

Participant Packet

Training Exercise: Research Translation to Address One Health Challenges

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



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Introduction to Training Event

The goal of this One Health Research Translation training event is to grow your skills in translating research to enhance capabilities for preventing, detecting, and responding to zoonotic disease threats. You 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, you 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 your work and providing a foundation for you to use the local research capacity to address zoonotic disease challenges after the training 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 your 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.

Introduction

- 4) Using the One Health Research Translation Framework in Your Work Activity: Exploring how you can promote research translation to address zoonotic disease challenges in your work and build your professional One Health research translation network.

You will complete these activities with a mixed group of trainees representing the research, public health, and animal health sectors. Each activity involves small group discussions and requires participants from different sectors to share their perspectives and experiences to complete the activity, enabling you to learn from each other's expertise. 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 the perspectives of researchers and policymakers 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 opportunities for you to network with fellow participants in order to grow your One Health research translation network.

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.

Overview of Participant Packet

This participant packet includes the information and worksheets you will need to complete all training 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) Descriptions of and instructions for each training activity;
- 3) Worksheets for completing the activities and taking notes; and
- 4) Blank notes pages for taking additional notes throughout the training.

Additionally, you should have received and reviewed in advance of the training event the six articles upon which the case study exercises are based (not included in this packet).

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.

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.

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

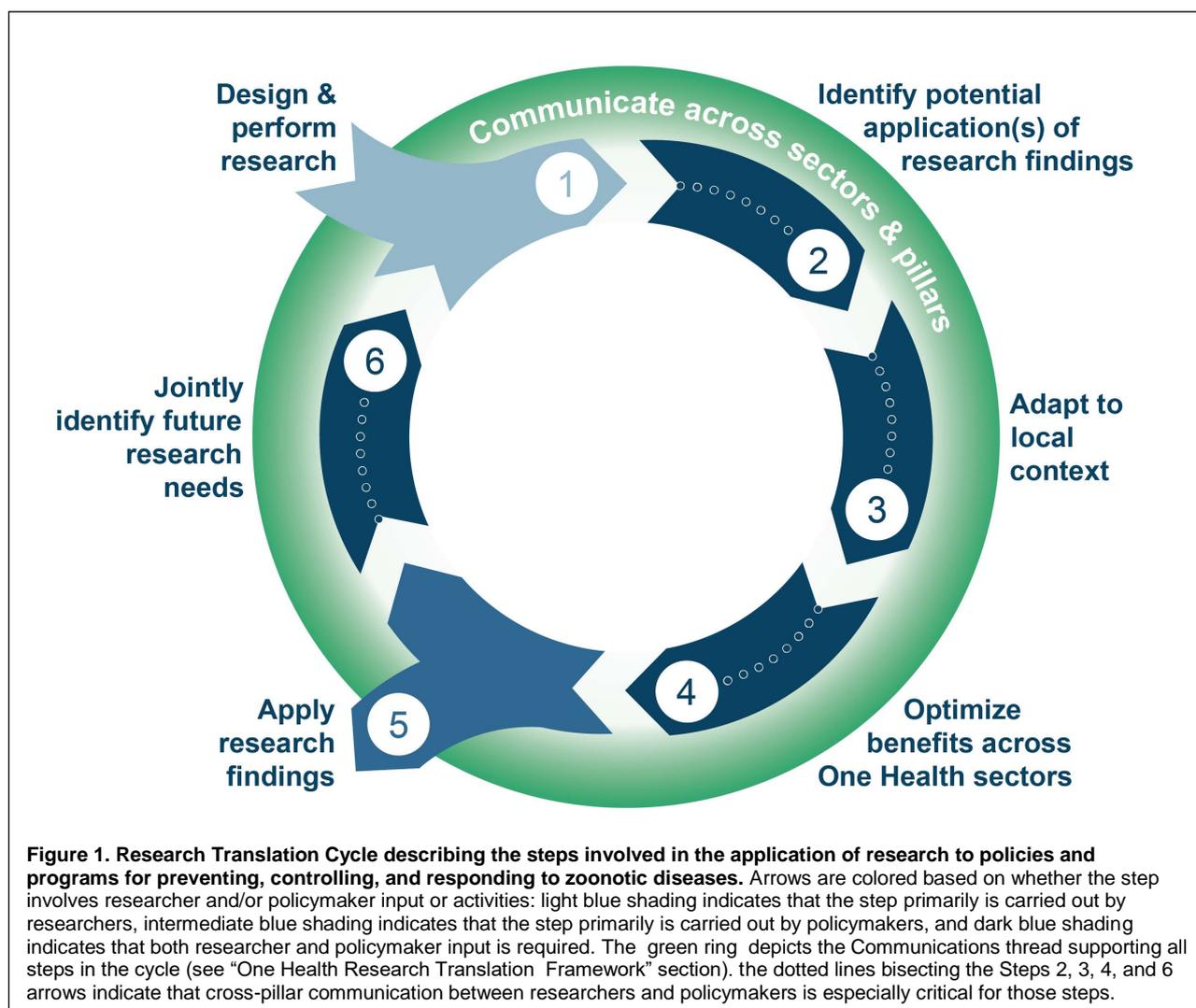
The cycle and framework synthesize and adapt elements from existing research translation and knowledge translation frameworks to focus on the application of *applied research* to *community-level challenges* in health systems and account for the multi-sectoral nature of research translation in a One 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.



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 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.

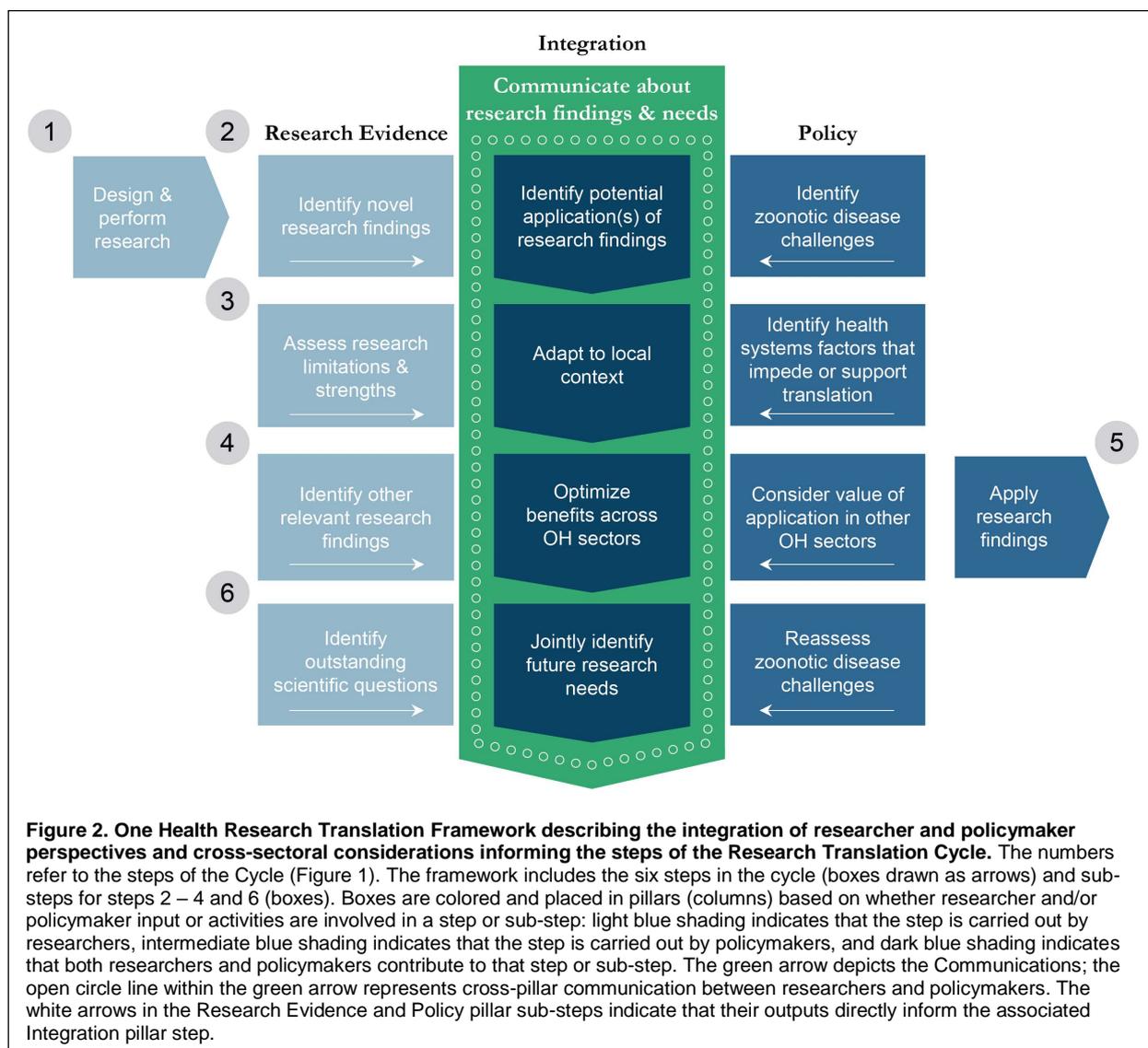
The contributions of researchers versus policymakers to the Research Translation Cycle vary depending on the step as indicated by step color in Figures 1 and 3. Step 1 (design and perform research, light blue shading) is conducted primarily by researchers. Step 5 (apply research findings, intermediate 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.



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	<p>Design and perform research.</p> <p>Design and perform applied research to address gaps in scientific knowledge about zoonotic diseases.</p>		
2	<p>Identify novel research findings.</p> <p>Identify novel research findings from the scientific literature and other publicly-available research sources that could be applied to zoonotic disease challenges.</p>	<p>Identify potential application(s) of research findings.</p> <p>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.</p>	<p>Identify zoonotic disease challenges.</p> <p>Identify policy or field challenges for preventing and controlling zoonotic diseases that could be informed by the research findings of interest.</p>
3	<p>Assess research limitations and strengths.</p> <p>Identify limitations and strengths of the research methodology and findings that influence its potential for application.</p>	<p>Adapt to local context.</p> <p>Refine the research application to the needs, culture, and health systems of the target jurisdiction(s). A key aspect of this step is integrating <i>research</i> and <i>policy</i> knowledge and experience to devise solutions for circumventing or overcoming research limitations and health systems barriers to the application.</p>	<p>Identify health systems factors that impede or support translation.</p> <p>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.</p>
4	<p>Identify other relevant research findings.</p> <p>Identify other research findings that could inform the research application, including studies from other disciplines or One Health sectors.</p>	<p>Optimize benefits across One Health sectors.</p> <p>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.</p>	<p>Consider value of application in other One Health sectors.</p> <p>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.</p>

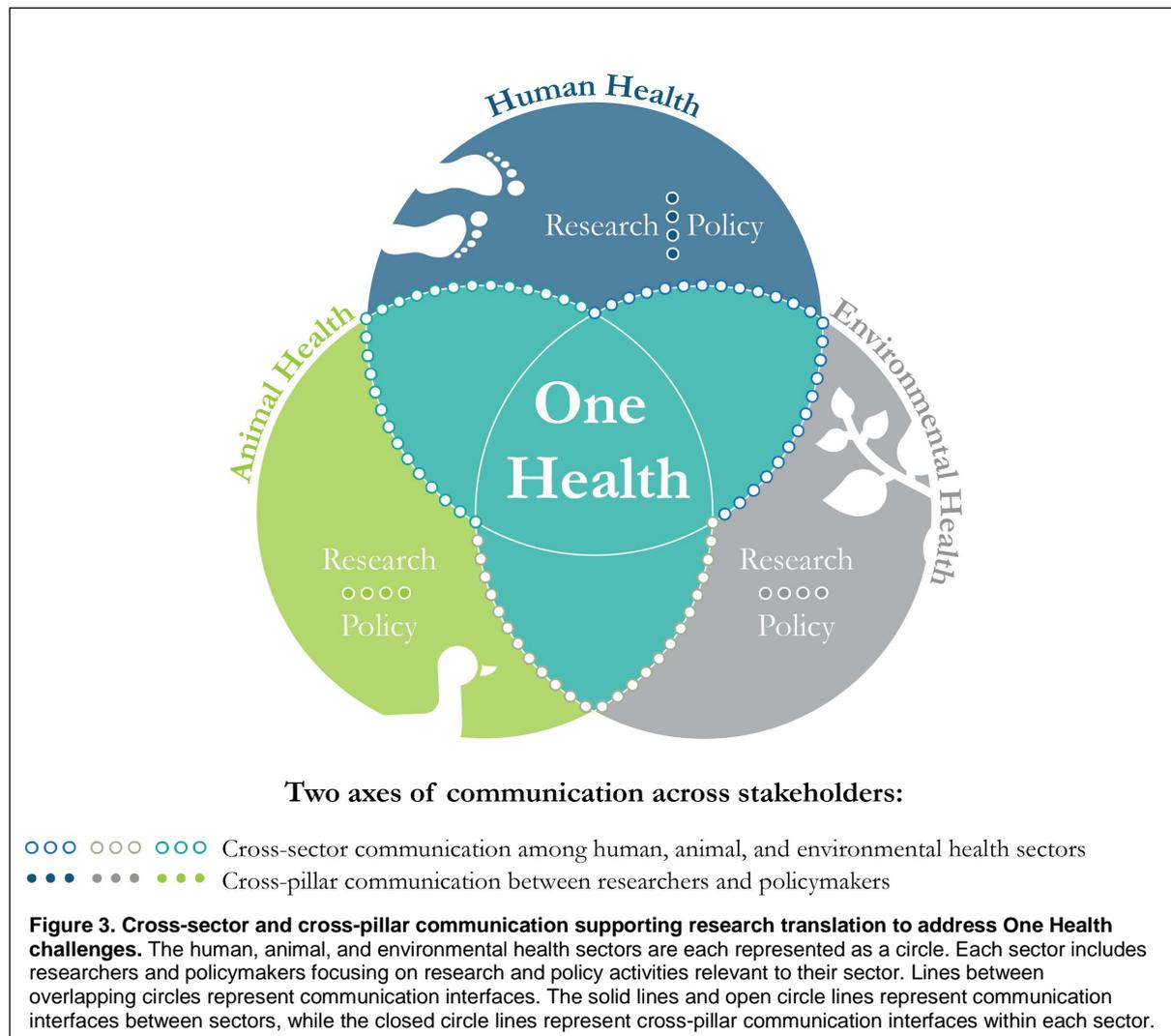
5			<p>Apply research findings.</p>
<p>Apply research findings to policies and programs for preventing, controlling, and/or responding to zoonotic diseases.</p>			
6	<p>Identify outstanding scientific questions.</p>	<p>Jointly identify future research needs.</p>	<p>Reassess zoonotic disease challenges.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

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.



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.

Participant Worksheet: Mapping Communication Pathways for Research Translation to Address One Health Challenges

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 evidence 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. In this activity, you will explore the communication networks needed to support research translation to zoonotic disease challenges in Indonesia. Facilitators will guide you 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.

Overview of Communication Pathways Mapping Activity

- **Part 1:** Participants will work individually and in a small group to develop a consensus list of institutions involved in research translation for emerging zoonotic diseases.
- **Part 2:** Participants will work in their small group to develop a communication pathways map and consider challenges to and possible solutions for two-way communication about research translation.
- **Part 3:** Participants will reconvene as a full group to compare their communication pathways maps and discussion results.

Throughout this activity, you are expected to:

- Read, consider, and answer to the best of your ability the questions contained in each step.
- Contribute thoughtful and respectful answers and responses to your colleagues' ideas during group discussion.
 - Each participant brings unique perspectives and experience about research and policy that inform and enable participant learning. Your colleagues' expertise and experience complement yours.

If you have questions about the purpose of a step or the meaning of questions in the worksheet, ask your facilitator for clarification.

Communication Pathways Mapping Activity

Beginning the Activity

- Facilitators will introduce the activity and demonstrate the basic mapping process.
- Participants will split into small groups, each including participants from the research, public health, and animal health sectors.

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

Step 1: Select your Governance Level

- Within your group, decide whether to focus on national, provincial, or city/district-level institutions.
 - Circle your group's selection on the worksheet below.

Step 2: Identify the institutions at your selected governance level that could be involved in research translation to prevention, detection, and response activities for emerging infectious diseases, 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.

- List as many institutions as you can think of in the worksheet below.
 - The list can include multiple departments or faculties within the same organization. Be as specific as you think is necessary to capture relevant stakeholders.
 - Include institutions involved in *producing* research and in *using* research to inform policy and practice.
 - Write a short description of the primary responsibility or activities of each listed institution (one phrase or sentence, for example "production of animal vaccines").
- When prompted by your facilitator, share your ideas about institutions involved in research translation with your small group. Your facilitator will create a consensus group list on a large sheet of paper.

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

- With your small group, determine whether the mission of each institution/department focuses primarily on human, animal, or environmental health.
 - On the consensus group list of institutions developed in Step 2, your facilitator will:
 - 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.
- With your small group, determine whether the primary activity (activities) of the institution/department involve research or policy activities (policy activities may include policy development, program implementation, or monitoring and evaluation of activities).
 - On the consensus group list of institutions developed in Step 2, your facilitator will:
 - Mark institutions involved in **research** with * (asterisk).
 - Mark institutions involved in **policy** with (diamond).
 - Mark institutions involved in research and policy with both symbols.

Your group's completed institutions list will be photographed and shared with you after this activity. If you would like, you can also take notes on your group's answers on the worksheet below (right columns, role of institutions in research translation).

Communication Pathways Mapping Activity

Institutional Level (Step 1)		
National	Provincial	District/City
Institutions/Departments Involved in Research Translation (Step 2)		
Research Producers	Research Users	

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.

- Your facilitator will 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 (see example in worksheet below).
- Considering the institutional roles discussed in Steps 2 and 3, identify existing communication pathways between the institutions on your map. Consider communication that occurs throughout the research translation cycle.
- Share your ideas about existing communication pathways with your small group. Your facilitator will draw linkages between institutions that currently communicate using bi-directional arrows \leftrightarrow and solid lines (—).
- Your group's completed map will be photographed and shared with you after this activity. You may also follow along with the group mapping process and take your own notes or create your own map on the worksheet below.

Develop a communication pathways map for your research translation scenario
(Step 4)

EXAMPLE

Institution 1: Airlangga
University

Role: *

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

- Identify at least three challenges and potential solutions for two-way communication between institutions and describe them in the worksheet below.
- To identify communication challenges and solutions, consider the map created in Step 4 and the following questions:
 - 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?
- When prompted by your facilitator, share and discuss your answers to the questions above with your small group.

Step 6: Add desired communication pathways to your map.

- With your small group, identify missing communication pathways that are important for research translation to zoonotic disease prevention, detection, and response activities.
 - Refer to your discussion of communication challenges and solutions (Step 5) to identify communication pathways that are important but do not exist currently.
- Your facilitator will draw linkages between institutions that *should be* communicating using bi-directional arrows \leftrightarrow and dashed lines (- - -).

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

Activity Part 3: Compare Results

Step 7: Compare Results

- Reconvene as a large group to share and compare institution lists and communication pathways maps. As you view communication pathways maps created by other small groups, consider the following questions:
 - 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?
- Each group will share highlights from the group discussions to close out the activity.
- You may use the space below to take notes during the summary discussion if you'd like.

Compare Results (Step 7):

Notes:

Participant Worksheet: Anthrax Case Study

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 Activity

You will use this worksheet to analyze potential applications of research findings in the literature provided to public health and veterinary policy and practice and identify strategies for cross-sectoral and cross-pillar communication about the research applications. This activity will be conducted in groups of five to nine people, and a facilitator will lead your group in a discussion of these topics.

The worksheet is structured similarly to the One Health Research Translation Framework. It includes discussion questions associated with the research evidence, policy, and integration pillars for Steps 2, 3, 4, and 6 of the Framework because the integration of research and policy perspectives, the main focus of this activity, is especially critical for these steps. Although Steps 1 and 5 are included in the Framework because they are relevant for research translation, neither step will be discussed.

Your group will advance through evaluation of Steps 2, 3, 4 and 6 sequentially. At the start of each Step, you will be given time to read, consider, and take notes on responses to questions associated with the research evidence, policy, and integration pillars for that Step. You will then discuss answers to all questions within your group before proceeding to the next step. Use the notes sections in this worksheet to capture notes from your individual assessment and the group discussions for each step. After Step 6, small groups will reconvene to share and compare results.

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 for each step 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.

Participant Expectations

Throughout this activity, you are expected to:

- Read, consider, and answer to the best of their ability the questions associated with the research evidence, policy, and integration pillars for each step.
 - Answering every question is not required. All questions will be discussed as a group.
 - Consider prioritizing questions in the research evidence or policy pillars based on your professional background and expertise.
- Contribute thoughtful and respectful answers and responses during group discussion.
 - Each participant brings unique perspectives and experience about research and policy that inform and enable participant learning. Your colleagues' expertise and experience complement yours. Collectively, your group will be able to address most or all of the questions in the worksheet.

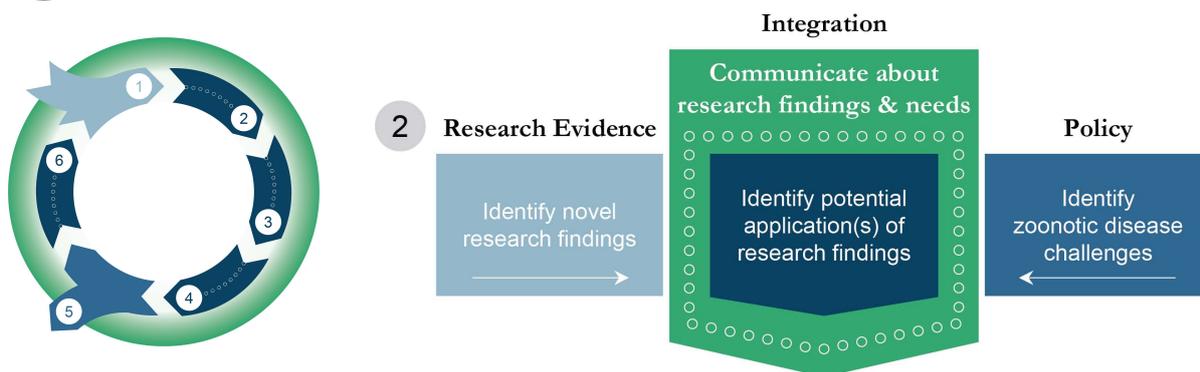
If you have questions about the purpose of a step or the meaning of questions in the worksheet, ask your facilitator for clarification.

Case Study Publications

This case study is based on two publications featuring research 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

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. Consider 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 – Policy Pillar: Identify zoonotic disease challenges

This step identifies zoonotic disease challenges that could be informed by the research findings in the selected publications. Consider the following questions:

- What policies and programs for preventing, controlling, and/or responding to zoonotic diseases could be informed by the research findings?
- What gaps in knowledge limit the design, implementation, or efficacy of these policies and programs?

Notes:

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

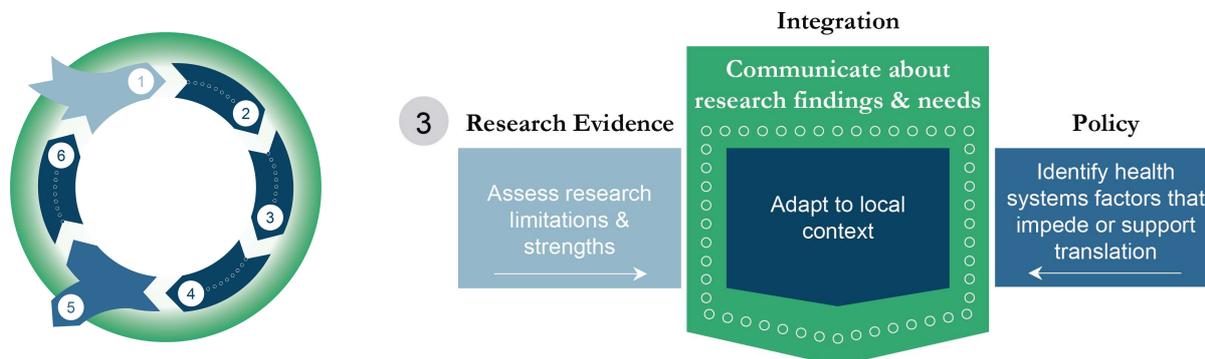
This step identifies applications of research findings in the case study publications that address priority zoonotic disease challenges. Consider the following questions:

- 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.*
- **Communications thread:** Who is involved in communication and information sharing in this research translation exercise? How should information be communicated among these stakeholders?

Notes:

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. Consider 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?
 - Will the findings remain relevant over time?
- 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?
- 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.*

Notes:

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. Consider 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?
- *Implementation Resources*: What funding and other resources are needed for sustained implementation of the proposed application?
- *Policymaker Knowledge, Attitudes, & Practices*: How do the knowledge, attitudes, and practices of funders and implementers affect the proposed applications?
- *Community Adoption*: How do knowledge gaps, attitudes, and existing practices in the community affect community adoption of the proposed application?
- *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?

Notes:

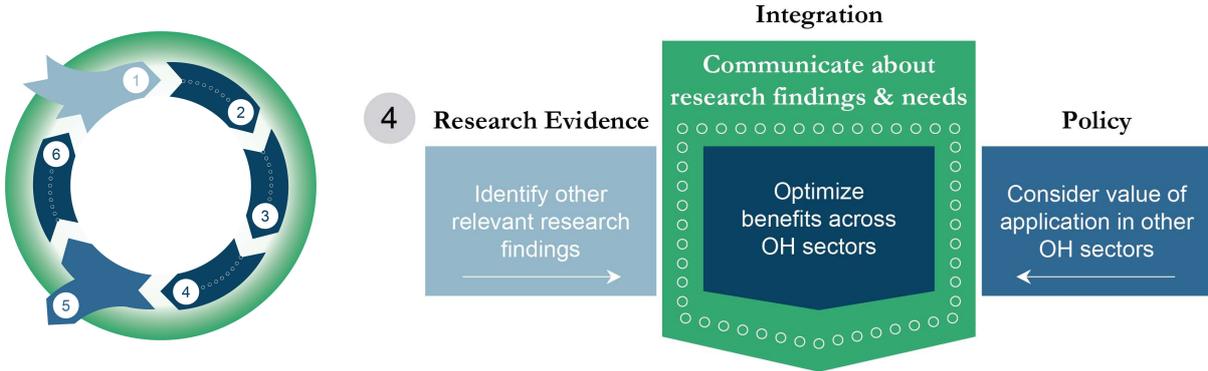
Step 3 – Integration Pillar: Adapt to local context

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. Consider the following questions:

- How do the limitations of the research weaken its application to policies and programs for preventing, controlling, or responding to zoonotic disease threats?
- How might health systems factors prevent, limit, or delay translation of the research findings?
- 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?
- **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?

Notes:

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. Consider the following question:

- What other research findings or types of studies could inform the proposed research application? *Consider studies from other disciplines or One Health sectors.*

Notes:

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. Consider the following questions:

- How does the proposed research application affect other One Health sectors?
- Do other sectors have expertise or resources that could be used to help design or implement the proposed application?

Notes:

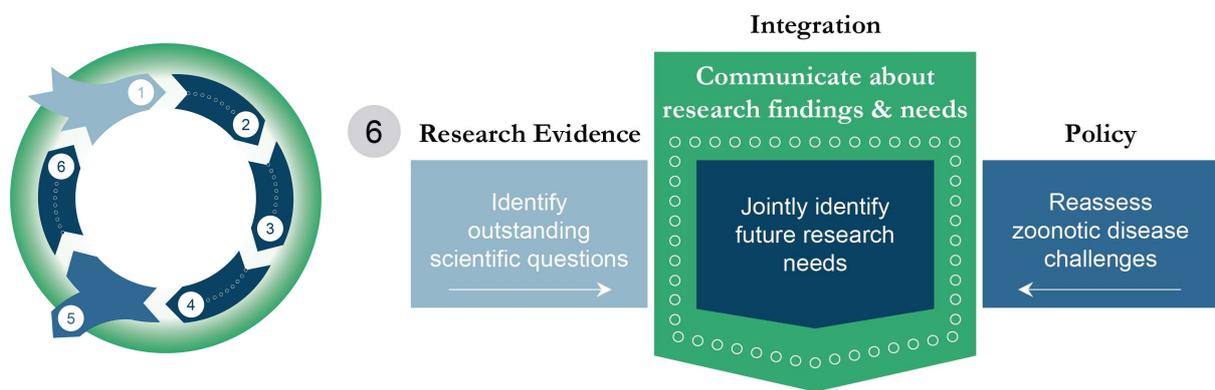
Step 4 – Integration Pillar: Optimize benefits across One Health sectors

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. Consider 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?

Notes:

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. Consider the following questions:

- What new research findings could:
 - Overcome the limitations of existing research findings?
 - Strengthen the evidence base for existing policies and programs for preventing, controlling, and responding to zoonotic disease threats?
 - Address outstanding gaps in scientific knowledge related prevention and control of zoonotic diseases?

Notes:

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. Consider the following questions:

- What gaps in knowledge limit the success of the proposed research application?
- What outstanding zoonotic disease challenges could be addressed with new research findings?

Notes:

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. Consider 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:

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

Within your group, reflect on the benefits of integrating research and policy perspectives for evaluation of research translation opportunities, challenges for cross-pillar communication, and potential solutions. Consider 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?

Take notes on your answers in the notes section below. You will have 5 to 10 minutes to consider the questions individually, then you will discuss your answers in your group.

Notes:

Compare Results

Reconvene to share and compare the results of your research translation discussion. Each group will share key findings from their group's 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.

Participant Worksheet: Highly Pathogenic Avian Influenza Case Study

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 Activity

You will use this worksheet to analyze potential applications of research findings in the literature provided to public health and veterinary policy and practice and identify strategies for cross-sectoral and cross-pillar communication about the research applications. This activity will be conducted in small groups of five to nine people, and a facilitator will lead your small group in a discussion of these topics.

The worksheet is structured similarly to the One Health Research Translation Framework. It includes discussion questions associated with the research evidence, policy, and integration pillars for Steps 2, 3, 4, and 6 of the Framework because the integration of research and policy perspectives, the main focus of this activity, is especially critical for these steps. Although Steps 1 and 5 are included in the Framework because they are relevant for research translation, neither step will be discussed.

Your group will advance through evaluation of Steps 2, 3, 4, and 6 sequentially. At the start of each Step, you will be given time to read, consider, and take notes on responses to questions associated with the research evidence, policy, and integration pillars for that Step. You will then discuss answers to all questions within your group before proceeding to the next step. Use the notes sections in this worksheet to capture notes from your individual assessment and the group discussions for each step. After Step 6, small groups will reconvene to share and compare results.

Overview of Case Study 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 for each step 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.

Participant Expectations

Throughout this activity, you are expected to:

- Read, consider, and answer to the best of their ability the questions associated with the research evidence, policy, and integration pillars for each step.
 - Answering every question is not required. All questions will be discussed as a group.
 - Consider prioritizing questions in the research evidence or policy pillars based on your professional background and expertise.
- Contribute thoughtful and respectful answers and responses during group discussion.
 - Each participant brings unique perspectives and experience about research and policy that inform and enable participant learning. Your colleagues' expertise and experience complement yours. Collectively, your group will be able to address most or all of the questions in the worksheet.

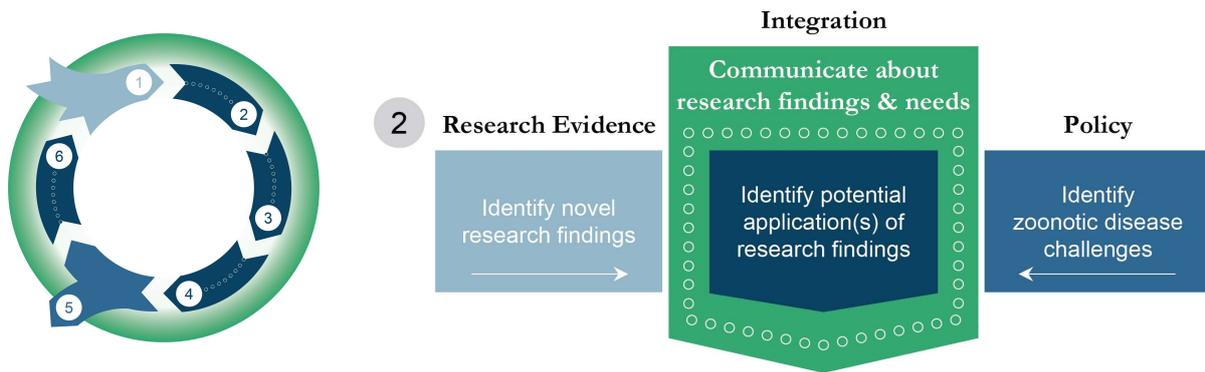
If you have questions about the purpose of a step or the meaning of questions in the worksheet, ask your facilitator for clarification.

Case Study Publications

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

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.

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. Consider 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 – Policy Pillar: Identify zoonotic disease challenges

This step identifies zoonotic disease challenges that could be informed by the research findings in the selected publications. Consider the following questions:

- What policies and programs for preventing, controlling, and/or responding to zoonotic diseases could be informed by the research findings?
- What gaps in knowledge limit the design, implementation, or efficacy of these policies and programs?

Notes:

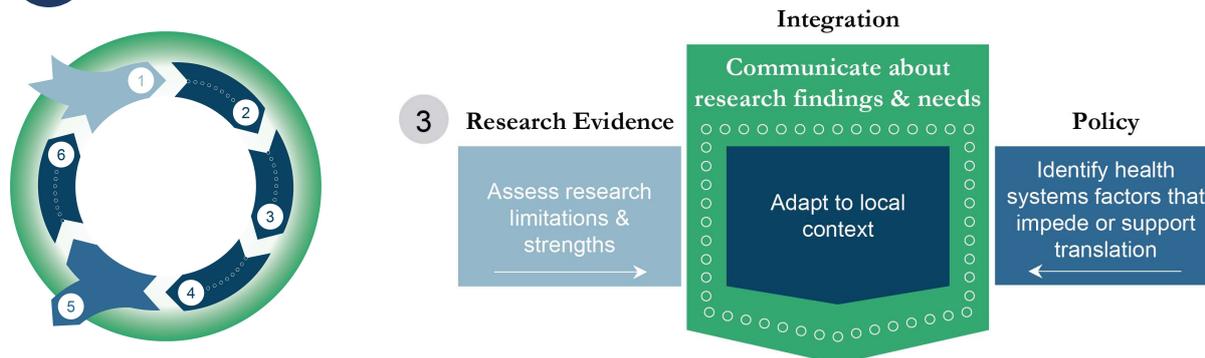
Step 2 – Integration Pillar: Identify potential application(s) of research findings

This step identifies applications of research findings in the case study publications that address priority zoonotic disease challenges. Consider 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.*
- **Communications thread:** Who is involved in communication and information sharing in this research translation exercise? How should information be communicated among these stakeholders?

Notes:

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. Consider 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?
 - Will the findings remain relevant over time?
- 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?

Notes:

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. Consider 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?
- *Implementation Resources*: What funding and other resources are needed for sustained implementation of the proposed application?
- *Policymaker Knowledge, Attitudes, & Practices*: How do the knowledge, attitudes, and practices of funders and implementers affect the proposed applications?
- *Community Adoption*: How do knowledge gaps, attitudes, and existing practices in the community affect community adoption of the proposed application?
- *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?

Notes:

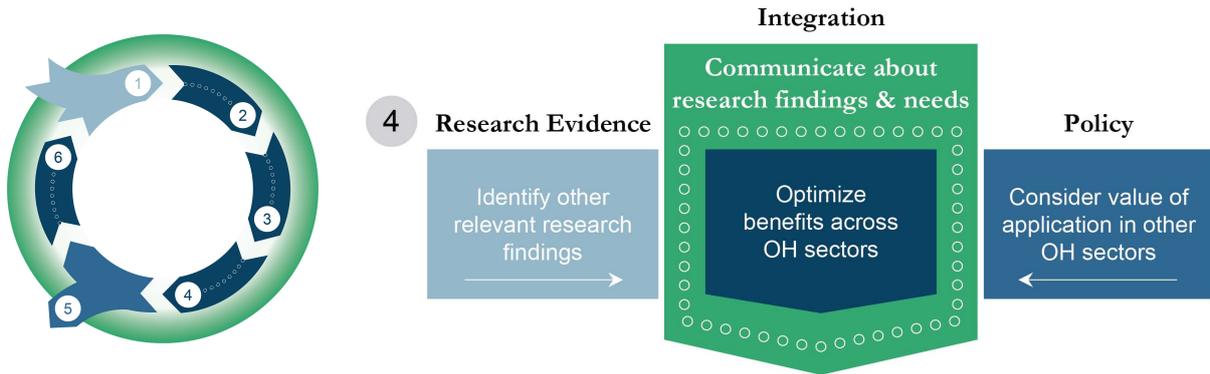
Step 3 – Integration Pillar: Adapt to local context

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. Consider the following questions:

- How do the limitations of the research weaken its application to policies and programs for preventing, controlling, or responding to zoonotic disease threats?
- How might health systems factors prevent, limit, or delay translation of the research findings?
- 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?
- **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?

Notes:

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. Consider the following question:

- What other research findings or types of studies could inform the proposed research application? *Consider studies from other disciplines or One Health sectors.*

Notes:

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. Consider the following questions:

- How does the proposed research application affect other One Health sectors?
- Do other sectors have expertise or resources that could be used to help design or implement the proposed application?

Notes:

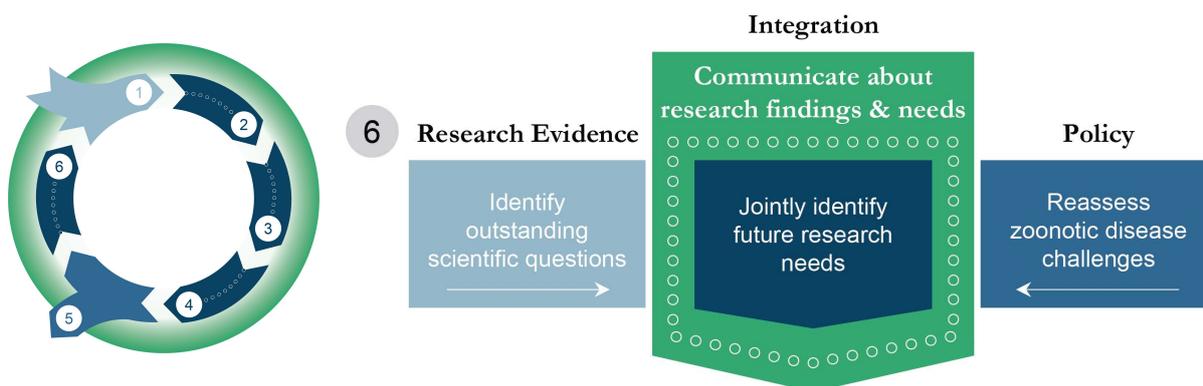
Step 4 – Integration Pillar: Optimize benefits across One Health sectors

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. Consider 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?

Notes:

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. Consider the following questions:

- What new research findings could:
 - Overcome the limitations of existing research findings?
 - Strengthen the evidence base for existing policies and programs for preventing, controlling, and responding to zoonotic disease threats?
 - Address outstanding gaps in scientific knowledge related prevention and control of zoonotic diseases?

Notes:

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. Consider the following questions:

- What gaps in knowledge limit the success of the proposed research application?
- What outstanding zoonotic disease challenges could be addressed with new research findings?

Notes:

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. Consider 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?
- **Communications thread:** What mechanisms exist to sustain communication about research findings and health systems needs?

Notes:

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

Within your group, reflect on the benefits of integrating research and policy perspectives for evaluation of research translation opportunities, challenges for cross-pillar communication, and potential solutions. Consider 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?

Consider your experiences in both the anthrax and HPAI case study exercises, and take notes on your answers in the notes section below. You will have 5 to 10 minutes to consider the questions individually, then you will discuss your answers in your group.

Notes:

Compare Results

Reconvene to share and compare the results of your research translation discussion. Each small group will share key findings from their group's 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.

Participant Worksheet: Using the One Health Research Translation Framework in Your Work

Purpose

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

Overview of Activity

You will use this worksheet to assess how you can use the OHRT Framework to promote research translation to zoonotic disease prevention, detection, and response activities as part of your professional responsibilities. The worksheet uses the One Health, research translation, and communications concepts underlying the Framework to guide you through an assessment of your One Health research translation networks and the identification of research translation opportunities related to your work. You will consider if and how you could be involved in research translation through *your* work by:

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

Using this worksheet, you will work through a series of questions on each of these topics. You will discuss your answers to some of these questions in a small group to receive feedback and additional ideas from your colleagues representing other sectors and pillars. By providing an opportunity for you to practice communicating research findings and needs across pillars and sectors, these discussions will strengthen your skills in communicating about research translation. At the end of the activity, you will synthesize the results of your individual assessments and small group discussions to develop a preliminary action plan for how to promote research translation in your own work. Throughout the activity, you should draw from existing knowledge and experience and the lessons learned in the case study discussions.

Output

Preliminary Action Plan for promoting research translation to address One Health challenges as part of your professional responsibilities, which describes several concrete actions you can take to explore research translation opportunities relevant to your work.

Participant Expectations

During this activity, you are expected to:

1. Read, consider, and answer to the best of their ability the questions associated with each part of this activity.
2. Contribute thoughtful and respectful answers and responses within your group discussions.
 - Share your expertise and experience to inform your group's understanding of research translation opportunities and challenges. Conversely, your activity partners may be able to share insights about research, policies, or programs on zoonotic diseases that inform your assessment.

If you have questions about the purpose of a step or the meaning of questions in the worksheet, ask a facilitator for clarification.

Step 1: Evaluate your Role in Research Translation

Format: Individual Assessment

Answer the questions below to evaluate your role in research translation at your institution. You may already engage in some of the activities described in the research translation cycle and may have opportunities to increase your involvement in research translation. The questions below will help you identify research translation activities that *are* or *could be* part of your professional responsibilities.

Describe your current role and responsibilities related to One Health and research translation at your institution.

- What are your focus areas and responsibilities related to zoonotic diseases in Indonesia?
- What aspects of those responsibilities are related to research translation to One Health challenges?

Notes:

- Do you, or do your institutional colleagues, participate in research translation to address zoonotic disease challenges?
- Given your professional responsibilities, do you have opportunities to expand *your* role in research translation at your institution?

Notes:

- What other research groups, departments, or branches of your institution could you work with to identify, assess, and promote research translation opportunities?
 - For example, could other groups help you identify and evaluate additional data or research that could inform research translation opportunities? Or identify and evaluate additional systems-level factors that influence research translation?

Notes:

Step 2: Identify Opportunities for Research Translation in Your Work

Format: Individual Assessment Followed by Small Group Discussion

In this step, you will apply concepts from the OHRT Framework to identify research translation opportunities in your work and practice communicating about research findings, research applications, and research needs across pillars and sectors. You may answer the questions for researchers *or* policymakers, depending on your expertise, experience, and professional responsibilities. Participants who conduct, manage, or are otherwise involved in applied research or surveillance for zoonotic diseases may want to answer the questions for researchers. Participants involved in the development, implementation, and/or evaluation of policies and programs for preventing and controlling zoonotic diseases may want to answer the questions for policymakers. Participants who are engaged in both research and policy activities can select either set of questions.

Answer the questions in the individual assessment below (Part 1), using the notes section provided (left column). Then, you will discuss your answers to the individual assessment questions with your small group, using the questions provided to guide the discussion (Part 2). Capture notes from that discussion in the notes section provided (right column).

Researchers | Describe past or ongoing research studies on zoonotic diseases at your institution that could be applied to zoonotic disease challenges.

For this step, you can evaluate studies in which you were involved directly or studies conducted by other researchers at your institution.

Part 1 – Individual Assessment	Part 2 – Small Group Discussion
<ul style="list-style-type: none"> • Describe the findings (or expected findings) from your selected studies. What are the implications of the findings for zoonotic disease prevention and control? • How could these findings be applied to enhance zoonotic disease prevention, detection, and response activities? • What challenges might you encounter when exploring and developing this research translation opportunity? 	<ul style="list-style-type: none"> • Do your research translation ideas address important gaps in existing policies and programs for preventing and controlling zoonotic diseases? Why or why not? • What are some potential challenges for these research translation opportunities? • What other zoonotic disease prevention, detection, or response activities could be informed by these research findings?
<p>Notes:</p>	<p>Notes:</p>

Policymakers | Describe priority challenges for prevention and control of zoonotic diseases within your institution’s areas of responsibility that could be informed by research.

Part 1 – Individual Assessment	Part 2 – Small Group Discussion
<ul style="list-style-type: none"> • What are the priority gaps in existing policies or programs targeting zoonotic diseases within your institution’s areas of responsibility that could be informed by research? • What data, information, and research findings are needed to address the priority gaps in existing policies or programs for zoonotic disease prevention and control? How could research address the gaps? • What challenges might you encounter when exploring and developing these research translation opportunities? 	<ul style="list-style-type: none"> • What types of studies could be performed to generate those research findings? What are some of the potential challenges associated with those types of studies? • What other research findings are relevant to the priority gaps identified?
<p>Notes:</p>	<p>Notes:</p>

Step 3: Assess Communication Pathways in your One Health Network

Format: Individual Assessment Followed by Small Group Discussion

The OHRT Framework emphasizes the collaborative roles of researchers and policymakers in the human, animal, and environmental health sectors to develop research applications that address important zoonotic disease challenges. Answer the questions below to evaluate how your communication networks support research translation to One Health challenges and identify opportunities to grow your network.

Answer the questions in the individual assessment below (Part 1), using the notes section provided (left column). Then, you will discuss your answers to the individual assessment questions with your small group, using the questions provided to guide the discussion (Part 2). Capture notes from that discussion in the notes section provided (right column). This step involves two sets of questions, one set focused on methods for accessing information about research translation and a second set focused on stakeholders and institutions involved in communication about research translation. Answer and discuss both sets of questions during the individual assessment and small group discussion periods, respectively.

A. Accessing Information

Part 1 – Individual Assessment	Part 2 – Small Group Discussion
<ul style="list-style-type: none"> How do you access information about applied research that could inform zoonotic disease prevention and control activities? How do you access information about health systems needs that could be informed by research? <i>Consider ways to access published information and ways to access this information directly from subject matter experts.</i> Do you face challenges in accessing this information? What are some potential solutions? 	<ul style="list-style-type: none"> How do your group members access information about applied research and/or priority challenges for zoonotic disease prevention and control? Do your group members have recommendations for resources or methods that could help you overcome challenges for accessing information?
<p>Notes:</p>	<p>Notes:</p>

B. Stakeholders and Institutions

Part 1 – Individual Assessment	Part 2 – Small Group Discussion
<ul style="list-style-type: none"> • How could your institution communicate with other stakeholders about the research translation opportunities you identified in Step 2? Are there leaders within your institution who can promote these research translation opportunities? • What other institutions and stakeholders are relevant to the research translation opportunities you identified in Step 2 of this activity? • Do you or does your institution have existing relationships with these stakeholders/institutions? If not, how could you establish relationships? 	<ul style="list-style-type: none"> • Can your group members identify other stakeholders or institutions that are relevant to the research translation opportunities you identified in Step 2? • Do your group members have recommendations for how you can strengthen existing or build new cross-sector and cross-pillar relationships to support those research translation opportunities?
<p>Notes:</p>	<p>Notes:</p>

Step Four: Develop your Preliminary Action Plan for Promoting Research Translation to Address One Health Challenges

In the final step of this activity, you will synthesize your ideas from Steps 1 – 3 of this activity and draw from the lessons learned in the case study exercises and communication pathways mapping activity to develop a preliminary action plan for promoting research translation to address One Health challenges in your work. Based on your notes from Steps 1 – 3 above (including notes from the individual assessment and small group discussion components of the steps), answer the questions below to develop a list of research translation actions and information needs to explore after this training. Answering these questions will require you to evaluate, synthesize, and prioritize your answers to the questions addressed in Steps 1 – 3 of this activity.

Action Plan for Supporting Research Translation to Address One Health Challenges

- 1. Identify at least two ways that you can play a role in research translation at your institution, individually or in collaboration with colleagues at your institution (Step 1 output).**

- 2. Identify at least one research translation opportunity at your institution (Step 2 output). Identify at least two stakeholders or institutions that play a role in this research translation opportunity (Step 3 output).**

3. Identify two actions you can take to explore these research translation opportunities further (for example, additional research, stakeholder outreach).

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}	<ul style="list-style-type: none"> • 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}	<ul style="list-style-type: none"> • 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}	<ul style="list-style-type: none"> • 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 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>

Appendix 1: Additional Information about Research Translation Frameworks

	<ul style="list-style-type: none"> • 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
<p>Promoting Action on Research Implementation in Health Services (PARIHS)^{23,24}</p>	<ul style="list-style-type: none"> • 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
<p>WorldBank One Health Operational Framework²⁵</p>	<ul style="list-style-type: none"> • 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

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: Additional Participant Notes

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