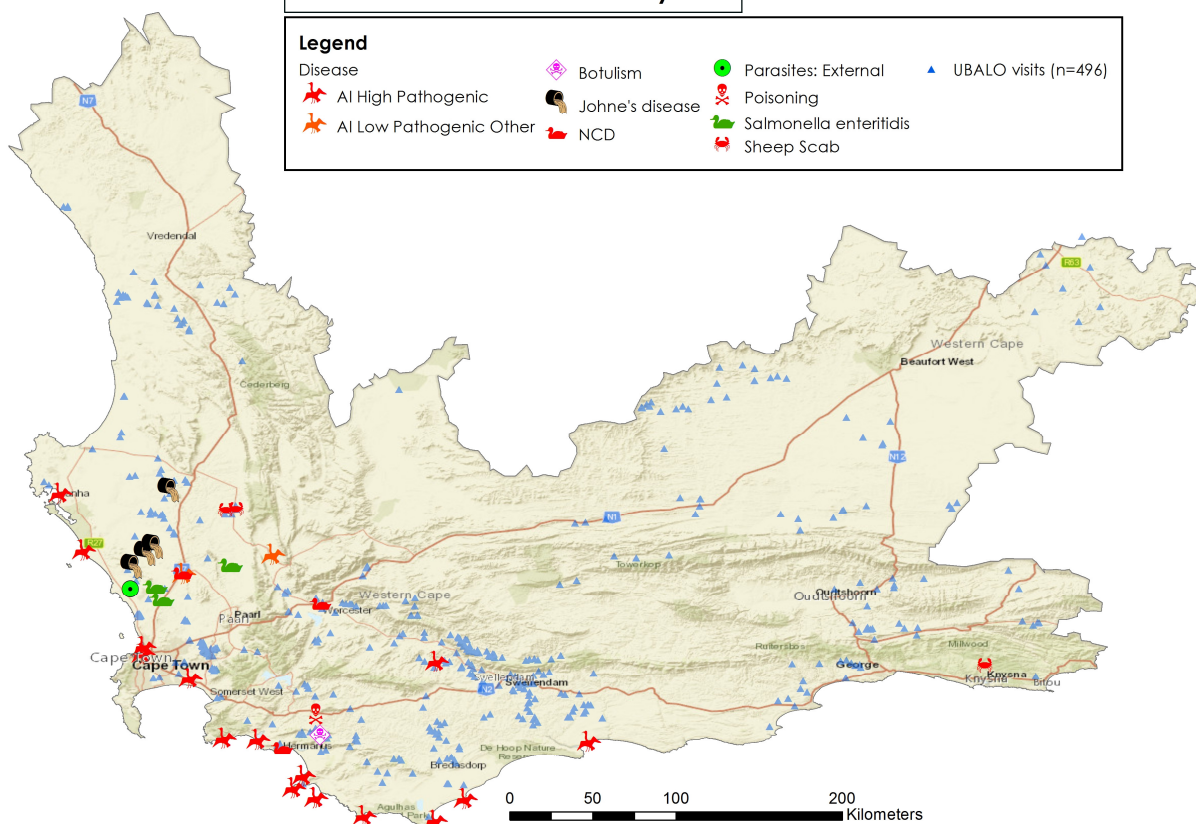
Figure 3: View of Paris from the Pont Alexandre III (Photo: L Roberts)

Disease and surveillance

Disease and Census - February 2018

Legend

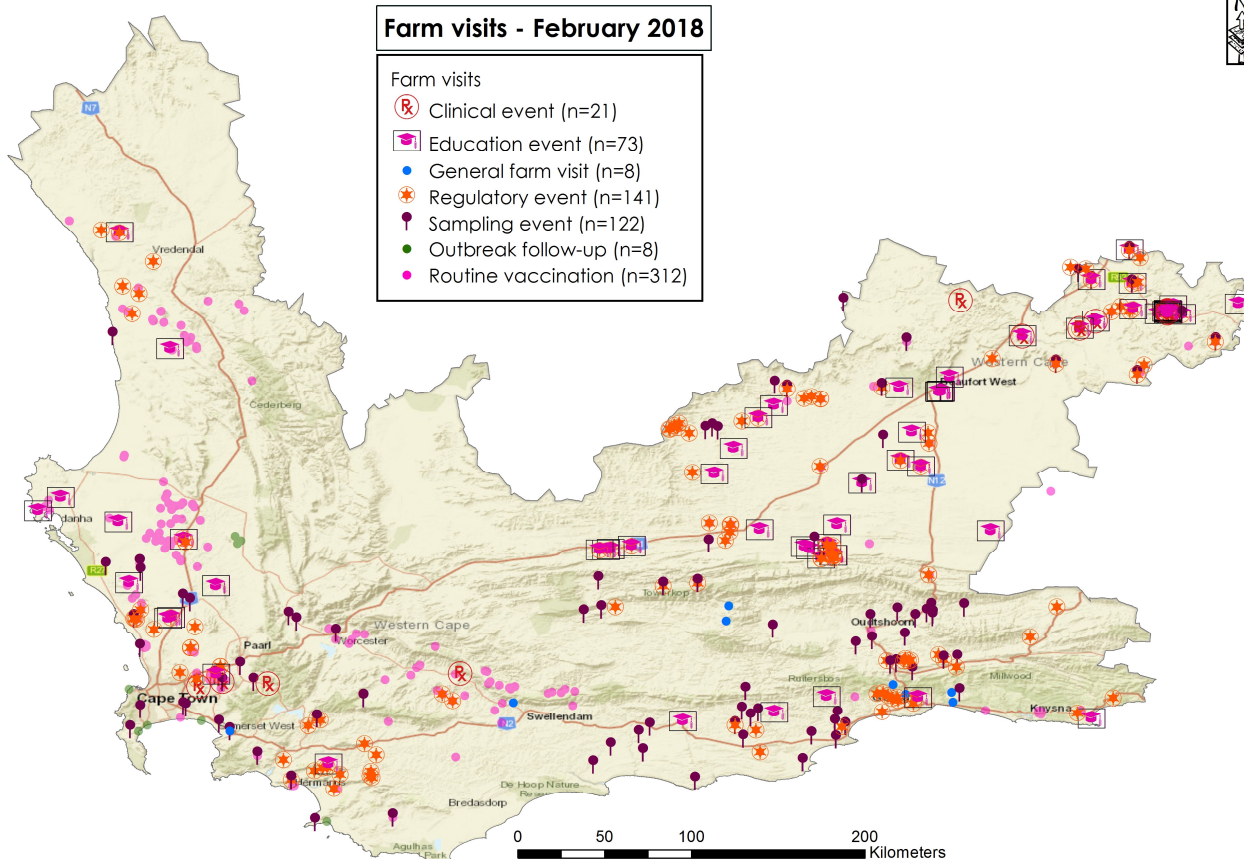
- | | | | |
|-------------------------|-----------------|------------------------|----------------------|
| Disease | Botulism | Parasites: External | UBALO visits (n=496) |
| AI High Pathogenic | Johne's disease | Poisoning | |
| AI Low Pathogenic Other | NCD | Salmonella enteritidis | |
| | | Sheep Scab | |



Farm visits - February 2018

Farm visits

- ⓧ Clinical event (n=21)
- 🏠 Education event (n=73)
- General farm visit (n=8)
- ⚙️ Regulatory event (n=141)
- 🔍 Sampling event (n=122)
- 🌿 Outbreak follow-up (n=8)
- 🌸 Routine vaccination (n=312)



Outbreak events

The outbreak of **highly pathogenic H5N8 avian influenza** continued to affect wild birds, which were found sick or dead at several locations, mostly along the Western Cape coast. All cases were confirmed by H5N8-specific PCR and all ill birds that were found still alive were euthanased for welfare reasons.

- Dead **swift terns** were found on **Witsand**, **Milnerton** and **Langebaan** beaches. Other swift terns that were found weak and displaying neurological clinical signs were found at Milnerton lagoon, **Yzerfontein** beach, **Dyer Island** and between the vineyards on a farm in the **Bonnievale** area.
- **Common terns** were found dead on **Betty's Bay** beach and in **Seapoint**.
- **Sandwich terns** were found dead on **Macassar** beach and **Dyer Island**.
- About thirty dead **Cape gannets** were found in the water near or washed up on **Die Dam** beach.
- Four dead **African penguins** were found on **Dyer Island**. Ill penguins, all showing seizure-like episodes, were found in **Arniston**, **De Kelders (Gansbaai)** and **Muizenburg** beach.
- Dead **Cape cormorants** from **Danger Point** near Gansbaai and **Struisbaai** tested H5N8 positive. Juvenile Cape cormorants, both showing neurological clinical signs, were found on **Dyer island** and at **Uilenkraalsmond**.
- A juvenile **spotted eagle owl** was found ataxic, lethargic and unable to fly near the mouth of the **Bot River**.
- A **Hartlaub's gull** was found dead on **Dyer Island**.
- A **grey-headed gull** (fig 4) was found on **Fishhoek** beach with an inability to fly, imbalance and head tremor.

Ostriches on a farm in the **Wolseley** area had serological reactions to H5N8 and H6N8 **avian influenza** antigens. No virus was detected and there were no clinical signs or increased mortalities.

Deaths of **feral pigeons** roosting in **Malmesbury** were noticed along with neurological clinical signs. Samples taken from the pigeons tested PCR positive for virulent **Newcastle disease** and **avian influenza**.

Wild **red-eyed doves** in found dead in **Hermanus** tested positive for virulent **Newcastle disease** and pigeon paramyxovirus, but also suspect positive for avian influenza.

Cape turtle doves dying in **Worcester** tested positive for virulent **Newcastle disease** and pigeon paramyxovirus.

Four **sheep** farms in the **Malmesbury** SV area were placed under quarantine for **Johne's disease**.

Salmonella enteritidis was cultured from chick box liners, dead-in shell chicks, boot swabs and/or cloacal swabs on three broiler **chicken** farms in the **Malmesbury** SV area.

Sheep scab was detected in flocks near **Porterville** and **Knysna**.



Figure 4: A grey-headed gull (Photo: G Buissart)



This is the 100th issue of the monthly Epidemiology Report, which was started by John Grewar in October 2009. Since then there have been four State Veterinarians: Epidemiology who have been editors of the report and numerous contributors. We would like to thank all of our officials in the team at Western Cape Veterinary Services who spend time in the field every day collecting the information that makes this report possible and useful to so many in the wider animal health community. We would also like to thank all of our readers, especially those who have provided us with feedback and participated in interesting discussions related to the issues featured in the report over the years.

All previous issues of the Epidemiology Report since 2009 are available on our website at <http://www.elsenburg.com/vetepi/>

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