



## One Health Approach Synergy in Animal Health and Public Health: Thailand Perspectives on Two IHR/PVS Assessments

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### Abstract

Thailand gained experience in assessing the International Health Regulations (IHR) and Performance of Veterinary Services (PVS) through the IHR-PVS national bridging workshops in 2014 and 2022. These workshops employed an interactive methodology, including identification of gaps, scenario analysis, and the development of multisectoral collaboration. Participants from various sectors engaged in discussions, identified gaps in cooperation, and proposed strategies to strengthen coordination. To strengthen Thailand's commitment to the One Health approach, the Thai government has prioritized efforts to enhance the understanding and implementation of this unifying approach among decision-makers, develop comprehensive health governance through the revision of governance structures and establish coordination units, strengthen joint surveillance systems, improve joint investigation procedures, establish a robust risk assessment framework, develop effective risk communication strategies, and engage communities in One Health initiatives. By addressing these areas, Thailand aims to build a more resilient health system capable of preventing, detecting, and responding to zoonotic diseases with a streamlined response to health emergencies.

**Keywords:** One Health approach, International Health Regulations, Performance of Veterinary Services, Thailand

### Introduction

The International Health Regulations (IHR) and the Performance of Veterinary Services (PVS) frameworks, established by the World Health Organization (WHO) and the World Organization for Animal Health (WOAH), respectively, are pivotal in global health security. The IHR primarily addresses human health, while the PVS targets animal health and veterinary services. Despite focusing on different aspects, both frameworks converge on shared objectives—preventing and controlling diseases, ensuring effective surveillance, and responding to public health threats, especially zoonotic diseases. However, the challenge of inter-sectoral coordination at the animal-human interface remains significant, with many countries reporting this as a critical weakness.<sup>1</sup>

The One Health approach, recognized by the American Veterinary Medical Association, promotes a collaborative, multidisciplinary effort across human, animal, and environmental health sectors.<sup>2</sup> This approach is important given that many contemporary infectious diseases, such as rabies, Ebola, avian influenza, severe acute respiratory syndrome (SARS), Middle East respiratory syndrome (MERS), and coronavirus disease 2019 (COVID-19), originate from animal pathogens. The interrelationship between the One Health approach and the IHR-PVS bridging workshop is that they both emphasize the enhancement of global health security<sup>3</sup> by improving the capacity of countries to prevent, detect, and respond to public health threats, particularly diseases associated with pathogens transmitted from animals to humans.

Thailand has organized two IHR-PVS national bridging workshops. The first pilot workshop was held from 26–27 Mar 2014 and the second from 20–22 Jul 2022. The workshops aimed to improve the capacity of Thailand to implement and comply with guidelines issued by both the IHR and PVS, focusing on enhancing the ability to effectively deal with zoonotic disease threats in the country. The concept of multisectoral approaches to public sector governance was adopted to promote good governance and constructive, practical dialogue to strengthen the coordination of operations and enhance effectiveness.<sup>1</sup> Upon completion of the workshops, they were expected to achieve improved alignment and strengthened synergies between the capacity-building approaches and strategies of human and animal health services in Thailand.

## Methods

The IHR-PVS national bridging workshops involved an interactive approach and a process with materials, scenarios, IHR-PVS matrix, and facilitation tools.<sup>4</sup> The workshop was divided into seven sessions that were organized in a step-by-step format from gap identification to the development of multisectoral collaboration to prevent and control zoonotic diseases.<sup>3,5</sup> The process consisted of: (1) defining the outbreak scenarios; (2) examining different case studies, and diagnosing the collaboration for the technical areas; (3) filling the identified gaps on the IHR-PVS matrix, and collecting data from the IHR and PVS tools; (4) extracting and compiling results from previous IHR and joint external evaluation assessments; (5) drafting joint activities and plans; (6) fine-tuning the joint activities and plans; and (7) focusing on the way forward and establishing linkages with other mandated plans.<sup>6</sup>

Representative participants from diverse sectors, including health, agriculture, and environmental management, were engaged in comprehensive discussions of the IHR, PVS, One Health concept, and national perspectives. Participants engaged in the outbreak scenario to better conceptualize and willingly embrace opportunities for joint important technical areas. The outbreak scenarios involving 4–5 diseases in each IHR-PVS bridging workshop. Rationale of the diseases in outbreak scenarios used during the IHR-PVS assessment workshops is shown in Table 1. Participants evaluated the effectiveness of collaboration between the veterinary and public health sectors.<sup>7</sup>

The workshop began with the convenors introducing the IHR-PVS matrix, which is a tool designed to visualize

the interface between human and animal health systems. Working groups were tasked with plotting their technical areas onto the matrix, allowing them to match their identified gaps to relevant indicators and visualize areas of common interest where the sectors could collaborate.<sup>8</sup> Building on the previous assessment, participants reviewed reports from the joint external evaluation and PVS evaluation, and then extracted key findings and recommendations into their particular technical areas and identified priority activities that could enhance future intersectoral collaboration.

## Results

The two national workshops were convened with the primary objective of exploring Thailand's perspectives on the IHR Monitoring Framework and the WOAHPVS Pathway, particularly in the context of enhancing One Health synergy between animal health and public health. These workshops aimed to demonstrate how the outputs and outcomes from both the WHO and WOAHP assessment frameworks can be leveraged to identify gaps and opportunities for improving coordination and collaboration at the animal–human interface.

The group discussions centered on past outbreak scenarios of zoonotic diseases, highlighting variations in collaborative efforts across different disease contexts. Participants noted that well-known diseases such as zoonotic avian influenza, rabies, and COVID-19 demonstrated strong multisectoral collaboration. In contrast, diseases such as salmonellosis and brucellosis (diseases related to food safety) were identified as areas of weaker collaboration, often being relatively neglected. Discussions also emphasized that antimicrobial resistance has seen improved collaboration, largely driven by advancements in policy development and increased awareness.

The IHR-PVS matrix analysis revealed notable progress between the first and second IHR-PVS workshops. In the initial workshop, field investigation, response, and laboratory capacity were rated negatively. However, in the second workshop, a significant improvement was evident, with positive ratings given for these areas and scores above average. Improvements also extended to other areas, including coordination, education, and training. Despite this, systemic gaps persisted in nearly half of the technical areas. Key challenges were identified in finance, human resource capacity, technical-level coordination, surveillance, and legislation, with additional gaps observed in risk assessment and communication.

**Table 1. Rationale of the diseases in outbreak scenarios used during the IHR-PVS assessment workshops**

Disease	1 <sup>st</sup> workshop	2 <sup>nd</sup> workshop	Rationale
<b>Rabies</b>	✓	✓	Rabies is a notable zoonotic disease and ranks as the fourth priority in Thailand. The rabies control program in Thailand demonstrates that intersectoral collaboration can be mobilized to prevent and contain disease spread. This includes mass immunization campaigns, stray dog population control, post-exposure prophylaxis for humans, and public awareness activities.
<b>Avian influenza</b>	✓	✓	Avian influenza ranks as the top priority zoonotic disease for One Health in Thailand due to its potential to cause widespread outbreaks with severe economic and public health implications. Thailand has experienced outbreaks of high pathogenicity avian influenza in the past and demonstrated that multisectoral coordination can be used to conduct surveillance, investigations, and response in affected areas to lessen the effects of the disease. Travel and trade restrictions also demonstrate the economic dimensions of disease management, stakeholder awareness, commitment, and compliance.
<b>Food safety</b>	✓		Thailand has the ability to prevent outbreaks through enhancements to food safety practices via the institutional strengthening of supply chain management. Integration of food safety practices into One Health approaches will allow animal health, food safety, and human health to be included in the prevention and response to disease outbreaks. Improved coordination of stakeholders is also important in Thailand's food safety strategy.
<b>Antimicrobial resistance</b>	✓		Antimicrobial resistance (AMR) is a global challenge, caused by changing dynamics in the prevalence of resistant pathogens associated with the misuse and overuse of antibiotics. Thailand has two national integrated AMR strategies that embraces collaboration between the veterinary sector, public health sector, and environmental agencies around surveillance, education, and policy development to manage and contain AMR.
<b>Salmonellosis</b>		✓	Salmonellosis is a significant foodborne zoonotic disease in Thailand, which is mostly associated with improper handling and consumption of contaminated products. The prevalence of <i>Salmonella</i> in food animals and global trade demonstrates the need for comprehensive surveillance and control measures. Thailand is focusing on food safety practices and hygiene education to minimize the potential for large outbreaks and protect health.
<b>Brucellosis</b>		✓	Thailand's experience with brucellosis serves as the value of joint investigations and intersectoral collaboration for disease control. In humans, brucellosis can result in chronic debilitating symptoms; in animals, it causes reproductive problems such as miscarriages and stillbirths, resulting in substantial economic losses in the livestock sector.
<b>Coronavirus group</b>		✓	Emerging coronaviruses, including SARS, MERS, and COVID-19, are among the most significant zoonotic threats globally to human health. These viruses are demonstrated to result in widespread outbreaks associated with severe social, economic, and political disruptions; all underscore the value of supporting an integrated One Health approach for the prevention and enrichment management of pandemics.

SARS: severe acute respiratory syndrome. MERS: Middle East respiratory syndrome. COVID-19: coronavirus disease 2019.

The first workshop focused on identifying and addressing critical gaps in Thailand's capacity for disease prevention and response. Participants highlighted several technical areas where improvements were needed, such as risk communication, joint surveillance, and emergency preparedness. The second workshop advanced the discussions by concentrating on policy advocacy and One Health governance, with a particular emphasis on community engagement at all administrative levels. Participants discussed strategies for enhancing the governance framework to better support intersectoral collaboration, as well as initiatives for educating and engaging communities to ensure their active participation in health initiatives.

The workshops explored the potential synergies between the PVS Pathway and IHR Monitoring Framework, which could be integrated into a One Health approach to enhance both human and animal health. The outcomes of the workshops highlighted the critical gaps and developed recommendations for strategic interventions to improve Thailand's health systems in the following technical areas.

### **Policy Advocacy**

Enhancing the understanding and implementation of the One Health approach among key decision-makers is needed. The complexity of managing health challenges that intersect human, animal, and environmental health necessitates informing leadership at all levels. To address this, a targeted advocacy program should be developed and presented to executive decision-makers at both national and subnational levels. This program should be designed to deepen their comprehension of One Health principles and their practical applications, fostering a more integrated and collaborative approach to One Health governance.

The advocacy program should focus on the fundamentals of the One Health approach, emphasizing its importance in managing zoonotic diseases, antimicrobial resistance, and emerging infectious diseases. By highlighting current examples and lessons learned from previous health crises, the program aims to illustrate the tangible benefits of intersectoral collaboration. The sessions are tailored to the needs of decision-makers, ensuring that the information is relevant, actionable, and aligned with their responsibilities in shaping health policies and programs.

### **One Health Governance**

The weakness of a comprehensive One Health governance system across all administrative levels emerged as a gap, impeding coordination efforts to address health challenges. To tackle this, a thorough

review and revision of the existing governance structures needs to be undertaken at the central, regional, provincial, and district levels. This process aims to align governance mechanisms with current needs and challenges, ensuring a cohesive approach to health management. By integrating the One Health principles, this initiative seeks to foster stronger intersectoral collaboration, emphasizing the interconnectedness of human, animal, and environmental health in addressing zoonotic diseases and other public health threats.

A key component of this effort was recommended to conduct a functional assessment of the One Health system. The One Health Assessment Tool should be employed to evaluate the status of One Health institutionalization and national operationalization and identify gaps and areas for improvement. The insights derived from this process can inform the development of the further One Health strategic framework and action plan.

One Health Coordination Units should be established within each main sector. These units are tasked with ensuring cohesive and effective implementation of One Health initiatives, fostering collaboration, and streamlining communication across sectors. The establishment of these units will mark a significant step in institutionalizing the One Health approach within the governance structure. Additionally, the initiative led to the creation of a joint network of national experts on priority zoonotic diseases. This network will be designed to facilitate knowledge sharing, enhance collaboration, and strengthen the capacity to respond to zoonotic threats.

The culmination of these efforts was the endorsement of a revised One Health governance framework, which clearly defined the roles and responsibilities of all stakeholders. A memorandum of understanding shall be signed by the Ministries of Public Health, Agriculture and Cooperatives, and Natural Resources and Environment, and other relevant sectors, formalizing the governance system and reinforcing the commitment to a unified approach to health management. The validated and pilot-tested tools for assessing coordination and collaboration further ensure the framework's effectiveness and adaptability to various health contexts.

### **Joint Surveillance**

The need to strengthen the joint surveillance systems became evident, highlighting a gap in the ability to detect and respond to emerging threats at the human-animal interface. A harmonized surveillance protocol on prioritized zoonotic diseases based on potential for causing pandemics should be established. The

surveillance protocol for the joint surveillance plan should emphasize standardized data collection, a case definition for the syndromic surveillance system, and harmonized data sharing to enable timely interventions.

In the case of avian influenza surveillance, data sharing should include influenza-like illnesses and severe acute respiratory infections in humans while incorporating the monitoring of outbreaks and early warning signals in animals, including wildlife. This should include targeted sampling of livestock, testing of migratory birds, and laboratory findings. All shared data should be systematically analyzed by trained epidemiologists to identify trends and initiate timely and effective response measures.

### **Joint Investigation**

The operational standard operating procedures (SOPs) for joint investigations were identified as a gap, potentially compromising coordinated responses during outbreaks. Addressing this issue requires the development of a comprehensive investigation guidance document, led by multidisciplinary investigators. The investigators can bring together epidemiologists from the animal health, public health, and environmental sectors, as well as key laboratory professionals, to ensure a holistic approach. The collaborative effort underscored the importance of the One Health approach, where joint investigations consider the interconnectedness of human, animal, and environmental health.

The guidance document aimed to standardize joint investigation procedures, fostering a seamless and efficient response to health emergencies. The working group recommended developing a joint contingency plan, incorporating coordination exercises to simulate current outbreak scenarios. These exercises not only test the readiness of the plan but also reinforce intersectoral collaboration. This will be accomplished by harmonizing a reporting platform that facilitates information sharing between the public health and animal health domains.

### **Risk Assessment**

The joint framework for risk assessment and limited knowledge of risk assessment processes posed significant challenges to effective One Health management. Recognizing these gaps, a concerted effort was undertaken to develop a comprehensive risk assessment framework. The Joint Risk Assessment and Strategic Tool for Assessing Risks were recommended to evaluate and prioritize risks associated with zoonotic diseases based on their likelihood and potential impact. These risk assessments aimed to bridge the divides between

animal health, public health, and environmental health to identify and mitigate health risks. The insights gained from these assessments provided evidence-based guidance for decision-making, helping to allocate resources effectively, develop policies, and enhance preparedness planning.

To support the framework's implementation, a train-the-trainer program should be launched, equipping a pool of trainers with the necessary skills to disseminate knowledge and build capacity across sectors. These trainers, alongside selected experts, can form a dedicated committee responsible for overseeing and guiding the risk assessment process. Another element of the initiative was the establishment of a mechanism to incorporate risk assessment results into risk management decision-making and communication. By doing so, the framework not only facilitates the identification of risks but also ensures that the findings are effectively used to inform policy and operational decisions. This mechanism enhanced the ability of health authorities to respond proactively to emerging threats, thereby improving overall health system resilience.

### **Risk Communication**

The identification of gaps in risk communication, particularly the absence of SOPs, has underscored a weakness in crisis management. To address this, a focused effort should be initiated to develop comprehensive SOPs for efficient crisis communication, emphasizing the One Health approach. Recognizing the interconnectedness of animal health, human health, and environmental health, the initiative seeks to ensure that communication during health crises is streamlined across all sectors. An ad hoc working group comprising experts from animal health, public health, and environmental sectors should be formed to lead the SOP development process. This multisectoral team aims to integrate perspectives from all relevant fields, ensuring that the SOPs would be robust and applicable across different health emergencies.

The development process will begin with the formulation of policies and guidelines, laying a foundation for drafting the SOPs. These guidelines will be designed to promote synergy between the animal and public health sectors, reflecting the One Health approach. A series of co-training sessions and field tests will be conducted to validate the practicality and effectiveness of the SOPs. These exercises not only test the protocols but also facilitate collaboration and mutual understanding among professionals from various sectors. The field tests will simulate the current scenarios, ensuring that the SOPs can be effectively implemented in diverse crises.

## Community Engagements

Strengthening One Health communication at the local level was identified as a gap, particularly in engaging communities to effectively manage zoonotic diseases. Recognizing the vital role of community engagement in achieving sustainable health outcomes, a coordinated approach should be developed to involve village volunteers in enhancing risk communication, surveillance, and response efforts. This initiative begins with the creation and signing of a memorandum of understanding between key sectors, including health, livestock, and environmental agencies. This will establish a formal framework for collaboration, emphasizing the importance of mobilizing community members as active participants in the One Health initiative, thereby fostering a sense of ownership and responsibility among local populations.

The development of a comprehensive training curriculum should be designed to harmonize risk communication, surveillance, and response efforts, with a strong focus on community engagement. This curriculum aimed not only to equip volunteers with the technical knowledge and skills needed to address zoonotic diseases and emerging infectious diseases but also to empower them as community leaders capable of fostering trust and cooperation among their peers. By integrating community engagement principles, the training ensures that volunteers can effectively communicate risks and mobilize community action, enhancing the overall impact of the One Health approach at the grassroots level.

A series of “training of trainers” programs should be conducted at regional levels, targeting personnel from disease prevention and control, livestock, and protected areas agencies. These programs should be followed by comprehensive training programs for village volunteers across selected provinces and high-priority districts. The volunteers, drawn from local communities, will be trained to implement coordinated risk communication strategies, conduct surveillance, and respond to outbreaks. This grassroots-level involvement ensures that the One Health approach is deeply embedded within local communities, promoting sustainable health practices.

The effectiveness of the trained volunteers should be closely monitored and evaluated to assess their impact on surveillance and communication efforts. This evaluation process can provide valuable insights into the strengths and areas for improvement within the volunteer network. The feedback will inform further refinements to the training curriculum, ensuring that it remains relevant and effective in addressing local health challenges. The finalized curriculum was

subsequently endorsed and implemented as a core component of the One Health strategy at the community level.

The findings from the National Bridging Workshops in Vietnam, Indonesia, and Bhutan revealed common themes and challenges. Similar to Thailand, these countries emphasized the need for strengthening intersectoral collaboration, surveillance systems, and joint responses to zoonotic disease outbreaks. Vietnam’s workshop participants highlighted gaps in inter-ministerial collaboration and the need for a mid-term review of its One Health framework, aligning with Thailand’s findings on systemic gaps in coordination. Indonesia’s delegates prioritized the development of legal frameworks and a harmonized surveillance system.<sup>9</sup> Bhutan focused on district-level coordination and capacity building for joint outbreak responses, corresponding to Thailand’s need for enhanced multisectoral collaboration and workforce development.<sup>10</sup> However, areas like Vietnam’s specific emphasis on environmental collaboration and Indonesia’s advanced implementation of One Health curricula mark unique divergences from Thailand’s context.<sup>11</sup>

## Discussion

The One Health approach, which integrates human, animal, and environmental health, has gained large acceptance globally as a framework for managing complex health issues, especially zoonotic diseases. The approach is also used for combating newly recognized and re-emerging diseases of animal origin and contributions toward pandemic preparedness based on enhanced collaboration between veterinary, human health, and environmental services.<sup>12</sup> The IHR-PVS National Bridging Workshops conducted in Thailand have been instrumental in identifying gaps and developing strategies to strengthen of synergy between the animal health, human health and environmental sectors. These efforts align with global trends emphasizing the need for coordinated responses to health threats at the human-animal-environment interface.<sup>4</sup>

Policy advocacy emerged as a crucial component. The workshops proposed advocacy programs targeting key decision-makers at national and subnational levels. The success of One Health implementation depends on joint planning, development of policies, and program implementation in a multidisciplinary and multi-institutional framework.<sup>13</sup> Strengthening One Health governance across various administrative levels is also important for preventing and reducing potential zoonotic diseases. The review and revision of governance structures, combined with the development of a strategic framework and the establishment of One Health coordination units, are

essential elements towards institutionalizing the One Health approach in Thailand. The One Health approach requires high-level commitments and advocacy from all sectors to build capacity and enhance the integrity and effectiveness of the One Health implementation. It also requires a clear definition of roles and responsibilities of the different sectors and details of existing coordination, which will help to strengthen coordination and collaboration and avoid unnecessary misunderstandings and misconceptions between the sectors.<sup>8</sup>

Enhancing joint surveillance is another issue that participants of the workshop discussed. Initiatives such as developing One Health guidelines, for example, for avian influenza surveillance, coupled with training programs for local officers, aimed to improve early detection and response to health threats. This system involves a multi-step process, including identifying triggering events, collecting samples from affected areas, conducting laboratory analysis, interpreting data, and coordinating response activities.<sup>14</sup> The robust surveillance framework has significantly enhanced intersectoral collaboration and data sharing, crucial for effectively managing zoonotic diseases. The development of operational SOPs for joint investigations has bridged critical gaps, ensuring rapid communication and coordination across all relevant sectors during outbreak responses, particularly in emergencies where resource sharing is essential.<sup>15</sup> The outcomes, including a detailed guidance document and a harmonized reporting system, have substantially strengthened Thailand's capacity to manage outbreaks.

Community engagement was also prioritized, with initiatives to involve village volunteers in risk communication and surveillance efforts. One important example of village health volunteers is to serve as an early warning active surveillance mechanism for any unusual poultry illnesses or deaths and influenza-like illnesses in the community.<sup>16</sup> These programs emphasize training local volunteers, equipping them with technical knowledge, and fostering community leadership. They empower local populations by involving them in surveillance, risk communication, and response efforts, thereby enhancing early detection and control of disease outbreaks. Furthermore, community participation ensures that health interventions are culturally appropriate and more likely to be accepted and sustained. Strengthening community engagement also builds local capacity and resilience, creating a robust network of informed individuals who can act promptly during health crises.

The perspectives from the IHR-PVS assessment in Thailand are consistent with global experiences in implementing the One Health approach. These activities are expected to enhance Thailand's preparedness for zoonotic diseases and contribute to supporting the development of a joint roadmap of corrective measures and strategic investments.<sup>4</sup> Moreover, a joint roadmap will also be included in the One Health Strategies and the National Action Plan for Health Security, which are the national action plans to ensure national capacities in health emergencies to achieve national, regional, and global efforts to strengthen health security and keep the world safe.

### **Limitations**

This review paper is limited by its reliance on workshop discussion without audio recordings, which may have led to potential omissions or subjective interpretations of key points. Additionally, the findings are context-specific to Thailand and may not be fully generalizable to other settings with different health systems and governance structures.

### **Conclusion**

The two national workshops on IHR and PVS provided a platform for Thailand to identify critical gaps in its One Health capacity and develop strategies to address them. Key findings highlighted the need for enhanced intersectoral collaboration, strengthened surveillance systems, improved risk communication, and effective community engagement. Policy recommendations from this review emphasize improving the understanding and implementation of the One Health approach among key multisectoral decision-makers. Strengthening collaboration and resource allocation in technical areas such as joint surveillance, investigation, and risk assessment will streamline responses to health emergencies. Furthermore, fostering sustained capacity-building efforts, including workforce development and enhanced risk communication, is essential for improving One Health integration and preparedness for zoonotic disease outbreaks. Ultimately, these efforts will enhance the country's resilience to health threats and promote sustainable health outcomes for both humans and animals.

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### **Conflicts of Interests**

No conflicts of interest are associated with the material presented in this paper.

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