

Chapter 16

The OIE Strategy to Address Threats at the Interface Between Humans, Animals and Ecosystems

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Abstract In our globalised, fast-changing world (deforestation, fast-growing animal protein demand, etc.), animal diseases that have an impact on public health, livelihoods, food security as well as the international trade of products of animal origin are constantly emerging or re-emerging. The complexity of disease emergencies calls for the identification of often collaborative effective strategies, based on both science and proven practical experience, to reduce future threats. The H₅N₁ avian influenza crisis has shown how crucial it is to address persistent global threats at the interface between humans, animals and ecosystems which requires (i) to strengthen animal and human health institutions and (ii) build strong partnerships among players who may have different perspectives on some issues and different levels of resources. To address the gaps in the animal health sector, OIE seeks to build member countries' capacities in policy design and good governance in animal health systems and Veterinary Services. At policy level, the OIE helps its members to enhance their credibility, both at the national and international level, by providing them with efficient tools, such as the strategic planning tools of the Performance of Veterinary Services (PVS) Pathway, with the objective to attract more commitment and more resources from their decision makers and partners. At good governance level, it provides science-based guidance that supports members in detecting, preventing and managing serious animal disease outbreaks through improved surveillance systems, strengthened laboratory networks and improved legislation. OIE promotes strong partnerships, notably with FAO and WHO, especially with regard to two topics that are getting currently a great attention and that require a strong multi-sectoral collaboration at all levels because of their social, economical and ecological determinants: rabies in humans that still kills more than 50,000 persons every year, mainly in Asia and mostly youngsters, and that is believed to be totally

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preventable through effective dog vaccination, and antimicrobial resistance that can hinder the effective treatment and recovery of illnesses in both humans and animals. At regional level and in full collaboration with ASEAN and other partners, the OIE Sub-Regional Representation (OIESRR) for Southeast Asia plays a significant role in regional coordination of animal health and emerging infectious disease management in a region that is often considered as a 'hotspot' for emergence. Along the strategic objectives of the OIE Fifth Strategic Plan, the implementation of its activities to achieve the OIE Strategic Objectives is supported by various programmes and projects funded by donors. Its long-standing flagship regional programme, the Southeast Asia and China Foot-and-Mouth Disease (SEACFMD) Campaign which aims at controlling FMD by 2020 through vaccination promotes socio-economical and participatory approaches as well as assessment of the role of wildlife.

16.1 Introduction

Threats at the interface between humans, animals and ecosystems are numerous. These threats are either socio-economics, related to biodiversity and species conservation or, more immediately visible, related to public health. They are more than often related to animal health.

For instance, the occurrence of SARS (severe acute respiratory syndrome) in 2003 that derived from civets, that of avian influenza known as H₅N₁ in late 2002 or that of Ebola Reston virus in hogs in the Philippines in 2008, have, to varying degrees, threatened or are still threatening the public health. On the animal production side, avian influenza has been, and is actually still, responsible for massive losses in the avian industry by direct mortality or through culling in many countries and especially in Southeast Asia. It has to be noted that these three diseases have originated more than likely from China or Southeast Asia. At the same time, and in addition to these so-called emerging infectious diseases, some other diseases that concern domesticated animals, such as rabies or foot-and-mouth disease, are kind of constantly re-emerging at the interface between humans, animals and the ecosystems and continue, even though less visibly at the first glance, to have serious consequences for human health and for animal health in Southeast Asia and the rest of the world.

As has been declared forcibly by the heads of WHO, FAO and OIE, the challenges facing animal health, beyond diseases transmissible to humans (zoonosis), are critically important and involve food security, agriculture economics and the ensemble of economic activities associated with agriculture. There are in addition some other issues related to public health (xenobiotics, antimicrobial resistances), the environment and animal welfare.

The general observation is that these threats are appearing more and more frequently and that they are more and more complicated to be tackled.

This complexity of disease emergencies or re-emergencies calls for the identification of often collaborative effective strategies, based on both science and proven practical experience, to reduce future threats. The H₅N₁ avian influenza

crisis has shown how crucial and challenging it is to address global threats at the interface between humans, animals and ecosystems. The lessons learnt indicate that it requires (i) to strengthen animal and human health institutions and (ii) build strong partnerships among players who may have different perspectives on some issues and different levels of resources.

When speaking about strengthening animal health systems and institution, the OIE is the intergovernmental organisation responsible for improving animal health and welfare worldwide regardless of the cultural practices or the economic situations in its member countries. The need to fight animal diseases at a global level led to its creation through an international agreement signed on 25 January 1924. In May 2003, the office became the World Organisation for Animal Health but kept its historical acronym OIE. It is recognised as a reference organisation by the World Trade Organization (WTO) and in 2011 had a total of 178 member countries. The OIE maintains permanent relations with 45 other international and regional organisations and has regional and sub-regional offices on every continent. To address the gaps in the animal health sector, OIE seeks to build member countries' capacities in policy design and good governance in animal health systems and veterinary services. Simultaneously, OIE promotes strong partnerships, notably with FAO and WHO, especially with regard to emerging issues and two topics that are getting currently a great attention and that require a strong multi-sectoral collaboration at all levels because of their social, economical and ecological determinants: rabies and food-and-mouth disease (FMD) (<http://www.oie.int/about-us/>).

16.2 Southeast Asia: A Hotbed for the Emergence and Endemisation of Infectious Diseases

In Southeast Asia, the geographical position, the current socio-economic situation and the sociocultural practices all facilitate the occurrence, spread and maintenance of diseases at the human–animal–ecosystems interface. Indeed, the warm and humid climate, as well as richness in wildlife host species, favours the spillover of zoonotic pathogens from wildlife to humans and domestic animals and the transmission of vector-borne pathogens (Jones et al. 2008). Some prevailing sociocultural practices, such as an increasing encroachment of human activities in the forests or the close contact between human and livestock populations, especially in poor and marginalised populations, provide excellent conditions for the frequent exchange of pathogens between animal and human populations. Furthermore, the high human and animal density and the globalisation of trade facilitate the spread of the diseases. Finally, a weakness of medical and veterinarian institutional capacity and a lack of food security and safety are aggravating factors for the endemisation of the diseases (Bhatia and Narain 2010).

Most of the animal diseases, including zoonoses, commonly described in Southeast Asia can be classified as emerging or re-emerging diseases, meaning that they have appeared in a population for the first time or that may have existed

previously but are rapidly increasing in incidence or geographic range (http://www.who.int/topics/emerging_diseases/en/). Furthermore, even if Southeast Asia is not among the main hotspots of recent emerging infectious disease events, the region is considered at high risk for the future emergence of zoonotic pathogens from wildlife and vector-borne pathogens (Jones et al. 2008). However, even though they actually did not emerge there, the most recent emerging zoonoses have developed themselves and sometimes geographically been embedded into Southeast Asia – severe respiratory acute syndrome (SARS) virus, Nipah virus (NiV) and highly pathogenic avian influenza (HPAI) virus. The occurrence and spread of zoonoses in Southeast Asia can be explained by the coexistence of different factors that facilitate the interspecies transmission, maintenance and dissemination of pathogens. One of the major reasons is the increased contact between humans, domestic animals and wildlife, due to the exceptionally high growth rate of the human and livestock population, the expansion and intensification of agriculture and human encroachment on game reserves (Cáceres and Otte 2009). The changing lifestyles associated with the globalisation of commerce and trades allow rapid propagation of pathogens. Additionally, in most of the countries in Southeast Asia, neither the health nor veterinary services have sufficient capacity and resources to detect emerging pathogens early and to contain infections in animals (Bhatia and Narain 2010).

It is then interesting to describe the actions that governments take, under the leadership of the international community, to anticipate and limit the impact of animal diseases. How to mobilise outside times of crisis, when it is often too late?

16.3 The One Health Concept

With regard to these existing or emerging threatening diseases at the human–animal–ecosystems interface, there is now an international consensus around the ‘One Health’ approach that supports and legitimates the need for cooperation between animal, public and environmental health institutions to defeat diseases that threaten both animal and human health (Leboeuf 2011). This collaboration should not be limited to only the international level, but shall be translated as a new and fundamental paradigm at national levels.

While the FAO, OIE and WHO have long-standing experience in direct collaboration, together they have realised that managing and responding to risks related to existing and emerging threats at the human–animal–ecosystems interface is complex and requires a cross-sectoral and multidisciplinary approach. In 2010, they drafted a document, which set out a joint strategy and proposed a long-term basis for coordinating global activities to address health risks at the human–animal–ecosystems interface (FAO et al. 2010). They agreed that the implementation of an efficient multidisciplinary approach requires that (i) both human and animal health systems need to further strengthen their own capacities in the public and private sector and (ii) strong partnerships among players who may have different

perspectives on some issues and different levels of resources have to be built. The Tripartite Concept Note provides a background and establishes a strategic alignment and some collaborations and joint actions, as well as the way forward that partners may consider when conducting One Health activities. At the regional level in Southeast Asia, one of the first such efforts was the Regional Workshop on Collaboration Between Human and Animal Health Sectors on Zoonoses Prevention and Control convened in December 2010 in Sapporo, Japan, and co-organised by the FAO, OIE and WHO. The meeting produced several recommendations to strengthen this collaboration. Member countries were called on to establish a functional coordination mechanism between their animal and human health sectors by 2011. The recommendations also called on the FAO, OIE and WHO to continue their collaboration with each other, countries and regional organisations (i.e. ASEAN, SAARC) to strengthen the coordination mechanism (FAO et al. 2010).

Even though a functional coordination mechanism is not always established yet, the way in which public health programmes are designated and funded has changed significantly since the H₅N₁ crisis. Pandemic prevention is now mainly addressed as a development issue, typically funded through emergency response avenues, and consequently, trends in health spending have moved from broad system-based investments to a more specialised, infectious disease model. As a result, basic health infrastructure commitment is estimated to have declined from 11 % to 5 % between 1990 and 2008, although it was found that poor health infrastructure is the main driving factor for outbreaks (Bogich et al. 2012). In this regard, the implementation of global programmes specifically targeting pandemic infectious disease threats through development is sometimes questioned.

The complexity of disease emergencies in a globalised world calls for the identification of effective strategies, based on both science and proven practical experience, to reduce future threats. And, once more, the H₅N₁ avian influenza crisis has shown how a concrete, transparent and consistent approach, based on efficient animal and human health infrastructures, high-quality scientific advice and practical experience, is vital for the management of these threats and for political credibility, both at the national and international level (<http://www.oie.int/for-the-media/onehealth/oie-approach/>).

In our modern interconnected world, international organisations play an active role in reducing global diseases threats. The concept of public sector governance, in which the state acquires and exercises the authority to provide and manage public goods and services, is an essential element of the One Health approach (Landford and Nunn 2012). Promoting a collaborative ‘One Health’ approach at national levels will result in a deeper and sustainable political support for the coordinated prevention of high public health and animal impact diseases at the human–animal–ecosystems interface (<http://www.oie.int/for-the-media/onehealth/>).

However, in this framework, what is the strategy of OIE to further strengthen the governance of the animal health systems and to support effective inter-sectoral collaboration?

16.4 The OIE Strategy

OIE advocates that improving the governance of animal health systems, in both the public and private sector, is the most effective way to safeguard global animal health and human health when diseases occur at the human–animal–ecosystems interface. Therefore, it provides science-based guidance needed by its members to strengthen their veterinary services to detect, prevent and manage serious animal disease outbreaks and efficient tools to enhance their credibility, both at the national and international level. Furthermore, OIE strongly supports activities to expand the scientific basis for effective inter-sectoral collaboration and to identify ways to operationalise One Health in policy and practice. It participates in inter-sectoral networking and technical activities and sponsors and contributes to inter-sectoral conferences, workshops and consultations that are usually co-organised by human and animal health partner agencies (<http://www.oie.int/for-the-media/onehealth/oie-involvement/>).

16.4.1 *The OIE Approach to Strengthen the Veterinary Services*

Among the different specific missions included in its mandate, the OIE prepares and adopts relevant standards for animal health and welfare and proposed support programmes to help OIE members to better implement these international standards.

Indeed, in the current trend of globalisation, animal health measures have increasing importance to facilitate safe international trade of animals and animal products while avoiding unnecessary impediments to trade. In light of this, the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) encourages the members of the WTO to base their sanitary measures on international standards, guidelines and recommendations, where they exist. The OIE publishes two codes (Terrestrial and Aquatic) and two manuals (Terrestrial and Aquatic) as the principle reference for WTO members (<http://www.oie.int/international-standard-setting/overview/>): using the Terrestrial Animal Health Code and Aquatic Animal Health Code as a basis is the recognised way to ensure the sanitary safety of international trade in, respectively, terrestrial animals and aquatic animals and their products.

The Terrestrial Code and the Aquatic Code set out standards for the improvement of animal health and welfare and veterinary public health worldwide, including through standards for safe national production and consumption and for safe international trade in animals and their products. All the OIE members have committed that their veterinary authorities shall use the health measures in the Code when importing or exporting animals and their products. The objective is to provide for early detection, reporting and control of agents pathogenic to animals or humans and to prevent their transfer via international trade in animals and animal products, while avoiding unjustified sanitary barriers to trade. To help ensure the effective

performance of the Veterinary Services of Member Countries, the OIE has dedicated two chapters (3.1 and 3.2) of the Terrestrial Code to the Quality of Veterinary Services. The development of these standards and recommendations results from the ongoing work of the OIE's Specialist Commissions, which comprise elected members and observers. Upon the expertise of internationally renowned specialists, they prepare draft texts for new chapters of codes or revise existing chapters in light of advances in veterinary knowledge (<http://www.oie.int/international-standard-setting/terrestrial-code/>; <http://www.oie.int/international-standard-setting/aquatic-code/>).

The Manual of Diagnostic Tests and Vaccines for Terrestrial Animals and the Manual of Diagnostic Tests for Aquatic Animals provide a harmonised approach to disease diagnosis by describing internationally agreed laboratory diagnostic techniques. The principal target readership is laboratories carrying out veterinary diagnostic tests and surveillance, plus vaccine manufacturers and regulatory authorities in member countries. The objective is to provide internationally agreed diagnostic laboratory methods and requirements for the production and control of vaccines and other biological products. The commissions in charge of these manuals update them regularly as new scientific information is released (<http://www.oie.int/international-standard-setting/terrestrial-manual/>; <http://www.oie.int/international-standard-setting/aquatic-manual/>).

The Codes and Manuals are published only once all chapters have been provided for comments to members and fully approved by the World Assembly of Delegates: the views of the National Delegates of OIE members are systematically sought through the circulation of draft and revised texts, and the health measures finally published have been formally adopted by the World Assembly of the Delegates of the OIE members.

To help members to better implement these standards and to improve the governance of veterinary services, the OIE has developed cornerstone support activities, among which the PVS (Performance of Veterinary Services) Pathway specifically focuses on the sustainable improvement of a country's veterinary services, through a global approach and in accordance with their own specific context. A specific methodology has been developed and approved by the members, and the OIE has published the 'OIE Tool for the Evaluation of Performance of Veterinary Services' (the OIE PVS Tool) as the basis for evaluating performance against the international standards published in the Terrestrial Code. A similar tool is available for the evaluation of Aquatic Animal Health Services. The PVS Pathway starts with a PVS evaluation mission which consists of a qualitative assessment of the performance and the compliance of a country's VS (veterinary services) in accordance with the OIE standards on the quality of VS. A PVS Gap Analysis mission follows which facilitates the definition of a country's objectives in terms of compliance with OIE quality standards, suitably adapted to national constraints and priorities. This analysis provides an outline of the corresponding financial action plan, which can be used to legitimate requests for funding from the government or donors. Based on the gaps the country has defined, some activities or projects and programmes are proposed and implemented in the field of the veterinary legislation, public/private partnerships, veterinary education or laboratories. Finally, follow-up missions provide a

way of measuring the progress that countries have made in sustainably improving their compliance with the OIE quality standards. Only OIE-certified PVS experts can carry out independent external PVS evaluations of country's Veterinary Services and PVS Gap Analysis. They have undergone training sessions organised by the OIE and funded by donors to the OIE World Fund. All experts use standard tools, indicators and experts' manuals, prepared and published by the OIE Headquarters, which also include template reports (<http://www.oie.int/support-to-oie-members/pvs-pathway/>).

Although there is still no specific tool officially recognised by WHO and OIE member countries, some PVS 'One Health' missions are currently carried out, using the OIE PVS Tool as a framework in that field.

The first PVS mission was carried out in 2006 in Vietnam, and since then, more than 120 countries in the world have requested OIE to benefit from this programme. Up to now, all the members countries from Southeast Asia, except Malaysia and Singapore, have initiated the PVS Pathway, with different degrees of progress. Many countries, including Vietnam in Southeast Asia, have decided to give a public and free access to their report online. Some main trends arose from the different PVS evaluations worldwide, Southeast Asia not being much different from the average.

All countries have realised the importance of strengthening their veterinary services and are politically committed to improve the situation when needed. First of all, the training and the management of the veterinarians and animal health workers are recognised as the main challenges to ensure a good governance. The initial veterinary education, of varying quality in the area, needs to be strengthened. In some countries, such as Cambodia or Laos, where there were up to now no veterinary schools and where the remaining active vets will retire in the coming years, this need is particularly strong. On the governance side, the efficacy of the chain of command from the central administration to the field is essential to react quickly when an issue arises. Some countries, such as Vietnam and Indonesia, have experienced successive episodes of decentralisation that are often believed to have undermined this process. In addition, the level of remuneration of the staff in charge of the controls, including those at the borders, is sometimes insufficient to prevent them from the temptation of seeking additional revenues for instance through getting a second job or even granting favours. And, along the same line, when financial compensation is lacking or inadequate, farmers hesitate to report diseases for which the total or partial culling of the herd is required.

Following this diagnosis, OIE helps countries in identifying the appropriate prescription, depending on the country's priorities and context. The Philippines and Vietnam, the two pilot countries for the implementation of the PVS Pathway, where the Veterinary Services entered a strong momentum, particularly in terms of public/private partnerships, have developed comprehensive strategic plans for 5 years, which are currently under study for approval at ministerial level. The future will tell, including the forthcoming diagnosis, planned 3–5 years after the first, if the approach is bearing fruit.

16.4.2 The OIE Approach to Enhance the Inter-sectoral Collaboration

OIE strongly supports activities to advance One Health and participates in various inter-sectoral networking and technical activities. Some of the cornerstone activities in this field are presented below.

OFFLU is the OIE-FAO global network of expertise on animal influenza, working to reduce the negative impacts of animal influenza viruses by promoting effective collaboration between animal experts and with the human health sector (<http://offlu.net/>). Within this network, the animal health community is in charge of providing early recognition and characterisation of emerging influenza viral strains in animal populations and effective management of known infections. This leads to better managing the risk to human health and promoting global food security, animal health and welfare and other community benefits derived from domestic animals and wildlife. The functioning of the network is based on the following activities: (i) exchange of scientific data and biological materials (including virus strains) within the network, to analyse such data and to share such information with the wider scientific community; (ii) offer of technical advice, training and veterinary expertise to member countries to assist in the prevention, diagnosis, surveillance and control of animal influenza; (iii) collaboration with the WHO influenza network on issues relating to the animal–human interface, including early preparation of human vaccine; and (iv) identification of the influenza research needs.

To strengthen laboratory capacity and networking activities in that field, OIE is involved in existing institutional frameworks, mechanisms and networks with partners, particularly with FAO and the WHO. Together, the three international organisations have initiated a number of collaborative projects to help strengthen laboratory capacity and networking. One current FAO/OIE/WHO project, the IDENTIFY project of the USAID-funded Emerging Pandemic Threats Programme, focuses on enhancing the capacity of veterinary laboratories to detect emerging pathogens by improving the ability to accurately and rapidly diagnose animal disease known to occur in a given region or country (<http://www.oie.int/for-the-media/onehealth/oie-involvement/identify/>). There again, Southeast Asia has been identified as an important area of work.

Within the tripartite partnership with FAO and WHO, OIE is involved in the Global Early Warning System (GLEWS) addressing health threats and emerging risks at the human–animal–ecosystems interface, which is a mechanism to share information on health threats beyond avian influenza. It is recognised that information from the human and animal health sectors, as well as from other relevant sectors such as food, wildlife, land use and agriculture, is most efficiently and appropriately collected by each sector according to its mandate – human and animal health sectors have already established mechanisms to collect data from the field. Once done, it is crucial that the information does not remain within that sector and is shared with other stakeholders (Munford, PMAC p 73). GLEWS allows to combine and coordinate the alert and disease intelligence mechanisms of OIE and FAO and to assist in

prediction, prevention and control of animal disease threats, including zoonoses, through sharing of information (<http://www.glews.net/>).

16.4.3 The OIE Strategy in Southeast Asia Through Two Case Studies

At regional level and in full collaboration with ASEAN and other partners, the OIE Sub-Regional Representation for Southeast Asia plays a significant role in regional coordination of animal health and emerging infectious disease management in a region that is often considered as a 'hotspot' for emergence. Along the strategic objectives of the OIE Fifth Strategic Plan, the implementation of its activities to achieve the OIE Strategic Objectives is supported by various programmes and projects funded by donors.

The choice of these two examples has been motivated by the fact that these diseases are key transboundary diseases in Southeast Asia and have major impact in terms of animal and public health in the region. The approach taken is not only considering the disease itself in isolation but also the whole system and its actors. It is thus expected that this approach will improve this two-disease situation as well as the capacities of both human and animal sectors to combat any kind of diseases, including by joining their efforts in collaboration when needed. These following case studies show how cooperative approaches are important between veterinary services, human health services and other relevant government services at the interface between domestic and wild animals, ecosystems and human populations.

16.4.3.1 Foot-and-Mouth Disease (FMD)

Foot-and-mouth disease (FMD) is a severe, highly contagious viral disease of livestock with significant economic impact. The disease is still widespread throughout the world, particularly in Asia, Africa and the Middle East. By the end of May 2012, at the time of the second Global Conference on the topic in Bangkok, more than 100 countries were not FMD-free which means that, beyond the impact of the disease in their territories, they remain a continuous threat to free countries. In developed countries, FMD has catastrophic consequences when declared. It can indeed severely affect and disrupt regional and international trade in animals and animal products causing enormous financial damage. The 2001 outbreak in the UK is estimated to have cost no less than ten billions euros. Australia estimates that an incursion of FMD that would not be immediately controlled would cost 3 % of its annual GDP. In addition, massive culling during outbreaks has created animal welfare and ethical concerns not only in the animal production sector, but in society as a whole. In developing countries, where the adverse effects of FMD are often underestimated, the disease undermines food security and economic development, at the level of both village smallholders and the more organised production chains.

Of the domesticated species, cattle, pigs, sheep, goats and water buffalo are susceptible to FMD. Many species of cloven-hoofed wildlife may become infected, such as deer, antelope, elephant, giraffe and some other species as well. Even though it has not been demonstrated for any other wild species, the African buffalo can serve as a source of FMD infection for domestic animals in Sub-Saharan Africa. Thus, FMD is typically the kind of disease arising at the human–animal–ecosystems interface which is not a zoonotic disease (<http://www.oie.int/en/international-standard-setting/terrestrial-manual/access-online/>).

FMD epidemiology is complex and this has important implications as it allows to learn many lessons that can be used to strengthen the systems as a whole and that can be reused for many other diseases. The agent which causes FMD is an aphthovirus of the family Picornaviridae. There are seven strains (A, O, C, SAT1, SAT2, SAT3 and Asia1) each one requiring a specific vaccine strain to provide immunity to a vaccinated animal. FMD is characterised by fever and blister-like sores on the tongue and lips, in the mouth, on the teats and between the hooves that can be the symptoms of numerous other diseases. The disease is not a killing disease and mainly causes severe production losses that are easy to be visualised by the owner when it affects dairy production but that are more difficult to assess and to quantify at the first glance when talking about meat cattle production. While the majority of affected animals recover, the disease often leaves them weakened and debilitated. In a susceptible population, morbidity approaches 100 %. Intensively reared animals are more susceptible to the disease than traditional breeds. If the disease is rarely fatal in adult animals, there is however often high mortality in young animals due to myocarditis or by lack of milk when the dam is infected by the disease (<http://www.srr-seasia-oie.com/disease-info/foot-and-mouth-disease/>).

FMD is, with rinderpest, one of the first severe diseases that has been listed (Chap. 1.2, Article 1.2.3) in the OIE Terrestrial Animal Health Code at the creation of the organisation in 1924. Rinderpest has been declared eradicated from the world in 2011 and the international community is now focusing on FMD. Technically, OIE members are committed by the OIE Terrestrial Animal Health Code, 2009, (Chap. 1.2, Article 1.2.3) to report to the OIE (Chap. 1.1 – Notification of Diseases and Epidemiological Information). FMD is the first disease for which the OIE established an official list of free countries and zones with or without vaccination.

Furthermore, there is a chapter dedicated to FMD in the Terrestrial Code which aims at mitigating the risk of infection and spread of the disease. The chapter provides detailed guidance for the surveillance strategy of the disease (http://www.oie.int/index.php?id=169&L=0&htmfile=chapitre_1.8.5.htm).

The recent epidemiological situation, with the incursion of FMD virus into free (Japan, Korea and Bulgaria) and infected countries (SAT2 in Egypt and Libya), shows that countries remain under threat and must be fully prepared for the emergence or re-emergence of FMD. Trade globalisation has without any doubt increased the risk of spread. It is now assumed that the control of FMD cannot be sustained if good governance of animal health systems, including effective Veterinary Services complying with OIE standards and updated legislation, is not in place and supported by appropriate public/private partnerships (FAO/OIE Global conference on FMD, June 2012, BKK).

In June 2009, OIE and FAO decided to establish an FMD working group under the Global Framework for the progressive control of Transboundary Animal Diseases (GF-TADs) and to prepare a Global FMD Control Strategy, based on the consultation of experts and representatives of national, regional and international institutions. The Global FMD Control Strategy was discussed and published in 2012 and is a combination of three related components, namely, the control of FMD, strengthening the Veterinary Services, and the prevention and control of other major diseases of livestock. The overall aim of the strategy is to reduce the global impact of the disease and to be used as an entry point to achieve sustainable progress in the performance of Veterinary Services and, in turn, improve the animal health status concerning other livestock diseases.

In Southeast Asia, one of the OIE long-standing flagship regional programmes is the Southeast Asia and China Foot-and-Mouth Disease (SEACFMD) Campaign, which aims at controlling FMD by 2020 through vaccination and promotes socio-economical and participatory approaches as well as assessment of the role of wildlife. Australia, through AusAID, and the European Union (via the vaccine bank) are the main funders of such activities. France, the Asian Development Bank, FAO and some other NGOs are also involved. These activities are complying with the recommendations of the Paris Declaration on Aid Effectiveness (www.oecd.org/dataoecd/53/38/34579826.pdf). To summarise, the OIESRR coordinates animal disease control activities between countries and provides technical advice to ensure coherent strategies. Furthermore, it seeks political and financial support to achieve FMD freedom in the region. It was made up of eight members until 2009, namely, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Thailand and Vietnam, and was referred to as the Southeast Asia Foot-and-Mouth Disease (SEAFMD) Campaign. In 2010, in the light of the overall benefits of SEAFMD, Brunei Darussalam, the People's Republic of China (PRC) and Singapore became members of the programme, thereby extending considerably its geographic range. Consequently, SEAFMD has been renamed the Southeast Asia and China FMD (SEACFMD) Campaign (<http://www.srr-seasia-oie.com/programs/seacfmd/>). Its boundaries are now nearly completely matching the epidemiological entity of cattle trade in the region which is the main driver for the spread of the disease.

The achievements – in terms of political support, awareness, public/private collaboration, knowledge of animal movements and the selling prices, identification of viral types, etc. – are so far satisfying. Now that the current situation is well known, there is a call for the implementation by all the countries of Southeast Asia of activities at larger scale. The strategy is notably to conduct targeted actions, such as specific vaccination campaigns, far less expensive than that of mass vaccination campaigns.

The 18th Meeting of the OIE FMD Sub-Commission for Southeast Asia and China that can be considered a turning point of the campaign was held in Lijiang, Yunnan, China, from 5 to 9 March 2012. One of the key focus points in the sessions was the various, newly introduced FMD control strategies in China, Vietnam, Laos and Malaysia, all of which advanced the implementation of the SEACFMD Campaign in accordance with the SEACFMD 2020 Roadmap.

Currently available opportunities for the region and the mechanisms as to how these can be accessed were also highlighted during the presentations regarding the now operational FMD vaccine bank (and the soon to be operational rabies vaccine bank), as well as the Small Grants Facility (SGF) under the AusAID-funded STANDZ Initiative that allows to implement small ad hoc projects with great flexibility. Country members have now a full set of tools for achieving the vision of an FMD-free region by 2020.

With regard to presence of efficient vaccines and experience of successful programmes for the eradication of the disease in Southeast Asia, socio-economic factors should play a major role in the maintenance of the disease in Southeast Asia. Willingness to tackle the disease is so far not obvious, especially in countries with the most limited resources that are Cambodia, Laos and Myanmar, even though it is assumed that they would substantially benefit from the control of the disease. Dairy farmers, that are few in the area, may be motivated by the direct losses that are clearly visible, it is less obvious for the other farmers aspiring to produce meat or using animals for work. Several factors may motivate this lack of commitment in tackling the disease: the global low impact of the disease on household economy and the lack of perception of the real economic impact by the farmers. More research work to assess the real impact and perception of FMD at these smallholders' level should be undertaken, to gain knowledge about the socio-economic drivers of the disease.

In collaboration with FAO through the GF-TADS, OIE recommends to enhance the analysis of the socio-economic drivers of the disease, such as livelihood, livestock sector strategies and value chain factors, that can guide FMD control programmes to be more successful (Global Conference). In Southeast Asia, the importance of central Burma as a potential source of FMD for the rest of the region has constantly been highlighted as an important number of animals are traded from Myanmar to the rest of Southeast Asia. Controlling FMD in central Burma would require a significant investment to better quantify the incentives as well as the benefits and costs of controlling FMD in this area, beyond the few existing studies identifying FMD risk factors, animal movement patterns and some initial cost-benefit analyses of controlling FMD at the individual farmer level.

Combating diseases of livestock such as FMD in developing countries can contribute significantly to poverty alleviation by generating employment, providing funds for education and training, improving opportunities for trade in livestock and animal products and supplying raw materials to industry.

The outcomes and severity of infectious diseases are the result of complex relationships between the infectious agent, animal husbandry systems, human behaviour and the environment, and disease management can only be effective if these elements are simultaneously taken into consideration in a holistic approach. The 'One Health' strategy offers the necessary conceptual framework, in terms of a multidisciplinary and multi-sectoral approach, and it is appropriate to address zoonoses as well as livestock diseases such as foot-and-mouth disease (FMD) that can have severe impacts on people's livelihood. A special session was held during the 18th SEACFMD Campaign on capacity building and One Health which recognised

the importance and the imperious necessity of more and better cooperation between human, animal and environmental health and, in particular, the need to involve more the medical profession, including academia in One Health cross-sectoral collaborations, including joint professional and technical trainings. The opposition to the creation of a specific global or regional institution for the governance of the One Health movement was also reaffirmed (<http://www.srr-seasia-oie.com/programmes/seacfmd/activities-report/18th-meeting-of-the-oie-seacfmd-sub-commission/>).

16.4.3.2 Rabies

Rabies is a zoonotic disease that is caused by neurotropic viruses of the genus *Lyssavirus* and is transmissible to all mammals. The virus is spread through close contact with infected saliva via bites or scratches. Rabies is present on all continents except the Antarctic and is a neglected zoonosis, while often endemic in countries with poor infrastructure and limited resources for combating disease. Between 50,000 and 100,000 human cases occur each year, mainly in Africa and Asia (OIE Terrestrial Manual, Landford and Nunn). Even though dog bites are responsible for 99 % of cases of rabies virus transmission to humans, bats – including vampire bats – and foxes can act as reservoirs and vectors of the disease, posing a very real threat to animal and public health. The victims, mainly children, die after a period of dreadful suffering. Most of the deaths occur in the absence of postexposure treatment (PET). Rabies is nearly always fatal when left untreated (<http://www.who.int/rabies/en/>).

Chapter 8.10 of the Terrestrial Animal Code is dedicated to rabies infection and aims at mitigating the risk of rabies to human and animal health and to prevent the international spread of the disease (http://www.oie.int/index.php?id=169&L=0&htmfile=chapitre_1.8.10.htm).

Despite the availability of technology to control rabies in domestic animals, as well as in wildlife, and of technical and institutional know-how gained from successful control programmes, rabies remains a huge public health threat in many areas including Southeast Asia, because of a lack of motivation by governments and the consequent inadequate funding. Many agriculture ministries neglect to seriously implement rabies control in dogs for a number of reasons, including the fact that there is less economic incentive to control rabies in dogs than to fund other disease-control programmes in livestock. Furthermore, despite data and studies underlining the real need to focus on controlling rabies in dog populations to eradicate the disease in humans, many health ministries allocate funds only for human rabies vaccine (Wilde et al. 2013). As a result, the veterinary services are faced with uphill struggle to convince governments in investing resources to control rabies in dogs.

A lack of accurate data on the burden of rabies contributes to the fact that the disease remains a low priority for the global public health community. In Southeast Asia, where data is sparse or cannot be reliably validated, knowledge gaps in key parameters, such as exposure incidence, probability of bite victims receiving PET, and prevalence of rabies in animal population (Hampson 2011). Furthermore, deficient data about the economic impact, both on livestock/working animals and tourism/recreation, is a major constraint to assessing the global burden of the disease.

Beyond the direct impact on local economies when livestock and working animals die due to rabies or infect humans, the need to pay for transport and expensive post-exposure treatment can lead to the unplanned sale of production animals and livelihood assets and further impacts food and economic security (De Balogh 2011). More recently, rabies has also become a concern for the tourism industry with travel advisories issued in countries experiencing a reintroduction of rabies or ongoing endemic disease (Cleaveland et al. Seoul).

The recent case that occurred in Thailand in February 2010 shows two other components that contribute to the unsuccessful control of the disease, both in dogs and humans. The owner of a pet shop, a public health official, was bitten by one of her dogs, a 3-year-old Rottweiler in December 2009. The woman developed rabies symptoms and died in February 2010. The dog later died, followed by another eight pets at the victim's house. She was vaccinating the dogs by herself. This case underlines that there are a circulation of fake vaccines in the region and a lack of awareness of the population about the epidemiology of the disease, even for people working in the field of public health (<http://www.promedmail.org/mbds>, archive number: 20100225.0623).

The example of rabies highlights both the necessity and the difficulties of implementing an efficient multi-sectoral collaboration to tackle a zoonotic disease at the animal source. Rabies control involves multiple agencies, including those responsible for human and animal (domestic and wild) health, and requires coordinated management across these sectors. An improved exchange of information between sectors is needed for better patient information, planning of personal protective equipment and monitoring the success of dog vaccination campaigns. According to Dr. Bernard Vallat, OIE director general, success in eradicating rabies relies on the close collaboration between public health and veterinary services in designing the control programmes. Good veterinary governance is crucial to applying successfully the technologies and tools available for rabies control but, most importantly, veterinary services have to establish collaboration between different sectors, beyond public health services. The OIE is so committed to supporting the efforts of the international community to achieve worldwide eradication of rabies (Seoul, Sept 2011).

In this context, the OIE SRR for Southeast Asia is recommending to develop a multi-sectoral strategy to control rabies in Southeast Asia that would focus in getting resources from governments, international organisations and other partners to support rabies control in the region. OIE has been campaigning to all governments and international agencies to provide veterinary services worldwide with resources to control rabies in animals. Part of this campaign is to highlight the importance of canine rabies during international meetings and workshops, to tackle not only technical challenges in controlling rabies but also in gaining political support. The SRR has closely worked with ASEAN in getting political commitment from member states to control rabies. Using the recommendations from the OIE Rabies Conference for Eurasia in 2007, the OIE Bangkok worked with the ASEAN through the ASEAN+3 EID project funded by AusAID, in coming up with a policy statement to support rabies control in ASEAN plus three countries. This statement dubbed as 'Call for Action towards the Elimination of Rabies in the ASEAN Member States and Plus Three Countries' was finally endorsed both by the ASEAN Health and

Agriculture Ministers in 2008 and 2009, respectively. It provides recommendations at the national level in terms of policies and legislation, prevention, control, surveillance, partnership, public awareness and communication and at the regional level in terms of prevention, control, information sharing, capacity building, coordination, training and research (www.aseanplus3-eid.info/dl.php?...Rabies_Call_f...). This document will be a useful tool for veterinary services to lobby their governments for support. The OIE, through its SEACFMD Campaign, has a long experience in coordinating regional control of transboundary animal diseases. The SEACFMD 2020 Roadmap could also be used in developing a multi-sectoral rabies control strategy in Southeast Asia. Support from FAO, WHO and other partners is crucial in the development of this strategy.

Furthermore, the OIE is currently managing a rabies vaccine bank in Asia with the financial support of the European Union, under the framework of the regional cooperation programme on Highly Pathogenic and Emerging and Re-emerging Diseases in Asia (HPED). This first regional rabies vaccine bank was launched in early 2012 and could serve as a model for developing other rabies vaccine banks in other regions of the world. The bank delivers vaccines to eligible countries (according to donor requirements) at the request of member countries, allowing effective public/private partnerships between international organisations, national authorities, local authorities, NGOs and private companies to be established. The guidelines for the use of the vaccine bank approved by the eligible countries specify that the applicant country must, in particular, (i) prove that there is an increase in bite rates and human mortality, that the location of the outbreak(s) increases the risk of rabies spreading to people and/or animals and that further spread of the disease may occur, (ii) provide a statement explaining that the National Veterinary Services are engaged and will have the authority to implement or supervise the vaccination of dogs, (iii) submit a specific vaccination control strategy, (iv) specify the nature and quantities of vaccines required, and (v) agree to international transportation conditions. Coinciding with World Rabies Day in 2012, the OIE donated 50,000 injectable rabies vaccines to Lao PDR through the regional rabies vaccine bank (see map). Following this first donation, other countries have requested the OIE for vaccine deliveries. Among them are countries in which GARC (Global Alliance for Rabies Control) has projects, like the Philippines. Other deliveries are under preparation in other Southeast Asian countries (<http://www.rabiescontrol.net/news/news-archive/oie-support-to-rabies-endemic-countries-a-vaccine-bank-in-asia.html>).

16.5 Conclusion

An integrated collaborative approach to investigating and managing infectious diseases has gained popularity. It is now commonly acknowledged that the integration of the veterinary, medical and environmental sciences necessary to predict, prevent or respond to emerging or re-emerging animal diseases requires effective collaboration and exchange of knowledge across these disciplines. The international

organisations regularly reaffirm their opposition to the creation of a specific global or regional institution for the governance of the One Health movement and promote instead that both human and animal health systems strengthen their own capacities and develop strong multi-sectoral partnerships.

If there is now an international consensus around the One Health approach and a call by an international organisation in charge of public and animal health for collaborative initiatives to combat diseases, the multi-sectoral approach is mainly promoted among health disciplines. It is now necessary to improve this integrated collaborative approach with the inclusion of human and social sciences, to take into account the social drivers for emergence, maintenance and spread of diseases. But, there is a dearth of information on the strategies to put interdisciplinarity collaboration into practice and no evidence of its effectiveness. A study carried out by Anholt et al. (2012) shows that the essential components of an ID approach that could support initiatives like the One Health movement were mainly the professional social networks that provide connections across disciplines and the need of trust and respect among disciplines. Education and experiential learning opportunities remain so the best tools to develop interdisciplinarity this time.

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