WAHIS-Wild and its interface: the OIE worldwide monitoring system for wild animal diseases

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Veterinaria Italiana 2016, **52** (2), 91-100. doi: 10.12834/VetIt.235.779.3
Accepted: 20.12.2015 | Available on line: 30.06.2016

Keywords
Animal diseases,
Biodiversity,
Disease early warning,
Disease monitoring system,
Infectious diseases,
Non-infectious diseases,
OIE,
Transparency,
WAHIS-Wild Interface,
Wild animals,
Wild animal diseases,
Wildlife,
World Organisation for Animal Health,
Zoonosis.

Summary
Wild animal diseases are a global growing concern, given the threat that they pose to animal health and their zoonotic potential. The World Organisation for Animal Health (OIE) was among the first organisations to recognise the importance of having a comprehensive knowledge of the disease situation in wild animals, collecting information on wildlife diseases worldwide since 1993, when for the first time an annual questionnaire was distribute by OIE to members Countries in order to collect qualitative and quantitative data on selected diseases in wild animals. Starting with 2008 until 2012 an updated version of questionnaire was circulated to allow for identifying wildlife species by their Latin name and by their common names in the 3 OIE official languages (English, French, and Spanish). This specific functionality was then implemented in the World Animal Health Information System (WAHIS) in 2012, when this information was made available to the public through WAHIS-Wild Interface.

WAHIS-Wild e la sua interfaccia: il sistema OIE di monitoraggio mondiale delle malattie degli animali selvatici

Parole chiave
Allerta rapida malattie,
Animali selvatici,
Biodiversità,
Fauna,
Interfaccia WAHIS-Wild,
Malattie animali,
Malattie degli animali selvatici,
Malattie infettive,
Malattie non infettive,
OIE,
Organizzazione Mondiale della Sanità Animale,
Sistema di monitoraggio delle malattie,
Trasparenza,
Zoonosi.

Riassunto
Le malattie degli animali selvatici rappresentano un problema crescente a livello globale data la minaccia che rappresentano per la salute degli animali domestici e il loro potenziale zoonotico. L'Organizzazione Mondiale della Sanità Animale (OIE) è stata tra le prime organizzazioni a riconoscere l'importanza di avere una conoscenza completa della situazione delle malattie negli animali selvatici attraverso la raccolta di informazioni in tutto il mondo sin dal 1993, quando per la prima volta un questionario annuale è stato distribuito dall'OIE a tutti i suoi Paesi Membri al fine di raccogliere dati qualitativi e quantitativi su specifiche malattie degli animali selvatici. A partire dal 2008 e fino al 2012 è stata distribuita una versione aggiornata del questionario che ha consentito l'identificazione delle specie di animali selvatici, colpiti dalle malattie riportate nel questionario, attraverso il loro nome latino e il loro nome comune nelle tre lingue ufficiali dell'OIE: l'inglese, il francese e lo spagnolo. Nel 2012 questa funzionalità è stata inserita nel sistema mondiale dell'informazione sanitaria animale (WAHIS) rendendola quindi disponibile per la comunità internazionale attraverso l'interfaccia web WAHIS-Wild.

Historical background

Legal obligation OIE Member Countries to disease notification

In 1924, the founding members of OIE defined 3 main objectives for the organisation: to promote and co-ordinate scientific research; to provide Governments with the means to supervise the enforcement of international agreements; and to function as an international disease intelligence node. Collecting animal health data and distributing it to all OIE Member Countries was therefore already deemed to be one of the main activities in 1924. The latter objective reads as follows "The main objects of the Office are: […] To collect and bring to the attention of the Governments or their sanitary services, all facts and documents of general interest concerning the spread of epizootic diseases and the means used to control them […]" (OIE 1924). To allow the OIE to fulfil this goal, the Organic Statutes impose the following obligations on OIE Member Countries: "The Governments shall forward to the Office:

1. By telegram, notification of the first cases of rinderpest or foot and mouth disease observed in a country or an area hitherto free from the infection.
2. At regular intervals, bulletins prepared according to a model adopted by the Committee, giving information on the presence and distribution of the following diseases: Rinderpest, Rabies, Foot and mouth disease, Glanders, Contagious pleuropneumonia, Dourine, Anthrax, Swine fever, Sheep pox. The list of diseases to which either of the foregoing provisions applies may be revised by the Committee, subject to the approval of the Governments.

The Governments shall inform the Office of the measures adopted by them to control epizootics, especially such measures enforced at their own frontiers to protect their territory against imports from infected countries. As far as possible they shall furnish information in reply to inquiries sent to them by the Office" (OIE 1924).

Moreover, the OIE Organic Statutes include provisions that require the OIE to distribute the information it has collected on animal diseases by means of the OIE Bulletin or special notifications. These obligations originally pertained to the diseases indicated above. Subsequently, they were extended to include diseases on OIE Lists A and B. Resolution OIE no. XXIII of 2001 (OIE 2001) requested to review the categorisation of animal diseases and create a single list of diseases (including the diseases on the former lists A and B). The list was then created and subsequently adopted by the resolution no. XXXI 2004 (OIE 2004), which came into force in January 2005 (OIE 2004), referred to in the chapter on notification and epidemiological information in the first version of the International Animal Health Code, published in 1969 (OIE 1969). Each new edition of this Code includes the latest provisions.

Another relevant point that comes across in the Organic Statutes is the mandatory nature of the notification of diseases, *i.e.* any listed disease needs to be notified to the OIE, in accordance with the requirements set out either in the Terrestrial Animal Health Code (Terrestrial Code) or in the Aquatic Animal Health Code (Aquatic Code), as appropriate (OIE 2013 a, b).

These diseases therefore have to be notified to the OIE regardless of the animal species affected. The only exception concerns a specific Terrestrial Code chapter on avian influenza: low pathogenic avian influenza, this is a disease that does not meet the necessary criteria for inclusion on the OIE list, which nevertheless must be notified to the OIE when it occurs in poultry but not when it occurs in wild birds.

Availability for information on List A and B diseases in domestic and wild animals

Lists A and B of diseases in domestic and wild animals for the period going between 1996 and 2004, can be consulted on the OIE website[1], where it is made available using the Handistatus II database interface[2]. Data prior to 1996 are available in the archived OIE Bulletins. Since 2005, information on OIE-listed diseases in domestic and wild animals has been processed by OIE Member Countries using the World Animal Health Information System (WAHIS) and is available online via the World Animal Health Information Database (WAHID)[3] (Ben Jebara *et al.* 2012). Starting with 2012, WAHID indicates the Latin name and the common name for each affected wildlife species rather than the previously used generic species tag 'Fauna (Fau)'.

In the present study we focus on the voluntary notification of a selected list of diseases that are not mentioned in the OIE's list. Disseminated information on those diseases should not impact the international trade of production animals and their products.

Today, with the increased global movement of

[1] http://www.oie.int/animal-health-in-the-world/oie-listed-diseases-2016/.

[2] http://www.oie.int/animal-health-in-the-world/the-world-animal-health-information-system/data-before-2005-handistatus/.

[3] http://www.oie.int/wahis_2/public/wahid.php/Wahidhome/Home.

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people and trade in animals, food and feed, animal pathogens and diseases may spread worldwide in a very short time. Owing to the increased speed and volume of international travel and trade, the entire world must be constantly on the alert as a disease that occurs in a given location may rapidly have a significant global impact.

It is estimated that about 60% of emerging infectious diseases are zoonotic, of these about 75% have been linked with wildlife. Wildlife diseases are a growing concern at global level, because of both the threat that they pose for the health of wild and domestic animal populations and because of the zoonotic risk that they represent. This is especially true when one considers that there is an increasing legal and illegal market in wildlife in the world, reported to be worth an estimated 6 billion USD per year (Wildlife conservation society 2005). It is noteworthy that between 2000 and 2006, in the USA only about 1.5 billion live wild animals were legally imported into the country and that an average of over 25 million kilograms of non-live wildlife enter the USA each year (Smith *et al.* 2012).

Methods

In this context, it is essential for the international community to have immediate access to reliable and precise information on the animal disease situation worldwide in order to mitigate and control the spread of diseases through trade in domestic and wild animals.

From 1993 to 2007, the OIE collected information on an annual basis using a questionnaire file (hereafter referred to as the 'questionnaire') requesting qualitative and quantitative data on selected diseases in wild animals. Completed questionnaires provided by OIE Member Countries were analysed by an OIE *ad hoc* Group (AHG) on Wildlife Diseases that was created in 1993. AHGs normally function for a limited period of time. However, given the growing importance of wildlife in the OIE's strategy, in 1995 this particular AHG was upgraded to become a permanent Working Group on Wildlife Diseases (WGWD).

The AHG listed a group of diseases specific to wild animals – the 'wildlife diseases waiting list' – which are considered of significance for wild animals, domestic animals or humans. A preliminary list was compiled in 1993, comprising 30 diseases that did not appear on either list A or list B, but which had been identified as important because wild animals were involved in their epidemiology as actual or potential victims, carriers or disseminators (OIE 1993, OIE 1994).

In 2008, the task of collecting, collating, and analysing data on wild animals was transferred to the OIE Animal Health Information Department (AHID) as a new AHG, the *ad hoc* Group on Wildlife Disease Notification, decided that the questionnaire and related data entry and reporting functions should be implemented in WAHIS (OIE 2008).

The AHID harmonised the data collection following three strategies:

1. updating the questionnaire for gathering data on wildlife diseases – from 2008 to 2012;
2. changing the disease names in the questionnaire to match those listed in WAHIS (*i.e.*, OIE-listed diseases);
3. incorporating corresponding templates (by month and by first administrative division or for the whole country, or by 6-months and by first administrative division or for the whole country) so that the information collected annually through the questionnaire would be compatible with the information collected through the reports for OIE-listed diseases as in WAHIS.

The updated questionnaire included the possibility to collect data on wildlife species by both their Latin and common names. This specific functionality was then implemented in the 'wild annual report' section of the second version of WAHIS in 2012 to process data on non-OIE listed disease specific to wild animals.

The 2013 version of the list of diseases specific to wild animals, for which data is collected on a voluntary basis, comprises 53 disease headings. These consist of 48 infectious diseases, 4 non-infectious diseases (algal toxicosis, botulism, chemical poisons and mycotoxins). The last heading is used to report events of undetermined cause that might generate significant morbidity and mortality and have an impact on wild animal populations (Annex 1).

OIE Member Countries have clearly responded positively to the use of the updated questionnaire, since the number of these reports submitted to the OIE has constantly increased since 2008 (Figure 1).

In 2012, the second version of WAHIS was launched. One of the main innovations is to have incorporated detailed information on wild animal diseases, not simply as a replacement for the questionnaire but as a fully-fledged application allowing on-line notification.

The information provided is constantly verified and validated by the AHID team and made available online to the international community through the newly developed and launched interface: the WAHIS-Wild Interface[4].

[4] http://www.oie.int/wahis_2/public/wahidwild.php.

WAHIS-Wild Interface: a new source of information on wild animal diseases

WAHIS-Wild Interface is a new website developed for the benefit of all stakeholders worldwide as it offers information and descriptive statistics on wild animal diseases that do not meet the criteria for inclusion on the OIE List of Notifiable Diseases (OIE 2013). The information presented is based on the reports provided on a voluntary basis by interested OIE Member Countries. The system generates and displays this information with the objective of improving knowledge about the disease agents present in wild animals, and their effects on wild animals themselves, domestic animals, and humans. Monitoring these agents is therefore of paramount importance for global biosecurity.

Guidelines for the inclusion of diseases in the WAHIS-Wild Interface

Principles were identified according to which those diseases that did not meet the criteria for inclusion in the OIE List of Notifiable Diseases could be considered for inclusion in the list of diseases specific to wild animals. The guiding principles for such inclusion are relevance to:

- human health, livelihoods, and well-being;
- domestic and wild animals health;
- environmental integrity and ecological sustainability.

Diseases in wild animals can have serious livestock or public health implications. They may also adversely affect conservation of wildlife in native habitats worldwide and hamper international translocation initiatives. Before 2008, the year when the AHID started to manage the questionnaire to collect information on diseases specific to wild animals, only 48 OIE Member Countries were providing completed questionnaires.

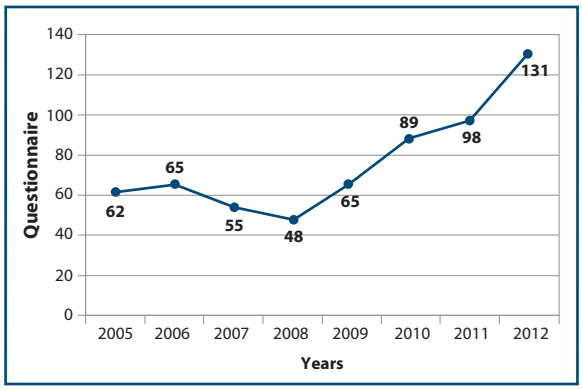

Figure 1. *Trend in the number of questionnaires received by the OIE from Members Countries on OIE and non OIE-listed diseases between 2005 and 2012.*

To improve reporting by OIE Member Countries, a new strategy was developed and a new structure for the questionnaire was introduced, bringing it into line with the WAHIS 6-monthly reporting templates. The structure, well known to OIE Focal Points for animal disease notifications and OIE Delegates, facilitated the use of the questionnaire. In 2012, the last year in which the questionnaire was used, 131 Member Countries provided a completed questionnaire (Figure 1), demonstrating their willingness to contribute to the database on non-OIE listed diseases even though it is on a purely voluntary basis.

In 1993, the questionnaire contained 30 diseases specific to wild animals; in 2008, the list was upgraded to include 55 diseases – namely 51 infectious diseases, 4 non-infectious diseases – as well as the possibility to add events of unknown origin.

In 2011, the list was reviewed by the WGWD and the diseases were classified according to the pathogens and other disease-causing agents in wildlife (Annex 1). Currently, 53 infectious or non-infectious diseases affecting wild animals are being monitored worldwide.

The wild annual report for data processing of diseases specific to wild animals, using WAHIS

After the harmonisation of the tool used to collect information on diseases affecting wild animals, the next step was to shift from the questionnaire to an on-line notification system. With the launch of the second version of WAHIS in 2012, a new section for the notification of diseases specific to wild animals, named Wild annual reports was added to the list of types of reports of the on-line notification system WAHIS (Figure 2).

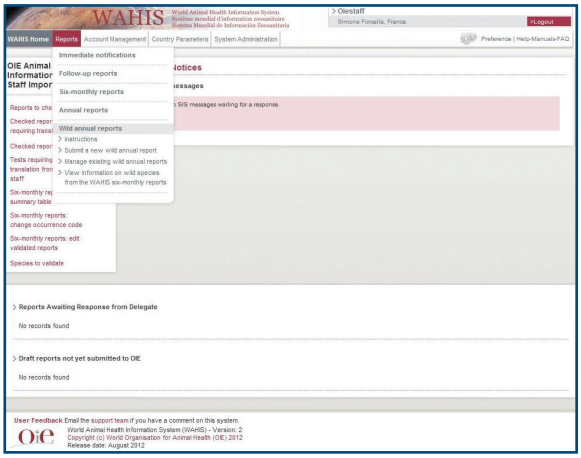

Figure 2. *Screenshot from the second version of WAHIS launched in 2012 and showing the new section to access the wild annual reports.*

The introduction of this section on the wild annual reports in 2012 replaced the Excel questionnaire and countries started using it replacement of the questionnaire. Yearly update of this questionnaire will continue since it can be used as a User's Manual by Member Countries as well as a template to collect information from different institutions at the national level and collate it. Also, when the information is completed, it could be processed in WAHIS by the OIE Delegates or by OIE National Focal Points for Wildlife (Annex 2) using the wild annual report on diseases specific to wild animals in WAHIS or sent directly to the OIE for processing it.

Data provided by OIE Member Countries to the OIE in their questionnaires from 2008 to 2012 (before the launch of the online notification and the creation of the wild annual report section) were evaluated to ensure that the data meet the minimum quality criteria set by OIE and validated reports meeting those minimal criteria were processed by the OIE in WAHIS.

Building of a database on wild animal species, by family, susceptible to specific diseases/infections

One of the main innovations incorporated into the questionnaire and subsequently integrated in WAHIS was the inclusion of a newly constituted database containing a list of wildlife species, arranged by Family name and Latin name, susceptible to the given diseases (Figure 3).

This database was built by collating information on affected wild animal species mentioned in questionnaire returns between 2000 and 2008, which was then complemented and documented by analysing the literature (Williams *et al.* 2011, Nancy *et al.* 2007, ONCFS 2008). In addition, the database was enriched with information in English, French, and Spanish as well as common names from reliable open web resources)[5].

A new functionality has also been developed to allow OIE Member Countries to add the name of an affected family and/or species if, while processing data in WAHIS, they find that said family and/or species is not on the drop-down list. The provided data are then verified and, where relevant, validated by the AHID on the basis of accredited scientific publications and officially recognised public sources and eventually, if relevant, are added to the database. Where Member Countries have been unable to identify the species, they have the possibility to report the family name and indicate the species as 'incognita' (from the Latin adjective meaning 'unknown' or 'on which one has no information').

Since the launch of the second version of WAHIS, more species have been added by OIE Member Countries and, after validation, some of them have been included in the database as new families or species.

OIE Member Countries have responded positively to the possibility of improving the quality of information by indicating the species affected by a disease. This positive response is demonstrated by the high number of cases of diseases related to different species reported between 2008 and 2012 (Figures 4, 5, 6).

The current database integrated in WAHIS contains Latin names, and the corresponding common names in English, French, and Spanish, as well as the families to which they belong. The completion of the database is an on-going process since the biodiversity of wild animal species worldwide is very rich and dynamic.

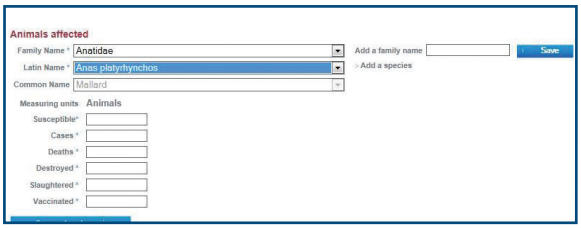

Figure 3. *Screenshot from WAHIS web application of the form used to provide quantitative data on outbreak(s) of a given disease or infection by affected wild animal species.*

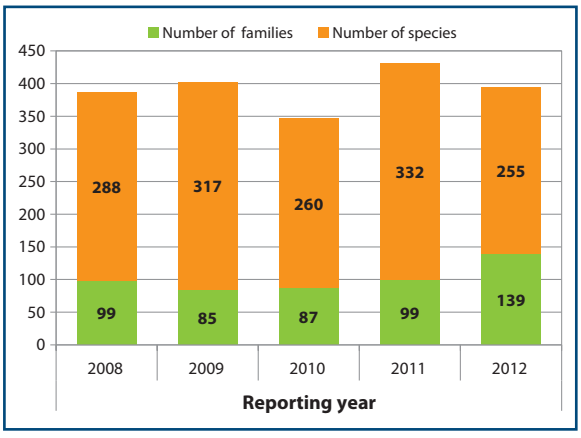

Figure 4. *Number of reported wildlife species and families affected by diseases between 2008 and 2012 reported to the OIE trough WAHIS.*

[5] • Avibase. The world birds database 2012. http://avibase.bsc-eoc.org/avibase.jsp.
• Oiseaux.net. La Classification 2012. http://www.oiseau.info/classification.html.
• Species 2000 & IT IS 2012. Catalogue of Life 2012 Annual Checklists. http://www.catalogueoflife.org/info_about_col.php.
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• Wildlife conservation society 2005. State of the Wild 2006: A Global Portrait of Wildlife, Wildlands, and Oceans. Washington, DC: Island Press.

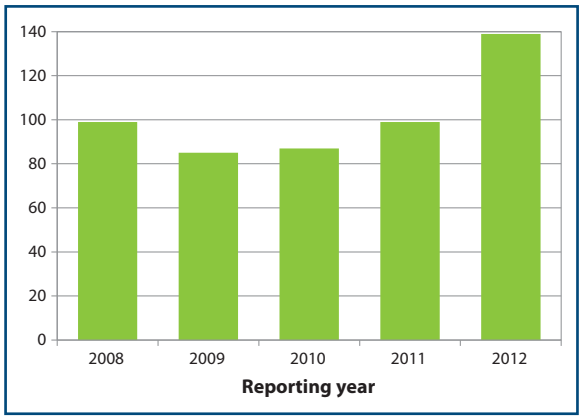

Figure 5. *Number of reported wild animal families affected by diseases between 2008 and 2012 reported to the OIE trough WAHIS.*

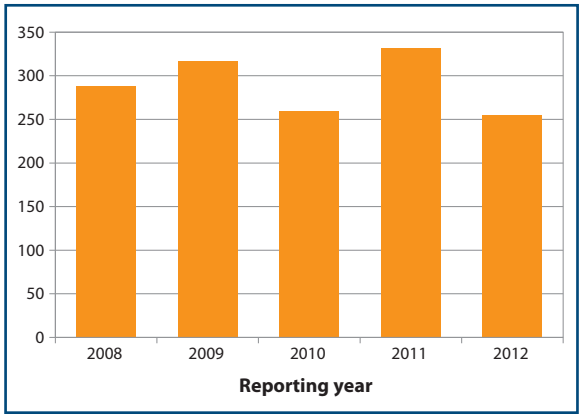

Figure 6. *Number of reported wild animal species affected by diseases between 2008 and 2012 reported to the OIE trough WAHIS.*

In 2013, the database contained 2,058 wild species belonging to 194 different families.

In the newly developed WAHIS-Wild Interface, information can be displayed according to the selected families and species, by year or by period of time.

Results

Outputs of data collected though the OIE worldwide monitoring system for wild animal diseases

WAHIS-Wild Interface is publicly accessible to all interested stakeholders in the OIE's three official languages: English, Spanish, and French[6] (Figure 7).

The interface introduces a new approach to presenting and analysing data gathered on wild animal diseases and has expanded the use of previously collected data.

This interface allows for consultation of the data through 5 main categories: country, disease, descriptive statistics, useful links, and upcoming events. Data can be displayed for a given country or region, for a given period, and also by affected species, and it can be displayed in the form of lists, tables or graphs.

For the first time, information on diseases specific to wild animals is available through descriptive statistics tools. Interested stakeholders can make their own descriptive analysis of the most frequently reported diseases and/or infections in wild animals. This section, divided into 2 subsections, will enable statistics to be produced on the frequency of reported diseases and/or infections by region (Figure 8) or by class (Figure 9).

WAHIS-Wild Interface will serve as a long-term tool in the worldwide monitoring system for diseases specific to wild animals. The data available through this website could serve as an early warning system

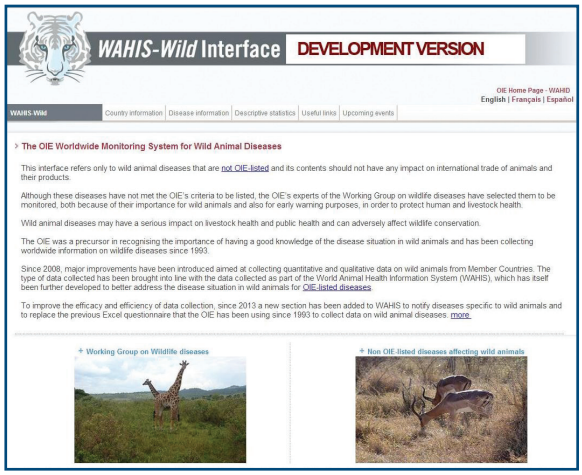

Figure 7. *Home page of WAHIS-Wild Interface.*

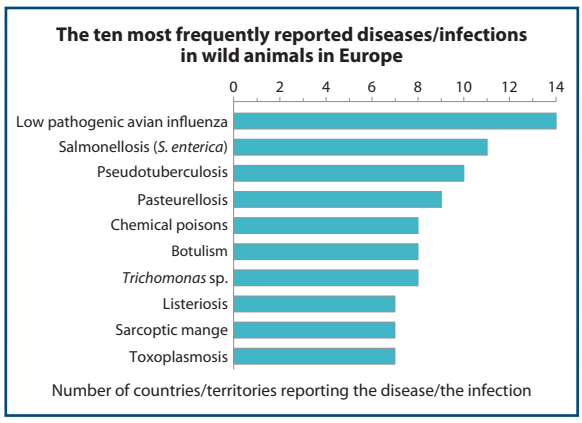

Figure 8. *An example of descriptive statistics by region.*

[6] http://www.oie.int/wahis_2/public/wahidwild.php.

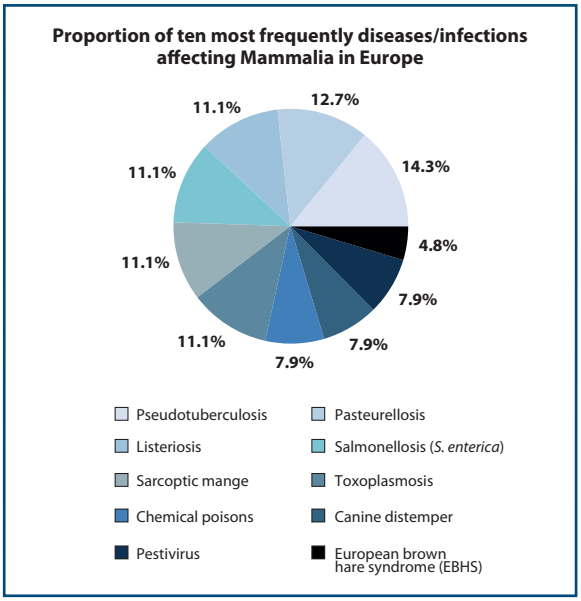

Figure 9. *An example of descriptive statistics by class.*

for humans as well as for livestock as they can be accessed by countries, institutions working on animal health and public health, and by many other stakeholders interested in wildlife and biodiversity.

WAHIS-Wild Interface compiles information on non-OIE-listed diseases affecting wild animals reported by interested OIE Member Countries on a purely voluntary basis.

Conclusion

Regular reports concerning the monitoring of the epidemiological situation at both national and regional level are also of paramount importance to reinforce the credibility of the National Veterinary Services at the international level.

Diseases at the human-animal-environment interface are constantly emerging and re emerging. At the same time, given the need for a healthy wild animal population to ensure biodiversity, all countries should be committed to improving their capacity to detect, control, and report diseases affecting wild animals. In order to strengthen capacities of its Member Countries in their disease surveillance systems, disease early warning and rapid response in domestic and wild animals, the OIE has developed appropriate tools, for Delegates and their national Focal Points to help countries in achieving these objectives and to disseminate relevant and diversified animal disease information.

The launch by the OIE of the new WAHIS-Wild Interface to display information on non OIE-listed diseases of wild animals will undoubtedly encourage more countries to implement or strengthen their surveillance systems for wildlife disease. This will enable them to produce more information on wild animal diseases and to share it with the international community through the OIE Worldwide Monitoring System for Wild Animal Diseases.

Furthermore, the OIE Evaluation of Performance of Veterinary Services (OIE PVS Tool) Pathway, with its Gap Analysis, have proved very effective in helping Member Countries to strengthen their Veterinary Services, resulting in better protection of animal health including for wild animals (OIE 2014).

The reporting of diseases specific to wild animals through a dedicated section of WAHIS allows OIE Member Countries to play an active role in promoting biodiversity, wild animal health, and early warning of diseases, thereby helping to protect the health of humans and of domestic animals as well.

Acknowledgements

The authors would like to thank all those who contributed to the establishment of the OIE Worldwide Monitoring System for Wild Animal Diseases, and in particular the Director General of the OIE, OIE Member Countries for having approved the recommendations made by the *ad hoc* Group for Wild Animal Disease Notification in July 2008, the staff of the OIE Administration, Logistics and Publications Department, and more specifically the IT Unit, which helped to develop the application, and, last but not least, all the team of the Animal Health Information Department (AHID) and the members of the OIE Working Group on Wildlife Diseases for their scientific contribution and for their support and encouragement for the work of the AHID.

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Annex 1

Publisher: Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise 'G. Caporale' | **Journal:** Veterinaria Italiana | **Article Type:** Reasearch Article | **Volume:** 52; **Issue:** 2; **Year:** 2016; **doi:** 10.12834/VetIt.235.779.3

Non-listed pathogens and other disease-causing agents in wildlife

Agent causing Chronic wasting disease (CWD)

Calicivirus Marine Mammals

Calicivirus of European Brown Hare Syndrome (EBHS)

Infection with Alcelaphine herpesvirus 1 (wildebeest origin causing malignant catarrhal fever in cattle)

Infection with Avian Paramyxoviruses (other than those listed by the OIE)

Infection with *Babesia* spp. (new or unusual occurrences)

Infection with *Baylisascaris procyonis*

Infection with *Borrelia* spp.

Infection with Circoviruses

Infection with *Clostridium piliforme* (Tyzzer´s Disease)

Infection with Encephalomyocarditis virus

Infection with Elephant Herpesvirus

Infection with *Fasciola gigantica*

Infection with *Fascioloides magna*

Infection with Feline Leukaemia virus (FeLV)

Infection with Filovirus

Infection with Flavivirus (causing Louping ill)

Infection with Flavivirus (causing Tick-borne encephalitis)

Infection with *Geomyces destructans* in bats (White-nose syndrome)

Infection with hantavirus

Infection with Henipaviruses (Hendra viruses)

Infection with Henipaviruses (Nipah viruses) in bats

Infection with *Histomonas* spp.

Infection with Immunodeficiency viruses (Feline, Simian)

Infection with *Leptospira interogans* sp.

Infection with *Listeria monocytogenes*

Infection with Low pathogenic avian influenza viruses (all subtypes)

Infection with morbillivirus (canids and felids)

Infection with morbillivirus (marine mammals)

Infection with morbillivirus (measles)

Infection with Ovine herpesvirus 2 (causing malignant catarrhal fever in sheep)

Infection with parvovirus

Infection with *Pasteurella* spp.

Infection with *Plasmodium* spp.

Infection with pox viruses (other than those listed by the OIE)

Infection with *Psoroptes* spp.

Infection with *Salmonella enterica* (all serovars)

Infection with *Sarcoptes scabiei*

Infection with *Theileria* spp. (new or unusual occurrences)

Infection with *Toxoplasma gondii*

Infection with *Trichomonas* spp. in birds and reptiles

Infection with Yellow fever virus

Infection with *Yersinia enterocolitica*

Infection with *Yersinia pestis*

Infection with *Yersinia pseudotuberculosis*

Reptiles

Infection with Crocodilepox virus (Papillomatosis in crocodiles)

Infection with Fibropapillomatosis in sea turtles (herpesvirus)

Infection with *Trichinella nelsoni, T. zimbabwensis* and *T. papouae*

Non-infectious diseases causing high mortality in animal population

Algal toxicosis

Botulism

Chemical poisons

Mycotoxins

Diseases of unknown cause

Unusual morbidity or mortality event (cause undetermined)

Annex 2

Publisher: Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise 'G. Caporale' | **Journal:** Veterinaria Italiana | **Article Type:** Reasearch Article | **Volume:** 52; **Issue:** 2; **Year:** 2016; **doi:** 10.12834/VetIt.235.779.3

Terms of reference of OIE National Focal Points for Wildlife

During the 76th General Session of the World Assembly of Delegates in May 2008 the importance of the focal point for information on animal diseases was re-iterated and Delegates were also requested to nominate additional focal points for wildlife, veterinary products, animal production food safety, animal welfare and aquatic animal diseases.

As detailed in the Final Report of the General Session, the responsibilities of the focal points are under the authority of the OIE Delegate. Any information transmitted to the OIE from the different focal points needs to be transmitted under the designated authority of the OIE Delegate. This practice would equally apply, if focal points are located in other Departments or Ministries not under the jurisdiction of the Veterinary Authority, as from a legal perspective the OIE considers the official OIE Delegate to be the unique representative of the country.

Details on proposed tasks of the national focal point for wildlife:

1. to establish a network of wildlife experts within his/her country or to communicate with the existing network;
2. to establish and maintain a dialogue with the Competent Authority for wildlife in his/her country, and to facilitate cooperation and communication among several authorities where responsibility is shared;
3. under the authority of the OIE Delegate of his/her country, to support the optimal collection of wildlife disease information and its submission to the OIE through WAHIS (immediate notifications and follow-up reports, six-monthly reports, and annual questionnaires) to enable the OIE Delegate to more efficiently manage his/her OIE Member obligations;
4. to act as a contact point with the OIE Animal Health Information Department and Scientific and Technical Department on matters related to information on wildlife, including wildlife diseases;
5. to receive from the OIE Headquarters copies of the reports of the Working Group on Wildlife Diseases, selected reports of the Scientific Commission for Animal Diseases and other relevant reports, should they address discussion points on wildlife or the livestock-wildlife interface, and conduct the in-country consultation process with recognised wildlife and animal health experts on draft texts of standards proposed in those reports as well as draft standards proposed by the Terrestrial Animal Health Standards Commission when dealing with wildlife diseases; and
6. to prepare comments for the Delegate on each of the relevant meeting reports reflecting the scientific view and position of the individual OIE Member and/or the region, including comments on the proposals for new OIE standards and guidelines related to wildlife.