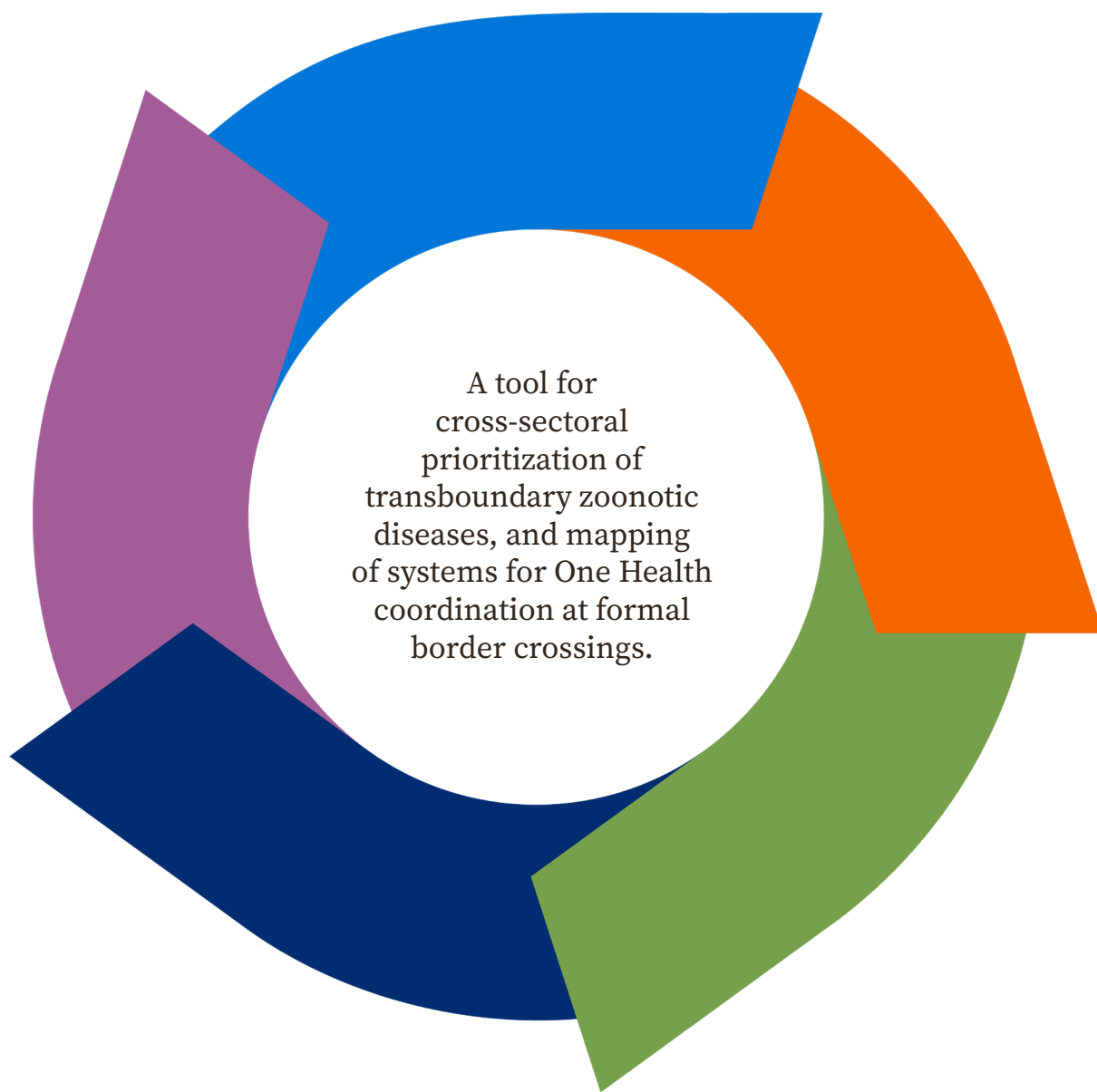




ONE HEALTH TRANSBOUNDARY ASSESSMENT FOR PRIORITY ZOOONOSES



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ONE HEALTH TRANSBOUNDARY ASSESSMENT FOR PRIORITY ZOOONOSES

A tool for cross-sectoral
prioritization of
transboundary zoonotic
diseases, and mapping of
systems for One Health
coordination at formal
border crossings.

1st Edition, October 2025

CONTENTS

1	Preface
2	Overview
4	Introduction
5	Relevant International Frameworks, Programs, and Collaborations
5	The International Health Regulation (2005)
5	The World Organisation for Animal Health Terrestrial Animal Code
6	Food and Agriculture Organization of the United Nations Emergency Centre for Transboundary Animal Disease
6	FAO-WOAH-WHO-UNEP Quadripartite Collaboration
7	One Health Transboundary Assessment for Priority Zoonoses (OHTAPZ)
7	Objective
7	Process
8	Phase 1. Prioritization
11	Phase 2. Transboundary Systems Mapping
14	Phase 3. SWOT Analysis
16	Phase 4. One Health PoE Checklist
19	Phase 5. Simulation Exercise and After-Action Review
25	Expected Outcomes
30	References
34	Appendices

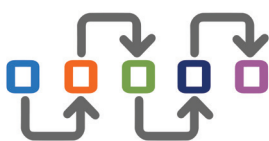
PREFACE

Modern global health initiatives have adopted a One Health approach to assessing and building capacities for the prevention, detection, response and recovery to emerging infectious diseases, a majority of which are zoonotic in nature. The goal is the integration of systems for communication and coordination between human, animal and environmental health sectors. Zoonotic disease threats however are complex, often multifactorial, and often result in transboundary spread requiring coordination at and between Points of Entry (PoEs). Therefore, robust and progressive One Health prevention, mitigation and response strategies require concerted efforts that identify related networks and outline operational interdependencies between traditional and nontraditional One Health sectors.

Over the last decade, our team—in collaboration with various academic and ministerial partners—has developed, validated, and refined the One Health Systems Assessment for Priority Zoonoses (OHSAPZ).¹ The objective of this tool is to facilitate the systematic assessment of the structures in place for One Health coordination with respect to preventing, detecting, and responding to zoonotic diseases. Through a three-phase process, the tool supports the development of a list of priority zoonotic diseases; uses these identified priority diseases as case studies to examine the structures and mechanisms for communication and coordination between and within sectors, at all levels of the health system; and provides a framework for analyzing collected data to help identify gaps and develop recommendations for action. The need for consideration of zoonotic disease threats between borders and across regions led to further adaptation of OHSAPZ, in this case to assess, map and analyze transboundary zoonotic disease (TZD) threats, with a particular focus on PoEs. The One Health Transboundary Assessment for Priority Zoonoses (OHTAPZ) tool uses a phased approach to bring together multisectoral stakeholders, create a consensus list of priority TZDs, identify existing processes for communication and coordination across and between sectors and levels, analyze strengths and weaknesses of existing operations, and recommend actions to address gaps in coordination from the local, subnational, national, and transboundary levels. OHTAPZ adds to the toolkit of modular, flexible, and easily adaptable approaches to One Health systems assessments that can support national, bilateral/regional capacity strengthening, regional epidemic preparedness, and compliance with international frameworks.

OVERVIEW

The global biological threat landscape has grown increasingly complex, combining concerns of recurring zoonotic threats alongside emerging and reemerging threats in existing and novel locales. The evolution and expansion of such threats requires equally adaptable prevention and response frameworks to effectively combat hazards in a manner that both minimizes damage and ensures the future protection of human, animal, and environmental health alike. This One Health approach requires integration beyond the traditional sectors, incorporating additional partners to create a truly multidisciplinary approach that mirrors the multifactorial nature of zoonotic threats. Among these is border and customs or analogous PoE bodies that serve as the first line of defense in recognizing and mitigating TZDs. PoEs are important for detecting and responding to TZD security threats due to routine migration, travel, and trade, as well as the un- or poorly regulated exchange of people, livestock, and goods.²⁻⁵ As the oft used adage in the health security field denotes, “outbreaks do not respect borders;” thus, customs, immigration, and various border health stakeholders are often the first line of defense for national health and agriculture systems and should be properly positioned and prepared to confront TZDs.⁶ There is a defined need for comprehensive, adaptable frameworks for assessing transboundary zoonotic threats that incorporate the myriad of applicable sectors and agencies which also consider the varied capabilities and resources of those entities in a dynamic environment.



The OHTAPZ methodology is a phased approach to engage human, veterinary, environmental health and relevant border security sectors in the development of a consensus priority zoonotic disease list. The OHTAPZ methodology is designed to operate independently of the OHSAPZ methodology. However, it can also be used following OHSAPZ or another national disease prioritization tool as further engagement.



The methodology uses an interactive tabletop exercise (TTX) to examine the structures and mechanisms for communication and coordination between and within governmental sectors at shared formal PoE(s). The discussions are used in the creation of disease-agnostic systems map schematic; and provides a

framework for analyzing strengths and weaknesses of existing intersectoral coordination in order to help identify gaps and develop targeted recommendations to strengthen One Health capacity and coordination at PoEs.



The overall goal of the assessment tool is to help identify priorities and gaps that limit information-sharing action through an examination of coordination and communications from index case to notification at the cross-border, national and international levels, focusing on TZDs viewed as a priority by all involved sectors and countries.

INTRODUCTION

TZDs, by their nature, can have serious socioeconomic and public health consequences, thus preparing for and responding to them requires multisectoral coordination. One Health is increasingly recognized as an important approach for health systems, particularly with respect to strengthening prevention, detection, and response to zoonotic and other emerging disease threats. Collaboration and coordination systems should adapt current One Health approaches to involve nontraditional health stakeholders' expertise, systems, and resources at local, provincial, and national levels.⁷⁻⁹

When building capacity around TZDs, national and international actors can use a variety of disease prioritization and assessment tools to guide outbreak preparedness and response.^{8,10-13} However, most tools do not adequately map capacities needed for transboundary multisectoral coordination, nor do they involve the full scope of One Health sectors.^{12,14,15} One Health-focused international guidance often does not include recommendations for identifying priority TZDs and assessing communication and coordination between relevant One Health security sectors.¹⁶⁻¹⁸ Tools such as the OHSAPZ and OHTAPZ fill this gap. Additionally, there are international programs and collaborations that recognize the socio-economic and health impacts of transboundary diseases as well as the importance of multisectoral engagement within the One Health approach.

RELEVANT INTERNATIONAL FRAMEWORKS, PROGRAMS, AND COLLABORATIONS

THE INTERNATIONAL HEALTH REGULATIONS (2005)

The IHR (2005),¹⁹ which entered into force in 2007, focus on strengthening capabilities to confront all potential “public health emergencies of international concern” when and where they occur, building networks that can prevent local public health crises from becoming international catastrophes. States Parties committed to developing core capacities to detect, assess, report, and respond to any public health event that might cross borders, whether of natural, accidental, or deliberate origin. Annex 1 of the IHR (2005) defines the core public health capacities that must be developed to achieve compliance: national legislation and policies, coordination, surveillance, response, preparedness, risk communications, human resources, and laboratories, as well as efforts to address additional hazards, including zoonotic diseases, foodborne disease, chemical safety and radiological safety. Importantly, the IHR also specify measures that must be established at designated PoEs, explicitly recognizing the importance of transboundary spread as a key criterion in determining the risk of a public health emergency of international concern. In 2024 at the Seventy-Seventh World Health Assembly, States Parties agreed on a package of critical amendments to the IHR, building on lessons learned from several global health emergencies, including the COVID-19 pandemic. These amendments include introducing a pandemic emergency definition, committing to solidarity and equity, establishing a States Parties Committee to facilitate effective implementation of the amended Regulations, and creating National IHR authorities.²⁰ States Parties Assessment of IHR (2005) compliance is achieved through the Monitoring and Evaluation Framework (MEF),²¹ which consists of mandatory annual self-assessment reporting via the State Party Self- Assessment Annual Reporting (SPAR) tool, voluntary external assessment every four to five years via the Joint External Evaluation (JEE) process, and the requirement to conduct at least one After-Action Review (AAR) of a naturally occurring event or Simulation Exercise (SimEx).

THE WORLD ORGANISATION FOR ANIMAL HEALTH TERRESTRIAL ANIMAL HEALTH CODE

The World Organisation for Animal Health (WOAH, founded as OIE) is an intergovernmental organization aimed at improving animal health and fighting animal diseases. The WOAH Terrestrial Animal Health Code (the Terrestrial Code) sets standards for improvement of animal health and veterinary health, including regulations relevant for international trade of animals and their products.²² Similarly, the WOAH Aquatic Animal Health Code (the Aquatic Code) sets standards for the improvement of aquatic animal health worldwide, including provisions for the welfare of farmed fish and use of antimicrobial agents in aquatic animals.²² Both codes play a critical role in facilitating safe international trade by outlining requirements that countries can use to demonstrate the health status of their animals and products. By adhering to these standards, nations can minimize the risk of importing or exporting transboundary diseases. In addition to publishing the Terrestrial and Aquatic Code, another major point of focus for WOAH is on the development of sustainable and quality veterinary services in its 183-member countries²³ through the Performance of Veterinary Services Pathway “PVS Pathway.”²⁴ Two of the four stages of the PVS Pathway include conducting:

1. A PVS Evaluation using the “Tool for the Evaluation of Performance of Veterinary Services: Terrestrial”, which is a qualitative diagnosis on compliance with quality standards and includes 45 critical competencies.²⁵
2. A PVS Gap Analysis that includes strategic priorities and capacity building.

Focused on the human-animal interface, the IHR-PVS National Bridging Workshop (NBW), facilitated by WHO and WOAH, gathers human and animal health stakeholders to jointly identify actions that support multisectoral collaboration while also advancing

sector-specific evaluation goals identified through the IHR-MEF, specifically the JEE or SPAR, and WOAHPVS Pathway. During seven sessions that take place over three days, the end result of the IHR-PVS NBW process is the creation of a realistic, concrete and practical joint road map for sectors to implement to improve the nation's prevention, detection and response efforts to zoonotic diseases and other health events such as food safety, food security and antimicrobial resistance.²⁶

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS EMERGENCY CENTRE FOR TRANSBOUNDARY ANIMAL DISEASES

Recognizing the socio-economic and health impacts of Transboundary Animal Diseases (TADs), the Food and Agriculture Organization of the United Nations (FAO) established the Emergency Centre for Transboundary Animal Diseases (ECTAD) in 2004.^{27,28} With a One Health approach embedded into its initiative, ECTAD plans and delivers FAO animal health emergency and development programmes to forecast, prevent, prepare for, detect and respond to the emergence, spread and persistence of animal disease threats, including antimicrobial resistance and with an explicit focus on transboundary threats, in more than 45 Member Nations.²⁹

FAO-WOAH-WHO-UNEP QUADRIPARTITE COLLABORATION

In 2010, recognizing the importance of multisectoral engagement within the One Health approach, FAO, WOAH, and WHO formalized their collaboration in the FAO-WOAH-WHO Tripartite, releasing A Tripartite Concept Note.³⁰ Additional strategic documents were released in 2017 and 2019; the first expanded the scope of the Tripartite collaboration to include strengthening of health services, early warning and surveillance,

food safety, neglected tropical diseases, and research and development. The 2019 guide entitled, "Taking a Multisectoral, One Health Approach: A Tripartite Guide to Addressing Zoonotic Diseases in Countries (TZG)"³¹ expands the 2010 Concept Note to include prevention, preparedness, detection and response to zoonotic diseases with examples of best practices and country experiences. The TZG provides a suite of operational tools to assess and strengthen capacities. One of these tools, the Surveillance and Information Sharing Operational Tool (SIS OT), was developed to support countries in creating, strengthening or sustaining coordinated, multisectoral surveillance and information sharing for zoonotic diseases.

In 2021, the Tripartite organizations called on the United Nations Environment Programme (UNEP) to join this collaborative effort, acknowledging the importance of the environmental dimension in a One Health approach. The four organizations signed a memorandum of understanding (MoU)³² in 2022 to reflect a change from the Tripartite to a new Quadripartite partnership, with UNEP as an equal partner. Together, the Quadripartite created the One Health Joint Plan of Action (2022–2026)³³ (OH JPA), using previously developed strategic documents, MoUs, recommendations, and resolutions, to (1) Guide these organizations in working together on One Health efforts, and (2) Support each organization's respective Members, Member States, and State Parties build their One Health capacities. The OH JPA aims to supplement existing global and regional One Health initiatives that address multidimensional health risks with resilient health systems. It considers regional and national contexts, priorities, and capacities for implementing One Health policies, strategies, and interventions. While not a binding policy document, the OH JPA provides a framework and proposes activities for nations to advance and sustainably scale-up One Health.

ONE HEALTH TRANSBOUNDARY ASSESSMENT FOR PRIORITY ZOOSES (OHTAPZ)



OBJECTIVE

The objective of this tool is to facilitate the systematic assessment of the structures in place for One Health coordination at the *transboundary level* with respect to preventing, detecting, and responding to TZDs at formal border crossings. OHTAPZ defines TZDs as highly contagious or transmissible, epidemic zoonotic diseases with the potential to spread rapidly across borders, and the potential to cause substantial socioeconomic and public health consequences. This tool has a total of five phases. From Phase 1 through 3, the tool supports the development of a list of priority TZDs; uses these identified priority diseases as the basis for an interactive TTX to examine the structures and mechanisms for communication and coordination between sectors at a designated formal border crossing; and provides a framework for analyzing collected data to help identify strengths, weaknesses, opportunities for improvement, and future potential threats. The tool then outlines further assessments that can be conducted in Phases 4 and 5 to understand the One Health competencies at formal PoEs and specifically for land border crossings and airports; use these competencies as the basis for developing and implementing a SimEx at a designated formal border crossing; and provide guidance on conducting an AAR.

PROCESS

The tool consists of a five-phase process of prioritization; transboundary systems mapping; strengths, weaknesses, opportunities, and threats (SWOT) analysis; One Health PoE Checklist; and SimEx and AAR, outlined below in Figure 1. Each phase has accompanying steps to consider and address before proceeding to the next phase. While this tool has been developed in collaboration with several stakeholders in low- and middle-income countries, it is amenable to adaptation for a variety of partner perspectives including considerations for the impacts of climate change and in times of insecurity and/or conflict.

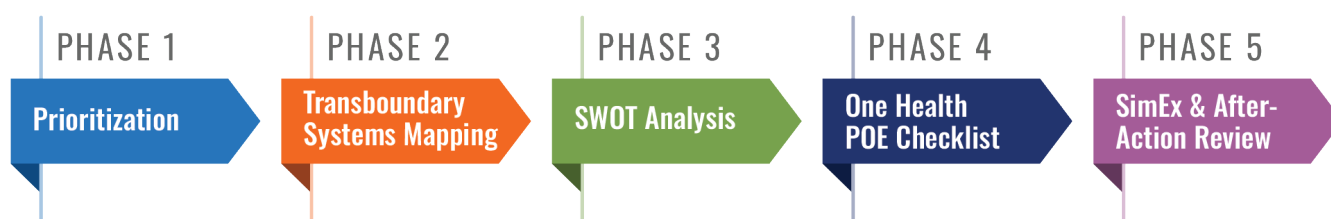


Figure 1. The OHTAPZ five-phase process

PHASE 1. PRIORITIZATION

The first step towards prioritization consists of identifying all relevant stakeholders from public health, agriculture/veterinary, environmental health and wildlife (where applicable), as well as border security, customs and immigration to socialize the effort and confirm their support and active engagement. Secondly, a literature review must be conducted to identify information on the distribution, prevalence, and burden of TZDs in the country pairing (or region, if the approach is a regional or island-based approach) before reviewing and agreeing to priority transboundary zoonoses. While this guidance document outlines sequential steps of identifying OHTAPZ focal points, mapping stakeholders and conducting a literature review it is recognized that the order of Step 1 and 2 may depend on the user's familiarity with the country pairs/regional context and can be adapted accordingly.

PHASE 1

Prioritization

Objective: Prioritize TZDs by engaging relevant stakeholders and conducting a literature review to assess their prevalence and impact

- STEP 1** Selecting Stakeholders
- STEP 2** Conducting a Literature Review
- STEP 3** Select Criteria for TZDs Prioritization
- STEP 4** Selecting Priority TZDs

Figure 2. Overview of steps for Phase 1 (Prioritization)

STEP 1. SELECTING STAKEHOLDERS

Achieving political support for disease prioritization and subsequent systems assessments, analysis and exercises is fundamental to the overall OHTAPZ process. Without such support, the outcomes of the process are unlikely to be widely accepted and will be of limited functional utility. The primary governmental sectors whose support will be required for Phase 1, Step 1 will also be integral to each subsequent Phase of this methodology. They include the ministry in charge of public health (usually the Ministry of Health), the ministry with oversight for veterinary, livestock and wildlife health (usually the Ministry of Agriculture or Livestock Development) and the ministry responsible for environmental health (water, soil, climate), management and protection (usually the Ministry of Environment), the ministry responsible for border control, customs and immigration (usually the Ministry of Interior, Internal Affairs, or Defense). In addition, the ministry responsible for national defense and border security (usually the Ministry of Interior and/or the armed forces directly) will be required to review, approve and possibly evaluate the SimEx at the designated formal border crossing.

Support from these stakeholders should be achieved at a sufficiently high level to guarantee acceptance of the outcomes across the sectors involved, and to ensure the engagement and participation of all relevant agencies and departments under each ministry's purview. It is extremely important to ensure all relevant stakeholders are at the table for this first step of Phase 1 because different sectors may approach disease prioritization from diverse and even competing perspectives.

The primary governmental sectors should serve as the OHTAPZ focal points to identify and invite participation from non-governmental stakeholders, with the view of ensuring national ownership of the disease prioritization, and subsequent processes (Figure 3). These competing priorities can complicate the consensus-building process but are important for stakeholders to consider and discuss. A template to facilitate the selection of stakeholders is available as **Appendix A**.

ONE HEALTH TRANSBOUNDARY ASSESSMENT FOR PRIORITY ZOOSES (OHTAPZ)

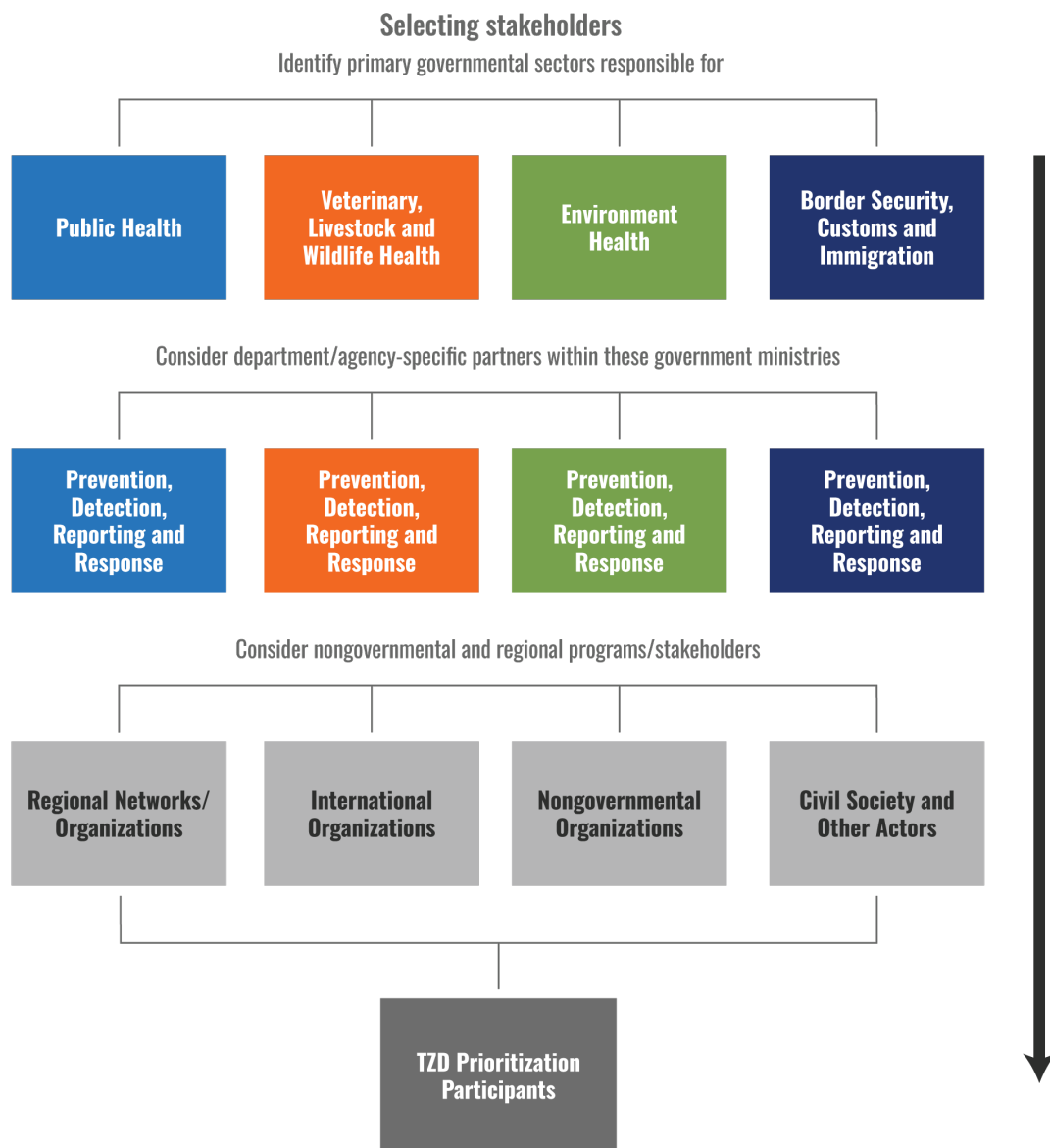


Figure 3. Flowchart for identifying stakeholders and selecting disease prioritization participants

STEP 2. CONDUCTING A LITERATURE REVIEW

Disease prioritization should begin with a literature review, to ensure that data on all potentially relevant TZDs are available at the start of the prioritization process. Each country will have its own information resources and databases, as well as methodologies for literature reviews; the aim is to use the literature review process to identify information on the distribution, prevalence, and burden of TZDs in the country and region as well as begin to identify key stakeholders. A

template to facilitate data collection and analysis for the literature review is available as **Appendix B**.

Identifying ministerial focal points or designating a committee that can organize efforts on the literature review can be a helpful mechanism to ensure all national and regional databases are considered. A variety of resources can be referenced including, but not limited to: ministerial weekly or monthly

epidemiological bulletins from all relevant sectors; World Animal Health Information System (WAHIS) Database Interface;³⁴ BEACON;³⁵ ProMED;³⁶ WHO's Disease Outbreak News (DONs);³⁷ open source informal surveillance programs; partner institutions who are members of the Global Outbreak Alert and Response Network (GOARN);³⁸ AFRO;³⁹ EURO;⁴⁰ PAHO;⁴¹ SEAR;⁴² WPRO;⁴³ peer-reviewed published literature; regional surveillance and laboratory disease network reports, etc.

STEP 3. SELECTION CRITERIA FOR TRANSBOUNDARY DISEASE PRIORITIZATION

Once stakeholders have been identified and individuals selected for the disease prioritization process, it is important to collectively determine the key selection criteria for assigning priority to the list of transboundary diseases. This step is not disease specific; it instead involves discussion and review on the level of importance for each criterium when selecting priority TZDs. Stakeholders may want to review and consider transboundary zoonoses of national and/or regional importance while others may feel it is important to consider global threats that have the potential for spread to their region based on changing climate, vector distribution, human migration and other factors. In addition, there may be diseases that are of particular concern at the regional level, and which are the focus of control efforts from regional networks, international organizations, and other non-governmental or civil society actors. A number of qualifying criteria can be considered, and/or added, for each country depending on priorities across the relevant stakeholders. Table 1 is not exhaustive but includes some of the key considerations; it is however important that stakeholders review and determine collectively the key criteria that will be used to assess and select the top five priority transboundary diseases to be included in the mapping process. Indeed, ministries may consider different qualifying criteria to be essential, which are important subjective distinctions to bring to the overall prioritization discussion. A template to facilitate determining key selection criteria is available as **Appendix C**.

Table 1. List of qualifying criteria when considering the selection of priority TZDs.

QUALIFYING CRITERIA
Present or endemic in country or region (known history of transboundary spread)
Outbreak potential in country or region
Emerging potential in country or region
Potential for endemic or pandemic in humans or animals
Pathogen of international concern – reportable to WHO
Pathogen of international concern – reportable to WOA (formerly OIE)
Large disease burden in humans/public health consequences (morbidity and/or mortality)
Large disease burden in livestock or domestic animals/veterinary health consequences (morbidity and/or mortality)
Large disease burden in wildlife (morbidity and/or mortality)
Listed on WOA or FAO Transboundary Animal Disease list
Regional priority disease
Available control strategies and/or programs
Available laboratory diagnostics (central and subnational level)
Existing mechanisms for multisectoral stakeholder communication and coordination
Existing mechanisms for cross-border stakeholder communication and coordination
Available and accessible treatments (vaccines and/or other countermeasures)
Economic, environmental, or social impact
Bioterrorism potential
Large impact on imports and/or exports
Accelerated by human and/or animal movement (legal and/or illegal)
Listed on national notifiable disease list (any ministry)

STEP 4. SELECTING PRIORITY TRANSBOUNDARY DISEASES

The final consensus priority TZD list (whether it be bilateral or regionally based) is based on agreement among all stakeholders from participating countries, via a facilitated discussion by OHTAPZ focal points. Note: If a country pair (or regional partner) has not yet conducted a national prioritization, they can refer to Phase 1, Step 3 of OHSAPZ to select national priority zoonoses. It is recommended that countries first develop a national list of TZDs and bring their respective lists to build consensus in developing a joint priority TZD list. It is important that each sector has an opportunity to present their proposed priority TZDs for consideration so a consensus can be reached. While the current tools do not specify a defined list of priority pathogens,^{44,45} it is recommended that countries identify and prioritize at least five zoonotic diseases. However, reaching consensus on the diseases to include in the list is more important than ensuring a list of exactly five diseases, and a list of four or six pathogens is also acceptable for the purposes of transboundary systems mapping and analysis. Country pairs can also consider the inclusion of disease families instead of specific pathogens to consider a wider array of diseases while recognizing that systems for communication and coordination remain consistent within some overarching categories of TZDs. A template to facilitate the selection of priority TZDs is available as **Appendix D**.

PHASE 2. TRANSBOUNDARY SYSTEMS MAPPING

The systems mapping phase involves applying the priority TZDs identified in Phase 1, to “map” existing processes for information sharing and coordination within and between sectors at formal PoEs. This approach allows for a robust and detailed evaluation of the processes supporting TZD management and creates disease schematics that allow visualization of existing capacities.

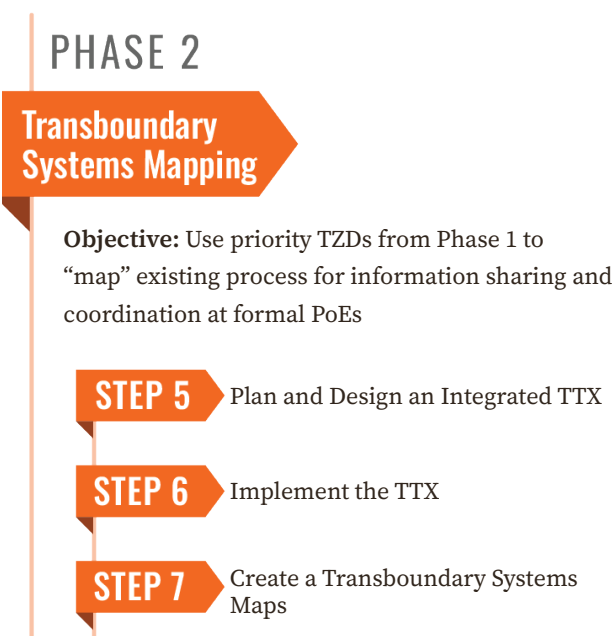


Figure 4. Overview of steps for Phase 2 (Transboundary Systems Mapping)

STEP 5. PLANNING AND DESIGNING AN INTEGRATED TABLE-TOP EXERCISE

The priority transboundary diseases identified in Phase 1 will be used in the development of an integrated TTX to identify the nodes of communication and coordination within and among sectors at a shared formal PoE and to gather data on the current systems for TZD prevention, detection, reporting and response. The first step in this process is to develop a TTX utilizing one or more of the bilateral priority TZDs. The TTX should be

ONE HEALTH TRANSBOUNDARY ASSESSMENT FOR PRIORITY ZOOSES (OHTAPZ)

fictional, though set in a context similar to the countries conducting the assessment, for maximum relevance. Data collected during the literature review (Phase 1, Step 2) can be used to inform TTX planning and design following the seven OHTAPZ competencies outlined in Figure 5 from prevention to international notification and response. Additional activities associated with TZD management, such as social mobilization, risk communication, advocacy, and recovery can be added to support TZD preparedness and response priorities. While a template for designing the structure and flow of the TTX is provided as an **Appendix E**, the process is intentionally flexible in the number of priority TZDs introduced to the TTX and the capacities assessed to align with national, bilateral and regional priorities. If there is interest in confirming roles and responsibilities for wildlife surveillance and water testing or the role of

immigration in public health screening at PoEs, this can also be included in the TTX. The TTX should, however, begin with a universal scene-setter for all participants, followed by multiple rounds of sector-specific injects and accompanying questions. Scripted injects should be tailored to each country and sector and designed based on roles, responsibilities, and reporting mechanisms captured during the stakeholder mapping (Phase 1, Step 1). Injects may include fictitious laboratory reports, ministerial memos, news reports, broadcast news videos, social media posts, and surveillance system reports to support the fictitious scenario. OHTAPZ focal points should lead in TTX planning, design and facilitation with all relevant stakeholders as key participants. A template to facilitate the planning and design of the TTX (along with suggested injects) is available as **Appendix E**.



Figure 5. The seven OHTAPZ competencies evaluated in the TTX

STEP 6. IMPLEMENTING THE TABLE-TOP EXERCISE

OHTAPZ focal points should facilitate the implementation of the TTX with relevant sector stakeholders to ensure each sector provides input (where applicable), and responds to existing actions, mechanisms, and protocols. Participants should work in country-specific and sector-specific groups to develop collective written responses to their customized injects. It is important to encourage that while responding to injects, sectors connect with other country- and sector-specific groups to model how they would communicate and coordinate during a transboundary event. Sectors should not simply note there would be collaboration during the TTX — they must actively determine what form collaboration would take, and demonstrate it by sharing sector-specific information distributed through injects, and use that information to inform their next steps. Particular attention should be paid to exploring where communication and coordination occurs within and between sectors at the PoE. This interactive process provides sectors opportunities to share information in a dynamic environment that requires decision-making, communication, collaboration, and responses to developing scenarios in real time. Following each round, country- and sector-specific groups will answer a list of qualitative questions to capture information about their procedures, decisions, and actions (in response to each inject). Responding to the sector-specific questions should be led by a sector-designated rapporteur to ensure capture of (and agreement on) situations where information is currently shared between and across sectors. Facilitators can request that at the end of the TTX each sector rapporteur present a summary of their actions, decisions, and procedural reflections to all TTX participants. A template to facilitate the run of show for an integrated TTX is available as **Appendix F**. A TTX developed in this manner produces data from three sources: sector-designated rapporteur's end-of-round notes, end-of-TTX sector-led summaries, and exercise facilitators' team notes that can then be used to create the transboundary systems maps.

STEP 7. CREATION OF TRANSBOUNDARY SYSTEMS MAPS

Mapping the nodes of communication and coordination for TZD prevention, detection, reporting and response can help identify vulnerabilities not only where TZDs pose significant health, security and trade threats but also where efforts can be focused to improve TZD capacities within and across sectors at formal PoEs. The TTX data collected from sector-designated rapporteur's end-of-round notes, end-of-TTX sector-led summaries, and exercise facilitators' team notes can be combined to conduct an iterative thematic analysis to identify processes related to the seven OHTAPZ competencies: prevention, surveillance, detection, laboratory capacity, isolation and quarantine, response, and communication and coordination. Analysis can then inform development of a cohesive narrative that explains how each country prevents, detects, and responds to the suspected and/or confirmed priority TZD event(s). The information can be represented in a schematic map to visually capture systems and processes for information sharing and coordination between individual sectors, different levels of government, and between countries. It is critical for this map to identify the nodes of communication, coordination, and decision-making where sectors at the PoE (and between PoEs) intersect, highlighting areas of strength as well as gaps that would benefit from capacity building resources. An example of the structure of the final systems map is provided in Figure 6 and an editable version of this diagram is provided in PowerPoint format as **Appendix G**. A disease narrative template that can be used to record information is available as **Appendix H**.

ONE HEALTH TRANSBOUNDARY ASSESSMENT FOR PRIORITY ZOOSES (OHTAPZ)

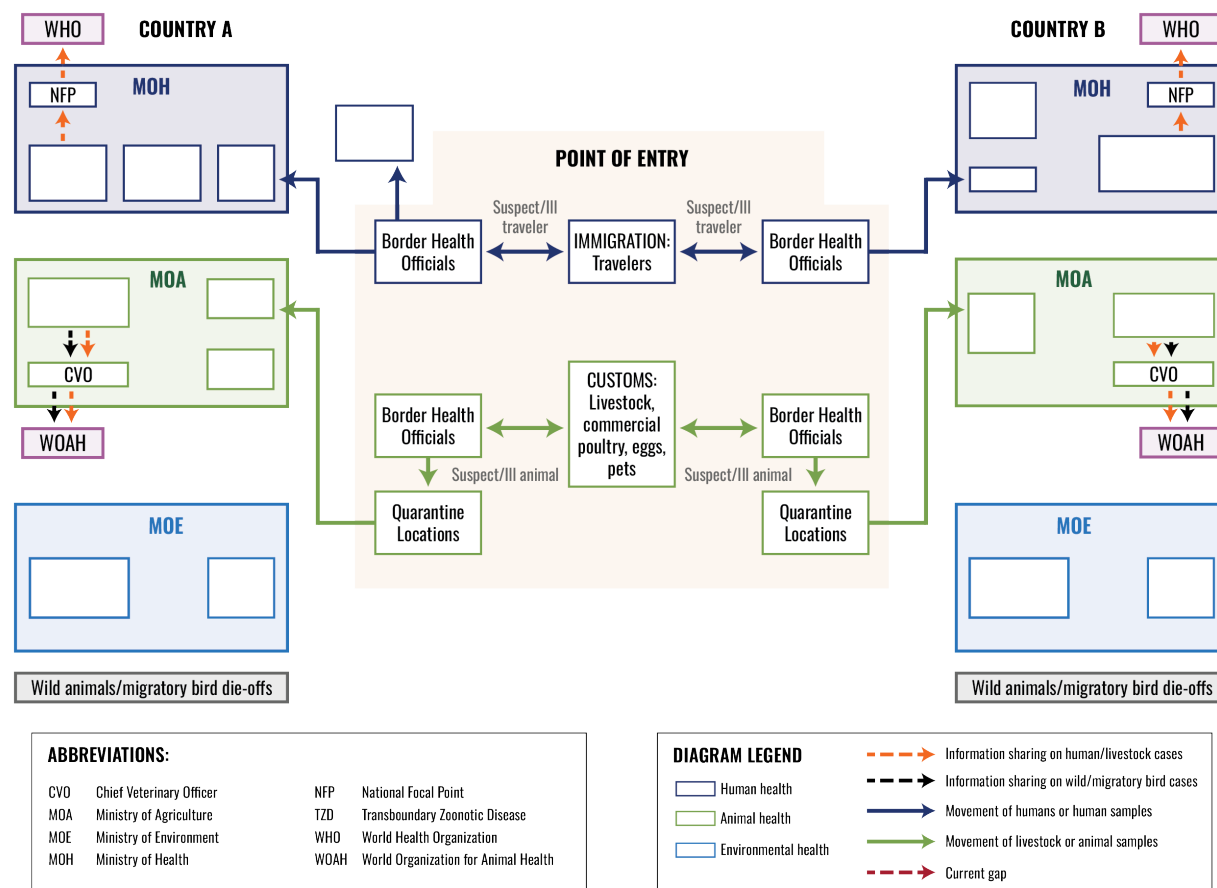


Figure 6. Template for Transboundary Systems Map

PHASE 3. SWOT ANALYSIS

The transboundary systems map created in Phase 2 can be used to conduct an analysis of the strengths, weaknesses, opportunities and threats (SWOT) of existing coordination mechanisms within and between sectors at formal border crossings. The identified strengths and opportunities can be applied to health frameworks like the PVS and IHR while weaknesses and threats can serve as the foundation for developing an action plan to address gaps. In addition, the map and corresponding action plan provide documented evidence for relevant ministries to promote current capacities and advocate for policy or investments in transboundary and national One Health systems strengthening.

PHASE 3

SWOT Analysis

Objective: Use the map from Phase 2 to conduct a SWOT analysis of existing coordination mechanisms within and between sectors at formal border crossings

STEP 8 Gap Analysis of Transboundary Systems Map

STEP 9 Develop and Validate Recommended Actions

Figure 7. Overview of steps for Phase 3 (SWOT Analysis)

STEP 8. GAP ANALYSIS OF TRANSBOUNDARY SYSTEMS MAP

The transboundary systems map provides an opportunity to view the existing structures and systems in place for coordination and communication on priority TZDs between PoEs, among sectors within a PoE, and across sectors within the boundaries of nation. Maps should be reviewed to: 1) Reveal areas of existing coordination and/or communication that can be highlighted as a best practice, advocated for sustained investment, and potentially used to advocate for further One Health capacity building (within a country's PoE or between PoEs); 2) Identify areas where gaps in coordination and/or communication can be translated into recommendations for strengthening policies, protocols and/or practices for TZD preparedness and response across sectors. Country-specific groups should discuss and conduct a SWOT analysis related to

communication and coordination around five core areas: prevention, detection, reporting, response and recovery. Groups should brainstorm and discuss what's working for TZD bilateral communication/coordination (S); what is not working for TZD bilateral communication/coordination (W); identify external factors PoE partners could capitalize on (O); and the external factors that could impact TZD bilateral communication/coordination (T). These ideas can then be consolidated into emergent themes to be prioritized in action planning. A template to support the SWOT analysis is available as **Appendix I**. The focus for the SWOT analysis should be on identifying weaknesses and threats in coordination and communication between the shared PoE between participating countries and between sectors within each country's PoE, highlighted below in Figure 8.

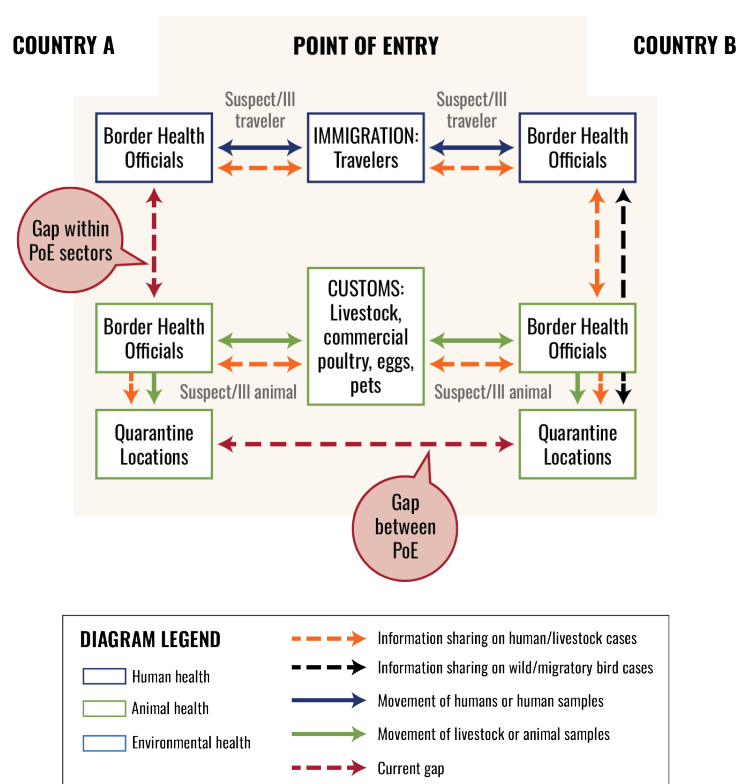


Figure 8. Identifying Gaps from the Systems Map

STEP 9. DEVELOP AND VALIDATE RECOMMENDED ACTIONS

The SWOT analysis emergent themes can now serve as the identified gaps or barriers to develop targeted recommended actions. Action planning provides an opportunity for reflection to identify gaps or barriers, in this case specifically in multisectoral communication and coordination between and across PoEs for TZD prevention, detection, reporting, response and recovery. It provides an opportunity for reflection, to identify through consensus building, the actions, responsible parties, and timelines to address the gaps. This process creates ownership and responsibility, outlines a timescale, identifies measures of success, and strengthens teamwork and partnerships. Action plans can serve as a roadmap for planning and evaluation.

A completed action plan should be reviewed with OHTAPZ focal points and key stakeholders for validation. The review should consider the types of actions that will be required to address the identified gaps/barriers, which stakeholders/sectors will be responsible (and which will be consulted), and the estimated timeline. A template and instructions for action planning is available as **Appendix J**.

PHASE 4. ONE HEALTH POE CHECKLIST

Given the multisectoral nature of One Health challenges at PoEs, there is a need for a systematic tool to assess preparedness and response capabilities specific to these settings. Existing evaluation frameworks, including the JEE (3rd edition)⁴⁴ and the PVS Pathway,²⁴ lack comprehensive One Health-specific guidance tailored to PoEs. To address this gap, Phase 4 of OHTAPZ includes the One Health PoE Checklist (hereafter referred to as “the Checklist”), an assessment tool designed to evaluate human, animal, and environmental health capacities at formal land border crossings and international airports.

The development of the Checklist is grounded in four major requirements. First, the Checklist must be easily completed in a timely manner by PoE officials from multiple sectors, including administration, security,

health, agriculture, and environment at the PoE of interest. Second, the Checklist should assess capacities drawn from international recommendations and regulations for human, animal, and environmental health. Third, while drawing from international guidance, the Checklist should provide concrete, practitioner-focused measures which could be readily assessed by border officers and relevant staff directly at the PoE and were also in line with national policies for PoE operations. Finally, the tool should focus on formal land border crossings and have a separate component to conduct assessments at international airports.

PHASE 4

One Health POE Checklist

Objective: Use the One Health PoE Checklist to evaluate human, animal, and environmental health capacities at land border crossings and international airports

- STEP 10** Identify Target PoEs and Teams for Assessment
- STEP 11** Implement PoE Checklist
- STEP 12** Determine Priority Functions

Figure 9. Overview of steps for Phase 4
(One Health PoE Checklist)

The Checklist outlines 13 core aspects of an effective One Health response at PoEs grouped under the Prevent, Detect, Respond, and Evaluate Framework (Table 2). Checklist questions are formulated to be practitioner-focused, applicable to multiple stakeholders contributing to One Health at PoEs, relevant to the capability and capacities at land border or airport and aligned with all relevant international guidance where possible. The Checklist consists of 95 questions which test capacities for an effective One Health response at land borders and 133 questions for international airports. The dataset package includes documentation, a literature and keyword review, and the final checklists

ONE HEALTH TRANSBOUNDARY ASSESSMENT FOR PRIORITY ZOOSES (OHTAPZ)

in both English and Arabic for both land borders and international airports, provided as Excel spreadsheets for ease of use along with PDF and Word files for supporting materials.⁴⁶

Table 2. Description of number of questions in the Checklist within the Prevent, Detect, Respond and Evaluate sections and key assessment components.

CHECKLIST SECTION	ASSESSMENT COMPONENTS	NO. OF QUESTIONS IN LAND BORDER CHECKLIST	NO. OF QUESTIONS IN AIR CHECKLIST
1. Prevent	Personal Protective Equipment	10	12
	Occupational Health and Safety	10	13
	Vector Control	6	6
	Water, Sanitation and Hygiene	2	3
	Infection Prevention and Control	9	12
2. Detect	Training for Priority Zoonoses	7	14
	Surveillance	12	14
	Point of Care Diagnostic, Sample Collection, and Referral	9	16
3. Respond	Isolation, Quarantine, Transport	14	24
	Response Plans	5	7
	National and International Communications	6	6
4. Evaluate	Evaluation Under International Frameworks	2	3
	Evaluation Under National Guidance	3	3

STEP 10. IDENTIFY TARGET POES AND TEAMS FOR ASSESSMENT

PoEs have a unique role at the nexus of national security and One Health making it essential to assess their capacity to respond to TZD threats and interact with public health, veterinary and environmental health sectors, all while aligning with the broader border security responsibilities. Preparedness or response capacity in one sector does not transfer to operational readiness in another equally important sector for TZD prevention, detection, response, and/or evaluation and while PoEs are essential to health security capacity across PoEs is often not uniform. This lack of uniformity means PoEs should not be assessed or compared in comparison to each other; the Checklist can provide insights into strengths and areas in need of improvement for a singular PoE, or if done at multiple, identify national level strengths and gaps in the broader PoE system.

While PoEs have the responsibility to prevent and control the spread of disease some PoEs, like international airports and major land border crossings, have greater capacities for public health screenings and available infrastructure onsite (or nearby) for quarantine and isolation making the detection of TZDs an achievable target. It is important to consider the bandwidth, travel routes, trade routes, and daily traffic patterns for each PoE when completing the Checklist. For example, while more critical for international airports, smaller land border crossings may not need a medical team on-site if the public health directorate where the PoE is located can respond to a call within a reasonable time frame for patient transport, treatment, testing and care at their facilities. It would also be unreasonable to expect onsite veterinary services for a PoE where animal goods and/or animals are irregularly traded but instead have a mechanism where Customs works closely with the governorate/provincial veterinary services to provide veterinary screening in the few times animals are imported to that particular PoE, for example during a religious holiday. The Checklist allows for the assessment to adapt to the capacities of the PoE so that this tool can be used beyond a country's main border points.

When selecting an assessment team, OHTAPZ focal points should assemble a group that represents the sectors present at the target PoE(s) who are responsible for the core components of OH prevention, detection, response, and evaluation. Each Checklist assessment team should designate a lead official responsible for coordinating with relevant authorities at the target PoEs, and any national-level authorities, that may require review and approval of the Checklist implementation. The assessment team should consist of the following sectors at minimum: Customs and Immigration, Border Security, Public Health, Veterinary Services, and Environmental Health. Each sector representative should complete and submit an assessment reflecting the current capacity of their sector at the designated PoE. If a sector is not represented at the PoE, it should be noted in the submission. If there are additional sector representatives with roles and responsibilities per the Checklist, that should also be captured.

STEP 11. IMPLEMENT POE CHECKLIST

OHTAPZ focal points should obtain the necessary approvals and plan the appropriate time to implement the Checklist at each target PoE, which can be completed electronically or via hard copy. It is important that the identified stakeholders determine whether they will complete the assessment together or delineate sector-specific questions and aggregate responses to generate a single complete Checklist assessment. The assessment should take no more than 45-60 minutes to complete (per PoE).

STEP 12. DETERMINING PRIORITY FUNCTIONS

Checklist results provide an opportunity to identify current gaps and/or barriers at the target PoEs that impact One Health capacity building and sustainability. Each of the 13 core operations/tasks under the Prevent, Detect, Respond, and Evaluate Framework (Table 2) can be assessed as a strength, weakness, opportunity or threat. With OHTAPZ focal points as facilitators, each country team should conduct a SWOT analysis. Consider the emergent themes from the assessment to determine your priorities. If needed, please review guidance on SWOT analysis (Phase 3, Step 8). Align your S, W, O and Ts under these 13 core One Health operations.

Using the completed SWOT analysis each country team can consider identified threats (T) and weaknesses (W) as the functions that should be priority functions for further evaluation in Phase 5, Simulation Exercise and After-Action Review. The purpose of the SimEx is to evaluate preparedness and response mechanisms for early communication, notification, movement controls, and/or disease controls at various border points between two countries and to provide opportunities to validate existing mechanisms and identify areas for enhancement. Country teams should consider the following: What functions should be tested? What frameworks, plans, policies are available? What did the PoE assessment tell us? What functions (capacities) are priorities to test? A template to determining priority functions is available as **Appendix K**. Country pairs can then compare priority functions across shared PoEs to determine transboundary priority functions.

PHASE 5. SIMULATION EXERCISE & AFTER-ACTION REVIEW

Simulation exercises (SimExs) are an essential part of the evaluation process because they provide a risk-free environment to test and improve plans, procedures, and performance resulting in opportunities for improved preparedness, coordination, and effective response to events. They identify gaps in plans, policies and/or resources and offer actionable recommendations to improve effectiveness in preparedness and/or response. SimExs are a recommended component of many monitoring and evaluation frameworks, including the IHR's MEF and the WOA's PVS Pathway.^{21,25} SimEx utilization has been increasing over time, with many scholars recognizing the importance of exercises to improve the preparedness and response capacities at the human-animal-environmental interface.⁴⁷⁻⁵⁵ That being said, limited reporting on application for cross-border SimExs to date, highlights an opportunity for OHTAPZ to address this challenge in real-time.⁴⁹⁻⁵² Although the lack of standardization in SimEx methodology across frameworks is challenging, it offers countries a unique opportunity to tailor and strengthen protocols for emerging frontiers of global health security, like the integration of One Health approaches at PoEs.^{47,48}

It is important to note that SimEx development, implementation, and evaluation require several weeks of planning and logistics. OHTAPZ is designed so that Phases 1-4 provide the crucial information required for the SimEx needs assessment, specifically: priority TZD(s) and functions to be evaluated and the current operating systems and resources in place at the target PoEs. Phase 5 will outline an iterative process to complete the following steps of SimEx and AAR planning, design, implementation, and reporting. The OHTAPZ SimEx and AAR process adapts materials and sources from WHO's Simulation Exercise Manual and WOA's Guidelines for SimExs.^{56,57} We are clear to note in our provided Appendices where templates are adapted from WHO or WOA and where templates are OHTAPZ originals.

PHASE 5

SimEx & After-Action Review

Objective: Enhance nations' preparedness and response capabilities at the human, animal, and environmental interface through the design and implementation of SimExs

STEP 13 Planning

STEP 14 Design

STEP 15 Implementation of the SimEx

STEP 16 Reporting, Conducting the AAR

Figure 10. Overview of steps for Phase 5 (SimEx & After-Action Review)

STEP 13. PLANNING

Concept Note: As designed, Phases 1-4 of OHTAPZ generate necessary outputs to inform the purpose and scope of the SimEx. The initial step in Phase 5 involves the development of a SimEx concept note, which should be prepared by OHTAPZ focal points. The concept note should clearly and concisely define the purpose, scope and objectives and indicate the anticipated date in which the exercise will be conducted. It can also include information including target participants, exercise team members, and/or proposed budget. This document serves as a framework for the planning and implementation of the SimEx and may also function as a briefing memo to secure the necessary approvals from senior management and/or relevant ministers. A template to assist in developing a concept note is available as **Appendix L**.

Exercise Team, Facilitators, Actors, Participants, and Evaluators: Once the OHTAPZ focal points have prepared the concept note, the SimEx exercise and evaluation teams can be established. These teams can be developed based on the needs and scope of the exercise, however, there are key positions that are essential to any exercise. These include the following:

Exercise Coordinator: An individual who will supervise the overall conduct of the exercise, ensuring that it proceeds as planned and that its objectives are reached.

Facilitators: Personnel responsible for delivering injects and monitoring progress during an exercise. The facilitator is the first point of contact for any questions, clarifications or requests. There should be at least one facilitator designated for each PoE. Facilitators should be able to communicate in real-time during the exercise.

Evaluators: Personnel who gather data from the exercise and determines if the targets of the exercise were met. Their evaluation will include overall performance, operational effectiveness, quality control, capabilities, strengths and weaknesses, and areas for improvement. One person should be designated as a lead evaluator responsible for finalizing all evaluation materials and reports. They will work closely with the lead exercise coordinator and facilitator.

Role-player (or actor): A person who simulates a specific pre-scripted role in the exercise.

Player/Participant: A participant in the exercise, performing their function and tasks as they would during a real event/response. They will have no role in the development or planning of the exercise.

Workplan: The workplan is a document that will be referenced throughout planning and implementation of the exercise. It maintains the project schedule listing major tasks, subtasks, and stakeholders based on their level of involvement. The level of involvement can be defined across 4 categories: Responsible, Accountable, Consulted, Informed (RACI). A responsibility assignment matrix is one way to define clear expectations about roles and responsibilities; it maintains open and transparent communications with all stakeholders, and enhances team collaboration. A proposed workplan task list based on the 4 steps in Phase 5 is outlined below; however, tasks should be adapted based on the exercise scope and scale.

- Step 13 Planning: Senior management approvals; Confirm exercise and evaluation teams, participants and actors
- Step 14 Design: Create exercise materials; Exercise location; Operational communications plans; Pre-exercise preparation
- Step 15 Implementation of the SimEx: SimEx implementation
- Step 16 Reporting – Conducting the After-Action Review: Debrief and AAR; Disseminate findings; Incorporate Findings into Preparedness/Response Plans.

A template to assist in crafting a workplan that can be referenced throughout the lifecycle of the SimEx and AAR is available as **Appendix M**.

Formal Notification: For a SimEx to be considered as part of the IHR MEF process, a minimum set of information must be shared with WHO. This is outlined in the *Country implementation guidance: after action reviews and simulation exercises under the International Health Regulations 2005 monitoring and evaluation framework (IHR MEF)*.⁵⁸ Briefly, for a SimEx one or more the following criteria must be met: At least one

of the SPAR capacities is reviewed, validated or tested; The simulated event (scenario) could be notified as an event that might constitute a public health emergency of international concern (PHEIC) under the IHR decision instrument Annex 2; The scope of the SimEx includes multiple sectors and/or countries; and/or Conducting the SimEx was recommended by one of the other IHR MEF instruments (SPAR, voluntary external evaluations or AAR). WOA, on the other hand, encourages Members to notify when exercises are planning and to follow guidelines provided but do not have specific requirements to meet PVS Pathway standards. A template to assist in composing a formal notification to WHO (via the IHR National focal point [NFP]) or to WOA via Chief Veterinary Officer (CVO) is available as **Appendix N**.

STEP 14. DESIGN

Administration and Logistics: Designing the exercise will require coordination with the exercise, evaluation, and facilitation teams on a variety of administrative, logistical, and exercise design components. The master workplan (**Appendix M**) will support managing these tasks and keep responsible parties accountable. Key tasks and subtasks, including securing approvals for the use of the exercise location date and time, developing operational communication plans (including media communications on the exercise and outreach to the local community), and pre-exercise preparation, are essential steps in the design phase. While the success of the exercise depends on the development of detailed, realistic and comprehensive materials, effective execution also requires proper planning and on-site coordination.

Securing approvals for exercises may take time and require signatures from authorities both at the PoE and at the national level. These requirements should be confirmed and incorporated into the work plan. It is encouraged that SimEx coordinators notify provincial level public health directorates and veterinary services once a location has been selected as their teams will most likely become participants in the SimEx. Depending on the scope of the exercise, the lead coordinator may consider incorporating directorate level representatives on the exercise or evaluation teams.

For effective communication strategies, one can consider messaging that aims to achieve maximum positive exposure for the exercise and for the ministries participating in the event. It can also serve to ensure community awareness and public safety during the exercise, informing the community of the exercise to manage any possible risks and to reduce any concern (staged incidents, concern of increased teams at border). Clear, direct messaging opens communication chains between the local community and the border health teams. This process ensures stakeholder engagement, demonstrates the goals and objectives of the exercise, and ensures the community understands the importance/requirement of the SimEx.

Exercise Materials: The process of creating the exercise materials is an iterative process and one that should start with a review of the concept note to make sure the exercise team is clear on the key elements of the exercise. The purpose, objectives and expected outcomes should lead the material development process. The exercise coordinator should schedule regular meetings with the team to outline a process and schedule for the design and creation of the following exercise materials: the master scenario, inject matrix, injects, briefings, and evaluation tools.

Master scenario: The master scenario serves as the outline for the exercise. It provides the context for the exercise, sets the scene, and provides the narrative on the triggering event(s) that initiates the exercise and outlines the cascading impacts (ie incoming injects) to public health and veterinary services at the PoE and local provincial health systems. The master scenario outlines the expected outcomes and includes the information for the scenario; it outlines the “story”, describing the events leading up the start of the exercise through its end. The master scenario can be developed in a variety of formats but should include the following components: title, date and location of exercise; context; scenario narrative; timeline and expected outcomes. The exercise team should reference any available preparedness and/or response plans, procedures, policies, or previous exercises (TTX, SimEx/AARs) in developing the master scenario. It should go without saying that the team should refer to outputs from Phases 2-4 to inform the scenario. The scenario should be

developed by and shared with the exercise management team and not given to any of the participants. A template to assist in developing a master scenario is available as **Appendix O**.

Develop injects: The inject matrix is essential for organizing injects across the PoEs in a chronological order (aligned to the simulation timeline). Injects are, in their simplest form, inputs or requests to exercise participants for information or action. They can come in many forms during a SimEx including official documents like animal import license/veterinary health certificate, ministerial memos, surveillance reports, laboratory reports or informal documents like social media reports, and/or email or SMS from various sectors and partners. Injects should be designed to allow participants to run through the scenario using the available resources, equipment, personnel, systems, and plans on-site as if the event were real. Each inject should be coded and estimated for run time so that the facilitation team can ensure the exercise is operating on schedule. It is also important that the design team and facilitators consider both expected and unexpected outcomes from participants' actions, the implications for subsequent injects, and how to account for unexpected outcomes in the mode of evaluation. A template to assist in developing an inject matrix is available as **Appendix P**.

Develop evaluation materials: The evaluation of an exercise comprises two main components: (1) Identifying the issues that require mitigation to turn them into lessons learned that can improve emergency preparedness and response to one health and welfare emergencies; and (2) Evaluating the planning and delivery of the exercise to improve the quality of future simulation exercises. The evaluation packet, hereafter referred to as the **evaluation and observation guidance document**, serves as the key document for the exercise and evaluation teams during the SimEx. It should reiterate the purpose and scope of the exercise and outline objectives and scoring instructions for the evaluation team (including any possible interventions). Interventions can be included in the SimEx if your exercise team has instructed the evaluators to intervene based on unexpected observations or if unanticipated actions would severely compromise the safety of the participants, animals, or environment. At its core, the

evaluation and observation guidance document lays out anticipated observations for each inject, while also allowing space to capture and address unexpected outcomes. The focus of the evaluation, therefore, is the ability of the participants to meet the expected outcomes for each inject and refer to or comply with the appropriate policy, plan or standard operating procedure. Finally, evaluation materials should include participant and evaluation team feedback forms. A template to assist in developing this guidance document is available as **Appendix Q**.

STEP 15. IMPLEMENTATION OF THE SIMEX

Pre-Exercise Briefing: Once the materials have been developed, reviewed, and finalized, the next step is to set up the exercise location(s) and control room, and prepare the exercise management team and the actors to conduct the exercise. Given the scope of a transboundary SimEx, the team will use different locations (and target different sectors) at the same time, particularly when testing coordination/communication between PoEs and/or off-site locations like quarantine centers. Identifying a central control room where the exercise team can manage the SimEx from is essential. This room should be run like an operations center and contain the necessary materials, evaluation packets, and resources the exercise and eval team needs to implement the SimEx. The control room should be kept separate from all participants. A template to assist with preparing a schedule for the run of show for the SimEx is available as **Appendix R**. The exercise coordinator should prepare and share this schedule with exercise and evaluation teams.

In addition, a pre-exercise briefing with the exercise and evaluation teams should be held at least 24 hours before the SimEx to provide the teams with the exercise packets and an opportunity to review the materials. During the briefing, the exercise coordinator should go over the agenda, provide evaluators with clear directives on their expected roles and responsibilities during the simulation and the debriefing sessions, explain how evaluators are expected to compile and submit their observations, and to review any relevant intervention strategies during the observation and evaluation. Additionally, this session is an opportunity for exercise and evaluation teams to

discuss the objectives and review the agenda for the subsequent AAR meeting. A template for suggested materials to include in the exercise packet is provided as **Appendix S**.

Running the SimEx: On the day(s) of the SimEx, the exercise coordinator, together with a senior official from the PoE or lead ministry, will welcome everyone to the event and give an overview of the exercise's rationale. Following this introduction, the exercise coordinator will then provide separate briefings for the exercise/evaluation teams and participants. The exercise officially begins with the delivery of the first inject. The exercise coordinator is responsible for managing the SimEx and maintaining the schedule. They should check in regularly with the facilitation teams between injects to ensure the exercise is running smoothly. The control room can be used to discuss any major challenges or obstacles. Meanwhile, the evaluation team will observe, monitor, and document the actions and interactions of participants and their responses to the injects in the evaluation guide. These outcomes will be documented and captured for the de-briefing and formal reporting. Once the final inject has been delivered and the outcomes have been evaluated, the exercise coordinator will officially end the exercise. The lead evaluator will then facilitate an immediate de-brief or "hot wash" which provides an opportunity for participants, exercise team members and evaluators to provide initial feedback on the exercise. It is important to note that the hot wash does not include evaluation of exercise outcomes, nor does it go into the level of detail planned for the AAR, which is typically conducted one or two days later. A Participant and Exercise Team Feedback Form is available as **Appendix T** and a SimEx Team Debrief Form is available as **Appendix U**.

STEP 16. REPORTING – CONDUCTING THE AFTER-ACTION REVIEW

Debrief and AAR: An AAR provides the opportunity to review the feedback captured from the exercise and evaluation teams and participants; identify challenges, existing capacities and recommendations; and build consensus on priority actions to sustain and strengthen transboundary One Health efforts at the SimEx sites. The meeting can be a one-day event but should take

place within 48 hours of the exercise. The ultimate goals for an AAR process include capturing corrective actions to be implemented immediately, to ensure better preparation for and response to the next event; and medium- and long-term actions needed to strengthen and institutionalize the necessary capabilities of the public health system. AARs rely on team and individual experiences and perceptions of participants or entities involved in the exercise. The evaluation process should combine individual perspectives and encourage working group discussion and a consensus-driven approach to identifying strengths, best practices, gaps and lessons, this can be done through a SWOT analysis and accompanying action plan (refer to Phase 3). WHO developed a guidance document for planning, preparing and conducting AARs that can be reference for additional templates and materials.⁵⁹

Disseminate findings: The lead evaluator is responsible for compiling a formal exercise report, using the debrief materials and reports from facilitators and evaluators. The report serves as an overview of the exercise, covers the key achievements, identifies challenges (and their root causes), and highlights recommendations to leadership and any potential sponsors. It is important that recommendations include institutionalizing and maintaining best practices and addressing challenges. Endorsement of the exercise report by senior management and key stakeholders is essential to ensure the implementation of the key recommendations or action plan. When possible, publishing reports (with omissions of sensitive information) gives regional partners confidence in national and transboundary health systems; for the agricultural sectors transparency can signal to trading partners confidence in the ability of a nation's Veterinary Services to apply and/or maintain sanitary measures. *Note:* If a country notified WHO or WOA of the SimEx the national delegates, IHR NFP and CVO respectively, will need to prepare and submit an exercise report to formally report and receive credit for the AAR under the IHR Monitoring and Evaluation Framework and/or PVS Pathway. It is recommended that the exercise report is submitted within 4 weeks of the SimEx. An exercise reporting template, outlining more details for each section can be found in **Appendix V**. This template is formatted based on requirements under

SPAR 2021 and should be updated as the framework is updated. This template can be used as a reporting template regardless of whether a country formally submits to WHO or WOA.

Incorporate Findings into Preparedness/Response Plans:

Once the AAR report recommendations have been reviewed and received political support from relevant ministries and key stakeholders the final step is updating national preparedness and response plans, SOPs, and policies to incorporate the approved recommendations and best practices. It is recommended that language be consistent between the AAR report and the revisions to the preparedness plans and that accompanying monitoring and evaluation tools are developed and implemented to measure implementation and/or performance of the new recommendations whether that be additional exercises or assessments.

While this is the final step, in the final phase of OHTAPZ it is important to note that the process of integrating systems for communication and coordination between human, animal and environmental health sectors is an expanding threat landscape. It requires continuous cycle of collaboration and evolution in approaches to assessment, evaluation, and capacity building.

EXPECTED OUTCOMES

The five phases and subsequent steps of the OHTAPZ methodology are designed to result in a series of products for countries interested in beginning or continuing their assessments of national and transboundary One Health capacity. Seven main outputs can be produced following all five phases:

1. Identification of stakeholders involved in transboundary One Health
2. Prioritization of national and bilateral transboundary zoonoses
3. Transboundary systems maps capturing nodes of communication and coordinating within and between PoEs for TZD preparedness and response
4. Analysis and action plans for TZD preparedness and response
5. One Health assessments for target PoEs (land and air)
6. Completed SimEx and AAR compliant with IHR and PVS frameworks
7. Bilateral relationships within and across target PoEs

More generally, OHTAPZ is designed to provide visibility to a country strengths and weaknesses with respects to communication and coordination on transboundary zoonotic diseases at and within PoEs while providing a clear pathway for addressing the identified gaps. OHTAPZ can serve as foundation for countries to assess and develop multisectoral approaches to strengthen One Health capacities, when performed for the first time, the results of the assessment can serve as baseline data on One Health coordination for zoonotic and TZDs, using a reproducible methodology, against which to compare the progress of future One Health implementation efforts. OHTAPZ can assess and address a variety of capacities under the IHR, PVS, and the Quadripartite One Health Joint Plan of Action (2022–2026)⁶⁰ thereby consolidating initial processes required by each framework. The data collected using OHTAPZ, through the One Health lens, can be fed into more traditional public or animal-health led frameworks such as SPAR, JEE and PVS as well as inform national One Health action plans. Our methodology can support activities outlined by the WHO, WOA and the Quadripartite, to advance and sustainably scale-up One Health systems strengthening.

ONE HEALTH TRANSBOUNDARY ASSESSMENT FOR PRIORITY ZOOSES (OHTAPZ)

Table 3. Alignment of OHTAPZ Methodology with One Health Reporting Requirements



CAPACITIES	PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5	RELEVANT INDICATORS
STATES PARTIES SELF-ASSESSMENT ANNUAL REPORT (SPAR)						
C2. IHR Coordination, National IHR Focal Point functions and advocacy		✓	✓	✓	✓	C2.2 Multisectoral coordination mechanisms
C4. Laboratory		✓	✓	✓	✓	C4.1 Specimen referral and transport system; C4.2 Implementation of a laboratory biosafety and biosecurity regime; C4.4 Laboratory testing capacity modalities; C4.5 Effective national diagnostic network
C5. Surveillance		✓	✓	✓	✓	C5.1 Early warning surveillance function; C5.2 Event management
C6. Human resources		✓	✓	✓	✓	C6.1 Human resources for implementation of IHR; C6.2 Workforce surge during a public health event
C7. Health emergency management		✓	✓	✓	✓	C7.1 Planning for health emergencies; C7.2 Management of health emergency response; C7.3 Emergency logistic and supply chain management
C8. Health services provision		✓	✓	✓	✓	C8.1 Case management
C9. Infection prevention and control (IPC)		✓	✓	✓	✓	C9.1 Infection prevention and control programmes
C10. Risk communication and community engagement (RCCE)		✓	✓	✓	✓	C10.1 RCCE system for emergencies; C10.2 Risk communication
C11. Points of entry (PoEs) and border health		✓	✓	✓	✓	C11.1 Core capacity requirements at all times for PoEs (airports, ports and ground crossings); C11.2 Public health response at PoEs; C11.3 Risk-based approach to international travel-related measures

ONE HEALTH TRANSBOUNDARY ASSESSMENT FOR PRIORITY ZOOSES (OHTAPZ)

CAPACITIES	PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5	RELEVANT INDICATORS
C12. Zoonotic diseases	✓	✓	✓	✓	✓	C12.1 One Health collaborative efforts across sectors on activities to address zoonoses
C13. Food safety	✓	✓	✓	✓	✓	C13.1 Multisectoral collaboration mechanism for food safety events
JOINT EXTERNAL EVALUATION (JEE)						
P3. IHR Coordination, National IHR Focal Point functions and advocacy		✓	✓	✓	✓	P3.2 Multisectoral coordination mechanisms; P3.3 Strategic planning for IHR, preparedness or health security
P5. Zoonotic disease	✓	✓	✓	✓	✓	P5.1 Surveillance of zoonotic disease; P5.2 Response to zoonotic disease
P6. Food safety		✓	✓	✓	✓	P6.1 Surveillance of foodborne diseases and contamination; P6.2 Response and management of food safety emergencies
P7. Biosafety and biosecurity		✓	✓	✓	✓	P7.1 Whole-of-government biosafety and biosecurity system is in place for human, animal, and agriculture facilities; P7.2 Biosafety and biosecurity training and practices in all relevant sectors (including human, animal, and agriculture)
P8. Immunization		✓	✓	✓	✓	P8.2 National vaccine access and delivery
D1. National laboratory system		✓	✓	✓	✓	D1.1 Specimen referral and transport system; D1.2 Laboratory quality system; D1.3 Laboratory testing capacity modalities; D1.4 Effective national diagnostic network
D2. Surveillance		✓	✓	✓	✓	D2.1 Early warning surveillance function; D2.2 Event verification and investigation; D2.3 Analysis and information sharing
D3. Human resources		✓	✓	✓	✓	D3.1 Multisectoral workforce strategy; D3.2 Human resources for implementation of IHR D3.3 Workforce training; D3.4 Workforce surge during a public health event
R1. Health emergency management		✓	✓	✓	✓	R1.1 Emergency risk assessment and readiness; R1.3 Management of health emergency response; R1.4 Activation and coordination of health personnel and teams in a public health emergency; R1.5 Emergency logistic and supply chain management

ONE HEALTH TRANSBOUNDARY ASSESSMENT FOR PRIORITY ZOOSES (OHTAPZ)

CAPACITIES	PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5	RELEVANT INDICATORS
R2. Linking public health and security authorities		✓	✓	✓	✓	R2.1 Public health and security authorities (e.g. law enforcement, border control, customs) are involved during a suspect or confirmed biological event
R3. Health services provision		✓	✓	✓	✓	R3.1 Case management
R4. Infection prevention and control		✓	✓	✓	✓	R4.1 IPC programmes; R4.3 Safe environment in health facilities
R5. Risk communication and community engagement		✓	✓	✓	✓	R5.2 Risk communication
PoE. Points of entry and border health		✓	✓	✓	✓	PoE.1 Core capacity requirements at all times for PoEs (airports, ports and ground crossings); PoE.2 Public health response at PoEs; PoE.3 Risk-based approach to international travel-related measures
PERFORMANCE OF VETERINARY SERVICES (PVS) PATHWAY						
I. Human, physical and financial resources		✓	✓	✓	✓	I-1 Professional and technical staffing of the Veterinary Services; I-2 Competency and education of veterinarians and veterinary paraprofessionals; I-3 Continuing education; I-6 Coordination capability of the VS; I-7 Physical resources and capital investment; I-8 Operational funding
II. Technical authority and capability	✓	✓	✓	✓	✓	II-1 Veterinary laboratory diagnosis; II-2 Risk analysis and epidemiology; II-3 Quarantine and border security; II-4 Surveillance and early detection; II-5 Emergency preparedness and response; II-6 Disease prevention, control and eradication
III. Interaction with stakeholders		✓	✓	✓	✓	III-1 Communication; III-2 Consultation with stakeholders; III-3 Official representation and international collaboration; III-7 Veterinary clinical services
IV. Access to markets		✓	✓	✓	✓	IV-2 International harmonization; IV-3 International certification; IV-4 Equivalence and other types of sanitary agreements; IV-5 Transparency

ONE HEALTH TRANSBOUNDARY ASSESSMENT FOR PRIORITY ZOOSES (OHTAPZ)

CAPACITIES	PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5	RELEVANT INDICATORS
ONE HEALTH JOINT PLAN OF ACTION (OH JPA)						
1. Situation analysis	✓	✓	✓	✓	✓	1.1 Stakeholder mapping and analysis; 1.2 Review national One Health governance and coordination mechanism; 1.3 Review One Health-related assessment results
2. Set-up/strengthening of One Health governance and coordination	✓	✓	✓	✓	✓	2.1 Establish or strengthen a sustainable national One Health governance approach through a multisectoral One Health coordination mechanism
3. Planning for implementation		✓	✓	✓	✓	3.1 Identify, adapt and develop activities based on the three pathways of the theory of change, linking to the action tracks and existing national action plans; 3.2 Prioritize activities based on strategic objectives and criteria; 3.3 Review, develop and/or adapt a costed and prioritized national One Health action plan, linking to existing national plans; 3.4 Analyse the resource environment/investment landscape and develop a One Health investment strategy; 3.5 Develop and adapt a monitoring, evaluation and learning (MEL) framework at national level
4. Implementation of national One Health action plans		✓	✓	✓	✓	4.1 Follow through on activities and MEL according to the three pathways of the theory of change, reviewing and adapting priorities to each context
5. Review, sharing and incorporation of lessons learned		✓	✓	✓	✓	5.1 Incorporate lessons learned from implementation activities through MEL, prepare annual reports on progress of national One Health workplans, and share lessons learned and best practices to scale results

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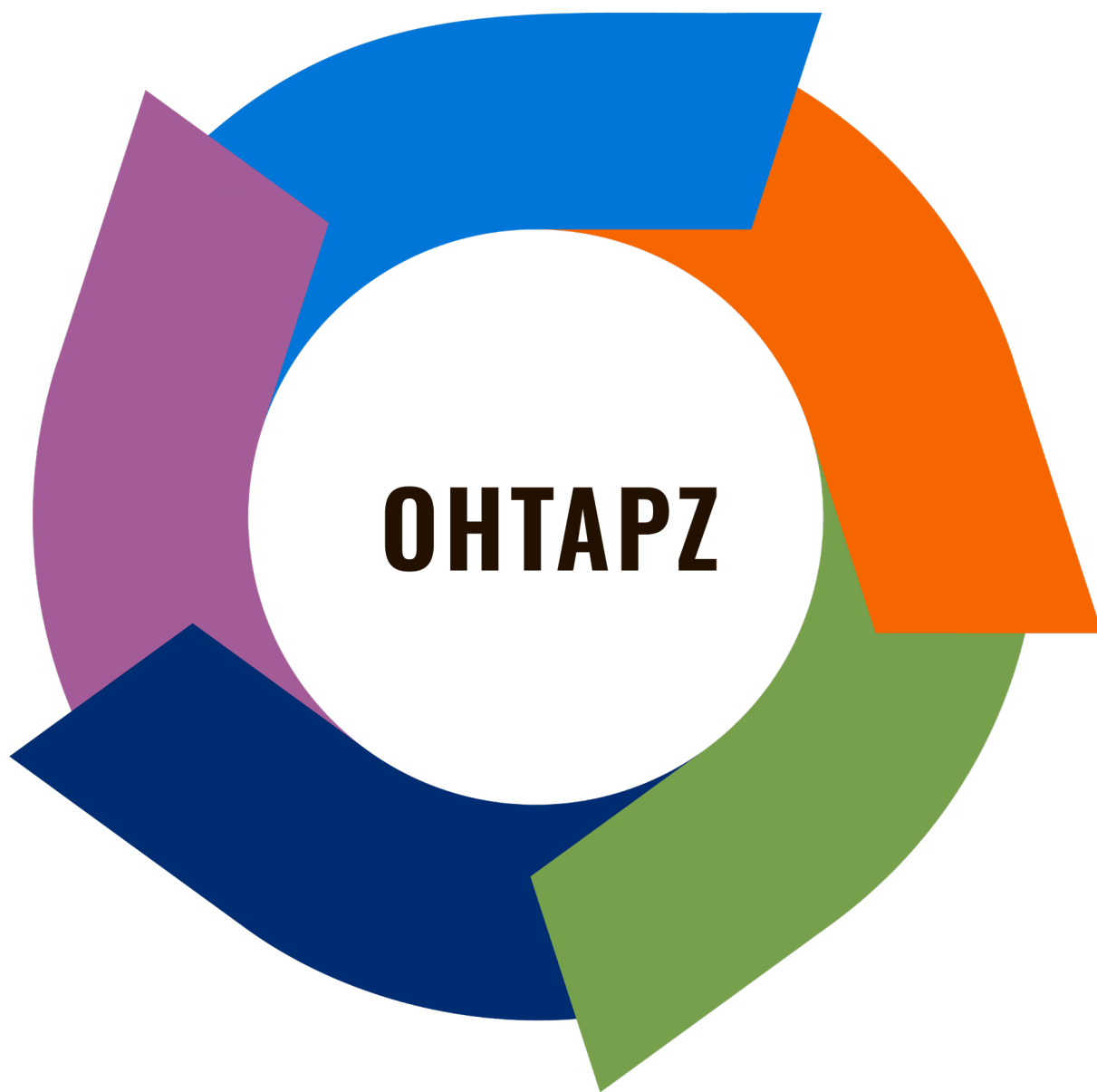
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APPENDICES

- A. [Stakeholder Mapping](#)
- B. [Literature Review Data Collection](#)
- C. [Selecting Qualifying Criteria for Transboundary Disease Prioritization](#)
- D. [Selecting Priority Transboundary Zoonotic Diseases](#)
- E. [Planning and Designing an Integrated Table-Top Exercise](#)
- F. [Facilitation Run of Show for Transboundary TTX](#)
- G. [Editable Diagram of Transboundary Systems Map](#)
- H. [Transboundary Zoonotic Disease Narrative](#)
- I. [SWOT Analysis](#)
- J. [Action Planning](#)
- K. [Determining Priority Functions](#)
- L. [Concept Note](#)
- M. [Simulation Exercise Workplan](#)
- N. [SimEx Notification](#)
- O. [Simulation Exercise Master Scenario](#)
- P. [Simulation Exercise Inject Matrix](#)
- Q. [Simulation Exercise Evaluation Guidance and Observation Template](#)
- R. [Simulation Exercise Timeline](#)
- S. [Simulation Exercise Packet Template](#)
- T. [Simulation Exercise Feedback Form](#)
- U. [Exercise and Evaluation Team Debrief Form](#)
- V. [Simulation Exercise Report Template](#)



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