Facilitator Guide

Training Exercise: Research Translation to Address One Health Challenges

Using Research to Strengthen Zoonotic Disease Prevention and Control Capabilities in Indonesia

GRYPHON SCIENTIFIC

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Overview of Training Materials

Introduction to Training Materials

The goal of this One Health Research Translation training event is to build participants' skills in translating research to enhance capabilities for preventing, detecting, and responding to zoonotic disease threats. Participants will learn how to identify opportunities for applying research to policies and programs for preventing and controlling zoonotic diseases, assess potential challenges to and solutions for research translation, and describe communication pathways supporting research translation. Through a series of interactive activities, participants will evaluate published research conducted by Indonesian research institutions and think about the role of Indonesian institutions in research translation, ensuring the relevance of the training materials to their work and providing a foundation for trainees to use the local research capacity to address zoonotic disease challenges after the event.

Learning Goals and Learning Objectives

Learning Goal 1 | Evaluate if and how research can be applied to public health and veterinary policy to enhance capabilities for preventing, detecting, and responding to zoonotic diseases in Indonesia.

After completing this training, participants will be able to:

- Describe at least three applications of the research findings in the scientific literature provided to public health and veterinary policy.
- Identify at least three limitations of the research methodology and findings in the scientific literature provided that weaken their application to public health and veterinary policy.
- Identify at least three examples of health systems barriers that may prevent, limit, or delay translation of the research findings in the scientific literature provided to public health and veterinary policy.

Learning Goal 2 | Recognize key factors that support cross-sectoral communication about how research can be applied to public health and veterinary policy to enhance capabilities for preventing, detecting, and responding to zoonotic diseases in Indonesia.

After completing this training, participants will be able to:

- Define research translation in a One Health context;
- Identify key stakeholders and their roles in research translation for preventing, detecting, and responding to zoonotic diseases; and
- Identify at least three challenges and potential solutions for two-way communication between researchers and policymakers during research translation to address zoonotic disease challenges.

Overview of Training Activities

The training includes several interactive activities that will enhance participants' skills in research translation and cross-sectoral communication:

1) Communication Pathways Mapping Activity: Identifying, mapping, and analyzing communication pathways between institutions involved in research translation to enhance capabilities for preventing and controlling zoonotic diseases in Indonesia.
2) Anthrax Case Study Exercise: Using published research on anthrax conducted in Indonesia to identify and assess potential applications of research findings to public health and veterinary policy and practice in Indonesia.

3) Highly Pathogenic Avian Influenza (HPAI) Case Study Exercise: Using published research on HPAI conducted in Indonesia to identify and assess potential applications of research findings to public health and veterinary policy and practice in Indonesia.
4) Using the One Health Research Translation Framework in Your Work Activity: Exploring how participants can promote research translation to address zoonotic disease challenges in their work and build their professional One Health research translation networks.

The scope of this training is the translation of applied research and surveillance findings to community-level challenges in public and animal health. This includes surveillance conducted as part of research projects or routine surveillance activities conducted by public health and veterinary institutions.

The training activities are designed for a mixed group of participants representing the research, public health, and animal health sectors. Each activity involves small group discussions during which participants from different sectors will share their perspectives and professional experiences. Participants will learn from each other's experiences, practice communicating with people from other sectors, and build skills in integrating diverse perspectives to reinforce the learning goals of the training. Additional details on the target audience for this training are provided below.

Training Outcomes

This training will build workforce capabilities in the translation of local research to enhance national capabilities for preventing, detecting, and responding to zoonotic disease threats. The activities' focus on research conducted at Indonesian research institutions helps to teach participants about research translation in a realistic and appropriate manner and to facilitate the application of training lessons to participants' research and policy activities. Although the case study exercises involve analysis of pre-selected publications, participants will have an opportunity to apply the training lessons to their work at the end of the training event. During that activity, participants will produce a preliminary action plan for research translation as part of their professional responsibilities, which they can pursue after the training event. Collectively, the training lessons and outputs will provide a foundation for participants to work toward harnessing local research capacity to enhance country capabilities for preventing, detecting, and responding to zoonotic disease threats.

The training activities will also strengthen One Health research translation networks including researchers and policymakers from the public health and animal health sectors. The activities focus on the value of the One Health approach to zoonotic disease prevention and control, which involves communication and collaboration across the public health, agriculture, and environmental sectors to achieve better health outcomes for humans, animals, and the environment. Training activities also emphasize the importance of integrating research and policy perspectives to develop and implement evidence-based research applications that are locally relevant, effective, and beneficial. To support this collaborative approach to research translation, the activities will provide multiple opportunities for participants to network with each other to grow their One Health research translation networks.

How to Use the Training Materials

Target Audience

The training event should include a mix of participants from the human health and animal health (including agricultural animals and wildlife) sectors, including participants engaged in research and policy activities from each sector. Relevant policy activities for this training include the development, implementation, enforcement, monitoring, and evaluation of policies and the local, national, or regional levels. Interaction between One Health stakeholders is an important aspect of these training materials. Each activity involves small group discussions and requires participants from different sectors to share their perspectives, expertise, and professional experiences to complete the activity. Participants from a single sector are unlikely to have sufficiently broad expertise and professional experience to complete the activities on their own. This participant-driven learning approach increases trainee engagement in the activities and reflects the complexity of research translation in a One Health context, which involves diverse stakeholder groups. The training activities work best if the

numbers of participants from the research, public health, and animal health sectors are balanced, so that all relevant perspectives are represented equally.

To complete the training activities, participants are expected to have the following core competencies:

- Ability to critically evaluate scientific literature.
- Understanding of and involvement in research *or* policy in the human health, animal health, and/or environmental health sector.
- Have, or be working toward, a relevant post-graduate degree, such as a Masters' degree, PhD, MD, PharmD, MPH, DVM, or local equivalent. Alternatively, participants without an advanced degree should have at least five years of professional experience.
- Interest in research translation and the One Health approach.

The case study exercises work best if at least some participants have knowledge of and involvement in research or policy activities related to the selected diseases. If possible, some participants in the training group should have expertise and/or professional experience related to anthrax, HPAI, or other selected diseases if these training materials are adapted.

Overview of Facilitator Packet

This facilitator guide contains the background information, instructions and worksheets that you will need to facilitate the workshop activities, including:

1) Background information, including a **glossary** of key terms related to research translation and One Health and the **One Health Research Translation Framework** that guides the case study exercises;
2) Facilitator instructions for each training activity, including how to prepare for and execute each activity; and
3) Worksheets for the training activities that you will use to capture summary findings and notes.
4) Instructions for how to adapt the training materials to focus on different diseases or research translation scenarios.

Facilitator's Role

Your role as a facilitator is to ensure that participants gain the knowledge and skills necessary to meet the learning objectives of these training materials. You are expected to instruct participants on the goals, format, and participation expectations for the activities, ensure that participants understand the materials and concepts upon which these activities are based, and facilitate group discussions. As the facilitator, you are responsible for guiding discussions about research translation and cross-sectoral communication so that participants:

- Think broadly about institutions and stakeholders involved in research translation to address One Health challenges, and identify appropriate approaches for communication about research translation across sectors and between researchers and policymakers.
- Consider a range of potential applications of the research evaluated in each activity;
- Think creatively and realistically about challenges to and potential solutions for research translation and cross-sectoral communication; and

Use the guidance and prompts from these facilitator's notes, your own knowledge of research translation, One Health, and HPAI and anthrax challenges in Indonesia, and the case study publications to present the materials and prompt discussion. Do not provide specific answers to questions in the participant worksheets but rather listen to and take notes on participants' ideas to produce summary outputs that reflect the group's thinking. If participants are having difficulty answering a question or the discussion is straying off-topic, you may prompt or focus the discussion using the leading questions that are included in the facilitator's guide for each activity.

Before the workshop, you should be familiar with the background material, the facilitator instructions and notes for each activity, and the publications upon which the case studies are based (listed at the start of each case study exercise). As the "expert" in each of the workshop activities, you must understand the concept of research translation in a One Health context, the One Health Research Translation Framework used in the activities, and the definitions of terms related to research translation and One Health. You will be responsible for ensuring that participants understand these concepts and can successfully participate in each activity.

Preparing for a Training Event

Select your Activities

Four training activities are included in this training package: (1) Communication Pathways Mapping Activity, (2) Anthrax Case Study Exercise, (3) HPAI Case Study Exercise, and (4) Using the One Health Research Translation Framework in Your Work Activity. To achieve the learning objectives of this training, you must complete the Communication Pathways Mapping Activity and at least one of the case study exercises. Completion of a second case study exercise and the "Using the One Health Research Translation Framework in Your Work Activity" will reinforce the learning objectives and support participants' ability to implement the training lessons as part of their professional responsibilities. Select the activities for your training event based on your training needs and available time. Conducting all four activities requires 2 – 2.5 days.

Training Activity	Activity Structure	Recommended Time
Presentation of research translation and One Health concepts	Facilitator presentation	1 – 1.5 hours
Communication Pathways Mapping Activity	Facilitator-led discussion	1.5 – 2 hours
Anthrax Case Study Exercise	Facilitator presentation; Facilitator-led discussion	2.5 – 3 hours
Highly Pathogenic Avian Influenza (HPAI) Case Study Exercise	Facilitator presentation; Facilitator-led discussion	2.5 – 3 hours
Using the One Health Research Translation Framework in Your Work Activity	Participant-led discussion	1 – 1.5 hours.

Each activity involves group discussions, with groups of five to nine individuals recommended for the Communication Pathways Mapping Activity and the case study exercises and groups of three to four individuals recommended for the Using the One Health Research Translation Framework in Your Work activity. If your training group includes ten or more individuals, you should plan to split individuals into small groups for the activities. Using different groups for each activity is recommended to enable participants to interact with more of their fellow trainees. One facilitator is needed to lead discussion during the Communication Pathways Mapping activity and the case study exercises, though it may be helpful to recruit two facilitators for each small group. The "Using the One Health Research Translation Framework in Your Work" is participant-led and does not require a facilitator to lead discussion.

Familiarize yourself with training materials

Before the training, all facilitators should be familiar with the background material (glossary of key definitions and the One Health Research Translation Framework) and instructions for each of the selected activities. Note the format of each activity (mix of facilitator presentation, facilitator-led discussions, and/or participant-led discussions) and ensure that you can provide the required materials (or reasonable alternatives). In addition to the background material provided in this facilitator

packet, to facilitate the communication pathways mapping activity, you should be familiar with Indonesian institutions that play a role in research translation to address zoonotic disease challenges and how they do (or could) communicate. To facilitate the case study exercises, you should feel comfortable explaining the basic scientific concepts, methodologies and procedures, and key findings of the case study publications and possible applications of the findings to public health and veterinary policy and practice. Facilitating the final activity, "Using the One Health Research Translation Framework in Your Work," uses similar knowledge and will also draw from your experience in previous workshop activities. Completing each activity on your own or with your fellow facilitators may be useful for ensuring that you understand the instructions and developing notes to help you facilitate discussion among trainees.

Assemble the Slide Deck

Assemble the slide deck for the training event with the slides for each activity you intend to complete. You may adapt the disease introduction and publication overview slides to incorporate additional publications or a different disease focus (see Appendix 5), and you may customize the slides for your available time and target audience. (The slides in this training package are provided in PDF format. E-mail the training developers if you would like a PowerPoint copy of the file for modification.) Ensure that the facility you are using can accommodate a projector and screen to display the slides.

Slide Deck Overview	
Training Exercise Overview	Slides 3 – 11
Overview of Key Definitions	Slides 12 – 21
Overview of the One Health Research Translation Framework	Slides 22 – 40
Mapping Communication Pathways for Research Translation to Address One Health Challenges	Slides 41 – 49
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Introduction to Selected Publications	Slides 104 – 134
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Summary Discussion	Slides 141 – 142
Using the One Health Research Translation Framework in Your Work	Slides 143 – 150

Prepare and Distribute Materials

At least two weeks in advance of the training event, send the case study publications to participants so that participants have sufficient time to read and evaluate the articles in advance of the training event. You should also explain how the publications will be used during the training event and provide guidelines for participant review of the publications. You can draw from the information provided in the introductions to the case studies in this facilitator packet.

Prepare the participant packet by removing the worksheets for activities you will not be completing. In advance of the workshop, you may send the full Participant Packet or the background information in addition to the publications. Print out one Participant Packet for each participant in your session. You may also print out a copy of the case study articles for all participants to reference during the case study discussions. Have these materials available for the participants when they arrive for the training.

Licensing and Development Information

This exercise was developed by Gryphon Scientific in collaboration with the Airlangga Disease Prevention and Research Center, University of Minnesota College of Veterinary Medicine, and International Federation of Biosafety Associations.

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Glossary of Key Definitions

Biorisk: The combination of the likelihood and consequences of an adverse event involving biological materials following unintentional exposure, accidental release or loss, diversion, theft, misuse, or intentional release.

Biorisk Management: The systems, processes, and practices used to identify, assess, control, and monitor biosafety and biosecurity risks posed by working with, storing, transporting, or disposing of biological materials in the laboratory or field.

Biosafety: The use of containment principles, technologies, and practices implemented to prevent unintentional exposure to or accidental release of biological materials from a laboratory or field study.

Biosecurity: The measures taken to protect, control, and account for biological materials to prevent their loss, diversion, theft, misuse, or intentional release from a laboratory or field setting.

Discipline: A branch of knowledge, instruction, or learning (for example, economics, virology, epidemiology, law, clinical medicine, etc.).[1]

- **Interdisciplinary**: Involving actions occurring between or among more than one discipline, resulting in the synthesis of perspectives and information to achieve integration of knowledge.[2]
- **Multisectoral/multidisciplinary:** Involving participation of more than one sector and/or more than one discipline; here, refers to including multiple entities across the human-animal-environment interface to jointly address health in a way that is more effective, efficient, or sustainable than might be achieved by one sector acting alone.[3]

Health Systems: All public, private, and voluntary entities that contribute to the delivery of human, animal, and environmental health, whether at the local, national, or global scale.[4]

One Health: A multi-sectoral, interdisciplinary approach that recognizes that the health of people, animals, and the environment is interconnected, and that encourages the collaborative efforts of multiple sectors and disciplines working locally, nationally, and globally to address shared health threats and achieve the best health for people, animals, and environment.[5]

One Health Stakeholder: Any individual or group that:

- Is involved in preventing or managing a health threat at the human-animal-environment interface (such as researchers or policymakers), or
- Affects, is affected by, or perceives themselves to be affected by such a health threat, including those that may be affected by associated risk management measures (such as, community members or farmers).

Pillar: Steps in the One Health Research Translation Framework are categorized into three *pillars*: research evidence, policy, and integration. The *research evidence* pillar focuses on the generation and evaluation of research evidence; the *policy* pillar focuses on understanding health systems challenges that could be informed by research and implementing research applications; and the *integration* pillar focuses on integrating research and policy perspectives to inform the development of research applications that are locally relevant, effective, and beneficial.

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[1] Adapted from: *Collaboration and Partnership Module* (2014) SEAOHUN One Health Course
[2] Adapted from: FAO/OIE/WHO Draft Tripartite Zoonotic Disease Guide and *Collaboration and Partnership Module* (2014) SEAOHUN One Health Course
[3] Adapted from: Draft FAO/OIE/WHO Draft Tripartite Zoonotic Disease Guide
[4] Adapted from: One Health Operational Framework for Strengthening Human, Animal, and Environmental Public Health Systems at their Interface. World Bank Group and Eco Health Alliance. 2018.
[5] Adapted from: CDC One Health. https://www.cdc.gov/onehealth/ and One Health Initiative http://www.onehealthinitiative.com/about.php

Policy: Laws, regulations, administrative actions, strategies, and other decisions, plans, and practices of governments and other institutions formulated to direct actions in pursuit of specific societal goals.

- **Policymaker**: Any individual with the authority and responsibility to influence the development, implementation, enforcement, monitoring, and/or evaluation of policies at the local, national, or regional levels. In these training materials, policymakers include individuals involved in policy development and evaluation and/or field work to implement, enforce, or monitor policies.

Research Application: The use of research findings to modify existing or inform the development of new programs, policies, practices, products or services for preventing, detecting, or responding to zoonotic diseases.[6]

- *Note*: These case studies focus on the application of applied research to community-level challenges in human, animal, or environmental health. Research translation to address health challenges at the individual level, for example through the development of vaccines, therapeutics, or clinical practice guidelines, is also important for strengthening health systems. Those interested in learning more about clinical research translation are encouraged to review the many resources that have been developed to inform this process.[7,8,9]

Research Translation: Research translation is a dynamic and iterative process of applying research findings that includes synthesis, dissemination, exchange, and application of knowledge to improve health systems.[10,11,12]

- *Note*: Research translation can be defined more broadly to include fields in addition to human, animal, and environmental health. In these training materials, the term research translation will be used solely as defined above.

Research Translation in a One Health context: A dynamic and iterative process involving collaborative efforts between the human, animal, and environmental health sectors to apply research findings to address shared health threats at the human-animal-environment interface. Key features include:

- Consideration of how information from multiple sectors can inform research applications;
- Evaluation of the cross-sectoral effects of research applications; and
- Refinement of research applications to maximize cross-sectoral benefits.

Sector: Whether the mission and primary area of responsibility of an academic, professional, government, or other organization relates to human, animal, or environmental/ecosystem health (for example, animal health sector).

- *Note*: The term sector is also used to delineate organizations based on other factors, including financial structure and funding sources (for example, non-profit, public, private), parts of the economy (for example, agriculture, energy), fields, or disciplines. In these training materials, the term sector will be used solely as defined above.

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[6] How funding agencies can support research use in healthcare: an online province-wide survey to determine knowledge translation needs. B. Holmes, M. Schellenberg, K. Schell, and G. Scarrow. *Implement Sci.* 2014. 9:71.

[7] The continuum of translation research in genomic medicine: how can we accelerate the appropriate integration of human genome discoveries into health care and disease prevention. M. Khoury, M. Gwinn, P. Yoon, N. Dowling, C. Moore, and L. Bradley. *Genetics in Medicine.* 2007 9, 665-674.

[8] Translational research: understanding the continuum from bench to bedside. B. Drolet and N. Lorenzi. *Transl Res.* 2011. Jan; 157(1):1-5.

[9] The NIH Roadmap. E. Zerhouni. *Science.* 2003. 302(5642):63-72.

[10] Adapted from: Canadian Institutes of Health Research (CIHR) http://www.cihr-irsc.gc.ca/e/29418.html

[11] Adapted from: The knowledge-value chain: A conceptual framework for knowledge translation in health. R. Landry, N. Amara, A. Pablos-Mendes, R. Shademani, and I. Gold. *Bull World Health Organ.* 2006. 84(8): 597-602.

[12] Adapted from: Using knowledge translation as a framework for the design of a research protocol. S. Fredericks, G. Martorella, and C. Catallo. *Int J Nurs Pract.* 2015. 21 Suppl 2:157-63

Two-way Communication: Ongoing, bi-directional communication between:

- *Researchers* and *policymakers* about research findings that could be applied to health systems challenges and health systems needs that could be informed by research;
- *Human, animal, and environmental health stakeholders* about the cross-sectoral effects of health system challenges and potential research applications.

Framework for Research Translation in a One Health Context

Introduction

Research translation is a *dynamic* and *iterative* process of applying research findings that starts at discovery and leads to application of knowledge to improve health systems.[13,14,15] It requires communication and collaboration between researchers and policymakers to synthesize, disseminate, and exchange information to design and implement research applications that are locally relevant, beneficial, and effective. The application of research to address health threats at the human-animal-environment interface poses an additional level of complexity because the threats and potential solutions involve multiple sectors. The multi-sectoral nature of research translation in a One Health context presents challenges and opportunities. Although the threat landscape is complex, solutions targeting one sector also may benefit another sector, and information and resources can be shared across sectors to address health-system challenges more efficiently and effectively.

Research Translation Cycle

The Research Translation Cycle (Figure 1) illustrates the steps involved in a cyclical, iterative process for designing and implementing research applications to address One Health challenges. This cycle is accompanied by the One Health Research Translation Framework (Figure 3), which provides additional details about the stakeholders, concepts, and processes informing each step of the cycle described below. Both researchers and policymakers from all relevant One Health sectors contribute to the steps of the Research Translation Cycle. The cycle and framework focus on the role of researchers who *generate* research findings about zoonotic diseases and policymakers who *use* research findings to inform the development, implementation, and/or monitoring of policies and programs for preventing and controlling zoonotic diseases. Policymakers and institutions responsible for funding research also play a critical role in research translation by supporting research that addresses priority health systems needs. The cycle and framework do not explicitly consider the role of research funders, but could be adapted to do so

The cycle and framework synthesize and adapt elements from existing research translation and knowledge translation frameworks to focus on the application of *applied research* to *community-level challenges* in health systems and account for the multi-sectoral nature of research translation in a One Health context.[16] Both are conceptual; each describing the relationships between universal elements of research translation to help stakeholders understand and explain factors that influence research translation to One Health challenges. These elements are organized in a sequential, step-wise manner to also illustrate the process of translating research to policy and practice, but the cycle and framework do not capture all the activities needed to operationalize the process fully. In particular, applying research findings within health systems requires additional activities including monitoring and evaluation that are not captured in the cycle and framework. Appendix 1 provides brief descriptions of selected frameworks that describe aspects of research translation in greater detail, such as implementation.

[13] Adapted from: Canadian Institutes of Health Research (CIHR) http://www.cihr-irsc.gc.ca/e/29418.html

[14] Adapted from: The knowledge-value chain: A conceptual framework for knowledge translation in health. R. Landry, N. Amara, A. Pablos-Mendes, R. Shademani, and I. Gold. *Bull World Health Organ.* 2006. 84(8): 597-602.

[15] Adapted from: Using knowledge translation as a framework for the design of a research protocol. S. Fredericks, G. Martorella, and C. Catallo. *Int J Nurs Pract.* 2015. 21 Suppl 2:157-63

[16] Multiple frameworks have been developed to guide research translation to clinical practice and medical countermeasure development (i.e., research translation from “bench to bedside”). See Appendix 1 for references for some of these frameworks.

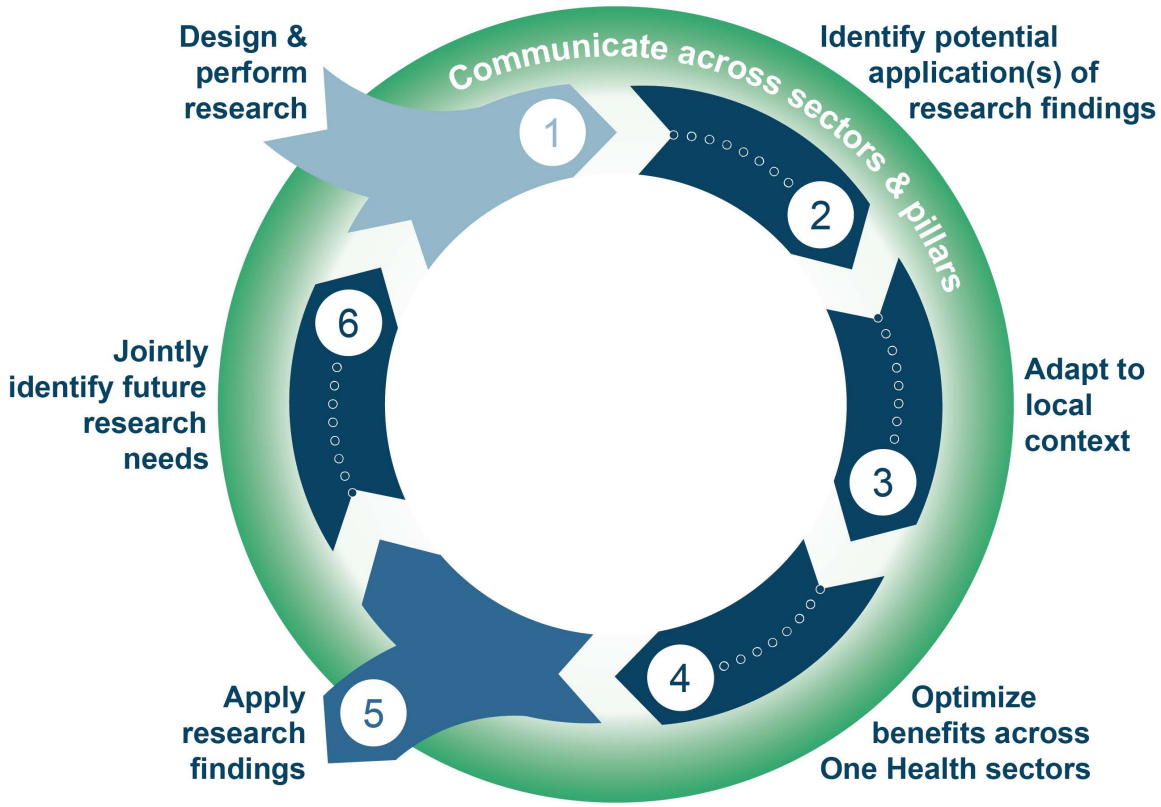


Figure 1. Research Translation Cycle describing the steps involved in the application of research to policies and programs for preventing, controlling, and responding to zoonotic diseases. Arrows are colored based on whether the step involves researcher and/or policymaker input or activities: light blue shading indicates that the step primarily is carried out by researchers, intermediate blue shading indicates that the step primarily is carried out by policymakers, and dark blue shading indicates that both researcher and policymaker input is required. The green ring depicts the Communications thread supporting all steps in the cycle (see "One Health Research Translation Framework" section). the dotted lines bisecting the Steps 2, 3, 4, and 6 arrows indicate that cross-pillar communication between researchers and policymakers is especially critical for those steps.

The Research Translation Cycle involves six sequential steps (Figure 1), which are numbered in the figure to indicate the progression of one step to another:

- **Step 1: Design and perform research.** Researchers design and perform research to address gaps in scientific knowledge about zoonotic diseases or other shared health threats at the human-animal-environment interface.
- **Step 2: Identify potential applications of research findings.** Researchers and policymakers identify applications of the research findings (Step 1 output) that address priority One Health challenges.
- **Step 3: Adapt to local context.** Researchers and policymakers adapt the research application (Step 2 output) to the needs, culture, and health systems of the target jurisdiction(s). A key aspect of this step is integrating *research* and *policy* knowledge and experience to identify solutions for circumventing or overcoming research limitations and health systems barriers to application the of research findings.
- **Step 4: Optimize benefits across One Health sectors.** Researchers and policymakers adapt the research application (Step 3 output) to maximize its benefits to all One Health sectors, by considering effects on other sectors and incorporating relevant research findings and resources from each.
- **Step 5: Apply research findings.** Policymakers implement, monitor, and evaluate the research application (Step 4 output).

- **Step 6: Jointly identify future research needs.** Researchers and policymakers synthesize information about scientific knowledge gaps and outstanding One Health challenges to identify and prioritize research needs.

After Step 6 is completed, researchers design and perform studies (Step 1) to address high-priority research needs identified jointly by researchers and policymakers, beginning the cycle again.

Stakeholders may determine in Step 3 that a research application is infeasible at the current time if limitations of the research or health systems barriers to implementation cannot be overcome. In that situation, stakeholders may skip Step 5 (apply research findings) and use Steps 4 and 6 to guide the design of new studies that will help to address research limitations, resolve health systems barriers, and maximize the cross-sectoral benefits of the proposed research application.

The cycle is flexible, so that stakeholders can adapt it for their jurisdiction (regional, national, or sub-national) and health system challenges. One Health stakeholders can enter the cycle at multiple points:

- **Step 1:** The design and conduct of studies to address priority research needs that already have been identified.
- **Step 2:** The identification of potential applications of research that already has been conducted and disseminated.
- **Step 6:** The identification of high-priority research needs to address key challenges in human, animal, and environmental health.

The best starting point for research translation will vary depending on the health system issue being addressed, available research findings, governance structures and cultures of involved stakeholder groups, and other factors.

The contributions of researchers versus policymakers to the Research Translation Cycle vary depending on the step as indicated by step color in Figures 1 and 3. Step 1 (design and perform research, light blue shading) is conducted primarily by researchers. Step 5 (apply research findings, intermediate blue shading) is conducted primarily by policymakers. In contrast, the joint input of researchers and policymakers is critical to Steps 2, 3, 4, and 6 (dark blue shading). Some institutions and stakeholders may be involved in both research and policy activities, whereas others are dedicated to research *or* policy activities.

One Health Research Translation Framework

The One Health Research Translation Framework (Figure 2 and Table 1) illustrates how research and policy perspectives and experiences contribute to Steps 2 – 4 and 6 of the Research Translation Cycle. This framework provides a structure for analyzing if and how research findings can be applied to improve human, animal, and/or environmental health. The elements of the framework are organized into three pillars: the **Research Evidence pillar**, **Policy pillar**, and **Integration pillar**, which is supported by the **Communications thread**.

- Elements in the **Research Evidence pillar** draw from the scientific literature and researchers' experience to enable assessment of the relevance and strength of research findings as they relate to policies and programs for preventing and controlling zoonotic diseases or other shared health threats at the human-animal-environment interface.
- Elements in the **Policy pillar** draw from the policy literature and policymakers' knowledge and experience to enable evaluation of health systems needs and the governance structures, current practices, and prevailing cultures in public, animal, and environmental health systems that influence research translation to One Health challenges.
- Elements in the **Integration pillar** involve synthesizing the knowledge and experience of researchers and policymakers about research and local health systems to apply research findings in a locally relevant, effective, and beneficial manner.

- The **Communications thread** involves two-way communication and information-sharing between researchers and policymakers and across sectors about research findings, applications, and health systems needs to support the Integration pillar concepts and activities.

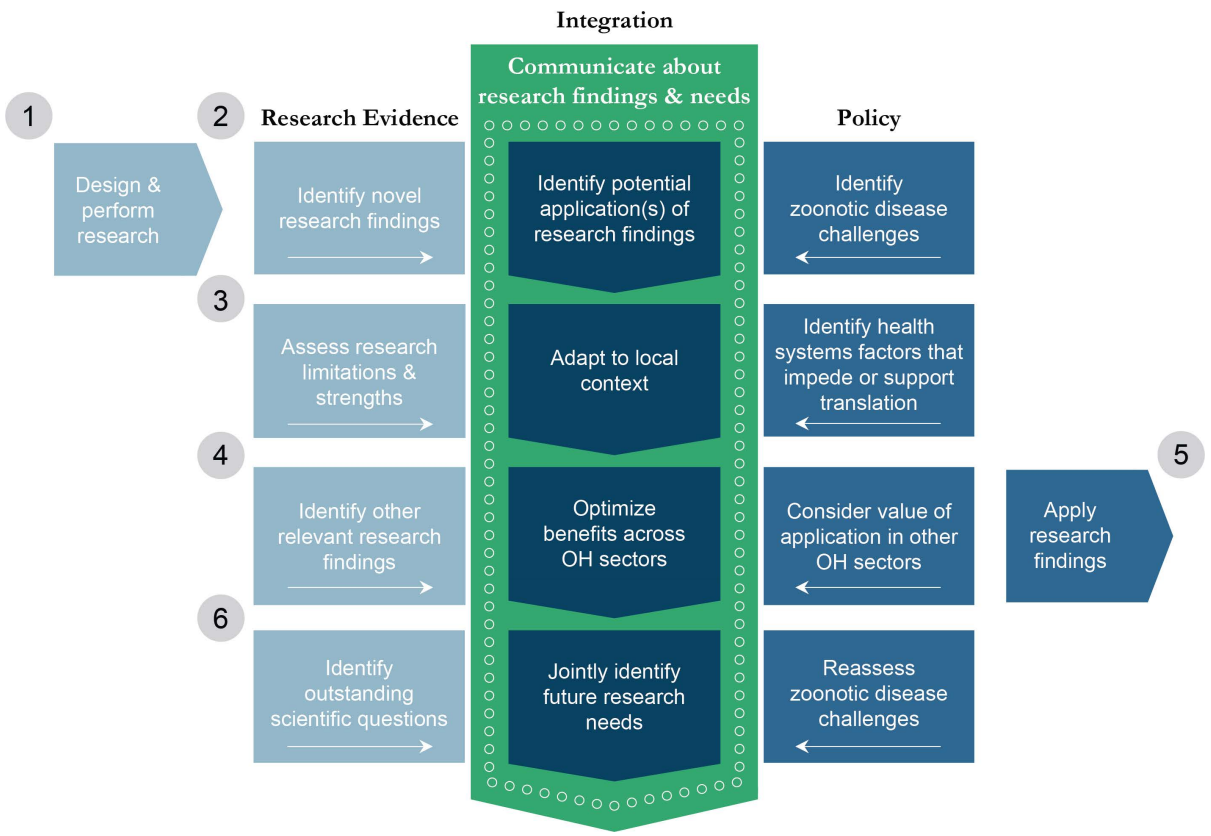


Figure 2. One Health Research Translation Framework describing the integration of researcher and policymaker perspectives and cross-sectoral considerations informing the steps of the Research Translation Cycle. The numbers refer to the steps of the Cycle (Figure 1). The framework includes the six steps in the cycle (boxes drawn as arrows) and sub-steps for steps 2 – 4 and 6 (boxes). Boxes are colored and placed in pillars (columns) based on whether researcher and/or policymaker input or activities are involved in a step or sub-step: light blue shading indicates that the step is carried out by researchers, intermediate blue shading indicates that the step is carried out by policymakers, and dark blue shading indicates that both researchers and policymakers contribute to that step or sub-step. The green arrow depicts the Communications; the open circle line within the green arrow represents cross-pillar communication between researchers and policymakers. The white arrows in the Research Evidence and Policy pillar sub-steps indicate that their outputs directly inform the associated Integration pillar step.

The framework includes all six steps of the Research Translation Cycle (Figure 2, boxes drawn as arrows to indicate the progression of one step to another, as in the cycle). For the steps requiring joint input from researchers and policymakers (steps 2 – 4 and 6), the framework includes additional sub-steps (Figure 2, boxes) describing the specific research and policy activities that provide a foundation for the step (Figure 2, boxes drawn as arrows). The steps and sub-steps are organized into pillars (columns) depending on whether the knowledge, experience, and activities of researchers and/or policymakers play a primary role. In steps 2 – 4 and 6 of the cycle, the Research Evidence and Policy pillar outputs must be evaluated and synthesized as described in the Integration pillar step before advancing to the next step of the cycle.

The table below includes descriptions of the Research Evidence, Policy, and Integration pillar steps and sub-steps in the One Health Research Translation Framework. The descriptions focus on the translation of research to zoonotic disease challenges, which is the focus of these training materials.

Step	Research Evidence Pillar	Integration Pillar	Policy Pillar
1	**Design and perform research.**		
	Design and perform applied research to address gaps in scientific knowledge about zoonotic diseases.		
2	**Identify novel research findings.**	**Identify potential application(s) of research findings.**	**Identify zoonotic disease challenges.**
	Identify novel research findings from the scientific literature and other publicly-available research sources that could be applied to zoonotic disease challenges.	Identify applications of the research findings of interest to policies and programs for preventing, controlling, and/or responding to zoonotic diseases. Consider ways in which the research could strengthen existing policies/programs or help the development of new policies/programs.	Identify policy or field challenges for preventing and controlling zoonotic diseases that could be informed by the research findings of interest.
3	**Assess research limitations and strengths.**	**Adapt to local context.**	**Identify health systems factors that impede or support translation.**
	Identify limitations and strengths of the research methodology and findings that influence its potential for application.	Refine the research application to the needs, culture, and health systems of the target jurisdiction(s). A key aspect of this step is integrating *research* and *policy* knowledge and experience to devise solutions for circumventing or overcoming research limitations and health systems barriers to the application.	Identify factors within the local health systems that may impede or support application of the research findings of interest, such as local policies, health systems infrastructure, and culture.
4	**Identify other relevant research findings.**	**Optimize benefits across One Health sectors.**	**Consider value of application in other One Health sectors.**
	Identify other research findings that could inform the research application, including studies from other disciplines or One Health sectors.	Adapt the research application to maximize its benefits to all One Health sectors by considering effects on other sectors and incorporating relevant research findings and resources from each affected sector.	Determine how the research application may affect other sectors and identify expertise or resources from other sectors that could aid in the design or implementation of the application.

5			**Apply research findings.** Apply research findings to policies and programs for preventing, controlling, and/or responding to zoonotic diseases.
6	**Identify outstanding scientific questions.** Identify outstanding gaps in scientific knowledge related to preventing, detecting, and responding to zoonotic diseases.	**Jointly identify future research needs.** Synthesize information about outstanding scientific knowledge gaps and challenges for zoonotic disease prevention and control to identify and prioritize research needs.	**Reassess zoonotic disease challenges.** Reassess priority zoonotic disease challenge given the prevention, detection, and response capabilities that were strengthened by the research application.

Communications thread: Stakeholder Communication Supporting Research Translation in a One Health Context

Communication supports each step of the Research Translation Cycle, including:

- Cross-pillar communication between researchers and policymakers about: a) research findings that could be applied to strengthen policies and programs for infectious disease prevention and control; and b) research needs to address health systems challenges.
- Cross-sector communication between the human, animal, and environmental health sectors to incorporate One Health considerations into research projects, consider the effects of research applications on other sectors, and adapt research applications with cross-sectoral knowledge, information, or resources.

Figure 3 shows these two “axes” of communication – cross-pillar and cross-sector – which underpin the development of research applications that are locally relevant, effective, and beneficial to human, animal, and environmental health.

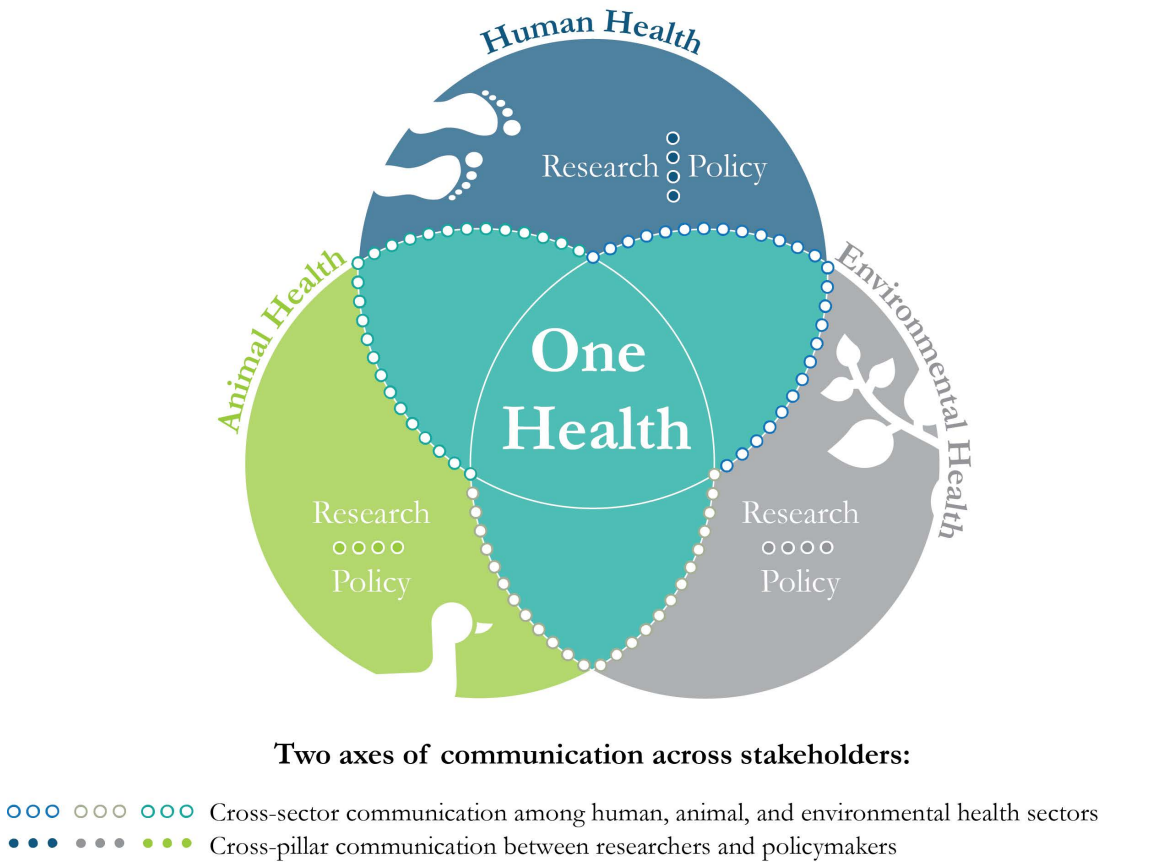


Figure 3. Cross-sector and cross-pillar communication supporting research translation to address One Health challenges. The human, animal, and environmental health sectors are each represented as a circle. Each sector includes researchers and policymakers focusing on research and policy activities relevant to their sector. Lines between overlapping circles represent communication interfaces. The solid lines and open circle lines represent communication interfaces between sectors, while the closed circle lines represent cross-pillar communication interfaces within each sector.

The cycle and framework show the importance of two-way communication and information-sharing between stakeholder groups through the Communications thread (Figure 1, green ring and Figure 2, green arrow). Involving all relevant stakeholder groups throughout the process of research translation to One Health challenges is critical. Cross-sector communication is important throughout the cycle, and cross-pillar communication is especially important in steps 2 – 4 and 6 which require joint input from researchers and policymakers.

Use of the Research Translation Cycle and One Health Research Translation Framework in the training materials

You can use the Research Translation Cycle and One Health Research Translation Framework as tools to explore research translation to public and animal health systems in the case study exercises on highly pathogenic avian influenza and anthrax. The case study exercises begin at Step 2 of the cycle. For these exercises, several publications have been preselected for discussion that describe applied research on HPAI and anthrax in Indonesia. In a small group discussion format, you can use the framework to evaluate if and how the research findings in the selected publications could be applied to HPAI and anthrax policies and programs on prevention and control to reduce the impacts of those diseases in Indonesia.

Beginning the Training Event

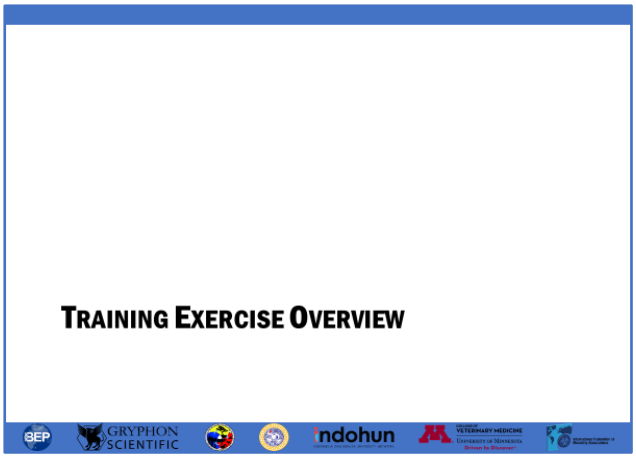
The training event should begin with a presentation of the motivation for the training, learning objectives, key definitions related to research translation and One Health, and the Framework for Research Translation in a One Health Context. This background information is necessary for participants to execute the training activities successfully.

Present the Training Exercise Overview

Begin by introducing the motivation and goals of the training (slides 3 – 11). Then, present the Learning Objectives and Learning Goals. Emphasize that these are the knowledge and skills that participants can expect to gain from the training activities.

This section also includes an overview of the training activities that participants will be completing, ground rules for participation, and a summary of the content of the Participant Packet.

- Recommended time: 10 – 15 mins.



Present the Key Definitions

Present the key definitions (slides 12 – 21). This presentation is important to ensure participants understand the concepts and terms used throughout the materials. You may choose to present a subset of terms that are most relevant to the activities you select and your target audience, or you may present all of the terms. You may supplement your presentation with additional information or examples from your experience.

You may choose to make the presentation of key definitions interactive, as time permits. For example, you could ask participants to discuss their understanding of a term with a neighbor/neighbors prior to presenting the key definition or ask participants how these definitions align with their prior knowledge of the concepts.

- Recommended time: 20 – 30 mins.

Present the Framework for Research Translation in a One Health Context

Present the Framework for Research Translation in a One Health Context (slides 22 – 40). Because this framework guides discussion in the case study exercises and informs all training activities, it is essential for participants to understand this framework and its underlying concepts.

This section presents the framework and associated figures, including: (1) Cross-pillar and cross-sectoral communications figure, (2) Research Translation Cycle figure, and (3) Detailed One Health Research Framework. The slides include a step-by-step breakdown of the Research Translation Cycle and the Detailed One Health Research Translation Framework. When presenting the Detailed Framework, you should emphasize how research and policy perspectives are integrated during the process of research translation. You should also highlight the One Health elements of the Framework, in particular in Step 4. You may supplement the presentation of the framework with additional information or examples from your own experience. At the end of the presentation, allow participants to ask questions and clarify any concepts that participants find unclear.

- Recommended time: 30 – 45 mins.

Facilitator Instructions: Mapping Communication Pathways for Research Translation to Address One Health Challenges

Introduction to Activity

Purpose

To identify, map, and analyze communication pathways between institutions involved in research translation to enhance capabilities for preventing, detecting, or responding to zoonotic diseases in Indonesia.

Learning Goals and Objectives

Learning goal: Recognize key factors that support cross-sectoral communication about how research can be applied to public health and veterinary policy to enhance capabilities for preventing, detecting, and responding to zoonotic diseases in Indonesia.

- *Objective*: Identify key stakeholders and their roles in research translation for preventing, detecting, and responding to zoonotic diseases.
- *Objective*: Identify at least three challenges and potential solutions for two-way communication between researchers and policymakers during research translation to address zoonotic disease challenges.

Overview of Activity

The application of research findings to policies and programs for preventing, detecting, and responding to zoonotic diseases is a complex process that involves many diverse institutions and requires communication and collaboration between researchers and policymakers and across the human, animal, and environmental health sectors. Cross-pillar and cross-sectoral communication about research and health systems practices and needs throughout the research translation cycle is key to the design and implementation of research applications that are locally relevant, effective, and beneficial. This activity uses a systems mapping approach to explore the communication networks needed to support research translation to zoonotic disease challenges in Indonesia. Facilitators will guide participants through a process of identifying, mapping, and analyzing communication pathways between different institutions that are involved in research translation to enhance capabilities for preventing, detecting, and responding to zoonotic diseases. Focusing on a specific governance level, participants will:

- Identify institutions from the research, public health, animal health, and environmental health sectors that participate in research translation;
- Characterize their roles in the research translation process;
- Map communication pathways between institutions including existing and desired pathways; and
- Describe potential challenges to and solutions for communication.

Through these activities, participants will develop the following outputs:

- A list of institutions involved in research translation to prevention and control activities for emerging infectious diseases, characterized by sector and whether the institution focuses on research and/or policy;

- A map describing communication pathways supporting research translation for emerging infectious diseases; and
- A list of at least three challenges to and potential solutions for communicating about research findings, applications, and health systems needs using the pathways identified in the map, which can inform communication strategies supporting research translation.

This communication pathways mapping activity should be conducted before the case study exercises on the translation of research findings from selected publications to challenges for preventing and controlling HPAI and anthrax in Indonesia. The outcomes of the communications activity provide a foundation for the communications thread supporting the research translation cycle. In the case study exercises, participants will draw from the results of and use the skills they have developed through this activity to describe communication pathways and strategies supporting the specific research translation scenarios discussed as part of each case study.

Refer to Appendix 5: Adapting the Training Materials for guidance on how to adapt this activity to focus on a specific disease.

Materials needed:

- Communication pathways mapping activity slide deck, which includes slides for introducing the activity (slides 41 – 49)
- Participant worksheet (one worksheet per participant, included in participant packet)
- Writing utensils for participants
- Large notepad and markers for developing an institutions list and a communication pathway map (one per group)
    - A whiteboard, chalkboard, easel pad, or other large writing surface may be used.

Time to complete activity:

1.5 – 2 hours

How to Facilitate this Activity

To facilitate the communication pathways mapping activity, facilitators will follow the steps below. This activity works best with small groups of 5 to 9 individuals with a mix of professional experience including experience in the research, public health, and animal health sectors. At least one facilitator should be assigned to each small group. Having a second facilitator or designating a group member to take notes while the other facilitator leads the activity may be helpful.

One facilitator will introduce the activity and briefly demonstrate the mapping process to the full group. Each small group facilitator will lead their group through the process of identifying, characterizing, mapping, and analyzing communication pathways between institutions involved in research translation to zoonotic disease challenges (Steps 1 – 6). Each small group will produce three outputs: (1) a list of Indonesian institutions that participate in research translation for emerging infectious diseases; (2) a map describing communication pathways between the listed institutions that support research translation; and (3) a list of at least three challenges and potential solutions for establishing and maintaining communication pathways on the map. During the discussions of each step, facilitators should act as group reporters rather than participants. That is, facilitators should not provide specific answers to the questions in the worksheet, but rather listen to and take notes on participants' ideas to produce summary outputs that reflect the group's thinking. If participants are having difficulty answering a question, you can prompt discussion by asking leading questions, as indicated in the guide below. At the end of the activity, the small groups will reconvene to compare maps and share highlights from their group's discussions.

The lead facilitator for this activity is expected to:

- *At the start of the activity*: introduce and demonstrate the mapping process;

- *At the end of the activity*: facilitate the process of small groups sharing insights from their discussions, once all participants reconvene.

Small group facilitators for this activity are expected to:

- Introduce and lead Steps 1 – 6 of this activity within their small groups;
- Facilitate discussion contributing to Steps 1 – 6 within their small groups;
- Capture the outputs of their small group discussions on large sheets of paper (institutions list and communication pathways map, Steps 2- 6) or in the facilitator worksheet (communication challenges and solutions list, Step 5), as directed in the detailed instructions below.
- Report on the group's findings when the small groups reconvene at the end of the activity or help a designated participant prepare their summary remarks.

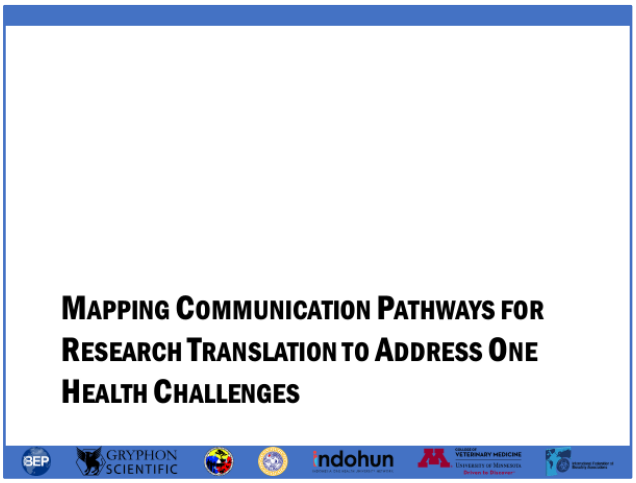
Communication Pathways Mapping Activity

Planning and Preparation

- Review the activity and familiarize yourself with all steps of the process.
- Review the One Health Research Translation Framework and glossary terms, in particular the communications thread component of the Framework and terms related to communication (sector, pillar, One Health stakeholder, and two-way communication). This activity will be conducted after participants are introduced to the Framework and glossary terms and assumes that participants are familiar with both.
- *Lead facilitator only*: Prepare to demonstrate the mapping activity.
    - An example of the mapping process is available in the slide deck (slides 44 – 47). If you would like to use this example, familiarize yourself with the content and ensure that you are comfortable presenting the example.
    - If you prefer to build your own example, begin by selecting a disease to use for the mapping demonstration. Select a disease that is different from the disease(s) that participants will be discussing so as not to preempt the results of this activity (such as vector-borne diseases). The purpose of the demonstration is solely to familiarize participants with the mapping process.
    - Practice developing a simple communication pathways map for that disease that includes 3 – 5 institutions that participate in research translation to prevention and control activities for that disease.
- Based on the size of the training group, determine whether to conduct the activity in small groups. If conducting the activity in small groups, consider pre-assigning trainees to groups to ensure that all sectors and both researchers and policymakers are represented in each group. Assign one or two facilitators to each small group. Having a second facilitator or designating a group member to take notes while the other facilitator leads the activity may be helpful.
- Determine whether each group will be asked to analyze the same governance level. If not, determine whether groups will select their own or be pre-assigned to a specific governance level.

Beginning the Activity

- The lead facilitator will introduce the purpose and learning objectives of the activity, using the activity slides as a reference, and briefly demonstrate the mapping process to the full group.
    - Refer to slides 41 – 49 in the slide deck.
- The lead facilitator will instruct participants to split into the small groups (if necessary).



Activity Part 1: Develop a List of Institutions Involved in Research Translation

Step 1: Select your Governance Level

- Within each group, have participants decide whether to focus on national, provincial, or city/district-level institutions.
- Write your group's selection at the top of a large sheet of paper and have participants circle it in their participant worksheet.

Step 2: Identify the institutions at your selected governance level that could be involved in research translation to prevention, detection, and response activities for the selected disease, including: (1) government institutions involved in research and/or policy activities; (2) public and private universities and other research institutions; (3) intergovernmental organizations; (4) non-profit organizations or institutions; and (5) professional organizations.

- Introduce the step. Give participants in your group five minutes to list institutions in the space provided in the participant's worksheet, on their own. Have participants list as many institutions as they can think of.
    - The list can include multiple departments or faculties within the same organization. Encourage the participants to be as specific as necessary to capture relevant stakeholders.
- After participants have created their lists individually, compile a consensus list on the large sheet of paper.
    - Have participants share institutions on their individual lists and write the combined list of organizations on a large sheet of paper. Be sure to invite quiet participants to share their thoughts.
    - To prompt discussion, consider asking the participants: *Which organizations play a role in prevention, detection or response to emerging infectious diseases? Which organizations conduct research on emerging infectious diseases?*
    - Make the list inclusive. If participants in your small group disagree about whether a particular institution plays a role in research translation, include the institution on your initial list and discuss whether the institution should remain on the list in Step 3, when characterizing the roles of each institution in research translation.
    - Consider photographing the completed list to share with participants after the activity. You may remind participants that the list will be shared with them, although they can take notes on the group's output in their participant's worksheets if they would like.

Step 3: Characterize the role of each institution or department involved in research translation to zoonotic disease prevention, detection, and response activities.

- Introduce the step. In your small group, have participants determine whether the mission of each institution/department focuses primarily on human, animal, or environmental health.
    - On the list developed in Step 2, mark each institution with the appropriate symbol(s):
        - Mark institutions involved in **human health** with □ (square).
        - Mark institutions involved in **animal health** with ○ (circle).
        - Mark institutions involved in **environmental health** with △ (triangle).
        - Mark institutions involved in more than one sector with multiple symbols.
- Have participants determine whether the primary activity (activities) of the institution/department involves research or policy activities.
    - On the list developed in Step 2, mark each institution with the appropriate symbol(s):
        - Mark institutions involved in **research** with * (asterisk).
        - Mark institutions involved in **policy** with ◊ (diamond).
            - Remind participants policy activities may include any aspect of the development, implementation, or evaluation of policies or programs for promoting human, animal, and environmental health.
        - Mark institutions involved in research and policy with both symbols.
- Review the institutions on your list to determine whether all sectors and both the research and policy pillars are represented. If the list is missing institutions from particular sectors or pillars, ask participants in your group to share ideas of institutions from those sectors/pillars that could be involved in research translation to address health challenges for the selected disease.
- Participants may follow along with the group discussion by noting the categorizations in their participant's worksheet.
- Display the institutions list in a place where it can be viewed by the participants. This list will serve as a reference in subsequent steps.

Activity Part 2: Develop a Communication Pathways Map

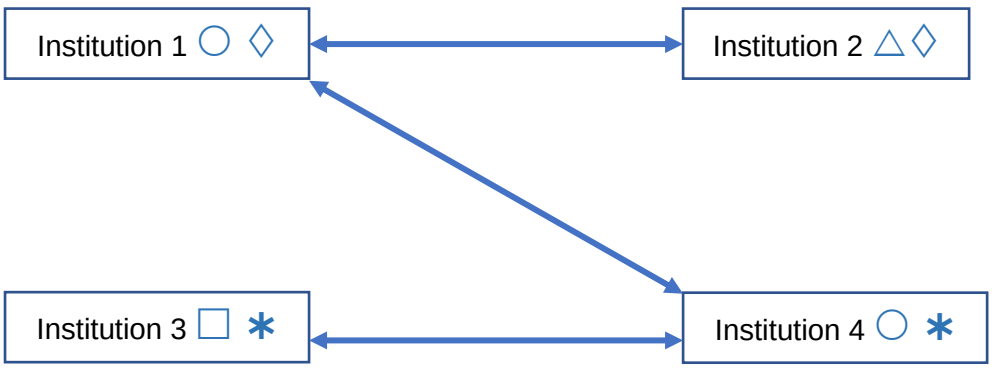
Step 4: Develop a map of existing communication pathways between institutions involved in research translation to zoonotic disease prevention, detection, and response activities.

- Introduce the step. Draw a box for each institution listed in Step 2 on a large sheet of paper, using the symbols above to categorize each institution according to sector and activity.
    - This schematic will serve as the basis of your communications map.
    - When drawing boxes for each institution, space out the boxes, ensuring you leave enough room to write between them.
    - As a group, consider which institutions from your list should be included on the map so that an appropriate and consistent level of institutional specificity is captured. For example, including individual departments within an institution may not be necessary.

- **Example:**

- Considering the institutional roles discussed in Steps 2 and 3, give participants five minutes to think about existing communication pathways between institutions on the map. Consider communication that occurs throughout the research translation cycle.
    - To prompt discussion, ask participants to consider communication for the following purposes:
        - *Communication about research*, including research findings informing the application, research limitations, and outstanding gaps in scientific knowledge?
        - *Communication about health systems*, including policies and programs for zoonotic disease prevention, detection, and response that could be informed by research and systems-level factors that influence research translation?
        - *Communication about effects on other One Health sectors*, including effects of the application on other One Health sectors and information or resources from other sectors that could inform the application?
        - Communication about other facets of the research translation cycle?
- As a small group, on the sheet containing the boxes drawn for each institution, draw linkages between institutions to illustrate existing communication pathways.
    - Draw bi-directional arrows ←→ between institutions that currently communicate, using solid lines (—).

- **Example:**



Step 5: Identify potential challenges and solutions for two-way communication between institutions.

- Introduce the step. Using the communication pathways map created in Step 4, give participants in your group five minutes to consider and take notes on the following questions and identify at least three challenges and potential solutions for two-way communication between institutions.
    - Challenges for establishing new lines of communication between institutions:
        - What new communication pathways need to be established? What strategies can be used to establish new communication pathways?
        - Do you think institutions have adequate resources to dedicate to establishing and maintaining lines of communication?
    - Challenges related to the use of formal versus informal communication mechanisms:
        - Are there defined processes, agreements, or working groups for communication or information sharing between institutions? Or do these communication pathways rely on personal relationships or affiliations?
        - What are the benefits of formal versus informal communication pathways? Are formal or informal communication pathways more effective for sustained two-way communication about research translation?
        - If existing communication pathways are primarily informal, are there opportunities to establish more formal lines of communication?
    - Challenges in communicating between institutions:
        - On average, how many communication pathways did your group identify for a given institution (i.e., how many other institutions are connected to that institution)? Is this number higher or lower than you expected? Do you think institutions will have difficulty dedicating resources to establishing and maintaining these lines of communication?
        - Are there differences in the ways that institutions in different sectors or pillars communicate, considering factors such as expectations for level of formality, institutional hierarchies, and preferred communication formats?
    - What are some potential solutions for the communications challenges you've identified?
- After participants have considered the questions individually, have participants share their answers and discuss as a small group.
    - Have participants refer to the map and use your expertise to help prompt discussion.
    - Capture notes about the key challenges and potential solutions that participants share in the notes section in Appendix 2. Include at least three distinct challenges and potential solutions in your group's list. You will share these findings with the large group when participants convene to compare results, in the next step.

Step 6: Add desired communication pathways to your map.

- As a small group, identify missing communication pathways that are important for research translation to zoonotic disease prevention, detection, and control.
    - Refer to your discussion of communication challenges and solutions (Step 5) to identify communication pathways that are important but do not exist currently.
- Draw bi-directional arrows ←→ between institutions that should be communicating, using dashed lines (- - -).
- Consider photographing the completed communication pathways maps to share with participants after the activity. Additionally, participants may follow along with the mapping process and take their own notes in their participant's worksheet.

Activity Part 3: Compare Results

Step 7: Compare Results

- Twenty to thirty minutes before the end of the allotted time, have all participants reconvene to share and compare institution lists and communication pathway maps.

- Each group's institution list and map should be displayed, and participants and facilitators should be given time to review the other maps and consider:
    - How are communication pathways at different governance levels similar or different?
    - How are the challenges and potential solutions at different governance levels similar or different?
- Facilitators should take notes on answers to the questions above, as well as other interesting trends or observations about the maps in the notes section in Appendix 2.
- Participants will return to their seats, and a representative (facilitator or participant) from each group should share one or two interesting or surprising things that their group learned about communication and One Health.
    - These findings can be drawn from your small group discussion and/or your comparison of communication pathway maps created by the different groups.

After the Activity

- Consider photographing your group's institutions list and communication pathway map to share with participants after the training.

Facilitator Instructions: Anthrax Case Study Exercise

Introduction to Exercise

Purpose

To use published research on anthrax conducted in Indonesia to explore research translation to public health and animal health systems.

Learning Goals and Objectives

- *Learning goal*: Evaluate if and how research can be applied to public health and veterinary policy to enhance capabilities for preventing, detecting, and responding to zoonotic diseases in Indonesia.
    - *Objective*: Describe at least three applications of the research findings in the scientific literature provided to public health and veterinary policy.
    - *Objective*: Identify at least three limitations of the research methodology and findings in the scientific literature provided that weaken their application to public health and veterinary policy.
    - *Objective*: Identify at least three examples of health systems barriers that may prevent, limit, or delay translation of the research findings in the scientific literature provided to public health and veterinary policy.
- *Learning goal*: Recognize key factors that support cross-sectoral communication about how research can be applied to public health and veterinary policy to enhance capabilities for preventing, detecting, and responding to zoonotic diseases in Indonesia.
    - *Objective*: Define research translation in a One Health context.

Overview of Exercise

This case study exercise uses published research conducted in Indonesia to explore research translation to public health and veterinary policy and practice in Indonesia. The case study is based on two publications focused on challenges for anthrax prevention and control in Indonesia, each of which includes at least one author from an Indonesian research institution (see Case Study Publications, below). Participants will identify, analyze, and describe communication pathways to support potential applications of the research findings in these publications using the One Health Research Translation (OHRT) Framework. Participants will answer and discuss a series of questions that guide them through the application of the Framework to the case study publications, including questions for the research evidence, policy, and integration pillars of each step. The importance of integrating researcher and policymaker perspectives to design and implement applications that are locally relevant, effective, and beneficial is a key focus of the questions and discussion. For that reason, the activity focuses on Steps 2-4 and 6 of the OHRT Framework because the integration of research and policy perspectives is especially critical for those steps. Although Steps 1 and 5 are included in the Framework because they are relevant for research translation, neither step is covered in this exercise. The use of local research in this case study means that the research and research applications that are discussed will be highly relevant to participants.

By practicing applying the OHRT Framework to actual research and exchanging feedback with their peers about each other's research translation ideas, participants will learn about the *process* of research translation. Although the case study is focused on anthrax, the OHRT Framework and skills that participants will gain are broadly applicable to research translation to address challenges for preventing and controlling other zoonotic diseases. At the end of this exercise, participants should be able to apply the Framework to new research findings to identify and assess potential research applications, including research findings from their own research or other published literature. After the training, participants are expected to use the Framework and lessons learned from the case study discussions to identify and promote research translation opportunities in their own work, as part of their professional responsibilities. Participants will have an opportunity to practice this skill and

develop a preliminary research translation action plan in the “Using the One Health Research Translation Framework in Your Work” activity at the end of the training.

This exercise will not generate a specific research translation plan for anthrax. Although the literature provided is representative of research on anthrax conducted in Indonesia and was selected because it addresses key challenges in anthrax prevention and control in Indonesia, it is not exhaustive. Additional, more wide-ranging research on the disease, insight into health systems needs, and engagement with affected stakeholders is needed to develop a specific research translation plan for anthrax. The OHRT Framework could inform this process.

Participants do *not* need to have expertise or direct experience in research or policy activities for anthrax to participate in this case study. The facilitator materials for this case study include a short presentation on anthrax that provides background information on the disease, disease impacts in Indonesia, and key challenges for prevention and control of the disease in Indonesia. Additionally, the materials include short presentations for each publication used in the case study which provide additional background information that is relevant to the publication and an overview of the study goal and methods, key findings, and author conclusions. These background materials contain sufficient information for all participants with advanced knowledge of zoonotic diseases (i.e., have or are working toward a post-graduate degree) to read and assess the selected publications. During the training event, facilitators will present the disease and publication overview presentations in advance of the small group discussions to ensure that all participants have sufficient knowledge to engage in the exercise. However, having at least some participants with knowledge of and professional experience in research or policy activities related to anthrax is helpful, as these participants can provide additional insights into the anthrax research landscape and health systems challenges that enrich the group discussions.

Refer to Appendix 5: Adapting the Training Materials for guidance on how to incorporate additional publications or adapt the case study exercise for a different zoonotic disease.

Materials Needed

- Case study slide deck, which includes slides for introducing the exercise, the anthrax overview presentation, and the publication overview presentations (two short presentations, one per publication)
    - Refer to slides 50 – 86.
- Participant Worksheet (one worksheet per participant, included in the participant packet)
- Facilitator Worksheet (one worksheet per small group, Appendix 3)
- Printed copies of the case study publications, to use as a reference during the discussion if needed
- Writing utensils for participants and facilitators

Time to Complete Exercise

- Part 1 – Introduction to exercise, anthrax, and publications: 30 – 45 minutes
- Part 2 – Small group discussion: 1 hour 30 minutes – 2 hours
- Part 3 – Summary discussion: 30 minutes – 45 minutes

Case Study Publications

This case study is based on two publications featuring research on anthrax that were conducted by Indonesian research institutions:

1. Chaerul Basri, Nuning Maria Kiptiyah. Handlers of Susceptible Animals and their Products have a High Risk of Being Infected With Cutaneous Anthrax in Endemic Areas Jurnal Veteriner Desember 2010; Vol. 11 No. 4: 226-231

2. Erwin Kusbianto, Eko Sugeng Pribadi, Abdulgani Amri Siregar. Cost Benefit Analysis and Strategy of Anthrax Control at Sumbawa Island, Province Of West Nusa Tenggara. Jurnal Veteriner Desember 2012; Vol. 13 No. 4: 378-388

How to Facilitate this Exercise

To facilitate this case study exercise, facilitators will follow the steps below. This activity works best with small groups of 5 to 9 individuals with a mix of professional experience including experience in the research, public health, and animal health sectors. At least one facilitator should be assigned to each small group. Having a second facilitator or designating a group member to take notes while the other facilitator leads the exercise may be helpful.

One facilitator will introduce the exercise to the full group and present the disease and publication overview presentations. Each small group facilitator will guide participants in their group through the process of identifying and analyzing potential applications of the research findings in the literature provided by working through the Participant Worksheet for the anthrax case study. The Participant Worksheet is structured similarly to the OHRT Framework. It includes discussion questions associated with the research evidence, policy, and integration pillars for Steps 2-4 and 6 of the Framework. At the start of each step, participants will be given time to read, consider, and take notes on responses to questions associated with all pillars for that step. Small group facilitators will then lead a discussion about answers to all questions before proceeding to the next step. During discussion, facilitators should act as group reporters rather than participants. That is, facilitators should not provide specific answers to the questions in the worksheet but rather listen to and take notes on participants' ideas to produce summary outputs that reflect the group's thinking. Because of the mix of expertise and experience in each small group, participants should be able to address all or nearly all of the questions in the worksheet collectively. If participants are having difficulty answering a question, you can prompt discussion by asking the leading questions included in the facilitator's guide, below. Groups will share highlights and conclusions from their discussion when the full group reconvenes at the end of the activity.

Overview of Case Study Group Discussions

- **Step 1**: Not addressed in group discussions. In this activity, the provided literature represents the output of Step 1 of the One Health Research Translation framework.
- **Steps 2 – 4**: Participants discuss the research evidence, policy, and integration pillar questions before proceeding to the next step.
- **Step 5**: Not addressed in group discussions. The implementation of research applications in public health, animal health, or environmental health systems involves multiple steps, carried out primarily by policymakers, that are addressed in several other frameworks for research translation (see Appendix 1).
- **Step 6**: Participants discuss the research evidence, policy, and integration pillar questions.

Specifically, for each step of the framework, facilitators should:

1. Briefly introduce the step and review the research evidence, policy, and integration pillar components of that step. Answer any questions about the purpose of the step.
2. Give participants 5-10 minutes to read the questions associated with all three pillars in the step. Ask participants to record brief answers in the space provided to refer to during group discussion.
    - This time is intended to allow participants to familiarize themselves with the discussion questions, begin thinking about answers, and organize thoughts for small group discussion.
    - Participants may feel more comfortable answering questions associated with the research evidence or policy pillars depending on their training and professional experience, and integration pillar questions are designed to require input from stakeholders with diverse expertise. You may suggest that participants focus first on the questions in the pillar(s) that is best aligned with their expertise (research or policy) before moving on to consider questions in the other pillars.

    - If a participant struggles to answer a question or sets of questions associated with a certain pillar, assure them that the questions will be discussed as a group and answering all questions individually is not expected.
3. Facilitate group discussion covering all questions in each pillar.
    - Encourage participants to share their individual answers and discuss their responses as a group. Be sure to invite quiet participants to share their thoughts.
    - Supplemental prompts (noted by *blue italicized* text) may be used to encourage and help focus the discussion, if participants are having difficulty answering a question or the discussion diverges from the focus of the worksheet questions. You may use whichever prompts you feel are necessary and/or appropriate, time permitting. Using every supplemental prompt included in the facilitator's guide is not necessary.
    - Capture conclusions and/or highlights of the group discussion on the Facilitators' Worksheet (Appendix 3), which will be a useful resource for sharing key findings and summarizing discussion with the entire audience.

Participants should think about and discuss research findings from one or both publications used in this case study in Step 2. The selected publications provide different types of research findings, enabling participants to discuss applications to a variety of policies and programs for anthrax prevention and control. In Steps 3 and 4, focusing on one or two of the most promising applications is helpful to ensure completion of the exercise in a timely manner. Additional applications can be discussed as time permits. Step 6, the identification of future research needs, can be a broader discussion. Complementary research findings and some research applications could be informed by findings from more than one publication. Small groups can also discuss more than one research application, as time permits.

The lead facilitator for this exercise is expected to:

- *At the start of the activity*: introduce the activity and present the disease and publication overview presentations.
- *At the end of the activity*: facilitate the process of small groups sharing insights from their discussions once all participants reconvene.

Small group facilitators for this exercise are expected to:

- Introduce Steps 2 – 4 and 6 of the OHRT Framework, including the research evidence, policy, and integration pillar components of each step.
- Answer questions from participants as they review and consider the questions associated with each pillar.
- Lead discussion within their small groups of responses to the questions.
- Record responses summarizing the discussions and report key findings to the full group at the end of the exercise.
- Ensure that all steps are discussed in the time allotted.

Anthrax Case Study Exercise

Planning and Preparation

- Review the exercise and familiarize yourself with all discussion questions.
- Read the publications used in the case study. Think about or take notes on answers to the discussion questions, to help you prepare for facilitating discussions on the questions.
- Review the OHRT Framework, including the descriptions of the research evidence, policy, and integration pillar components of each step.
- At least two weeks in advance of the training event, share the publications used in this case study with participants. Participants should have read these publications carefully in advance of the training event.
- *Lead facilitator only*: Review and prepare to present the disease and publication overview presentations.

- Based on the size of the training group, determine whether to conduct the exercise in small groups. If conducting the exercise in small groups, consider pre-assigning trainees to groups to ensure that all sectors and both researchers and policymakers are represented in each group. Assign one or two facilitators to each small group. Having a second facilitator or designating a group member to take notes while the other facilitator leads the exercise may be helpful.

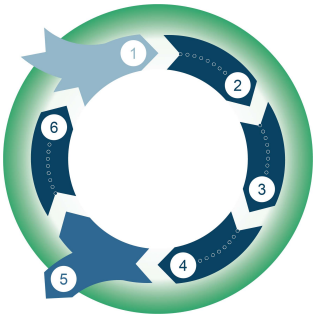
Exercise Part 1: Beginning the Exercise

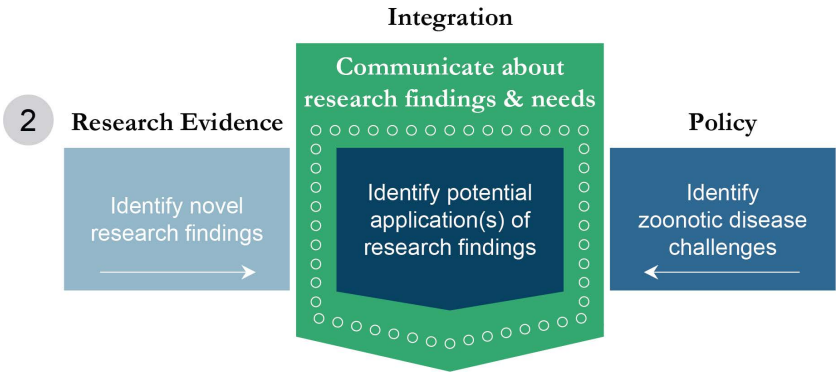
- The lead facilitator for this exercise will introduce the purpose, learning goals and objectives, and format of the exercise using the case study slides as a reference (slides 51 – 53).
- The lead facilitator will present a short introduction to anthrax in Indonesia and present overviews of the selected research publications, using the case study slides (slides 54 – 79).
- The lead facilitator will instruct participants to split into small groups that have been pre-assigned for this exercise (if necessary).
- Group facilitators will lead their groups through the Participant Worksheet. The discussion questions in the Participant Worksheet are listed below. Appendix 3 includes notes sections for facilitators to capture summary notes during the group discussion of each step.

Exercise Part 2: Small Group Discussions

Following the steps described in the “How to Facilitate this Exercise” section above, facilitators will lead their groups through consideration and discussion of the questions associated with Steps 2 – 4 and 6 listed below. Pay attention to the notes included for the steps, which provide guidance for how to facilitate the questions associated with those specific steps. In addition, you may use the supplemental prompts (noted by *blue italicized* text) to encourage and help focus the discussion. Use whichever prompts you feel are necessary and/or appropriate, time permitting.

2 Identify Potential Applications of Research Findings





Step 2 – Research Evidence Pillar: Identify novel research findings

This step identifies novel research findings in the case study publications that could be applied to zoonotic disease challenges. Guide participants through discussion of the following questions:

- What are the key findings of the research?
- How are the findings relevant to policies and programs for preventing, controlling, and/or responding to zoonotic diseases?

Notes:

- Step 2 of the Research Evidence pillar contains questions that were addressed during the introductions to each publication. Participants may review these questions and note any additional key findings or implications of the research that were not identified in the publication summary. During the group discussion, you may briefly review the answers and note any implications identified by participants that differ from those presented in the publication summary.
- Guide participants to identify the research findings *and* their implications for policies and programs for preventing, controlling, and/or responding to zoonotic diseases.
- At the end of this step, your group should select the research findings that are most promising for application to public and animal health policy to discuss during the policy and integration pillar questions for Step 2, to help focus those discussions.

Step 2 – Policy Pillar: Identify zoonotic disease challenges

This step identifies zoonotic disease challenges that could be informed by the research findings in the case study publications. Guide participants through discussion of the following questions:

- What policies and programs for preventing, controlling, and/or responding to zoonotic diseases could be informed by the research findings?
    - *Encourage participants to think back to the anthrax overview presentation, which identified two important strategies for anthrax control that are relevant to the selected publications: community education and outreach and livestock vaccination.*
    - *What types of community education and livestock vaccination programs are ongoing in your district/province? How could these programs be enhanced?*
- What gaps in knowledge limit the design, implementation, or efficacy of these policies and programs?
    - *To inform discussion about community education programs, encourage participants to think about gaps in knowledge related to the content, targeted stakeholders, and delivery of programs.*

- *To inform discussion about livestock vaccination, encourage participants to think about gaps in knowledge related to the efficacy of vaccines or vaccination regimes and the economic benefits of vaccination.*

Step 2 – Integration Pillar: Identify potential application(s) of research findings

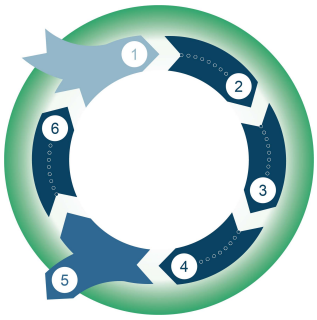
This step identifies applications of research findings in the case study publications that address priority zoonotic disease challenges. Guide participants through discussion of the following questions:

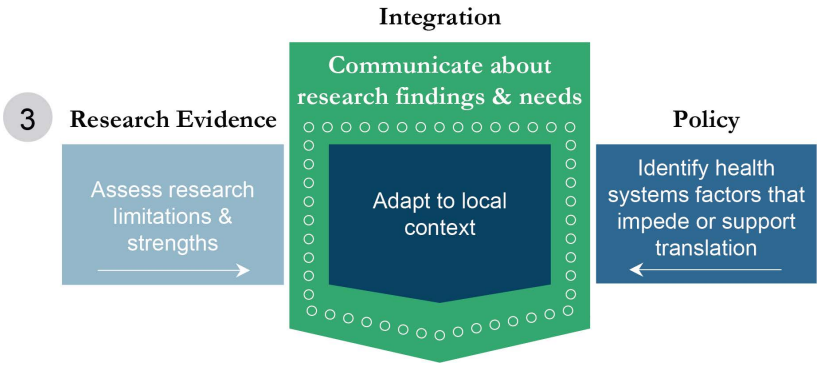
- How could the research findings be used in policies or programs for preventing, controlling, and/or responding to zoonotic diseases? *Consider ways in which the research could strengthen existing policies/programs or help the development of new policies/programs*.
    - *Basri publication example: The findings on high-risk behaviors for cutaneous anthrax could be incorporated into community education programs aiming to increase community awareness and empower people to reduce transmission risks.*
    - *Kusbianto publication example: The findings on the economic benefits of varying levels of anthrax vaccination coverage in livestock could influence livestock vaccination targets established by the district/province.*
- ***Communications thread*:** Who is involved in communication and information sharing in this research translation exercise? How should information be communicated among these stakeholders?
    - It may be useful for participants to refer back to their notes from the communication pathways mapping activity during the discussion of these questions.

Notes:

- Reminding participants of the definition of “research application” in this activity may be useful during this step. A research application is the proposed use of research findings to modify existing or inform the development of new programs, policies, practices, products, or services for preventing, detecting, and responding to zoonotic diseases.
- For the discussion of the Communications thread questions, it may be useful for participants to refer back to their notes from the Communication Pathways Mapping Activity.
- Make sure your small group identifies *at least two* potential applications of the research findings in the selected publications.
- At the end of this step, your group should select one or two specific research applications that the group deems most promising, interesting, or useful to focus on during Steps 3, 4, and 6. As time permits, you can further discuss other research applications discussed during Step 2.

3 Adapt to Local Context





Step 3 – Research Evidence Pillar: Assess research limitations & strengths

This step identifies strengths and limitations of the research methodology and findings in the case study publications that influence its potential for application. Guide participants through discussion of the following questions:

- What are the strengths and limitations of the research findings?
  - Are the findings generalizable to different geographical locations, human or animal populations, pathogens, or pathogen strains?
    - *Basri publication: Are the behaviors examined relevant to all areas of Indonesia? Are there differences in animal slaughtering or animal product handling practices between areas that might impact risk?*
    - *Kusbianto publication: Are the assumptions about the effect of vaccination on anthrax incidence appropriate? Are the cost and income data collected in this study relevant in other districts and provinces?*
  - Will the findings remain relevant over time?
    - *Both publications: When was the study conducted? Are the findings still relevant today, given changes in anthrax incidence and control practices that have occurred since then? Will the findings remain relevant for the next year, five years, or ten years? Why or why not?*
- What other research findings may be available that reinforce the research findings in the selected publications?
- What other research findings may be available that contradict the research findings in the selected publications?
  - *Basri publication: Discuss the findings from other anthrax risk factor studies that were referenced in the publication. For example, the Kazakhstan study referenced identified many of the same risk factors as the Basri study, but found different risk factors to be highest risk (e.g., slaughtering was identified as one of the highest-risk behaviors in the Kazakhstan study but not the Basri study). What are the implications of the similarities and differences in these publications for the proposed research application?*
  - *Kusbianto publication: Are participants aware of other cost-benefit analyses of anthrax vaccination programs conducted in Indonesia or other countries?*
- How did biorisk management considerations affect the design of the selected studies in ways that influence the applicability of findings to zoonotic disease challenges? *For example, consider whether biosafety considerations limited the number of samples collected in the field or the number of animals used in laboratory experiments.*
  - Note: This question is minimally relevant to the selected publications since neither involved work with pathogens or samples containing pathogens.

Notes:

- Focus your initial discussion on the research findings supporting the applications selected by the group at the end of Step 2. As time permits, you can discuss strengths and limitations of other research findings in the case study publications.
- Make sure your small group identifies *at least two* limitations of the research findings in the case study publications that may influence application of the findings.
- Some of the questions in this step require additional literature research. Because participants do not have time to do this during the case study activity, encourage them to discuss the types of studies and research findings they would search for to answer these questions. Participants can also share specific research findings if they are familiar with the fields of study covered in the case study.

Step 3 – Policy Pillar: Identify systems-level factors that impede or support translation

This step identifies factors within the local health systems that may impede or support application of the research findings in the case study publications to zoonotic disease challenges. These factors include local policies, health systems infrastructure, and culture. Guide participants through discussion of how some or all of the following factors may influence implementation of the research applications proposed in Step 2:

- *Infrastructure and Workforce Capacity*: Do local health systems have the appropriate infrastructure and workforce to implement the proposed research application?
    - *Basri publication: Encourage participants to think about the workforce needs for developing and delivering educational messaging about anthrax risks using different formats and/or venues.*
    - *Kusbianto publication: Encourage participants to think about the workforce needs for vaccination programs aiming for varying levels of coverage.*
- *Implementation Resources*: What funding and other resources are needed for sustained implementation of the proposed application?
    - *Both publications: What are the major costs associated with the proposed applications?*
- *Policymaker Knowledge, Attitudes, & Practices*: How do the knowledge, attitudes, and practices of funders and implementers affect the proposed applications?
    - *Encourage participants to think about their experiences with past or current education and outreach programs and vaccination programs for anthrax or other livestock diseases.*
- *Community Adoption*: How do knowledge gaps, attitudes, and existing practices in the community affect community adoption of the proposed application?
    - *Encourage participants to think about their experiences with past or current education and outreach programs and vaccination programs for anthrax or other livestock diseases. What are the key knowledge gaps they have encountered? Has their community been receptive or resistant to education campaigns and livestock vaccination?*
    - *Basri publication: Will attitudes or cultural conventions make it difficult to change the high risk practices identified in the study?*
- *Regulatory Factors:* What regulatory pathways are relevant to the proposed research application (for example, vaccine or drug licensure pathways)? How might the need for regulatory approvals prevent or delay translation of the research?
- *Cross-sector Coordination*: Are there differences in governance, missions, authorities, practices, or attitudes across sectors? How might these differences pose challenges for the coordinated implementation of policies and programs at the human-animal-environmental interface?
    - *Encourage participants to think about past or current examples of cross-sectoral communication related to the prevention and control of anthrax or other livestock diseases. What challenges have they encountered?*

Notes:

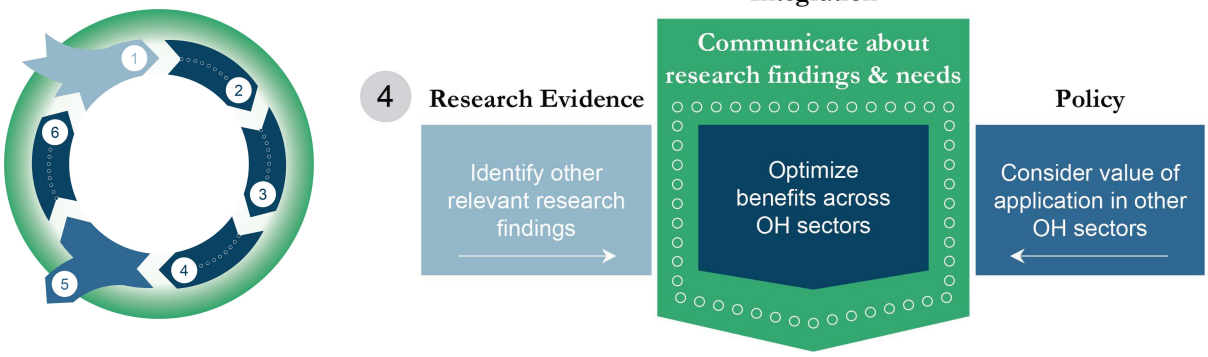
- Focus your initial discussion on the research applications selected by the group at the end of Step 2. As time permits, you can discuss health systems factors that influence implementation of other research applications.
- To work through the discussion of this step in a timely manner, consider asking participants at the outset of the discussion which of the factors listed above is likely to have the greatest effect on the research applications being discussed, and why. The rest of the discussion can then focus on those factors.
- Make sure your small group identifies *at least two* health systems barriers that may prevent, limit, or delay translation of the research findings in the selected publications.

Step 3 – Integration Pillar: Adapt to local context

This step refines the proposed research application based on research and policy knowledge and experience to leverage scientific and health systems enablers and minimize barriers.

- How do the limitations of the research weaken its application to policies and programs for preventing, controlling, or responding to zoonotic disease threats?
    - *Basri publication: How might limitations related to the sample size and lack of specificity in the results lead to uncertainty in which of the behaviors are highest-risk? Does that weaken the translatability of the findings?*
    - *Kusbianto publication: How do weaknesses in the model assumptions, inputs, or outputs influence the results? If significantly, does that weaken the translatability of the findings?*
- How might health systems factors prevent, limit, or delay translation of the research findings?
    - *You may find it useful to prompt participants with the key systems-level barriers discussed during the research evidence and policy pillar questions. Consider how the barriers influence the feasibility of the application.*
- How can the research application be adapted to account for the limitations of the research findings and to circumvent or overcome local health systems barriers?
    - *Basri publication: Encourage participants to think about how the content, targeted audience, or delivery strategy for anthrax education and outreach programs could be adapted.*
    - *Kusbianto publication: Encourage participants to think about whether the vaccination coverage targets recommended in the study or a different level of coverage is most appropriate in their district/province, considering the disease situation and health systems infrastructure.*
- ***Communications thread***: What are the major challenges for two-way communication between stakeholders involved in this research translation exercise? *Consider how differences in governance, missions, authorities, practices, or attitudes between stakeholders may influence communication.*
- ***Communications thread***: What are some potential solutions to overcome challenges for two-way communication?

4 Optimize Benefits Across One Health Sectors



Step 4 – Research Evidence Pillar: Identify other relevant research findings

This step identifies other research findings that could inform the proposed research application. Guide participants through discussion of the following questions:

- What other research findings or types of studies could inform the proposed research application? *Consider studies from other disciplines or One Health sectors.*
    - *Basri publication: Encourage participants to think about studies on knowledge, attitudes, and/or practices of the anthrax-affected community that could inform the design and delivery of education and outreach programs on mitigating high-risk behaviors for cutaneous anthrax.*
    - *Kusbianto publication:*
        - *Are participants aware of studies on the costs of anthrax infection in humans? How should that information be synthesized with the information on livestock-associated costs?*
        - *Encourage participants to think about studies on the efficacy of anthrax vaccination. How could these inform the results of cost-benefit analysis and the translation of the research findings?*

Notes:

- The questions in this step often require additional literature research. Because participants do not have time to do this during the case study activity, encourage them to discuss the types of studies and research findings they would search for to answer these questions. Participants can also share specific research findings if they are familiar with the fields of study covered in this case study.

Step 4: Policy Pillar – Consider value of application in other OH sectors

This step evaluates the relevance and value of the proposed research application in other One Health sectors. Guide participants through discussion of the following questions:

- How does the proposed research application affect other One Health sectors?
    - *Basri publication: How might behavioral changes to reduce risk of cutaneous anthrax in humans also reduce the transmission of anthrax in livestock?*
    - *Kusbianto publication: How might the different vaccination programs influence human infection risks?*
- Do other sectors have expertise or resources that could be used to help design or implement the proposed application?

Notes:

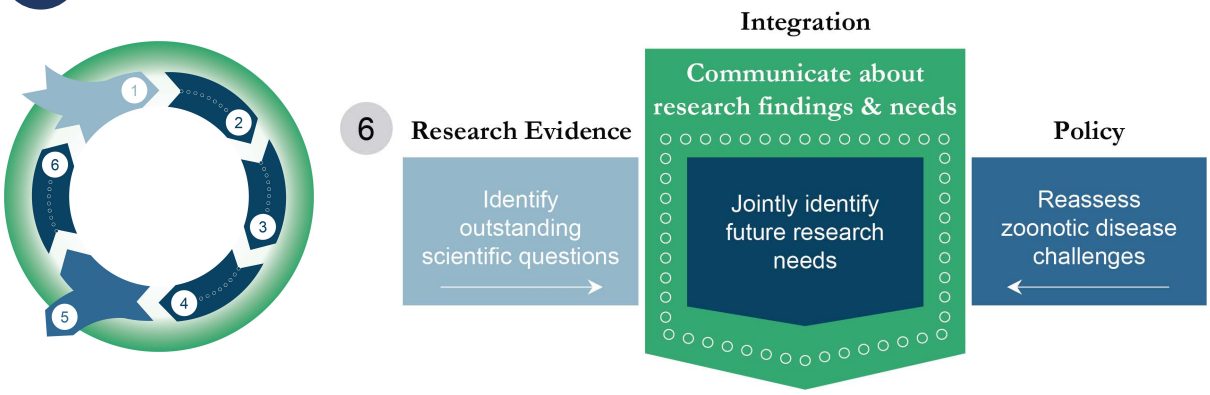
- Because each of these questions focuses on the human-animal interface, participants may have difficulty answering the questions on their own. During the small group discussion, emphasize the importance of synthesizing perspectives from the public health and animal health sectors to address these questions fully.

Step 4 – Integration Pillar: Optimize benefits across One Health sectors

This step adapts the proposed research application to optimize its benefits to all One Health sectors, by considering its cross-sectoral effects and incorporating relevant research findings and resources from each One Health sector. Guide participants through a discussion of the following questions:

- How could the proposed research application be adapted to optimize its benefits across One Health sectors?
    - How could research findings from other disciplines or sectors be incorporated?
    - How could resources from other sectors be used?
    - How could cross-sectoral benefits be maximized?
        - *Encourage participants to think about program content. For example, what additional information could be incorporated into community education and outreach programs to empower the community to reduce anthrax transmission in livestock and to humans?*
        - *Encourage participants to think about program delivery. For example, could educational information be provided at the same time as livestock vaccination to increase efficiency?*

6 Jointly Identify Future Research Needs



Step 6 – Research Evidence Pillar: Identify outstanding scientific questions

This step identifies outstanding gaps in scientific knowledge related to preventing, detecting, and responding to zoonotic diseases. Guide participants through discussion of the following questions:

- What new research findings could:
  - Overcome the limitations of existing research findings?
    - *What new research findings could improve the applicability of the findings to different geographic locations or populations or the relevance of the findings over time?*
  - Strengthen the evidence base for existing policies and programs for preventing, controlling, and responding to zoonotic disease threats?
    - *Encourage participants to think about follow-on studies to the selected publications. For example, what types of studies would help to refine the understanding of high-risk behaviors for cutaneous anthrax infection, underlying mechanisms, and effective mitigation strategies? What types of data or studies could help to refine the understanding of the economic benefits of anthrax vaccination programs in livestock?*
  - Address outstanding gaps in scientific knowledge related prevention and control of zoonotic diseases?

Notes:

- In a real-world research translation scenario, this step will likely be considered after the proposed research application has been implemented, so some information about the effects and efficacy of the application is available. For the discussion, encourage participants to think about how they expect the research application to enhance prevention, detection, and response activities, and how research needs will change in response to those enhancements.

Step 6 – Policy Pillar: Reassess zoonotic disease challenges

This step reassesses priority zoonotic disease challenges given prevention, detection, and response capabilities that were strengthened by the research application. Guide participants through discussion of the following questions:

- What gaps in knowledge limit the success of the proposed research application?
  - *Encourage participants to think about gaps in knowledge, attitudes, and practices related to anthrax disease in humans and livestock and anthrax vaccination that may influence the efficacy of the research application.*
- What outstanding zoonotic disease challenges could be addressed with new research findings?

Step 6 – Integration Pillar: Jointly identify future research needs

This step synthesizes information about scientific knowledge gaps and outstanding zoonotic disease challenges to identify and prioritize research needs. Guide participants through discussion of the following questions:

- What new research findings could support or enhance the proposed research application during or after field testing?
- What types of information, data, and research could address outstanding challenges for preventing, detecting, and responding to zoonotic diseases?
    - What are the key biorisk management considerations for the proposed research?
    - How might these considerations influence the applicability of the findings to prevention, detection, and response activities and how could the research be adapted to overcome these limitations?
- ***Communications thread***: What mechanisms exist to sustain communication about research findings and health systems needs?

Notes:

- In a real-world research translation scenario, this step will likely be considered after the proposed research application has been implemented, so that some information about the effects and efficacy of the application is available. For the discussion, encourage participants to think about how they expect the application(s) discussed to enhance prevention, detection, and response activities, and how research, policy, and program needs and priorities will change in response to those enhancements.

Communications Thread: Two-way communication about research findings and needs

This step allows your group to reflect on the benefits of integrating research and policy perspectives for evaluation of research translation opportunities, challenges for cross-pillar communication, and potential solutions. Guide participants through discussion of the following questions:

- Did your preliminary answers to the integration pillar questions change after discussing the questions with your colleagues? How?
- What new information did you learn from your colleagues from different sectors and/or pillars?
- Did you encounter any challenges in communicating with your small group colleagues from different sectors and/or pillars?
- What are some potential strategies for overcoming those challenges?

Note: You may skip this step if you are completing both case studies. This set of questions can be discussed at the end of the second case study only and should incorporate lessons learned from both case studies

.

Exercise Part 3: Compare Results

Participants will reconvene to share and compare the results of the research translation discussion.

- One representative (facilitator or participant) from each group should share key findings from their small group discussion, including:
    - The research translation examples, research limitations, and health systems barriers discussed by their group;
    - Interesting discussion points about the benefits, challenges, and potential solutions for integrating research and policy perspectives when evaluating research translation opportunities; and
    - Other surprising or interesting discussion points about research translation and One Health.
- As representatives from other groups share the results of their small group discussions, consider how the findings of other groups concur with or differ from your group's conclusions.
- One facilitator should take notes during the summary discussion, which may be shared with participants after the training.

Facilitator Instructions: HPAI Case Study Exercise

Introduction to Exercise

Purpose

To use published research on highly pathogenic avian influenza (HPAI) conducted in Indonesia to explore research translation to public health and animal health systems.

Learning Goals and Objectives

- *Learning goal*: Evaluate if and how research can be applied to public health and veterinary policy to enhance capabilities for preventing, detecting, and responding to zoonotic diseases in Indonesia.
    - *Objective*: Describe at least three applications of the research findings in the scientific literature provided to public health and veterinary policy.
    - *Objective*: Identify at least three limitations of the research methodology and findings in the scientific literature provided that weaken their application to public health and veterinary policy.
    - *Objective*: Identify at least three examples of health systems barriers that may prevent, limit, or delay translation of the research findings in the scientific literature provided to public health and veterinary policy.
- *Learning goal*: Recognize key factors that support cross-sectoral communication about how research can be applied to public health and veterinary policy to enhance capabilities for preventing, detecting, and responding to zoonotic diseases in Indonesia.
    - *Objective*: Define research translation in a One Health context.

Overview of Exercise

This case study exercise uses published research conducted in Indonesia to explore research translation to public health and veterinary policy and practice in Indonesia. The case study is based on four publications focused on HPAI challenges in Indonesia, each of which includes at least one author from an Indonesian research institution (see Case Study Publications, below). Participants will identify, analyze, and describe communication pathways to support potential applications of the research findings in these publications using the One Health Research Translation (OHRT) Framework. Participants will answer and discuss a series of questions that guide them through the application of the Framework to the case study publications, including questions for the research evidence, policy, and integration pillars of each step. The importance of integrating researcher and policymaker perspectives to design and implement applications that are locally relevant, effective, and beneficial is a key focus of the questions and discussion. For that reason, the activity focuses on Steps 2 – 4 and 6 of the OHRT Framework because the integration of research and policy perspectives is especially critical for those steps. Although Steps 1 and 5 are included in the Framework because they are relevant for research translation, neither step is covered in this exercise. The use of local research in this case study means that the research and research applications that are discussed will be highly relevant to participants.

By practicing applying the OHRT Framework to actual research and exchanging feedback with their peers about each other's research translation ideas, participants will learn about the *process* of research translation. Although the case study is focused on HPAI, the Framework and skills that participants will gain are broadly applicable to research translation to address challenges for preventing and controlling other zoonotic diseases. At the end of this exercise, participants should be able to apply the Framework to new research findings to identify and assess potential research applications, including research findings from their own research or other published literature. After the training, participants are expected to use the Framework and lessons learned from the case study discussions to identify and promote research translation opportunities in their own work, as part of their professional responsibilities. Participants will have an opportunity to practice this skill and

develop a preliminary research translation action plan in the “Using the One Health Research Translation Framework in Your Work” activity at the end of the training.

This exercise will not generate a specific research translation plan for HPAI. Although the literature provided is representative of research on HPAI conducted in Indonesia and was selected because it addresses key challenges in HPAI prevention and control in Indonesia, it is not exhaustive. Additional, more wide-ranging research on the disease, insight into health systems needs, and engagement with affected stakeholders is needed to develop a specific research translation plan for HPAI. The OHRT Framework could inform this process.

Participants do *not* need to have expertise or direct experience in research or policy activities for HPAI to participate in this case study. The facilitator materials for this case study include a short presentation on HPAI that provides background information on the disease, disease impacts in Indonesia, and key challenges for prevention and control of the disease in Indonesia. Additionally, the materials include short presentations for each publication used in the case study which provide additional background information that is relevant to the publication and an overview of the study goal and methods, key findings, and author conclusions. These background materials contain sufficient information for all participants with advanced knowledge of zoonotic diseases (i.e., have or are working toward a post-graduate degree) to read and assess the selected publications. During the training event, facilitators will present the disease and publication overview presentations in advance of the small group discussions to ensure that all participants have sufficient knowledge to engage in the activity. However, having at least some participants with knowledge of and professional experience in research or policy activities related to HPAI is helpful, as these participants can provide additional insights into the HPAI research landscape and health systems challenges that enrich the group discussions.

Refer to Appendix 5: Adapting the Training Materials for guidance on how to incorporate additional publications or adapt the case study exercise for a different zoonotic disease.

Materials Needed

- Case study slide deck, which includes slides for introducing the exercise, the HPAI overview presentation, and the publication overview presentations (four short presentations, one per publication)
    - Refer to slides 87 – 142.
- Participant Worksheet (one worksheet per participant, included in the participant packet)
- Facilitator Worksheet (one worksheet per small group, Appendix 4)
- Printed copies of the case study publications, to use as a reference during the discussion if needed
- Writing utensils for participants and facilitators

Time to Complete Activity

- Part 1 – Introduction to exercise, HPAI, and publications: 30 – 45 minutes
- Part 2 – Small group discussion: 1 hour and 30 minutes- 2 hours
- Part 3 – Summary discussion: 30 minutes – 45 minutes

Case Study Publications

This case study is based on four publications featuring research on HPAI that were conducted by at least one researcher from an Indonesian research institution:

1. Dyah Ayu Hewajuli, NLP Indi Dharmayanti. Avian Influenza H5N1 Identification in Avian Species Surrounding Avian Influenza H5N1 Human Cases in Bekasi, West Java, 2011. Jurnal Veteriner 2014 Vol.15 No.1 pp.68-78

2. Atik Ratnawati, NLP Indi Dharmayanti. Detection of Avian Influenza H5N1 Subtype in Live Bird Markets around West Java Province. Jurnal Kedokteran Hewan. 2015;19(1)

3. Kazufumi Shimizu et al. Seroevidence for a High Prevalence of Subclinical Infection With Avian Influenza A(H5N1) Virus Among Workers in a Live-Poultry Market in Indonesia. J Infect Dis. 2016 Dec 15;214(12):1929-1936.

4. Simson Tarigan et al. Field effectiveness of highly pathogenic avian influenza H5N1 vaccination in commercial layers in Indonesia. PLoS One. 2018 Jan 10;13(1):e0190947

How to Facilitate this Exercise

To facilitate this case study exercise, facilitators will follow the steps below. This activity works best with small groups of 5 to 9 individuals with a mix of professional experience including experience in the research, public health, and animal health sectors. At least one facilitator should be assigned to each small group. Having a second facilitator or designating a group member to take notes while the other facilitator leads the exercise may be helpful.

One facilitator will introduce the exercise to the full group and present the disease and publication overview presentations. Each small group facilitator will guide participants in their group through the process of identifying and analyzing potential applications of the research findings in the literature provided by working through the Participant Worksheet for the HPAI case study. The Participant Worksheet is structured similarly to the OHRT Framework. It includes discussion questions associated with the research evidence, policy, and integration pillars for Steps 2 – 4 and 6 of the Framework. At the start of each step, participants will be given time to read, consider, and take notes on responses to questions associated with all pillars for that step. Small group facilitators will then lead a discussion about answers to all questions before proceeding to the next step. During discussion, facilitators should act as group reporters rather than participants. That is, facilitators should not provide specific answers to the questions in the worksheet but rather listen to and take notes on participants' ideas to produce summary outputs that reflect the group's thinking. Because of the mix of expertise and experience in each small group, participants should be able to address all or nearly all of the questions in the worksheet collectively. If participants are having difficulty answering a question, you can prompt discussion by asking the leading questions included in the facilitator's guide, below. Groups will share highlights and conclusions from their discussion when the full group reconvenes at the end of the activity.

Overview of Case Study Group Discussions

- **Step 1**: Not addressed in group discussions. In this activity, the provided literature represents the output of Step 1 of the One Health Research Translation framework.
- **Steps 2 – 4**: Participants discuss the research evidence, policy, and integration pillar questions before proceeding to the next step.
- **Step 3**: Participants discuss the research evidence, policy, and integration pillar questions before proceeding to Step 5.
- **Step 5**: Not addressed in group discussions. The implementation of research applications in public health, animal health, or environmental health systems involves multiple steps, carried out primarily by policymakers, that are addressed in several other frameworks for research translation (see Appendix 1).
- **Step 6**: Participants discuss the research evidence, policy, and integration pillar questions.

Specifically, for each step of the framework, facilitators should:

4. Briefly introduce the step and review the research evidence, policy, and integration pillar components of that step. Answer any questions about the purpose of the step.
5. Give participants 5-10 minutes to read the questions associated with all three pillars in the step. Ask participants to record brief answers in the space provided to refer to during group discussion.

- This time is intended to allow participants to familiarize themselves with the discussion questions, begin thinking about answers, and organize thoughts for small group discussion.
- Participants may feel more comfortable answering questions associated with the research evidence or policy pillars depending on their training and professional experience, and integration pillar questions are designed to require input from stakeholders with diverse expertise. You may suggest that participants focus first on the questions in the pillar(s) that is best aligned with their expertise (research or policy) before moving on to consider questions in the other pillars.
- If a participant struggles to answer a question or sets of questions associated with a certain pillar, assure them that the questions will be discussed as a group and answering all questions individually is not expected.
-

6. Facilitate group discussion covering all questions in each pillar.
    - Encourage participants to share their individual answers and discuss their responses as a group. Be sure to invite quiet participants to share their thoughts.
    - Capture conclusions and/or highlights of the group discussion on the Facilitator Worksheet (Appendix 4), which will be a useful resource for sharing key findings and summarizing discussion with the entire audience.

Participants should think about and discuss research findings from multiple publications used in this case study in Step 2. The selected publications include several different types of research findings, enabling participants to discuss applications to a variety of policies and programs for HPAI prevention and control. Additionally, some of the research findings from different publications are complementary and could inform the same research applications. In Steps 3 and 4, focusing on one or two of the most promising applications is helpful to ensure completion of the exercise in a timely manner. Additional applications can be discussed as time permits. Step 6, the identification of future research needs, can be a broader discussion. complementary research findings, and some research applications could be informed by findings from more than one publication. Small groups can also discuss more than one research application, as time permits.

The lead facilitator for this exercise is expected to:

- *At the start of the exercise*: introduce the exercise and present the disease and publication overview presentations.
- *At the end of the exercise*: facilitate the process of group's sharing insights from their small group discussions once all participants reconvene.

Group facilitators for this exercise are expected to:

- Introduce Steps 2 – 4 and 6 of the OHRT Framework, including the research evidence, policy, and integration pillar components of each step.
- Answer questions from participants as they review and consider the questions associated with each pillar.
- Lead discussion within their small groups of responses to the questions.
- Record responses summarizing the discussions and report key findings to the full group at the end of the activity.
- Ensure that all steps are discussed in the time allotted.

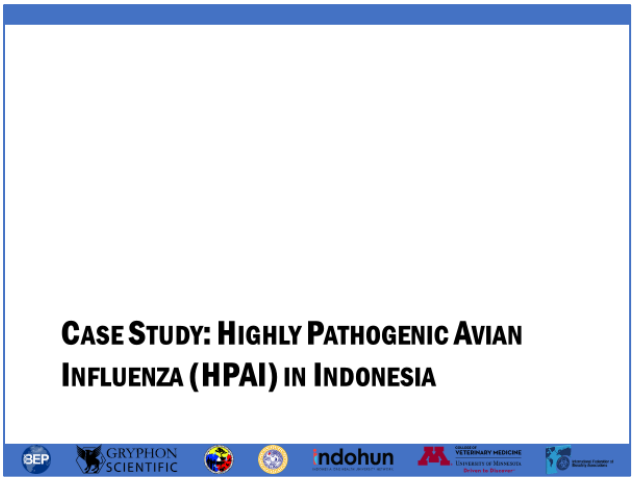
HPAI Case Study Exercise

Planning and Preparation

- Review the exercise and familiarize yourself with all discussion questions.
- Read the publications used in the case study. Think about or take notes on answers to the discussion questions, to help you prepare for facilitating discussions on the questions.

- Review the OHRT Framework, including the descriptions of the research evidence, policy, and integration pillar components of each step.
- At least two weeks in advance of the training event, share the publications used in this case study with participants. Participants should have read these publications carefully in advance of the training event.
- *Lead facilitator only*: Review and prepare to present the disease and publication overview presentations.
- Based on the size of the training group, determine whether to conduct the exercise in small groups. If conducting the activity in small groups, consider pre-assigning trainees to groups to ensure that all sectors and both researchers and policymakers are represented in each group.
- Assign one or two facilitators to each small group. Having a second facilitator or designating a group member to take notes while the other facilitator leads the activity may be helpful.

Exercise Part 1: Beginning the Exercise

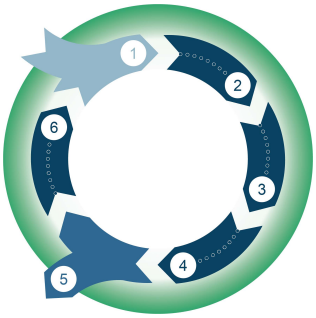


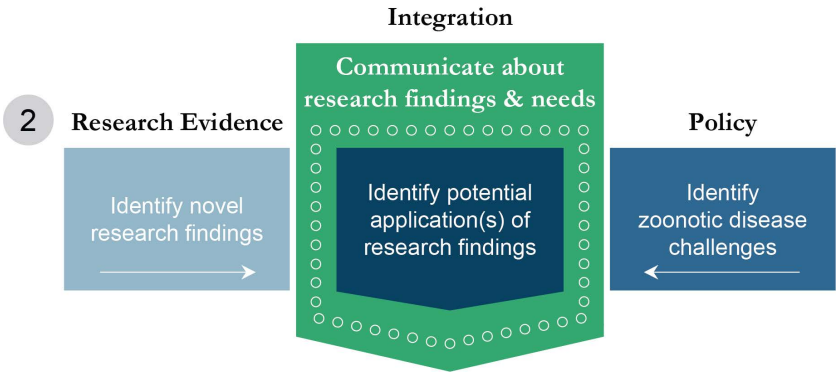
- The lead facilitator for this activity will introduce the purpose, learning goals and objectives, and format of the exercise using the case study slides as a reference (slides 88 – 90).
- The lead facilitator will present a short introduction to HPAI in Indonesia and present overviews of the selected research publications, using the case study slides (slides 91 – 135).
- The lead facilitator will instruct participants to split into small groups that have been pre-assigned for this activity (if necessary).
- Group facilitators will lead their groups through the Participant Worksheet. The discussion questions in the Participant Worksheet are listed below. Appendix 4 includes notes sections for facilitators to capture summary notes during the group discussion of each step.

Exercise Part 2: Small Group Discussions

Following the steps described in the “How to Facilitate this Exercise” section above, facilitators will lead their groups through consideration and discussion of the questions associated with Steps 2 – 4 and 6 listed below. Pay attention to the notes included for the steps, which provide guidance for how to facilitate the questions associated with those specific steps.

2 Identify Potential Applications of Research Findings





Step 2 – Research Evidence Pillar: Identify novel research findings

This step identifies novel research findings in the case study publications that could be applied to zoonotic disease challenges. Guide participants through discussion of the following questions:

- What are the key findings of the research?
- How are the findings relevant to policies and programs for preventing, controlling, and/or responding to zoonotic diseases?

Notes:

- Step 2 of the Research Evidence pillar contains questions that were addressed during the introductions to each publication. Participants may review these questions and note any additional key findings or implications of the research that were not identified in the publication summary. During the group discussion, you may briefly review the answers and note any implications identified by participants that differ from those presented in the publication summary.
- Guide participants to identify the research findings *and* their implications for policies and programs for preventing, controlling, and/or responding to zoonotic diseases.
- At the end of this step, your group should select the research findings that are most promising for application to public and animal health policy to discuss during the policy and integration pillar questions for Step 2, to help focus those discussions.

Step 2 – Policy Pillar: Identify zoonotic disease challenges

This step identifies zoonotic disease challenges that could be informed by the research findings in the case study publications. Guide participants through discussion of the following questions:

- What policies and programs for preventing, controlling, and/or responding to zoonotic diseases could be informed by the research findings?
    - *Encourage participants to think back to the HPAI overview presentation, which identified several important strategies for HPAI control that are relevant to the selected publications: enhancing biosecurity practices in live poultry markets and poultry vaccination.*
    - *What types of programs for enhancing market biosecurity and poultry vaccination are ongoing in your district/province? What are the shortcomings in existing programs? How could these programs be enhanced?*
- What gaps in knowledge limit the design, implementation, or efficacy of these policies and programs?
    - *To inform discussion about market biosecurity, encourage participants to think about gaps in knowledge related to risk factors for transmission in live poultry markets.*

Which areas of the market are most contaminated with HPAI? What practices lead to contamination and transmission of HPAI between birds or to people?
- *To inform discussion about poultry vaccination, encourage participants to think about gaps in knowledge related to the efficacy of different vaccines or vaccination regimes. Since many HPAI vaccines are commercially available and no one vaccine and vaccination regime are recommended, what are the challenges in providing guidance to poultry farmers regarding vaccination strategies?*

Step 2 – Integration Pillar: Identify potential application(s) of research findings

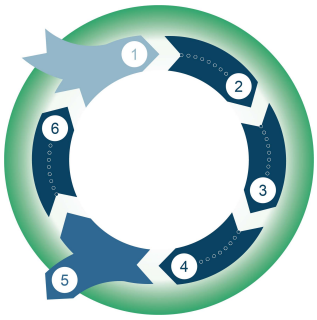
This step identifies applications of research findings in the case study publications that address priority zoonotic disease challenges. Guide participants through discussion of the following questions:

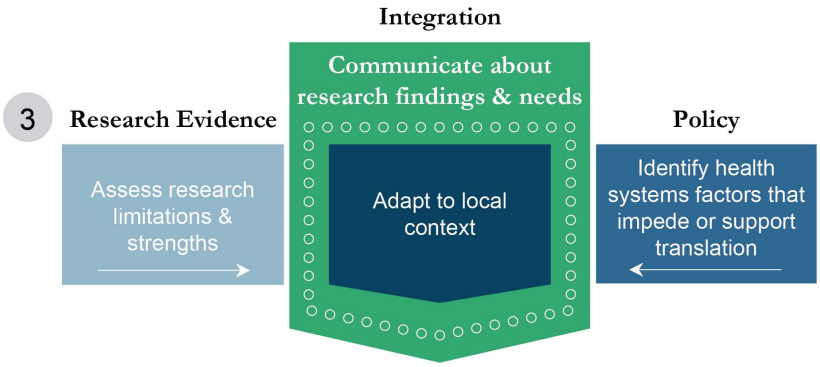
- How could the research findings be used in policies or programs for preventing, controlling, and/or responding to zoonotic diseases? *Consider ways in which the research could strengthen existing policies/programs or help the development of new policies/programs*.
  - *Live poultry market (LPM) publications (Ratnawati, Hewajuli, and Shimizu):*
    - *How could the findings about environmental contamination in markets inform initiatives to enhance sanitation practices in LPMs?*
    - *How could the findings on the high frequency of market poultry shedding and the high level of exposure of LPM workers be communicated to LPM workers to increase their awareness of transmission risks between birds and to people in the market?*
  - *Tarigan publication: How could the findings on the efficacy of different vaccination regimes could inform vaccination recommendations for poultry farmers?*
- ***Communications thread*:** Who is involved in communication and information sharing in this research translation exercise? How should information be communicated among these stakeholders?

Notes:

- Reminding participants of the definition of “research application” in this activity may be useful during this step. A research application is the proposed use of research findings to modify existing or inform the development of new programs, policies, practices, products, or services for preventing, detecting, and responding to zoonotic diseases.
- For the discussion of the Communications thread questions, it may be useful for participants to refer back to their notes from the Communication Pathways Mapping Activity.
- Make sure your small group identifies *at least two* potential applications of the research findings in the selected publications.
- At the end of this step, your group should select one or two specific research applications that the group deems most promising, interesting, or useful to focus on during Steps 3, 4, and 6. As time permits, you can further discuss other research applications discussed during Step 2.

3 Adapt to Local Context





Step 3 – Research Evidence Pillar: Assess research limitations & strengths

This step identifies strengths and limitations of the research methodology and findings in the case study publications that influence its potential for application. Guide participants through discussion of the following questions:

- What are the strengths and limitations of the research findings?
  - Are the findings generalizable to different geographical locations, human or animal populations, pathogens, or pathogen strains?
    - *LPM publications: Encourage participants to think about differences in the frequency of H5/H5N1 detection in samples from markets in different cities and provinces. What are the implications for the generalizability of the findings in LPMs across Indonesia?*
    - *Shimizu publication: Are there differences in the set-up or operations of LPMs in different areas of Indonesia that might influence the generalizability of the H5N1 seroprevalence findings?*
    - *Tarigan publication: Are there differences in the biosecurity practices or operations of commercial poultry farms in other provinces that may limit the generalizability of the findings?*
  - Will the findings remain relevant over time?
    - *LPM publications: These publications tested market samples at one or two timepoints only. Are the results likely to change over time?*
    - *Tarigan publication: How might antigenic changes in circulating strains influence the findings? What about changes to the seed strains used in H5N1 vaccines in response to those antigenic changes?*
- What other research findings may be available that reinforce the research findings in the selected publications?
- What other research findings may be available that contradict the research findings in the selected publications?
  - *LPM publications: How do the findings in these publications about the types and frequency of birds and market materials that are H5N1-positive reinforce or contradict each other? Are you aware of other H5N1 surveillance studies that yielded similar or different results?*
  - *Shimizu publication: Are you aware of other HPAI seroprevalence studies in LPM workers or poultry farmers? Are studies conducted in populations outside Indonesia relevant? Why or why not?*
  - *Tarigan publication: Would results from laboratory studies of HPAI vaccine efficacy be useful in interpreting the results of this study? Why or why not? Are you aware of other field studies of HPAI vaccination conducted in Indonesia or elsewhere? Are field studies conducted outside Indonesia relevant? Why or why not?*
- How did biorisk management considerations affect the design of the selected studies in ways that influence the applicability of findings to zoonotic disease challenges? *For example,*

consider whether biosafety considerations limited the number of samples collected in the field or the number of animals used in laboratory experiments.

- *LPM publications: The Ratnawati, Hewajuli, and Shimizu publications each tested cloacal samples from LPM birds for H5N1.The Shimizu publication used virus isolation while the other publications performed RT-PCR. What are the trade-offs of using virus isolation versus PCR for this type of study, from scientific and biorisk management perspectives?*
- *Tarigan publication: What were the key biosecurity considerations for the HPAI challenge experiments? How did those considerations influence the design of the experiments?*

Notes:

- Focus your initial discussion on the research findings supporting the applications selected by the group at the end of Step 2. As time permits, you can discuss strengths and limitations of other research findings in the case study publications.
- Make sure your small group identifies *at least two* limitations of the research findings in the case study publications that may influence application of the findings.
- Some of the questions in this step require additional literature research. Because participants do not have time to do this during the case study activity, encourage them to discuss the types of studies and research findings they would search for to answer these questions. Participants can also share specific research findings if they are familiar with the fields of study covered in the case study.

Step 3 – Policy Pillar: Identify systems-level factors that impede or support translation

This step identifies factors within the local health systems that may impede or support application of the research findings in the case study publications to zoonotic disease challenges. These factors include local policies, health systems infrastructure, and culture. Guide participants through discussion of how some or all of the following factors may influence implementation of the research applications proposed in Step 2:

- *Infrastructure and Workforce Capacity*: Do local health systems have the appropriate infrastructure and workforce to implement the proposed research application?
  - *All publications: Encourage participants to think about the workforce needs for developing and publicizing recommendations related to LPM biosecurity and poultry vaccination strategies.*
- *Implementation Resources*: What funding and other resources are needed for sustained implementation of the proposed application?
  - *All publications: What are the major costs associated with the proposed applications?*
  - *Tarigan publication: The most effective vaccination regime identified in the paper involves the highest number of vaccinations. How does this impact the cost, time, and other resources needed for implementation of that regime? Is widespread implementation feasible?*
- *Policymaker Knowledge, Attitudes, & Practices*: How do the knowledge, attitudes, and practices of funders and implementers affect the proposed applications?
  - *Encourage participants to think about their experiences for past and current outreach programs related to LPM or farm biosecurity and poultry vaccination for HPAI or other poultry diseases.*
- *Community Adoption*: How do knowledge gaps, attitudes, and existing practices in the community affect community adoption of the proposed application?
  - *Encourage participants to think about their experiences for past and current outreach programs related to LPM or farm biosecurity and poultry vaccination for HPAI or other poultry diseases. What are the key knowledge gaps they have encountered? Has their community been receptive or resistant to poultry vaccination and education initiatives about farm and LPM biosecurity?*

    - *LPM publications: Will attitudes or cultural conventions make it difficult to improve biosecurity practices at LPMs to reduce levels of H5N1 contamination and transmission?*
- *Regulatory Factors:* What regulatory pathways are relevant to the proposed research application (for example, vaccine or drug licensure pathways)? How might the need for regulatory approvals prevent or delay translation of the research?
    - *Regulatory factors related to poultry vaccine production may be relevant to the discussion of the Tarigan publication findings.*
- *Cross-sector Coordination*: Are there differences in governance, missions, authorities, practices, or attitudes across sectors? How might these differences pose challenges for the coordinated implementation of policies and programs at the human-animal-environmental interface?
    - *Encourage participants to think about past or current examples of cross-sectoral communication related to the prevention and control of HPAI or other poultry diseases. What challenges have they encountered?*

Notes:

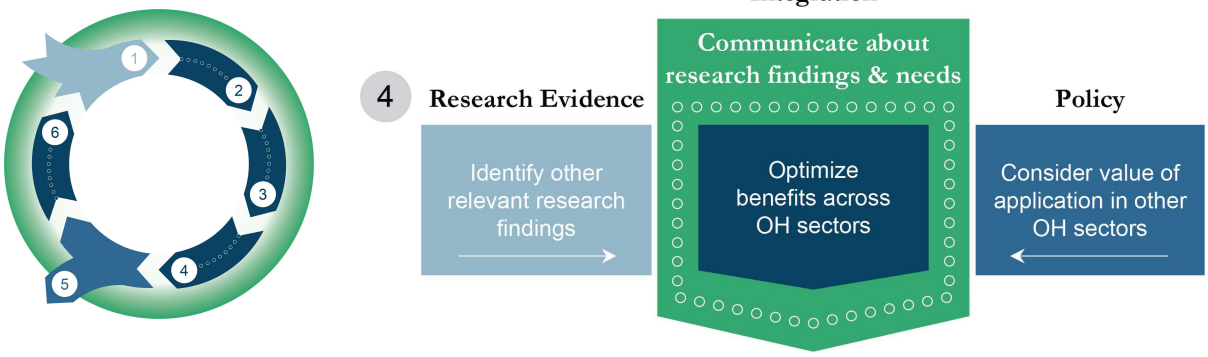
- Focus your initial discussion on the research applications selected by the group at the end of Step 2. As time permits, you can discuss health systems factors that influence implementation of other research applications.
- To work through the discussion of this step in a timely manner, consider asking participants at the outset of the discussion which of the factors listed above is likely to have the greatest effect on the research applications being discussed, and why. The rest of the discussion can then focus on those factors.
- Make sure your small group identifies *at least two* health systems barriers that may prevent, limit, or delay translation of the research findings in the selected publications.

Step 3 – Integration Pillar: Adapt to local context

This step refines the proposed research application based on research and policy knowledge and experience to leverage scientific and health systems enablers and minimize barriers.

- How do the limitations of the research weaken its application to policies and programs for preventing, controlling, or responding to zoonotic disease threats?
    - *You may find it useful to prompt participants with the key limitations discussed during the research evidence pillar questions. Do participants consider the limitation a significant impediment to using the findings in policy? Why or why not?*
- How might health systems factors prevent, limit, or delay translation of the research findings?
    - *You may find it useful to prompt participants with the key health systems barriers discussed during the policy pillar questions. How do the barriers influence the feasibility of the proposed research application(s)?*
- How can the research application be adapted to account for the limitations of the research findings and to circumvent or overcome local health systems barriers?
    - *LPM publications: Encourage participants to think about how the content, prioritization of biosecurity enhancements, targeted audience (for example, LPM workers, managers, and/or customers), and delivery strategy could be adapted.*
    - *Tarigan publication: Encourage participants to think about whether vaccination recommendations could be refined to increase feasibility (for example, further analysis of the paper findings or research to understand whether a smaller number of vaccinations could achieve the same level of protection).*
- ***Communications thread***: What are the major challenges for two-way communication between stakeholders involved in this research translation exercise? *Consider how differences in governance, missions, authorities, practices, or attitudes between stakeholders may influence communication.*
- ***Communications thread***: What are some potential solutions to overcome challenges for two-way communication?

4 Optimize Benefits Across One Health Sectors



Step 4 – Research Evidence Pillar: Identify other relevant research findings

This step identifies other research findings that could inform the proposed research application. Guide participants through discussion of the following questions:

- What other research findings or types of studies could inform the proposed research application? *Consider studies from other disciplines or One Health sectors.*
  - *LPM publications: Would epidemiological studies to identify risk factors for HPAI transmission (between birds and from birds to humans) in markets be useful?*
  - *Tarigan publication: Would surveillance studies evaluating the antigenic match between vaccines and circulating strains be useful? What about studies evaluating poultry farmers' receptiveness to different vaccination regimes?*

Notes:

- The questions in this step often require additional literature research. Because participants do not have time to do this during the case study activity, encourage them to discuss the types of studies and research findings they would search for to answer these questions. Participants can also share specific research findings if they are familiar with the fields of study covered in this case study.

Step 4: Policy Pillar – Consider value of application in other OH sectors

This step evaluates the relevance and value of the proposed research application in other One Health sectors. Guide participants through discussion of the following questions:

- How does the proposed research application affect other One Health sectors?
  - *LPM publications: How might initiatives to enhance LPM biosecurity with the goal of reducing transmission risks to humans also reduce transmission risks between birds?*
  - *Tarigan publication: How might initiatives to increase the efficacy of HPAI vaccination in poultry reduce transmission risks to poultry farmers and consumers?*
- Do other sectors have expertise or resources that could be used to help design or implement the proposed application?

Notes:

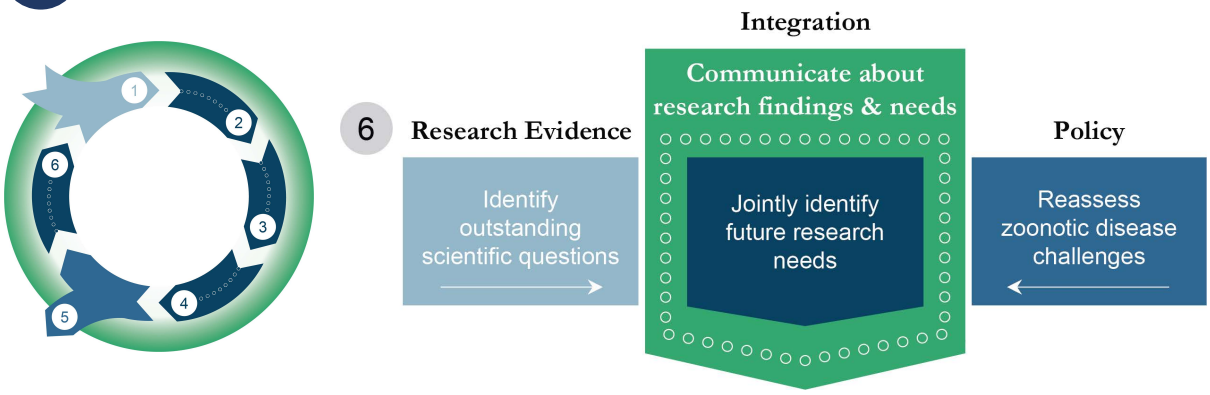
- Because each of these questions focuses on the human-animal interface, participants may have difficulty answering the questions on their own. During the small group discussion, emphasize the importance of synthesizing perspectives from the public health and animal health sectors to address these questions fully.

Step 4 – Integration Pillar: Optimize benefits across One Health sectors

This step adapts the proposed research application to optimize its benefits to all One Health sectors, by considering its cross-sectoral effects and incorporating relevant research findings and resources from each One Health sector. Guide participants through a discussion of the following questions:

- How could the proposed research application be adapted to optimize its benefits across One Health sectors?
    - How could research findings from other disciplines or sectors be incorporated?
    - How could resources from other sectors be used?
    - How could cross-sectoral benefits be maximized?
        - *LPM publications: Encourage participants to think about how efforts to improve LPM biosecurity can be adapted to mitigate transmission risks between birds and from birds to humans.*
        - *Tarigan publication: Poultry vaccination against HPAI not only benefits farmers economically, by reducing their risk of losing birds to illness, but also reduces the risk that they or family members will become infected. How can this benefit be incorporated into outreach to farmers about poultry vaccination to increase compliance?*

6 Jointly Identify Future Research Needs



Step 6 – Research Evidence Pillar: Identify outstanding scientific questions

This step identifies outstanding gaps in scientific knowledge related to preventing, detecting, and responding to zoonotic diseases. Guide participants through discussion of the following questions:

- What new research findings could:
  - Overcome the limitations of existing research findings?
    - *What new research findings could improve the applicability of the findings to different geographic locations or populations or the relevance of the findings over time?*
  - Strengthen the evidence base for existing policies and programs for preventing, controlling, and responding to zoonotic disease threats?
    - *All publications: Encourage participants to think about follow-on studies to the selected publications.*
    - *LPM publications: What types of studies would help to identify risk factors associated with H5N1 positivity in LPM worker, poultry, and environmental samples from LPMs? How would this information help to refine efforts to enhance biosecurity practices at markets?*
    - *Tarigan publication: What types of studies would help refine HPAI vaccination recommendations for poultry, including studies on the efficacy of particular vaccines or vaccination regimes?*
  - Address outstanding gaps in scientific knowledge related prevention and control of zoonotic diseases?

Notes:

- In a real-world research translation scenario, this step will likely be considered after the proposed research application has been implemented, so some information about the effects and efficacy of the application is available. For the discussion, encourage participants to think about how they expect the research application to enhance prevention, detection, and response activities, and how research needs will change in response to those enhancements.

Step 6 – Policy Pillar: Reassess zoonotic disease challenges

This step reassesses priority zoonotic disease challenges given prevention, detection, and response capabilities that were strengthened by the research application. Guide participants through discussion of the following questions:

- What gaps in knowledge limit the success of the proposed research application?
  - *LPM publications: Encourage participants to think about gaps in knowledge about which LPM practices pose the highest risk for HPAI transmission, effective risk*

mitigation strategies, and the knowledge and attitudes of LPM workers and customers about HPAI and biosecurity.
    - *Tarigan publication: Would additional information about poultry farmers' willingness to undertake HPAI vaccination strategies of varying complexity be useful? What about information about how to adapt vaccination regimes to extend protective immunity through the duration of the production period?*
- What outstanding zoonotic disease challenges could be addressed with new research findings?

Step 6 – Integration Pillar: Jointly identify future research needs

This step synthesizes information about scientific knowledge gaps and outstanding zoonotic disease challenges to identify and prioritize research needs. Guide participants through discussion of the following questions:

- What new research findings could support or enhance the proposed research application during or after field testing?
- What types of information, data, and research could address outstanding challenges for preventing, detecting, and responding to zoonotic diseases?
    - What are the key biorisk management considerations for the proposed research?
    - How might these considerations influence the applicability of the findings to prevention, detection, and response activities and how could the research be adapted to overcome these limitations?
- ***Communications thread***: What mechanisms exist to sustain communication about research findings and health systems needs?

Notes:

- In a real-world research translation scenario, this step will likely be considered after the proposed research application has been implemented, so that some information about the effects and efficacy of the application is available. For the discussion, encourage participants to think about how they expect the application(s) discussed to enhance prevention, detection, and response activities, and how research, policy, and program needs and priorities will change in response to those enhancements.

Communications Thread: Two-way communication about research findings and needs

This step allows your group to reflect on the benefits of integrating research and policy perspectives for evaluation of research translation opportunities, challenges for cross-pillar communication, and potential solutions. Guide participants through discussion of the following questions:

- Did your preliminary answers to the integration pillar questions change after discussing the questions with your colleagues? How?
- What new information did you learn from your colleagues from different sectors and/or pillars?
- Did you encounter any challenges in communicating with your small group colleagues from different sectors and/or pillars?
- What are some potential strategies for overcoming those challenges?

Note: Participants should consider their experiences in both the anthrax and HPAI case study exercises when answering these questions.

Exercise Part 3: Compare Results

Participants will reconvene to share and compare the results of the research translation discussion.

- One representative (facilitator or participant) from each group should share key findings from your small group discussion, including:
    - The research translation examples, research limitations, and health systems barriers discussed by their group;
    - Interesting discussion points about the benefits, challenges, and potential solutions for integrating research and policy perspectives when evaluating research translation opportunities; and
    - Other surprising or interesting discussion points about research translation and One Health.
- As representatives from other groups share the results of their small group discussions, consider how the findings of other groups concur with or differ from your group's conclusions.
- One facilitator should take notes during the summary discussion, which may be shared with participants after the exercise.

Facilitator Instructions: Using the One Health Research Translation Framework in Your Work

Introduction to Activity

Purpose

To explore how participants can use the One Health Research Translation (OHRT) Framework in their own work to promote research translation to address zoonotic disease challenges and build their professional One Health network.

Overview of Activity

In this activity, participants will explore how they can use the OHRT Framework to promote research translation to zoonotic disease prevention, detection, and response activities as part of their professional responsibilities. Participants will complete a worksheet that uses the One Health, research translation, and communications concepts underlying the Framework to guide them through an assessment of their One Health research translation network and the identification of research translation opportunities related to their work. Participants will consider if and how they could be involved in research translation by:

- Evaluating their role in research translation at their institution;
- Identifying research translation opportunities that are relevant to their work; and
- Assessing communication pathways in their One Health network that could support research translation.

The activity worksheet includes a series of questions on each of these topics. Participants will answer all questions independently and discuss answers to some of the questions within a small group to receive feedback and additional ideas from their colleagues. This activity will take place after participants have completed:

- A communication pathways mapping activity to identify and analyze communication pathways between institutions to support research translation to One Health challenges, and
- Two case study exercises involving the application of the OHRT Framework to identify and assess potential applications of research findings in published literature.

From these activities, participants developed familiarity with the types of stakeholders and institutions that play a role in research translation to address One Health challenges and developed skills in using the OHRT Framework to identify and analyze research translation opportunities. When answering the worksheet questions in this activity, participants should draw from their existing knowledge and experience and the lessons learned from the communication pathways mapping activity and the case study exercises.

This exercise of critically evaluating research translation opportunities in their own work will deepen participants' understanding of the concept of research translation in a One Health context. It will also reinforce participants' skills in identifying, assessing, and describing communication pathways that support the application of research to zoonotic disease challenges. In addition, the opportunity for participants to practice communicating research findings and needs across pillars and sectors will strengthen participants' skills in communicating about research translation. At the end of the activity, participants will develop a preliminary action plan for how to promote research translation in their own work.

Output

Preliminary Action Plan for promoting research translation to address One Health challenges as part of their professional responsibilities developed by each participant, which describes several concrete actions they can take to explore research translation opportunities relevant to their work.

Materials Needed

- "Using the OHRT Framework in Your Work" slide deck, which includes slides for introducing the activity
    - Refer to slides 143 – 150
- Participant worksheet (one worksheet per participant, included in participant packet)
- Writing utensils for participants

Time to complete activity

1 hour -1 hour 30 minutes

How to Facilitate this Activity

To facilitate the "Using the One Health Research Translation Framework in Your Work" activity, facilitators will follow the steps below. The facilitator will introduce the activity goals and structure. Participants will then split into small groups of 3 – 4 people to work through the activity worksheet. Each group should include participants with research, public health policy, and animal health policy experience to ensure that diverse perspectives contribute to the small group discussions. Each small group will work through the worksheet on their own, while facilitators help manage activity timing and answer any participant questions about the activity.

When completing the worksheets, each participant will answer the questions in Step 1 (Evaluate your Role in Research Translation) independently, using the notes sections provided. Participants will then proceed to Step 2 (Identify Opportunities for Research Translation in Your Work), where participants should elect to answer the researcher-oriented *or* policymaker-oriented questions based on their expertise and professional responsibilities. Each participant will work independently to answer the questions in Part 1 of Step 2 (the individual assessment) using the notes sections provided. Within each small group, participants will then share their answers to the Part 1 questions, provide feedback on each other's answers, and offer additional ideas. The questions listed in Part 2 of Step 2 (small group discussion) should be addressed as part of the feedback discussion, and participants should capture notes from the small group discussion in the notes section provided. Participants will then progress to Step 3 (Assess Communication Pathways in your One Health Networks), which has a similar format to Step 2 (individual assessment followed by small group discussion). After completing Step 3, participants will work independently to develop a preliminary action plan to promote research translation to address One Health challenges in their work in Step 4. At the end of the activity, participants should share their Action Plans with facilitators, who will photocopy the plans and return them to participants. After the training event, facilitators can review the plans to help evaluate participant learning, identify promising opportunities for research translation to address One Health challenges in Indonesia, and inform concrete steps that can be taken to support those research translation opportunities.

The structure of the activity and time allotted to each step is summarized in the table below.

Overview of Using the One Health Research Translation Framework in Your Work Activity		
Step Number	**Format**	**Time (minutes)**
Step 1 Evaluate your Role in Research Translation	Individual Assessment	5 – 10
Step 2 Identify Opportunities for Research Translation in Your Work	Individual Assessment (Part 1)	5 – 10
	Small Group Discussion (Part 2)	15 – 20
Step 3 Assess Communication Pathways in your One Health Networks	Individual Assessment (Part 1)	5 – 10
	Small Group Discussion (Part 2)	15 – 20
Step 4 Develop Preliminary Action Plan for Promoting Research Translation to Address One Health Challenges	Individual Assessment	15 – 20

Facilitators for this activity are expected to:

- Introduce the goals and structure of the activity and answer questions from participants, at the start of the activity (one facilitator only);
- Provide support to small groups that request help during the activity;
- Manage time during the activity to ensure that all steps are discussed during the time allotted;
- Collect and photocopy Preliminary Action Plans from participants at the end of the activity; and
- Synthesize and analyze the findings in the Action Plans after the training event, if desired.

Using the One Health Research Translation Framework in Your Work Activity

Planning and Preparation

- Review the activity and familiarize yourself with all instructions and worksheet questions.
- Review the OHRT Framework, which guides several components of the worksheet questions.
- Determine whether you will pre-assign participants into groups of 3 – 4 people for the small group discussions. If you let participants form their own groups, consider developing a strategy to ensure that each small group will include representatives from the research, public health, and animal health sectors.

Beginning the Activity

- The lead facilitator will introduce the activity, using the activity slide deck as a reference (slides 143 – 150):
    - Describe the goals and outputs of the activity (slides 144 – 145).
    - Introduce the activity structure noting how participants will progress through the participant worksheet, when participants will work independently or in small groups, and that facilitators will indicate when participants should move on to the next step (slides 146 – 150).
- Answer any remaining questions from the participants.
- Direct participants to break into small groups of 3-4 people.

During the Activity

- For each Step in the activity, facilitators should:
    - Introduce each timing and format of each step, using the activity slide deck as a reference (slides 146 – 150).
    - Announce when five minutes of time is remaining and when participants should progress to the next step in the activity. In Steps 2 and 3, the time for the individual assessment and small group discussion components of the Step should be announced and monitored separately.
    - Circulate the room and provide additional support to individuals or small groups who have questions.
- When participants have completed Step 4, ask participants for their Preliminary Action Plans, photocopy the plans, and return them to the participants.

Appendix 1: Additional Information about Research Translation Frameworks

The One Health Research Translation (OHRT) Framework used in these training materials was developed to guide the application of applied research and surveillance findings to community-level challenges at the human-animal-environment interface. It focuses on the *design* of research applications that are locally relevant, beneficial, and effective through the integration of perspectives from researchers and policymakers in the human, animal, and environmental health sectors. Details about the concepts and operational steps of the implementation of research applications are not covered in the OHRT Framework.

Several research translation frameworks have been developed that focus on different aspects of research translation than the OHRT Framework, including: (1) frameworks that focus on "bench-to-bedside" research translation, such as the application of research to clinical practice or medical countermeasure development, (2) frameworks that elaborate on the concepts and steps involved in the implementation of research applications, such as implementation, evaluation, and monitoring, and (3) operational frameworks that focus on implementing One Health approaches. The table below describes and provides references for selected other frameworks that may serve as useful references in your work.

Title of Framework	Key Features of Framework
Translational Research Continuum (T Model) Frameworks[17,18]	• Conceptual frameworks • Organizes research translation into four phases: discovery, evidence-based health practice guidelines, changes in health practice, and overall impact on health outcomes • Often centered on clinical settings and the "bench to bedside" concept • Use case: Using a newly developed drug or medical intervention in the clinic following pre-clinical testing
Knowledge to Action Framework[19,20]	• Conceptual framework • Aligns a knowledge creation "funnel" in which knowledge producers generate and synthesize new knowledge into tools/products and an action cycle which captures steps involved in implementing knowledge tools • Broadly relevant to scenarios involving the use of knowledge in policy and practice • Use case: Developing science-driven innovations for combating maternal and perinatal ill-health
CDC Knowledge 2 Action (K2A) Framework[21,22]	• Conceptual framework adapted from the Knowledge to Action framework to focus on the implementation of research evidence in public health practice

[17] Muin J. Khoury, Marta Gwinn, Paula W. Yoon, Nicole Dowling, Cynthia A. Moore, and Linda Bradley. (2007) The continuum of translation research in genomic medicine: how can we accelerate the appropriate integration of human genome discoveries into health care and disease prevention? *Genetics in Medicine*; 9: 655-674

[18] Russell E. Glasgow, Cynthia Vinson, David Chambers, Muin J. Khoury, Robert M. Kaplan, and Christine Hunter. (2012) National Institutes of Health Approaches to Dissemination and Implementation Science: Current and Future Directions. *Am J Public Health*; 102(7): 1274-1281.

[19] Ian D. Graham, Jo Logan, Margaret B. Harrison, Sharon E. Straus, Jacqueline Tetroe, Wenda Caswell, and Nicole Robinson. (2006) Lost in Knowledge Translation: Time for a Map? *J Contin Educ Health Prof*; 26(1): 13-24.

[20] Becky Field, Andrew Booth, Irene Ilott, and Kate Gerrish. (2014) Using the Knowledge to Action Framework in practice: a citation analysis and systematic review. *Implement Sci* 9: 172.

[21] Wilson KM, Brady TJ, Lesesne C, on behalf of the NCCDPHP Work Group on Translation. An organizing framework for translation in public health: the Knowledge to Action Framework. Prev Chronic Dis 2011;8(2):A46. http://www.cdc.gov/pcd/issues/2011/mar/10_0012.htm. Accessed September 12, 2018

[22] Centers for Disease Control and Prevention. Applying the Knowledge to Action (K2A) Framework: Questions to Guide

	• Organizes research translation into three phases: research, translation, and institutionalization • Identifies the decision points, interactions, and supporting structures for moving research discoveries through efficacy trials, effectiveness studies, dissemination, practice, and institutionalization • Use case: Using research discovery to inform the development and implementation of public health programs targeting chronic heart disease
Promoting Action on Research Implementation in Health Services (PARiHS)[23,24]	• Conceptual framework • Organizes research translation into three phases: evidence, focusing on assessing the nature and strength of the evidence for implementation; context, focused on understanding the environment or setting within which evidence-driven changes in clinical practice occur; and facilitation, focusing on knowledge translation strategies to enable attitudes, habits, and practices that support translation • Use cases: Uptake of research evidence in improving quality of clinical care in rehabilitation facility
WorldBank One Health Operational Framework[25]	• Operational framework • Provides operational guidance for the implementation and application of the One Health approach to strengthen human, animal, and environmental public health systems • Not focused on research translation explicitly, but guidance is relevant to implementing a One Health approach and the implementation of research applications to One Health challenges • Use case: Cross-sector collaboration to implement program for the early identification of yellow fever risks

Planning. Atlanta, GA: Centers for Disease Control and Prevention, US Dept of Health and Human Services; 2014. PDF available at https://www.cdc.gov/chronicdisease/pdf/K2A-Framework-6-2015.pdf

[23] Alison Kitson, Gill Harvey, and Brendan McCormack. (1998) Enabling the implementation of evidence based practice: a conceptual framework. *Quality in Health Care*; 7: 149-158

[24] National Collaborating Centre for Methods and Tools (2011). PARiHS framework for implementing research into practice. Hamilton, ON: McMaster University. (Updated September 18, 2017) Retrieved from http://www.nccmt.ca/resources/search/85

[25] Franck Cesar Jean Berthe, Timothy Bouley, William B. Karesh, Francois G. Le Gall, Catherine Christina Machalaba, Caroline A. Aurelie Plante, and Richard M. Seifman. (2018). Operational framework for strengthening human, animal and environmental public health systems at their interface. Washington, D.C.: World Bank Group. http://documents.worldbank.org/curated/en/703711517234402168/Operational-framework-for-strengthening-human-animal-and-environmental-public-health-systems-at-their-interface

Appendix 2: Facilitator Worksheet: Mapping Communication Pathways for Research Translation to Address One Health Challenges

This document is intended to be used to take notes during the communication pathways mapping activity. Use this worksheet to capture highlights and conclusions as your small group advances through the discussion questions. These notes will serve as a useful reference when you share the results of your small group discussion with the larger audience and will be provided to participants following the activity.

Step 5: Identify potential challenges and solutions for two-way communication between institutions.	
Challenges:	**Potential Solutions:**

Additional Notes:

Step 7: Compare Results

Comparison Notes:

Appendix 3: Facilitator Worksheet: Anthrax Case Study

This document is intended to be used to take notes during the small group discussions for the anthrax case study. Use this worksheet to capture highlights and conclusions as your small group advances through the discussion questions. These notes will serve as a useful reference when you share the results of your small group discussion with the larger audience.

2 Identify Potential Applications of Research Findings

Research Evidence Pillar: Identify novel research findings

Discussion Summary:

Policy Pillar: Identify zoonotic disease challenges

Discussion Summary:

Integration Pillar: Identify potential application(s) of research findings

Make sure your small group identifies *at least two* potential applications of the research findings in the selected publications.

Discussion Summary:

3 Adapt to Local Context

Research Evidence Pillar: Assess research limitations & strengths

Make sure your small group identifies *at least two* limitations of the research findings in the selected publications that may influence the translation of the findings.

Discussion Summary:

Policy Pillar: Identify systems-level factors that impede or support translation

Make sure your small group identifies *at least two* systems-level barriers that may prevent, limit, or delay translation of the research findings in the selected publications.

Discussion Summary:

Integration Pillar: Adapt to local context

Discussion Summary:

4 Optimize Benefits Across One Health Sectors

Research Evidence Pillar: Identify other relevant research findings

Discussion Summary:

Policy Pillar: Consider value of application in other OH sectors

Discussion Summary:

Integration Pillar: Optimize benefits across One Health sectors

Discussion Summary:

6 Jointly Identify Future Research Needs

Research Evidence Pillar: Identify outstanding scientific questions

Discussion Summary:

Policy Pillar: Reassess zoonotic disease challenges

Discussion Summary:

Integration Pillar: Jointly identify future research needs

Discussion Summary:

Appendix 4: Facilitator Worksheet: HPAI Case Study

This document is intended to be used to take notes during the small group discussions for the HPAI case study. Use this worksheet to capture highlights and conclusions as your small group advances through the discussion questions. These notes will serve as a useful reference when you share the results of your small group discussion with the larger audience.

2 Identify Potential Applications of Research Findings

Research Evidence Pillar: Identify novel research findings

Discussion Summary:

Policy Pillar: Identify zoonotic disease challenges

Discussion Summary:

Integration Pillar: Identify potential application(s) of research findings

Make sure your small group identifies *at least two* potential applications of the research findings in the selected publications.

Discussion Summary:

3 Adapt to Local Context

Research Evidence Pillar: Assess research limitations & strengths

Make sure your small group identifies *at least two* limitations of the research findings in the selected publications that may influence the translation of the findings.

Discussion Summary:

Policy Pillar: Identify systems-level factors that impede or support translation

Make sure your small group identifies *at least two* systems-level barriers that may prevent, limit, or delay the translation of the research findings in the selected publications.

Discussion Summary:

Integration Pillar: Adapt to local context

Discussion Summary:

4 Optimize Benefits Across One Health Sectors

Research Evidence Pillar: Identify other relevant research findings

Discussion Summary:

Policy Pillar: Consider value of application in other OH sectors

Discussion Summary:

Integration Pillar: Optimize benefits across One Health sectors

Discussion Summary:

6 Jointly Identify Future Research Needs

Research Evidence Pillar: Identify outstanding scientific questions

Discussion Summary:

Policy Pillar: Reassess zoonotic disease challenges

Discussion Summary:

Integration Pillar: Jointly identify future research needs

Discussion Summary:

Appendix 5: Adapting the Training Materials

Adapting the Communication Pathways Mapping Activity

The “Mapping Communication Pathways for Research Translation to Address One Health Challenges” activity instructions and worksheets included in this packet focus on emerging zoonotic diseases generally, but the activity can be adapted to focus on one of the case study diseases (anthrax or HPAI) or another zoonotic disease of interest. You may assign participants a disease or allow them to choose from a list of relevant diseases. Using the same instructions, participants will list institutions involved in research, prevention, or control efforts for the selected disease and draw a map of communication pathways between those institutions.

Adapting the Case Study Exercises

The case study exercises included in this training packet focus on anthrax and HPAI and include two (anthrax) or four (HPAI) publications from Indonesian research institutions for evaluation during the exercise. These publications were selected based on the quality of the research, relevance to key challenges for anthrax and HPAI prevention and control, and use of a One Health approach. The case studies may be adapted to incorporate other publications on HPAI or anthrax or address different zoonotic diseases. If you would like to substitute or add a publication on anthrax or HPAI, the publication should be evaluated using the selection criteria described above. The case study exercises work best with high-quality publications that relate to the local context and have potential applications to multiple One Health sectors. Additionally, you may wish to prepare a short presentation on the study, including an overview of the methodology, key findings, and conclusion, similar to the presentations included in this training package for the pre-selected publications. This presentation will be given at the start of the case study exercise to ensure that all participants are familiar with the study.

If you would like to adapt the case study exercise for a different zoonotic disease, you should select a new set of publications to serve as the basis of the case study discussion. The case study exercise works best with two to four publications, including publications with research findings that relate to each other and could be integrated to inform the same or similar policies and programs for disease prevention and control. Depending on the experience of your training group, presenting an introduction to the zoonotic disease of interest at the start of the case study exercise may be useful to ensure that all participants have sufficient understanding of the disease biology and field challenges to participate in the research translation discussion. The current training package has short introductory presentations (10 – 12 slides) to anthrax and HPAI, which include information on the pathogen, disease manifestations in humans and animals, disease situation in Indonesia, and strategies for prevention and control of the disease. Similar presentations could be developed for other zoonotic diseases of interest. When substituting or adding publications on anthrax or HPAI or focusing on a different zoonotic disease, the case study discussion questions will remain the same. You may wish to provide publication-specific sample answers or prompts for facilitators to use when guiding the discussion.