

HOW CAN WE PROGRESS THE COOPERATION BETWEEN ANIMAL HEALTH SECTOR AND PUBLIC HEALTH SECTOR?

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Summary: *Global public health is a shared responsibility of both the animal and human health authorities. The concept of multi-sectoral or multi-ministerial approaches for public sector governance is an essential element through which a country acquires the authority to provide and manage public goods and services. The World Health Organization (WHO) Member States have adopted the International Health Regulations (IHR 2005), designed to prevent, protect, control, and respond to the international spread of disease as well as to avoid unnecessary interruptions to transport and trade. The World Organisation for Animal Health (OIE) has developed the Performance of Veterinary Services (PVS) Pathway, a global programme for the sustainable improvement of the quality of Veterinary Services' compliance with international standards in order to improve animal health and reduce production losses, which together contribute directly and indirectly to food security and to safeguarding human health and economic resources. This paper aims to increase awareness and understanding of the WHO IHR Monitoring Framework (IHRMF) and the OIE PVS Pathway, to review and evaluate frameworks and tools of the IHRMF and the OIE PVS Pathway to help assess the capacities of the human and animal health sectors, and to identify practical next steps and activities for a joint national, regional and global roadmap to strengthen collaboration and coordination between the animal and public health sectors. Coordination and collaboration between the Veterinary Services, the Public Health Services, and other relevant authorities is a key component of good veterinary and public health governance. It is absolutely crucial for effective action and optimal management of available human and material resources. Coordinating the effective implementation of these standards at the national, regional and global level with efficient cooperation between the Veterinary Services and the Public Health Services is one of the most critical factors for controlling health hazards nationally and worldwide.*

Keywords: *animal health sector – International Health Regulations (IHR) – Performance of Veterinary Services (PVS) Pathway – public health sector.*

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1. Introduction

Emerging and re-emerging diseases pose a substantial and continued threat to public health, animal health, ecological systems, and food security. These risks exist within a global context in which human populations, agricultural and animal production, globalisation, and international trade and travel are increasing significantly, the effects of climate and environmental change are becoming more apparent, and the demand for livestock products is growing dramatically [1].

Global public health is a shared responsibility of both the animal health and human health authorities. Countries must be equipped with effective and well organised national health systems that operate in collaboration and under the principles of good governance in order to monitor both animal and public health. The World Health Organization (WHO) and the World Organisation for Animal Health (OIE) are the reference intergovernmental organisations for public and animal health. WHO and the OIE have been active promoters and implementers of an intersectoral collaborative approach among institutions and systems for the prevention, detection, and control of diseases among and between animals and humans [2].

The OIE is the international organisation responsible for developing standards, guidelines, and recommendations for animal health, including zoonoses and animal welfare; these are mainly laid down in the OIE *Terrestrial Animal Health Code* and *Aquatic Animal Health Code* and their respective *Manuals*. The OIE has developed the OIE PVS Pathway, which is a global programme for the sustainable improvement of a country's Veterinary Services' compliance with OIE international standards on the quality of Veterinary Services. This is an important foundation for improving animal and public health and enhancing compliance with sanitary and phytosanitary (SPS) measures at the national, regional and international level [3].

WHO Member States have adopted the International Health Regulations (IHR 2005), a document that provides a legally binding framework for the prevention and control of events that may constitute a public health emergency of international concern. The IHR is considered an international legal instrument aimed at preventing, protecting against, controlling, and responding to the international spread of disease as well as avoiding unnecessary interruptions to transport and trade [4].

The OIE developed the *Performance of Veterinary Services (PVS) Pathway* in order to achieve the sustainable improvement of national Veterinary Services' compliance with OIE standards, particularly regarding the quality of Veterinary Services. The OIE PVS Pathway is composed of different tools to assist countries with objectively assessing and addressing the main strengths and weaknesses of their Veterinary Services. These tools include the *PVS Evaluation Tool* (qualitative assessment of the level of advancement in terms of compliance with OIE international standards on quality of Veterinary Services) and the *PVS Gap Analysis Costing Tool* (qualitative and quantitative assessment of priorities and investments needed to address identified key gaps). The OIE PVS Pathway also proposes support in specific fields such as veterinary legislation, veterinary laboratories, Veterinary Statutory Bodies, and veterinary education. A country can also monitor its progress in complying with OIE intergovernmental standards by requesting OIE *PVS Evaluation Follow-up missions*.

Under the terms of the IHR agreement, WHO Member States are required to develop, strengthen and maintain minimum national core public health capacities. Member States should implement plans of action and ensure that they implement the core capacities required by the IHR. Various assessment and monitoring tools have been developed by WHO (e.g. the *IHR Monitoring Framework* (IHRMF) and the associated *Questionnaire for Monitoring Progress in the implementation of IHR Core Capacities in State Parties* with indicators of performance for predefined core capacities and specific hazards) [2].

As we are all aware, the concept of multi-sectoral or multi-ministerial approaches for public sector governance is an essential element in which the country acquires the authority to provide and manage public goods and services. Therefore, we need to understand and review the above-mentioned information in order to define how we can progress cooperation between the animal and public health sectors using the OIE PVS Pathway and the IHRMF as tools to synergise the 'One Health' approach.

This paper aims to increase awareness and understanding of the WHO IHRMF and the OIE PVS Pathway, to review and evaluate the frameworks and tools of the WHO IHRMF and the OIE PVS Pathway to help assess the capacities of the animal and human health sectors, and to identify practical next steps and activities for a joint national, regional and global roadmap to strengthen communication, coordination and collaboration between the animal and public health sectors.

2. What are the WHO IHR monitoring framework and the OIE PVS Pathway?

The OIE and WHO develop, publish, and constantly review intergovernmental regulations and standards, not only for disease prevention and control methods but also for the quality of national animal and public health systems. Both the WHO IHRMF and the OIE PVS Pathway approaches enable countries to determine the strengths and weaknesses in their respective functions and activities, and promote prioritisation and pathways for further improvement (Fig. 1).

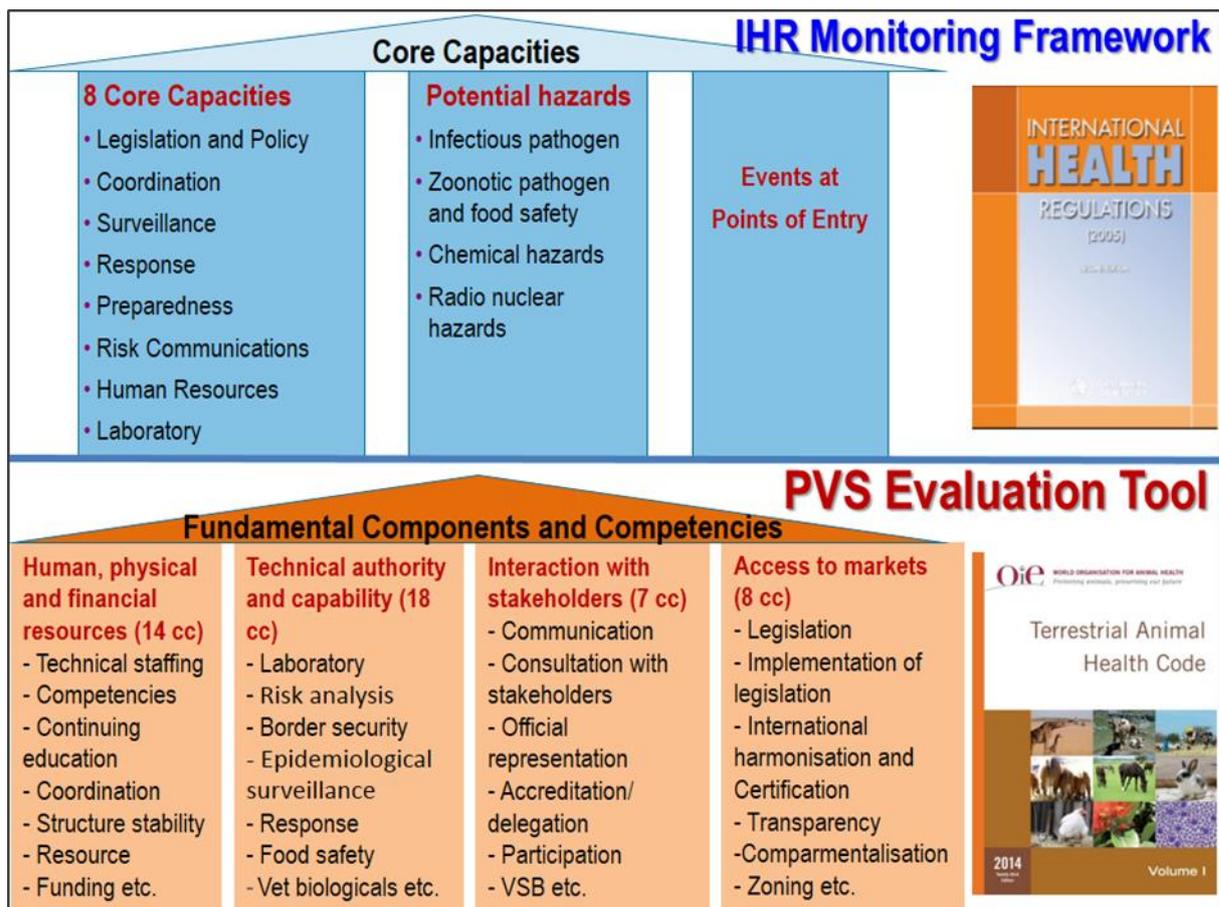


Fig. 1

A summary of the eight core capacities and hazards under the WHO IHR Monitoring Framework and the four Fundamental Components and 47 Critical Competencies (CC) under the OIE PVS Evaluation tool

These approaches propose to engage countries in a routine monitoring and follow-up mechanism on the overall level of performance and to determine the needs for compliance with internationally adopted references or standards. Coordinating the effective implementation of these standards at national, regional and global level with efficient cooperation between Veterinary Services and Public Health Services is one of the most critical factors for controlling health hazards nationally and worldwide.

IHR Monitoring Framework

When they were first adopted, in 1969, the International Health Regulations (IHR), the primary document governing the international response to public health risks and emergencies, covered only few diseases. In 2005, the World Health Assembly approved revisions of the IHR with the aim of improving the governance of international responses to public health risks and emergencies. The

document requires all 194 WHO Member States to detect, assess, notify, and report any potential 'public health emergency of international concern' (PHEIC) under specific timelines [6].

The IHR (2005) represents an important step in achieving global health security by promoting the preparation for and response to public health risks and emergencies in a manner that does not unnecessarily impact on cross-border travel and trade [7, 8]. A major innovation in the revision of the IHR (2005) was the shift away from disease-specific notification to require notification of any events that may constitute a potential PHEIC [9]. Under the IHR (2005), PHEICs are not limited to infectious diseases, but also apply to events stemming from biological, radio-nuclear or chemical agents, from newly discovered or unknown agents or modes of transmission, and events transmissible via persons, vectors, cargo, goods, and environmental diffusion (Fig. 1).

All WHO Member States are required to have or to develop minimum core public health capacities to implement the IHR (2005) effectively. In this context, a monitoring framework was developed, which represents a consensus among technical experts from WHO Member States, technical institutions, partners and WHO. The main objectives of this monitoring tool are:

- to give countries technical guidance in assessing the status of their IHR implementation and the development of IHR core capacities;
- to facilitate the annual reporting of States Parties to the World Health Assembly (WHA), as required under the IHR; and
- to provide countries and partners with information on areas where support is needed.

OIE PVS Pathway

The OIE designed its Tool for the Evaluation of Performance of Veterinary Services (OIE PVS Tool) and its PVS Gap Analysis Tool (Costing Tool) on the basis of Section 3 of the OIE *Terrestrial Animal Health Code* (the *Terrestrial Code*), a section which addresses the quality of Veterinary Services (VS). Similar provisions are available for the evaluation of Aquatic Animal Health Services. Since the introduction of the entire 'PVS Pathway' by the OIE in 2005, OIE PVS evaluation missions have been conducted in 123 out of the 180 OIE Member Countries and 96 Member Countries have requested a PVS Gap Analysis mission (as of June 2015).

The PVS Evaluation Tool has four Fundamental Components: human and physical resources, technical authority and capability, interaction with stakeholders, and access to markets. All the 47 Critical Competencies within the PVS Tool are listed under one of these Fundamental Components and are underpinned by the relevant technical chapters of the OIE *Terrestrial Code*.

The wording of the definition and the levels of advancement of each Critical Competency is designed to allow VS to progressively improve their quality. Subsequently, the progressive and participatory methodology, the structure of the report, and the tools used during PVS Gap Analysis missions enable VS to define appropriate resources and organisation based on their national constraints and priorities [10].

3. Lessons Learnt from the National Workshop on IHR/PVS Assessment

A national pilot workshop – entitled 'Country perspectives on IHR/PVS assessments and roadmap for better intersectoral collaboration among animal and human health sectors' – was jointly organised by WHO and OIE in collaboration with Thailand's Ministry of Public Health and the Department of Livestock Development, Ministry of Agriculture and Cooperatives in Bangkok, Thailand, on 26 and 27 March 2014.

The national workshop was organised with the aim of understanding country perspectives on the IHR Monitoring Framework and the OIE PVS Pathway and to highlight how the outputs and outcomes of the WHO and OIE assessment frameworks can be used to identify gaps and opportunities for improving coordination and collaboration at the animal-human interface.

The main results of the assessments conducted in Thailand were presented by a representative of the national IHR focal point and by the representative of the National Veterinary Authority (Department of Livestock Development) with the support of OIE and WHO experts. The data used during this workshop were extracted from

- the 2012 IHR Assessment;
- an OIE PVS Evaluation in 2012; and
- a PVS Gap Analysis in 2014.

This session helped the participants to understand where gaps had already been reported and to gain knowledge of any current or planned corrective measures. This workshop triggered a discussion on how the results of the PVS Pathway and the IHR Monitoring Framework can bring benefits to the endeavours of both sectors. A brief summary of the similarities and differences between the PVS Tool and the IHR Monitoring Tool that were identified during the workshop is shown in Table I.

Table I

Summary comparison of the OIE PVS Pathway and the WHO IHR Monitoring Tool [2]

	OIE PVS Pathway and Tools	WHO IHR Monitoring Framework and Tools
Objective	To help OIE Member Countries to sustainably and continuously improve their Veterinary Services' compliance with international standards (OIE <i>Codes</i>)	To assess the capacity of WHO Member States to promptly and effectively respond to public health risks and emergencies according to international regulations
Use of tools	Third party (PVS-certified experts)	Self-evaluation by the country
Obligation	Voluntary process initiated upon a request from the country to the OIE (country-driven)	Mandatory annual report to the World Health Assembly (Member States can choose their preferred monitoring process, including use of the WHO IHR Monitoring Framework)
Time frame	Step-based and continuous process PVS Pathway is country-driven	With agreed specific deadline in the WHO IHR (2005)
Scope	Improve compliance and performance of Veterinary Services	Countries' capability to address an international public health emergency of international concern, including zoonosis
Outcome	<i>Provide sustainable foundations for the integrated protection of human health and animal health at national, regional and international level</i>	
Confidentiality	<i>The reports and outputs are the property of the country and are kept confidential by WHO and the OIE unless otherwise agreed by the individual OIE Member Country</i>	

Based on the discussion of the Working Group reports during the workshop, a matrix was used to highlight overlaps between indicators of the IHR Monitoring Framework Core Capacities (CC IHR) and those of the Critical Competencies of the PVS Pathway (CC PVS). From this mapping exercise, several intersections were frequently reported as gaps in the operational collaborations between the two sectors. Some gap activities were identified and the results of these discussions are summarised in Table II.

This national workshop was also a pilot exercise, and some of the main lessons learnt on the methodology developed jointly by WHO and OIE were as follows:

- a) All stakeholders require further explanation and comprehension of the IHR Monitoring Framework and OIE PVS Pathway objectives, tools and their intended outcomes.
- b) Stakeholders need to engage in scenario exercises to better conceptualise and more willingly embrace opportunities for joint activities.
- c) Other workshops to better engage both sectors in dialogue and share assessment results (as appropriate) are a necessary prerequisite in order to motivate future intersectoral liaison in establishing a national 'One Health' collaborative Roadmap [2].

Table II

Summary of some gaps, activities to be conducted and expected outputs for each of the thematic areas identified during the workshop [2]

Risk communication	Joint investigation	Risk assessment (RA)	Joint surveillance
Gap: Lack of SOPs for efficient crisis communication	Gap: Lack of operational joint SOPs	Gap: Lack of joint framework for RA, lack of knowledge on RA	Gap: Need to strengthen surveillance
Activities: <ul style="list-style-type: none"> – Create an <i>ad hoc</i> working group (WG) – Define policy, guidelines, drafting of standard operating procedures (SOPs) – Co-training + Field test – Finalisation of SOP and guidelines, website – Training programme 	Activities: <ul style="list-style-type: none"> – Conception of guidance: WG, involvement of experts and laboratories – Definition of contingency plan, joint exercise, use and coordination of alert system – Harmonising investigation, report platform, sharing resources, equipment data 	Activities: <ul style="list-style-type: none"> – Conception of the framework: event database, data information, pilot model – Test of the pilot model and update – Training of trainers, selection of experts (committee for RA) – Mechanism and use of RA results for risk management (decision-making), and for communication 	Activities: <ul style="list-style-type: none"> – Meeting to develop guidelines to define a relevant surveillance plan and strengthen knowledge of local officers – Pilot experience in some areas to validate the methodology – Meeting to improve and finalise the guidelines – Diffusion of the guidelines
Expected outputs: <ul style="list-style-type: none"> – A finalised SOP on risk communication – Trained staff to apply this SOP – Plan to define specific SOP for some key diseases 	Expected outputs: <ul style="list-style-type: none"> – A guidance for joint investigation – Integrated contingency plan – Well-designed reporting system 	Expected outputs: <ul style="list-style-type: none"> – A clear and effective framework for risk assessment – Relevant human resources 	Expected outputs: <ul style="list-style-type: none"> – Effective team and good guidelines to define and organise relevant surveillance

Table III shows a matrix of the indicators and 'Core Capacities' or 'Critical Competencies' respectively used in the WHO IHR Monitoring Framework and the OIE PVS Tool which was presented during the national workshop. The matrix allowed visualisation of areas of common interest and an enhanced understanding of where the development of joint approaches could be mutually beneficial for the animal and public health sectors.

4. Some Thai initiatives to tackle main health issues: Together, we can make a difference

The OIE and WHO consider that the joint use and/or refinement of the WHO IHR monitoring tools and the OIE PVS Pathway would result in a detailed assessment of existing strengths and gaps, and a better alignment of capacity-building approaches and strategies at country level between the human and animal health sectors. Some case studies of good practices between the Public Health Services and the Veterinary Services are presented below.

Case study 1: Rabies

In Thailand, a ‘rabies and stray dog control programme’ has been developed over decades and has mobilised a number of ministries around the public health sector and the Veterinary Services, including those in charge of internal affairs, municipalities, wildlife, education, NGOs and religious affairs.

With dogs remaining the major reservoir of the disease, rabies is considered an important zoonotic disease and public health issue in Thailand. Human rabies cases have declined dramatically, from 370 deaths in 1980 (78 per 10 million population) to 5 in 2013 (1 per 10 million population). The number of animal rabies cases in Thailand has also decreased, from 4,263 cases in 1993 to 98 cases in 2013. Dogs were the main reservoir (88.78% of cases), followed by cats (6.12% of cases), and cattle (5.10% of cases). Of those 98 rabies-infected animals, 36.73% had not been vaccinated against rabies, 9.18% had been vaccinated, and for the remaining 54.08% no information on their vaccination status was available [11].

The Department of Livestock Development (DLD), Ministry of Agriculture and Cooperatives, and the Department of Disease Control (DDC), Ministry of Public Health, along with local administrative organisations are the key bodies that have implemented rabies control activities, including the following: immunisation, dog population control, post-exposure treatment in humans, and public awareness campaigns.

Key accomplishments of the rabies control programme include:

- a) development of guidelines for rabies-free areas based on the criteria of the WHO and the OIE;
- b) development of a National Rabies Control Strategy; and
- c) delegation of authority and activities of the rabies control programme to local administrative organisations.

The major constraints on rabies control as identified by Thailand include:

- a) limited vaccination not reaching the country’s set goal of 80% coverage;
- b) inefficient stray dog population management and control;
- c) less participation of certain local administrations;
- d) inefficient law enforcement; and
- e) lack of social responsibility and awareness on the part of the public.

Case study 2: Highly pathogenic avian influenza

The emergence and spread of avian influenza viruses are complex issues. While preparation for pandemic disease is a critically important public health task, understanding risk factors for disease transmission at the animal–human interface may identify opportunities for disease prevention and outbreak containment [11, 12]. Outbreaks of highly pathogenic avian influenza (HPAI) have raised awareness among all countries of the need to undertake planning for incursions by major transboundary animal diseases. These preparedness plans are not always well developed and structured, nor have they always been tested through real events or simulation exercises. A critical factor for developing robust and effective response plans is managing the impact that emergency controls will have on the livestock industry stakeholders. To encourage strong commitment to an emergency response, and to ensure that the necessary trade restrictions are implemented, joint programmes need to be developed and promoted. This process will include identifying factors that may limit industry commitment when problems occur, such as market collapse and the absence of effective, timely and appropriately valued compensation [14].

During the HPAI outbreaks in Thailand, joint teams (Veterinary Services, Public Health Services, and Environment Services, etc.) visited HPAI-affected areas to enhance surveillance capacity and

to conduct a joint investigation of an avian influenza outbreak. Public Health Services and Veterinary Services need to make their regular visits in villages to promote health education and hygiene. They may also be entrusted with delivering animal health messages, particularly to villagers raising poultry and a few other livestock animals.

Case study 3: Food safety

A food safety control system that will ensure the safety of livestock products has become a significant issue in Thailand. This has raised concerns about the food supply chain management of livestock products and how Thailand will prepare for and prevent food safety incidents involving livestock products. Therefore, strengthening 'food supply chain management of livestock products' is vital to ensure a supply of safe foods for all stakeholders in the food supply chain. In this regard, the pilot project entitled 'Institutional Strengthening on Food Safety and Quality in Supply Chain Management of Livestock Products' has been implemented. This project aims to strengthen the institutional mechanism for food safety and quality control in supply chain management of livestock products based on guidance given in the *FAO/WHO Guidelines for Strengthening National Food Control Systems*. This will be done by enhancing the role of the relevant food safety authorities dealing with livestock products for sale on the domestic market to include both domestic production and imports. Their understanding of the requirements of food supply chain management in both normal and emergency situations is needed in order to establish a roadmap to address gaps and overlaps in the food control systems; identify coordination needs between different departments; issue timely alerts and food safety information to the public and the livestock industry; and strengthen the INFOSAN website and coordination mechanism for information sharing. Transparent and accurate information on food safety will be provided in a timely manner to consumers and producers.

The Bureau of Food Safety Extension and Support, Office of Permanent Secretary of the Ministry of Public Health, Thailand, and the Department of Livestock Development, Ministry of Agriculture and Cooperatives and local administrative organisations will take responsibility for coordinating the above activities. The outcome of the project will enhance food safety and quality and promote food chain management of livestock products in both the domestic and international market.

Case study 4: Antimicrobial resistance

Antimicrobial resistance (AMR) is one of the most important public health issues in terms of impact on society. This problem is not only restricted to Thailand but also concerns the entire world and requires action at a local, national and global level. The prevalence of antimicrobial resistance in Thailand has been studied in healthcare and community settings. Data have been collected from the nationwide hospital network at the Department of Medical Sciences, Ministry of Public Health, and from operational research.

Thailand's integrated 'Antimicrobial Resistance (AMR) Strategy' has been developed in collaboration with the Ministry of Public Health, the Department of Livestock Development at the Ministry of Agriculture and Cooperatives, universities, and relevant associations and stakeholders. Although Thailand has measures to contain and prevent AMR, these measures need to be fully integrated and this can only be achieved through cooperation among the various local and global stakeholders, importantly the WHO-led AMR Global Action Plan. For instance, a joint committee on AMR control programme has been established and a strategic framework on AMR control was also jointly drafted between public health and animal health sector. Meetings with relevant stakeholders (i.e. government agencies, academic institutions, livestock producers' associations, pharmaceutical companies, sellers' association, and professionals' associations) have been regularly organised to share and update information in order to progress on AMR control activities. In addition, AMR monitoring and surveillance activities have been conducted by both public health and animal health sectors. Such programmes should be maintained or expanded at national level and adapted into policy for sustainability with system monitoring. AMR cannot be eradicated, but a multidisciplinary approach involving a wide range of partners will limit the risk of AMR and minimise its impact on health, now and in the future. At the same time, we need even stronger international partnerships so that the threat of AMR is fully recognised and understood, with responsibility for reducing it being shared. That is why Thai authorities have been discussing with WHO, the OIE and others what more can be done to tackle the issue and achieve real progress in key areas within the next few years.

5. How to achieve synergy between PVS and IHR Tools for better intersectoral communication, coordination and collaboration between the animal and human health sectors

The global spread of severe acute respiratory syndrome (SARS) highlighted the need to detect and control disease outbreaks at their source, as envisioned by the 2005 revised IHR [15]. In the meantime, the pandemic outbreaks of HPAI of H5N1 subtype have also raised global awareness of the need to strengthen intersectoral communication, coordination and collaboration between the animal and human health sectors [13].

WHO and the OIE are committed to supporting their Member Countries' efforts to strengthen their capacities to comply with both the WHO IHR and the OIE *Codes*. The joint use of the outputs of the WHO IHR Monitoring Framework and the OIE PVS Pathway by Member Countries enables a detailed assessment of the existing national forces, bridges and gaps in human and animal health coordination. This also provides wide ranging benefits for the development of national strategies targeting capacity building in the human and animal health sectors.

Over the few past years, the OIE and WHO have organised national pilot workshops, such as the one held in Thailand in 2014, with national key players in order to assess the preliminary results achieved in real conditions. The OIE, jointly with the WHO and the World Bank, based on the experience of these pilot workshops, has released a guide for national public health authorities and national animal health authorities represented by Veterinary Services outlining methods for strengthening the good governance of health systems worldwide. This publication is entitled *WHO-OIE Operational Framework for Good governance at the human-animal interface: Bridging WHO and OIE tools for the assessment of national capacities* and can be found on the OIE website [23]. Based on the success of these experiences, the two organisations are prepared to expand the implementation of further national workshops worldwide. The following sections will describe the main areas identified as requiring coordination.

Technical areas

The Veterinary Services were originally organised in order to manage major livestock diseases (such as foot and mouth disease and HPAI) and zoonoses (such as tuberculosis and rabies). Their areas of intervention have gradually extended to include the inspection of live animals and carcasses at slaughter, and the processing, storage and distribution of animal products and animal feed, in keeping with an integrated approach to food safety throughout the food chain 'from farm to fork'. In many countries, processing, storage and distribution are entrusted to either the Ministry of Public Health or the Ministry of Consumer Affairs, or are shared between the Veterinary Services and one or other of these ministries [16].

The Ministry of Public Health is, therefore, the first body with which the Veterinary Services are required to collaborate, in such areas as:

- animal diseases and foodborne zoonoses;
- food safety (including veterinary drug residues and environmental pollutants); and
- laboratories and testing capabilities.

Moreover, the broader are the areas of responsibility entrusted to the Veterinary Services, the more numerous are their technical interactions with other relevant authorities (i.e. Food and Drug Administration, Ministry of National Resources and Environment, Department of Fisheries, etc.), for example:

- veterinary drugs and products;
- wildlife, both captive (zoos, circuses, etc.) and free roaming; hunting;
- fisheries, aquaculture; and
- environmental protection.

Organisational areas

Irrespective of the technical areas covered by the Veterinary Services, all their primary activities are activities of the State (design and implementation of regulations; inspection and control; export certification; animal health checks at points of entry, control of contagious disease

outbreaks, etc.) and this leads them to interact with other relevant authorities in the administrative and legal fields. The development of contingency plans against contagious animal diseases threatening a country (such as foot and mouth disease, avian influenza, African swine fever, and Rift Valley fever) typically entails the Veterinary Services working with numerous public authorities and agencies [16].

Human resources

Focusing efforts towards IHR implementation and capacity building and enabling all countries to measure progress toward IHR implementation is essential. A well-trained cadre of public health professionals and veterinary professionals at the national health and veterinary authorities and at a country's central and local levels is needed for timely detection and response to public health and animal health emergencies. Building the cadre of field-trained epidemiologists available to monitor disease trends, inform decision makers about potential disease threats, and guide response during a public health emergency should be one of the first priorities in implementing the IHR [17].

In Thailand, the Field Epidemiology Training Programme (FETP) and Field Epidemiology Training Programme for Veterinarians (FETPV) represent good examples of joint training programmes between the animal and public health sectors. These programmes are supported by the United States Centers for Disease Control and Prevention (US CDC) and the Food and Agriculture Organization of the United Nations (FAO). The objective of these programmes is to ensure adequate numbers of trained personnel to respond to a public health emergency. Specific targets to measure progress toward completion of this objective are laid out in a national workforce plan. In addition, there are provisions for the organisation of at least one joint training or simulation exercise each year between the public health sector and the Veterinary Services. These concrete indicators enable measurement of incremental progress and are specific enough to enable tracking of success and clear documentation of failure.

Surveillance

Disease surveillance is a cornerstone of the Public Health Services and the Veterinary Services. It provides for systematic and ongoing collection of data that help identify and detect disease-related aberrations that might constitute public health emergencies. The joint investigation team (involving the Veterinary Services, the Public Health Services, the Environment Services, etc.) gathered during the HPAI outbreaks in 2004–2007 helped to enhance their surveillance capacities, coordination and collaboration [13]. Additionally, surveillance for key disease syndromes provides the foundation for interpreting signals of possible emergencies and early notification of outbreaks of potentially devastating diseases [18, 19].

The Public Health Services and the Veterinary Services may establish joint criteria and definitions to detect public health and animal health emergencies. For example, criteria for perhaps three to five syndromes in animals and humans could be set and used as a case definition for a joint syndromic surveillance system meeting the relevant international standards [17]. The common syndromes chosen will depend on national disease control priorities for addressing public health and animal health concerns. These surveillance systems should include early warning surveillance data and laboratory findings, which should be analysed by trained epidemiologists.

Laboratory

Laboratory diagnostic capacity can help in detecting emerging or re-emerging pathogens in a timely manner and can support syndromic surveillance systems by adding specificity. Given the costs associated with establishing laboratory diagnostic capacity, diagnostic capability might not be feasible for all pathogens for every country. Therefore, pooling of international laboratory resources through networks of local, national, regional, and international reference laboratories is encouraged. However, countries should be able to provide certain core diagnostic tests (either through their own or through network capacity) quickly and reliably to direct disease surveillance and response activities [17].

Achievement of laboratory diagnostic capacity requires all major components of the laboratory network to be well integrated in the national laboratory system. Components of such a system include sample collection, specimen transport, specimen processing, quality management

systems, biosafety and biosecurity (specimen storage), staff, infrastructure, cold chains, reporting, and networking of peripheral and central or regional reference laboratories. To strengthen their capacities, public health and animal health laboratories should share their expertise and information on emerging diseases, zoonoses and food-borne pathogens.

Response

To implement and strengthen the Public Health Services and Veterinary Services in line with the WHO IHR and the OIE standards, countries must have an adequate rapid response capacity. During public health and animal health emergencies, a timely response to such events and threats is essential to prevent excess illness and death and control further transmission, including transboundary spread. The presence of well-trained and functioning rapid response teams at local and national levels in a country can ensure a rapid, well-coordinated, and organised response. These rapid response teams should comprise a multidisciplinary team of trained public health professionals, veterinarians, epidemiologists, laboratory scientists, clinicians, chemical experts, and radiologic experts as appropriate for the event, who routinely deploy within 24 hours after a reported event. Rapid response teams enhance a country's ability to respond to outbreaks in a timely and effective manner [17]. These teams should undergo regular exercises in responding to public health and animal health emergency events. For instance, a target could be that at least two field outbreak investigations per year should be jointly conducted between the public health sector and the Veterinary Services. Response teams should also be trained in the 10 basic steps for outbreak investigations [20]. Data and after-action reports from outbreak responses collected annually will enable countries to monitor their progress, identify gaps, and improve performance.

6. Discussion and conclusion

This paper highlights the importance of an intersectoral approach for addressing complex multidisciplinary issues associated with global health safety and security (including, emerging infectious diseases, zoonoses, and food safety). The existing approaches and tools, including the WHO IHR Monitoring Framework and the OIE PVS Pathway [21, 22], have been developed to strengthen global health safety and security. Adapting these tools to build bridges and work together using an intersectoral approach should be considered.

The national IHR-PVS Workshop conducted in Thailand confirmed the following issues calling for special attention in order to improve governance and cooperation between the public health sector and the animal health sector at both national and international level:

- A high level of commitment by the national Public Health Authority and the national Veterinary Services to improving the effectiveness and integrity of their systems in establishing joint national priorities for both the public health and animal health sectors is essential. Part of this increased advocacy must come from closer liaison with and support from relevant stakeholders and the private sector.
- The foundations and key references for good governance at the human–animal interface should be explained to draw attention to the relevant national and global regulations and standards setting bodies. The synergies, complementarities and differences between the WHO and OIE processes and tools should be explained to relevant stakeholders.
- Countries need to identify concrete and well-defined goals and indicators to monitor their progress towards implementation of joint technical areas of IHR Core Capacities and PVS Critical Competencies.
- Countries can use the WHO IHR Monitoring Framework and OIE PVS Pathway to undertake a detailed assessment of the existing national strengths and gaps in the human and animal health sectors.
- Identification of gaps and overlaps, coupled with a clear definition of the roles and responsibilities of the different departments and details of existing coordination, will help to strengthen coordination and collaboration and avoid unnecessary misunderstandings and misconceptions between the two sectors.

- Maintenance of the chain of command and coordination mechanism must be clearly identified as a priority factor of good governance that is vital for the effectiveness and efficiency of the Veterinary Services and Public Health Services. The composition of the coordinating committees (steering committee, technical committee, joint committee, advisory body, task force, working group, etc.) should be suitably customised.
- Risk assessment strategies for cross-border controls can be integrated between the public health and animal health sectors to protect and safeguard humans and animals.
- Joint in-service training programmes can be held for both public health and animal health officials from different authorities that are likely to be called upon to work jointly or in a support role, such as during disease controls or joint investigations of food poisoning.
- Written standard operating procedures for coordinated interventions should be developed, regularly updated, tested and validated by the public health and animal health sectors (including relevant stakeholders).
- Public health and animal health sectors could expect to see a general improvement in core good governance activities, including strengthened and enhanced legislation, improved management and reporting systems, enhanced technical independence, and increased use of joint programmes and activities between the sectors.
- Technical independence and transparency of the Veterinary Services and the public health sector are essential in order to ensure public recognition.

Coordination and collaboration between the Veterinary Services, the Public Health Services, and other relevant authorities constitute a key component of good veterinary and public health governance, and are crucial for the effective action and optimal management of human and material resources. A lack of coordination could in fact negatively impact all other efforts. Such is its importance that both the OIE PVS Pathway and the WHO IHR Monitoring Framework include a critical competency on coordination, which is ultimately the key to the success of national and global efforts to protect human and animal health.

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