THE OIE NETWORK OF REFERENCE LABORATORIES

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ABSTRACT: Since its establishment in 1924, the World Organization for Animal Health (OIE), currently consisting of 167 member countries, developed and implemented numerous actions to control animal diseases worldwide. Whereas initial actions focused on the prevention of global animal disease epidemics, the increased risk of rapid spread of animal diseases brought about by globalization of international trade and the movement in animals and animal products called for reevaluation of the objectives, priorities, and strategies of the OIE. The initial objectives remained unchanged, but the urge to recognize veterinary services as an international public good resulted in additional objectives to improve the legal framework and resources of national veterinary services, the establishment of guarantees for safe food of animal origin, and the promotion of animal welfare. Networks of reference laboratories of the OIE were expanded to establish a unique backup system for science-based standards and diagnosis of terrestrial animal and aquatic animal diseases, including zoonoses. This network now comprises 160 reference laboratories in 29 countries covering 58 terrestrial and 29 aquatic diseases. A network of 20 OIE collaborating centers is established in 13 countries. To address the demands of emerging and threatening zoonoses, the OIE collaborated with its international partners such as the Food and Agriculture Organization (FAO) and World Health Organization (WHO) to establish the Global Early Warning System (GLEWS) and the OIE/FAO Global Framework for the Progressive Control of Transboundary Animal Diseases (GF-TAD) to complement the mechanisms for early detection and diagnosis of disease. The unprecedented spread of highly pathogenic avian influenza (HPAI) also resulted in establishment of the OIE/FAO worldwide scientific network for the control of avian influenza (OFFLU). This joint OIE and FAO network provided a technical and scientific base for the control of avian influenza and, in close collaboration with the WHO, established strategies for control of avian influenza in poultry in order to prevent a possible human pandemic.

Key words: Diagnostic laboratories network, OIE reference laboratories.

OIE reference laboratories are designated to pursue all the scientific and technical problems relating to a named disease on the OIE list of diseases. Their role is to function as a center of expertise and standardization of diagnostic techniques for a designated disease. The experts at the respective laboratories are responsible to the OIE and its member countries with regard to these issues. They are leading and active researchers helping the reference laboratories provide scientific and technical assistance and expert advice on topics linked to surveillance and control of the disease for which the particular reference laboratory is responsible. They also may provide scientific and technical training for personnel from member countries, and coordinate scientific and technical studies in collaboration with other laboratories or organizations. The OIE clearly is one of the most appropriate organizations to undertake such tasks on a global level. It was established in 1924 and comprised 167 member countries in 2006. The main objectives aimed at improving animal health worldwide are to ensure transparency in the global animal disease and zoonosis situation; to collect, analyze, and disseminate scientific veterinary information; to provide expertise and encourage international solidarity in the control of animal diseases; to safeguard world trade by publishing health standards for international trade in animals and animal products within its mandate under the World Trade Organization Sanitary and Phytosanitary Agreement (SPS Agreement); to improve the legal framework and resources of national veterinary services; to provide a better guarantee of the
The worldwide network of OIE reference laboratories and collaborating centers is the practical implementation of these objectives. The OIE has a global network of over 160 reference laboratories in 29 countries covering 58 terrestrial and 29 aquatic diseases or topics, and a further 20 collaborating centers in 13 countries covering more than 18 disease topics or areas of activity.

The mandate and operational procedures for OIE reference laboratories are outlined in the OIE Manual of Diagnostic Tests and Vaccines for Terrestrial Animals (OIE, 2004). The manual aims to harmonize elements of animal disease prevention, surveillance, and control by describing internationally agreed-upon laboratory methods for disease diagnosis and requirements for the production and control of biological products (mainly vaccines). Achieving the ambitious objective to compile and make available this extensive manual required the cooperation of animal health specialists from many countries.

The terrestrial manual (OIE, 2004) covering infectious and parasitic diseases of mammals, birds, and bees was first published in 1989. Each successive edition extended and updated the information. The fifth edition includes new chapters on zoonotic infections reflecting the OIE’s increased involvement in public health issues. As a companion volume to the Terrestrial Animal Health Code (OIE, 2006b), the terrestrial manual sets laboratory standards for all OIE listed diseases as well as several other diseases of global importance. It is widely adopted as a key reference for veterinary laboratories around the world. Aquatic animal diseases are included in a separate aquatic manual (OIE, 2006a).

The International Committee of the OIE assigned the OIE Biological Standards Commission the task of commissioning chapters and compiling the terrestrial manual. Manuscripts are requested from specialists in each of the diseases or other topics covered. After initial scrutiny by the consultant technical editor, the chapters are sent to scientific reviewers and to experts at OIE reference laboratories. They also are circulated to all OIE member countries for review and comment. The Biological Standards Commission and the consultant technical editor take all comments into consideration, often referring back to the authors for further help before finalizing the chapters. The final text of the terrestrial manual has approval of the International Committee of the OIE.

The OIE reference laboratories function as centers of expertise and standardization for a designated disease. They also store and distribute biological reference products and any other reagents used in the diagnosis and control of the designated disease(s) or topics; develop new procedures for diagnosis and control of the designated disease(s) or topics; gather, process, analyze, and disseminate disease and epidemiological data relevant to their specialty; and place expert consultants at the disposal of the OIE.

Reference laboratories of the OIE may contribute to the provision of scientific and technical training for personnel from member countries and the provision of diagnostic testing facilities to member countries. When results are confirmed positive for diseases reportable to OIE, the reference laboratory should immediately inform the OIE delegate of the member country from which the samples originated, as well as the OIE Central Bureau. The laboratories also organize scientific meetings on behalf of the OIE, coordinate scientific and technical studies in collaboration with other laboratories or organizations, and publish and disseminate information in their sphere of competence that may be useful to member countries.

The OIE reference laboratories fulfill
an important additional role to assist the Biological Standards Commission in validating and certifying diagnostic assays. Consistency and harmonization in the quality of diagnostic tests is important to ensure accuracy in diagnosis of a disease as well as consistency in test results. During the 71st General Session of the OIE in May 2003, the International Committee adopted Resolution No. XXIX endorsing the principle of OIE validation and certification of diagnostic assays (test methods) for infectious animal diseases and giving the Director General of the OIE the mandate to set up standardized procedures prior to a final decision on the validation and certification of the assay by the OIE International Committee. The Resolution establishes that fitness for purpose should be used as a criterion for validation. It also requires that the OIE make provisions to establish a registry of assays with specified levels of validation. The Resolution confirms that OIE reference laboratories should be intimately involved with the validation procedures and should establish serum/sample reference collections to be used for validation on par with their mandates.

Relevant to avian influenza, the unprecedented spread of HPAI over three continents in a relatively short time emphasized the urgent need of OIE member countries to detect and diagnose suspected outbreaks of the disease as quickly as possible. Within its network of reference laboratories the OIE currently has seven dedicated laboratories able to diagnose HPAI and conduct more advanced procedures relevant to viral isolations and sequencing. These include the laboratory of the Canadian Food Inspection Agency (CFIA), National Center for Foreign Animal Disease in Winnipeg, Canada; the National Reference Laboratory for Highly Pathogenic Avian Influenza and Newcastle Disease, Institute of Diagnostic Virology, Federal Research Center for Virus Diseases of Animals (BFAV) in Riems, Germany; the Veterinary Laboratories Agency at Weybridge, United Kingdom; the Australian Animal Health Laboratory (AAHL) in Geelong, Australia; the National Veterinary Services Laboratories in Ames, Iowa, USA; the Istituto Zooprofilattico Sperimentale delle Venezie, Laboratorio Virologia in Padova, Italy; and the Graduate School of Veterinary Medicine, Hokkaido University, Department of Disease Control, in Kita-ku, Sapporo, Japan. National and private laboratories in many countries conduct diagnostic tests for HPAI but are encouraged to also submit their samples to any OIE reference laboratory for confirmation and the sharing of viral strains.

In April 2005 the OIE and FAO created OFFLU, a joint network of expertise on avian influenza, to further strengthen networking among laboratories in respect of avian influenza. Member countries benefit from exchange of scientific data and biological materials (including virus strains) within the network and sharing such information with the wider scientific community; technical advice and veterinary expertise to assist in the diagnosis, surveillance, and control of avian influenza; collaboration with the WHO influenza network on issues relating to the animal–human interface; and increased profile, development, and coordination of avian influenza research needs.

The network of OFFLU consists of a steering committee, a scientific committee, a secretariat, and a team of scientific collaborators. OFFLU plays a major role to promote collection and characterization of avian influenza viruses, and exchange of isolates important for understanding the epidemiology of virus spread and monitoring mutations. The main priorities of OFFLU include organizing technical missions in collaboration with WHO, recruiting employees to organize missions, establishing a broad list of laboratory and field experts, setting up linkages between laboratories in industrialized and in-transit countries, and promoting transparent and frequent communication with mem-
ber countries and international organizations.

During the 70th General Session of the International Committee of the OIE in 2002, a resolution was adopted to encourage OIE reference laboratories and collaborating centers to partner as advanced research institutes with developing countries in order to share scientific knowledge and skills, provide training in the development of robust inexpensive diagnostic tests for disease control, and provide technical assistance to develop surveillance structures for disease control. Underpinning this resolution is the concept of twinning national laboratories in developing countries with OIE reference laboratories.

To further enhance the transparency and availability of data on avian influenza, the OIE in collaboration with FAO established the Global Early Warning System (GLEWS) to track all outbreaks or suspect outbreaks of the disease. Over and above its compulsory disease notification system for OIE listed diseases (including notifiable avian influenza), the OIE launched its World Animal Health Information System (WAHIS) in April 2006. This system will enable member countries to record disease outbreaks interactively and thus enhance the completeness and timeliness of the global picture of evolution and spread of the disease. This will have to be complemented by more sophisticated data on the movement of wild birds across the globe as generated by more technologically advanced systems such as remote sensing and other satellite data available from sources outside the capacity of both the OIE and FAO.

In conclusion, the control of HPAI at the animal source requires a multidisciplinary approach among important players such as the veterinary services of member countries, wildlife specialists, conservationists, international organizations, farmers, and many more. However, the continuous availability of a well-equipped and functional diagnostic service is a condition-
al prerequisite for the early detection of the disease and rapid response to such incursions by member countries, leading to successful implementation of risk-mitigation measures. To this end, the OIE fulfills an important role by establishing and expanding a unique network of reference laboratories to meet these demands, facilitate capacity building, and improve sharing of expertise among national and other laboratories.

LITERATURE CITED


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