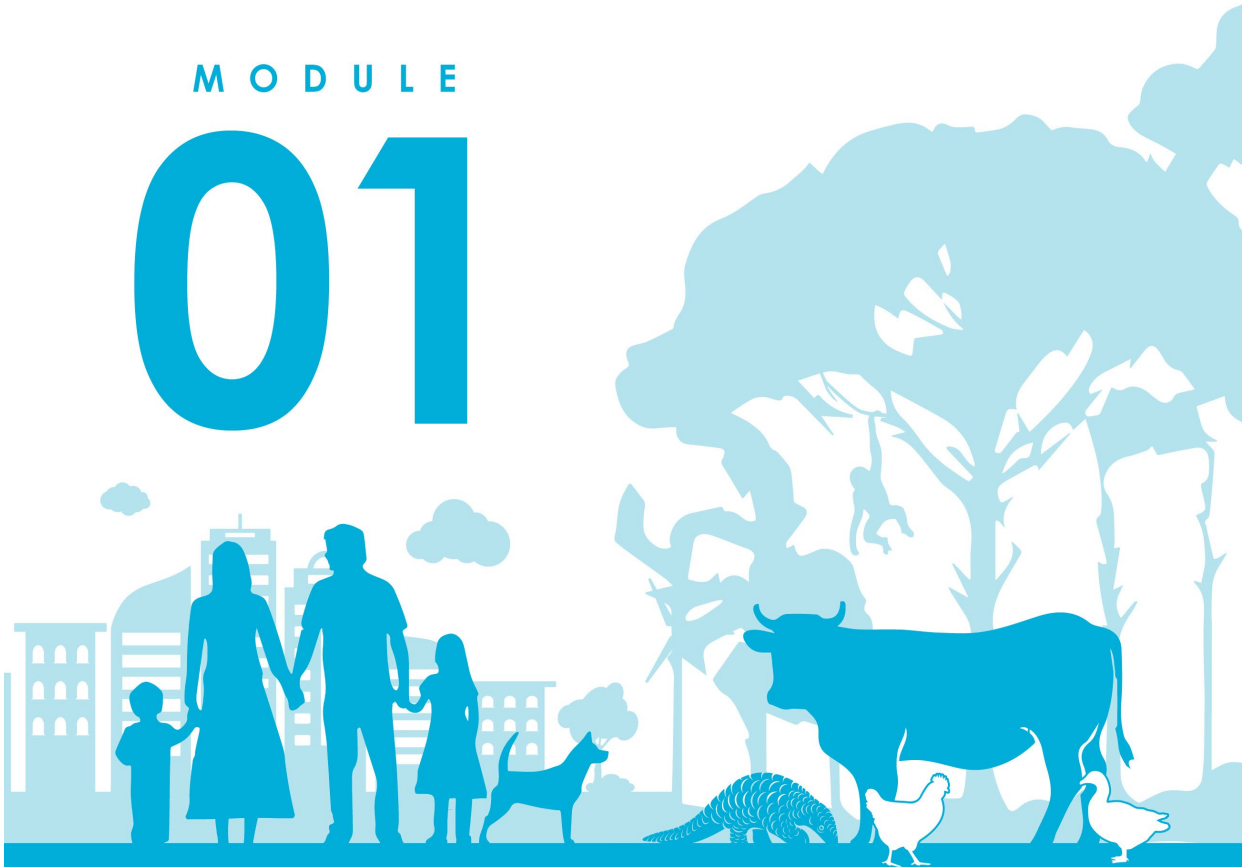


MODULE

01



Introduction

Co-Authors

Meghan Davis & Abhi Veerakumarasivam

Introduction

Infection that occurs via the transmission of pathogens from animals to humans (zoonotic infection) represents a significant public health issue in Southeast Asia and in many regions of the world (Nguyen et al., 2024; WHO, 2020b). Several factors make Southeast Asia an important and particularly complex region to consider both for transmission of established zoonotic diseases and emergence of high-consequence pathogens (HCPs) with pandemic potential. These factors include the extensive interactions among wildlife, domestic animal species, and humans in the live animal supply chain (Saba Villarroel et al., 2023).

In an effort to better understand the drivers, pathways, and key factors that can contribute to spillover, the International Network for Government Science Advice (INGSA)- Asia Regional Chapter in partnership with the U.S. National Academies of Sciences, Engineering, and Medicine (NASEM) undertook a project to develop a guidebook with a goal to inform prevention and mitigation of zoonotic spillover originating in the live animal supply chain in Southeast Asia. Understanding the factors that lead to pathogen spillover in the region, and identifying points for intervention can help reduce the risk that a HCP from the region could contribute to a pandemic. Such efforts are critical to inform efforts of pandemic prevention and mitigation.

INGSA and NASEM convened committees of experts who organized a series of workshops to explore what is known on countering zoonotic spillover and how to address the major challenges in the region [1]. The information gathered and advice offered during the workshop series, along with the expertise of the regional and global committees assembled by INGSA and NASEM, informs the following guidance.

Several organizations, including the World Health Organization (WHO),¹ Food and Agriculture Organization of the United Nations (FAO),² World Organisation for Animal Health (WOAH),³ and the United Nations Environment Programme (UNEP)⁴ have published useful guidelines for prevention of zoonotic spillover. This new report is not intended to replace those works, but instead to complement them with region-specific recommendations and examples. This guidebook draws from those earlier reports to provide a clearinghouse of those references, with suggestions on how best to use them and illustrations and elaboration on topics of particular interest to the Southeast Asia region that may not be covered in the original guidance documents and reports. This guidebook is designed to help those working at international, national, regional, and local levels in Southeast Asia who want to implement evidence-based strategies to prevent zoonotic spillover. A goal of this work is to elaborate on shared communication and decision-making among community, practitioner, and policymaker groups of relevance to national and regional efforts.

¹ One Health High-Level Expert Panel. 2023. *Prevention of Zoonotic Spillover: From Relying on Response to Reducing the Risk at The Source*. Geneva, Switzerland: WHO. <https://www.who.int/publications/m/item/prevention-of-zoonotic-spillover>.

² FAO. 2023. White paper on zoonotic spillover prevention. <https://www.fao.org/one-health/highlights/highlights-detail/new-white-paper-on-zoonotic-spillover-prevention/en>. (Accessed April 2, 2024).

³ WOAH. 2023. Wildlife Health. <https://www.woah.org/en/what-we-do/animal-health-and-welfare/wildlife-health/>. (Accessed March 18, 2024).

⁴ UNEP. 2020. Preventing the next pandemic- Zoonotic diseases and how to break the chain of transmission. <https://www.unep.org/resources/report/preventing-future-zoonotic-disease-outbreaks-protecting-environment-animals-and>. (Accessed April 12, 2024).

Who Should Use this Guidebook?

The guidebook is designed to be a tool to be used by those working to reduce the risk of zoonotic spillover in Southeast Asia. It also may serve as an inspiration and resource for others to adapt. Readers who seek to gain an overall understanding of the issues and strategies for addressing them can read the guidebook in sequence from beginning to end. Readers who are facing specific challenges, such as cross-border trafficking of wildlife, may prefer to access only specific modules or use this document to identify relevant reports and organizations that can provide assistance.

What is One Health?

Countries are widely moving towards organizational plans that implement One Health strategies for public health goals (de la Rocque et al., 2023); that is, increasingly they are using integrated approaches that bring key communities together to conduct zoonotic spillover prevention, disease surveillance, and outbreak response with a goal to improve and enhance the health of people, animals, and the environment (see Figure 1.1). Current One Health efforts incorporate principles of sustainability, address challenges of climate change, and acknowledge the valuation of ecosystem services. One Health approaches are complementary to planetary health and ecohealth approaches (de Castañeda et al., 2023), which place high value on rapid and widespread response to challenges of global environmental change and ecosystem degradation, but distinct in the focus on health-related outcomes (Talukder et al., 2024).

Future outbreaks with the potential to escalate to pandemic levels are both devastating and avoidable (Mishra et al., 2023). Proactive identification and management of their root causes effectively can reduce the frequency of these outbreaks and their consequences. To do this, we must understand the drivers of pandemics. Additionally, we will address the “why” behind global pandemics. The three deep drivers of pandemics include: (1) people consuming animal-sourced food products, (2) globalization, and (3) change, including climate change, demographic change, land-use change, and cultural changes.

The best response in terms of pandemic preparedness is the prevention of initial spillover events, which requires robust response capabilities and multisectoral coordination to be truly effective. The second best is early warning through strong surveillance systems that enable swift action and coordination among different sectors. The third is the application of countermeasures: rapid diagnoses, quarantines, and vaccines, underpinned by effective risk communication to ensure public understanding and compliance. Strengthening systems and response capacity through investment in a skilled workforce, enhanced coordination and communication among human, animal and environmental sectors, surveillance capacity and laboratory infrastructure capacity, and investment in risk communication and participatory approaches for community engagement are critical to prevent spillover and mitigate when an outbreak occurs.

Operational Costs Involved in One Health

When responses do occur within a One Health framework, activities are coordinated among human health, environmental health, and animal health domains. There are financial costs to such an approach, but experts conclude that there are substantial net benefits. Annual financial benefits of such One Health approaches have been estimated at \$125 billion given investments of \$25 billion annually in a number of sectors (Grace, 2014).

1. Sharing resources across sectors.
 - In most countries, the three sectors involved in One Health—that is, human health, animal health, and environmental health—do not have the same funding sources or budgets. The World Bank has estimated that resource sharing can save 10-30% through use of common services and joint facilities between human and animal health sectors ([Le Gall et al., 2018](#)).
2. Offsetting resources and costs needed for response by focusing on prevention of endemic and neglected zoonotic diseases.
 - Economic estimates suggest that endemic zoonoses (e.g., brucellosis, tuberculosis, cysticercosis) cost around \$86 billion US dollars annually, but control programs that address these diseases in animal hosts before they are transmitted to humans require only a quarter of that cost (around \$21 billion) ([Grace, 2014](#)).
3. Reducing human and financial costs of outbreaks by detecting early signals and responding before outbreaks spread regionally or globally.
 - Delays in response can increase case numbers and outbreak costs. In addition to the toll of health impacts and mortality, the financial costs of pandemics have been rising, from between \$30-\$50 billion for SARS in 2003 to over \$11 trillion for COVID-19 ([World Bank and FAO, 2022](#)).
4. Preventing even a fraction of potential pandemics through activities to reduce upstream drivers.
 - The World Bank estimates that preventing even just one in five pandemics would have a 25% expected annual rate of return on investment ([Le Gall et al., 2018](#)).
5. Other needs in operationalizing a One Health approach in the context of zoonotic spillover include:
 - Providing tools to de-risk or minimize pandemic drivers. This can only be achieved through bringing together human, animal, and ecosystem health sectors and treating them as an interconnected system.
 - Generating insights to support innovation. The multisector and multi- or trans-disciplinary nature of One Health has influenced integrated agricultural and health development, e.g., through application of genomic information to understand disease pathways through the animal value chain ([FAO, 2022](#)).
 - Engaging diverse communities and other stakeholders. Participatory approaches that engage community leadership and knowledge are critical to produce feasible and sustainable interventions ([Virginia Department of Health, n.d.](#)).

Most global activities through the FAO-WHO-WOAH-UNEP Quadripartite Collaboration on One Health and the World Bank have focused on how to operationalize One Health ideas and strategies at global and national levels ([FAO et al., 2022](#)). This guidebook is designed to fill a gap for operations at the local level and to be the foundation for more hands-on technical training and assistance in the future.



FIGURE 1-1: An illustration of the One Health approach

The definition and application of One Health has been evolving, driven by established and emergent global health security threats (Mackenzie and Jeggo, 2019). At its core, One Health uses integrated approaches to address challenges at the intersection of human health, animal health, and environmental health—and the latter increasingly has included separate consideration of plant health (Figure 1-1). The 2021 definition advanced by the One Health High-Level Expert Panel an advisory panel to the Joint Tripartite (FAO, WOA, and WHO) and the UNEP —specifically includes consideration of ecosystems and plant health and prioritized issues of sustainability and response to climate change. It also codified the centrality of multi- and trans-disciplinary efforts

at all levels of society, which have been foundational to One Health approaches since its inception and have important implications for surveillance and response activities.

Best practices for One Health response include mapping expertise and engaging disciplines not traditionally involved in public health efforts. This is because of the need to create a collaborative team of technical experts and to engage resources from multiple fields. Critically, key stakeholders (Box 1-1) from a One Health perspective also may include people and organizations that are not traditionally engaged in health-related activities, such as those in transportation, manufacturing or industry, marketing, law, and other fields. At national levels, key leaders typically include those in Ministries of Health or Public Health (human domain), Ministries of Agriculture (animal and plant domains), and Ministries of the Environment or Natural Resources (animal, plant, and environment domains), although livestock and wildlife may be administered through different ministries. Each of these ministries or departments may have distinct mandates or goals, may promulgate or administer different regulations or policies, and may receive differential funding for these activities. With coordination, all of them can be more effective.

Another critical component of One Health approaches is the use of holistic approaches and systems thinking to address challenges. In this context, holistic means coordinated activities among multiple disciplines, sometimes through explicit coordinating units (e.g., Thailand's Coordinating Unit for One Health). Further, One Health approaches informed by systems thinking are those that consider not just associations and linear relationships, but also non-linear relationships, feedback loops, and the potential for emergent behaviour. In this, policies and procedures for response may contain contingencies that will vary based on the current status of a situation. For example, the use of personal protective equipment (PPE) may be mandated only when the incidence or prevalence of disease is above a certain threshold, with the requirement for PPE relaxed when the incidence or prevalence falls below that point—this is an example of how a current status of an outbreak can feed back to inform policy and intervention mechanisms.

It is important to acknowledge that other approaches have been developed to address these issues, including planetary health, ecosystem approaches to health, participatory epidemiology, socio-biological methods/models, mixed methods, team science, systems approaches, the science of team science, and many more. Some of these can be seen as elements of the One Health approach promoted in this guidebook, while others simply have alternative foci. For example, ecohealth refers to the need to consider the coupled interaction between humans and wild animals within the ecosystem context. One Health may be better integrated with the traditional environmental health approaches, which tend to emphasize characterization and mitigation of toxicant exposures to human populations, than ecohealth and planetary health approaches are. Instead, the field of ecohealth focuses on understanding the ways in which environmental and ecological changes, including those caused by human activities (habitat destruction, pollution, and the wildlife trade) can affect both the health of wild animal populations and the risk of zoonotic disease transmission to humans. Understanding these distinctions can be important in terms of the communication among different disciplinary groups or experts, and at various levels of governance, as understanding of what One Health, ecohealth, and other frameworks can differ based on stakeholder.

Organisation of the Guidebook

The guidebook is organized into eight sections and appendix materials. The current module, the Introduction, helps to provide orientation and motivation for the development of these recommendations and their use by different groups of users. This work reflects the joint efforts of the committees and invited experts who participated in the workshop series and authorship of the guidebook. The remaining modules may be accessed in order or piecemeal, depending on the needs of the user. These modules reflect partnerships in leadership and authorship between regional and technical experts.

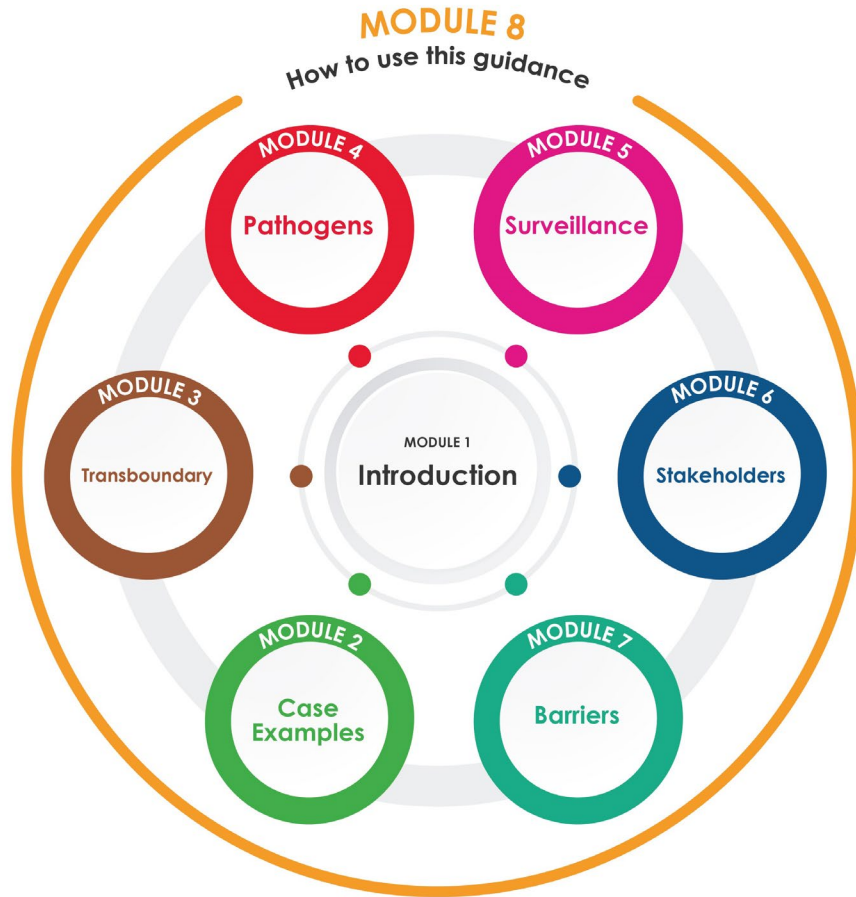


FIGURE 1-2 Organisation of the guidebook.

BOX 1-1

A Note on the Term “Stakeholder”

The term stakeholder is used in this guidebook. However, while ubiquitous in countless official documents across disciplines, cultures, and sectors, we want to acknowledge that this term has colonial and financial connotations for some people. The term was originally used to describe a person who physically held bettors’ money during games. The definitions subsequently evolved into: a person, company, etc., with a concern or interest (esp. financial) in ensuring the success of an organization, business, system, etc. and one who is involved in or affected by a course of action which is how we use it in this guidebook.

Introspectively, public health practitioners, social scientists, historians, and business holders, among others, have advocated to banish the word from modern usage because of the history of stakeholder meetings claiming to engage interested parties while dismissing the perspectives of the public or individuals who are directly affected by policy or regulatory decisions. Furthermore, in some nations or communities, intrinsic to the concept of a stake is ownership, which may be at odds with their indigenous concept of sharing, pointing to the colonial roots of possession and power.

Sarah Bentley argues that typically, when public health researchers and practitioners use the term stakeholder, the reality is we are often purposely empowering those who may have been excluded from decision-making in the past. We are turning the table and making stakeholders of individuals and communities who haven’t had a voice. While our intent with “stakeholder” is one of inclusivity and representation, it is imperative to understand any inadvertent use of insensitive language the term brings.

The authors of this guidebook have considered several alternatives to the term stakeholder, but none fully captures the limitless nature of the relationship between people, their roles, and the context in which they interact. The guidebook uses the term to represent people and communities with interests in the issues and roles to play in finding solutions while simultaneously recognizing both the bias implicit for some in the term and the wider need to decolonize research across the globe.