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WAHIS is modernising: be a partner in the project

OIE

Protecting animals, preserving our future • **World Organisation for Animal Health**

contents


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editorial

WAHIS is modernising: be a partner in the project

Since its foundation in 1924, the role of the OIE has been to disseminate, as widely as possible, the health information notified by Delegates in accordance with their obligations as OIE Members. The principles that prevailed in the 1920s continue to guide our work today: transparency, quality and objectivity of information, fast communication, and equal access to information.

Since its foundation in 1924, the role of the OIE has been to disseminate, as widely as possible, information on animal health

The OIE's Sixth Strategic Plan, adopted for 2016 2020, again emphasises the importance of *communication [that] must be rapid, contextual and understandable*. That is because, in order to act, we need robust, validated data. For information to contribute effectively to action, it must meet needs, and it must be accessible in a suitable format and within the shortest possible timeframe.

The OIE's role is therefore not only to collect, sort and check the information it receives, it also needs to produce useable information, ensure that it is made available to all potentially interested stakeholders, and encourage them to use it to good effect. To achieve those aims, in addition to running the *World Animal Health* Information System (WAHIS) and responding to the many daily requests for information and practical advice to assist Members with notification of disease occurrences, the OIE has implemented a number of actions to enhance the efficiency of WAHIS. These include:

- a training programme for national focal points on notification of health events, delivered through advanced workshops and e-learning modules. The positive impact of the programme has been felt immediately in an improvement in the quality of the information received and shorter average notification timeframes;
- easier access to animal health data with the creation of a specific portal on the OIE website;
- an app for smart phones and tablets for instant access to alerts; 6,000 people have downloaded the app so far[1].

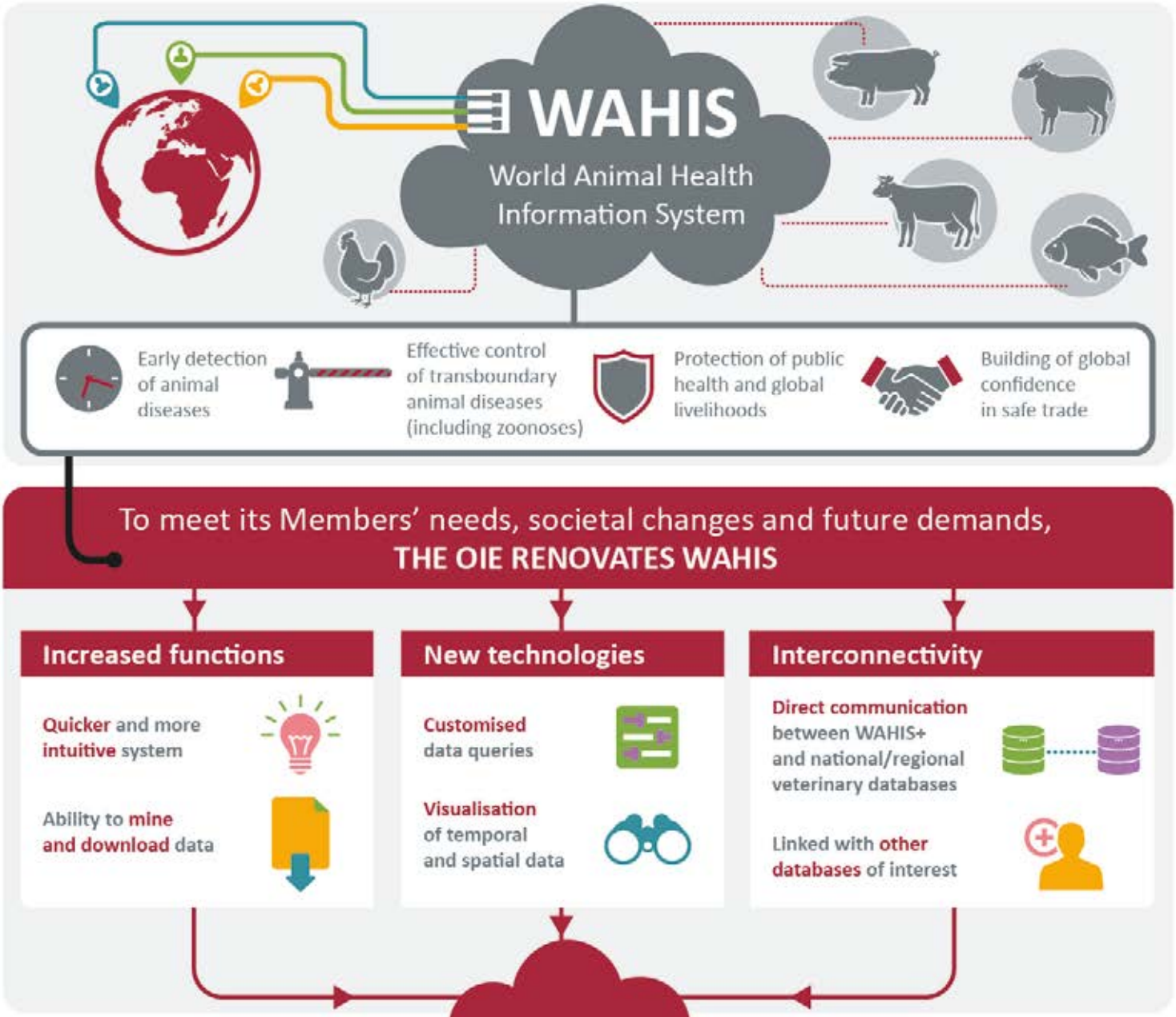
Now we are taking on a new challenge: upgrading WAHIS. This will mainly involve integrating new information technologies and optimised use of diverse communications media.

The immediate aim is to improve the interface by making WAHIS more robust and searchable. However, the investment should also be an opportunity to enhance the quality of our work. We would like tomorrow's WAHIS to be able to:

- perform retrospective analyses in order to better anticipate events;

1. Download the app here: www.oie.int/en/for-the-media/press-releases/detail/article/oie-alerts-and-animal-health-information-now-available-on-your-smartphone-or-tablet/

WAHIS is becoming WAHIS+



BE PART OF THIS PROJECT AND SPREAD THE MESSAGE TO:

- Public bodies
- International and regional organisations
- Private foundations
- Academic & research institutions
- Individuals

TOGETHER WE WILL DEVELOP THE NEW WAHIS+

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– monitor low-intensity signals in order to detect danger and assess risk more accurately;
– incorporate more non-veterinary information, especially economic and climatic data, in order to understand events in the light of other factors that can impact on health or contribute to disease emergence;
– enable interconnectivity between the OIE and other systems (including regional systems) in order to facilitate networking and information-sharing – that is the ambitious aim of GLEWS+[2], which aims to pool information between the OIE, FAO and WHO so that it can be analysed in accordance with 'One Health' principles.

For the WAHIS upgrade, we at the OIE have decided to take an innovative approach.

Now we are taking on a new challenge: upgrading WAHIS

Firstly, we sought advice from experts who have been involved in developing similar tools at WHO and FAO, as well as at the European Commission, the European Centre for Disease Prevention and Control (ECDC)[3], Météo France and the European Bioinformatics Institute, in order to benefit from their experience before hiring a project management company.

We also consulted you on your needs and expectations by sending questionnaires to Members (in particular to the national focal points responsible for notifying animal diseases to the OIE) and, more recently, to the partners that use WAHIS, in order to draft the technical specifications for the future WAHIS.

Lastly, in view of its importance, I decided to set up a governance system for this project by establishing two committees: a Strategic Consultative Committee, which will be tasked with overseeing progress on the project in accordance with the priorities defined by the OIE, and a Technical Consultative Committee, which will provide advice throughout the project's operational development.

Please join us for WAHIS+

It is now my hope that the Members and OIE's partners will be keen to support this project for the future by becoming involved in its technical oversight and financing.

Ensuring the transparency and dissemination of information is the OIE's core mandate, and WAHIS is the central interface for that work. Please join us for **WAHIS+**.

Monique Éloit
Director General

http://dx.doi.org/10.20506/bull.2017.2.2636

2. GLEWS+: The Joint FAO/OIE/WHO Global Early Warning System for Health Threats and Emerging Risks at the Human-Animal-Ecosystem Interface
3. ECDC: European Centre for Disease Prevention and Control (http://ecdc.europa.eu)

Notification of animal disease information to the OIE

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Introduction

Veterinary Services and Public Health Authorities are responsible for controlling diseases of animals and people, respectively, and both are responsible for zoonotic diseases. To achieve this, clear knowledge about the source of the disease is required. Surveillance and monitoring systems are the basis for Veterinary Authorities being able to prevent, control or eradicate animal diseases at the national level. The timely and systematic collection of data and dissemination of information allow different stakeholders to undertake a range of actions and interventions to improve animal health. The exchange of information at the national level allows immediate action in the field which ensures the safety of international trade in animals and animal products.

In this context, the notification of animal diseases is essential to rapidly alert authorities to disease outbreaks and facilitate their response so that further outbreaks can be prevented. Only two international organisations have a global legal framework that allows them to request, collect and release global animal or human health information: the World Organisation for Animal Health (OIE) since 1924 and the World Health Organization (WHO) since 1951 [1].

The purpose of notifying animal diseases to the OIE is the worldwide sharing of scientific information on the global disease situation in order to protect animals and preserve our future through safe international trade. Notification as defined by the OIE means the procedure by which a Veterinary Authority informs the OIE, and the OIE subsequently informs the Veterinary Authorities of other Member Countries, of the occurrence of an outbreak of disease or infection, in accordance with OIE international standards, recommendations and guidelines.

This article briefly summarises the origins of the OIE, its legally binding mechanisms and systems for disease reporting, the evolution of the dissemination of information through the OIE's notification systems and, finally, the benefits of disease notification.

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Origins of the World Organisation for Animal Health (OIE)

The spread of rinderpest through Europe in 1920, from a shipment of infected zebu cattle that came originally from India and were destined for Brazil, transiting through the Belgian port of Antwerp, alerted a group of countries to the need to organise themselves to notify the health status of their animals and animal products before import and export. The resurgence of rinderpest in Europe, where it had previously been eradicated, highlighted the need for international collaboration to control major infectious animal diseases. Concern over the resulting spread of rinderpest led to an international conference of Chief Veterinary Officers in Paris, France, in May 1921. This eventually led to the creation in 1924 of the *Office International des Epizooties* (OIE), founded by 28 Member Countries, under the terms of an 'International Agreement' signed on 25 January 1924.

By the beginning of 1927, the International Agreement had already been ratified by 24 Member Countries and the International Committee of the OIE held its first General Session on 8 March of that year.

The International Committee decided to publish the first *Bulletin* to communicate information on animal diseases and statistics on animal health status worldwide provided by Member Countries [2, 3]. The exchange of information on animal diseases between countries was one of the prime reasons for creating the OIE, with the ultimate aim of ensuring transparency of the animal health situation across the globe.

In May 2003, the Office became the World Organisation for Animal Health but kept its historic acronym, 'OIE'. The OIE is the intergovernmental organisation responsible for improving animal health worldwide. In 1998, it was recognised as a reference organisation by the World Trade Organization (WTO) [4].

Legal basis for notification to the OIE

Within the framework of the OIE's first historic mission ('ensuring transparency in the global animal disease situation'), each Member Country undertakes to report the animal diseases, including those transmissible to humans, that it detects on its territory, as stated in Articles 4 and 5 of the OIE Organic Statutes [5]. These statutes set out the objectives of the OIE in providing information about diseases to its Members. They also define the role and responsibilities of Member Countries, identified the original list of diseases to be notified, and specify how and when the OIE disseminates information to its Members regarding the presence and distribution of diseases. This applies to both naturally occurring and deliberately caused disease events. The OIE shares this information with other countries, which can then take any necessary preventive action. Information is sent out immediately or periodically.

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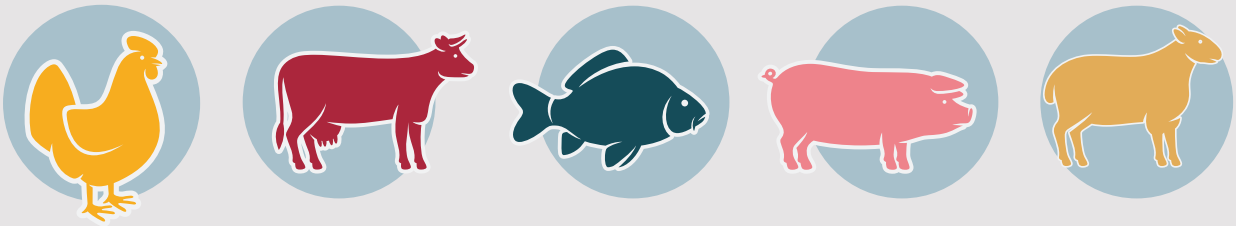


Immediate communication is reserved for exceptional events, as defined by Chapter 1.1., Article 1.1.3., of both the *Terrestrial Animal Health Code* (the *Terrestrial Code*) and the *Aquatic Animal Health Code* (the *Aquatic Code*), while periodic communication is sent concerning the more stable absence, presence or evolution of OIE-listed diseases via six-monthly reports [6, 7].

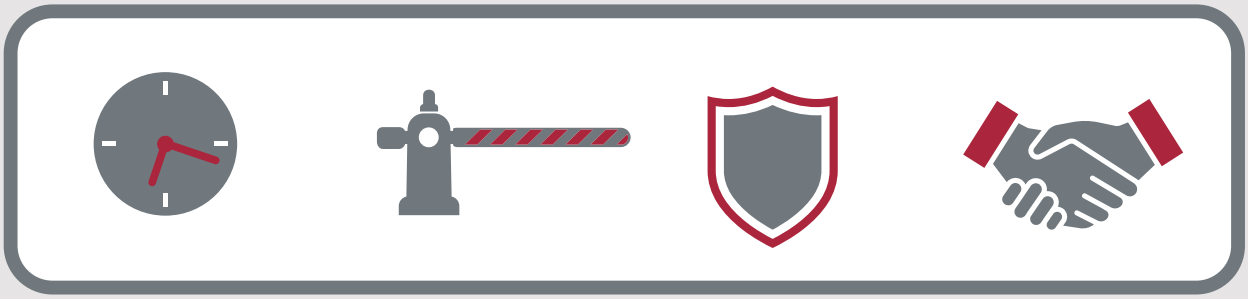
These international standards should be used by Veterinary Authorities to deliver uniform disease notification. The OIE has developed detailed guidance to provide clear data interpretations to support consistent reporting, thereby minimising misinterpretations which could lead to unjustified animal health barriers to trade.

The WTO Agreement on the Application of Sanitary and Phytosanitary Measures ('SPS Agreement') recognises the OIE's standards, recommendations and guidelines as the international reference for global trade. This Agreement creates an obligation for all WTO Members to harmonise their national legislative frameworks with the OIE standards, and provides additional legal support through international law for the OIE's disease notification system. In meeting their obligations to ensure the transparency of their animal disease situation to the OIE, Members comply with the related provisions of the SPS Agreement [4, 8].

Disease reporting

In accordance with the criteria for listing a terrestrial or aquatic animal disease (these criteria are now found in Chapter 1.2. of both the *Terrestrial Code* and the *Aquatic Code*), the OIE has established a list of the animal infectious diseases that pose the greatest threat to animal health, public health and/or agricultural or aquaculture economies. The objective of the OIE List is to support Member Countries by providing the information that they need to take appropriate action to prevent the transboundary spread of important animal diseases, including zoonoses.

The OIE list is regularly reviewed by experts and updates are approved at the annual General Session of the World Assembly of Delegates of the OIE before formal adoption by their governments. The list contains nearly 120 animal diseases, infections and infestations, which are listed in Chapter 1.3. of both the *Terrestrial Code*



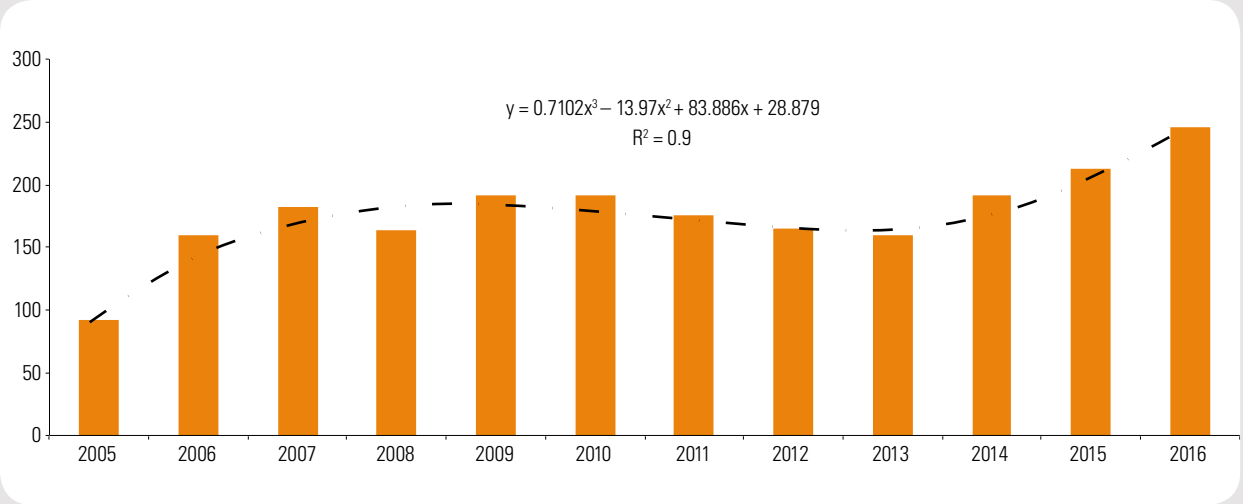


Fig. 1

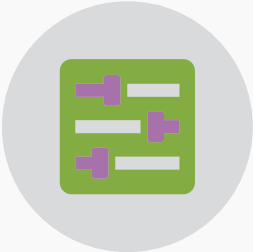
Number of immediate notifications submitted to the OIE by year since 2005 up to 2016

and the *Aquatic Code*. When modifications are made to the OIE list and adopted by the World Assembly of Delegates, the new list comes into force on 1 January of the following year [6, 7]. In addition to these diseases, OIE Member Countries also have a legal obligation to notify events involving 'emerging diseases'. After an immediate notification, the OIE requests Member Countries to send weekly follow-up reports to provide further information on the evolution of the event, until such time as the disease has been eradicated, the situation has become sufficiently stable or, in the case of emerging diseases, sufficient scientific information is available to determine whether it meets the criteria for listing [6, 7].

To facilitate the process of notification, the OIE has developed the *World Animal Health* Information System (WAHIS) [9], a secure computer system accessible via the Internet that enables Member Countries to enter, store and view data on animal diseases, including zoonoses, in the OIE's three official languages (English, French and Spanish). Access to this secure system is only available to authorised users, namely the Delegates of the national Veterinary Services of OIE Member Countries and their authorised representatives. All information collected through WAHIS is verified and validated before its dissemination to Member Countries and to the public.

Since the launch of WAHIS in 2005 (as of 2016), Member Countries have sent the OIE around 2,300 immediate notifications relating to OIE-listed or emerging diseases (Fig. 1). The number of immediate notifications has significantly increased in the last 12 years, reaching a peak in 2016 (246 immediate notifications submitted), as Member Countries have been made more aware of their reporting obligations. Infection with influenza A viruses of high pathogenicity is by far the most frequently reported disease, followed by foot and mouth disease.

By collecting animal disease data, the notification process builds up a wealth of scientific information that contributes to the development of appropriate animal health management measures and international animal health standards. Data collected through WAHIS are used by the OIE experts to identify priority areas for



future research studies in animals and for the collection of further data to aid in developing more effective prevention and control methods for OIE-listed and emerging diseases.

Evolution of 93 years' experience in disease data collection and sharing

The evolution of disease reporting and the distribution of animal disease information can be analysed from a range of perspectives. Four areas are analysed in this article:

a) The evolution of Member *Country participation*
b) OIE-Listed diseases
c) The quality of information gathered
d) The dissemination of information.

By deciding to join the OIE, a Member Country agrees to fulfil its international commitment to notify the OIE of disease events and its animal health situation, as laid down in the Organic Statutes and in Chapter 1.1. of the *Terrestrial Code* and the *Aquatic Code* [6, 7]. As mentioned above, in 1924, 28 Member Countries founded the OIE. This number has progressively increased across the years and with it the quantity of information collected by the OIE. In 2017, the 85th General Session of the World Assembly of OIE Delegates welcomed the 181st Member Country to join the OIE, Curacao [10]. In view of the importance of WAHIS for international trade, an additional 22 non-Members also submit information on a voluntary basis so, all together, 203 countries and territories are currently submitting information to the OIE.

In terms of animal diseases, in 1924 the founder Members agreed to notify the animal health situation in their countries with regard to nine diseases . The information collected by the OIE on these diseases was published in the first OIE *Bulletin* of 1927 [2]. It was not until May 1964 that the list was reviewed and the 'A' and 'B' Lists of notifiable diseases were created, with a total of 56 diseases (53 terrestrial animal diseases and three aquatic diseases). List A comprised 16 diseases subject to compulsory notification, to be reported monthly or fortnightly to the OIE, and List B cited 40 diseases that were

reportable annually to the OIE [11]. During the 72nd General Session in May 2004, it was decided that all 108 diseases previously contained in Lists A and B should be combined into a single list, 'the OIE List'. Since 1 January 2017, 116 OIE-listed diseases (88 terrestrial and 28 aquatic animal diseases) are now being reported through WAHIS [6, 7].

For the OIE, it is very important to ensure that the information collected and shared with its Members is of the highest quality. Since the first OIE *Bulletin*, Members have exchanged information not only on the nine diseases listed at that time, but also on many other diseases

[2]. Moreover, in 2001 the OIE initiated a process with Members to confirm or refute any circulating unofficial information that may be of interest to other Members [12]. In accordance with its mandate to report the international animal health situation transparently, the OIE introduced and has continued to develop an active search for non-official information and rumours relating to animal and public health. This activity increases the sensitivity of information collected by the OIE, which is particularly important in an early-warning system designed to detect exceptional epidemiological events. In addition, the OIE trains Focal Points in disease notification to improve the quality of the information provided. Between 2005 and 2016, 40 regional and global WAHIS training courses have been run (with an average of 25 participants), involving 98% of the OIE's Member Countries. However, the submission rate for countries submitting the six-monthly reports on aquatic animal diseases is much lower than that for terrestrial diseases (an average of 70% versus 95%, respectively). The same situation can be observed in the number of immediate notifications provided between 2005 and 2017 (172 aquatic diseases reported, as against 2,113 terrestrial). Thus, there is still plenty of room for improvement when it comes to reporting aquatic diseases.

In the 1920s, disease information was reported and disseminated to OIE Members by telegram. During the 49th General Session, the World Assembly resolved to publish *World Animal Health* (1981–2013), an annual

publication in paper format, which presented a synthesis of animal health information from OIE Members, as well as non-OIE Member Countries. It was not until 1996 that the first electronic platform, 'Handistatus II' [13], was available, which published information on a monthly basis for former List A diseases, and on an annual basis for former List A and List B diseases. With the adoption of the single list, WAHIS was created in 2005. WAHIS is a single reference source of validated official data, with over 4,500 pages viewed each day. In 2016, the number of recorded visitors reached more than 80,000 per month, showing considerable and growing public interest in WAHIS data. To facilitate the dissemination of disease alerts (immediate notifications), a distribution list was created in 2002 and in 2017 this list counts more than 15,000 subscribers, each receiving daily notifications. In 2014, the publication *World Animal Health* was replaced by an electronic public version [14]. To increase the ease and speed with which the information can be accessed, the OIE launched the *WAHIS Alerts* application for smartphones in 2015. This enables immediate notifications and follow-up reports to be sent directly to mobile phones or tablets.

The changing environment of disease evolution, added to the availability of new technologies in both data processing and communication, has changed the way in which society behaves as well as how it expects to receive animal health data. In addition, Member Countries have requested the ability to be able to undertake customised data mining in large volumes and, at the same time, share WAHIS data with regional and national databases. In order to achieve these goals, the Sixth Strategic Plan of

Wahis+

the OIE, which covers the period from 2016 to 2020 [15], foresees the development of a new platform, **WAHIS+**.

Benefits of animal disease notification

A transparent Veterinary Service, which undertakes prompt and accurate disease notification, builds credibility and trust between trading partners, which is one of the crucial elements for fair and safe trade in animals and animal products.

Timely reporting enables early warning and preparedness and, if data are accurate, limited resources can then be redirected accordingly. However, the quality of information and the timely notification of any disease depend on the professionals who are responsible for communicating to the OIE. Notification and publication of animal health and zoonosis data by the OIE also encourages and strengthens partnerships between veterinarians and other health professionals who contribute to these reports, for the benefit of the Member Countries involved.

Animal health data also provide the basis for determining regional, national, and international animal health priorities. Policy-makers, regional and international organisations and donors use observed disease trends to prioritise and allocate resources for animal health programmes. Examples of such priority programmes include the global eradication strategies for rinderpest, foot and mouth disease and peste des petits ruminants. The increased incidence of zoonotic avian influenza (H5N1), starting in 2003 and reaching its peak in 2006, saw the call for an increased resource allocation at the international level to fight against this disease [16].

Early notification of some diseases, in combination with relevant genomic data, has provided information on the source of disease outbreaks, allowing a better explanation of the dynamics involved in the transmission of diseases at the population level. Disease traceability has therefore been enhanced by the notification of high-quality epidemiological and genomic data.

Notification is used not only to determine how well a country is fulfilling its obligation of transparency, but also to monitor the progress of its disease programmes and its ability to maintain its disease-free status. When a Member submits an application to the OIE for endorsement of a national control programme; official recognition of its disease status, or the disease status of a zone, for the six specified OIE-listed diseases; or a self-declaration of its status for a specified disease; one of the prerequisites for acceptance is that Member's notification of its animal disease situation to the OIE.

Notification of animal diseases allows the OIE to identify critical areas for the provision of technical support to Members who request assistance with animal disease control and eradication operations, including zoonoses. This technical support includes regional capacity-building programmes, vaccine banks, the PVS Pathway programme,

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WAHIS training workshops and other seminars. Achieving and maintaining an official disease-free status and determining the absence of disease, as demonstrated through regular disease reporting, demonstrate the quality of the Veterinary Services involved and enhance a country's credibility in the international community. Access to regional and international markets is also made easier, with a resulting increase in the economic potential of the country's livestock sector and improvement to food security and livelihoods.

Conclusion

Animal disease notification has evolved since the creation of the OIE. Notification through WAHIS under the OIE international standards is a way of providing early warning to OIE Members for the timely identification of disease outbreaks and to coordinate responses to prevent further spread. The observed increase in the number of disease notifications over the years creates a wealth of scientific data and information that benefits both the Organisation and its Members in developing standards and providing temporal and geographic disease trends for risk analysis, which, in turn, influence policy decisions, resource allocations and the provision of technical assistance to Members.

Transparency in the notification of animal diseases demonstrates the quality of a country's disease reporting, leads to trust, builds the credibility of Veterinary Services, and facilitates market access for safe trade in animals and animal products. For all these reasons and more, the OIE will continue to improve and strengthen the notification of animal diseases as demanded by its Members.

http://dx.doi.org/10.20506/bull.2017.2.2637

WAHIS portal:
www.oie.int/en/animal-health-in-the-world/wahis-portal-animal-health-data/

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Global situation regarding reporting of aquatic animal diseases: worldwide diagnostic capabilities

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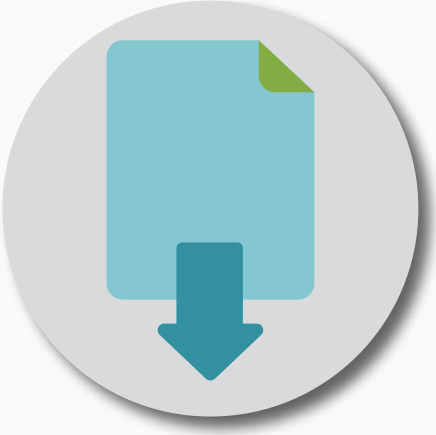
The OIE is the intergovernmental organisation responsible for improving animal health worldwide. This mandate covers both terrestrial and aquatic animals. This paper focuses on aquatic animals. It is aimed at evaluating the global situation regarding disease reporting and discussing the potential gaps in diagnostic capabilities in the different OIE regions. The paper is based on information presented during the 85th OIE General Session in May 2017, compiled from the World Animal Health Information System (WAHIS). It starts with a description of the current submission of six-monthly reports for aquatic animal diseases by OIE Member Countries, followed by an analysis of the information they provide and the reported capacity of the National Reference Laboratories.

Submission of six-monthly reports by OIE Member Countries

As of 10 May 2017, 67% (121/180) of Member Countries had submitted their six monthly report on aquatic animal diseases for the first semester of 2016 and 57% (102/180) had submitted their report for the second semester. These percentages were much lower than those for terrestrial animal diseases, as terrestrial animal disease reporting stood at 93% for the first semester and 75% for the second. Similar differences in report submission rates between aquatic and terrestrial animals were also seen in the four previous years, showing that, despite all efforts made by the OIE to increase report submission for aquatic animals, the situation has remained the same.

To better understand the factors influencing the notification of aquatic animal diseases, the submission of six-monthly reports by Member Countries as of 10 May 2017 was plotted against their 2015 aquaculture production in tonnes, as



reported by the 2015 statistics of FAO Global Aquaculture Production[1]. The median production of Member Countries that had not submitted information (991 tonnes) was significantly lower than that of Member Countries that had submitted information (10,020 tonnes), according to the Wilcoxon rank sum test ($p < 0.001$), suggesting that Member Countries providing information are mainly the ones with higher levels of aquaculture production.

1. www.fao.org/figis/servlet/TabLandArea?tb_ds=Aquaculture&tb_mode=TABLE&tb_act=SELECT&tb_grp=COUNTRY&lang=en

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The percentage of Member Countries that had submitted information to the OIE for 2016 was also broken down by OIE region. Europe had the highest percentage (92%), followed by the Americas (80%). In Asia, the Far East and Oceania and in the Middle East, more than half of the Member Countries provided information on aquatic animal diseases (61% and 60%, respectively). Finally, the region with the least information submitted was Africa, where only 44% of the Member Countries in the region submitted reports.

Information provided within reports

Having discussed submission patterns, the next step of the analysis was to describe the

information contained within these reports. Indeed, some countries might submit six-monthly reports to the OIE on a regular basis, but with very little information contained in them. Out of the 121 Member Countries having submitted six-monthly reports for aquatic animal diseases for 2016, 93% provided information for fish, 92% for crustaceans, 80% for molluscs and 72% for amphibians.

The quality of information also varied among countries. At the global level, during the period of analysis, only a few countries reported diseases present, either in aquaculture or wild harvest fisheries. Many countries that submitted reports reported all diseases absent. In some regions, under-reporting is likely, and reporting the presence of disease is considered as a clear indicator of a country's capacity to perform adequate surveillance.

To evaluate disease presence and detection at the country level, the distribution of OIE-listed diseases of aquatic animals in 2016 and early 2017 is presented in the four maps in Figure 1. Significant information gaps were observed, particularly in Asia and Africa.

In the Americas; Asia, the Far East and Oceania; and Europe; more than half of the Member Countries reported at least one disease present (respectively: 67%, 59% and 54%). In Africa, this percentage was lower (42%), while, in the Middle East, only 8% reported the presence of any aquatic OIE-listed diseases.

These results should be considered in the context of production levels, as well as the distribution of OIE-listed diseases. According to the 2015 statistics of FAO Global Aquaculture Production, the countries with the highest aquaculture production are mainly in Asia, a region with a relatively high percentage of Members reporting diseases present. However, these results might also be interpreted as revealing a lack of diagnostic capabilities among countries in some regions, especially in those Member Countries with low aquaculture production tonnages.

During the period of 2016 and early 2017 (as of 10 May), aquatic animal diseases were reported via immediate notification by 13 countries. Sixteen immediate notifications were submitted for fish diseases, three for mollusc diseases and two for crustacean diseases. No exceptional events relating to amphibian diseases were reported. Three countries submitted immediate notifications for the first occurrence of diseases in their country: Croatia reported the first occurrence of koi herpesvirus disease in June 2016, and infection with *Bonamia exitiosa* in July 2016. Kenya reported the first occurrence of infectious haematopoietic necrosis in July 2016 (due to the importation of infected eggs). In August 2016, Zimbabwe reported the first occurrence of epizootic ulcerative syndrome, which highlighted the recent spread of the disease in the African continent in wild fish.

National Reference Laboratories' capacities

To identify potential gaps in national diagnostic capabilities for aquatic animal diseases, information on National Reference

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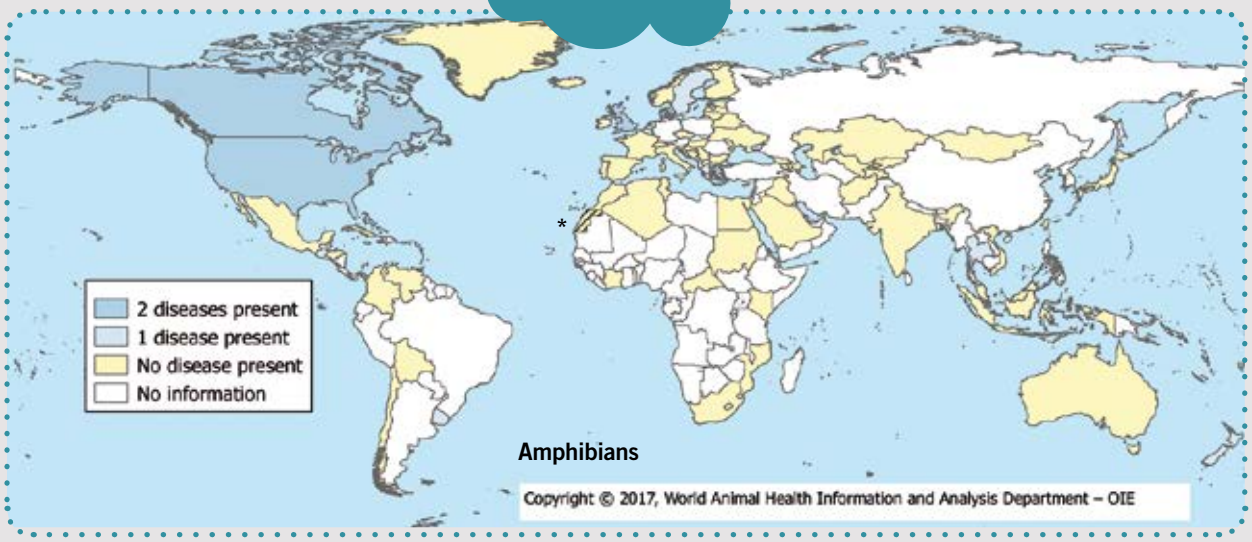
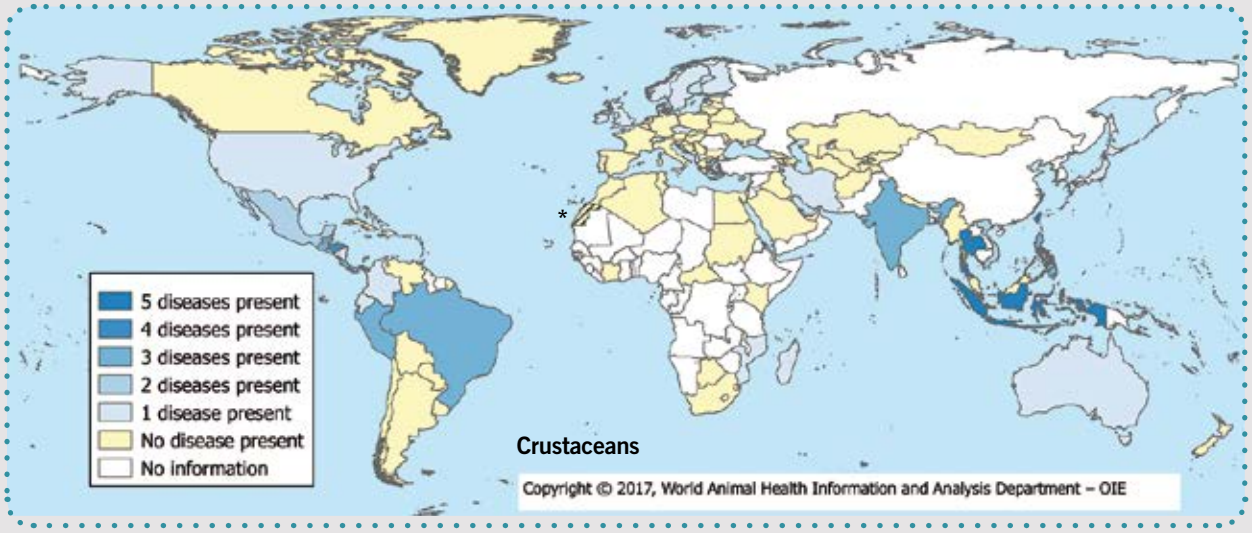




* Data provided by Morocco

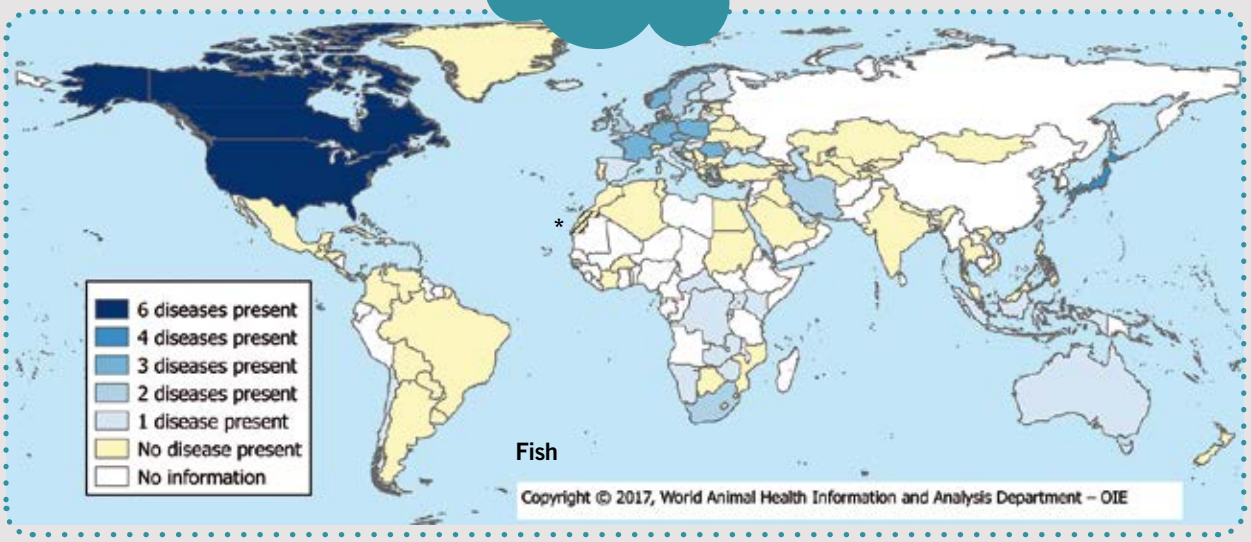
Fig. 1

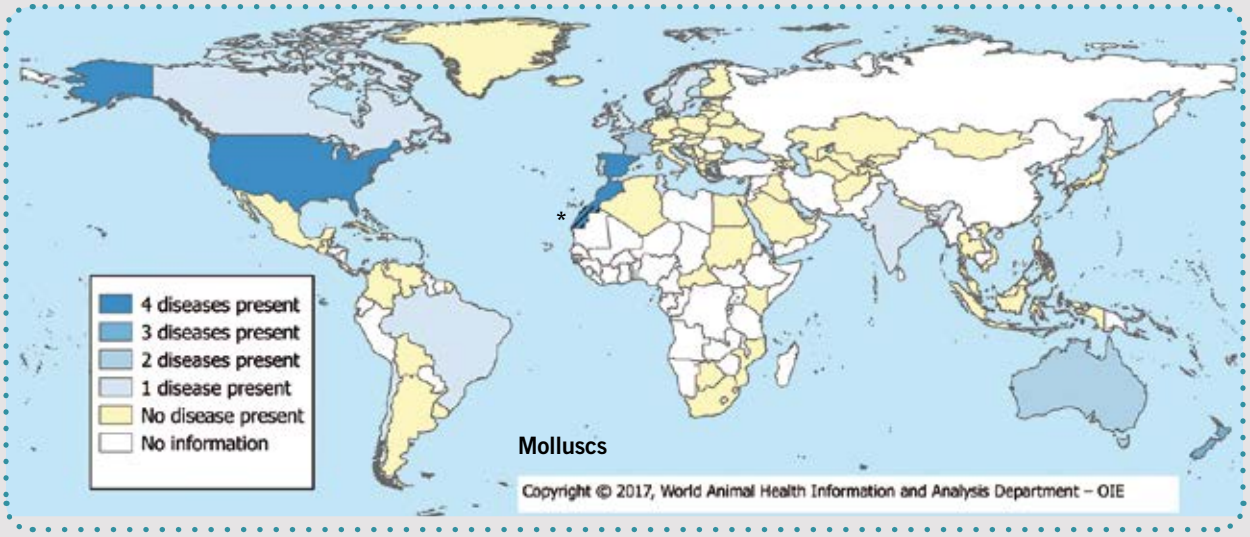
Reported distribution of OIE-listed aquatic animal diseases in 2016 and early 2017

(data based on reports received up to 10 May 2017)

Laboratory capacities indicated in Member Countries' latest annual reports was analysed and the results broken down by OIE region. The highest percentages of Member Countries that reported diagnostic capabilities for aquatic animal diseases were observed in the Americas (62%) and Europe (61%). Fewer than half the Member Countries in other regions reported diagnostic capacities. In particular, the percentages were very low for the Middle East (16%) and Africa (9%), two regions with relatively low rates of report submission and disease detection. Conversely, for Asia, the Far East and Oceania, which is also a region with relatively low submission rates, diagnostic capabilities were reported by 42% of Member Countries. Capacities within this region differed widely, however, with countries in Oceania and some in Asia and the Far East reporting strong capacities for aquatic animal diseases, and others in Asia and the Far East not reporting any capacity through their annual reports.

These percentages may be underestimated, as Focal Points for Animal Disease Notification to the OIE are not always aware of changes in National Reference Laboratories, and Focal



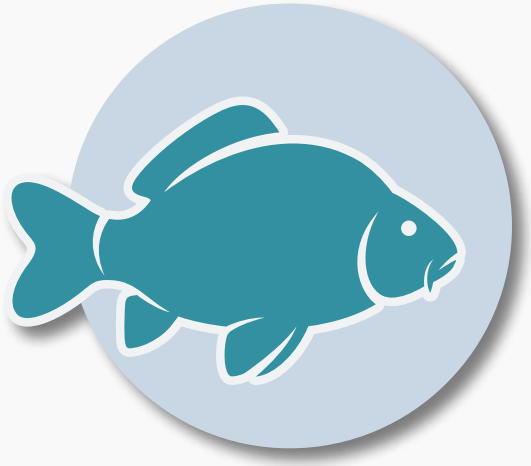


Points for Veterinary Laboratories are rarely involved in completing WAHIS annual reports. The OIE is exploring how to address these issues in the next version of WAHIS, by simplifying the completion and updating of information on National Reference Laboratories. Furthermore, the OIE is seeking to increase the involvement of Focal Points for Veterinary Laboratories in updating information on National Reference Laboratories each year through the annual reports, as emphasised in the recent training sessions.

OIE Reference Laboratories are intended to provide scientific and technical assistance to Member Countries, especially those lacking the relevant capacities. OIE Reference Laboratories for OIE-listed aquatic animal diseases are currently present in 14 Member Countries throughout the world, but none is situated in either of the regions most in need, namely Africa and the Middle East.

The last part of the analysis was aimed at evaluating the use that Member Countries make of OIE Reference Laboratories for the diagnosis of OIE-listed aquatic animal diseases. Between 1 January 2005 and 10 May 2017, 151 exceptional epidemiological events were reported for OIE-listed aquatic animal diseases. For 142 of these events, laboratory diagnostic results were provided. This information

was analysed in order to assess the use made of National Reference Laboratories, private laboratories, OIE Reference Laboratories or National Reference Laboratories of other countries for confirmation of aquatic animal disease events during this period.



For most events, confirmation was based on National Reference Laboratory diagnostic techniques only (77% of events). For 12% of events, confirmation was based on OIE Reference Laboratory diagnosis only. Private laboratories and National Reference Laboratories of other countries were used less frequently to confirm exceptional events, before the submission of immediate notifications to the OIE. These results highlight the importance of capacity-building within countries, and of the network of OIE Reference Laboratories. This is consistent with OIE Reference Laboratories' annual reports, which show that 50% provided international support for the diagnosis of aquatic animal diseases in 2016.

Conclusion

This paper shows that, despite the importance of aquatic animal diseases, the level of global reporting is much lower than for terrestrial animal diseases, and that, unfortunately, this has been a stable trend for the past five years. Reporting on aquatic animal diseases is an obligation for all Member Countries, not only those with high aquaculture production, as these reports encompass diseases in both aquaculture and wild harvest fisheries.

The geographical disparities of information highlighted in this paper can be partially explained by the lack of diagnostic capabilities in certain regions. The OIE provides the following mechanisms to address these gaps:

a) support from OIE Reference Laboratories in case of specific need, and

b) twinning programmes involving an OIE Reference Laboratory and a National Reference Laboratory.

The OIE also helps its Member Countries to fulfil their obligations for the notification of aquatic animal diseases by encouraging the nomination of National Focal Points for Aquatic Animals, giving them access to WAHIS, providing regular dedicated training, and through the e-learning platform on WAHIS launched in 2017. Members are encouraged to take advantage of the support provided by the OIE to ensure transparent and timely notifications, which are crucial for avoiding disease spread.

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E-learning platform on WAHIS for training OIE Focal Points

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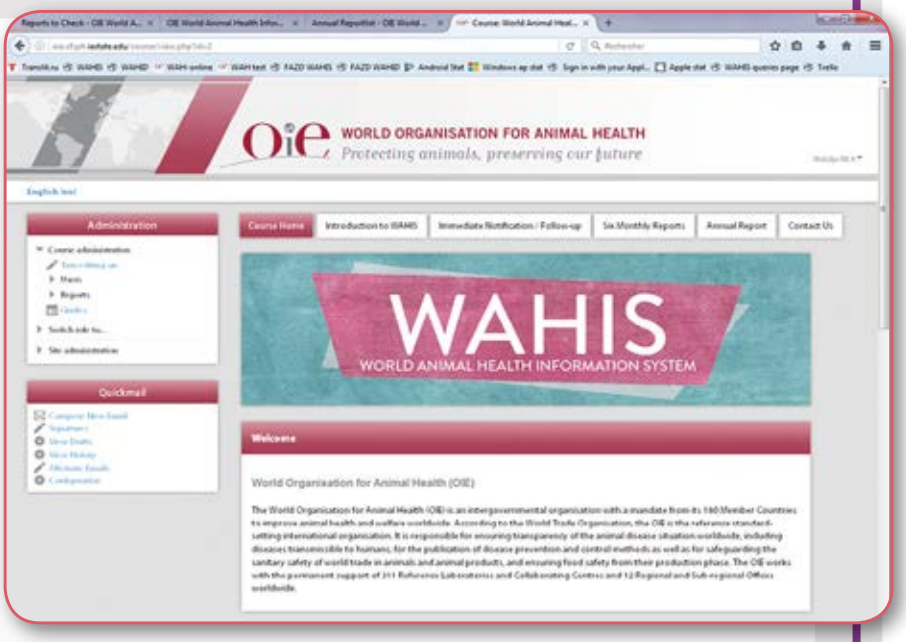

The OIE, in partnership with Iowa State University in the United States, has designed and developed an English-language online training platform for the World Animal Health Information System (WAHIS). The platform was made available to OIE Members, and in particular to National Focal Points, mid-way through 2017.

The main objective of the platform is to provide National Focal Points with easy and rapid access to continuously updated WAHIS training material. More generally, the platform will help to improve the notification of animal diseases to the OIE and the knowledge levels of National Focal Points before they attend worldwide or regional in-person training sessions.

The platform enables new Focal Points to access training materials as often and in as much depth as necessary, and on a continuous basis. More experienced Focal Points will be able to refer to the platform in case of any doubts when sending animal health reports to the OIE. The platform guides users step-by-step through completion of the various reports, both for the early warning system (immediate notification and follow-up reports) and the follow-up system (half-yearly and annual reports). The suggested material includes theoretical training as well as hands-on, practical examples.

In the module on immediate notifications, users learn – among other things – how to identify situations that require immediate notifications to be sent, consistent with the *Terrestrial Animal Health Code* and the *Aquatic Animal Health Code*, and how to complete and send these notifications correctly.

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In the module on half-yearly reports, they learn the standardised way to correctly complete the frequency codes of animal diseases, the measures for preventing and controlling diseases, and quantitative data (for example, on the number of outbreaks and cases). Lastly, in the module on annual reports, users learn how to fill in the required information on zoonoses among humans, as well as animal population data, figures on veterinarians and veterinary para-professionals, and information on national reference laboratories and the national production of vaccines against animal diseases.

All the training material was produced by the team at the OIE World Animal Health Information and Analysis Department. The team at Iowa State University was responsible for uploading the content on line, accompanied by advice on the structure of the platform and educational formats conducive to online learning. The result is an interactive platform, involving numerous quizzes that users can complete to test their knowledge as they move ahead with the course. In addition, certificates are awarded to users who have completed the various modules and passed the corresponding tests.

Launched in English, the material on the platform is currently being translated into the two other official languages of the OIE, French and Spanish, and will thus eventually be available in three languages.

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E-learning platform on WAHIS:
http://oie.cfsph.iastate.edu/login/index.php

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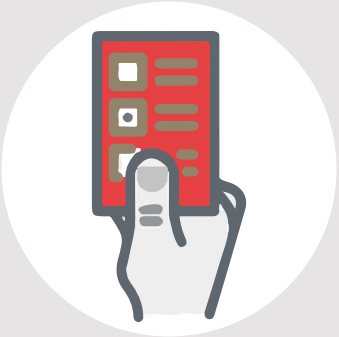

Results of the survey: 'Building the new WAHIS+ together'

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In April 2017, an online survey was carried out: 'Building the new WAHIS+ together'. It received 739 responses from stakeholders in 143 countries and territories (Fig. 1). The questionnaire was designed to gain a greater understanding of the wide range of WAHIS stakeholders, to identify current problems in using the system and determine future needs when designing WAHIS+. The majority of respondents came from the public sector (53%), followed by those working in academic or research institutes (18%), and in the private sector (13%) (Fig. 2).

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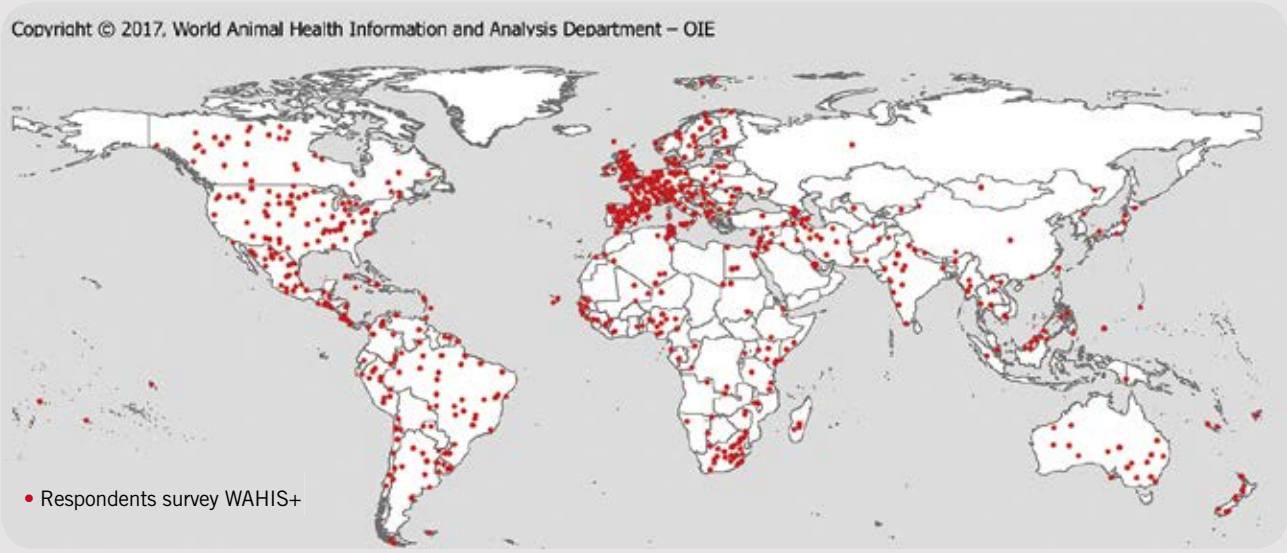

Fig. 1

One-to-one dot density map illustrating the number of respondents per country (within a country dots are randomly distributed)

Use of WAHIS data

A variety of data are available in WAHIS. However, if we can better understand the ways in which these data are used and the frequency with which they are accessed, we can improve the interface for all users and purposes.

The majority of respondents (86%) used WAHIS data to evaluate the world animal health situation and display the distribution of animal diseases on maps (68%). Nearly half of these respondents used WAHIS data to perform risk assessment and data analysis, and 23% used data for commercial or trade purposes. Approximately 25% of respondents used WAHIS data for research or to assess the capacity of Veterinary Services.

Of all the data available in WAHIS, data on exceptional events were the most frequently accessed, with 33% of respondents consulting this information at least once per week. Around 70% of respondents used the global distribution of diseases (a list of countries or maps), and more than 80% consulted the prevalence of diseases within countries through time (disease timelines) at least a few times per year. Similarly, 70% of respondents used the quantitative information for OIE-listed diseases at least a few times per year. Up to

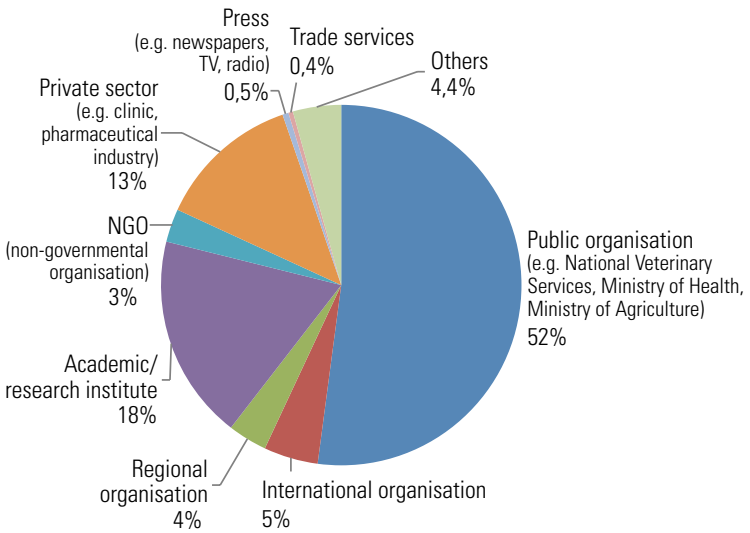

Fig. 2

Percentage of respondents representing various organisations

Wahis+

30% of respondents used data about Veterinary Services and laboratory capabilities, animal population censuses, and zoonotic diseases in humans a few times per year.

Quality of WAHIS user experience

To identify the limitations of the current system and avoid these problems in the future, we asked questions about the user's experience in accessing WAHIS data. More than 75% of stakeholders who used information on exceptional events and outbreaks, disease distribution and outbreak maps were able to access the data with 'ease' or with 'no major difficulties'. Information on animal populations, zoonotic diseases, laboratory capabilities and vaccines (the annual report) was useful for nearly 63% of respondents. Similarly, 62% indicated that they can easily find this information in WAHIS.

On the other end of the spectrum, of those stakeholders who used quantitative information for OIE-listed diseases, 35% said that accessing the data could be 'very challenging'. Similarly, finding the control measures that had been applied was problematic for 30% of users. The most commonly reported problem when accessing WAHIS data was trying to navigate the interface, noted by 43% of respondents. Some 27% of respondents said that they were limited by the inability to download data from WAHIS and 21% had difficulty finding the relevant data. The other significant barrier was the slow response time of the interface, reported by 25% of respondents.

Additional tools

Up to 42% of respondents did not use the WAHIS-Wild Interface, while 43% considered it difficult to find information on this interface.

The *World Animal Health* tool (WAH) was used by 46% of respondents and 62% said that searching information using this tool was not challenging. Only 37% of respondents used WAHIS Alerts and, of these, 77% said that they could readily find the desired information on this smartphone application.

Features of the future WAHIS+

In a survey conducted in 2016, 'WAHIS Evaluation, 10 years after launching' (see p. 24), seven new features that would enhance disease notification through WAHIS+ were identified by internal users, including Delegates, Chief Veterinary Officers, and Focal Points from 167 countries. Based on the responses from these internal users, we asked the stakeholders to prioritise these seven features in order of usefulness (Fig. 3).

The highest priorities were:

- the ability to extract data from WAHIS (70%)
- interactive mapping (67%)
- the graphic visualisation of outbreak progression (64%).

The next highest priorities included:

- online tools for data manipulation (58%)
- a tool to compare the animal health situation between countries (47%)
- interoperability with national and regional databases (46%)
- interoperability with other data sources (35%).

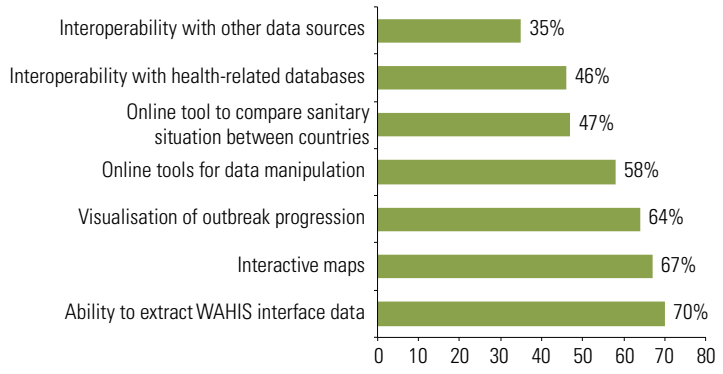

Fig. 3

Most important features that should be included in WAHIS+, according to stakeholders

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Open questions

A total of 235 comments and suggestions on the development of WAHIS+ were provided by 170 respondents. These suggestions highlighted the importance of developing a tool to enable data downloads from WAHIS+, so that researchers and others could easily access information and integrate data from multiple sources for analysis and problem-solving. Improvements in mapping (interactive maps that can be updated automatically) were also identified as a high priority.

Lastly, respondents were asked to describe any other functions they would like to see in WAHIS+. Most agreed that the features described were the highest priority, though others noted that it would be useful if individual countries had the ability to use WAHIS modules as a national animal health database,

Conclusion

The majority of respondents used WAHIS data to evaluate the world animal health situation, view the distribution of diseases on maps, and perform risk assessments. As expected, significant disease outbreaks, as reported through immediate notifications, were accessed most frequently by users. Other types of data, such as the global distribution of disease, the occurrence of disease within particular countries through time, and quantitative information on OIE-listed diseases within particular countries, were accessed at least a few times per year by the majority of respondents. Data regarding immediate notifications were readily accessed by the majority of respondents. However, navigating the interface to find other types of data, particularly quantitative information about OIE-listed diseases within individual countries, could be challenging.

Based on these results, and those of the previous survey, **the highest priority** for WAHIS+ is a user-friendly interface to facilitate finding and downloading data in various formats, as selected by the user, for use in a broad spectrum of analytic programs. **Secondly**, interactive maps that allow the dynamic display of information are also a high priority. **Third**, tools should be developed to allow the user to carry out common analyses, such as epidemic curves, more swiftly, to make the evolution of outbreaks easier to understand, particularly for disease control purposes. **Fourth**, a module should be developed for countries to use as an animal health database to facilitate the collection and reporting of information, as well as giving users the ability to easily upload data to WAHIS from existing national databases.

We greatly appreciate the time and effort spent by respondents on completing the survey.

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Summary results of suggested functionalities in the survey: 'WAHIS evaluation, 10 years after launching'

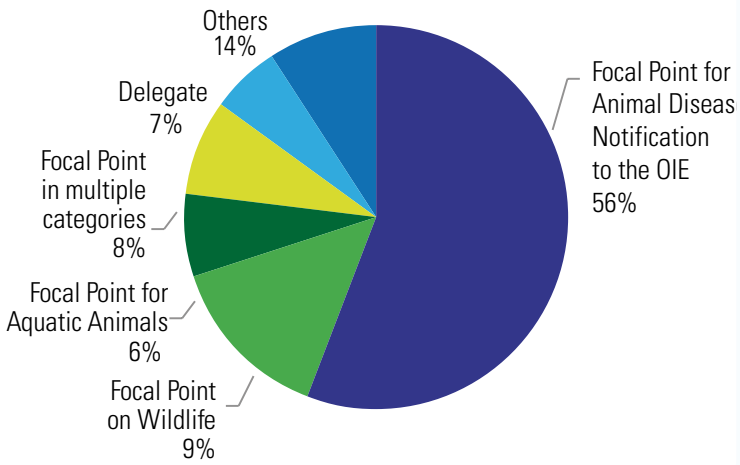
Between December 2015 and March 2016, a survey – 'WAHIS Evaluation, 10 years after launching' – was conducted to gather information from WAHIS users (Delegates and Focal Points) on their level of satisfaction with the system, the main challenges experienced during the disease notification process, and suggestions to improve this process and the WAHIS system as a whole. The survey also measured the level of satisfaction with the support provided by the World Animal Health Information and Analysis Department (WAHIAD) staff to countries who were using the system.
A total of 206 WAHIS users from 152 countries responded to the survey. The responses were analysed by WAHIAD so that WAHIS could be upgraded.
Based on their experiences and challenges, the users suggested several improvements for the future **WAHIS+**. This report presents an analysis of the general results and the specific improvements or new functions requested.

First section: data entry

This section defines the profiles of people who enter data for the various WAHIS reports and the experiences and challenges that they encounter. The graphic shows the percentage of respondents by their position (Focal Points or Delegates).

In 56% of cases, National Focal Points for Animal Disease Notification to the OIE were responsible for entering data in WAHIS. They were supported by other officials, since half of the respondents who have received WAHIS training have also trained other officials within their country.

In terms of their training and experience using WAHIS, 75% of respondents had attended at least one training session. Just over 50% of the respondents had four years' experience or more of using WAHIS, while 6.8% had no experience. Based on the high level of user experience, the results of this survey should prove reliable.



The Delegate is responsible for establishing credentials for their Focal Points, so that they too can access WAHIS. However, only 56% of respondents used their own passwords.

Fifty-eight percent of respondents agreed that improvements should be made to facilitate access to WAHIS, including the process of obtaining usernames and passwords for the

various National Focal Points. This would also have a positive impact on the timely submission of reports.

Did you know that 35% of Focal Points use the Delegate's password to access WAHIS?

From the open-ended questions about **data entry**, the respondents indicated a number of functions that they require, including:

a) the ability to enter data from active surveillance (number of samples, animals recovered) in six-monthly reports (SMR). These data are commonly requested for trade purposes to conduct risk analyses;

b) the ability to include more accurate quantitative data in the SMR when reporting outbreaks, such as the number of different species of birds, ruminants and aquatic animals susceptible, affected or destroyed during events;

c) 67% of respondents indicated that data processing times should be improved. Possible solutions included templates or modules that can be downloaded to work on off-line (for countries with poor Internet connectivity); the option to load the data onto a single page, which can be saved on the local drive, then submitted when ready;

d) the ability to add free text to include more epidemiological information related to risk factors (i.e. environmental conditions and data on farming systems) in the SMR;

e) taking into account the fact that outbreaks influence trade, the ability to send an 'alert' to Delegates when disease eradication is achieved after an outbreak;

f) the ability to include in the Annual Report (AR) data on animal production, including susceptible populations and animal imports and exports;

g) the provision of links to the Terrestrial/*Aquatic Animal Health Code*s so that each disease has a link to the relevant *Code* chapter.

Regarding the process of data collection by Veterinary Services, in 66% of cases, administrative divisions within a country send data to their Central Veterinary Services, which then aggregate and verify the data. Fewer than 10% of respondents enter data directly via on-line national databases from local veterinary units. However, 15% of respondents use both methods. In this area, the main improvements requested were:

a) **to enhance the compatibility between national or regional databases and WAHIS**, to reduce repetitive data entry and enhance the speed of data submission (59%);

b) **to facilitate the upload of quantitative data, using more user-friendly databases**, such as Excel or Access, and develop new tools to make reporting easier, while also providing more training in the use of the current tools in WAHIS;

c) **the period of user inactivity on the system before automatic log-out was considered too short** by 15% of respondents.

The tools introduced in 2012 to facilitate data entry for large data sets have made little impact on facilitating reporting, since few respondents use these tools. Six percent of respondents used CSV files, and 9% used the cluster option for Follow-Up Reports (FUR). Importantly, only 21% of respondents said that they had IT support, so the future **WAHIS+** must take this into consideration.

Second section: fundamental reporting features in WAHIS

The aim of this section was to assess the level of satisfaction with the amount and type of data reported through WAHIS; its usefulness and relevance for trade and in establishing national animal health policies. Seventy percent of respondents were satisfied with the data included in Immediate Notifications (IN), FUR, SMR and AR. For annual reports on aquatic and wild animals, fewer than 56% of respondents were satisfied, and 26% had no opinion.

Did you know that every year the Notification Procedures are reviewed and updated according to users' needs and to harmonise these procedures with the information from the *Animal Health Codes*?

The main points noted in open-ended questions for this section were as follows.

a) Many of the non-listed diseases in *WAHIS-Wild* are listed as a Genus or Family rather than a specific pathogen. Having to summarise groups of pathogens into a single code makes accurate reporting difficult.

b) Respondents requested more clarification for definitions in the *Codes* and in WAHIS (10%). It was suggested that definitions be broadened to improve understanding. In addition, the prevention and control measures defined in WAHIS are, at times, incompatible with national definitions.

c) To avoid confusion with abbreviations, symbols and codes, a pop-up window with definitions and explanations should be available on every page when completing the reports.

Third section: display of information on WAHIS interface

The aim of this section was to assess the level of user satisfaction with how data are published in WAHIS. Sixty-one percent of respondents indicated that they were satisfied with the information display in WAHIS, while 6% indicated that the layout of the data was inadequate. When responding to specific points, such as ease of finding information, completeness of displayed information, ease of interpretation, and data query and extraction, the main suggestions included the following:

a) the development of a **user-friendly extraction tool** to carry out customisable data queries, data-mining and to create **dynamic maps** on the WAHIS interface, including information on ***Official Disease Status*** (62%);

b) 48% of respondents indicated that the information displayed on the WAHIS Interface was incomplete. The ability to **display additional information** was wanted by 40% of respondents;

c) the need to **simplify the WAHIS interface** to make it easier to interpret data (53%);

d) **improve mapping tools** to create dynamic maps, to follow disease outbreaks over time;

e) the ability to query all types of WAHIS data, such as mapping features and the automatic display of data by administrative division dealing with a disease within a country;

f) the function to compare the animal health situation between two countries (exporting and importing) should be restored.

Fourth section: evaluation of the World Animal Health Information and Analysis Department (WAHIAD) staff

Different categories of WAHIS users expressed different needs. As envisioned in the OIE Sixth Strategic Plan, this feedback has been taken into account to upgrade WAHIS, with the goal of improving the animal disease information available through this system.

The objective of this section was to evaluate the level of satisfaction with the support offered for WAHIS by the OIE to Member Countries. The main results are summarised below.

a) More than 80% of respondents were satisfied with the knowledge and courtesy of OIE support staff (the WAHIAD team). Similarly, approximately 80% of respondents expressed satisfaction with the level of understanding from WAHIAD regarding the difficulties encountered by WAHIS users and the ability to resolve problems.

b) 88% of respondents considered that the feedback from WAHIAD was adequate and useful in improving the quality of their reports.

c) More training opportunities, meetings, teleconferences and forums between Focal Points and the WAHIAD team were requested.

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Wahis+

The use of WAHIS data in preparing Crisis Management Centre for Animal Health (CMC-AH) missions

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Keywords
Animal health information – Crisis Management Centre for Animal Health (CMC-AH) – Food and Agriculture Organization of the United Nations (FAO) – Global Early Warning System (GLEWS) – planning – preparedness – rapid response – World Animal Health Information System (WAHIS) – World Organisation for Animal Health (OIE).

Background

The OIE's primary mandate is to support the improvement of animal health and welfare and veterinary public health worldwide. Much of this is achieved through the development of international standards; assessing gaps to deal with health threats more effectively through the OIE Performance of Veterinary Services (PVS) Pathway; and making the best possible use of the scientific expertise in the OIE's global network for advice on animal welfare and the control and prevention of diseases. Also central to the OIE's mandate is the transmission of information related to animal health and disease outbreaks in OIE Member Countries. This has been a core tenet of the OIE since its establishment in 1924.

Specifically, OIE Member Countries have a legal obligation to report their animal disease situations in a timely and transparent manner. In addition, several territories and non-Member Countries report their animal disease situations on a voluntary basis, which makes the information collected by the OIE extensive.

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The type of data gathered and the means by which it is collected and transmitted has evolved significantly over time, with changes to the *Terrestrial* and *Aquatic Animal Health Codes* and, of course, with technology. There are still shelves at the OIE Headquarters lined with leather-bound books dating back to the 1920s, containing annual reports on animal health situations. Today, data are collected through a Web interface; from 1996 to 2004 they were compiled through the 'Handistatus II' system, while since 2005 they have been gathered through the *World Animal Health* Information System (WAHIS). All information collected through WAHIS is publicly available on line.

The range of available information includes:

a) immediate notifications and follow-up reports submitted by countries and territories for exceptional epidemiological events

b) six-monthly reports on the presence/absence of all OIE-listed diseases in countries and territories

c) annual reports providing information on animal populations, veterinarians and veterinary para-professionals, zoonotic diseases in humans, national reference laboratory capacity and national vaccine production, as well as

d) optional annual reports on the presence/absence of non-OIE listed diseases among wildlife in countries and territories.

WAHIS captures official information, which guarantees the reliability of the outbreak data reported through this system. In addition, all information goes through a verification process before validation and publication. This includes checking that the qualitative and quantitative data are consistent with previously reported information, with what is known from the regional and global context, and with any non-official information circulating. In case there is need for clarification, the OIE also communicates with the appropriate official national authorities. This process, which involves institutions with high levels of expertise, such as the OIE Reference Centres, ensures the quality of the information published.

In this way, WAHIS has become an essential tool supporting many OIE activities, not only for assessments such as the PVS Pathway, but also for other activities developed in partnership with other organisations.

For example, in preparing for missions launched by the Crisis Management Centre for Animal Health (CMC-AH), reliable animal health information sources are invaluable.

The CMC-AH is the FAO and OIE's platform for emergency preparedness and rapid response to animal disease emergencies. The CMC-AH is a joint branch of the FAO's Animal Production and Health and its Emergency and Rehabilitation Divisions. Established in partnership with the OIE in October 2006, the CMC-AH sends emergency preparedness and response missions to countries, to the field, to help assess epidemiological situations, diagnose outbreaks of animal disease, and set up immediate measures to prevent or stop disease spread [1].

In addition, the CMC-AH works closely with the Global

Early Warning System (GLEWS) [1, 2] and the FAO Emergency Prevention System (EMPRES) [1, 3] to continuously track and analyse the animal disease situation worldwide. It operates in constant collaboration with the OIE and World Health Organization (WHO) to complement FAO's technical expertise at every step of the response. The CMC-AH monitors animal health emergencies and anticipates responses using intelligence from GLEWS. The Centre continually plans for deployment and works with partners across the world to rapidly mobilise teams of experts [1].

The information provided by WAHIS is often referred to, in order to get an understanding of the current and past animal health situation in a particular country.

CMC-AH Preparedness and Emergency Missions deployed between 2015 and 2017

To date, 88 missions in 49 countries have been deployed under the CMC-AH mechanism since it was established. Approximately 46% of these missions were launched to address highly pathogenic avian influenza (HPAI), 20% for other zoonoses, and 34% for transboundary animal diseases (TADs). In Table I, CMC-AH missions are presented for the 2015–2017 period.

Table I

Number of CMC-AH emergency preparedness and response missions deployed during the period 2015–2017, by region and animal disease

Region	Year			CMC-AH missions	Disease
	2015	2016	2017		
East Asia		1	1	2	Peste des petits ruminants
Eastern Europe		1		1	Peste des petits ruminants
Middle East	2			2	Highly pathogenic avian influenza
Southern Africa	1			1	Foot and mouth disease
West Africa	6	4		10	Highly pathogenic avian influenza, anthrax and Rift Valley fever
Total	**9**	**6**	**1**	**16**	

Source: FAO CMC-AH and OIE Programmes Department Liaison Officer for the CMC-AH (2017)

Planning CMC-AH missions

CMC-AH missions are undertaken using a standard operating framework that includes the following steps:

1. analysis of the country mission request and decision process
2. mission preparation phase
3. deployment phase, including:
   a. active mission
   b. in-country activities
   c. supporting activities at Headquarters
4. post-mission phase, including:
   a. a debriefing to CMC-AH management
   b. mission reports
   c. support for recovery.

Points 1 and 2 on the list above are the major components of the planning process of a mission. It is at this stage that the animal health and Veterinary Services information held by WAHIS becomes crucial in assessing the possible spread of infection, the magnitude of the consequences, the supporting expertise needed, and other relevant technical and logistical considerations.

For this reason, it is important not only to gather relevant information about the particular animal disease for which a country has requested international support, but also to look at general background information on the capacity of the Veterinary Services involved and the animal populations.

WAHIS can provide overall background knowledge on the Veterinary Services and animal health situation in the country where a CMC-AH mission is going to be deployed. In particular, mission planners can view recent reports of any exceptional disease events that might be occurring or have recently occurred in the selected country, region or group of selected countries. In addition, they can access the six-monthly reports on the animal health situation by country for all

Wahis+

OIE-listed diseases, indicating whether any of these diseases have been reported as being present or absent from the country in question.

Although the information on Veterinary Services is not always complete, it provides invaluable preliminary information to the mission planners about:

- the numbers of veterinary and animal health personnel for the specified country
- animal populations, with figures and density maps
- the key reference laboratories responsible for disease diagnosis in each reporting country, as well as a list of tests that those laboratories are able to perform
- vaccine production and number of vaccine doses produced, as well as the number of doses exported by country, and vaccination information on those diseases for which vaccines are available and, finally,
- OIE-listed and other selected zoonotic diseases in humans, to provide a general overview of zoonotic diseases.

Information about a particular disease for which a CMC-AH mission is requested

Although the CMC-AH relies on information from a variety of sources, for a given disease event, mission organisers and experts can find data in WAHIS on: the populations involved in animal disease outbreaks, the numbers of affected animals, control measures taken, complementary epidemiological information, diagnostics, etc. Moreover, WAHIS provides a readily understandable perspective of the situation, as it differentiates stable disease situations from exceptional epidemiological events.

For the CMC-AH planning phase, dependable and consistent animal health information is vital. WAHIS provides this, and so is a pivotal source of intelligence.

Information for experts and mission team members

Once the decision is taken to deploy a CMC-AH mission, the information available in WAHIS may also be used by experts on the mission teams to further explore the data in order to prepare their own background information. Members of these mission teams are usually epidemiologists, laboratory and disease experts as well as experts in risk communication and disease control, so having standardised information that is easily accessible from anywhere there is an Internet connection provides important support to those making assessments and drawing conclusions in the field.

Acknowledgement

The authors would like to thank Ms Natalja Lambergeon, of the OIE World Animal Health Information and Analysis Department, for her valuable contribution regarding specific information for WAHIS+.

Conclusion

In 2016, the OIE began the process of upgrading WAHIS. This project aims to deliver WAHIS+, a new system designed to improve the transparency of animal health in an innovative and effective way for the benefit of the global community. A more dynamic and intuitive system with new features and powerful digital technologies will support users. Genomic data linked to epidemiological information will strengthen disease traceability and help to formulate an appropriate response. In addition, integration with other databases and platforms for enriched risk assessment will make WAHIS+ a reliable, real-time source of knowledge, paving the way for future policy and decision-making. With this project, the OIE continues to evolve as it seeks to address its primary objectives more efficiently. The new version of WAHIS is expected to be launched in April 2019. This is a foundation stage, comprising mainly developments in the functional core business of the WAHIS+ platform, and introducing new features with added value in terms of business, processes and technical levels.

Stage 2, which will continue to deliver new features, integrated into the main core business, and Stage 3 (focusing primarily on data migration) should be completed by the end of April 2020.

The use of WAHIS for the planning and deployment phases of CMC-AH missions has offered valuable insights into the animal health situation in-country. Furthermore, combining WAHIS data with other information mechanisms, such as GLEWS, enhances both epidemiological assessments and the formulation of advice on measures for preventing or controlling the spread of disease.

Countries who contribute reports and notifications to WAHIS, or who make supportive investments in the system, are supporting other countries in their disease control efforts through the use of the information available. Member Countries who ensure that they report and share information on their respective animal health situations in a timely manner enable rapid and effective international responses and thus help to curtail the further spread of disease.

http://dx.doi.org/10.20506/bull.2017.2.2642

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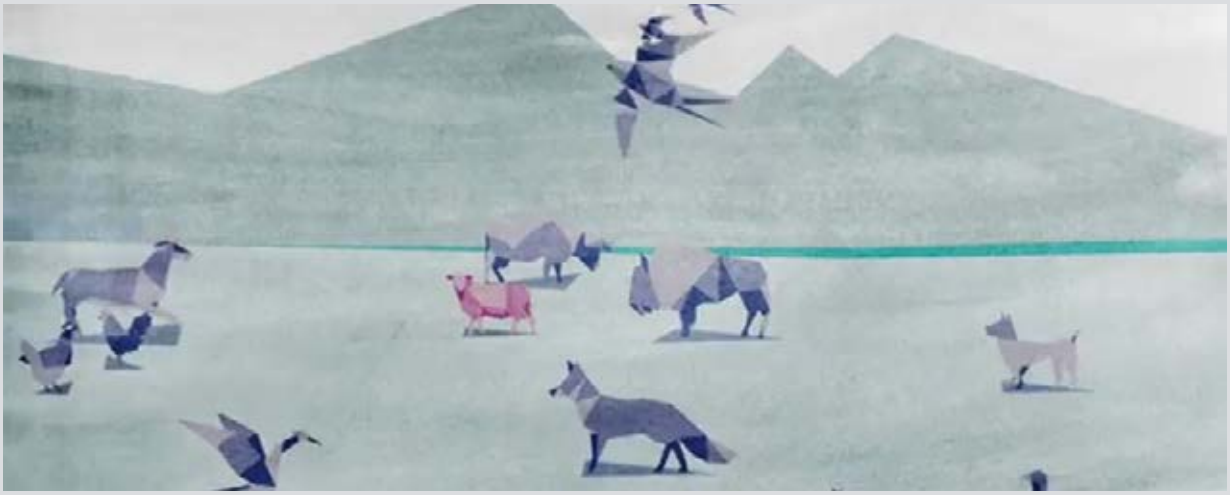
The Crisis Management Centre – Animal Health (CMC-AH):
www.oie.int/en/our-scientific-expertise/cmc-ah-the-crisis-management-centre-animal-health/

Wahis+

WAHIS Portal: Animal Health Data



The WAHIS Portal: Animal Health Data brings together all the online animal health information available at the OIE from 1992 to date. The vast majority of the information available on the portal comes from WAHIS.

The animal health data available on the portal are as follows:

- **List of real-time disease alerts**: significant epidemiological events notified through immediate notifications and follow-up reports in WAHIS are published on receipt.
- **WAHIS interface**: provides access to a comprehensive range of information available from 2005 onwards relating to immediate notifications and follow-up reports; six-monthly reports on the status of OIE-listed diseases in each country/territory (diseases absent or present) and annual reports providing health information and information on veterinary staff, laboratories, vaccines, etc.
- **Handistatus II**: provides all data collected by the OIE between 1996 and 2004.
- **Archives**: provides access to weekly animal disease reports dating from 1992 to 2006 in PDF format.
- ***World Animal Health***: a synthesis of animal health information from OIE Members and non-OIE Member Countries. This tool is formatted to facilitate the extraction of large amounts of data (in Excel format).
- ***WAHIS-Wild* interface**: a tool presenting information on the 53 wildlife diseases that are not included in the OIE list and are reported to the OIE on a voluntary basis.
- **Subscription form to receive alerts**: by clicking on this link, subscribers are included in the OIE-Info distribution list, enabling them to receive, by email, immediate notifications on animal health issues published by the OIE.
- ***WAHIS-Alerts* application for smartphones or tablets**: by clicking on this application, users are sent immediate notifications and OIE follow-up reports on animal health issues direct to their mobile or tablet.

WAHIS Portal: Animal Health Data
www.oie.int/wahis-portal/

new OIE publications

Trilingual publication
August 2017
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http://dx.doi/org/10.20506/rst.issue.36.2.2659

Biological threat reduction *Scientific and Technical Review*, Vol. **36** (2)

Coordinator and Editor:
Tammy Beckham

Animal diseases, including zoonoses, have the potential to negatively impact economies, the environment, society, and public health. It is currently thought that over 60% of human diseases and over 80% of agents that can be used for bio-terrorism are of animal origin. The emergence and spread of animal diseases, including zoonoses, is at an all-time high. This increase in disease emergence and spread is thought to be the result of an increase in intensive farming, global travel, human pressure on ecosystems and social unrest. As new diseases and or strains emerge, they travel freely and do not respect borders.

Many animal pathogens, including zoonotic agents, are easy to obtain and have long been developed for use in several prominent bio-warfare programmes. In fact, the use of animal agents in biological warfare has been documented for centuries. This issue reviews the use of animal pathogens and zoonotic agents as bioweapons. More specifically, it examines their use throughout history, explores current disease trends and threats and evaluates the use of animals (terrestrial and aquatic) as sentinels for early detection of outbreaks affecting animals and/or humans, whether the outbreaks be of natural, accidental or deliberate origin.

In addition, it looks at the potential impacts of animal pathogens, including zoonotic agents, on economies, social unrest, food security, and public health. It reviews current frameworks for an international response to a biological event and explores current United Nations mechanisms for response to an alleged use of biological agents. This volume also explores technological advances for early detection, surveillance, and response to a disease event. It concludes by discussing systems for strengthening global biosecurity and resilience and considering methods of ensuring the sustainability of these systems.

Published in English, French and Spanish
26th edition, 2017

29.7 × 21 cm
Volumes I and II sold together
Vol. I & Vol. II: approx. 800 pp.
ISBN 978-92-95108-33-2
Price: EUR 60

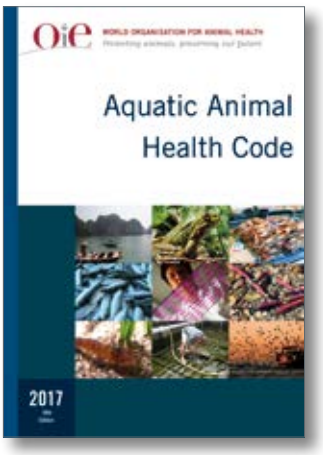
Terrestrial Animal Health Code

The OIE *Terrestrial Animal Health Code* (the *Terrestrial Code*) sets out standards for the improvement of animal health and welfare and veterinary public health worldwide, including through standards for safe international trade in terrestrial animals (mammals, reptiles, birds and bees) and their products.

The health measures in the *Terrestrial Code* have been formally adopted by the World Assembly of the Delegates of the OIE Members. The 26th edition incorporates modifications to the *Terrestrial Code* agreed at the 85th OIE General Session in May 2017.

Volume I is arranged in seven sections in addition to the user's guide and glossary. Section 1 contains chapters for diseases surveillance and notification including chapters on notification of diseases and provision of epidemiological information; criteria for the inclusion of diseases, infections and infestations in the OIE List and animal health surveillance. Section 2 has a chapter on import risk analysis. Section 3 is relating to quality of Veterinary Services including chapters on evaluation of Veterinary Services and veterinary legislation. Section 4 contains chapters relating to general recommendations for disease prevention and control including zoning and compartmentalisation; collection and processing of bovine, small ruminant and porcine semen; collection and processing of in vivo derived embryos from livestock and horses; official health control of bee diseases and high health status horse subpopulation. Section 5 is dedicated to chapters relating to trade measures and includes chapters on OIE procedures relevant to the SPS Agreement and model veterinary certificates for international trade in live animals hatching eggs and products of animal origin. Section 6 is relating to veterinary public health including chapters on biosecurity procedures in poultry production and responsible and prudent use of antimicrobial agents in veterinary medicine. Section 7 is dedicated to chapters relating to animal welfare including chapters on transport of animals; use of animals in research and education; animal welfare and beef cattle, broiler chicken and dairy cattle production systems and welfare of working equids.

Volume II contains disease-specific chapters for OIE listed diseases including infection with foot and mouth disease virus; infection with avian influenza viruses; bovine spongiform encephalopathy; infection with African horse sickness virus; infection with peste des petits ruminants; infection with classical swine fever virus and many other listed diseases.



Published in English, French and Spanish
20th edition, 2017

29.7 × 21 cm
Approx. 300 pp.
ISBN 978-92-95108-45-5
Price: EUR 45

Aquatic Animal Health Code

The OIE *Aquatic Animal Health Code* (the *Aquatic Code*) sets out standards for the improvement of aquatic animal health and welfare of farmed fish worldwide, and for safe international trade in aquatic animals (amphibians, crustaceans, fish and molluscs) and their products.

The standards in the *Aquatic Code* have been formally adopted by the World Assembly of OIE Delegates, which constitutes the organisation's highest decision-making body. This 20th edition incorporates modifications to the *Aquatic Code* agreed at the 85th General Session in May 2017.

The *Aquatic Code* is arranged in 11 sections in addition to the user's guide and glossary: Section 1 includes chapters on surveillance and notification. Section 2 includes a chapter on import risk analysis. Section 3 includes chapters on the quality of aquatic animal health services. Section 4 includes chapters includes chapters on general recommendations for disease prevention and control. Section 5 includes chapters focused on topics relating to trade measures, import and export procedures and certification. Section 6 includes chapters on the use of antimicrobial agents in aquatic animals. Section 7 includes chapters on the welfare of farmed fish during transport and killing. Sections 8 to 11 include disease-specific chapters for OIE listed diseases of amphibians, crustaceans, molluscs and fish, and are designed to prevent the disease in question being introduced into the importing country, taking into account the nature of the commodity, the aquatic animal health status of the exporting country, and the risk reduction measures available.

news from headquarters

Staff movements

Arrivals

Communication Unit

Marie-Laetitia Ceccaldi
Communications Officer

Marie-Laetitia has joined the OIE for a nine-month mission as a Communications Officer within the organisation's Communication Unit.

Her main task is to coordinate the production and implementation of the communications campaign on rinderpest: 'Never turn back'. This campaign aims to encourage the 181 Members of the OIE to remain active and committed to ensuring that this terrible disease becomes nothing more than a bad memory. She will be targeting national Veterinary Services in particular, as well as veterinary practitioners, students, teachers and laboratories throughout the world. Marie-Laetitia is also tasked with coordinating the production of communications materials from the Second OIE Conference on Biological Threat Reduction, which will take place in October 2017 in Canada.

Following her stint as Press Officer at the French Embassy in Haiti (in Port-au-Prince), then as Public Information Officer in the Project Unit of the United Nations Stabilization Mission in Haiti (MINUSTAH), also based in Port-au-Prince, Marie-Laetitia remained in the capital to become a communications consultant within the Pan American Health Organization–World Health Organization (PAHO–WHO).

Financial Directorate

Isabelle Dieuzy-Labaye
Senior Advisor, Public-Private Partnerships

Dr Isabelle Dieuzy-Labaye began her new position as Senior Advisor, Public–Private Partnerships, within the Financial Directorate on 2 November 2016.

Her missions include implementing the new 'Public–Private Progress' initiative, financed by the Bill & Melinda Gates Foundation, and contributing to the preparation of the 'Business Plan for Rabies', in liaison with the appropriate departments and WHO. In addition, she assists with proposals for donors in relation to the Global Control and Eradication Programme for Peste des Petits Ruminants, in collaboration with FAO. More generally, she supports the further development of public–private partnerships to successfully carry out OIE strategies.

Isabelle graduated from the National Veterinary School of Alfort, France, and gained her MBA at INSEAD, the European Institute of Business Administration. She was formerly Director of Strategic Alliances for Europe, Africa and the Middle East (EuAfME) at the EuAfME Headquarters of Zoetis veterinary drugs manufacturer, based in Paris.

World Fund Unit

Stéphane Renaudin
Project Officer

As Project Officer in the OIE World Fund Unit, Stéphane is involved in ensuring the follow-up and good management of a portfolio of projects including the Regional Sahel Pastoralism Support Programme (PRAPS) funded by the World Bank, the Ebola project funded by the European Commission, the biological threat reduction projects funded by the Canadian Government Department of Foreign Affairs and International Trade and other projects linked to French-speaking partners (French Ministry of Foreign Affairs and International Development, French Development Agency).

Stéphane is also responsible for monitoring the OIE's vaccine banks on a daily basis and liaising with suppliers to provide a rapid response to requests from beneficiary countries.

With diplomas in management/finance and international relations, Stéphane can use his experience gained in international cooperation – in Thailand in a research unit specialising in HIV/AIDS, in France with the French Ministry of Foreign Affairs, and in Guinea with the UN Mission for Ebola Emergency Response (UNMEER) – to carry out his duties effectively and help to ensure the success of projects developed by the OIE.

Information Systems Unit

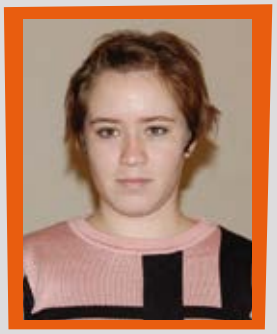
Amna Kooli
Engineer-Developer PHP/Web

Amna Kooli joined the OIE Information Systems Unit as 'Engineer-Developer PHP/Web' on 2 November 2016.

After obtaining a degree in computer science at the Higher Institute of Computer Science, Tunisia, in 2007, Amna began her professional career working freelance in web research and development, designing and developing web applications for numerous clients in various countries. In 2011, she decided to resume her studies and obtained a Master 1 in 'Artificial intelligence and decision' at Paris-Descartes University (France). She went on to specialise in the next generation web, otherwise known as the semantic web, and obtained a Master 2 in 'Artificial intelligence and decision', specialisation 'semantic web', at Pierre and Marie Curie University (France). Amna then spent three years working on the development of language learning platforms for the firm '*Le Comptoir des langues*' before returning to Pierre and Marie Curie University as a web research and development engineer in the context of the project 'GEOVISIT: a serious game', a game-based application enabling geoscience students to carry out a virtual tour in preparation for their fieldwork activities.

World Animal Health Information and Analysis Department

Patricia Vergara
Chargée de Mission



Dr Patricia Eliana Vergara Zárate joined the OIE World Animal Health Information and Analysis Department on 12 January 2017, as Chargée de Mission of the Government of Paraguay.

Her principal task is to verify the six-monthly and annual reports on diseases of terrestrial, aquatic and wild animals that are submitted to the OIE through its World Animal Health Information System (WAHIS), as well as to process reports submitted on paper. In addition, she is a member of the team actively seeking out non-official information on animal diseases and zoonoses. Her other duties will include providing technical support to WAHIS, participating in training for Focal Points and helping to make future improvements to the animal health information system (WAHIS+).

Dr Vergara graduated as a veterinarian from Paraguay's public university, the National University of Asuncion, San Lorenzo. Working as a technician in the Animal Health Information System Department of the Epidemiology

Directorate at Paraguay's official Veterinary Service, the National Animal Quality and Health Service (SENACSA), Dr Vergara was in charge of producing animal health bulletins, processing animal disease and vaccination data, and analysing geo-referencing data on Paraguay's farms in the online animal health information system (SISA). She was also a member of the SISA management training team, responsible for preparing Paraguay's animal health information summary for submission to the OIE via WAHIS.

Status Department

Anna-Maria Baka

Chargée de Mission

Anna-Maria Baka joined the OIE on 14 November 2016 as Chargée de Mission within the Status Department. Her work focuses mainly on the collection, analysis and screening of scientific and compliance documents submitted by Member Countries in support of their applications for recognition of official disease status, for endorsement of their national control programmes and to maintain their annual status in accordance with standard operating procedures. She prepares and takes part in the meetings of *ad hoc* Groups for the assessment of Member Countries' dossiers, as well as in other related *ad hoc* groups.

Anna-Maria also contributes to the implementation of the FAO/OIE Global Control and Eradication Strategy for peste des petits ruminants, as the Focal Point liaising between the FAO/OIE Joint PPR Global Secretariat and OIE Headquarters.

Anna-Maria graduated from the School of Veterinary Medicine at Aristotle University of Thessaloniki, Greece, then obtained her Master's degree from its School of Agriculture. Before joining the OIE, she was Greece's national consultant for field work in the THRACE programme, a EuFMD[1]-led project to provide early warning surveillance for FMD and other transboundary diseases along Greece's common borders with Bulgaria and Turkey.

1. EuFMD: European Commission for the Control of Foot and Mouth Disease

Hernán Oliver Daza

Chargé de Mission

Dr Hernán Daza joined the OIE on 6 February 2017 as Chargé de Mission in the Status Department, after being seconded to the OIE by the Bolivian Government from the National Service for Animal and Plant Health and Food Safety (SENASAG) of the Ministry of Rural Development and Land (MDRyT).

Hernán is involved in the collection and analysis of scientific and normative documents submitted by Member Countries in support of their applications for recognition of official disease status, for official endorsement of national control programmes and for annual maintenance of status in accordance with the standard operating procedure. Hernán brings his experience of epidemiology to bear on the work of the Status Department.

Hernán graduated as a veterinarian from Gabriel René Moreno Autonomous University (Santa Cruz, Bolivia) and has a post-graduate qualification in epidemiology from the Federal University of Minas Gerais (UFMG, Belo Horizonte, Brazil). Hernán has been Manager of the National Epidemiology Department at SENASAG (Trinidad, Bolivia) for the past eight years, as well Focal Point for Animal Disease Notification to the OIE, in which capacity he

closely monitored the extensive PVS Pathway implementation process in Bolivia. He has contributed to the implementation of foot and mouth disease progressive control strategies in Bolivia's various livestock ecosystems.

Programmes Department

Mariana Marrana

Chargée de Mission

Dr Mariana Marrana took up her new post as Chargée de Mission – Rinderpest Officer with the Programmes Department in October 2016.

Mariana's work involves all activities related to rinderpest, post-eradication, in line with OIE policies and agreements with the Global Partnership and FAO/OIE Rinderpest Secretariat. She is in constant contact with members of the Rinderpest Joint Advisory Committee, as well as with the representatives of rinderpest holding facilities and the FAO Co-Secretariat.

Mariana graduated from the University of Porto in Portugal, with a Master's Degree in Veterinary Medicine, and during her studies undertook a four-month internship at OIE Headquarters. Before arriving at the OIE, Mariana worked on a project devoted to food safety in Portugal and also trained in the areas of One Health and Global Health in Copenhagen, Denmark.

Christine Uhlenhaut

Chargée de Mission

Dr Christine Uhlenhaut started her new functions as Chargée de Mission for Biological Threat Reduction within the OIE Programmes Department on 14 November 2016. Her missions pertain to the implementation of activities in support of biological threat reduction. In particular she will be working on the preparation and organisation of the Second Global Conference on Biological Threat Reduction, as well as supporting the work of an expert *ad hoc* group in developing methodologies for Veterinary Services related to the investigation of suspicious or deliberate outbreaks. Another area Christine will be responsible for is the OIE's support to partners' biological threat reduction activities and as such will be the OIE focal point for the Biological and Toxin Weapons Convention (BTWC), the Global Partnership (GP), the United Nations Security Council Resolution 1540, United Nations Office for Disarmament Affairs (UNODA), and Interpol.

Christine graduated from the Free University of Berlin, Germany, and completed her PhD at the Department for Highly Pathogenic Viruses at the Robert Koch Institute, Berlin. She was previously Deputy Head of Strengthening Global Biosecurity at the Robert Koch Institute where she developed and implemented the German Partnership Programme for Biological and Health Security on behalf of the German Federal Foreign Office. Christine also worked for five years on vaccine safety at the Center for Biologics Evaluation and Research (CBER) within the US Food and Drug Administration. She is a trained inspector for biological weapons of mass destruction and worked in this capacity for the United Nations Monitoring Verification and Inspection Commission in Iraq.

Science and New Technologies Department

Antonino Caminiti

Chargé de Mission

On 1 September 2016, Dr Antonino Caminiti joined the OIE as a Chargé de Mission with the Science and New Technologies Department.

Antonino will be in charge of two new projects. The first is a web-based platform to collect genetic sequences from pathogens that have been the subject of country reports to the OIE, in

collaboration with the World Animal Health Information and Analysis Department. The second project will create an OIE Virtual Biobank: an online catalogue of all the reference material produced and supplied by OIE Reference Laboratories.

A veterinarian by training, Antonino graduated from the Faculty of Veterinary Medicine, at the University of Bologna, Italy. He has a post-graduate diploma in Food Safety and Hygiene, as well as a Master's in International Health Care Management, Economics and Policy from the SDA Bocconi School of Management in Milan, Italy.

Antonino previously worked as an epidemiologist in the field of food safety and animal health for the *Istituto Zooprofilattico Sperimentale della Lombardia e dell'Emilia Romagna*, Italy. He has also worked in epidemiology units at other Italian and international veterinary public health institutions, and has extensive experience in data collection, data control and verification, and statistical analysis.

Stefano Messori

Chargé de Mission

Dr Stefano Messori joined OIE Headquarters in Paris as Chargé de Mission within the Science and New Technologies Department on 3 November 2016.

Stefano will mainly work on the European Union-funded scientific secretariat of the STAR–IDAZ[1] International Research Consortium (IRC) project, which coordinates global research on animal health. He will work in collaboration with other OIE staff, as well as personnel from the Department for Environment, Food & Rural Affairs (DEFRA, United Kingdom), the Centre for Agriculture and Biosciences International (CABI), the International Federation for Animal Health (IFAH Europe) and the Biotechnology and Biological Sciences Research Council (BBSRC), to direct research gap analysis and advise on the realignment of research programmes. In addition, he will support the IRC Secretariat in delivering the work plan of the IRC Executive Committee. Stefano will also support the Head of the Science and New Technologies Department in the implementation of the OIE's Sixth Strategic Plan, building on his own expertise in this area.

A veterinarian by training, Stefano graduated from the Faculty of Veterinary Medicine, the University of Parma, Italy. He has a PhD in animal science from the University of Bologna and has been recognised as a European specialist in matters of animal welfare science, ethics and law, by the European College of Animal Welfare and Behavioural Medicine.

Stefano previously worked as an expert in the management of international projects at the OIE Collaborating Centre for Veterinary Training, Epidemiology, Food Safety and Animal Welfare of the *Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise* (Teramo, Italy), and as a Task Leader for the Animal Health and Welfare (ANIHWA) European Research Area (ERA–) Net project[2] at the Italian Ministry of Health, Rome, where he was in charge of identifying research gaps in animal health and welfare and supporting decision-makers in setting priorities for research and aligning research programmes.

1. STAR-IDAZ: Global Strategic Alliances for the Coordination of Research on the Major Infectious Diseases of Animals and Zoonoses
2. www.anihwa.eu

NEVER TURN BACK!

A new OIE campaign against rinderpest: let's make sure that rinderpest remains history

At its 85th General Session from 21 to 26 May 2017, the OIE presented its rinderpest awareness campaign 'Never turn back!' for its 181 Member Countries. The aim of the campaign is to ensure that our world remains rinderpest-free by keeping the memory of the disease alive.

In the past, rinderpest killed millions of animals all over the world, with dire consequences for food security, rural livelihoods and the economy. After decades of concerted efforts at the global level, in 2011 the OIE and Food and Agriculture Organization of the United Nations declared rinderpest to have been officially eradicated from the planet, making it the very first animal disease to be completely eradicated and only the second disease in history, after the human disease smallpox.

However, unless we are vigilant, our world will remain vulnerable to a recurrence of this disease.

The keyword of the campaign is therefore: 'Vigilance'

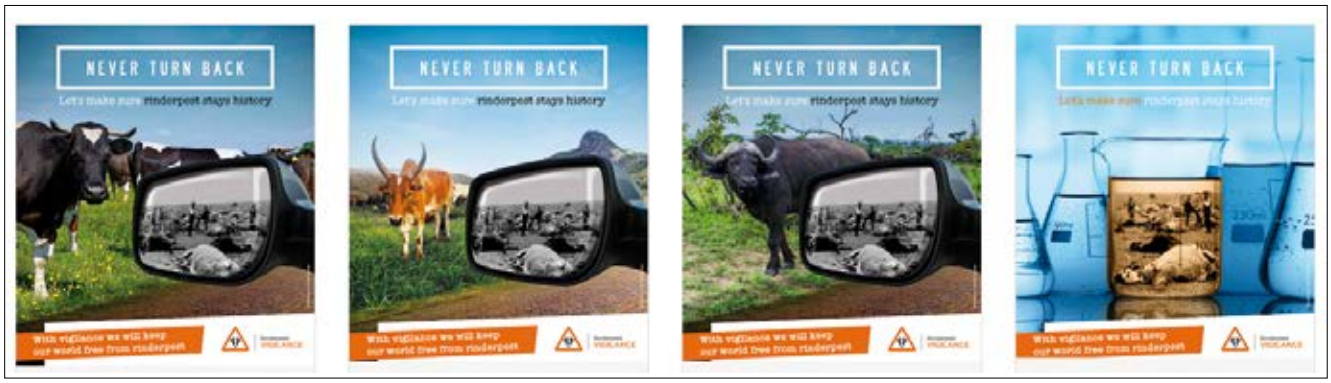
Only the continuous vigilance of every key player will enable us to keep our world free from rinderpest.

The campaign is aimed at all key players in animal health: veterinarians, both veterinary authorities and practitioners, farmers, veterinary teachers and students, and laboratory staff. Its purpose is to make sure that everyone involved in animal health is fully aware of rinderpest challenges and of the role they still need to play in the post-eradication era, to safeguard this achievement.

The representatives of the 181 OIE Member Countries also have a major role to play in ensuring the implementation and success of the campaign in their countries. They are our voice to encourage the key players in their own countries to remain vigilant and mobilised on the rinderpest issue.

The campaign therefore urges them to:

- ensure that rinderpest occupies an appropriate place in veterinary education curricula;
- maintain professional veterinary knowledge of rinderpest to enable effective surveillance for rapid detection, notification and response in the event of rinderpest resurgence;
- guide laboratories to dispose of any stocks of rinderpest virus-containing material.



The OIE has developed a wide range of tools to help you implement your campaign, which are available on the campaign website: **www.oie.int/rinderpestvigilance**

Discover the OIE's 2016 Annual Report!

2016 will be remembered as a milestone year for the OIE, the beginning of a new phase in the life of the Organisation as it evolved in both its operations and representative bodies. The OIE's 2016 Annual Report takes stock of the progress made under the framework of the Sixth Strategic Plan (2016–2020), through practical examples that illustrate the work of OIE teams throughout the world.

The current Annual Report reviews the events which marked 2016, in response to three key priorities set for the next five years: to control animal health risks, ensure transparent communication and to strengthen the capacities of Veterinary Services.

Healthy animals for a better life

We work to protect the health and welfare of animals globally, leading to economic prosperity as well as social and environmental well-being of populations.

All over the world, the personnel of OIE Headquarters and the Regional and Sub-Regional Representations work alongside the national Veterinary Services of Member Countries and numerous experts, on a day-to-day basis, to expand the ambitious programme of activities developed to achieve the objectives set by the Organisation's Sixth Strategic Plan.

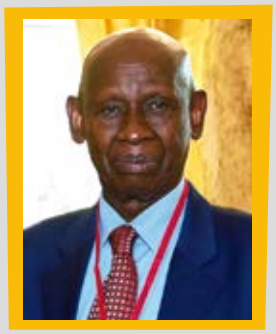
This year, the OIE Annual Report is available in several formats, to make it easier to share, promote interactiveness and to meet the needs and interests of as many people as possible. The reader can access these different formats (video, interactive PDF and summary version) through the dedicated web portal:
www.oie.int/report2016

Staff movements

Africa

Departure

Amadou Samba Sidibé



Dr Amadou Samba Sidibé, Regional Coordinator of the Animal Health component of the Regional Sahel Pastoralism Support Project (PRAPS), retired on 1 February 2017 after a rewarding professional career.

Of Malian nationality, Dr Amadou Samba Sidibé is a graduate of Alfort Veterinary School in France. He has held numerous positions of responsibility at both national and international level.

As a high-ranking civil servant in Mali, he served as Director of the Poultry Centre at the Sotuba National Animal Production Research Centre in Bamako from 1971 to 1977 and as National Livestock Director from 1977 to 1987.

Regionally and internationally, Dr Sidibé held the positions of Regional Coordinator for West and Central Africa for the Pan African Rinderpest Campaign (PARC), the Pan African Programme for the Control of Epizootics (PACE) from 1987 to 2002, the Regional Animal Health Centre in Bamako, established by the OIE, FAO and AU–IBAR[1]. He also served as Chairman of the Scientific Board of the Inter-State School of Veterinary Science and Medicine (EISMV).

After becoming Mali's Delegate to the OIE, Dr Sidibé was elected board member then President of the OIE World Assembly from 1991 to 1994, playing an active role in the development and enhanced international standing of the OIE. As OIE Regional Representative for Africa from 2002 to 2007, he was instrumental in establishing the OIE firmly on the African continent. Under his impetus, a number of activities and fruitful partnerships were developed to improve animal health.

Dr Sidibé is a Commander of the National Order of Mali, a Knight of the French Legion of Honour, a member of the French Veterinary Academy, and a Gold Medallist and Honorary Chairman of the OIE.

1. AU–IBAR: African Union – Interafrican Bureau for Animal Resources

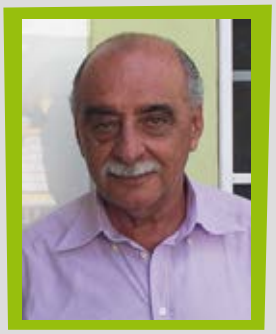
Americas

Arrival

OIE Sub-Regional Representation for Central America

Emerio Serrano Ramírez

OIE Sub-Regional Representative for Central America



The Americas region welcomes the new OIE Sub-Regional Representative for Central America: Dr Emerio Serrano Ramírez.

Doctor of Veterinary Medicine and a specialist in veterinary epidemiology, Dr Serrano has developed a wealth of clinical field experience with cattle, sheep, goats and horses during his long career. He has more than 30 years of management experience within the Veterinary Services, at the provincial, regional and national levels of the Veterinary Medicine Institute, in Cuba, the country of his birth.

As a specialist in veterinary epidemiology, he took part in the development, implementation and assessment of endemic disease prevention, control and eradication programmes in his native Cuba, as well as in Cuba's national emergency response programmes to exotic diseases. Moreover, he assisted in

the design, implementation and updating of Cuba's animal health information and surveillance system. Dr Serrano also developed and directed programmes for the prevention, response to and mitigation of health disasters, and played an active role in the development of veterinary medicines legislation in his country.

His distinguished career has seen him direct various international animal health projects, sponsored by the Food and Agriculture Organization of the United Nations (FAO), the Pan American Health Organization (PAHO), and the International Atomic Energy Agency (IAEA). He has taken part in several PVS Evaluation missions as an OIE expert, as well as missions supporting foot and mouth disease control programmes in Latin America. He has also been involved in Cuban technical cooperation missions in several countries, including Angola.

As Cuba's OIE Delegate from 1987 to 2011, Dr Serrano has held the positions of Vice-President and President of the OIE Regional Commission for the Americas. In 2010, he was honoured with the OIE Gold Medal.

Asia – Pacific

OIE Regional Representation for Asia and the Pacific

Arrivals

Pasang Tshering

Regional Project Coordinator

Dr Pasang Tshering joined the OIE Regional Representation for Asia and the Pacific in April 2017 as Regional Project Coordinator. His primary role is to coordinate a range of activities under the 'One Health' umbrella, focusing on rabies, avian influenza, antimicrobial resistance (AMR), antimicrobial use (AMU), and various other zoonoses, including those being tackled under the FAO/OIE/WHO Tripartite framework.

Dr Pasang has a Bachelor's degree in Veterinary Science (BVSc) from Kerala Agricultural University, India, and an MSc in the 'Development of Animal Health and Production Programmes', from the Veterinary Epidemiology and Economics Research Unit (VEERU) at Reading University, in the United Kingdom.

Dr Pasang has served the government of Bhutan in various capacities, starting as a veterinary officer in 1989 for a Swiss-assisted development programme. After his postgraduate studies, he headed the Epidemiology Unit at the Royal Veterinary Epidemiology Centre (RVEC), which functioned as the main institution for animal health in Bhutan. He developed the national animal disease information system (VIS) and became the OIE National Focal Point for Animal Disease Notification and, briefly, for Wildlife. After becoming the Officer in Charge of the RVEC in 2005, he reformed and upgraded the Centre, and was responsible for its renaming as the National Centre for Animal Health (NCAH).

From May 2011, Dr Pasang took up an 11-month position as consultant for an FAO-implemented programme under the Regional Support Unit for the South Asian Association for Regional Cooperation (RSU-SAARC), based in Kathmandu, Nepal. As the Regional Epidemiology Centre Coordinator, his job was mainly building veterinary epidemiological capacity among the SAARC Member States, networking with their epidemiological institutions and experts to encourage information exchanges and harmonisation, and forging collaborative relationships for prevention and control of the priority animal diseases in the region, i.e. foot and mouth disease, peste des petits ruminants and highly pathogenic avian influenza.

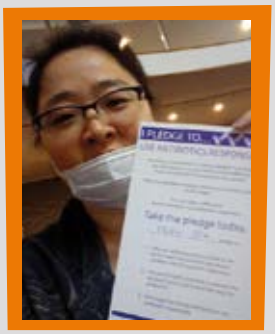
Jing Wang
Regional Veterinary Officer

Dr Jing Wang joined the OIE Regional Representation for Asia and the Pacific in May 2017 as a Regional Veterinary Officer. Her major responsibilities include aquatic animal health-related activities and organising capacity-building training sessions and meetings. She will also give general support to other staff; in particular, helping with activities centred around the 'One Health' approach.

Dr Jing Wang graduated as a Doctor of Veterinary Medicine from the China Agricultural University and worked in the China Animal Disease Control Centre for several years, focusing on animal disease prevention and control, swine diseases and laboratory diagnosis, as well as laboratory quality management. From 2013–2015, she was seconded to the Veterinary Bureau of the Chinese Ministry of Agriculture, to work in the field of international cooperation, where she built up a breadth of knowledge on such topics as: OIE recognition of disease status, the SPS Agreement rules of trade, and control measures for transboundary animal diseases and animal movement.

Dr Jing Wang previously held the position of Deputy Focal Point for Animal Disease Notification, and Secretary for the OIE Reference Laboratory for Porcine Reproductive and Respiratory Syndrome, as well as helping to translate several OIE publications into Chinese.

Departure



Yooni Oh

Dr Yooni Oh worked as a Regional Project Coordinator at the OIE Regional Representation for Asia and the Pacific, in Tokyo. She has finished her three-year spell with us and is returning to her home country, the Republic of Korea, to work with the Animal and Plant Quarantine Agency (QIA) of the Ministry of Agriculture, Food and Rural Affairs.

Dr Oh joined the OIE Regional Representation for Asia and the Pacific in May 2014 and worked as an officer in charge of One Health-related issues. Her work was supported by the OIE/Japan Trust Fund (JTF) Project for Controlling Zoonoses in Asia under the 'One Health' approach, and focused on such topics as zoonotic influenza, rabies, other neglected zoonoses and antimicrobial resistance. During her time with the Regional Representation, she worked to strengthen regional Tripartite (FAO/OIE/WHO) collaboration and represented the OIE at relevant meetings on many occasions. Also within her remit was support for GF–TADs issues (i.e. the Global Framework for the Progressive Control of Transboundary Animal Diseases). Animal welfare was also a concern and so she became secretary for the Regional Animal Welfare Strategy (RAWS) Coordination Group in 2014–2015, and then the RAWS Advisory Group in 2015. Since she joined the OIE Regional Representation in Tokyo, Dr Oh has amply demonstrated her expertise in animal health and welfare and her flexibility in undertaking a broad range of professional missions.

Dr Oh returns to her country to resume her position as a researcher at the QIA. We wish her every success in her new assignment!

OIE Sub-Regional Representation for South-East Asia

Arrival

Maria Judith L. Sablan

Monitoring and Evaluation (M&E)/ Communication Project Officer

Ms Maria Judith L. Sablan joined the OIE Sub-Regional Representation for South-East Asia (SRR–SEA) on 30 January 2017, as the Monitoring and Evaluation (M&E)/ Communication Project Officer. She is responsible for managing the implementation of the Monitoring and Evaluation Framework of the Stop Transboundary Animal Diseases and Zoonoses (STANDZ) initiative, and other SRR–SEA projects. She is also charged with carrying out the SRR–SEA's communication and advocacy plan and gender programme. Among her other duties is providing support to the general operation of SRR–SEA, including drafting various reports for submission to OIE Headquarters.

Ms Sablan gained her BSc, majoring in cell biology, from the University of the Philippines, Los Baños, and her Master's degree in Technology Management from the University of the Philippines, Diliman. She has a strong background in project management, including planning, monitoring and evaluating several technology transfer projects in the Bicol region of the Philippines, ensuring their successful adoption and implementation. Moreover, Ms Sablan has over ten years' experience as managing editor of the *Philippine Journal of Science*, the oldest scientific journal in the Philippines, first published in 1906. During her term as managing editor, she successfully elevated the journal to inclusion in the international abstracting and indexing services, including Thomson Reuters (formerly ISI) and Scopus. From time to time she has served as a documenter for the United Nations Development Programme (UNDP), as well as editor/ proofreader of various publications.

Ms Sablan will continue to pursue her interests in project management and communication through the work of the OIE SRR–SEA, and is looking forward to contributing to the Representation's very productive working relationships with its stakeholders.

Meetings

Africa

Harmonising veterinary legislation one region at a time

An update on OIE experiences in Africa

Patrick Bastiaensen
Programme Officer, OIE Sub-Regional Representation for East Africa

While the concept of legislation is probably as old as civilisation itself, and veterinary legislation as old as the science of veterinary medicine, it became an important capacity-building target for the OIE when the Organisation began to analyse its evaluations of Veterinary Services carried out since 2006, under the OIE Performance of Veterinary Services (PVS) Pathway. The capacity to develop and implement effective veterinary legislation is included among the 47 critical competencies of the PVS Tool to assess the performance of Veterinary Services in OIE Member Countries. Recurring reports of shortcomings or inadequacies in many countries' veterinary legislation led to the development of the Veterinary Legislation Support Programme (VLSP), under the umbrella of the broader PVS Pathway (which includes the initial PVS Evaluation, the PVS Evaluation Follow-up, Gap Analysis, specific laboratory support missions and, indeed, the VLSP).

Some important milestones in this respect were: the implementation of veterinary legislative support missions on a pilot basis in 2007 and 2008; the publication of the OIE guidelines on veterinary legislation in July 2009; the first Global Conference of the OIE on Veterinary Legislation, held in Djerba (Tunisia) in December 2010; the

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Opening ceremony of the Veterinary Legislation Seminar for Member States of the Economic Community of West African States (ECOWAS), Lomé, Togo, June 2016. Left to right: the OIE Delegate from the host country and the representatives of ECOWAS, AU–IBAR, OIE and FAO

© OIE/P. Bastiaensen

Working group session during the Veterinary Legislation Seminar for Member States of the East African Community (EAC), Arusha, Tanzania, August 2016

establishment of an *Ad hoc* Group on Veterinary Legislation to transform the guidelines into a proposed chapter for the OIE *Terrestrial Animal Health Code*; and the subsequent adoption, in May 2012, of that *Code* chapter, Chapter 3.4., on Veterinary Legislation. These provided a solid foundation for the formal launch of the VLSP and, in particular, the undertaking of OIE VLSP veterinary legislation identification missions in countries that submitted a request. In Africa, the programme has been a resounding success with (by the end of April 2017) 35 countries having benefited from an identification mission, and 10 countries having requested longer-term collaboration with the OIE under a formal agreement, with the aim of modernising their national veterinary legislation.

In November 2011, a pilot training course on veterinary legislation was organised by the OIE Sub-Regional Representation for Southern Africa in Gaborone (Botswana), targeting National OIE Focal Points and Delegates from the Member States of the Southern African Development Community (SADC). For the first time, the pool of trainers represented a mix of veterinarians and lawyers. The seminar focused on the general principles of sound legislation (drafting, internal and external quality, the legislative hierarchy) and two major areas of veterinary legislation: animal disease control and food safety.

In January 2013, a second seminar took place for the countries of the Economic Community of West African States (ECOWAS), held in Cotonou, Benin. This training was funded primarily by a Contribution Agreement, signed with the OIE, under a European Union-funded programme called 'Strengthening of Veterinary Governance in Africa', or VETGOV. Two other implementing partners are involved in VETGOV: the African Union's Inter-african Bureau for Animal Resources (AU–IBAR) and the United Nations' Food and Agriculture Organisation (FAO), each addressing veterinary governance

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Representing the Director of AU–IBAR, Dr Mohamed Abdel-Razig Aziz, Technical Advisor to the VETGOV Programme, at the seminar held in Lusaka, July 2017

Group photograph at the Veterinary Legislation Seminar for the Member States of the Common Market for Eastern and Southern Africa (COMESA), Lusaka, Zambia, July 2017

Group photograph at the launch of the Veterinary Legislation Seminar for Member States of the Economic Community of West African States (ECOWAS), Lomé, Togo, June 2016

issues within their own international and continental mandates and expertise.

In October and November 2013, two more continental seminars on veterinary legislation took place within the framework of VETGOV, this time funded by AU–IBAR and facilitated and coordinated by the FAO. The OIE took part in both seminars, one for French-speaking participants (Naivasha, Kenya, November 2013) and the other for English speakers (Arusha, Tanzania, November 2013). These were three-day training programmes on the importance and drafting of veterinary legislation. This overall effort, which targeted all African countries, was well received by the delegations of those nations who took part. At the close of each seminar, AU–IBAR presented a draft of its proposed plan for working with individual countries and regional bodies on developing legislation in the coming years. The active participation of the OIE was a key element in that plan and resulted in a series of seven sub-regional seminars, starting in October 2014 and targeting specific clusters of Member States of African Regional Economic Communities or RECs:

- Yaoundé, Cameroon, November 2014, for the countries of the Economic Community of Central African States (ECCAS, 10 Member Countries)
- Khartoum, Sudan, November 2014, for the countries of the Inter-Governmental Authority on Development (IGAD, Horn of Africa, 8 Member Countries)
- Tunis, Tunisia, June 2015, for the countries of the Union of the Arab Maghreb (UMA, North Africa, 5 Member Countries)
- Maseru, Lesotho, July 2015, for the countries of the Southern African Development Community (SADC, 15 Member Countries);
- Lomé, Togo, June 2016, for the countries of the Economic Community of West African States (ECOWAS, 15 Member Countries);
- Arusha, Tanzania, August 2016, for the countries of the East African Community (EAC, 5 Member Countries at that time).
- Lusaka, Zambia, July 2017, for the countries of the Common Market for Eastern and Southern Africa (COMESA, 19 Member Countries).

These sub-regional seminars were co-funded under VETGOV, initially by AU–IBAR and later increasingly by the OIE.

The methodology applied here was and still is innovative. At all of these seminars, each participating country sent three participants, including one veterinarian, one lawyer and one subject-matter specialist, involved in the development and implementation of veterinary legislation. Formal presentations were kept to a minimum during the five-day seminars to allow space for a progressive series of working-group activities, which focused on a specific area of veterinary legislation, e.g. animal disease control or regulation of the veterinary drug supply. In the working groups, countries first analysed their own existing legislation on the selected topic, then identified gaps and weaknesses in that legislation, next looking for areas where a regional approach might help to fill those gaps. The groups created an outline for harmonised regional legislation, based on the gap analysis, and, finally, identified the problems,

costs, challenges and opportunities involved in adopting the regional approach. The RECs then pledged to work with their Member States after the seminars to move forward and develop regionally harmonised legislation.

As can be seen from the list of seminars above, the total number of countries invited to attend these seminars (77) far exceeds the number of countries in Africa (54), pointing to much overlapping membership of RECs. This means that one country may have to align its national (veterinary) legislation with various regional directives from up to three different RECs. Consequently, some countries were invited up to three times to attend such seminars, as members of the different RECs targeted. The potentially repetitive nature of this approach, however justified, was in part mitigated by asking countries to select a technical topic amongst the topics considered, based on Chapter 3.4. of the OIE *Terrestrial Animal Health Code*. This topic, and the relevant national legislation, would then be used to work on as case studies. This was also a way to address the specific needs of different RECs and avoid unrealistic expectations of what could be achieved in a five-day training seminar. From the range of proposed topics, three were addressed by the following RECs:

– animal disease control (ECCAS, ECOWAS, IGAD, SADC, UMA)
– veterinary products (EAC)
– import/export inspection and certification (COMESA).

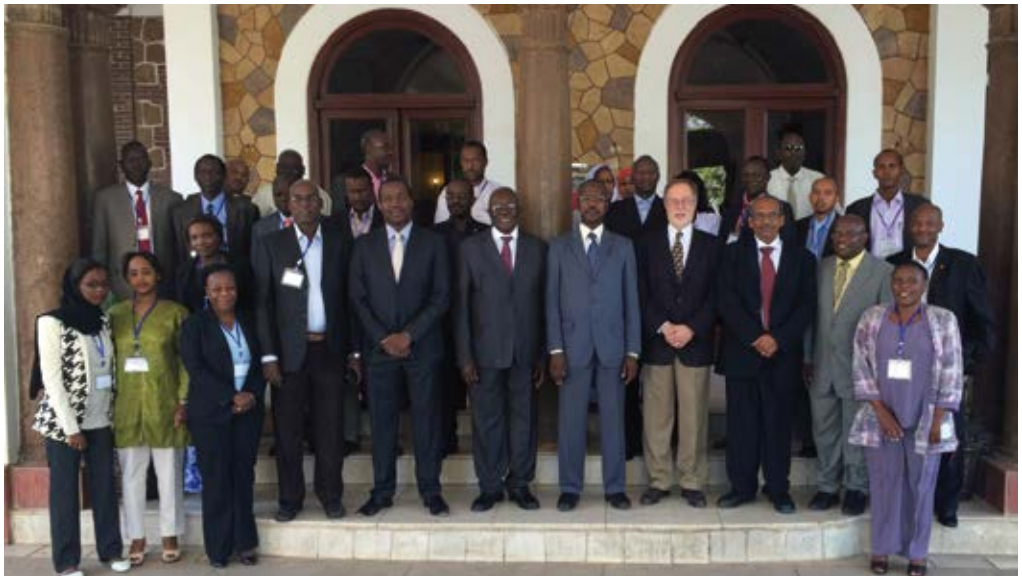
In the specific case of SADC, the theme of animal disease control was used to highlight the control of peste des petits ruminants (PPR), a disease regarded as a high priority for the region at the time, particularly in the context of the OIE/FAO PPR Global Control and Eradication Strategy, which was launched in April 2015 at a global conference in Abidjan, Côte d'Ivoire.

All seven seminars have resulted in varying degrees of commitment and recommendations by REC Member Countries and secretariats to implement agreed-upon procedures to move towards regional harmonisation.

Furthermore, efforts are currently under way, once more in partnership with AU–IBAR and FAO, to develop a new supporting mechanism to assist Member States and REC secretariats on this specific challenge of regional harmonisation in years to come. As experience to date has shown, legislative review and harmonisation is a complex, and therefore slow, process which has taken the European Union, for example, the better part of half a century to implement.

A crucial consideration in this respect is that not all RECs in Africa have been granted the authority, by their founding Member States, to approve binding regional directives for their countries to transcribe in national legislation. In combination with the overlapping membership of some of these RECs, this means that some countries face major difficulties in adopting veterinary legislation in a timely, coherent and harmonised manner.

http://dx.doi.org/10.20506/bull.2017.2.2654



Group photograph after the opening ceremony of the Veterinary Legislation Seminar for Member States of the Inter-Governmental Authority for Development (IGAD), Khartoum, Sudan, November 2014

The OIE Veterinary Legislation Support Programme: **www.oie.int/en/support-to-oie-members/veterinary-legislation/**
The OIE Component of the VETGOV Programme: **www.rr-africa.oie.int/vetgov.html**

23rd Conference of the OIE Regional Commission for the Americas

A new dynamic to secure active involvement

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The terms of reference and internal rules of the OIE Regional Commissions require them to hold Regional Conferences, bringing together OIE Members in the region, OIE Regional Representatives, the Director General of the OIE, representatives of international and regional organisations and experts invited to examine issues related to animal health, animal welfare and animal production food safety from a regional perspective. The recommendations made by these Regional Conferences will then be submitted to the World Assembly of OIE Delegates for approval.

The active involvement of OIE Member Countries in the conferences of Regional Commissions is extremely important because it allows a country not only to take part in the discussion of recommendations proposed for adoption but also to inform the Regional Commission of all the specific needs of that country, and thus the region, to ensure that the OIE is kept up to date and able to take the appropriate action.

At the invitation and with the support of the Government of Bolivia, the OIE Regional Commission for the Americas held its 23rd Conference in Santa Cruz de la Sierra from 14 to 18 November 2016, attended by 78 participants. They represented, among others, 20 OIE Member Countries from within the region and nine international and regional organisations.

The 23rd Conference consolidated a new dynamic for Regional Commission conferences, established under the OIE Sixth Strategic Plan, i.e. to stimulate discussion and encourage the active involvement of OIE Delegates and international and regional organisations. This renewed purpose was rolled out at the 27th Conference of the OIE Regional Commission for Europe, with considerable success.

The agenda of the 23rd Conference was developed in consultation with the members of the Bureau of the Regional Commissions and the Council, and was structured to give participants the opportunity to attend institutional presentations, including a panel discussion with the OIE Director General and the members of the Bureau and the Council on their role in supporting the OIE's mandate. In its conclusions, the panel stressed the importance of the Regional Commission seizing the opportunity offered by the Sixth Strategic Plan, the new emphasis on open dialogue and frank debate, and identifying the region's priorities when deciding where efforts should be invested in the short and medium term to achieve success.

The institutional presentations were preceded by an opening ceremony in which farmers' representatives from Bolivia made an impassioned plea for governments to work towards ensuring that their countries complied with OIE standards, to maintain safe and sustainable international trade and thus secure global supply, which is one of the biggest concerns at the current time.

His Excellency César Cocarico Yana, Minister for Rural Development and Land, addressed the opening ceremony to pledge that Bolivia would continue working to guarantee the food sovereignty and security of Bolivians. He added that governments had a duty to ensure healthy food in compliance with OIE standards, which had all been approved by OIE Members, to prevent animal health hazards.

His Excellency also took the opportunity to reiterate Bolivia's commitment to an active involvement in OIE activities, which has allowed the country to make great strides in strengthening its Veterinary Services over the years. Clear evidence of Bolivia's progress has been seen in the reform of its national veterinary legislation. Cooperation with the OIE has been further bolstered by the secondment of an official from Bolivia's official Veterinary Services to OIE Headquarters.

The aim of the new conference dynamic was to draw a clear distinction between ceremonies of protocol, institutional presentations and technical sessions, to ensure that sufficient time was allowed for each.

Day One culminated in a poster session, which gave participants a foretaste of the technical sessions to be held on the Tuesday and Wednesday, enabling them to begin to reflect and engage in discussions. The posters included one by Bolivia on its implementation of the OIE PVS Pathway. The OIE Director General and OIE Regional Commission praised Bolivia as a model of how a tool developed by the OIE for its Members could lead to successful outcomes, establishing a firm baseline for recognising a country's animal disease status, especially by updating or adopting appropriate legislation.

Another important item on the new agenda was the way in which the various topics at the technical session were approached. The session began with a presentation on the animal health situation in the region, which set the scene for subsequent presentations. The Vice-President of the *Terrestrial Code* Commission described the OIE's standard-setting procedure, in which he highlighted key points and recommendations to secure the region's active involvement in the process. This was followed by a presentation from the Head of the OIE Status Department, explaining the differences between official recognition and self-declaration of a country's animal disease status. Three closely linked addresses with a single purpose: to ensure animal health and welfare through risk management and to build stakeholder trust through transparency and communication.

As none of this can be achieved without improving the capabilities and sustainability of Veterinary Services, the 23rd Conference devoted a good part of

His Excellency César Cocarico Yana, Minister for Rural Development and Land, Bolivia, addressing the opening ceremony

Dr Monique Eloit, OIE Director General, with Dr Javier Ernesto Suárez Hurtado, Delegate of Bolivia to the OIE

Working groups exploring options for the evolution of the OIE PVS Pathway

Wednesday afternoon to a presentation, accompanied by group work involving all the participants, reflecting on how the OIE PVS Pathway might evolve to dispel the misconceptions that have inevitably sprung up around this tool. The discussions centred around the four specific options put forward for developing the Pathway: PVS self-evaluation; formal integration of the PVS Pathway into national strategic planning cycles; the development of dedicated content on priority topics within future PVS Pathway missions; and the appointment of National Focal Points for the PVS Pathway. These conclusions were included in the background information used to develop the OIE PVS Pathway Think Tank Forum, held at OIE Headquarters in Paris from 4 to 6 April 2017.

These two issues were discussed at length among those in the region, with a group of Delegates meeting at the end of each discussion to draw up recommendations that were adopted by the OIE Regional Commission for the Americas at the Conference and submitted for the approval of the World Assembly of OIE Delegates at its General Session in 2017. The recommendations were duly approved by the Assembly and are now considered as a guide for all 181 OIE Members.

One of the key objectives of the OIE's Sixth Strategic Plan is to strengthen cooperation with its partners. To this end, the programme concluded with a panel discussion by a group of international and regional organisations, including ALA[1], CVP[2], FARM-MERCOSUR[3], IICA[4], OIRSA[5] and WCO[6], on the challenges of international trade in animals and animal products. The issues covered included trade activities relating to the OIE and its standards, challenges faced and opportunities for improving cooperation between the OIE and its partners. One of

At its previous meetings, and in accordance with its terms of reference, the Regional Commission had selected two technical items for submission to the 23rd Conference:

- Technical Item I (drawn up on the basis of Members' answers to a questionnaire): **'Implementation and maintenance of animal traceability in the Americas: overview of current status and impact for international trade'**
- Technical Item II: **'Highly pathogenic avian influenza: challenges encountered and measures for preventing its spread'.**

1. ALA: Latin American Poultry Association
2. CVP: Permanent Veterinary Committee of the Southern Cone
3. FARM-MERCOSUR: Federation of Rural Associations of the Southern Common Market (MERCOSUR)
4. IICA: Inter-American Institute for Cooperation on Agriculture
5. OIRSA: *Organismo Internacional Regional de Sanidad Agropecuaria* (Regional International Organization for Plant Protection and Animal Health)
6. WCO: World Customs Organization

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Drafting recommendations adopted by the OIE Regional Commission for the Americas at the Conference

the main conclusions drawn from the discussion was that communication with all stakeholders and their active involvement in the OIE standard-setting process are essential to ensure mutual understanding of OIE standards, leading to safe trade that guarantees the quality and safety of animal goods and so protects the global consumer.

The 23rd Conference concluded as a success. The Regional Commission expressed its satisfaction with and wholehearted support for the new dynamic, stressing the need for OIE Members to take on board the full implications of OIE membership, in order to understand and fulfil their obligations and exercise their prerogatives, including the use of OIE tools to build the capacity of their Veterinary Services.

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Panel discussion of international and regional organisations, led by Dr Luis Barcos, OIE Regional Representative for the Americas.
From left to right: Dr Luis Barcos; Dr Luis Alberto Espinoza Rodezno (OIRSA); Dr Javier Ernesto Suárez Hurtado (Bolivia); Dr Isidro Molfese (Executive Director of ALA); Dr Monique Eloit (Director General of OIE); Dr Leonardo Macedo (WCO); Dr Jaime Ricardo Romera Prada (IICA); Dr Decio Couthino (FARM MERCOSUR); and Dr Jorge Dillon (interim President of the CVP)

Asia – Pacific

The ongoing fight against FMD across Asia

23rd Meeting of the OIE Sub-Commission for Foot and Mouth Disease Control in South-East Asia and China

Ronello Abila
OIE Sub-Regional Representative for South-East Asia
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Front row, from left: Dr Gongmin Wang, Deputy Director General, Ministry of Agriculture, P.R. China; Dr Syafrison Idris, Head of Risk Analysis Section, Ministry of Agriculture Office, Indonesia; Dr Kamarudin Md Isa, Director General, Department of Veterinary Services, Malaysia; Dr Him Hoo Yap, Director General and Deputy CEO, Agri-Food & Veterinary Authority, Singapore; Dr Ye Tun Win, Director General, Livestock Breeding and Veterinary Department, Myanmar; Dr Syseng Khounsy, Deputy Director General, Department of Livestock and Fisheries, Laos; Dr Sovann Sen, Director General, General Directorate of Animal Health and Production, Cambodia; Dr Monique Eloit, Director General, OIE; H.E. Malin Hor, Secretary of State, Ministry of Agriculture, Forestry and Fisheries, Cambodia; Dr Zhongqiu Zhang, Chief Veterinary Officer, Ministry of Agriculture, P.R. China; H.E. Pin Prakad, Deputy Governor of Siem Reap, Cambodia; Dr Mark Schipp, Chief Veterinary Officer, Department of Agriculture and Water Resources, Australia; Dr Enrico Garzon, Jr, Assistant Secretary, Department of Agriculture, Philippines; Dr Nguyen Thu Thuy, Deputy Director General, Department of Animal Health, Vietnam; Dr Wilai Linchongsubongkoch, Consultant, Department of Livestock Development, Thailand; Dr Ronello Abila, OIE Sub-Regional Representative for South-East Asia

The 23rd Meeting of the OIE Sub-Commission for Foot and Mouth Disease (FMD) in South-East Asia and China was held in Siem Reap, Cambodia, from 9 to 10 March 2017. The event hosted around 90 participants, including OIE Delegates (or representatives) of the 12 SEACFMD[1] Member Countries and neighbouring countries or territories, staff from OIE Headquarters and the Asian Representation offices, and representatives of international organisations and the private sector, as well as FMD experts and observers.

The Opening Ceremony was attended by Dr Malin Hor, Secretary of the State Ministry of Agriculture, Forestry and Fisheries of Cambodia, and Dr Zhongqiu Zhang, President of the OIE Regional Commission for Asia, the Far East and Oceania. They welcomed participants to the meeting and stressed the importance of FMD control in the SEACFMD region, considering the substantial FMD-susceptible animal populations and the critical role of livestock production for a growing human population.

In her keynote address, Dr Monique Éloit, OIE Director General, thanked Cambodia for hosting the meeting, and acknowledged the progress made by SEACFMD Member Countries in controlling FMD risks. Four out of 12 Member Countries have maintained freedom from FMD without vaccination (Brunei, Indonesia, the Philippines and Singapore), one country has an FMD-free zone without vaccination (Malaysia), and three Member Countries in which FMD is endemic have had their National FMD Control Plan endorsed by the OIE (China, Mongolia and Thailand).

The meeting reviewed the requirements in the OIE *Terrestrial Code* and *Manual* relevant to FMD vaccination, diagnostics and trade. Updates on the latest global and regional FMD situation and current challenges were also discussed.

1. SEACFMD: South-East Asia and China Foot and Mouth Disease Campaign

OIE/Preechaya Srithep

STANDZ Steering Committee Meeting

The recent cross-regional transmission of FMD virus (FMDV) O/ME-SA/Ind-2001d from South Asia was highlighted and Member Countries were asked to actively monitor the spread of this exotic virus strain and establish risk-based control and prevention measures.

Updates on the Campaign's progress along the milestones of the SEACFMD Roadmap and selected case studies from Member Countries were presented to demonstrate the practices and lessons learned in implementing the Roadmap; particularly in the areas of cross-border animal movement controls, FMD surveillance and outbreak investigation, vaccination, and post-vaccination monitoring, as well as coordination, advocacy, policy and governance. These discussions underlined the fact that further in-depth research is needed to understand and predict the epidemiological patterns of FMDV strains and improve vaccine selection. Better diagnostic methods and, especially, better vaccination are needed to significantly facilitate FMD control in endemic countries. In particular, vaccines with a longer duration of immunity are highly desirable, given the difficulty in carrying out repeated vaccinations in countries with limited resources.

On the second day, FMD-relevant activities from the OIE and FAO Regional Representations for Asia and the Pacific were presented, as well as industry reports from vaccine manufacturers. Other key partners, including the OIE Regional Reference Laboratories for FMD, Veterinary Authorities of neighbouring countries/territories, and research institutes, shared their recent developments in FMD research and control through poster presentations. Dr Francisco D'Alessio, representative of SENASA[2], shared the successful experience of South America in FMD eradication activities, stressing the importance of a regional governance and coordination mechanism and capacity-building for Veterinary Services, a tailored regional surveillance and mass vaccination strategy, sustained political and financial commitment from Member Countries and strong public–private partnerships.

The meeting also endorsed the outcomes of evaluations of applicant countries for their progress along the FMD Progressive Control Pathway (PCP–FMD). Cambodia, Laos and Myanmar retained their Stage 1 status, and Malaysia and Vietnam remain at Stage 3. The importance of a proper risk assessment in Stage 1 for the future success of the FMD programme was highlighted here. It was recommended that countries at PCP Stage 1 need to assess their FMD situation and its impact at the national level more accurately, and that countries completing PCP Stage 1 should consolidate their national plan and base their control measures on the risks identified at that stage. Recent active surveillance results have highlighted significant shortfalls in passive surveillance capability at the national level in these countries.

At the end of the meeting, the SEACFMD Campaign priorities and action plan for 2017/2018 were reviewed. The meeting concluded with key recommendations which will serve as a guideline for the SEACFMD Campaign's work over the next year. Discussions were productive and these recommendations will be submitted to the OIE World Assembly in May 2017 for endorsement.

2. SENASA: *Servicio Nacional de Sanidad y Calidad Agroalimentaria* (National Service for Agri-food Health and Quality, Argentina)

3rd FMD Roadmap Meeting for SAARC Member States

Caitlin Holley
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The Third Foot and Mouth Disease (FMD) Roadmap meeting was held in Colombo, Sri Lanka, in December 2016. The meeting was organised by the FMD Working Group under GF–TADs (Global Framework for the progressive control of Transboundary Animal Diseases) and was the result of collaboration between FAO, the OIE, and the European Commission for the Control of Foot-and-Mouth Disease (EuFMD), regional inputs from the South Asian Association for Regional Cooperation (SAARC) secretariat, and regional support from both the OIE and FAO.

The meeting was attended by technical staff working on FMD from the SAARC Member States, as well as Chief Veterinary Officers (CVOs) and experts from the GF-TADs FMD Working Group. The FMD World Reference Laboratory provided technical advice and shared experiences and case studies from other regions.

The objectives of the meeting were to provide training on the FMD Progressive Control Pathway (PCP) tool and the global FMD strategy, to form a regional advisory group for the PCP and undertake PCP assessments on SAARC Members. It was also a valuable opportunity to share information on current control programmes, circulating viruses, vaccines currently in use and commonly encountered problems amongst neighbouring countries.

The first day of the meeting was a chance to provide updates on the global FMD situation as well as its status in the South Asian region.

The FMD Working Group introduced the current FMD PCP tool, describing how the Regional Advisory Group undertakes country assessments with technical advice from the FMD Working Group. Members of the Regional Advisory Group were agreed upon during this session and interviews and assessments were carried out during the meeting.

Participating countries gave updates on their national FMD situation, including their national strategies for control, prevention and vaccination.

On the second day, workshops were held to discuss important regional issues, such as cross- border movements of animals, establishing stronger regional networks and deciding on SAARC regional priorities, as well as identifying synergies with other disease strategies such as that for peste des petits ruminants (PPR).

There were also discussions on how to update the regional Roadmap for FMD.

Aspects highlighted during the meeting included the need for access to good-quality vaccines that appropriately match the strains in circulation, for more information on animal movements in the region, and continued opportunities to collaborate and share information, as well as further laboratory and epidemiology training opportunities. During the PCP assessments, the importance of countries having a risk-based strategic plan to progress from PCP Stage 1 to Stage 2 was also highlighted.

The meeting was significant, as this was the first time that a Regional Advisory Group has been formed in South Asia. It will now have the ongoing task of reassessing PCP stages for countries in this region.

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PCP interview

Part of the family

Regional Meeting of OIE Reference Centres in Asia and the Pacific

Tokyo, Japan, 6–7 February 2017

Noriyoshi Ojima
Deputy OIE Regional Representative for Asia and the Pacific
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With support from the Ministry of Agriculture, Forestry and Fisheries, Japan (MAFF), the OIE organised the inaugural Regional Meeting of OIE Reference Centres in Asia and the Pacific, held in Tokyo, on 6–7 February 2017. The meeting was attended by 65 participants from OIE Reference Laboratories (RLs) and Collaborating Centres (CCs) located in Asia and the Pacific, staff from the OIE, and representatives of the host country, Japan.

The meeting opened with welcoming remarks on behalf of the host nation by Dr Kazuo Ito, OIE Delegate of Japan, and Director of International Animal Health Affairs of MAFF. Dr Hirofumi Kugita, OIE Regional Representative for Asia and the Pacific, also spoke at the opening.

The keynote speaker of the meeting was Dr Jean-Philippe Dop, OIE Deputy Director General, who discussed the activities of OIE Reference Centres, emphasising that the network of RLs and CCs is one of the great strengths of the OIE, representing – as it does – a global network of scientific excellence covering all areas of OIE activity. However, there is always room for improvement, and strengthening disease diagnostics and capacity-building remains an ongoing concern so that the members of the network can optimise their contributions to the services provided by the OIE to Member Countries.

In the Asia and Pacific region, there are 48 RLs and 12 CCs. These OIE Reference Centres can play a vital role in the improvement of animal health and welfare in the region, but not all of them are fulfilling their full potential. Although the Terms of Reference for OIE RLs require them to provide regional diagnostic testing facilities, 25 out of 43 RLs in Asia and the Pacific did not carry out diagnostic testing for other Member Countries in 2015. In the same vein,

The OIE has a global network of 322 reference centres, including 267 Reference Laboratories covering 118 diseases or topics in 38 countries and 55 Collaborating Centres covering 49 topics in 29 countries.

although the Terms of Reference also require RLs to provide scientific and technical training for personnel from Member Countries, only 24 OIE RLs in the region did so during 2015.

In this two-day meeting, the participants discussed the following key challenges:

- providing diagnostic testing facilities and technical advice on disease control measures to Member Countries outside their own,
- providing scientific and technical training for personnel from Member Countries outside their own,
- establishing a network with other OIE Reference Centres to exchange knowledge, reference materials and expertise for the benefit of Member Countries,
- participating in the OIE Twinning Programme,
- contributing to the development of standards for the OIE *Terrestrial* and *Aquatic Manual*s and other OIE standard-setting publications.

After presentations by designated experts from OIE Reference Centres, participants took part in free and open discussions about these topics, making constructive suggestions to the host country, the OIE, the Regional Representation for Asia and the Pacific (RRAP) and OIE Reference Centres.

The meeting closed by suggesting that the OIE think about more flexibility with its OIE Twinning Programme; recommending that the OIE RRAP organise regular meetings of OIE Reference Centres in this region to support and encourage their activities; and suggesting that the Reference Centres themselves should set up a regional network, becoming involved with other networks by species or topic (e.g. aquatic animals).This should promote the sharing of knowledge and resources, including biological reagents, with other OIE Reference Centres, as well as fostering collaborative research and inter-laboratory proficiency testing.

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Improving veterinary education in Eastern Europe and Central Asia

Djahne Montabord [(1)*], Pierre Sans [(2)] & Agnès Leblond [(3)]

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(2) Animal Productions– Economics, Toulouse National Veterinary School (France)

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Delegates from countries of Eastern Europe and Central Asia gathered in Almaty (Kazakhstan) on 12–13 October 2016 to consider improvements to veterinary education, and are now working on the establishment of a regional association of Veterinary Education Establishments (VEEs).

The meeting was organised by the OIE Sub-Regional office in Astana, the Kazakh National Agrarian University (KazNAU) and the National Veterinary School of Toulouse, France (ENVT). The meeting, supported by the French veterinary schools of Toulouse and Lyon and the Ministry of Agriculture of Kazakhstan, brought together 42 representatives of VEEs and Veterinary Services from the 11 participating countries (Armenia, Azerbaijan, Belorussia, Georgia, Kazakhstan, Kyrgyzstan, Russia, Tajikistan, Turkmenistan, Ukraine and Uzbekistan), along with 39 observers from Kazakhstan, all highly interested in the topic.

The Vice-Minister of Agriculture of Kazakhstan, Ms Gulmira Issayeva, at the opening of the meeting, shared her country's experience in the implementation of an OIE twinning programme designed to improve educational standards and the quality of the veterinary profession. The Vice-Minister had realised, a long time ago, the importance of strengthening veterinary education in Kazakhstan as a key to achieving a sustainable improvement of Veterinary Services. The ultimate goal was to ensure a high level of health in animal and food production to enable Kazakh products to access international markets.

Under the auspices of the OIE, with the participation of Dr Bernard Vallat, Honorary Director General of the OIE, the meeting was structured around a presentation of the progress and provisional results of the institutional partnerships under two veterinary education twinning projects with French veterinary schools:

a) one in Kazakhstan (ENVT with KazNAU);

b) the second in Ukraine (VetAgro Sup Lyon and Agrarian University of Bila Tserkva).

These twinning projects targeted the alignment of veterinary education curricula with OIE guidelines and recommendations on veterinary education – recent OIE Veterinary Education Global Conference recommendations, as well as the OIE guidelines on the competencies of graduating veterinarians ('Day 1 competencies') and the OIE Veterinary Education Core Curriculum – all of which were presented to the participants at the meeting.

The meeting had the following main objectives to direct future action in Eurasia:

- analyse the current situation of veterinary education in the region
- review the experiences of OIE Members with OIE veterinary education twinning projects
- follow up on the OIE recommendations approved in Paris, Lyon, Foz de Iguazu and Bangkok
- discuss how OIE Members can improve governance using the OIE PVS (Performance of Veterinary Services) Pathway
- tighten relationships among veterinary authorities and Veterinary Education Establishments (VEEs)
- review innovative teaching practices and discuss how to improve global access to them.

In order to guide activities in the coming year, the meeting concluded with some important recommendations:

- enhance curricula to implement OIE standards and guidelines, meet professional and social expectations and adopt innovative teaching methods and educational best practices
- facilitate the dialogue between Veterinary Statutory Bodies (VSBs) and VEEs to adapt the training offered to the demand for high quality veterinarians
- encourage the VEEs to promote continuing education programmes for veterinarians

and, for OIE, in addition to the general support to countries:

- facilitate regional cooperation and harmonisation among the VEEs.

Active exchanges of ideas and points of view: the regional dynamic in action

Following very animated presentations of veterinary training systems during the two-day meeting, participants expressed, in working group discussions, the expected improvement of education methods, and many ideas arose – the first of which was to better match veterinary education to the real world by developing collaboration between veterinary faculties and the professional world. Linking establishments and launching the sharing of experience can start with the creation of a common platform of knowledge (e.g. bibliographic resources, distance learning) or through development of the already existing collaborative networks, to refocus on a regional approach where issues and materials could be shared or staff or students exchanged. As an outcome of the discussion of such regional developments, interest emerged in a commonly recognised diploma for the region, enabling future exchanges of vets, with each country keeping its specificities.

Potential further twinning

This meeting also gave a unique chance for the participants to take new possible VEE twinning projects into consideration when they judged the process to be a possible solution to enable them to better adapt the national curricula to OIE guidelines and recommendations. Kyrgyzstan and Belarus, already involved in such considerations, took this opportunity at the meeting to gather the appropriate information to guide their projects.

The recommendations adopted by participants concentrated around three main objectives:

a) strengthening the curricula,
b) improving the dialogue between Veterinary Statutory Bodies (VSB) and VEE, and
c) improvement of continuing education.

A regional association in preparation

All these numerous ideas led naturally to a proposal to create a regional association of VEEs, as a dedicated forum to discuss progress at regular meetings. Strengths identified for its implementation were: the level of knowledge and skills; the mobilisation of each country, school and university; and the Russian language as the common means of communication.

Achievements since the meeting

A few months after the meeting, some of the participating VEEs started to engage in new projects.

Belarus and Kyrgyzstan have started to prepare twinning requests.
A cooperation agreement has been signed between KazNAU and Agrarian University of Bila Tserkva, the latter preparing other partnerships with some of the VEEs present at the meeting in October. A first version of the statutes of the forthcoming association has been drafted and discussed during the 85th OIE General Session. It is on track to be launched, hopefully, during the next meeting, which Ukraine has agreed to host.

As a pioneering activity in the region, this meeting highlighted the interest in revising the veterinary curricula in the participating countries, paying specific attention to ensuring compliance of the curricula with the OIE guidelines. The final goal is to adapt regional veterinary curricula in accordance with global market needs, the evolution of which has not yet been fully identified. We hope that what was started in Almaty will be the preliminary point for a regional dynamic in which the VEEs and Veterinary Services will work together to implement the OIE guidelines and recommendations on veterinary education.

http://dx.doi.org/10.20506/bull.2017.2.2643

Setting a new standard in OIE Member Country support

Regional workshop on OIE standards – Facilitating safe international trade

Dubai, United Arab Emirates, 14–15 March 2017

Ghazi Yehia [1], Patrícia Pozzetti [2] & Leopoldo Stuardo [2]

(1) Regional Representative for the Middle East, World Organisation for Animal Health (OIE), Beirut, Lebanon

(2) Chargé(e) de mission, Standards Department, World Organisation for Animal Health (OIE), Paris, France

The OIE held a Regional Workshop on OIE Standards as part of a series of activities supported by the Australian Department of Agriculture and Water Resources, aiming to facilitate safe international trade. The workshop was organised by OIE Headquarters in collaboration with the Regional Representation for the Middle East and facilitated by Dr Leopoldo Stuardo and Dr Patrícia Pozzetti (OIE Standards Department), with the assistance of Dr Ghazi Yehia (OIE Regional Representative for the Middle East) and Dr Alex Thiermann, past President of the Terrestrial Animal Health Standards Code Commission.

The OIE also acknowledges the significant contribution of the Ministry of Environment and Climate Change of the United Arab Emirates in hosting this workshop.

Representatives of the Veterinary Services of Bahrain, Iraq, Jordan, Lebanon, Qatar, Saudi Arabia, the United Arab Emirates and Yemen took part.

The objective of this workshop was to assist participants to develop a broader understanding of the OIE standard-setting process and see how OIE standards and tools can aid in taking appropriate animal health measures to facilitate safe trade.

The workshop programme was designed to focus on two main goals:

a) developing practical knowledge and understanding of OIE standards and how they relate to the World Trade Organization (WTO) framework; and

b) applying this knowledge and understanding when selecting appropriate animal health and welfare measures for animals and animal products in international trade.

This workshop contributes to the OIE's implementation of Strategic Objective No. 3 of its Sixth Strategic Plan – ensuring the capacity and sustainability of Veterinary Services by providing direct support (including capacity development) and technical advice to Member Countries on OIE standards and guidelines.

The technical programme of the workshop was composed of presentations and group discussions, highlighting the following topics:

- a general knowledge of OIE core missions
- OIE standards and their relationship to WTO Agreements
- OIE-listed diseases and notification procedures
- the principles of risk assessment under the OIE Framework (Performance of Veterinary Services [PVS] and disease notification)
- the development of import and export regulations and policies, and elements to consider when developing animal health certificates
- OIE animal welfare standards, in particular OIE *Code* chapters on the transport of animals, and
- the OIE Global Animal Welfare Strategy and the implementation of the OIE Regional Animal Welfare Strategy and Action Plan.

In the introductory session, Dr Stuardo highlighted key points of the structure and history of the OIE. To ensure the active participation of all attendees, this was done via a quiz, which enabled the workshop facilitators and presenters to quickly evaluate the participants' knowledge of the OIE and, at the same time, deliver essential information about the OIE's mission and activities.

During the second session, Dr Thiermann led the participants in an exchange of views on their countries' needs and challenges, as well as the current situation of trade in live animals and animal products in the region.

To build on the interactive discussion, Dr Pozzetti led the participants through a practical exercise that demonstrated how participants should take into account the OIE's standards and other tools (i.e. risk analysis) when preparing a health certificate for live animals or animal products.

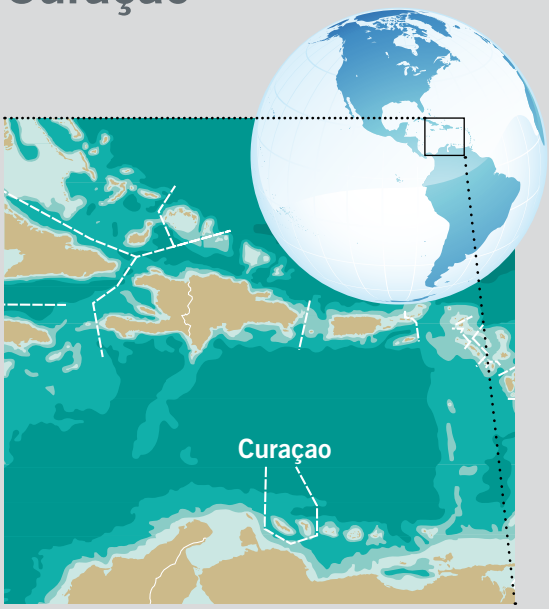
During the final session of the workshop, Dr Stuardo and Dr Yehia introduced the OIE standards for animal welfare during transport by land and sea, together with the objectives of the Regional Animal Welfare Strategy and its Action Plan to facilitate the implementation of these standards.

The countries of this region are major importers of live animals and their products and, accordingly, the presentations and discussions were directed towards assessing the animal health situation in the exporting country, using risk analysis and other standards and recommendations of the OIE to ensure the protection of animal health and welfare in importing countries in the region.

Participants discussed their experiences and challenges involved in the negotiation and preparation of animal health certificates. By the time the workshop ended, attendees said that they felt more familiar and confident with the use of OIE standards and recommendations to promote safe trade in live animals and animal products.

official acts

The OIE welcomes its 181st Member: Curaçao



The accession of Curaçao to the OIE took effect on 27 May 2017[1].

On becoming an OIE Member, this autonomous state of the Lesser Antilles within the Kingdom of the Netherlands joined the OIE Regional Commission for the Americas, which now has 31 members.

The Government of Curaçao has appointed Dr Arnold Dwarkasing as its permanent Delegate to the OIE.

Photo by Jabneel Statia on Unsplash

1. Resolution No. 14 adopted by the World Assembly of Delegates of the OIE on 26 May 2017 in view of an entry into force on 27 May 2017

Appointment of permanent Delegates

29 March 2017

Uruguay

Dr Eduardo Barre Albera

Director General de Servicios Ganaderos, Ministerio de Ganadería, Agricultura y Pesca

4 April 2017

Fiji

Mr Hillary Kumwenda

Chief Executive Officer, Biosecurity Authority of Fiji (BAF)

10 April 2017

Bangladesh

Dr Ainul Haque

Director General, Department of Livestock Services, Ministry of Fisheries and Livestock

19 April 2017

Kuwait

Dr Maha Al-Mershad

Director of Central Veterinary and Research Laboratory, Public Authority for Agriculture Affairs & Fish Resources

27 April 2017

Kazakhstan

Dr Zhomart Nurkenov

Chairman of Committee of veterinary control and supervision, RSE 'National Reference Center for Veterinary', Ministry of Agriculture

5 May 2017

Saudi Arabia

Dr Ali Al Doweriej

Director General of Veterinary Health and Monitoring Department, Ministry of Environment, Water and Agriculture

8 May 2017

Georgia

Dr Lasha Avaliani

Head of Veterinary Department, Deputy CVO, National Food Agency, Ministry of Agriculture

10 May 2017

Cameroon

Dr Marcel Casimir Ndongo Kounou

Directeur des Services vétérinaires, Ministère de l'élevage, des pêches & des industries animales

16 May 2017

Nicaragua

Dr Wilmer José Juárez Juárez

Director de Salud Animal, Instituto de Protección y Sanidad Agropecuaria (IPSA)

27 May 2017

Curaçao

Dr Arnold Dwarkasing

Chief Veterinary Officer, Veterinary Services

1 June 2017

Lithuania

Dr Darius Remeika

Director of the State Food and Veterinary Service, State Food and Veterinary Service, Ministry of Agriculture

30 June 2017

Ecuador

Dr Milton Fernando Cabezas Guerrero

Director Ejecutivo, Agencia Ecuatoriana de Aseguramiento de la Calidad del Agro (AGROCALIDAD), Ministerio de Agricultura y Ganadería

4 July 2017

Former Yug. Rep. of Macedonia

Mr Zoran Atanasov

Director, Food and Veterinary Agency, Ministry of Agriculture, Forestry and Water Economy

strengthening of Veterinary Services

OIE PVS Pathway for efficient Veterinary Services

PVS Evaluation missions

State of Play – as at 1 August 2017

OIE Region	OIE Members	Requests received	Missions completed	Reports available for distribution to donors and partners
Africa	54	53	51	43
Americas	29	26	25	19
Asia and the Pacific	32	25	25	14
Europe	53	19	19	11
Middle East	12	13	11	6
Total	**180**	**136**	**131**	**93**

PVS Evaluation mission requests

- **Africa** (53)

Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Rep., Chad, Comoros, Rep. of the Congo, Dem. Rep. of the Congo, Côte d'Ivoire, Djibouti, Egypt, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Libya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, São Tomé and Principe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, Sudan, Swaziland, Tanzania, Togo, Tunisia, Uganda, Zambia, Zimbabwe.

- **Americas** (26)

Argentina, Barbados, Belize, Bolivia, Brazil, w Chile, Colombia, Costa Rica, Dominican Rep., Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname, Trinidad and Tobago, Uruguay, Venezuela.

- **Asia-Pacific** (25)

Australia, Bangladesh, Bhutan, Brunei, Cambodia, Fiji, Indonesia, Iran, Japan, Dem. People's Rep. of Korea, Laos, Malaysia, Maldives, Mongolia, Myanmar, Nepal, New Caledonia, Pakistan,
Papua New Guinea, Philippines, Sri Lanka, Thailand, Timor Leste, Vanuatu, Vietnam.

- **Europe** (19)

Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Georgia, Iceland, Israel, Kazakhstan, Kyrgyzstan, Former Yug. Rep. of Macedonia, Romania, Serbia, Tajikistan, Turkey, Turkmenistan, Ukraine, Uzbekistan.

- **Middle East** (13)

Afghanistan, Bahrain, Iraq, Jordan, Kuwait, Lebanon, Oman, Palestinian N.A. (observer), Qatar, Saudi Arabia, Syria, United Arab Emirates, Yemen.

In red: completed missions

PVS Pathway

Legislation identification missions

State of Play – as at 1 August 2017

OIE Region	OIE Members	Requests received	Missions completed
Africa	54	41	36
Americas	29	9	7
Asia and the Pacific	32	8	7
Europe	53	5	4
Middle East	12	5	4
Total	**180**	**68**	**58**

PVS Gap Analysis missions

State of Play – as at 1 August 2017

OIE Region	OIE Members	Requests received	Missions completed	Reports available for distribution to donors and partners
Africa	54	52	50	33
Americas	29	18	13	10
Asia and the Pacific	32	21	17	9
Europe	53	10	9	4
Middle East	12	10	4	0
Total	**180**	**111**	**93**	**56**

Legislation identification mission requests

- **Africa** (41)

Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Central African (Rep.), Chad, Comoros, Dem. Rep. of the Congo, Côte d'Ivoire, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Libya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Niger, Nigeria, Rwanda, Senegal, Seychelles, Sudan, Tanzania, Togo, Tunisia, Uganda, Zambia, Zimbabwe.

- **Americas** (9)

Barbados, Belize, Bolivia, Dominican Rep., Guatemala, Haiti, Honduras, Panama, Paraguay.

- **Asia/Pacific** (8)

Bhutan, Cambodia*, Fiji, Laos, Mongolia, Papua New Guinea, Vietnam.

- **Europe** (5)

Armenia, Georgia, Israel, Kazakhstan, Kyrgyzstan.

- **Middle East** (5)

Afghanistan, Kuwait, Lebanon, Saudi Arabia, United Arab Emirates.

In red: completed missions
* Including a full mission following an initial pilot mission

PVS Gap Analysis mission requests

- **Africa** (52)

Algeria, Angola, Benin*, Botswana, Burkina Faso, Burundi, Cameroon, Central African (Rep.), Chad*, Comoros, Dem. Rep. of the Congo, Côte d'Ivoire, Djibouti, Egypt, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea*, Guinea-Bissau, Kenya, Lesotho, Liberia, Libya, Madagascar*, Mali, Mauritania, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Seychelles, Sierra Leone, South Africa, Sudan, Swaziland, Tanzania, Togo, Tunisia, Uganda, Zambia, Zimbabwe.

- **Americas** (18)

Argentina, Barbados, Belize, Bolivia, Brazil, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Nicaragua, Panama, Paraguay, Suriname.

- **Asia-Pacific** (21)

Bangladesh, Bhutan, Brunei, Cambodia, Fiji, Indonesia, Iran, Dem. People's Rep. of Korea, Laos, Malaysia, Maldives, Mongolia, Myanmar, Nepal, Philippines*, Sri Lanka, Thailand, Timor Leste, Vanuatu, Vietnam.

- **Europe** (10)

Armenia, Azerbaijan, Bosnia and Herzegovina, Israel,Kazakhstan, Kyrgyzstan, Serbia, Tajikistan*, Turkey.

- **Middle East** (10)

Afghanistan, Jordan, Kuwait, Lebanon, Oman, Palestinian N.A. (observer), Saudi Arabia, Syria, United Arab Emirates, Yemen.

In red: completed missions
*Including second Gap Analysis missions and Aquatic Gap Analysis mission

OIE PVS Pathway Think Tank Forum
Reflections and Directions at the 10–Year Mark

John Stratton

Deputy Head of the Regional Activities Department, World Organisation for Animal Health (OIE)

OIE/N.Filiol

The OIE PVS Pathway is exactly 10 years old… and still going strong! This 10-year birthday milestone provided the OIE with a symbolic opportunity to pause and reflect on its landmark programme, to analyse both its successes and challenges and, in so doing, to set directions for an even brighter PVS Pathway future. The biggest risk with successful long-running programmes such as the OIE PVS Pathway is complacency. In this spirit, a total of 74 representatives of OIE Member Countries, staff, PVS Pathway experts and key partners met in Paris on 4–6 April 2017 for the PVS Pathway Think Tank Forum, to review and plan for its strategic evolution.

As a flagship programme of the OIE, overall, the PVS Pathway has been an unmitigated success over the past decade, with more than 130 Member Countries actively engaged by requesting an OIE PVS Evaluation mission, and most of these countries also requesting several other types of mission. There is growing evidence of the major global impact that the PVS Pathway has had on strengthening national Veterinary Services in various areas. Contrary to a prevailing myth that the PVS Pathway was only suitable for developing countries, recent years have seen full, active engagement from highly developed nations.

The challenge of the Forum was to maintain all that is good and unique about the OIE PVS Pathway, while at the same time working together to evolve it, to adapt it to shifting contexts and priorities, and re-invent it to engender renewed enthusiasm and support to assure its future.

The participants were categorised into four roughly equal-sized stakeholder groupings representing:

a) OIE Member Countries
b) OIE staff
c) OIE PVS Pathway experts
d) OIE partners.

While all groups had the opportunity to contribute during plenary sessions on Days 1 and 3,

on Day 2 each group undertook a 'deep dive' to analyse 4–5 concepts or options of most relevance to their grouping for evolving the PVS Pathway.

Excellent feedback was received from all participants on the detailed preparations, the interactive and innovative format and delivery, and the positive, open and convivial atmosphere throughout.

The report is being finalised and outcomes will be shared with all Member Countries and interested parties, with OIE's PVS Pathway evolution to be rolled out intensively over the next 12–18 months. As an overall theme, this will involve providing OIE Member Countries, staff, experts and partners with a more tailored, flexible approach to their PVS Pathway engagement that is more responsive to their particular needs. This form of 'tailored' evolution is fully appropriate given that the PVS Pathway is long established, with stable and robust basic tools and methods. With the great majority of countries already possessing a solid baseline of PVS Pathway evaluation and planning, more highly tailored approaches will further assist them in moving forward with the OIE to improve animal health both in their country and globally.

Please stay tuned, as the main theme of the next issue of the OIE *Bulletin* will be *'OIE PVS Pathway Evolution – Reflections and Directions at the 10–Year Mark'*. The issue will report in much greater detail on the discussions and outcomes of the Think Tank Forum and its implementation planning for the benefit of all readers and global animal health.

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OIE PVS Pathway:
www.oie.int/en/support-to-oie-members/pvs-pathway/

Pilot programme for PPR-specific country assessments during PVS Evaluation or Follow-up missions

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At the beginning of April 2015, the OIE and FAO jointly launched the **Peste des Petits Ruminants (PPR) Global Control and Eradication Strategy (GCES)**[1] at an international conference held in Abidjan, Côte d'Ivoire. The GCES was endorsed at Ministerial level by representatives from the more than 70 countries in attendance.

This was followed by the development, endorsement and publication of the **PPR Global Eradication Programme (GEP)** in 2016. While the principal objective of both the GCES and the GEP is to progressively control PPR infection, with the ultimate goal of global eradication by 2030, a second important goal is to strengthen national Veterinary Services, to support the eventual eradication of PPR and the effective control of other small ruminant diseases.

The strengthening of Veterinary Services is a major focus of the OIE and is incorporated into the Organisation's Sixth Strategic Plan (2016–2020). Through the PVS Pathway and its associated tools and programmes, the OIE provides opportunities for Member Countries to undertake systematic assessments of their overall Veterinary Services, as well as of specific components, in order to identify gaps and weaknesses in relation to the OIE standards embodied in the *Terrestrial/Aquatic Animal Health Codes*.

The OIE/FAO PPR Working Group, which developed the GCES, also developed **a PPR Monitoring and Assessment Tool (PMAT)**, to assess a country's PPR disease control status and the country's ability to move through the four stages of PPR control and eradication, namely:

1. epidemiologic assessment,
2. control,
3. eradication, and
4. post-eradication.

Successful implementation of each of these stages depends on specific capacities within the national Veterinary Services, including risk assessment, laboratory diagnostic capacity, disease surveillance, and maintenance of the vaccination cold chain, among others. Not surprisingly, then, the PMAT is built around 33 of the 47 critical competencies included in the PVS Tool, which is used during OIE PVS Evaluation missions of Member States. These 33 critical competencies are considered the most relevant to the specific goal of controlling and eradicating PPR.

This convergence of the PPR GCES and the PVS Pathway led to discussions within the OIE about the potential value of integrating a PPR assessment component into PVS Pathway missions, notably PVS Evaluation missions or Evaluation Follow-up missions. This idea was then discussed with the PPR Global Secretariat at FAO Headquarters in Rome. As a result of the interest expressed by the PPR secretariat, **a meeting was organised at OIE Headquarters in Paris on 2 February 2017**, with representation from the PPR secretariat and PVS and PPR experts, to discuss the feasibility and logistics of implementing PPR pilot missions in the context of PVS Pathway missions.

At the meeting, it was agreed that the idea of assessing a country's preparedness to successfully engage in the PPR GCES in the context of a PVS Evaluation or Evaluation Follow-up Mission was a good one, given that the performance of a country's Veterinary Services is a crucial element in carrying out the activities necessary for the successful completion of each stage of the GCES, and that the PMAT is based on the PVS Tool. However, it was also essential that the main purpose of the PVS Evaluation – namely, the broad and systematic

1. Global strategy for the control and eradication of PPR: www.oie.int/PPRStrategy

review of national Veterinary Services, through assessment of 47 critical competencies, to determine how well these Veterinary Services comply with OIE standards – should not be compromised by adding the PPR-specific evaluation.

Once this was agreed, the participants developed a list of specific questions to be asked during the mission to assess PPR GCES preparedness. The questions were linked to the 33 critical competencies of the PVS Tool already associated with the PMAT. As an example, Critical Competency II-1A addresses the technical capacity of laboratories, while the PPR-specific question would assess the laboratory capability for specific diagnostic tests associated with PPR, such as reverse transcription polymerase chain reaction (RT–PCR) to detect PPR virus. It was also agreed that one member of the mission team would be responsible for the PPR component, as well as participating in the mission as a whole, and that at least half a day would be set aside for that team member to meet with country counterparts to discuss the PPR component in depth.

Since that meeting, two PVS Evaluation Follow-up missions which included PPR pilot missions have been conducted. The first was in Turkey, from 6 to 17 March 2017, and the second took place in Afghanistan, from 12 to 24 April 2017. The reports of these missions have not yet been finalised but debriefings indicate that there was no conflict or interference between the PPR-specific activities and the performance and integrity of the general assessment. It was also clear that the PPR exercise is useful in helping PPR-infected countries understand the challenges of effective PPR control, and the necessary elements required to advance through the four stages of the GCES, from epidemiologic assessment to post-eradication monitoring. In the mission reports, the PPR-specific assessment will be presented separately from the general PVS assessment, as an annex to the report.

Consideration is now being given to finalising guidance and documentation, based on the experiences of these two pilot missions, and to subsequent PVS Evaluation or Evaluation Follow-up missions which contain a PPR-specific component.

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OIE Peste des Petits Ruminants Portal:
www.oie.int/PPR

OIE Regional Workshops
for focal points and Information Seminars for new Delegates

Connecting the dots: how regional seminars for National Focal Points for Veterinary Laboratories influence the OIE's work

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Keywords

Biological risk analysis – international standards – laboratory – *Manual of Diagnostic Tests and Vaccines* – National Focal Point – quality management – regional seminar – stewardship – transport of specimens – World Organisation for Animal Health (OIE).

Summary

The global capacity-building programme for OIE National Focal Points for Veterinary Laboratories focuses on providing tools for OIE Members to comply with the OIE international standards concerning laboratories, carry out appropriate activities and transfer knowledge at all levels of the laboratory network. Regional seminars are an opportunity not only to update Members on the OIE standards but also to exchange experiences and information and provide feedback on the future work of the OIE. The OIE will continue to encourage the active participation of Veterinary Laboratory Focal Points in the development and implementation of OIE standards, which, in turn, will inform the OIE's work on additional guidance and tools for laboratories in Member Countries.

What is the Global Laboratory Focal Point Programme?

The OIE launched a global capacity-building programme for OIE National Focal Points for Veterinary Laboratories in 2013.

The first cycle of regional seminars for Laboratory Focal Points took place in October 2015 in the European region and concluded in December 2016 in the Middle East, with all OIE regions having benefited from this first round of seminars. In this first cycle, the intention was to provide a broad overview of all OIE standards and activities related to laboratories, as many Laboratory Focal Points were relatively new to the OIE. In taking this approach, the OIE attempted to lay a solid foundation of awareness of the OIE international standards, allowing all Laboratory Focal Points to begin from the same level of understanding.

Jeju, Republic of Korea, 5–7 April 2016

Buenos Aires, Argentina, 28–30 June 2016

The seminars focused on the importance of strong collaboration with the OIE Delegate and with other National Focal Points for other topics. Also highlighted was the role of laboratories in the veterinary domain and Veterinary Services, and the crucial task of preparing comments for the Delegate on OIE draft standards. The seminars were held over three days, and included a visit to a veterinary laboratory in the host country, plenary and working group sessions, scenarios, discussions, and presentations by OIE Reference Centre Experts, with an emphasis on networking and building strategies to involve the OIE Delegate and other National Focal Points.

Using OIE Member feedback to shape the approach for future regional seminars

Throughout the course of the seminars, the OIE has worked hard to understand the most pressing and important themes to explore further, to increase the impact that this training programme has on the work of the Laboratory Focal Point in each Member Country. As a result, the second cycle of regional seminars will attempt to instil a deeper understanding of the OIE international standards. It will also provide a forum for discussion on the challenges facing Laboratory Focal Points and the need for practical tools to contribute directly to their effectiveness in implementing the OIE standards.

To produce the most effective second cycle of regional seminars for Laboratory Focal Points, Member feedback has been seriously considered and incorporated. The seminar's theme, 'Creating and nurturing a culture of safety and quality', will allow a deeper examination of the four pillars of good laboratory management: i.e. transport

Evaluation of the Global Laboratory Focal Point Programme's first cycle of regional seminars

According to 155 seminar evaluations filled out by the Laboratory Focal Points of all five OIE Regions, 99% of participants said they were satisfied or fully satisfied with the overall technical content of the seminar, with a global average score of 3.77 out of 4 points. When asked about the impact that the seminar had or will have on their work, 95% of Laboratory Focal Points said that the seminar had a good or significant impact on their work, giving 3.46 out of a possible 4 points. Most participants said that they now had a better understanding of the role of the Laboratory Focal Point after the seminar. In this regard, the OIE is confident that the objectives of the first cycle of the Laboratory Focal Point Programme have been met.

What does being a Laboratory Focal Point really mean?

While the Terms of Reference for a National Focal Point for Veterinary Laboratories are available online[1], they only tell part of the story. In one word, the Laboratory Focal Point's main goal to fulfil his or her terms of reference is *stewardship,* or supporting the careful and responsible management of the national veterinary laboratory network, in close collaboration with the OIE Delegate. In practice, the Laboratory Focal Point would ideally be the champion for the implementation of the OIE international standards on biosafety and biosecurity, quality management, and the overall scientific excellence of the laboratory network, as well as the safe collection and transport of samples within their country. The regional seminars provide the knowledge and tools to carry out this mission of stewardship of the national veterinary laboratory network, since the outputs of that network provide the evidence base for decisions taken by Veterinary Services, and support their good governance.

of specimens, biological risk analysis, quality management and laboratory networking. The seminar's theme and approach focus on providing practical tools to Laboratory Focal Points, so that they will be better equipped to translate their knowledge of the OIE international standards into action in their role as stewards of the national veterinary laboratory network. The four pillars framework will also inform the structure of future seminars, as each pillar is built on over time. It goes without saying, therefore, that Member Countries should commit to taking an active part in these seminars if they wish to benefit from the information, tools and opportunity to exchange knowledge and experience that they offer.

Using OIE Member feedback to shape the OIE's future work

While regional seminars for Laboratory Focal Points primarily help to inform Members of the OIE international standards with regard to veterinary laboratories, they are also an important moment to give feedback on the future work of the OIE. Within these regional seminars, Members have expressed a need for additional guidance and tools from the OIE to implement quality management systems in their veterinary laboratories, in order to demonstrate both competency and consistency in producing valid results to meet the needs of their clients.

To better understand this feedback from OIE Members, the Organisation has begun to analyse laboratory-related data from the OIE Tool for the Evaluation of Performance of Veterinary Services (OIE PVS Tool). The PVS Tool has evolved since it was first developed in 2006, particularly in terms of laboratories. New critical competencies have been added over time, which explains the difference in denominators. In addition, the four OIE Members who have undergone a PVS Evaluation and who belong to both the African and Middle East regions are counted in the African region for the purposes of this preliminary analysis.

The analysis of PVS Tool data on laboratories and quality assurance[2] shows that 56% (49/87) of all OIE Members evaluated, and 77% (24/30) of OIE Members in Africa, used formal quality assurance systems in none, or only in some, of the veterinary laboratories used by public-sector Veterinary Services.

Moreover, 55% (71/129) of all OIE Members evaluated, and 69% (35/50) of African OIE Member Countries evaluated, do not have sufficient access[3] to veterinary laboratory diagnosis and so disease diagnosis is almost always conducted by clinical means only. They have no access to or use of a laboratory to obtain a correct diagnosis, or access is available only for major zoonoses and diseases of national economic importance.

These preliminary findings shine a light on important needs for Member Countries, and will affect the investments that the OIE makes in coming years on the implementation of OIE standards for veterinary laboratories. These results may also influence partners and donors, by highlighting strategic areas for investment, focused on long-term sustainability.

As a direct result of this information, and in an effort to ensure that the OIE international standards can be implemented by all OIE Members, an *Ad hoc* Group on the Development of Quality Management Systems Implementation Tools will be convened in September 2017. Once companion guidance and tools to the OIE *Manual of Diagnostic Tests and Vaccines for Terrestrial Animals* and *Manual of Diagnostic Tests for Aquatic Animals* are developed by the *Ad hoc* Group, they will find a ready audience at the regional seminars for OIE National Focal Points for Veterinary

1. www.rr-africa.oie.int/en/RC/OIE_focal%20point_ToR_Laboratories_2012.pdf
2. Critical Competency II.2 Laboratory Quality Assurance
3. Critical Competency II.1-A Access to Veterinary Laboratory Diagnosis

Laboratories. This work will provide Member Countries with practical tools to gain a deeper understanding of the crucial importance of implementing quality management systems to create and promote a culture of safety and quality in all veterinary laboratories. It will also assist in guaranteeing the validity of test results for Veterinary Services when making decisions and thereby contribute to good governance. In the future, the OIE hopes that the strong involvement of Laboratory Focal Points in the implementation of the OIE international standards, in addition to close collaboration with the OIE Delegate and other National Focal Points, will continue to inform the OIE's work on additional guidance and tools for veterinary laboratories in Member Countries.

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Veterinary Services in Africa and the accidental or intentional release of biological agents: time for a wake-up call?

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Keywords

Africa – biological – biosafety – laboratory – OIE – terrorism – threat – UNSCR 1540.

Summary

Although most animal disease outbreaks and food contamination incidents occur naturally, there is the possibility that disease may be spread following deliberate or accidental release of an infectious agent or toxin. Although the likelihood of such an event is low, the impact may be considerable and cross national boundaries. This paper looks at the vulnerability of African Veterinary Services, and in particular their national veterinary laboratories, to such occurrences. Some terrorist organisations seek to possess stocks of pathogens such as those of bubonic plague and anthrax. This, combined with weak public health and animal health systems in many parts of Africa (as illustrated by the recent outbreaks of Ebola), is cause for concern. According to the OIE's Performance of Veterinary Services (PVS) evaluation system, the most severely affected countries in West Africa possessed veterinary laboratories that were, at the time of the Ebola outbreaks, regarded as non- or under-performing. In Africa, 25% of national Veterinary Services almost always conduct diagnosis by clinical means only, without use of or access to a laboratory. Many veterinary laboratories store, handle and produce live vaccines under circumstances which are dangerous for both the laboratory personnel and the environment, with few or no biosafety and biosecurity measures.

Except for a few plant-derived toxins and strictly human pathogens, most of the known biological agents are of animal origin, and many are listed by the OIE. The OIE has entered into partnerships to bolster support from the security sector for programmes such as laboratory twinning, rinderpest post-eradication activities, the renovation of the World Animal Health Information System (WAHIS), the PVS Pathway and training for national laboratory focal points: the first training session was held in Zimbabwe in December 2016. The OIE is also working closely with the United Nations Office of Disarmament Affairs and with the Committee that supports the implementation of the UN Security Council Resolution 1540 (2004). As far as Africa is concerned, it is the African Union Commission that oversees the implementation of UNSCR 1540.

The OIE, in line with the UNSCR 1540 Resolution, and with its partner organisations at international and continental level, is ready to assist veterinary laboratory managers throughout Africa in assessing where they stand in terms of protecting the biological materials that they may stock, including vaccines, from being inadvertently or deliberately released into the environment.

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Introduction

Infectious disease agents and toxins found in animal populations and animal products are a considerable and on-going threat to animal health, agricultural economies, food security (both crops and livestock), food safety and public health. Most disease outbreaks and food contamination incidents occur naturally. However, there is also a real risk that disease may be introduced into susceptible human or animal populations following deliberate or accidental release of an infectious agent or toxin. These 'unnatural' biological threats carry special risks because pathogens may be engineered or released in such a way as to make them more harmful. Although the probability of a deliberate or accidental release may be relatively low, the impact may be catastrophic, from a national to a global level [13]. This paper looks at the vulnerability of African Veterinary Services, and in particular their national veterinary laboratory systems, to such deliberate or accidental release of pathogens, in a context of decreasing investments in Veterinary Services and the simultaneous emergence of terrorism cells in some countries of the continent.

Biological threats in the African perspective

As per the OIE Strategy on Biological Threat Reduction [10], a biological threat or 'bio-threat' refers to the accidental or deliberate release of a pathogen or toxin into a susceptible population.

At first glance, a focus on biological threats in Africa may seem out of place. However, if we consider the threat of terrorism and the risk of the intentional release of pathogens and toxins in susceptible populations, such a focus should not seem inappropriate. Furthermore, no fewer than 59 biological agents in the Australia Group's 'List of Human and Animal Pathogens and Toxins for Export Control' [3] can be found in Africa (23 viruses, 21 bacteria and 15 toxins). There is reason to believe that, for example, ISIL is eager to obtain stocks of bacilla of bubonic plague and anthrax, as evidenced by recent criminal investigations conducted in Tunisia [5] and Kenya [2], respectively.

Africa is also regarded as a hub for many trafficking routes that could facilitate the transfer of pathogens. Smuggling routes provide terrorist groups and other criminal entities with the possibility of clandestinely transferring biological agents for use inside and outside the continent. In particular, the Sahelo-Saharan region is regarded as a critical zone in this respect.

The recent wave of outbreaks of Ebola virus disease (2014–2016) demonstrated the weakness of the public health systems in many of the affected countries in West Africa. However, little has been said about the capacity of veterinary laboratories, in particular in terms of biosafety and biosecurity, to handle biological samples of animal origin, some of which are suspected to be potential (dead-end, reservoir or maintenance) hosts for the Ebola virus, i.e. bats (Chiropterae) and (non-human) primates. According to the OIE's Performance of Veterinary Services (PVS) evaluation system, the countries in West Africa (Guinea, Liberia and Sierra Leone) that were most seriously affected by Ebola possess veterinary laboratories that are regarded as non- or under-performing, based on evaluations conducted in 2012, 2013 and 2010, respectively.

A broader, preliminary, Africa-wide review of data from the OIE PVS reports, produced by independent OIE assessors over the past ten years [14], reveals that weaknesses, in terms of diagnostic capacity to detect animal pathogens of zoonotic or major economic potential, are widespread in Africa. Out of 44 countries for which such reports are available,

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11 conduct diagnosis 'almost always by clinical means only, with no access to/use of a laboratory to obtain a correct diagnosis', and another 20 have 'access to and use a laboratory to obtain a correct diagnosis', but for 'major zoonoses and diseases of national economic importance' only. Fifty-seven percent of countries do not have formal laboratory quality-assurance systems in place [P. Bastiaensen, personal communication, training of laboratory focal points, Harare, 2016]. There are many national veterinary laboratories storing, handling and producing live vaccines under circumstances which are dangerous for both the laboratory personnel and the environment in general, with little or no (appropriate) biosafety and biosecurity measures in place, and no capacity to prevent ill-intentioned individuals from stealing such pathological agents.

Most border inspection agencies, including the Veterinary Services, are ill-equipped to detect the clandestine import or export of animal pathogens, which, most experts recognise, is much more challenging than the detection of chemical or radio-nuclear products and devices. The overall level of biosecurity in Africa is equally worrisome. According to data from the comprehensive review of the United Nations Security Council Resolution 1540 (2004), 44 African countries have neither a biosecurity legal framework nor national implementation measures. In addition, around 20 African countries have no national framework for controlling exportation of biological agents that can be used for terrorist purposes. This concerns the Committee of UNSCR 1540, with regard to the risk of theft and misuse of pathogens in Africa [R. Prenat, personal communication, African Union assistance and review conference on the implementation of resolution 1540 (2004) in Africa, Addis Ababa, 2016].

The OIE List of diseases and pathogens, with regard to the pathogenic agents that can represent a biological threat

The OIE currently lists 116 infections, infestations and diseases affecting (mostly food-producing) animals, including 28 diseases of aquatic species (fish, molluscs, crustaceans and amphibians). The decision to include a disease or pathogen in this list is based on an algorithm (see Chapter 1.2. of the OIE *Terrestrial Animal Health Code*: 'Criteria for the inclusion of diseases, infections and infestations in the OIE list' [11]). This considers factors such as the potential of the disease to spread internationally (via live animals or their products, vectors or fomites), whether natural transmission to humans has been proven, and whether human infection is associated with severe consequences, but without specifically referring to the concept of biological threat.

Where diseases are listed by the OIE, corresponding international standards provide guidance on how the Veterinary Authorities of importing and exporting countries can best provide for early detection, reporting and control of these agents [11]. In the corresponding *Manual of Diagnostic Tests and Vaccines for Terrestrial Animals* chapter [12], standards are provided that allow accurate diagnosis (i.e. detection, where applicable) of such pathogens, based on internationally agreed diagnostic laboratory methods.

Except for a few plant-derived toxins, for example ricin, abrin and several aflatoxins, as well as strictly human pathogens such as cholera (toxin), most of the 100 biological agents affecting humans and/or animals, as listed in the Australia Group's 'List of Human and Animal Pathogens and Toxins for Export Control' [3] as part of their 'Common Control List', are of animal origin. Sometimes, the animal interface

Table I

List of human and animal pathogens and toxins for export control (Australia Group, 2016) and OIE status (currently OIE listed, formerly OIE listed)

Disease: virus	OIE-listed
1. African horse sickness virus	✔
2. African swine fever virus	✔
3. Andes virus	
4. Avian influenza virus	✔
5. Bluetongue virus	✔
6. Chapare virus	
7. Chikungunya virus	
8. Choclo virus	
9. Classical swine fever virus	✔
10. Crimean–Congo haemorrhagic fever virus	✔
11. Dobrava–Belgrade virus	
12. Eastern equine encephalitis virus	✔
13. Ebola virus: all members	
14. Foot and mouth disease virus	✔
15. Goatpox virus	✔
16. Guanarito virus	
17. Hantaan virus (Hanta)	
18. Hendra virus (equine morbillivirus)	✖
19. Japanese encephalitis virus	✔
20. Junin virus	
21. Kyasanur Forest disease virus	
22. Laguna Negra virus	
23. Lassa virus	
24. Louping ill virus	
25. Lujo virus	
26. Lumpy skin disease virus	✔
27. Lymphocytic choriomeningitis virus	
28. Machupo virus	
29. Marburgvirus: all members	
30. Monkeypox virus	
31. Murray Valley encephalitis virus	
32. Newcastle disease virus	✔
33. Nipah virus	✔
34. Omsk haemorrhagic fever virus	
35. Oropouche virus	
36. Peste des petits ruminants virus	✔
37. Porcine Teschovirus	✖
38. Powassan virus	
39. Rabies virus and other Lyssavirus members	✔
40. Reconstructed 1918 influenza virus	
41. Rift Valley fever virus	✔
42. Rinderpest virus	✔
43. Rocio virus	
44. Sabia virus	
45. Seoul virus	
46. Severe acute respiratory syndrome (SARS)	
47. Sheeppox virus	✔
48. Sin Nombre virus	
49. St. Louis encephalitis virus	
50. Suid herpesvirus 1 (Aujeszky's disease)	✔
51. Swine vesicular disease virus	✖
52. Tick-borne encephalitis virus (Far Eastern)	
53. Variola virus	
54. Venezuelan equine encephalitis virus	✔
55. Vesicular stomatitis virus	✖
56. Western equine encephalitis virus	✔
57. Yellow fever virus	

Disease: bacterium	OIE-listed
1. *Bacillus anthracis* (anthrax)	✔
2. *Brucella abortus*	✔
3. *Brucella melitensis*	✔
4. *Brucella suis*	✔
5. *Burkholderia (Pseudomonas) mallei*	✔
6. *Burkholderia (Pseudomonas) pseudomallei*	
7. *Chlamydia psittaci (Chlamydophila psittaci)*	
8. *Clostridium argentinense* (formerly known as *C. botulinum* type G), botulinum neurotoxin producing strains	
9. *Clostridium baratii*, botulinum neurotoxin producing strains	
10. *Clostridium botulinum*	✔
11. *Clostridium butyricum*, botulinum neurotoxin producing strains	✔
12. *Clostridium perfringens*, epsilon toxin producing types	✔
13. *Coxiella burnetii*	
14. *Francisella tularensis*	
15. *Mycoplasma capricolum* sub-species *capripneumoniae* ('strain F38') (CCPP)	
16. *Mycoplasma mycoides* subspecies *mycoides SC* (CBPP)	
17. Rickettsia prowazekii (louse-borne typhus)	
18. Salmonella typhi (typhoid fever)	
19. Shiga toxin producing Escherichia coli	
20. Shigella dysenteriae	
21. Vibrio cholerae	
22. Yersinia pestis	

Disease: fungus	OIE-listed
1. *Coccidioides immitis*	
2. *Coccidioides posadasii*	

Toxins	OIE-listed
1. Abrin	
2. Aflatoxins	
3. Botulinum toxins	
4. Cholera toxin	
5. *Clostridium perfringens* toxins	
6. Conotoxins	
7. Diacetoxyscirpenol	
8. HT-2 toxin (Fusarium)	
9. Microcystins (cyanoginosins)	
10. Modeccin	
11. Ricin	
12. Saxitoxin	
13. Shiga toxins (verotoxins, verocytotoxins)	
14. *Staphylococcus aureus* enterotoxins, haemolysin alpha toxin and toxic shock syndrome toxin (formerly known as S. enterotoxin F)	
15. T-2 toxin (*Fusarium*)	
16. Tetrodotoxin	
17. Viscumin (*Viscum album* lectin 1)	
18. Volkensin	

✔ OIE-listed

✖ Previously listed by the OIE but recently delisted (in the past five years). Disease chapters (for diagnostic purposes) are still available in the *Manual of Diagnostic Tests and Vaccines for Terrestrial Animals* [12].

is an (invertebrate) vector; for example, lice may play a role in the transmission of (epidemic) typhus fever, or petechial fever, without necessarily requiring the involvement (as a host) of a mammal or bird. Table I lists these 100 viral, bacterial and fungal pathogens, and toxins, and indicates which of them has an OIE standard, i.e. a chapter in the *Terrestrial Code* [11]. Note that the OIE does not list toxins, only pathogens (diseases, infections and infestations).

Overlying the OIE listed diseases with those of the Australia Group Common Control List illustrates that there are pathogens of particular concern not only to the veterinary and public health sectors but also to the 'security sector'. In particular, this sector is concerned with strengthening global security – in this case 'biological security' – through the prohibition of the development, production, stockpiling, or otherwise acquiring or retaining biological agents and toxins, or related biological weapons or equipment materials. Similar conclusions can be drawn from comparisons with the authoritative listing of 'Bioterrorism and High Consequence Pathogens' published by the Center for Food Security and Public Health (CFSPH) of Iowa State University [6].

Although the OIE is an organisation dedicated above all to the improvement of animal health and animal welfare, and to veterinary public health, worldwide, it has been working with the security sector on a number of topics to enhance global security in the broadest of contexts.

Implementing biological threat reduction

In support of the reduction of biological threats, the OIE has not radically changed its programmes currently available to Member Countries in terms of capacity building. However, it has expanded its partnerships to receive support from the security sector for programmes such as twinning, focal point training, rinderpest post-eradication activities, renovation of the *World Animal Health* Information System (WAHIS) and the Performance of Veterinary Services (PVS) Pathway, to name a few.

In addition, and in relation to biological threat reduction and global security, the OIE has a cooperation agreement with the United Nations Office of Disarmament Affairs which, by extension, has allowed for working relationships with the Biological and Toxin Weapons Convention and with the Committee that supports the implementation of UNSCR 1540 (2004). These two key international instruments effectively commit the international community to the non-proliferation of weapons of mass destruction, including biological weapons. In relation to the 1540 Committee, the OIE is considered to be a technical assistance provider and responds to requests received from the Committee on behalf of other countries. There are currently eight requests for assistance from African countries to the 1540 Committee. The OIE has responded favourably to several of them, in order to strengthen the capacity of certain veterinary laboratories dealing with potentially dangerous pathogens [7].

The African Union (AU) Commission, based in Addis Ababa, Ethiopia, oversees the implementation of UNSCR 1540 at African level and this task is entrusted to its Department of Peace and Security on the basis of Decision Assembly/AU/Dec.472(XX) of the 20th Ordinary Session of the Assembly of the AU, held from 27 to 28 January 2013 in Addis Ababa. It requests the AU Commission to take the necessary steps, in collaboration with the Committee established pursuant to UNSCR 1540 (1540 Committee) and all other stakeholders, to further promote and enhance the implementation of resolution 1540 (2004) in Africa [1].

Addressing the accidental or deliberate release of biological agents in veterinary laboratories in Africa

Following the first OIE Global Conference on Biological Threat Reduction, organised in June 2015 in Paris, France in close collaboration with the World Health Organization, the OIE Strategy on Biological Threat Reduction (BTR) was updated [10] to reflect the OIE's strategic vision for the mitigation of these threats. The strategy is centred on five key areas:

a) maintaining scientific expertise and setting standards, and guidelines

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b) good governance, capacity-building and implementation of the 'One Health' concept
c) global disease intelligence and updates on the latest methods for disease prevention and control
d) international cooperation and solidarity between countries
e) advocacy and communication.

When taking a closer look at the African situation, and in particular the situation of African veterinary laboratories, 'maintaining scientific expertise and setting standards, and guidelines' remains a challenge for most under-resourced laboratories. However, efforts by, for example, the African Union, through the Interafrican Bureau for Animal Resources (AU-IBAR), to coordinate the active (submission of new texts) and passive (responsive) participation of African countries in OIE standard-setting, has borne fruit, especially when dealing with issues or diseases that are of high relevance for Africa, such as Rift Valley fever (RVF).

Whereas many African medical and veterinary services have embraced the 'One Health' concept, advocating a closer integration to 'better understand and address the contemporary health issues created by the convergence of human, animal, and environmental domains' [4], such integration is far from evident in veterinary and public health laboratories and more needs to be done to 'operationalise' One Health in laboratories in Africa. Paradoxically, the fight against antimicrobial resistance is paving the way for such collaborative approaches, where other initiatives in the past have failed, including those involved in combating Ebola.

The aforementioned PVS evaluation programme has been a resounding success in Africa, with nearly all countries (51 out of 54) having benefited from at least one, if not several, consecutive steps in the PVS Pathway, at their own request, providing for a degree of transparency and acceptance of external review that is unprecedented. The PVS Pathway includes specific programmes to address observed shortcomings in the performance of veterinary services, such as the OIE Veterinary Laboratory Support Programme, linked to Chapter 1.1.1. of the *Manual of Diagnostic Tests and Vaccines for Terrestrial Animals*, on 'Management of veterinary diagnostic laboratories' [12], and which has to date benefited six African countries: Côte d'Ivoire, Libya, Sudan, Tanzania, Tunisia and Uganda.

In addition, the OIE Laboratory Twinning programme targets national reference laboratories (primarily in low-resource countries), which link up with existing OIE (and often FAO) Reference Laboratories with the primary goal of building expertise in the diagnosis of animal diseases and zoonoses to improve global capacity for disease prevention, detection and control. In some cases, such laboratories eventually become OIE Reference Laboratories in their own right [15]. Overall, this programme has been very successful in Africa: more than 15 countries have engaged in the programme and 26 Twinning Agreements have been concluded or are ongoing, resulting in the addition of three OIE Reference Laboratories (and Collaborating Centres) in Africa over the past five years [16], an increase of 23%.

Much of the work involved in building the capacity of veterinary laboratories is conducted in partnership with the United Nations Food and Agriculture Organization (FAO), which has several programmes and tools (e.g. the Laboratory Mapping Tool, LMT) that target the material and institutional strengthening of veterinary laboratories in the developing world [8].


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A good example, showing the role that may be played by laboratories in biological threat reduction, involves the recently recognised FAO/OIE rinderpest holding facilities for rinderpest virus-containing material (*Terrestrial Animal Health Code* Chapter 8.15, [11]). Materials such as rinderpest vaccines, biological samples and diagnostic materials should either be destroyed or be sequestered in a designated FAO/OIE rinderpest holding facility. The only FAO/OIE rinderpest holding facility for such material in Africa, following the eradication of rinderpest in 2011, is the BSL-3 facility of the Pan-African Veterinary Vaccines Centre of the African Union (AU-PANVAC), which is based on the premises of the National Veterinary Institute (NVI) in Debre-Zeit, Ethiopia [9].

Much progress has also been seen in the field of disease intelligence and transparency, for example four cycles of training of national focal points for animal disease notification to the OIE via the World Animal Health Information System (WAHIS). This has seen an increase in regular (half-yearly) reporting to the OIE by African Member Countries over the past 12 years. The percentage of African Member Countries having submitted a six-monthly report in time to share information with other Members during the OIE General Session has increased from an average of 52% in 2006 to 89% in 2017, along with an increase in immediate notifications (mainly of outbreaks) from 6 in 2005 to 42 per annum currently [WAHIAD, OIE, personal communication, 2017]. However, many improvements could still be made in terms of the timeliness and accuracy of the reporting.

It is also necessary to stress the pivotal role that the national laboratory focal points can play in biological threat reduction, in terms of implementing appropriate biosafety and biosecurity measures and policies, not only to mitigate accidental releases of pathogens or toxins but also to guard against theft and potential misuse of biological material and equipment. The first (cycle) training of laboratory focal points was held in Harare, Zimbabwe, in December 2016 and was attended by focal points from 31 countries. Within the 16 hours of training content, a session of 3 hours (18%) was dedicated to biosafety and biosecurity, biological threat reduction and quality assurance.

The training of national focal points, along with most of the other activities and programmes of the OIE mentioned previously (PVS, twinning), including intensified communication and advocacy approaches, has been made possible by the international cooperation and solidarity among countries that has resulted from the adoption of the OIE's 3rd Strategic Plan (2001–2005). This has given rise to proactive initiatives to extend support to poorer and more vulnerable OIE Member Countries, and richer nations are expected to contribute in excess of their statutory contributions to the OIE, for the benefit of global animal health security. Many of these actions are channelled through the OIE's trust fund, the *World Animal Health* and Welfare Fund.

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Discussion and conclusion

The OIE's mandate has historically been the improvement of animal and welfare. The organisation thus contributes to food security and food safety for animal products worldwide. The protection of food animal production is, therefore, a major concern and the reason why the OIE has focused its standard setting on farm animals for almost a century.

Within the scope of its mandate the OIE has also developed a strategy on biological threat reduction, with a particular vision: **A world that is safe and secure from the accidental or deliberate release of animal pathogens, including zoonoses.**

The Member Countries of the OIE, and consequently the OIE itself, are increasingly faced with not only new societal demands (such as improved animal welfare and the concerns surrounding bioterrorism) but also biological (antimicrobial resistance) and environmental changes (climate change, invasive species, biodiversity and species conservation).

In Africa, these changes and their resulting impacts are magnified by the sheer number of infectious animal diseases that represent potential biological threats and often remain undetected and, even when detected, remain largely uncontrolled or untreated. They are also magnified by the lack of means to address biosafety and biosecurity in veterinary laboratories, leading to considerable risks for the bench worker, the people and the animals in the immediate vicinity of these laboratories and the wider environment, should the release of the biological agents find a suitably susceptible host population. Finally, they are magnified by the relative ease with which ill-intentioned individuals or groups may gain possession of some of the most infectious animal diseases known to humankind.

It is therefore time for a 'wake-up call', for veterinary laboratory managers everywhere in Africa to assess where they stand in terms of protecting the biological materials that they may stock, including those used for the production of live or inactivated vaccines, from being inadvertently or deliberately released into the environment. The OIE, in line with UNSCR 1540, and with its partner organisations at international and continental level, is ready to assist African nations in dealing with this menace today, before the threat becomes real.

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epidemiology and animal disease control programmes

Elimination of an outbreak of FMD in the Vladimir region, Russia, in 2016

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Foot and mouth disease (FMD) is still one of the major diseases of cloven-hoofed animals throughout the world. This is because FMD is a highly contagious disease capable of spreading over long distances and infecting large populations of animals, considerably affecting animal welfare as well as influencing agribusiness. It causes difficulties in marketing livestock and animal products due to restrictions imposed by the Veterinary Authorities of importing countries, which lead to serious social and economic consequences for infected countries and zones.

During the past decades concern has been raised in various parts of the world because of frequent incursions of FMD, which has had negative effects on some territories previously free from FMD with or without vaccination.

Purpose

Control and prevention of the introduction of FMD to the Russian Federation as well as implementation of the Global FMD Control Strategy and the OIE *Terrestrial Animal Health Code (Terrestrial Code)* Recommendations.

Objective

Division of different cloven-hoofed livestock subpopulations and maintenance of their disease-free status within specific territories, based on the principles of regionalisation and zoning recommended by the OIE.

Materials and methods

Provisions of the *Terrestrial Code*, Russian Federation Veterinary Law (as amended by Federal Law No 243-FS as of July 13, 2015) and other regulatory veterinary acts were used during the regionalisation of Russian Federation territory.

Initial zoning approach

The principle of the FMD control strategy in the Russian Federation is based on zoning, involving the division of the national territory into two zones:

a) **FMD free zone where vaccination is not practised** – Russian Federation administrative divisions where FMD-specific preventive vaccination is not practised, and where there has been no outbreak of FMD during the past 12 months and no evidence of FMD virus (FMDV) infection has been found during the past 12 months; no vaccination against FMD has been carried out during the past 12 months; and no vaccinated animals have been introduced into the zone since the cessation of vaccination. Movement of susceptible animals from the zone where vaccination is practised to the free zone where vaccination is not practised is banned. Surveillance for FMD in the animal population is in operation.

b) **Protection zone** – A zone covering the administrative divisions where preventive FMD vaccination of cattle and small ruminants is performed. Enhanced surveillance (both passive and targeted) is performed in susceptible animal populations kept in the protection zone.

OIE official recognition

In 2015, the Federal Service for Veterinary and Phytosanitary Surveillance compiled a dossier for submission to the OIE so that the Russian Federation could be officially recognised as a country having an FMD free zone without vaccination. According to the OIE procedure, the application was submitted and reviewed by the OIE *ad hoc* Group on the evaluation of FMD status of Member Countries and later by the OIE Scientific Commission for Animal Diseases (Scientific Commission) that assessed the documentation, submitted by the Russian Federation, against the requirements of the *Terrestrial Code.*

During the 84th General Session of the World Assembly of the OIE Delegates, the proposed zone of the Russian Federation, composed of 50 administrative divisions, was unanimously recognised as free from FMD without vaccination and Russia was granted a certificate for an FMD free zone where vaccination is not practised.

FMD Asia1 outbreak in Vladimir region

On 20 October 2016, an outbreak of FMD due to serotype Asia 1 in Vyshmanovo settlement, Sobinsky district (*Raion*), Vladimir region (*Oblast*) was reported to the OIE. Given the change in the FMD situation in the officially recognised FMD free zone where vaccination is not practised, the FMD free zone without vaccination status of the zone was suspended.

Cattle affected by FMD kept on 'VKV' farm in Vyshmanovo were detected by a veterinarian during daily routine livestock examinations. The event was immediately reported to the Veterinary Service of Vladimir Oblast. Pathological samples were collected from animals showing clinical signs suggestive of FMD. These samples were sent to the Regional OIE Reference Laboratory for FMD (FGBI 'ARRIAH').

For the purpose of FMD prevention and according to the current legislation of the Russian Federation, the Vladimir Oblast Veterinary Service established

quarantine on the farm, including a ban on the transportation of live animals, milk and raw milk products, meat, animal raw materials and feed to and from the farm concerned. Trained staff were designated for the handling of the animals.

As soon as FMD diagnosis was confirmed in the laboratory, the Vladimir Oblast Governor's Decree 'Restrictive Measures (Quarantine) to be Imposed in the Sobinsky Raion' was issued, which stated the following:

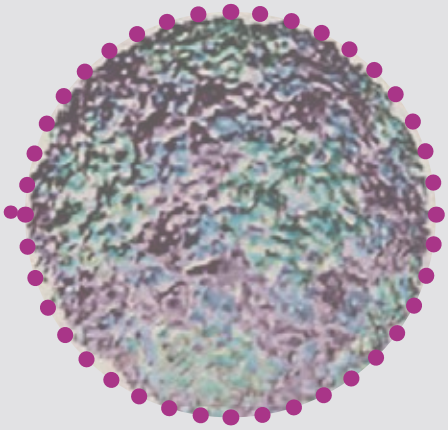
- FMD epidemic outbreak – 'VKV' farm
- FMD infected site (infected settlement) – Vyshmanovo settlement
- FMD infected zone – Sobinsky Raion, Vladimir Oblast.

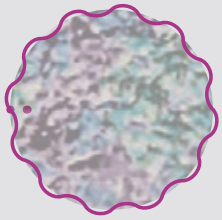
An action plan for containment and eradication of the FMD outbreak was implemented. The action plan involved:

- traffic restrictions on all roads leading out of the infected settlement, arrangement for 24-hour security at quarantine posts, all posts equipped with access barriers and disinfection barriers;
- culling (stamping out policy) of all susceptible animals in the infected settlement with destruction on-site;
- disinfection of animal-keeping facilities.

In the FMD infected zone (Sobinsky Raion):

- a ban on animal pasturing in the infected zone;
- inventory of all FMD susceptible animals;
- emergency vaccination of all FMD susceptible animals (except pigs) (a total of 18,309 cattle and 1,648 small ruminants were vaccinated);
- activities to raise awareness among livestock keepers;
- termination of economic relations with the infected site and the other farms within the infected zone.





During eradication of the FMD outbreak, 814 cattle, 11 small ruminants and 54 pigs were destroyed at their location. The animals were killed under strict control of the regional veterinarian, and thorough disinfection of the animal keeping/killing facilities was performed. The carcasses were destroyed by burning in the trench arranged at the site of the outbreak.

Following the completion of all measures for eradication of the FMD outbreak, the destruction of susceptible animals in the infected settlement and no new reported cases of FMD during a period equal to three incubation periods, as well as the completion of serological surveillance in the infected zone and in the whole of Vladimir Oblast with no positive reactors, the quarantine was lifted in Vyshmanovo, Sobinsky Raion, Vladimir Oblast according to the Vladimir Oblast Governor's Decree No. 102 dated 11 November 2016.

According to the current Veterinary Law of the Russian Federation the following restrictions are in operation in the infected zone (Sobinsky Raion, Vladimir Oblast):

- transportation/movement of animals, including vaccinated animals, from the holding as well as keeping of such animals with non-immune animals is prohibited for 12 months after the lifting of quarantine;
- introduction of FMD-susceptible animals to the holding is prohibited for 12 months after the lifting of quarantine;
- movement of vaccinated animals is prohibited.

Establishment of a containment zone

In order to recover the FMD free zone status of the Russian Federation, a containment zone was established in Vladimir Oblast following the recommendations in Chapter 8.8 of the *Terrestrial Code.*

A list of measures was introduced, involving restrictions on the movement of animals and regulated products both from the Sobinsky Raion to other Raions within the Oblast and from Vladimir Oblast to other administrative divisions.

An application was prepared for the recognition of a FMD containment zone within the FMD free zone where vaccination is not practised, detailing the measures taken by the Russian Federation for FMD control upon detection of the outbreak. The application was reviewed by the OIE Scientific Commission; it was concluded that the measures implemented by the Russian Federation were sufficient for FMD control and were compliant with the requirements of the *Terrestrial Code* for the establishment of a containment zone.

As of 13 January 2017, the establishment of the containment zone comprising Vladmir Oblast and the recovery of the status of the remainder of the previously recognised FMD free zone where vaccination is not practised were approved by the OIE. The containment zone was excluded from the recovery of the status of the remainder of the FMD free zone where vaccination is not practised (see map on p. 84).

Based on the findings of the outbreak, biosecurity measures as well as control of live animal and animal product movements were enhanced on all livestock farms. Additional serological tests are being performed to confirm absence of the circulation of FMDV for the subsequent recovery of the free status of the containment zone.

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Equine influenza vaccine composition

Conclusions and recommendations of the OIE Expert Surveillance Panel on Equine Influenza Vaccine Composition Meeting

held at OIE Headquarters

Paris, on 22 March 2017

OIE/Communication Unit

Equine influenza activity in 2016

During 2016, individual animal cases and outbreaks of equine influenza were reported by Ireland, Sweden, the United Kingdom (UK) and the United States of America (USA).

Sources of equine influenza viruses characterised

Equine influenza A (H3N8) viruses were isolated and/or characterised from outbreaks in Ireland, the UK and the USA.

Field data

In Europe there were fewer equine influenza virus infections than in recent years. The clinically affected horses on the seven affected premises in the UK were unvaccinated. A single confirmed case in Sweden had an unknown vaccination history. In Ireland, equine influenza cases were confirmed in both vaccinated and unvaccinated horses but only 10% (approximately) of the horses on the two affected premises had up-to-date vaccination records.

In the USA, outbreaks were detected throughout the year with over 30 confirmed cases from 16 states. No vaccination data were available.

In Asia and South America no equine influenza outbreaks were reported.

Characterisation of viruses identified in 2016

Viruses isolated/identified from outbreaks in Ireland, the UK and the USA were genetically characterised by sequencing the haemagglutinin (HA) and the neuraminidase (NA) genes.

Viruses from the UK and the USA were antigenically characterised by the haemagglutination inhibition (HI) assay, using post-infection ferret antisera and chicken red blood cells.

Genetic characterisation

All HA sequences obtained from viruses were of the American lineage (Florida sublineage). The viruses detected in the USA were characterised as clade 1 viruses and were very similar to those identified in 2015. Viruses detected in Ireland and the UK were characterised as clade 2 viruses. They were similar to viruses from those countries in 2015 in that, compared to the Florida clade 2 reference strain, they had the substitution A144V. This is in contrast to viruses identified in mainland Europe in 2015, which had the substitution I179V.

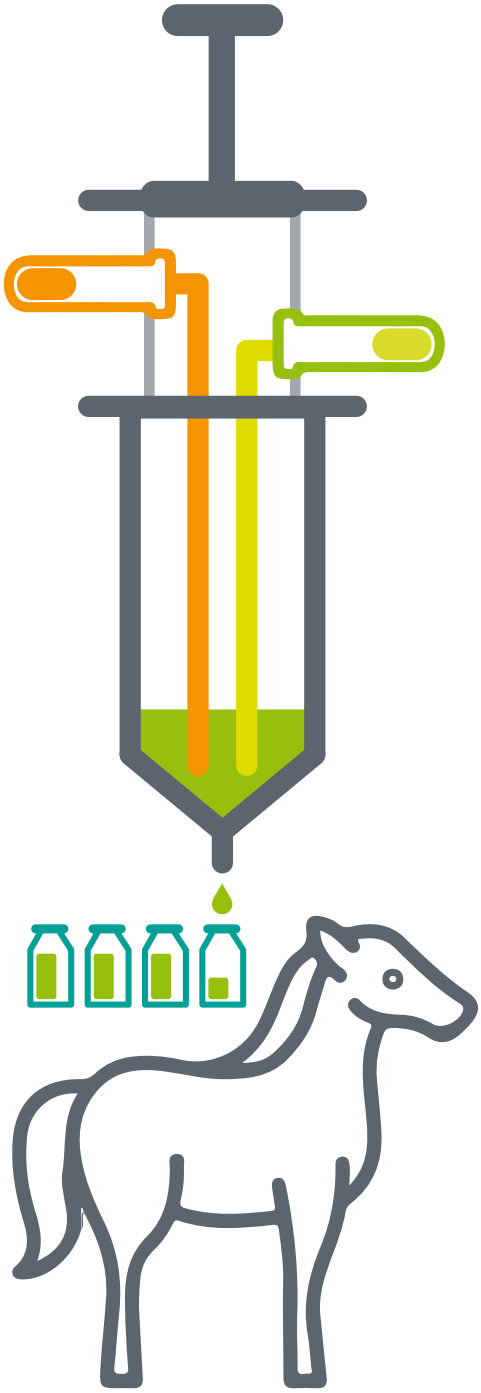
The NA gene sequences of the viruses from clade 1 and clade 2 were also similar to those of the viruses identified in 2015.

Antigenic characterisation

Haemagglutination inhibition data available for viruses isolated in 2016, and antigenic cartography analyses thereof, show that the viruses of the two clades of the Florida sublineage continue to remain closely related antigenically to the recommended vaccine viruses of that lineage.

Conclusion

All viruses isolated and characterised in 2016 were from clades 1 and 2 of the Florida sublineage and were similar to those identified in 2015.



Level of surveillance and updating of vaccines

The Panel continues to emphasise the importance of increased surveillance and investigation of vaccination breakdown in different countries. The rapid submission of viruses to reference laboratories is essential if antigenic and genetic drift is to be monitored effectively on a global basis.

Although some vaccines have been updated to include a virus from clade 2, in accordance with the recommendations of 2010 to 2016, many current vaccines contain outdated strains. Updating vaccines with epidemiologically relevant viruses is necessary for optimum protection.

Recommendations (March 2017)

These are unchanged from those made each year since 2010.

It is not necessary to include an H7N7 virus or an H3N8 virus of the Eurasian lineage in vaccines as these viruses have not been detected in the course of the most recent surveillance and are therefore presumed not to be circulating.

Vaccines should contain both clade 1 and clade 2 viruses of the Florida sublineage:

- clade 1 continues to be represented by A/eq/South Africa/04/2003-like or A/eq/Ohio/2003-like viruses but more recent clade 1 viruses are available from the OIE Reference Laboratories
- clade 2 continues to be represented by A/eq/Richmond/1/2007-like viruses but more recent clade 2 viruses are available from the OIE Reference Laboratories.

Manufacturers producing vaccines for a strictly national market are encouraged to liaise with reference laboratories. The selected viruses should induce responses that are immunogenically relevant to the equine influenza viruses circulating nationally. A sequence determination of both HAs and NAs should be completed before use.

Reference reagents

Freeze-dried post-infection equine antisera to A/eq/Newmarket/1/93 (American lineage H3N8) and A/eq/South Africa/4/2003 (Florida clade 1, sublineage of the American lineage) are available from the European Directorate for the Quality of Medicines (EDQM). These sera have been assigned single radial haemolysis (SRH) values through an international collaborative study and can be used as primary reference sera for the assay. An OIE/EDQM collaborative study is in progress, and a new antiserum against the Florida clade 2 reference strain A/eq/Richmond/1/2007 has been produced and is being standardised internationally.

Recent virus strains, including suitable vaccine candidates for clades 1 and 2, are available from the OIE Reference Laboratories. In the event that an OIE Reference Laboratory cannot supply suitable vaccine candidates for both clades, they will assist the vaccine company to source the viruses from an alternative OIE Reference Laboratory.

Small quantities of ferret antisera for antigenic characterisation are available from the OIE Reference Laboratories in Ireland and the UK.

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OIE Reference Laboratories for equine influenza

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OIE Project brief

Capacity building and surveillance for Ebola Virus Disease EBO-SURSY Project

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Background

The 2014–2016 West African Ebola Virus Disease (EVD) epidemic underscored the risks linked to inadequate disease detection, prevention and response mechanisms, and the importance of strengthening public and animal health systems. The epidemic also raised a series of unanswered questions and defining challenges – at the human-animal-ecosystem interface – that need to be brought into the spotlight so as to reduce the vulnerability of societies to infectious disease threats that spread across national and international borders.

With the objective of contributing to this endeavour, in December 2016, the OIE received a grant from the European Union to implement the project of capacity building and surveillance for Ebola Virus Disease ('EBO-SURSY Project'). In order to implement this project, the OIE has teamed up with the French Agricultural Research Centre for International Development (*Centre de coopération internationale en recherche agronomique pour le développement* – Cirad), French Research Institute for Development (Institut de recherche pour le développement – IRD), the Pasteur Institute and its international network (RIIP).

Project

Through the promotion and adoption of a 'One Health' approach to detect, prevent, control and respond to new and devastating disease threats, this Project will support an enhanced and coordinated response to the (re-) emergence of zoonotic pathogens and address the ongoing efforts to prevent the proliferation and spread of endemic zoonotic pathogens. This Project's purpose is to strengthen laboratory and surveillance

capacities; the OIE's internationally adopted standards and guidance for diagnostics, surveillance, risk assessment and reporting will serve as the basis for the Project activities.

Project objectives

The general objective is the strengthening of national and regional early detection systems in wildlife in West and Central Africa using a One Health and multi-sectoral approach to better detect, differentiate and prevent future EVD outbreaks or outbreaks of other emerging zoonotic pathogens.

Project leader

The OIE is the intergovernmental organisation responsible for animal health and veterinary public health worldwide. The OIE has 180 Member Countries as of 2016 and permanent relationships with over 70 other international and regional organisations, as well as regional and sub-regional offices in Africa. The OIE is uniquely placed to coordinate this programme given its network of 313 Reference Centres in more than 40 countries, collaborations with the world's leading academic and research institutes and scientists, and the permanent support of national Veterinary Services' networks including National Delegates to the OIE, eight OIE national Focal Points in each country and field personnel. Among OIE's mandates are: to ensure transparency in the global animal disease situation; to collect, analyse and disseminate veterinary scientific information; and to strengthen the capacities of national Veterinary Services.

Project partners

The OIE has established a partnership (sub-grants) with the following leading scientific institutions to ensure the implementation of a transdisciplinary and scientifically sound project:

- the French Agricultural Research Centre for International Development (*Centre de coopération internationale en recherche agronomique pour le développement* – Cirad),
- the French Research Institute for Development (*Institut de recherche pour le développement* – IRD),
- the Pasteur Institute and its international network (RIIP).

The OIE and its partners will work through the national Veterinary Services in each target country and will support them with external expertise to conduct safe and statistically based investigations and sampling. At the same time, the national Veterinary Services will receive training and investments in capacity so that they can continue to monitor the animal reservoir(s) once the Project is complete. The national Veterinary Services in each target country will be encouraged to work closely with their public health counterparts throughout the Project.

The main specific objectives of the EBO-SURSY Project are:

Specific objective 1:

Building institutional and 'One Health' capacity through teaching and training

- *Sub-objective 1.1*: Increased reporting into the OIE World Animal Health Information System (WAHIS);
- *Sub-objective 1.2*: Alignment of human and animal health surveillance systems.

Specific objective 2:

Contribute to increasing the communities' awareness of zoonotic diseases.

Specific objective 3:

Reinforcing zoonotic disease surveillance protocols through field investigations and improved diagnostic assays;

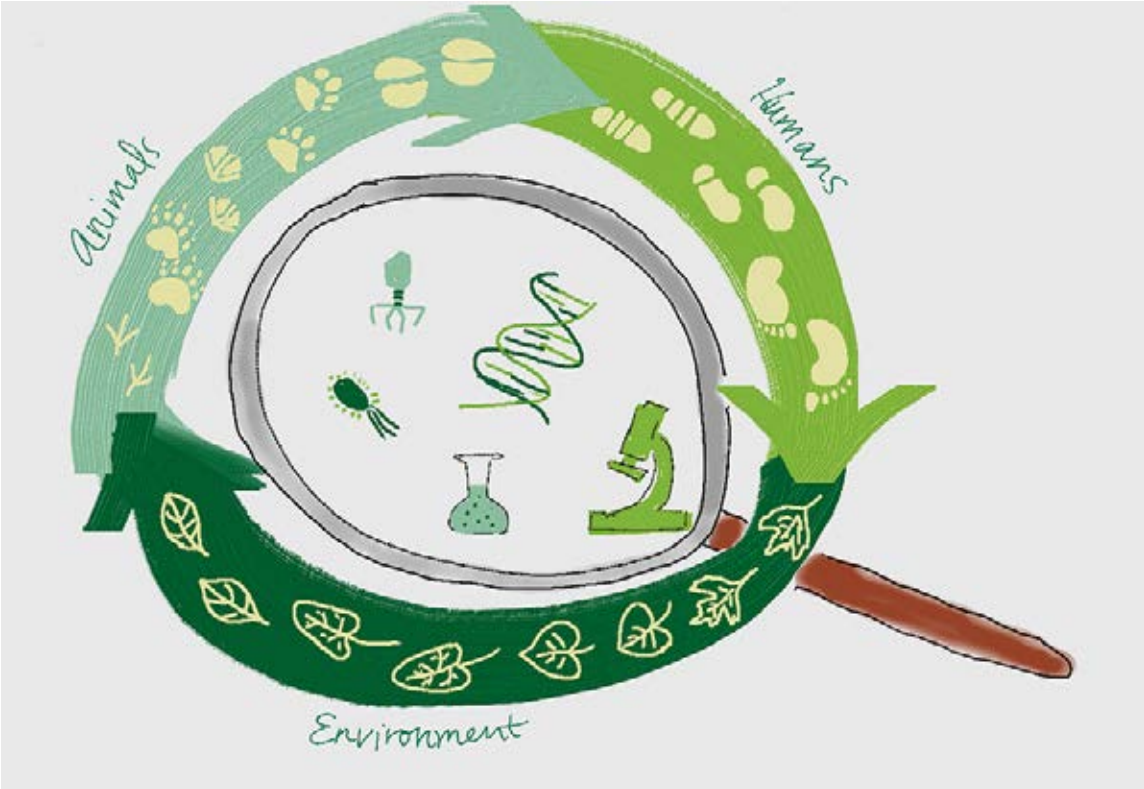
- *Sub-objective 3.1*: Developing predictive models and risk assessment tools based on an understanding of the transmission cycle, including potential wildlife reservoirs for viral haemorrhagic fever (VHF) viruses and environmental factors; and
- *Sub-objective 3.2*: Identifying and assessing, through epidemiological investigations, major health risks (real or perceived) associated with wildlife, bushmeat and human activities in Africa.

Project duration and location

The Project will run over the course of five years (60 months). The contract became effective on 15 January 2017.

Capacity-building efforts (i.e. PVS Pathway, IHR/PVS Pathway national bridging workshops, and OIE Focal Point seminars) that target the African continent will be undertaken by the OIE to improve the Veterinary Services' capacities to detect, control and prevent animal diseases.

The Project partners will conduct specific capacity-building efforts and field or laboratory studies in the following ten West and Central African countries: Cameroon, Central African Republic, Democratic Republic of the Congo,



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Building surveillance and laboratory capacity through 'One Health'

Republic of the Congo, Côte d'Ivoire, Gabon, Guinea, Liberia, Senegal and Sierra Leone. Other OIE Reference Centres and Partners' laboratories based in France, Germany and Hong Kong will provide additional technical support and training.

Governance of the Project

Strategic and scientific oversight will be provided by an Advisory Committee and a Programme Committee. These committees will meet in person at least every 12 months.

The role of the Advisory Committee is to:

- inform on Project implementation, orientations and strategic axes;
- disseminate information among Project implementers concerning the Project and other complementary projects being simultaneously implemented by the Project implementers; and
- ensure and develop complementarities between projects.

The objective of the Programme Committee is to:

- monitor the progress of the Project, and therefore review investigation procedures and protocols (captures, analysis, diagnosis, etc.);
- oversee field activities;
- assess progress on Project implementation;
- review the interpretation and analysis of results; and
- support optimising the use of the results (communication, publications, etc.).

The OIE will identify and form a Project management team to implement, manage and monitor the Project, including coordination of all Project implementers and their activities. This team will be composed of staff from OIE Headquarters, and the OIE Regional Representation for Africa (Mali).

Conclusion

The EBO-SURSY Project highlights the OIE's advocacy of the 'One Health' concept as a collaborative global approach to understanding risks for human and animal health (including both domestic animals and wildlife) and ecosystem health as a whole. Through this European Union-funded laboratory and surveillance capacity-building project, the OIE will continue with its key mission of supporting the strengthening and improvement of national animal health services.

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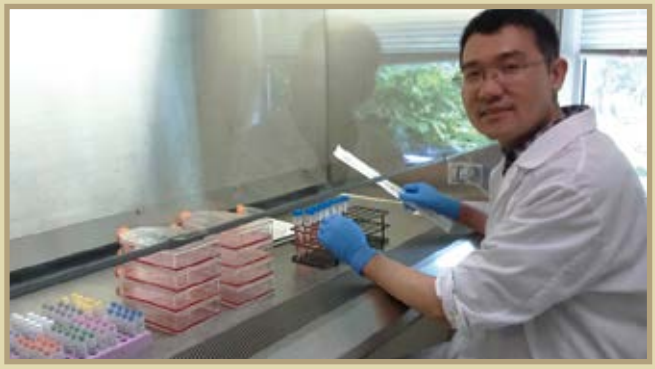
activities of Reference Laboratories & Collaborating Centres

Successful completion of the OIE Laboratory Twinning Project on infectious haematopoietic necrosis

In 2014, a Laboratory Twinning Project was established between the OIE Reference Laboratory for Infectious Haematopoietic Necrosis[1] (IHN) – the United States Geological Survey (USGS) Western Fisheries Research Center (WFRC) in Seattle, Washington, USA –, and the Animal and Plant Inspection and Quarantine Technology Centre State Key Laboratory of Aquatic Animal Health in Shenzhen, Guangdong, People's Republic of China.

1. Infectious haematopoietic necrosis (IHN) means infection with IHN virus (IHNV) of the genus *Novirhabdovirus* of the family Rhabdoviridae

Dr Peng Jia discussing research results with Western Fisheries Research Center (WFRC) staff



Dr Peng Jia preparing fish cell cultures for IHNV research at the WFRC

The rapid geographical expansion of IHN within Asia means that this is an important region for research and for improvements in the diagnosis and control of the disease. The goal of the project was to provide training and experience that would allow the State Key Laboratory of Aquatic Animal Health in Shenzhen to apply for OIE Reference Laboratory status for IHN.

The fact that the Candidate Laboratory was already an OIE Reference Laboratory for a fish disease, spring viraemia of carp, helped ensure that the current twinning project would be successful and only a few priority areas were needed for improvement. These included direct experience in working with the IHN virus (IHNV) in experimental fish and publishing a series of research papers that would enhance the reputation of the laboratory as a source of expertise on the disease.

THE OIE TWINNING PROJECT ON INFECTIOUS HAEMATOPOIETIC NECROSIS OCCURRED IN FOUR PHASES

1 **Phase one of the project** consisted of a visit by the expert from the Parent Laboratory, Dr James Winton, to the Candidate Laboratory in Shenzhen. In addition to a formal meeting to initiate the project, the expert assessed the diagnostic capacity of the Shenzhen laboratory and worked with the Principal Investigator from the Candidate Laboratory, Dr Hong Liu, to develop a training plan for the staff members. At this time, the Candidate Laboratory also hosted a workshop on IHNV attended by fish health specialists from throughout China, at which Dr James Winton presented a global overview of IHN and the staff from the Shenzhen Laboratory reviewed the goals of the OIE Twinning project.

2 **Phase two of the project** included a visit by Dr Hong Liu to the Parent Laboratory to review facilities and finalise the training plan. Subsequently, three staff members from the Candidate Laboratory were sent for a total of 180 person–days of training at the Parent Laboratory in Seattle. The training programme included research on a set of IHNV isolates from China with the goal of producing several peer-reviewed publications. During the training period, staff from the Shenzhen laboratory gained experience in the use of cell cultures to grow, detect and enumerate IHNV, as well as the use of both reverse transcription PCR (RT-PCR) and real-time quantitative reverse transcription PCR (real-time qRT-PCR) assays for confirmatory identification of the virus. These methods and assays were put to use in a large challenge study in rainbow trout, to compare the virulence of selected strains of IHNV from Asia and North America, which also included histopathology.

3 **In phase three**, the training was incorporated into the diagnostic capacity of the Candidate Laboratory. A large set (n = 24) of diverse reference isolates was sent from the Parent Laboratory to facilitate research and validation of diagnostic methods. This set was used in the Candidate Laboratory to validate a novel droplet digital RT-PCR assay for detection of IHNV, and the manuscript was accepted for publication in the *Journal of Virological Methods*. Also, a large set of infected and uninfected fish was sent as part of a formal ring test in which the Candidate Laboratory correctly identified all of the positive and negative animals.

Phase four of the Twinning Project continued to develop the skills and reputation of the Candidate Laboratory as a Reference Laboratory for IHN in the People's Republic of China, as well as hosting a second workshop for fish health workers from countries in the Asia–Pacific Region, including Singapore, Brunei, the Philippines, Vietnam, Thailand, Cambodia, Indonesia, Laos and Malaysia.

4 **At the end of the project, a wrap-up meeting** was held in June 2016 to include the management of the State Key Laboratory of Aquatic Animal Health in Shenzhen as well as the OIE Regional Representative for Asia and the Pacific, Dr Hirofumi Kugita.

During the course of the OIE Twinning Project, a strong bond was formed between staff of the two laboratories and this helped to ensure that all twinning objectives were met in a timely manner. In addition, the relationships formed during the project will ensure that the two laboratories will continue to collaborate in the future, and the Candidate Laboratory has already successfully applied for funding to continue joint research on IHNV as well as other important fish viral diseases.

Dr Xiaocong Zheng working with infected trout in the aquatic biosafety laboratory at the WFRC

Presentation of results from the OIE Twinning Project at a laboratory meeting of WFRC staff

Photo: Yanwei Li

Wrap-up meeting of the OIE Laboratory Twinning Project on IHN in Shenzhen

Information about laboratory twinning:
www.oie.int/en/support-to-oie-members/laboratory-twinning/

news from Member Countries

Self-declarations

Other than for African horse sickness, bovine spongiform encephalopathy, classical swine fever, contagious bovine pleuropneumonia, foot and mouth disease and peste des petits ruminants, for which the OIE currently has a procedure of official recognition of status, the self-declaration of freedom of a country or a territory from a given OIE-listed disease is under the responsibility of the Member concerned.
The OIE is not responsible for inaccuracies in the publication of self-declarations concerning the status of a country or zone with regard to a disease.

Self-declaration by Turkey of zones free from infection with avian influenza viruses

Self-declaration submitted to the OIE on 5 January 2017 by Dr Nihat Pakdil, Delegate of Turkey to the OIE, Deputy Under-Secretary of the Ministry of Food, Agriculture and Livestock, Ankara

The objective of this self-declaration is to explain the procedures and principles used to define and declare zones in Turkey free from infection with avian influenza in order to protect animal and public health provide safe animal products and sustain international trade.

Background – infection with avian influenza viruses

Declaration of disease-free status

After an outbreak of highly pathogenic avian influenza in April 2015, the disease has been eradicated from Turkey. On 15 August 2015, three months after the final outbreak, the OIE was notified that Turkey is free from avian influenza. This self-declaration was published in the OIE *Bulletin* No. 2015-4, pp. 89-91.

According to surveillance conducted throughout the country in 2015 and 2016, Turkey continues to be free from avian influenza.

Surveillance system

Under its administrative system, Turkey is composed of 81 provinces. On this basis, 81 zones, limited by the geographical borders of each province, were established for the avian influenza surveillance and control programme. Each zone comes under a biosecurity management system and consists of poultry populations with the same health status in regard to avian influenza. An active and passive survey are conducted in each zone every six months.

1) Passive surveillance

a) Passive surveillance is carried out by clinical monitoring during visits to randomly selected backyard and commercial poultry farms. Additionally, sick or dead poultry notifications are within the scope of the passive surveillance system.

b) These passive surveys include 10% of villages and of commercial poultry holdings within each province during the six-month period.

c) In the passive survey, the daily feed and water intake, live weight, increases and

decreases in egg yield, clinical signs of respiratory system infections and increases in the daily mortality rate are inspected and the findings for each set of premises are recorded.

d) The results of the passive survey are reported in the village/commercial holdings (poultry houses) Passive Survey Result Report by the Provincial Directorates in the first week of July and last week of December, and sent to the General Directorate of Food and Control.

e) If there is any suspicion related to the disease in question in the passive survey, samples will be taken and sent to the designated Veterinary Control Institute.

2) Active surveillance

The active surveillance plan, prepared by the Ministry according to the provisions of the OIE *Terrestrial Animal Health Code* on avian influenza, is sent to the Provincial Directorates before the survey.

Active surveillance is conducted during periods when migratory bird activities increase. Thus, the first survey is conducted in March, April and May, and the second active survey is conducted in September, October and November, as follows.

a) Active survey is carried out by sampling for virological and serological inspection.

b) Active survey includes poultry in all commercial holdings, villages and wetland areas.

Table I

Zones free of infection with avian influenza virus in Turkey

Zone number	Name of zone	Zone number	Name of zone	Zone number	Name of zone
01	Adana	28	Giresun	55	Samsun
02	Adiyaman	29	Gümüşhane	56	Siirt
03	Afyonkarahisar	30	Hakkari	57	Sinop
04	Ağri	31	Hatay	58	Sivas
05	Amasya	32	Isparta	59	Tekirdağ
06	Ankara	33	Mersin	60	Tokat
07	Antalya	34	Istanbul	61	Trabzon
08	Artvin	35	Izmir	62	Tunceli
09	Aydin	36	Kars	63	Ş. Urfa
10	Balikesir	37	Kastamonu	64	Uşak
11	Bilecik	38	Kayseri	65	Van
12	Bingol	39	Kirklareli	66	Yozgat
13	Bitlis	40	Kirşehir	67	Zonguldak
14	Bolu	41	Kocaeli	68	Aksaray
15	Burdur	42	Konya	69	Bayburt
16	Bursa	43	Kütahya	70	Karaman
17	Çanakkale	44	Malatya	71	Kirikkale
18	Çankiri	45	Manisa	72	Batman
19	Çorum	46	K. Maras	73	Şirnak
20	Denizli	47	Mardin	74	Bartin
21	Diyarbakir	48	Muğla	75	Ardahan
22	Edirne	49	Muş	76	Iğdir
23	Elaziğ	50	Nevşehir	77	Yalova
24	Erzincan	51	Niğde	78	Karabük
25	Erzurum	52	Ordu	79	Kilis
26	Eskişehir	53	Rize	80	Osmaniye
27	Gaziantep	54	Sakarya	81	Düzce

Fig. 1

Turkish zones that are free from infection with avian influenza viruses

c) Samples are tested according to the methods indicated in the Book of Unification of Diagnosis, prepared by our Ministry and harmonised with the recommendations of the OIE.

d) The Bornova Veterinary Control Institute sends the results of the first and second survey to the General Directorate at the time indicated in the survey plan prepared by the Ministry.

Control of avian influenza outbreaks in infection-free zones

In the event of an avian influenza outbreak in an infection-free zone, the free zone status is repealed. If the protection and surveillance area covers more than one zone, free zone status is repealed for all these zones. This is announced on the website of the General Directorate (www.tarim.gov.tr/GKGM), and the OIE is informed. The following procedure is carried out to regain free zone status.

a) All animals at the affected holding(s), and at holdings that the Ministry considers to be at risk, are destroyed. These establishments are then cleaned and disinfected.

b) Surveillance is carried out according to OIE standards, to determine whether the virus is circulating in the zone.

c) If no evidence of the existence of the virus is found in the results of the survey, the Ministry declares the zone free from avian influenza three months after the final cleaning and disinfection of the zone, by submitting the appropriate report to the OIE.

General provisions

a) Provisions of the 'Biosecurity Directive for Commercial Broiler and Laying Poultry Holdings' will be applied in full.

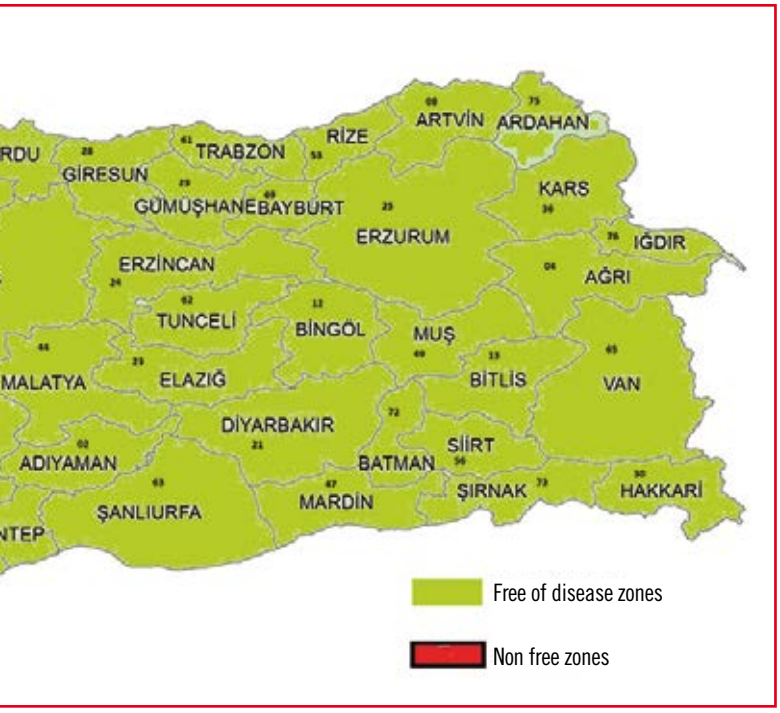
b) Any information related to poultry animal diseases within the zones will be rigorously and immediately assessed.

c) The General Directorate audits the Provincial Directorates, when required.

d) Updates to the zone list on the General Directorate website will be checked before the transportation of live poultry and/or hatching eggs, and transportation will be conducted according to the Directive.

e) Any transportation from a non-free zone to a free zone, violating the provision of this Directive, shall be notified to the General Directorate. In such a case, the following procedure will be applied.

– Free status of the zone is immediately repealed by the General Directorate and this situation is announced on the website.



– Legal action is taken by the Provincial Directorate against the holding that engaged in illegal transportation.
– In addition to clinical monitoring, 20 cloacal and tracheal swab samples and blood samples will be taken from the poultry houses of all commercial holdings and villages located within a 10-km radius around the holding that was responsible for the illegal transportation. These will be sent to the designated Veterinary Control Institute for testing.
– The Institute will test the samples and send the results to the General Directorate. If the analysis results and clinical monitoring results are negative for avian influenza, infection-free status is re-established and announced on the website. If any sample is positive, infection-free status is repealed and the provisions of Article 9 of the Directive are applied for the re-establishment of infection-free status.

Free zones for avian influenza disease

According to the results of the survey carried out throughout the country in 2015 and 2016, Turkey remains free from infection and 81 infection-free zones are thus defined under 81 provincial administrative borders, as published in the Ministry of Food, Agriculture and Livestock's Directive related to the definition and declaration of infection-free zones.

Table I gives the numbers and names of the defined infection-free zones, as does the corresponding map (Fig. 1).

In order to maintain the infection-free status of each zone, an active survey will be conducted twice a year, according to OIE international standards, during the migration period of wild birds. A passive survey will also be carried out during the year. As a result of the disease situation identified within Turkey, from the results of these surveys, infection-free zones will be updated at least yearly and more often, when necessary.

Therefore, taking into account:
– the information presented about the surveillance programme
– the fact that Turkey has maintained its freedom from infection with avian influenza viruses since 15 May 2015, and
– the provisions of Article 10.4.3. of the OIE *Terrestrial Animal Health Code* (2016),

the Delegate of Turkey to the OIE declares that the whole of Turkey is free from infection with avian influenza viruses, as of 5 January 2017.

SPAIN

Self-declaration by Spain of freedom from avian influenza

Self-declaration submitted to the OIE on 29 May 2017 by Dr Valentín Almansa, Delegate of Spain to the OIE and Director General of Agricultural Production Health, of the Ministry of Agriculture and Fishery, Food and the Environment (MAPAMA), Madrid

Highly pathogenic avian influenza situation

In February 2017, Spain's annual National Avian Influenza Surveillance Programme, which includes active and passive surveillance in domestic poultry and wildfowl, detected the presence of the H5N8 subtype of the highly pathogenic avian influenza (HPAI) virus on ten duck farms in the Catalonia provinces of Gerona (or Girona) and Barcelona.

On 23 February, an initial outbreak was confirmed on a free-range duck farm with 17,800 birds. Later, on 27 February, an epidemiological survey conducted on epidemiologically related farms in regard to live animal movements resulted in the notification of seven secondary outbreaks, all on duck farms (Table I).

Table I

Affected farms

Farm identification	Community	Province	Reason for sampling	Number of susceptible animals
ES171630024858	Sant Gregori	Girona	clinical signs	17,800
ES172240015515	Villalonga de Ter	Girona	contact farm	500
ES172320036206	Vilopriu	Girona	contact farm	177
ES170200036717	Bescano	Girona	contact farm	450
ES171830034823	Sant Aniol de Finestres	Girona	contact farm	0 *
ES170700034648	Fontanilles	Girona	contact farm	5,603
ES171890016583	La Cellera de Ter	Girona	contact farm	190
ES081070036954	Lliçà d'Amunt	Barcelona	contact farm	380

* There were no birds to sample on this holding as they had already been sent to the slaughterhouse by the time of detection. It was assumed to be infected and subjected to full cleaning and disinfection procedures, as per the other properties.

As a result of the surveillance measures operating over a 3-km radius, two additional secondary outbreaks were notified on 1 March in the 3-km protection zone (Table II).

Table II

Secondary outbreaks reported within the protection zone

Farm identification	Community	Province	Reason for sampling	Number of susceptible animals
ES171630037061	Sant Gregori	Girona	within the 3-km zone	2,450
ES171630007127	Sant Gregori	Girona	contact farm	380

The map in Figure 1 (p. 100) shows the location of the affected farms and the 3-km and 10-km zones.

Positive results were obtained only in the confirmed outbreaks, with the distribution shown in Table III.

Table III

Test results in the confirmed outbreaks

Farm identification	Municipality	ELISA tested	ELISA +	IHA H5 +	PCR tested	PCR H5+
ES171630024858	Sant Gregori	40	40	40	76	15
ES172240015515	Villalonga de Ter	20	20	12 (8 samples spoiled)	40	40
ES172320036206	Vilopriu	20	20	20	40	25
ES170200036717	Bescano	20	13	13	40	40
ES171830034823	Sant Aniol de Finestres	Empty holding				
ES170700034648	Fontanilles	20	19	20	40	25
ES171890016583	La Cellera de Ter	20	20	17	40	20
ES081070036954	Lliçà d'Amunt	0	0	20	40	40
ES171630037061	Sant Gregori	20	20	20	40	36
ES171630007127	Sant Gregori	20	19	17	40	38

ELISA: enzyme-linked immunosorbent assay
IHA: indirect haemagglutination test
PCR: polymerase chain reaction

Epidemiological study

The epidemiological study produced the following findings.

- No animals were moved from the affected farms to other regions of Spain (apart from the affected region in the map in Figure 1), to the European Union or third countries.
- Initially, seven movements causing risk were identified, from the initially affected farm (the primary outbreak) to final fattening farms in the Gerona and Barcelona provinces. An epidemiological study was conducted on the receiving farms, six of which tested positive, while the seventh had no birds at the time of the outbreak. The total duck population of the seven farms was 7,000.
- Surveillance conducted within the 3-km radius around the primary outbreak revealed two new outbreaks within the same community, also on duck farms. Birds on one of the farms started to display clinical signs, resulting in sampling, and the second had taken delivery of live animals from this newly affected farm. No animal movements took place from these two new farms, apart from those destined for stamping out.

Control and eradication measures

All affected farms were locked down from the moment suspicions were raised, and clinical inspection and sampling were conducted in all the sheds.

The farms were subjected to serological and virological tests, in compliance with the requirements established in Article 10.4.33. of the OIE *Terrestrial Animal Health Code*. The Veterinary Services followed a sampling protocol that specified which samples should be taken, what personal protection equipment to use and the sampling method. On each farm, 20 blood samples, 20 tracheal swabs and 20 cloacal swabs were collected.

Every time a new outbreak was confirmed, the whole population was stamped out and, once completed, this was followed by clean-up and disinfecting operations. Both the (naturally) dead and slaughtered animals were transported from each depopulation site to the Secanim processing plant (Termens, Lerida [Lleida] province), where the carcasses were specially disposed of, to rule out any risk of contamination. Accordingly, leak-proof

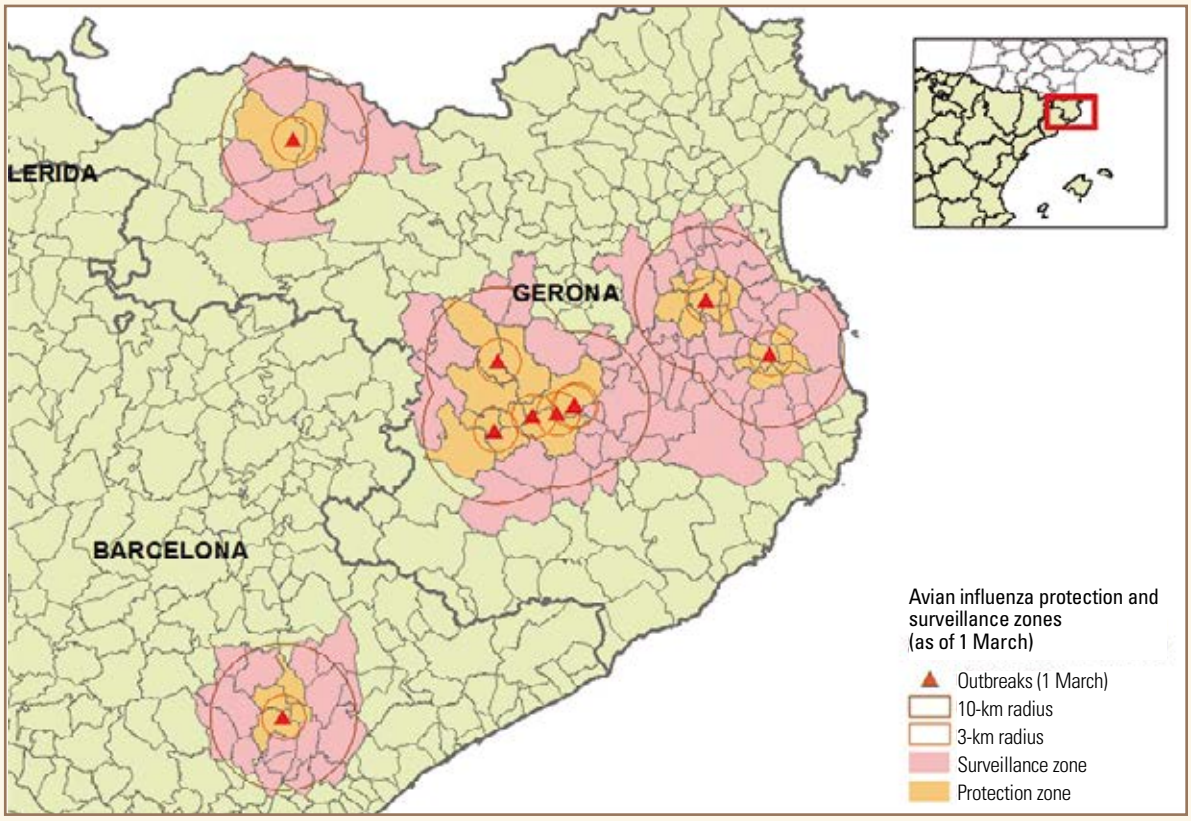


Fig. 1
Location of outbreaks

containers were used to avoid contamination during transport.

The movement of poultry, their products and other materials that could transmit the virus was prohibited in the 3-km zone (the 'protection zone') and the 10-km zone (the 'surveillance zone'). Nonetheless, certain exceptions were permitted, with the application of additional biosecurity measures, in the case of birds intended for slaughter, day-old chicks, ready-to-lay poultry and hatching eggs. These measures remained in force until 1 April 2017, on which date 30 days had elapsed since the end of the clean-up and disinfection operations at the site of the last outbreak, as stipulated in the European Directive 2005/94.

In the protection and surveillance zones, compulsory strengthening of biosecurity measures, as well as other measures, such as a ban on spreading used litter and staging fairs, markets and exhibitions, were enforced as an additional preventative measure. The confinement of free-range poultry was imposed within the 3-km radius.

Epidemiological surveillance

In the protection and surveillance zones, the quarantine and investigation of all poultry farms located in these zones was conducted through clinical surveillance. This included sampling all the farms in the protection zone and, in the event of the display of clinical symptoms or epidemiological links with affected farms, in the surveillance zone. This was in accordance with the heightened surveillance requirements set out in Article 10.4.3.1. of the OIE *Terrestrial Animal Health Code* enabling a country to regain freedom from avian influenza status after an outbreak.

The number of samples taken in the protection zone, and in the other restricted zones, is displayed in Table IV.

Negative results from polymerase chain reaction (PCR) and haemagglutination (HI) were obtained in all cases, except in the last two outbreaks detected in the protection zone (farms ES171630037061 and ES171630007127). In regard to enzyme-linked immunosorbent assay (ELISA), seven farms obtained positive results but were confirmed as negative by specific H5 and H7 PCR.

Table IV

Number of samples taken in the protection zone and in the other restricted zones

	Protection zone	Surveillance zone
Number of farms sampled	55	13
Number of samples	1,375	564
Number of ELISA tests	494	370
Number of PCR tests	881	194

Furthermore, a National Avian Influenza Surveillance Programme has been conducted throughout the country since 2003 to provide early diagnosis of the disease. Its remit includes farmyard poultry, other captive poultry and wildfowl.

Active surveillance is based on the laboratory sampling of farmyard poultry and other captive poultry, to detect the circulation of the H5 and H7 viruses. The sample must be representative of the country's entire poultry population; therefore, a minimum number of samples is set for:

– the various production categories: laying hens, free-range laying hens, breeder hens, breeder turkeys, breeder ducks, breeder geese, fattening turkeys, fattening ducks, fattening geese, gallinaceous game birds (pheasants, partridges and quail), game Anatidae, ratites and others
– each Autonomous Community, to be eligible for consideration as being representative of the whole of Spain.

The sampling strategy chosen in Spain is based on a representative sampling of its entire territory. The sampling period is adapted to the seasonality of production and can also be adapted to other types of timelines identified locally that may potentially involve a higher risk. The number of farms to be sampled (with the exception of duck and goose farms) must ensure detection in the case of an estimated prevalence of 5% with a 95% confidence interval. The number of duck and goose farms to be sampled must ensure the identification of at least one infected farm, involving a minimum prevalence of 5% with a 99% confidence interval. For all categories, the number of samples to be taken on each holding is defined to ensure a 95% probability of identifying at least one seropositive bird, with a considered prevalence of over 30%.

The following table shows changes to the sampling in recent years, which is always in relation to the risk assessment at that time, is detailed in Table V.

The results of the samples taken in Catalonia from July to December 2016 have been revised. In this campaign, 49 holdings were sampled. All returned negative results by ELISA.

The sampling programme continued through 2017 without detecting new positive cases. The total number of farms to be sampled in 2017 is shown in Table VI, broken down by production category.

During the first semester of 2017, 486 samples were taken on 40 holdings in the region of Catalonia, all of them with negative results to the ELISA test.

Moreover, since the first outbreaks of H5N8 HPAI in Northern Europe, the Central Veterinary Services (MAPAMA) have regularly reminded all the sectors involved, and the regional authorities, of the need to boost biosafety measures on poultry farms, primarily those aimed at avoiding contact with wildfowl, and to increase surveillance when faced with an abnormal mortality or compatible clinical symptoms on poultry farms and in wildfowl, as well as to improve passive surveillance and preventative measures.

Table V

Changes to the sampling in recent years

Year	2013	2014	2015	2016
Farms	965	897	833	752
Wild birds	2,772	1,435	1,201	1,148

Table VI

Total number of farms to be sampled in 2017, broken down by production category

Production category	Total number of installations	Total number of installations to be sampled	Number of samples per installation	Minimum number of samples to be carried out per method	Laboratory analysis method
Laying hens	412	60	20	1,200	ELISA
Breeder hens	638	60	20	1,200	ELISA
Free-range laying hens	314	60	5–10	600	ELISA
Ratites	73	42	5–10	420	ELISA
Gallinaceous game birds	503	60	5–10	600	ELISA
Fattening turkeys	629	60	5–10	600	ELISA
Breeder turkeys	14	14	5–10	140	ELISA
Game Anatidae	120	80	20	1,600	ELISA
Fattening ducks	49	47	20	940	ELISA
Fattening geese	17	17	20	340	ELISA
Breeder ducks	3	3	20	60	ELISA
Breeder geese	3	3	20	60	ELISA

Description of laboratory tests

The diagnostic method used to detect and identify the virus, the isolation method, and the specific antibodies complied with Chapter 2.3.4. of the OIE 2016 *Manual of Diagnostic Tests and Vaccines for Terrestrial Animals (Terrestrial Manual)* and have been EN ISO 17025-certified by the Spanish National Accreditation Body.

Serum samples were analysed by ELISA (blocking ELISA, ID.VET). Any samples testing positive were confirmed by a haemagglutination inhibition (HI) assay, using designated strains as recommended by the Animal and Plant Health Agency (APHA) European Union Reference Laboratory (APHA–EURL).

The cloacal and tracheal swabs were analysed using the real-time PCR method to detect the influenza A virus.

In the event of a positive result, the method used was real-time PCR to determine the avian influenza virus subtype and sequencing was subsequently carried out to determine its pathogenicity.

Lastly, in positive cases, egg embryos were inoculated with the positive samples to attempt to isolate the virus, following the procedure described in Chapter 2.3.4. of the OIE *Manual.*

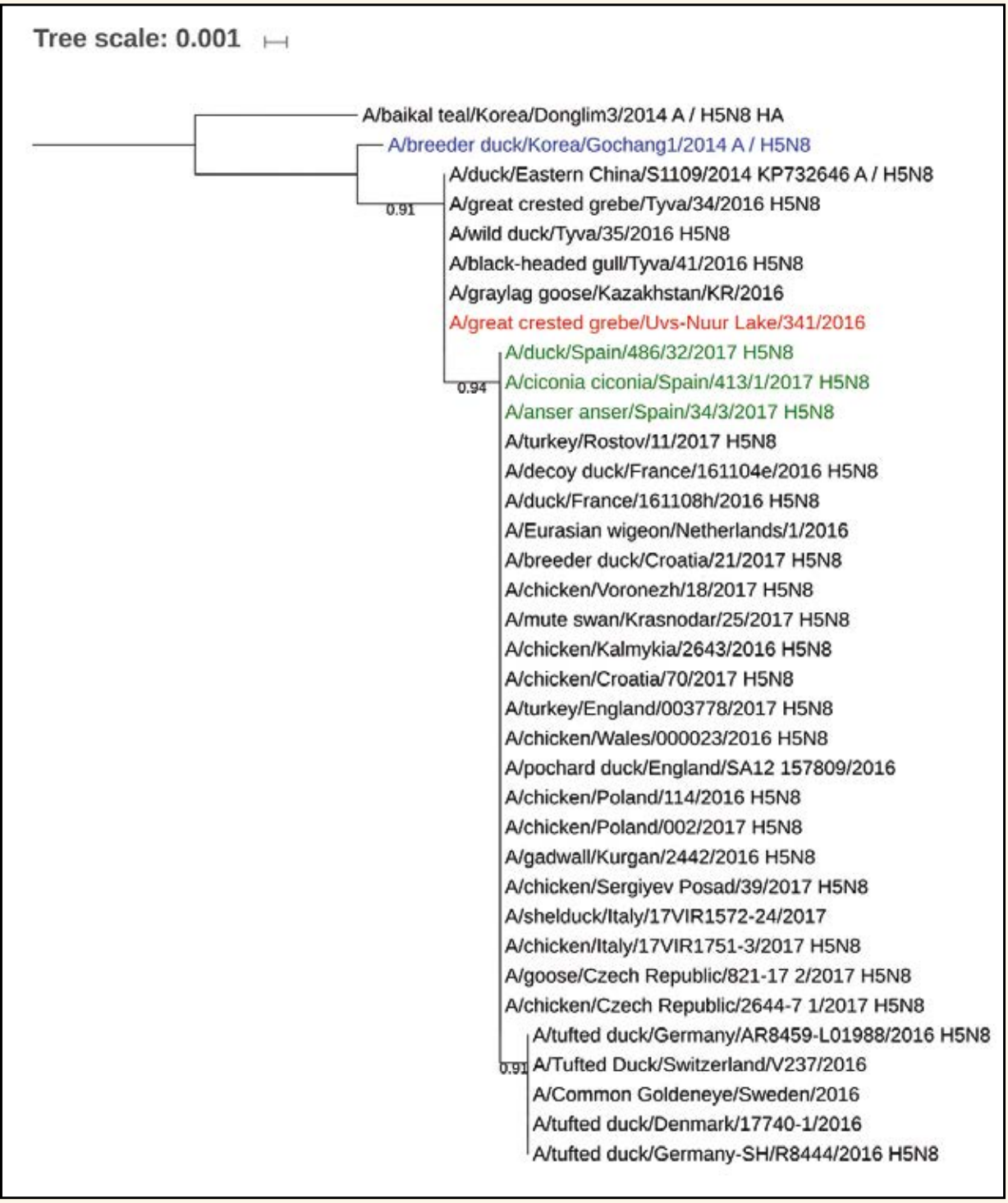
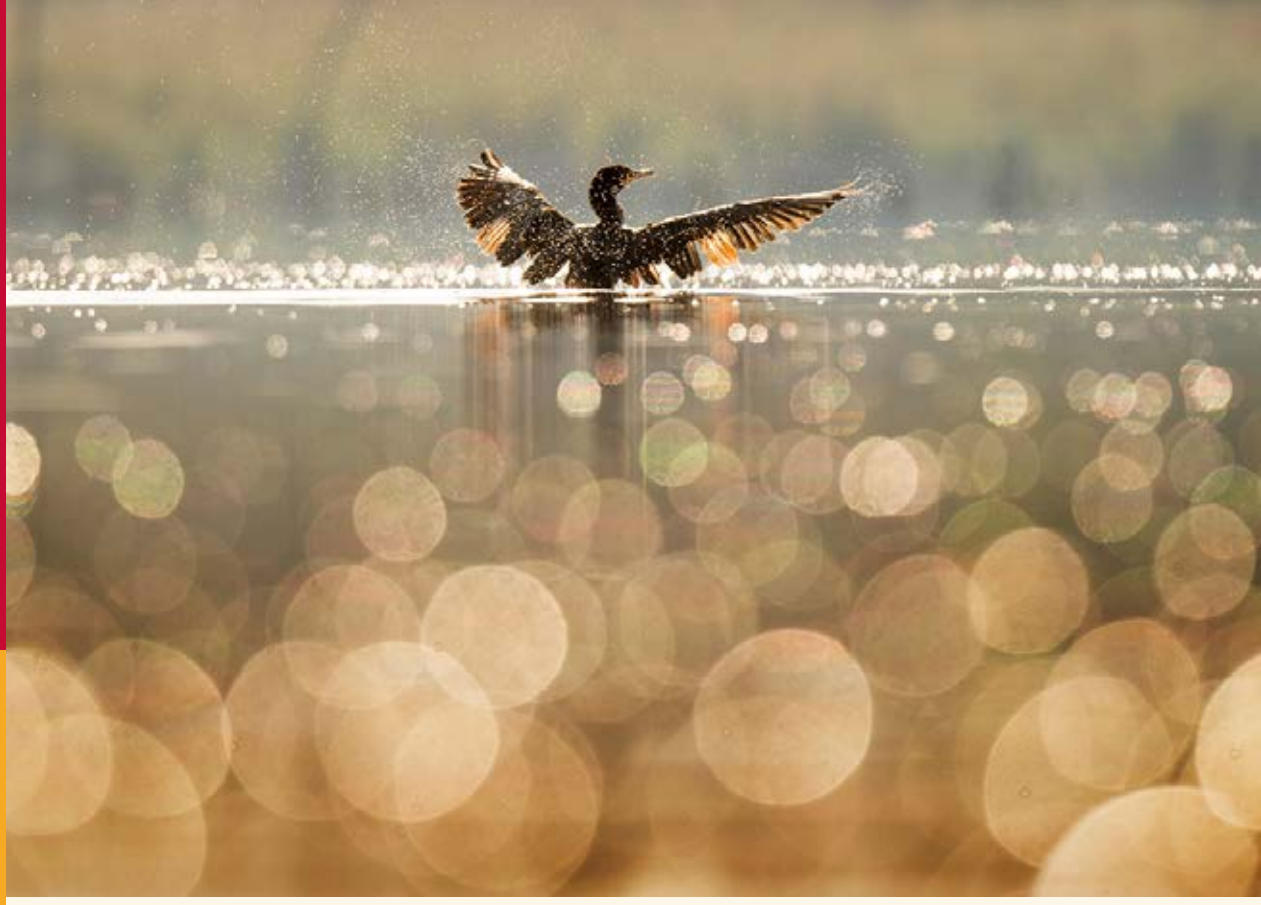


Fig. 2

Haemagglutinin phylogenetic analysis of 35 H5 clade 2,3,4,4 nucleotide sequences

Sequences were aligned with Muscle (v3.7); 32 from Global Initiative on Sharing All Influenza Data (GISAID) databases and three Spanish isolates in green. The region analysed was a 259 base-pair fragment (821–1080 nt) of the H5 haemagglutinin (HA) gene.

The phylogenetic tree was reconstructed using the maximum likelihood method implemented in the PhyML program (v 3.0). The HKY85 substitution model was selected assuming an estimated proportion of invariant sites (of 0.001) and 4 gamma-distribute rate categories to account for rate heterogeneity across sites. The gamma shape parameter was estimated directly from the data (gamma = 0.501). Reliability for internal branch was assessed using the approximate likelihood ratio (aLRT) test (minimum of Shimodaira–Hasegawa [SH]-like).



Phylogenetic results

The region of haemagglutinin H5 of the HPAI virus isolated on farm ES171630024858 was sequenced by the Spanish National Reference Laboratory for avian diseases (*Laboratorio Central de Veterinaria* [LCV], Algete), together with two other HPAI H5N8 isolates obtained in January and February 2017 from wild birds in Palencia province (*Anser anser*) and Gerona province (*Ciconia ciconia*), respectively.

The resulted phylogenetic tree (Fig. 2) shows that the three Spanish HPAI H5N8 isolates are identical in the sequenced region of haemagglutinin H5 and identical to all isolates that appear in that branch of the tree.

Conclusions

Bearing in mind that:

- prior to the notification of outbreaks, Spain enjoyed avian influenza-free status,
- stamping-out measures were adopted that included cleaning up and disinfecting all the affected farms,
- three months have elapsed, as stipulated in Point 1 of Article 10.4.3. of the OIE *Terrestrial Animal Health Code*, since the end of the clean-up and disinfection operations,
- surveillance has been performed in accordance with Articles 10.4.27. to 10.4.33. of the OIE *Terrestrial Animal Health Code* during that three-month period,

the official Veterinary Authorities of Spain have decided **to self-declare that Spain's status as being free of notifiable avian influenza has been regained for the whole country.**

The Delegate of Spain to the OIE declares that this country has met the requirements for recognition as a country free from avian influenza as of 2 June 2017, in accordance with Article 10.4.3. of the *Terrestrial Animal Health Code* (2016).

Creating closer ties between the animal information systems of the European Union and the OIE

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One of the objectives of the OIE, under its mission of transparency, is to establish connectivity between the World Animal Health Information System (WAHIS) and regional animal disease platforms.

A Contribution Agreement for the Development and Implementation of an Animal Disease Information System (ADIS) for the European Union (EU) Member States, signed between the OIE and the European Commission, enabled these organisations to call for tenders in September 2015, to select IT support services dedicated to ADIS. This project is being carried out by the OIE's World Animal Health Information and Analysis Department and the European Commission's Directorate General for Health & Food Safety (DG SANTE), with the help of consultants from the company Sogeti.

This project builds on the work of previous analyses and focuses on core objectives to streamline the transfer of data between the OIE and EU.

The goal is to simplify the animal disease notification process, so that EU Member States can meet their legal obligations more easily when it comes to both EU and OIE notifications. Importantly, experts in the current EU Animal Disease Notification System (ADNS) and in WAHIS have been involved in all project phases from the beginning, to provide valuable feedback and ensure that the system will meet user needs. Governance of the project is carried out through meetings of a Steering Committee, made up of representatives from both organisations, which receives reports from the Operations Committee.

During the first stage of the project, the correlation mechanisms between ADNS and WAHIS were identified and mapped out. Next, documents detailing the data dictionaries, data models and architecture for the new system were written. At present, mock screens of the new system are being developed to enable accurate visualisation and evaluation of data management and the workflow between ADIS and WAHIS. The final steps, expected to be completed in the first quarter of 2018, are to build, beta-test and launch the ADIS platform.

Successful interoperability between the two systems of the OIE and the EU will not only increase the efficiency of the notification process but also lay down the foundations for similar initiatives in the future.

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OFFLU swine influenza experts develop global nomenclature system and automated annotation tool for H1 haemagglutinin genes of influenza A viruses

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Keywords

Epidemiology – H1 – influenza A virus – Influenza Research Database (IRD) – nomenclature – OFFLU – swine.

Summary

Influenza A viruses (IAV) infect a wide range of hosts, including avian species, humans and swine. Although there are host species specificities, IAV is periodically transmitted between different species, in some cases causing epidemics or even pandemics in humans.

Swine are natural hosts for H1N1, H1N2, and H3N2 IAV, and tremendous diversity exists among the endemic IAV, both within and between regions. However, prior to the 2009 H1N1 pandemic, relatively little was known regarding IAV circulating in swine around the world, compared with the knowledge base on IAV circulating in avian and human populations. This gap in knowledge impeded our understanding of how viruses adapted to swine, how human transmission to swine impacted the ecology and evolution of IAV as a whole, and the true impact of swine IAV on human health. The H1N1 pandemic in 2009 underscored the need for greater surveillance and sharing of data on IAV in swine. With the establishment of a network of expertise on animal influenza in 2005 by the World Organisation for Animal Health (OIE) and the Food and Agriculture Organization of the United Nations (FAO), referred to as OFFLU[1], this network has supported and coordinated global efforts to prevent, detect and control important influenzas in animals. The World Health Organization (WHO) also participates in OFFLU activities on issues related to the animal–human interface. To address the technical issues around IAV in swine, an expert group under the auspices of OFFLU was established. Recently, the OFFLU swine influenza experts collaborated with influenza bioinformatics experts to develop rapid automated sequence analysis tools to facilitate a globally harmonised nomenclature and clade identification systems for diagnosing and communicating the evolutionary relationships of swine H1 IAV.

1. OIE/FAO global network of expertise on animal influenza (OFFLU): www.offlu.net

Identifying a need

Many animal species are susceptible to infection with IAV, but swine and human hosts represent an ecological niche by sharing common IAV subtypes and genetic lineages. In swine and humans, IAV infection can cause respiratory disease, and some IAV can transmit between the two hosts. Consequently, understanding in a timely manner how IAV are evolving in swine is critical to reducing the disease burden in pigs and minimising the risk of swine IAV spilling over into human populations.

The OFFLU swine influenza experts first met in 2010, and since then they have maintained a collaboration among the network experts to characterise the genetic and antigenic relationships between human influenza viruses and swine influenza viruses. Determining these relationships relies upon the analysis of the haemagglutinin (HA) surface protein of IAV, which is the primary target of the host immune response and is the main antigenic component of human and swine influenza vaccines. As vaccination remains the best control measure for IAV, assessing the antigenic diversity and evolution of HAs circulating in pigs and humans, and understanding how this diversity may affect the risk of interspecies transmission, is critical to improving vaccine formulations for public and animal health.

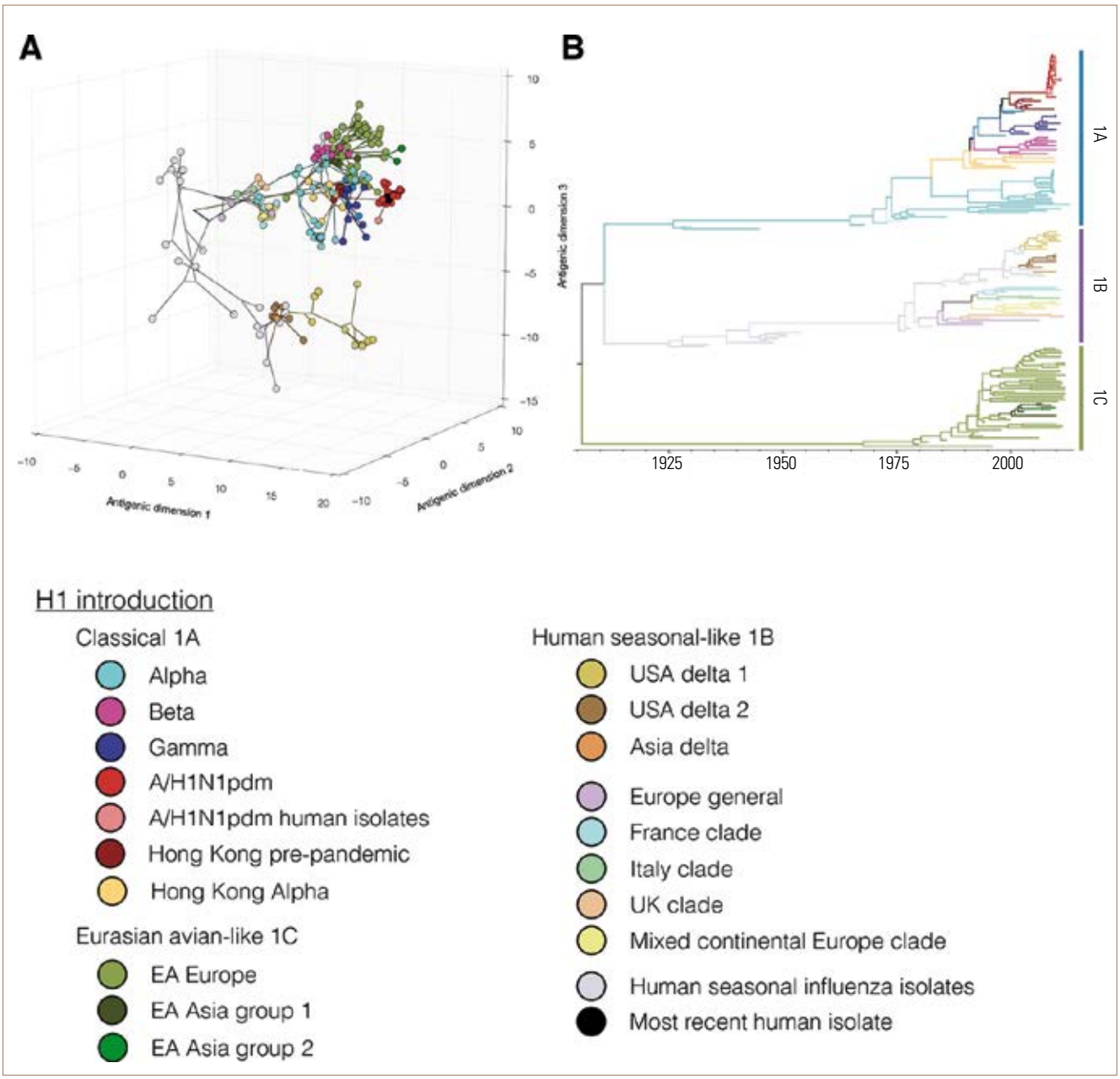
Genetic analyses of swine IAV in recent years has revealed recurrent incursions of human seasonal influenza viruses into pig populations, and variants of these introductions continue to circulate in different pig populations worldwide [1, 2]. Analyses of newly identified swine IAV alongside existing genetic data can be used to select representative strains to pursue for phenotypic characterisation using haemagglutination inhibition (HI) assays that evaluate antigenic properties. This workflow, where genetic and antigenic analyses of IAV in pigs are linked, has recently been used to demonstrate that there is significant antigenic diversity among human and swine strains circulating within and between geographical areas [3]. This diversity is the result of independent incursion events occurring at different time points in different geographical regions. Figure 1A highlights antigenic diversity; Figure 1B is time-scaled evolutionary tree and shows the introduction time for each of the major clades. The subsequent maintenance of such genetically diverse viruses within pig populations for long periods of time resulted in antigenically drifted viruses that may also pose a risk of reintroduction into the human population.

Thus, providing a publicly available resource that quickly determines the genetic identification of newly generated HA gene sequences from swine is essential for timely diagnosis, making informed decisions on whether a virus should be further characterised in the laboratory for antigenic and other phenotypic properties, and determining whether vaccine strain updates are necessary. Further, in order to develop accurate risk assessment processes for pandemic preparedness, approaching this question with a global rather than a regional perspective is a necessity given the rapid movement of swine and humans across large geographical distances and the frequent exchange of IAV between humans and swine.

At a technical meeting in April 2013, the OFFLU swine influenza experts identified the need for a global framework for comparing and contrasting HA genes from IAV endemic in swine and began discussing the criteria for naming H1 genes. A global phylogenetic clade classification and naming system was proposed, based on criteria adapted from avian influenza H5 genetic diversity, but customised to be suitable for quantifying the global evolution and genetic diversity of swine IAV. The classification and naming system was proposed for several reasons:

a) to communicate the genetic relationships among H1 subtype IAV circulating in swine in different geographical regions;

b) to communicate the genetic relationships between swine and human seasonal IAV (and other host-specific IAV) to facilitate public health collaboration;



A: Antigenic relationships inferred by Bayesian multidimensional scaling (BMDS) of human and swine H1 viruses. Each coloured ball represents a single virus. Viruses are coloured by lineage and by geography. Lines connecting the viruses represent inferred phylogenetic relationships. Distances for antigenic dimensions are measured in antigenic units (AU) and each unit is equivalent to a two-fold dilution in HI assay data. Antigenic distance can be interpreted as a measure of antigenic similarity – viruses close to one another are more antigenically similar than viruses further apart.

B: Bayesian MCC phylogenetic tree of swine H1 genes representing three major lineages: classical 1A, human seasonal-like 1B, and Eurasian avian-like 1C.

Fig. 1

Antigenic and genetic evolutionary relationships of H1 influenza viruses circulating in swine [3]

c) to provide a benchmark to monitor and identify significant genetic evolution of H1 IAV.

The OFFLU swine influenza experts engaged with bioinformatics experts and the curators of the Influenza Research Database (IRD) to incorporate the HA gene phylogenetic clade naming convention into a web-based clade classification tool with open public access for H1 sequences available in GenBank, as well as for users' private sequences.

Constructing the naming framework

The H1 subtype of IAV has circulated in swine since the 1918 human influenza pandemic, followed by further

introductions over time from non-porcine hosts. Swine H1 evolve along three major genetic lineages, assigned the names 1A, 1B and 1C (Fig. 1B, Fig. 2). Within these lineages, the genetic makeup of IAV continually evolves.

In 2013, there was no established system for describing these genetic changes. Reporting of novel H1 genotypes in swine used idiosyncratic names and terms specific to particular swine production regions and particular research efforts. These names and terms provided little insight into the genetic history or biology of the virus and complicated communication among scientific peers.

To establish a globally consistent nomenclature for describing swine H1 HA evolution, the OFFLU swine influenza experts began with a rigorous phylogenetic analysis of a dataset of 7,070 swine, human and avian H1 HA sequences [4]. Results from this analysis were used to identify distinct clades of H1 sequences with strong statistical support.

Twenty-eight distinct contemporary clades were identified within the three primary lineages; these clades form the basis for the nomenclature system (Fig. 2). Strongly supported subclades of these primary lineages were assigned 'number' suffixes.

For example, the 1B lineage refers to 'human-like' sequences that originated from pre-2009 human seasonal H1 introductions into swine. The notation 1B.1 applies to those 1B sequences originating from the United Kingdom and Europe, while 1B.2 sequences originate from America. The notation 1B.2.1.2 applies to a distinct group of H1 sequences within the 1B lineage from Argentina.

Importantly, clades may cross geographical and temporal boundaries, reflecting dispersion of genetic variants which is probably due to trade in live swine. The clade nomenclature is designed to describe distinct genetic patterns, with potential phenotypic associations, irrespective of geographical and temporal associations.

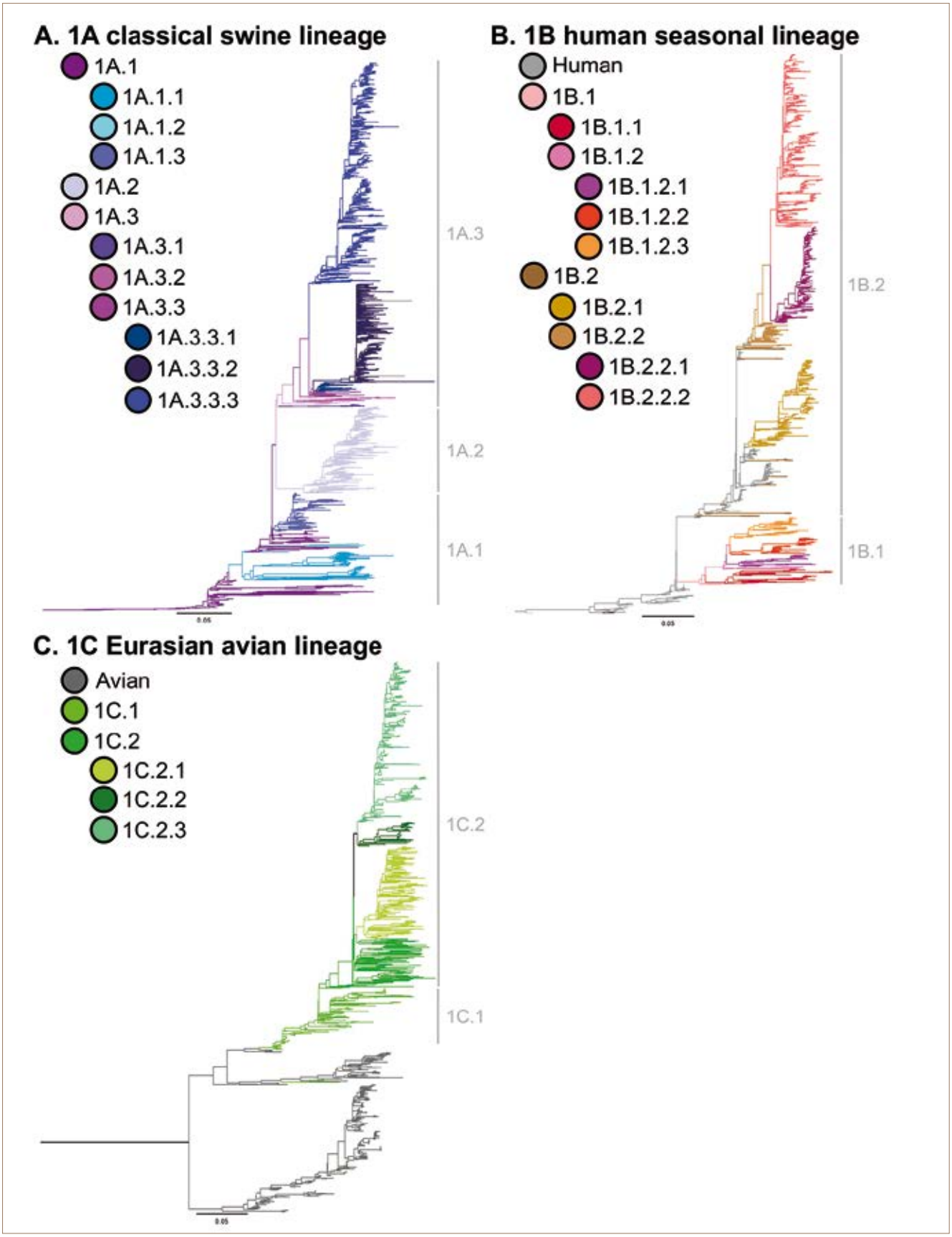
To enable widespread adoption of this nomenclature, the OFFLU swine influenza experts believed it important both to classify the public database of swine H1 sequences using this nomenclature and to provide a mechanism for those involved in swine IAV research and surveillance to classify their novel swine H1 sequences simply and accurately within this system. To attain these goals, the OFFLU swine influenza experts partnered with bioinformatics experts of the IRD to develop a publicly available, automated classification tool that accurately recapitulates the clade assignments of the earlier, large-scale manual phylogenetic analyses. This tool uses the algorithms of the IRD H5 clade assignment tool, adapted for specific use to the classification of swine H1 sequences. While focused on swine H1 viruses, the IRD tool also identifies and classifies circulating human H1 and avian H1 sequences that fall into broad lineages distinct from swine H1. When applied to the dataset of 7,070 swine, human and avian H1 sequences, the IRD automated classification tool matched the clade assignment of the large-scale manual phylogenetic analyses with an accuracy of >99%.

Clade annotation of publicly available swine H1 sequences is accessible through the IRD website[2]; the IRD website also provides an interface for classification of newly generated swine H1 sequences. The tool can be updated readily to track evolving nomenclature as new clades emerge, ensuring continued relevance. **Importantly, the global nomenclature system simplifies communication, and the associated web-accessible classification tool provides a simple, accurate method for researchers, diagnosticians and health officials to review clade designations of historical sequences as well as assigning clade designations to contemporaneous H1 sequences**. A global nomenclature system facilitates comparison of IAV infecting pigs within and between regions. It also provides insight into the diversity of swine H1 influenza viruses and the impact on vaccine strain selection, diagnostic reagents and test performance.

Open source automation

The IRD is a Bioinformatics Resource Center sponsored by the United States National Institute of Allergy and Infectious Diseases (NIAID)[3] that is dedicated to providing bioinformatics support for influenza virus research by providing a comprehensive collection of influenza-related data integrated with a growing suite of analysis and visualisation tools for data mining and hypothesis generation [5, 6]. The IRD supports use of this resource through active community outreach and training programmes. Given that IRD has the capability of providing enriched sequence annotations, integrating a wide range of data types and facilitating data analysis and visualisation, it provided an ideal platform for implementing the new global swine H1 nomenclature.

2. www.fludb.org
3. HHS-NIH-NIAID: Department of Health and Human Services – National Institutes of Health – National Institute of Allergy and Infectious Diseases (www.niaid.nih.gov)



The best-known tree was generated using maximum likelihood methods from 7,070 H1 swine and representative human and avian haemagglutinin gene sequences. Subsequently, the global tree was split into the three major lineages to facilitate presentation: 1A classical swine lineage; 1B human seasonal lineage; and 1C Eurasian avian lineage. Branch colour represents clade designations based on the nomenclature system proposed in this study.

Fig. 2

Phylogeny and nomenclature of swine H1 influenza A virus haemagglutinin gene sequences [4]

The collaboration between OFFLU and IRD led to the following enhancements within the freely available IRD site:

- Viewing the clade assignment of swine H1 sequences on the IAV Strain Detail Page (Fig. 3A).
- Searching for IAV strains belonging to certain swine H1 clades using the Swine H1 Clade Search interface (Fig. 3B).
- Assigning the correct H1 clade to a user's novel sequences using the Swine H1 Clade Classification Tool (Fig. 3C).
- Verifying a clade classification result by viewing the query sequence within a reference phylogeny of sequences with known classification.
- Colour-coding phylogenetic tree nodes on the basis of H1 clade assignments [7].
- Identifying genetic differences between H1 clades using Meta-CATS, a tool that pinpoints the genetic variations between groups of virus sequences [8].

With the new H1 nomenclature system integrated in the IRD resource, veterinarians, public and animal health officials and influenza researchers can annotate and analyse IAV sequences derived from their diagnostic and research efforts. These classification tools and the nomenclature system will help to improve swine production as well as disease preparedness for humans through the elucidation of important changes in swine IAV.

Conclusion

This paper highlights an important achievement of the OFFLU swine influenza experts, carried out in partnership with experts in bioinformatics and influenza genetics and biology. A similar nomenclature system for H3 swine IAV is now in development. Cross-species transmission and the true directionality of IAV movement and evolution cannot be fully understood without surveillance, combined with virological and epidemiological investigation, and the tools described here greatly facilitate these activities. A global approach enables integration and sharing of data and resources across regions, increasing the effectiveness of surveillance and control efforts. Strong collaboration and communication between animal and public health influenza communities are critical for maximising the benefits of work conducted in each of these individual sectors. The OFFLU network is addressing the need for global integration and rapid sharing of data and resources to fight IAV in swine. Facing the health, production and trade issues caused by influenza proactively by using science, transparency and cooperation is both our challenge and our opportunity, now and in the coming years.

Acknowledgements

We gratefully acknowledge OFFLU network experts, OIE, FAO, swine producers, veterinarians and IAV sequence contributors. This work was supported by USDA-ARS[4], USDA-APHIS[5], and by an NIH-NIAID[6] interagency agreement associated with the Center for Research on Influenza Pathogenesis (CRIP[7]), an NIAID-funded Center of Excellence in Influenza Research and Surveillance (CEIRS, contract No. HHSN272201400028C). The Influenza Research Database is funded by the NIAID under contract No. HHSN272201400028C.

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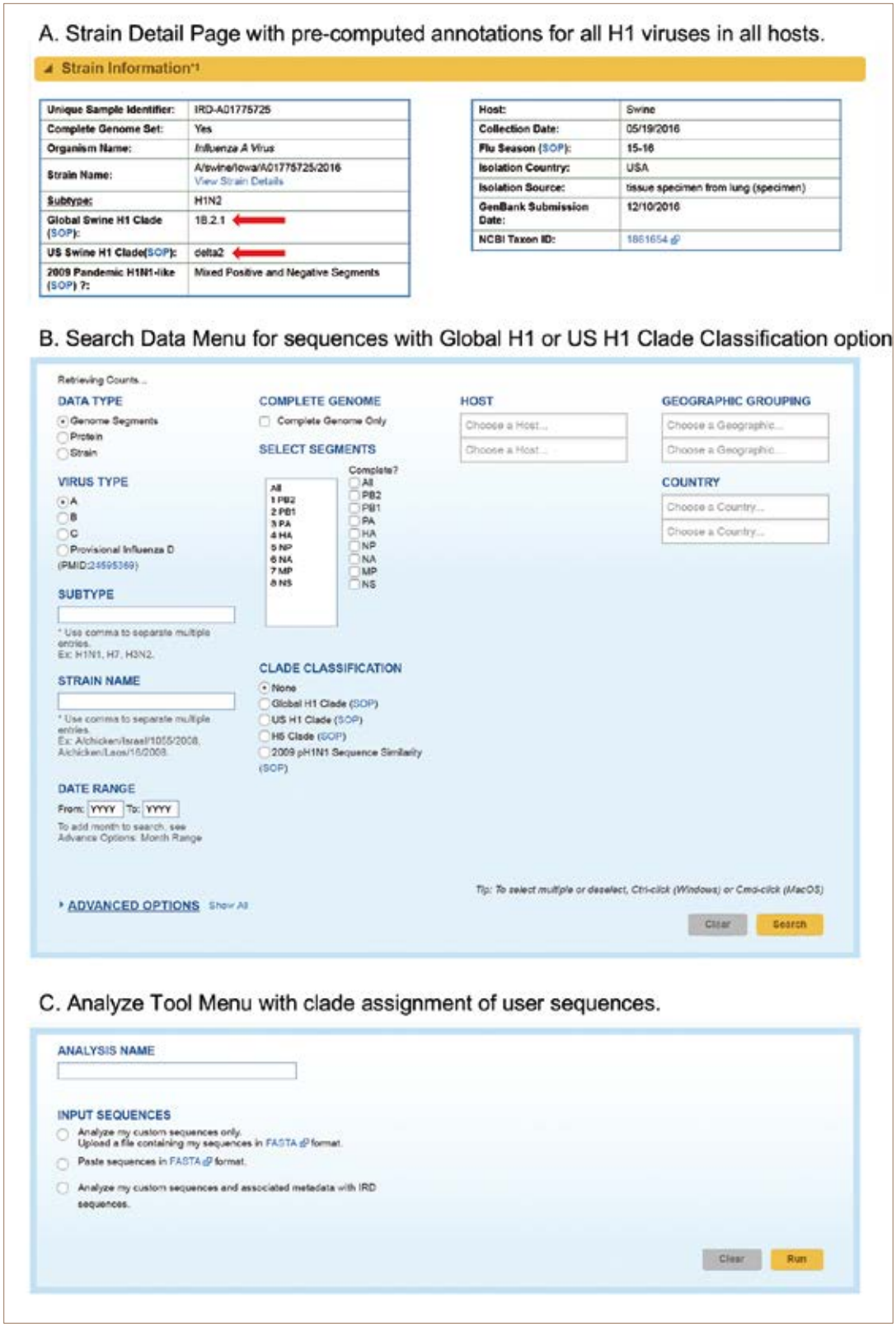
4. USDA: United States Department of Agriculture; ARS: Agricultural Research Service (www.ars.usda.gov)
5. USDA: United States Department of Agriculture; APHIS: Animal and Plant Health Inspection Service (www.aphis.usda.gov)
6. NIH: National Institutes of Health; NIAID: National Institute of Allergy and Infectious Diseases (www.niaid.nih.gov)
7. www.niaidceirs.org/centers/crip/



A: View the clade assignment of swine H1 sequences on the IAV Strain Detail Page. US and Global H1 clade tools are both available (red arrows).

B: Search for IAV strains belonging to specific swine H1 clades using the Clade Classification options in addition to other specific criteria such as host and country.

C: Assign the correct H1 clade to a user's novel sequence using the Swine H1 Clade Classification Tool.

Fig. 3

Influenza Research Database swine H1 clade tool interfaces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publications

Honeybee Veterinary Medicine: *Apis mellifera* L.

Nicolas Vidal-Naquet

Preface by Bernard Vallat, foreword by Gregory A. Lewbart

In English
2015
24 × 17 cm
260 pages
ISBN 978-1-91945-504-3
Published by 5m Publishing
Available from: www.5mbooks.com/honeybee-veterinary-medicine.html

Honeybees are an essential part of farming and the wider ecosystem. Since the middle of the 1990s bee populations around the world have suffered dramatic decline through diseases, intoxication, and unknown causes. Veterinarians have had little training in bee health but as the situation continues, qualified animal health professionals and, in particular, veterinarians are being required to become involved as new dangers threaten honeybee health everywhere because of global apiculture trade and exchanges of honeybees, products of the hive and beekeeping material such as *Aethina tumida* (the small hive beetle – a beekeeping pest) introduced in Italy in 2014 or the mite *Tropilaelaps* spp. (parasitic mites of honeybees).

This book provides an overview of bee biology, the bee in the wider environment, intoxication, bee diseases (viral, bacterial, fungal diseases), bee parasites (with a large part dedicated to the mite *Varroa* destructor), pests, enemies, and veterinary treatment and actions relating to honeybee health. The book also covers current topics such as climate change, crop pollination, use of phytosanitary products, antibiotic resistance, and colony collapse disorder (CCD).

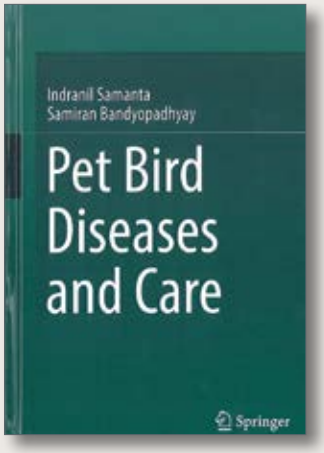
While aimed at veterinary practitioners, students and veterinarians involved in apiculture and bee health (officials, researchers, laboratory veterinarians, biologists...), the book can also be beneficial to beekeepers, beekeeping stakeholders, animal health and environmental organisations.

About the author:

Nicolas Vidal-Naquet, DVM, graduated in apiculture and honeybee medicine, is a veterinary practitioner and lecturer in honeybee biology and diseases at the Veterinary School of Alfort, France.

Pet bird diseases and care

Indranil Samanta & Samiran Bandyopadhyay



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DOI 10.1007/978-981-10-3674-3

This book provides fundamental information on pet birds, menaces, and advances made in the diagnosis and treatment of menaces. It is the only book covering all species of pet birds, menaces and their individual management. The handful of related books available

worldwide are largely outdated and focus on a single species or breed of pet bird.

The book encompasses the history of bird keeping, common breeds of birds, their nutritional requirements, list of zoonotic diseases transmitted by birds and guideline for their prevention. It covers infectious, non-infectious clinical and metabolic diseases, and toxicity in detail with a special focus on the history of diseases, etiology, affected hosts, pathogenesis, clinical signs, diagnosis and treatment. Separate chapters detail relevant diagnostic techniques, management and care practices, including updated information.

The book offers an invaluable guide for students and teachers in the field of (avian) veterinary medicine, scientists/research scholars working in related fields, and avian medicine practitioners, as well as all those progressive bird owners who want to know the basics of their care and management.

About the authors:

Indranil Samanta has published more than 100 research articles in reputed international and national journals along with review articles in international journals. He has published two textbooks entitled 'Veterinary Bacteriology' and 'Veterinary Mycology' from New India Publishing Agency and Springer, respectively. He is an editorial board member and reviewer of several other international and national journals.

Samiran Bandyopadhyay has published 90 research articles in reputed international and national journals. He is an editorial board member and reviewer of international and national journals.

OIE PHOTO COMPETITION 2017

Theme: **Animal health and welfare, beyond the cliché**

The OIE has brought its major mission, improving animal health and welfare in a photo competition, whose aim is to visually and creatively show the crucial importance of the work done to protect animal health and welfare worldwide through the implementation of OIE International Standards, the crucial link between animal health and welfare, as well as the significance of these latter elements to face the challenges of the future, and preserve human health and ecosystems.

The winners of the 2017 OIE photo competition are therefore the photographers who best illustrate, both from an artistic and a descriptive point of view, the work carried out by animal health and welfare players, in particular by Veterinary services both in their public and private components, to protect animal health and promote animal welfare worldwide in the context of the OIE Standards' implementation.

OIE Photo Competition:
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Europe. Caress. *Mr Simon Halas*. Slovakia

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agenda

2017

September

42nd World Small Animal Veterinary Association (WSAVA) Congress
25–28 September
Copenhagen, Denmark
www.wsava2017.com

SEACFMD LabNet-EpiNet Meeting
27–29 September
Bangkok, Thailand

October

2nd meeting of the stray dog Roadmap for West Eurasia
(dates to be confirmed)
Uzbekistan

14th Conference of the OIE Regional Commission for the Middle East
2–6 October
Istanbul, Turkey

7th meeting of the Regional Steering Committee of the GF-TADs for Europe
16–17 October
Brussels, Belgium

Annual meeting of OIE Regional and Sub-Regional Representations
24–27 October
OIE Headquarters, Paris, France

2nd OIE Global Conference on Biological Threat Reduction
31 October – 2 November
Ottawa, Canada

November

GF-TADs Global Steering Committee Meeting
(dates to be confirmed)
Rome, Italy

9th meeting of the OIE Platform on Animal Welfare for Europe
(dates to be confirmed)
Turkey

Seminar of the American Committee Veterinary Medicinal Products (CAMEVET) on Harmonization of Registration and Control of Veterinary Medicines in the Americas
(dates to be confirmed)
Paraguay

Regional (Middle East) Seminar for OIE National Focal Points for Veterinary Products
7–9 November
Lebanon

49th Session of the Codex Committee on Food Hygiene
11–13 November
Chicago, United States of America

9th meeting of the VICH Outreach Forum (VOF)
14–15 November
Tokyo, Japan
www.vichsec.org

OIE Sub-Regional (SADC) Seminar on Veterinary Statutory Bodies
14–16 November
Victoria, Seychelles

FEI General Assembly
18–21 November
Montevideo, Uruguay
https://inside.fei.org/fei/about-fei/fei-general-assembly

30th Conference of the OIE Regional Commission for Asia, the Far East and Oceania
20–24 November
Putrajaya, Malaysia

December

OIE World Conference on Antimicrobial Resistance
(dates to be confirmed)
South Africa

Seminar for OIE National Focal Points for Animal Disease Notification to the OIE
(dates to be confirmed)
Paris, France

Regional (Africa) Seminar for OIE National Focal Points for Veterinary Products (in English)
5–7 December
Mbabane/Manzini, Swaziland

Regional (Europe) Seminar for OIE National Focal Points for Communication
11–15 December
Riga, Latvia

Regional (Asia–Pacific) Seminar for OIE National Focal Points for Aquatic Animals
12–14 December
People's Republic of China

2018

January

3rd Annual Project Meeting of Ecology from Farm to Fork of Microbial Drug Resistance and Transmission (EFFORT)
10–11 January
Brussels, Belgium
www.effort-against-amr.eu

Regional (Africa) Seminar on the implementation of OIE standards (in English)
23–25 January
(venue to be confirmed)

February

FAO/OIE/WHO Tripartite Executive Meeting
13–14 February
OIE Headquarters, Paris, France

May

86th General Session of the OIE World Assembly of Delegates
20–25 May
Paris, France

June

10th meeting of the VICH Outreach Forum (VOF)
26–27 June
Belgium
www.vichsec.org

Assessment of the gaps between the new OIE standard on the welfare of working equids and common practices in Kenya

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Keywords
Animal welfare – Kenya – World Organisation for Animal Health (OIE) – working equid.

In May 2016, the OIE adopted a new Chapter of the *Terrestrial Animal Health Code* (the *Terrestrial Code*) dealing with the welfare of working equids, which includes horses, donkeys and mules used for traction, transport and income generation. This paper focuses on the welfare of donkeys as a proxy for all working equids in Kenya.

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The range of welfare standards of the World Organisation for Animal Health (OIE) includes working equids, i.e. horses, mules and donkeys which are used for traction and transport and for income generation as well as domestic use (non-commercial work). Equids used in sports, leisure riding, biopharmaceutical production and research are excluded.

In developing countries, working equids used for transport and traction have a direct or indirect impact on the livelihoods of communities. They contribute to agricultural production and food security by transporting water and fodder for other livestock, firewood and other daily needs for the homestead, and agricultural products to the market [1]. They also provide draught power for ploughing, harrowing, seeding and weeding. Working equids may also generate income through the production of manure, by being rented out or through involvement in commercial activities such as taxi services, construction or tourism. They may strengthen social relationships within extended families and communities through the sharing of working animals in times of need, for example during ploughing and harvesting seasons. In very remote areas where transport is a problem, working equids may be used to transport people and form an important part of weddings and other ceremonial occasions [2].

In Kenya, working equids include horses, mules and donkeys but, according to data from the East Africa Representation of Brooke, donkeys appear to be the most frequently used. This paper therefore focuses on the welfare of donkeys as a proxy for all working equids. According to the 2009 Kenyan livestock census report, there are over 1.8 million donkeys, which is a considerable (threefold) increase from an estimated 600,000 donkeys ten years earlier (Kenya livestock census, 2009) [3].

OIE standard on animal welfare of working equids

The OIE defines *animal welfare* as the manner in which the animal copes with the conditions in which it lives [1]. An animal is in a good state of welfare if (as indicated by scientific evidence) it is healthy, comfortable, well nourished, safe, able to express innate behaviour, and it is not suffering from unpleasant states such as pain, fear and distress. Good animal welfare requires disease prevention and veterinary treatment, appropriate shelter, management, nutrition, humane handling and humane slaughter/killing.

In May 2016, the OIE World Assembly of Delegates unanimously adopted a new Chapter (7.12.) of the *Terrestrial Code* dealing with the welfare of working equids, which includes horses, donkeys and mules used for traction, transport and income generation [1].

The new OIE Chapter highlights the importance, role and responsibilities of the different organisations


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which are linked to the implementation of this standard and also provide services that improve the welfare of working equids.

To assess the welfare of these animals, several outcome-based criteria, or measurables, were identified such as behavioural changes, morbidity and responses to handling. These indicators can be used as good indicators of the welfare of working equids and are linked to the recommendations further developed in the Chapter.

In the last part of the Chapter, it is recommended that working equids should be fed fibre-based diets with proteins, minerals and vitamins to be supplemented. Water should be safe and palatable, given regularly, in sufficient amounts. Shelter should be provided both at rest and in working environments to protect the animals against heat and cold stress and from predators. Diseases and injuries should be managed promptly to reduce mortality and morbidity rates. The personnel involved in driving and handling working equids should be trained so as to acquire good management skills. Animal handlers should be familiar with normal and abnormal behaviour in order to interpret the welfare implications. The end of the working life should be considered and abandonment discouraged because it causes suffering. Such equids should be slaughtered or euthanased humanely. Animals should work for at most six hours a day and given one to two full days of rest from work each week. Mares should not be worked for three months both before and after foaling. Sick and injured animals should not work at all. Hooves should be checked, cleaned and trimmed regularly. The harness should be well fitting and comfortable, to avoid causing wounds.

Animal welfare stakeholders in Kenya

Whether local, national or international, there are numerous organisations in Kenya today that work with the Department of Veterinary Services (DVS) to support the improvement of many aspects of animal welfare.

National organisations that deal with donkey welfare specifically include

- the Kenya Veterinary Association (KVA)
- the Donkey Sanctuary Kenya
- Animal Welfare for Public Health (AWAPH)
- the Kenya Network for Dissemination of Agricultural Technologies (KENDAT)
- the Kenya Society for Protection and Care for Animals (KSPCA).

The international or regional animal welfare stakeholders include:

- the OIE Representation for Eastern and the Horn of Africa
- the East Africa Representation of Brooke (Action for Working Horses and Donkeys)
- Africa Network for Animal Welfare (ANAW)
- The Donkey Sanctuary
- World Animal Protection (WAP)
- Society for the Protection of Animals Abroad (SPANA).

Assessing the compliance of common practices in Kenya with the new OIE international standard

Between June and October 2016, a questionnaire survey was carried out, targeting donkey owners and some of the donkey welfare stakeholders in Kenya. The OIE animal welfare standard for working equids was used as reference in designing the questionnaire. The survey was conducted in Meru County, and completed by a survey during the Nairobi International Trade Fair (NITF) held at Jamhuri Park, between 3 and 9 October 2016, in which respondents from various counties in Kenya participated. This generated a total of 100 completed questionnaires (Table I), with 64% of the respondents being male and 78% of respondents claiming to be handlers of donkeys, and only 28% claiming to be owners (Table II).

The processing of these questionnaires indicates a considerable gap in compliance with the OIE welfare standard for working equids. Since these standards were only approved in May 2016, one explanation for this gap is of course the lack of awareness of these international standards for working equids.

Table I

County of origin of the respondents

County	Number of respondents
Isiolo	7
Kiambu	18
Machakos	6
Meru	33
Murang'a	5
Nairobi	2
Nakuru	11
Narok	8
Nyeri	8
Vihiga	2
Total	**100**

Source of the data: 2016 Nairobi International Trade Fair (NITF)

Table II

Respondents' profile

Gender	
Male	Female
64	36

Donkey ownership	
Owner	Handler
28	78

When looking at the aforementioned welfare issues that are covered by the OIE standard, it would appear that most of the respondents do not provide a balanced diet to their donkeys, simply because they feel they don't gain anything in return, e.g. milk. Also, the irregular provision of water is often attributed to the scarcity of water itself. A small proportion provides shelter for their donkeys: 15% in Meru County and 39% of those interviewed during the NITF.

None of the handlers (including drivers of carts) has received any formal training in handling equids. A large proportion of these handlers, more than 77%, use whips to make the animals move during work, while many (also) use threatening sounds to make the animals move. Despite the lack of formal training, signs of ill health that animal handlers do know include droopy head, coughing, standing hair coat, anorexia, reluctance to work, abnormal discharges, presence of wounds and isolation from the others during grazing or resting. If any is used, the most frequently reported types of treatment are wound management and deworming. Treatment is usually done by the owners and to some extent by veterinarians (Table III).

Most respondents work their animals for 5 to 12 hours a day for seven days a week without rest, unless there is no work. According to the OIE standard, animals should work for a maximum of six hours a day and be given a full day of rest once or twice a week.

The OIE also recommends that sick or injured animals should not work, and that any animal that has been under veterinary treatment should not be returned to work until advised by a veterinarian. Indeed, according to this survey, sick animals are usually not expected to work, though this is not applied by 9% and 2% of respondents in Meru and at the NITF, respectively.

Most respondents do not know when mares should resume work after foaling, because this depends, they claim, on the strength of the mare. The OIE standard indicates that mares should not be ridden or worked for three months both before and after foaling.

The OIE also recommends that equids should start working at three years of age or more, and certainly not less than two years of age. In Kenya, 34% of respondents in Meru County and 19% of those interviewed at the NITF start involving their donkeys in work at the age of one year. Most others do not recall the exact age, because they use physical size, rather than age, to judge readiness for work (Table IV).

In addition, the concept of retirement of donkeys seems to be alien to handlers and owners, none of the respondents having a specific age in mind at which they ought to retire their donkeys from work. More than 82% of respondents work donkeys until they die, or eventually abandon them, with a small minority selling them off, a very challenging undertaking in terms of marketing. According to the OIE standard, abandonment at the end of the productive phase should be discouraged. Animals should be kept, without working, or – if it is unavoidable – euthanased/slaughtered humanely to avoid prolonged suffering.

Finally, the assessment of management measures, such as hoof trimming and the use of appropriate harnesses, showed that most respondents seem to neglect these aspects. Only very few respondents check and trim the hooves of their donkeys, and this is often performed by unqualified personnel. Manila ropes, when used as harness material, cause wounds and

Table III

Management of injuries and disease control

Survey*	Treatment type		Personnel involved in treatment		
	Wound dressing	Deworming	Owner	Para-vet	Veterinarian
Meru	51%	7%	61%	32%	7%
NITF 2016	48%	24%	49%	19%	32%

Table IV

Working age and appropriate workload

Survey*	Sick donkeys	Duration of work per day (in hours)			Age at start of work		Treatment at age of retirement		Work resumption after foaling	
	Continue to work	1–5	5–8	8–12	1 year	No specific age	Continue to work	Sold	No specific time	Do not know
Meru	9%	22%	36%	42%	34%	66%	82%	18%	51%	49%
NITF 2016	2%	21%	24%	55%	19%	81%	98%	2%	33%	67%

Table V

Farriery and harnessing

Survey*	Frequency of hoof trimming			Trimming personnel		Harnessing material	
	Once per year	Rarely	Never	Veterinarian	Owner	Clothes/rags	Manila ropes
Meru	6%	64%	30%	39%	16%	75%	15%
NITF 2016	15%	51%	34%	24%	7%	72%	28%

* The survey was conducted in Meru County, and completed by a survey during the Nairobi International Trade Fair (NITF) held at Jamhuri Park, Nairobi, between 3 and 9 October 2016, in which respondents from various counties in Kenya participated.

should be discouraged. They are nonetheless still used by between 15% and 28% of respondents (Table V).

Whereas an appreciable portion of the respondents (approximately one quarter) was aware of the existence of the OIE, none of them was aware of the welfare standards on working equids.

Conclusion

In 2016, the OIE published a new animal welfare standard for working equids. It is clear from this survey that there is an important shortfall in terms of compliance with the standard among donkey owners and handlers in Kenya. There is an overall negative perception of donkey welfare and lack of awareness of the existence of the OIE welfare standard for working equids.

There is, therefore, a pressing need for donkey owners, handlers, and the public in general, to be informed, educated and sensitised on matters pertaining to the welfare of working equids. This can be achieved through community engagement, training, workshops and communication, and in schools.

Acknowledgement

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Tribute

Daniel Bourzat

On 18 August 2017, Daniel Bourzat left us, as he began another peaceful day of active retirement at his home in Nadaillac, France. Grief sets in as we recover from the astonishment of his sudden disappearance.

Daniel devoted his entire professional life to livestock development. Few amongst us however knew that his early career as an animal scientist took him to the French Southern and Antarctic Territories, in the Kerguelen Islands, to study marine mammals. But soon, a change of climate was required and in 1978, a passion for Africa won him over with his first post in Ouahigouya, Burkina Faso, a passion which was still as strong after assignments in Ethiopia, Kenya or Tanzania, Uganda, Chad... despite sidestepping for a few years to New Caledonia where he became the Regional Director of the French Agricultural Research Centre for International Development (Cirad) for New Caledonia and the South Pacific. Among his outstanding professional achievements, we should also remember that Daniel was a Special Adviser to the Prime Minister of the Republic of Somalia from 2004 to 2008.

The last stage of his rich professional career led Daniel to join the OIE in April 2009 as an Advisor to the OIE Regional Representative for Africa, in Bamako, Mali, from where all of us benefited from his experience, exuberance, the stories of his adventures – by car or by plane – and his discreet generosity towards certain staff.

Despite a well-deserved retirement that allowed him to benefit more often from the French countryside, Daniel remained one of us, in particular, by continuing to take part in PVS missions.

Daniel was passionate about his professional commitment. For many of us, he was a point of reference, notably because of his considerable experience of pastoralism in the Sahel, and a friend.

Daniel was also proud of his family, children and grandchildren: it is to them that our sympathy goes today; hoping that the fond memories we keep of Daniel will make their grief a little easier to bear.

Daniel was a Frenchman, but allow me to finish with these words that will forever more link him to the African continent: *'May the earth be light upon him...'*

Monique Éloit
Director General

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BIOLOGICAL THREAT REDUCTION

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Coordinator and Editor: Tammy Beckham

This issue of the *Scientific and Technical Review* reviews the use of animal pathogens and zoonotic agents as bioweapons. More specifically, it examines their use throughout history, explores current disease trends and threats and evaluates the use of animals (terrestrial and aquatic) as sentinels for early detection of outbreaks affecting animals and/or humans.

In addition, it looks at the potential impacts of animal pathogens, including zoonotic agents, on economies, social unrest, food security, and public health. It reviews current frameworks for an international response to a biological event and explores current United Nations mechanisms for response to an alleged use of biological agents. This volume also explores technological advances for early detection, surveillance, and response to a disease event. It concludes by discussing systems for strengthening global biosecurity and resilience and considering methods of ensuring the sustainability of these systems.

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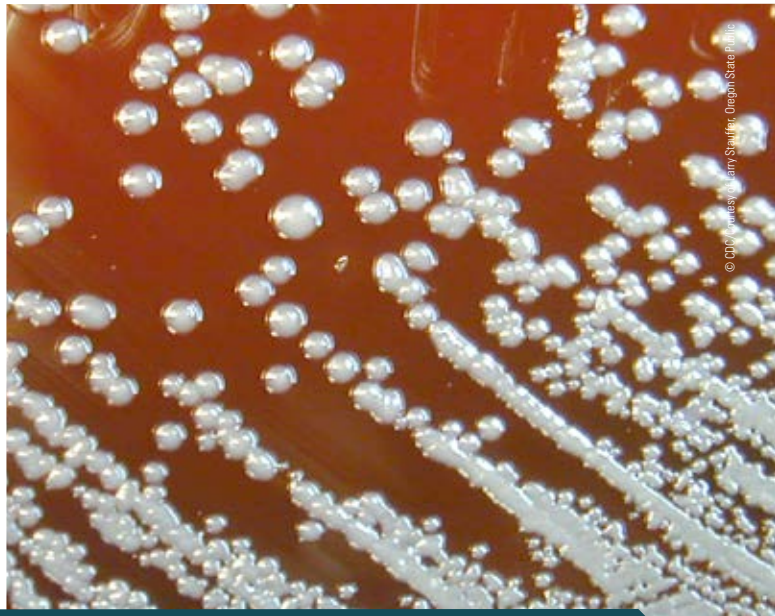
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