STOP Spillover

Year 2 Semi-Annual Report

1 October 2021 – 31 March 2022

Working with key stakeholders to prioritize and plan interventions to reduce the risk of viral zoonotic spillover

April 2022

Strategies to Prevent (STOP) Spillover

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Cover photo: Live bird market in Dhaka, Bangladesh. Credit: icddr,b

Table of Contents

Acronyms and Abbreviations

AFROHUN	Africa One Health University Network
BAU	Bangladesh Agricultural University
BLRI	Bangladesh Livestock Research Institute
CAMBOHUN	Cambodia One Health University Network
CCG	Community Collaborator Group
CDC	Centers for Disease Control & Prevention
CoV	Coronavirus
COVID-19	Coronavirus Disease 2019
CRISPR	Clustered Regularly Interspaced Short Palindromic Repeats
CVASU	Chittagong Veterinary and Animal Sciences University
DARD	Department of Agriculture and Rural Development
DLS	Department of Livestock Services
DOH	Department of Health
EAB	External Advisory Board
EPA	Environmental Protection Agency
FAO	Food and Agriculture Organization of the United Nations
FGD	Focus Group Discussion
GENOME	Global Electronic Network of Monitoring & Evaluation
GHSA	Global Health Security Agenda
HPAI	Highly Pathogenic Avian Influenza
IACUC	Institutional Animal Care and Use Committee
IEDCR	Institute of Epidemiology Disease Control and Research
IHR-JEE	International Health Regulations-Joint External Evaluation
IRB	Institutional Review Board
ISSP	Intervention/Study Selection Process
JSI	John Snow International Research and Training Institute, Inc.
KPIs	Key Performance Indicators
LBM	Live bird market
M&E	Monitoring & Evaluation
MARD	Ministry of Agriculture and Rural Development
MEL	Monitoring, Evaluation and Learning
MERS	Middle East Respiratory Syndrome
MoFL	Ministry of Fisheries and Livestock
MOH	Ministry of Health
NEPRC	National Emergency Preparedness and Response Committee
NGO	Non-Governmental Organization
NPHIL	National Public Health Institute of Liberia
OH-DReaM	One Health-Design Research and Mentorship
OHIAT	One Health Information Assessment Tool
OHS	One Health Secretariat
OIE	World Organization for Animal Health
OM	Outcome Mapping
PCR	Polymerase Chain Reaction
POC	Point-of-Care
PPC	Provincial People's Committee
PSRT	Private Sector Roundtable

SARS	Severe Acute Respiratory Syndrome
SARS-CoV-2	Severe Acute Respiratory Syndrome Coronavirus 2
SBC	Social behavior change
SEAOHUN	Southeast Asia One Health University Network
SHINE	Streamlined Highlighting of Infections to Navigate Epidemics
SMM	Surveillance, Mapping and Modeling Resource Hub
SOP	Standardized Operating Procedure
STOP Spillover	Strategies to Prevent Spillover
TIPC	Technology, Innovation, Partner Support and Coordination/Communication
TIPs	Trials of Improved Practices
VOHUN	Viet Nam One Health University Network
WCS	Wildlife Conservation Society
WHO	World Health Organization
WWF	World Wildlife Fund (USA/Canada); World Wide Fund for Nature (rest of the world)

Executive Summary

Strategies to Prevent Spillover - STOP Spillover - is a five-year, U.S. Agency for International Development (USAID)-funded cooperative agreement to support priority countries in Asia and Africa to strengthen their capacities to identify, assess, and monitor risk associated with emerging zoonotic viruses and to develop and introduce proven and novel risk reduction measures. STOP Spillover focuses on prioritized zoonotic viruses – Ebola, Marburg, Lassa, Nipah, animal-origin coronaviruses (including SARS-CoV, SARS-CoV-2, and MERS-CoV), and zoonotic highly pathogenic avian influenza viruses. By implementing a number of locally designed interventions in each country over the life of the project, and evaluating the social, gender, economic, and environmental acceptability and effectiveness of each intervention, participating countries will have strengthened capacity to develop, validate, and implement interventions to reduce spillover.

Over the past six months, STOP Spillover has taken important steps in four countries, working with key stakeholders and local communities to prioritize and plan interventions to reduce the risk of viral zoonotic spillover. Their contributions and guidance have helped ensure that STOP Spillover's approach is inclusive and will have a sustainable impact on decreasing the risk of zoonotic viral spillover.

A core component of STOP Spillover is Outcome Mapping (OM). OM is a participatory process that uses a collaborative stakeholder-driven approach to engage a broad range of traditional and non-traditional stakeholders to identify and map desired outcomes. For each prioritized interface, OM is used to determine the viral pathogens of focus, the key stakeholders to engage, potential interventions for mitigating the risk of viral spillover, and gaps in knowledge that need to be addressed in order to design appropriate and effective interventions.

This report documents progress made during the first half of the project's second year of implementation, describing work conducted since the beginning of Project Year 2 on October 1, 2021 through the end of the first half of the fiscal year on March 31, 2022.

Since the beginning of Project Year 2, STOP Spillover has taken important steps in four priority countries – Uganda, Bangladesh, Viet Nam, and Liberia. OM workshops have been completed in all four of these countries. To synthesize the information collected during OM workshops and to facilitate the decision-making process about selection of the most appropriate interventions and studies, STOP Spillover conducted an Intervention/Study Selection Process (ISSP) in each of these four countries. Our ISSPs engage and leverage the technical expertise across STOP Spillover to make informed programmatic decisions regarding the interventions – and studies needed to inform interventions – that emerge from OM. The final output of a STOP Spillover ISSP is a set of recommended interventions and aligned studies to pursue in a given country. For Uganda, Viet Nam, and Bangladesh, the risk-reduction interventions and studies have been approved by USAID and have been incorporated into the endorsed country work plans.

We believe that knowing what to do to reduce the risks of spillover from animals to humans is not enough. To truly prevent the next pandemic, we must institutionalize knowledge in local communities and governments and work together

as teams to develop, test, and implement smart interventions. Central to STOP Spillover's plans for sustainable, country-led programming are One Health-Design Research and Mentorship (OH-DReaM) working groups. OH-DReaM working groups are technical groups formed at the country level to address a specific thematic area. Once a work plan for a given country has been endorsed, OH-DReaM working groups are formed to design, implement and validate interventions to mitigate viral spillover and spread of zoonotic diseases, or close an information or data gap to inform the design of interventions. Led by a STOP Spillover country team member and supported by global STOP Spillover subject matter experts in areas relevant to the working group, OH-DReaM working groups comprise key in-country stakeholders and technical experts. The Uganda country team successfully formed five OH-DReaM working groups to implement the three interventions and two research studies around which Uganda's Year 2 work plan (November 2021 – April 2022) is based. The OH-DReaM working groups developed detailed action plans, laying out the work that the group will pursue. As the reporting period drew to a close, these action plans were being finalized. As STOP Spillover moves into the second half of Project Year 2, OH-DReaM working groups in Uganda will begin conducting their activities, and OH-DReaM working groups will be established in Viet Nam, Bangladesh and Liberia.

Designing, implementing and validating effective interventions to reduce the risk of spillover, amplification and spread requires supporting surveillance activities to provide data. STOP Spillover seeks to prevent duplicative or conflicting surveillance activities within each of our supported countries and strives to leverage existing in-country capacities. Conducting surveillance assessments is a critical first step to help understand existing in-country surveillance resources and capacities. During this reporting period, surveillance assessments were initiated in Liberia, Bangladesh, and Viet Nam. STOP Spillover partner the Broad Institute leads the project's work on the development of diagnostic tools in support of building viral surveillance assays. The Broad Institute has focused on the development of best-in-class polymerase chain reaction (PCR) assays for all pathogens prioritized by STOP Spillover. Point-of-care (POC) assays for Marburg, Ebola and Lassa using clustered regularly interspaced short palindromic repeats (CRISPR) technology are also in development. As STOP Spillover moves into the second half of Project Year 2, laboratory testing of assays will be completed. All assays will subsequently be validated in the field, initially focusing on Liberia.

In the first half of Project Year 2, STOP Spillover welcomed two additional countries: Cambodia and Sierra Leone. Recruitment of the country teams has been a priority. The full Sierra Leone country team has been recruited, with all members set to officially start in April. Key members of the Cambodia country team are in place, and recruitment is ongoing for the final two technical members. Engagement to elicit buy-in for the project from government and other stakeholders and conducting OM will be priorities once the country teams are fully in place.

1. Introduction

Strategies to Prevent Spillover – STOP Spillover – is a five-year, U.S. Agency for International Development (USAID)-funded cooperative agreement to support priority countries in Asia and Africa to strengthen their capacities to identify, assess, and monitor risk associated with emerging zoonotic viruses and to develop and introduce proven and novel risk reduction measures. STOP Spillover builds on more than 15 years of USAID investments in promoting a multisectoral, One Health approach to addressing emerging zoonotic viruses before they pose an epidemic or pandemic threat. Led by Tufts University, STOP Spillover is a global consortium of 14 partner organizations with expertise in human, animal, and environmental health who will take the next step in understanding and addressing the risks posed by known zoonotic viruses that have the potential to spill over and cause pandemic crises. STOP Spillover focuses on prioritized zoonotic viruses – Ebola, Marburg, Lassa, Nipah, animal-origin coronaviruses (including SARS-CoV, SARS-CoV-2, and MERS-CoV), and zoonotic highly pathogenic avian influenza (HPAI) viruses. The three core objectives of STOP Spillover, and expected overarching results of the project, are presented in Figure 1.

"With its direct linkage to human health, animal health, and wildlife, STOP Spillover provides a perfect platform to enhance the culture of multisectoral collaboration."
– Professor Dr. Tahmina Shirin, Chair of the Bangladesh One Health Secretariat Coordination Committee.

STOP Spillover began in October 2020. The project will roll out in up to 10 USAID priority countries, adding countries in a phased approach. Project Year 1 (October 1, 2020 through September 30, 2021) focused on initiation of project activities in four countries (Uganda, Liberia, Bangladesh and Viet Nam), with two additional countries (Cambodia and Sierra Leone) added during the first half of Project Year 2.

Sustainability is a critical aspect of STOP Spillover, with the project specifically designed to ensure local sustainability and inclusion, capacity strengthening, and stakeholder engagement through a deep understanding of the context-specific spillover ecosystem in each country. Working with government partners at all levels (national, regional and local) is fundamental to STOP Spillover's objectives. Similarly, STOP Spillover strives to engage a range of non-government stakeholders to build a network within the pandemic prevention community and aims to add value, avoid duplication and promote efficiency and complementarity.

A core component of STOP Spillover is Outcome Mapping (OM). OM is a participatory process that uses a collaborative stakeholder-driven approach to engage a broad range of traditional and non-traditional stakeholders to identify and map desired outcomes. Through the OM process, STOP Spillover works with stakeholders to identify strengths and limitations within their zoonotic spillover ecosystems and interfaces, and their desired changes and barriers to change, and determine how these changes can be achieved. Through OM, STOP Spillover enhances the capacity of local, regional, and national institutions to understand their spillover ecosystems and to develop, deploy and validate tools and interventions to reduce risk of spillover. This iterative approach recognizes stakeholders' motivating factors and strengths, will continue for the life of the project and will result in a framework for identifying existing and new points of intervention for risk reduction, as well as markers towards success and sustainability.

Figure 1. STOP Spillover objectives and expected results

OBJECTIVE 1	OBJECTIVE 2	OBJECTIVE 3
Strengthen country capacity to monitor, analyze and characterize the risk of priority emerging zoonotic viruses spilling over from animals to people	Strengthen country capacity to develop, validate, and implement interventions to reduce risk of priority emerging zoonotic viruses spilling over from animals to people	Strengthen country capacity to mitigate amplification and spread of priority zoonotic diseases in human populations
EXPECTED RESULTS		
Up to 10 countries are able to update risk assessments and identify key knowledge gaps related to risk of spillover, amplification, and spread of priority emerging zoonotic viruses in animal and human populations. Up to 10 countries have strengthened capacity to address these key knowledge gaps. Up to 10 countries are able to monitor, analyze, and characterize the gender and sex-specific risks associated with high-risk, animal-human interfaces through their gender-sensitive applied research and testing/validating intervention strategies.	Up to 10 countries are able to use available information to test and validate the effectiveness of interventions to reduce spillover of priority emerging zoonotic viruses from animals to humans. Up to 10 countries are able to implement interventions, policies, and regulations to reduce spillover of priority emerging zoonotic viruses from animals to humans. Up to 10 countries can develop, analyze, validate, and implement gender-responsive and culturally appropriate interventions relevant to women, girls, men, and boys to limit direct contact with animals and animal products. Up to 10 countries are able to implement interventions and are working towards implementing policies and regulations to reduce spillover of priority emerging zoonotic viruses from animals to humans.	Up to 10 countries have the capacity to understand risk and plan an appropriate response to contain amplification and spread of zoonotic disease events originating from wildlife. High-risk communities, workers, and health facilities in up to 10 countries can rapidly recognize and respond to suspect zoonotic disease events originating from wildlife. Up to 10 countries have the ability to integrate research findings and best practices into risk mitigation efforts to directly impact gender and sex-specific risks.

This process will guide the integration of interventions into planned and on-going local and national systems to enhance impact, institutionalize change and promote sustainability. For each prioritized interface, OM is used to determine the viral pathogens of focus, the key stakeholders to engage, potential interventions for mitigating the risk of viral spillover, and gaps in knowledge that need to be addressed in order to design appropriate and effective interventions. To

date, OM has been successfully conducted in four countries (Uganda, Bangladesh, Viet Nam, and Liberia), identifying priority viral pathogens and the specific high-risk interfaces at which STOP Spillover will conduct initial risk-reduction activities (Table 1).

We believe that knowing what to do to reduce the risks of spillover from animals to humans is not enough. To truly prevent the next pandemic, we must institutionalize knowledge in local communities and governments and work together as teams to develop, test, and implement smart interventions. Spillover leverages global-level resource hubs to provide expertise, technical assistance, and support to country-level teams. In each target country, country teams composed of in-country personnel lead intervention design and implementation with local stakeholders. Once high-risk interfaces and interventions have been identified through the OM process, One Health-Design, Research and Mentorship (OH-DReaM) working groups will be established to design, implement and evaluate interventions. Each OH-

DReaM working group will include qualified in-country representatives chosen specifically for the intervention/interface and activity of interest. The number of OH-DReaM working groups established in each country will generally depend on the number of activities prioritized through OM. The period of time each OH-DReaM working group will operate will depend on the needs of the specific activity. Each OH-DReaM working group will be overseen by a country team member and a technical co-lead from the consortium, and will be supported by targeted subject matter experts and mentors from STOP Spillover resource hubs.

STOP Spillover's first year was defined by its deep engagement with countries, key stakeholders, and communities. This engagement with in-country stakeholders has continued into the project's second year. The COVID-19 pandemic presented numerous challenges during Project Year 1: the entire project was set-up virtually; most project activities – including stakeholder engagement and participatory OM workshops – were conducted virtually; and international consortium members

Country	Pathogen(s)	Prioritized Interface	Specific Location
UGANDA	Ebola, Marburg	Bat-Human	Bundibugyo District
BANGLADESH	HPAI	Poultry-Human	Live bird markets in Dhaka
VIET NAM	Coronaviruses	Wildlife-Human	Wildlife farms in Dong Nai province
LIBERIA	Lassa	Rodent-Human	Nimba County

Table 1. Initial prioritized pathogens and high-risk interfaces of focus for STOP Spillover

were unable to travel to support country teams. While still a challenge during Project Year 2, the easing of COVID-19 restrictions across STOP Spillover-supported countries has allowed us to conduct some activities in-person. Challenges due to COVID-19 persist in some countries, but the versatility, adaptability and flexibility of country teams and supporting global personnel allows STOP Spillover to continue its important work in all countries.

This report describes STOP Spillover's work from the beginning of Project Year 2 on October 1, 2021 through the end of the first half of the fiscal year on March 31, 2022.

OM workshop in Ganta, Nimba County, Liberia. Photo credit: AFROHUN

2. Activity Implementation

Key Activities Accomplished: Prioritizing and Planning Interventions

Outcome Mapping

STOP Spillover is using OM in target countries to identify and support outcomes based on collaboratively generated ideas for risk reduction interventions. Through OM, STOP Spillover works with a diverse range of stakeholders to ensure that we include relevant actors to enhance national and local capabilities to locate potentially new and emerging high-risk interfaces. We work with these relevant actors to identify specific risks at prioritized interfaces, understand knowledge gaps and barriers to intervention design, and brainstorm potential interventions contextualized to the needs for specific interfaces to reduce the risk of spillover. During this reporting period, OM was conducted in Bangladesh, Viet Nam, and Liberia.

Indicator 1.1.a # of OM related activities engaging national and community stakeholder knowledge, priorities, and perspective (by region and country)

AFRICA

Liberia – **1** interface workshop

ASIA

Bangladesh – **3** interface workshops

Vietnam – **1** interface workshop

Outcome Mapping in Bangladesh

During the previous reporting period, STOP Spillover conducted an OM workshop at the national level which prioritized the poultry-human interface – specifically, live bird markets (LBMs) in Dhaka – as the entry point for the project in Bangladesh. During the current reporting period, three separate OM workshops were conducted to focus on Dhaka's LBMs. At each of two targeted LBMs in Dhaka, an OM workshop was conducted with stakeholders who work at the LBMs. The first group of stakeholders was from a retail LBM operated under private ownership, and the OM engagement was held on 21 November 2021 with 34 participants. The second group of stakeholders was from a wholesale LBM (including some retail poultry shops) operated under Dhaka City Corporation, and the OM engagement was conducted over three days – December 9-11, 2021 – with 42 participants. At both workshops, participants discussed and prioritized potential interventions to reduce spillover risk at LBMs and identified knowledge gaps that need to be addressed to design appropriate interventions. The third OM workshop targeted national-level stakeholders involved in various capacities with the poultry value chain interface and was held on 28 December 2021 with 41 participants. The information gathered at Bangladesh's OM workshops was subsequently synthesized by the Bangladesh country team, supported by global STOP Spillover colleagues, and used to make informed selections of risk-reduction activities for Dhaka's LBMs (see "Risk Reduction Interventions and Studies at Prioritized Interfaces").

OM workshop in Dhaka, Bangladesh. Photo credit: icddr,b

"It was a very successful Outcome Mapping stakeholder workshop meeting because it rightly identified the critical stakeholders who would play the critical role. Then they identified their specific role in terms of where they would put their effort, the risk reduction, and the priority areas they identified. I understand that we need behavioral change intervention for a sustainable solution at the end of the day. Because many of the intervention [are] unknown to us, we have to go to community people to learn more and more."
– Participant at OM workshop in Bangladesh.

Outcome Mapping Viet Nam

Rather than conducting an OM workshop at the national level to select the prioritized interface and pathogen, followed by a workshop at the interface level to select the prioritized interventions and studies, it was determined to conduct OM only at the interface level (wildlife farms in Dong Nai). An OM workshop was conducted in Dong Nai province over four days – December 7-10, 2021 – with 110 participants representing stakeholders from national, provincial, and community levels. Participants identified knowledge gaps and barriers that need to be addressed to reduce spillover risk at captive wildlife farms, as well as opportunities for intervention design. Potential interventions to reduce spillover risk at captive wildlife farms were discussed by participants, as were desired outcomes for critical partners involved in the wildlife value chain. This four-day workshop was convened in-person, but broadcast through Zoom to facilitate virtual representation for stakeholders who could not attend in-person, including global representatives from STOP

Spillover's resource hubs. Viet Nam served as the model for this direct-to-interface approach, providing lessons for how to be flexible with OM strategy in other countries. The information gathered at Viet Nam's OM workshop was subsequently synthesized by the Viet Nam Country Team, supported by global STOP Spillover colleagues, and used to make informed selections of risk-reduction activities in Dong Nai (see "Risk Reduction Interventions and Studies at Prioritized Interfaces").

"We have regular monitoring at farms and households, we can only remind them that their practice in wildlife farming is unsanitary. Biosafety practices needs to be changed, however, I don't know how to guide them to change and according to what standards."
– District-level official, Dong Nai province, and participant at OM workshop in Viet Nam.

OM workshop in Dong Nai, Viet Nam. Photo credit: VOHUN

Outcome Mapping in Liberia

Similar to Viet Nam, Liberia determined that STOP Spillover's OM strategy forgo a national-level workshop – as conducted in Bangladesh and Uganda during Project Year 1 – and go directly to the interface. Lassa fever's status as a priority public health problem for the Government of Liberia led to the Lassa virus being selected as the priority pathogen for STOP Spillover's initial work in Liberia. Nimba County was selected as a starting point for STOP Spillover's work based on the high reported number of infections and deaths from Lassa, coupled with a shared international border with the Republic of Guinea and Côte d'Ivoire. Lassa fever is also a public health threat in these countries and border crossings are considered a potential spillover location. An OM workshop was conducted in Ganta, Nimba County, over three days (February 23-25, 2022). This workshop was convened in-person, but broadcast through Zoom to facilitate virtual representation for stakeholders and consortium members who could not attend in-person. An average of 56 participants attended in person at the venue in Ganta, with eight participants dialing in through Zoom. Participants represented stakeholders from

national and local levels. During the workshop, participants discussed knowledge gaps and barriers that need to be addressed to reduce spillover risk of Lassa virus in Nimba County, and potential interventions were brainstormed. The information gathered at Liberia's OM workshop was subsequently synthesized by the Liberia country team, supported by global STOP Spillover colleagues, and used to make informed selections of risk-reduction activities in Nimba County (see "Risk Reduction Interventions and Studies at Prioritized Interfaces").
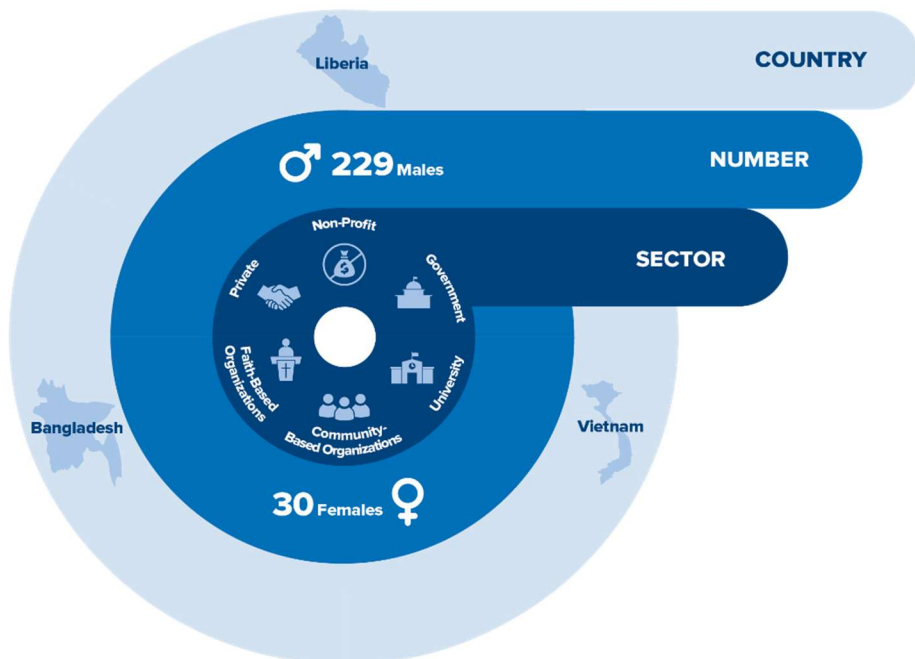
Risk Reduction Interventions and Studies at Prioritized Interfaces

Outbreaks can start – and stop – at the country level, and early country-level and country-led interventions are key to preventing and reducing the impact of outbreaks. The participatory nature of the OM process applied by STOP Spillover leverages a broad range of in-country stakeholders to identify potential interventions to reduce the risk of spillover at prioritized interfaces, along with addressing knowledge gaps and challenges that limit intervention design. While discussing and prioritizing interventions to reduce the risk of spillover forms a significant component of an OM workshop, it is important to note that decisions regarding the interventions to implement are not made at OM workshops. Rather, the information collected during the OM process is synthesized by members of STOP Spillover at country and global levels to decide on the most appropriate risk-reduction activities. To facilitate this decision-making process, STOP Spillover has instigated an Intervention/Study Selection Process (ISSP), the purpose of which is to engage and leverage the technical expertise across STOP Spillover to make informed programmatic decisions regarding the interventions – and studies needed to inform interventions – that emerge from OM.

During an ISSP, a STOP Spillover country team and global technical experts meet virtually to assess the complete set of interventions and studies that emerged from OM (where applicable, related interventions/studies are clustered into logical groups that could potentially be implemented

holistically) and a ranking process using defined criteria (see "Criteria for ranking interventions/studies during ISSP") is applied. This ranking process serves to focus discussions on interventions and aligned studies with the most potential. The final output of STOP Spillover's ISSP is a set of recommended interventions and aligned studies to pursue in a given country.

> **Criteria for ranking interventions and studies during ISSP**
> 1. Alignment with local needs and priorities
> 2. Alignment with STOP Spillover objectives
> 3. Perceived level of impact on reducing risk of spillover
> 4. Willingness and commitment of local stakeholders to drive implementation
> 5. Foundations towards sustainability (policies or systems in place, etc.)
> 6. Feasibility (resources [human and financial] required for implementation; timeline for implementation)

During the current reporting period, STOP Spillover convened an ISSP for four countries: Uganda, Viet Nam, Bangladesh, and Liberia. For Uganda, Viet Nam, and Bangladesh, the risk-reduction interventions and studies that emerged from the ISSPs have been approved by USAID and have been incorporated into the endorsed country work plans. Liberia is at an earlier stage of this process, with the activities recommended through the ISSP process being incorporated into a work plan, which will be shared with USAID for review early in April. Below we describe the risk-reduction interventions and aligned studies that will be initiated during the next reporting period at the prioritized interfaces in Uganda, Vietnam and Bangladesh.

UGANDA: Planned interventions and studies

INTERVENTION 1: Engage communities through a social behavior change (SBC) intervention strategy to keep bats out of households and promote safe practices.

Justification for intervention: In Uganda, many households have bats living within their houses, usually in roofing materials. Pathways for zoonotic disease spillover exist at these interfaces, driven by people's livelihoods, including economic, nutritional, and cultural needs. Opportunities for contact with infected animals occur on a daily basis. Communities' awareness of the health risks associated with wild animal contact varies but is generally low. Livelihood activities rely on those interactions that may be risk factors for spillover.

What we'll do: We will develop an SBC strategy and plan for addressing practices, behaviors, and norms that put families and communities at risk, and promote sustainable, locally available ways to keep bats out of households, as well as safe practices around bats and their excretions. The SBC intervention strategy will segment primary audiences and their influencers, addressing specific barriers and motivating factors to adopting safe practices around bats. The strategy will provide a roadmap outlining multiple prioritized interventions and channels at different levels to increase impacts, such as community dialogue, interactive radio programs, and interpersonal communication.

INTERVENTION 2: Promote protection of household and communal water resources and food safety.

Justification for intervention: One of the most common ways people are exposed to bat excrement is through unprotected water collection and storage containers. If water containers are left open, especially during the day when bats are at rest, bats can urinate and defecate in them. The same applies to communal water resources such as free-standing wells and surface water. OM highlighted that fruit partially eaten by bats, and potentially contaminated by bat saliva and excrement, poses spillover risks that can be mitigated by promoting food hygiene practices.

What we'll do: We will train communities in water and food storage, management, and quality control practices linked to reduced risk of environmental exposure and viral transmission. This intervention will target mostly female members of households, whose role is to collect, store and protect water and food. Simple, easy-to-use and locally available tools will be developed and tested, using *Trials of Improved Practices* (TIPs).[1] TIPs is a participatory formative research approach developed by the Manoff Group to test and refine potential health interventions on a small scale before promoting them broadly. We will

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[1] https://toolkits.knowledgesuccess.org/toolkits/miycn-fp/trials-improved-practices-guide

test potential practices through a series of visits in which the interviewer and the participant analyze current practices, discuss what could be improved, and together reach an agreement on one or a few solutions to try over a trial period. Participants will then assess the trial experience together at the end of the trial period.

INTERVENTION 3: Develop and evaluate a community-based bat-human interface monitoring program for zoonotic spillover early warning and response.

Justification for intervention: Knowledge gaps that emerged from OM included community challenges in identifying bat species known to be potential reservoirs of zoonotic viruses, which bats roost in houses, caves and agricultural fields, and seasonal variations for different bat species.

What we'll do: We will develop and evaluate a participatory bat monitoring program centered around community-driven participatory mobile-phone-based surveillance. Key stakeholders in the community will be enabled to take photographs to identify bat species using phones for basic characterization of types of bats, and will upload information – including bat species, locations of bat roosts, bat behavioral observations, and information on bat-human interactions – to an online system to refine an interactive map. Data from this community-based bat-human interface monitoring system will establish key interaction points in both space and time, as well as changes in roosting behavior and bat-human interaction, which will enable identification of high-risk sites, time periods and behaviors that may increase bat-human interactions. This information will be utilized directly by the community, STOP Spillover and other stakeholders to mitigate the risk of viral zoonotic spillover from bats.

RESEARCH STUDY 1: Investigate bat host ecology and human behavioral risk factors associated with human-bat interactions.

Justification for study: OM identified knowledge gaps about bat biology, ecology, and community uses of bats. Data on bat species and filovirus distribution in Uganda, especially for the Bundibugyo District, are limited. The goal of this research is to identify where humans are exposed to bats and associated potential risk factors for Marburg and Ebola transmission, which will inform the development of the community-driven participatory bat monitoring system (Intervention 3).

What we'll do: We will characterize the presence and distribution of bat species, describe bat feeding practices and behaviors, as well as uses of bats and bat products (e.g., guano) by human communities.

RESEARCH STUDY 2: Investigate behavioral, sociocultural, gender-specific, and economic risk factors associated with human-bat interactions.

Justification for study: This activity aims to better understand individual, social, and cultural factors that influence behaviors that put people at risk of spillover of Marburg and Ebola viruses; this will inform the development of SBC interventions (Intervention 1). We will build on research conducted under USAID PREDICT but have found that there is very little published information specific for Bundibugyo District.

What we'll do: We will involve people who contact bats (e.g., by sharing dwellings, entering caves, mining, farming, hunting, harvesting fertilizer, eating bats, etc.) in focus group discussions (FGDs) and conduct individual in-depth interviews with community leaders, health care workers, park rangers, hunters, traditional healers, and other key informants. In addition, we may directly observe how people behave near caves, working on farms, in buildings occupied by bats, etc.

"It's a common thing here in our community for people to have bats in their houses, and they are not aware of their potential to spill over diseases. We need to educate them about it. I know we cannot eradicate bats, but we need to think about how to live safely with bats."
– Mr. Asaba Timothy, Chairperson of the Ntandi Town Council in Bundibugyo, Uganda

VIET NAM: Planned interventions and studies

INTERVENTION 1: Use trials of improved practices on demonstration farms to identify feasible biosafety improvements. Implement SBC interventions using communication materials and exchange visits to biosafety demonstration farms to disseminate results.

Justification for intervention: Biosafety was mentioned repeatedly as a key concern by stakeholders during OM and was highlighted in the desktop review that was conducted by STOP Spillover in Project Year 1 to describe the spillover ecosystem in Viet Nam. It was also previously identified as a key concern by the USAID PREDICT project and has been partially addressed by numerous actors in Viet Nam. STOP Spillover seeks to design and implement interventions that improve the adoption of feasible and sustainable biosafety practices. These biosafety interventions will be focused on interface-level wildlife value chains using a participatory approach that identifies practices that actors are willing to test and validate.

What we'll do: We will work with target value chain actors at the interface level using the TIPs methodology. Using this approach, we will engage local stakeholders (e.g., wildlife farm producers, traders, processors/slaughter facilities and other value chain actors) to determine which of the currently recommended biosafety practices they are willing to try. We will work with them to capture the challenges and benefits they derive during the testing process. Stakeholders who adopt and/or adapt these practices will become demonstration farms where other actors can go to learn and observe recommended practices. Three biosafety techniques will be tried with at least 30 wildlife farming value chain actors (10 actors/practice). It is important to document whether prevailing market systems support the adoption of recommended biosafety measures, including the extent to which there are cost-incentives built into consumer demand for safe products, and farmer motivation to ensure personal, family and community safety. Differential incentives and disincentives for female and male actors in the wildlife farming value chain will be captured.

INTERVENTION 2: Establish a coordination mechanism at the provincial level (refining the sub-steering committee and developing implementation guidelines for coordinated action), and community collaborator groups (CCGs).

Justification for intervention: Effective coordination and communication among interface-level stakeholders is critical to ensure rapid response to zoonotic spillover, and to reduce spillover amplification and spread. One Health structures have been developed at the national level but not yet effectively rolled out at the provincial level. Collaboration between human health and animal health sectors in zoonosis prevention and control has been institutionalized in Joint Circulars and decisions issued by the Ministry of Health (MOH) and the Ministry of Agriculture and Rural Development (MARD); however, the roles of different government and non-governmental actors in identifying and responding to zoonotic spillover events is not as clear at the interface level.

What we'll do: This intervention includes three components: creating coordination guidelines at the provincial level; developing standard operating procedures (SOPs) to inform the function of these local level coordination mechanisms; and establishing sub-level zoonotic disease spillover steering committees to strengthen One Health partnerships.

INTERVENTION 3: Consolidate zoonotic disease monitoring data on wildlife farms with human health and livestock data and develop reporting procedures to improve data sharing and planning among sub-committee members.

Justification for intervention: Wildlife disease monitoring data has been identified as an urgent need for wildlife managers, as well as in animal health protection and zoonosis prevention and control by the Government of Vietnam, MARD and Dong Nai Provincial People's Committee (PPC). Implementation of effective and timely disease monitoring, and controlling the transmission of diseases and pathogens among wildlife species and domestic animals and/or humans, requires close collaboration among human health, animal health, wildlife and forest protection sectors.

What we'll do: This activity involves a simple and participatory tool – the One Health Information Assessment Tool (OHIAT) – to determine which information is already being collected by which partner and to identify ways this information can be shared more quickly to improve evidence-based and timely decision making, especially at the interface level. The OHIAT will be utilized to perform a landscape assessment of existing information systems pertinent to One Health stakeholders at the provincial and interface levels, with a focus on wildlife farms and actors in the wildlife farm value chain. The assessment will help identify key data gaps and information needs, and areas for improvement in systems governance, data analysis and use, and resource allocation. STOP Spillover will use this information to inform how to strengthen stakeholder capacity for evaluating risk at the interface level. Initially, the team will focus on ways to improve stakeholder access to and use of existing data that is already being collected.

RESEARCH STUDY 1: Conduct a behavioral risk assessment to characterize risk associated with the wildlife farming value chain in Dong Nai province.

Justification for study: Wildlife farm owners and workers are typically not informed of disease control and prevention strategies and lack knowledge of and incentives to adopt biosafety practices to reduce spillover risk. Data from these assessments will be used to inform the design of social behavior change messages and approaches to improve biosafety practices through reduced exposure (Intervention 1).

What we'll do: We will conduct social and behavioral risk assessments to better understand individual and community level knowledge, attitudes and practices that potentially put stakeholders involved in the wildlife value chain in Dong Nai at risk for zoonotic disease transmission. We will address knowledge gaps amongst key stakeholders highlighted by the initial risk assessment using various methods, including FGDs and direct observations of stakeholder practices.

RESEARCH STUDY 2: Conduct a rapid assessment of prior biosafety training programs conducted at the stakeholder level, to improve the design and adoption of appropriate and feasible biosafety recommendations using barrier analysis tools and ethnographic decision trees.

Justification for study: Many capacity development and training programs have been implemented in Viet Nam, including those related to biosafety. It is important to understand what training has already occurred, where, when and who it targeted, and to determine the degree to which new skills were applied and recommended practices adopted. Training on biosafety does not guarantee behavior change or the adoption of recommended practices. It is important to understand the barriers that actors face in adopting biosafety practices, and what might motivate or constrain them to change their practices. Data from these assessments will be used to inform the design of SBC messages and approaches to improve biosafety practices through reduced exposure (Intervention 1).

What we'll do: We will conduct a rapid assessment of prior biosafety training programs delivered to stakeholders involved in the wildlife value chain in Dong Nai to identify strengths and weaknesses. We will use barrier analysis, a rapid assessment methodology used in behavior change projects to help identify behavioral determinants of a particular behavior so that more effective social and behavioral change messages, strategies, and supporting activities can be developed. We will also use FGDs with actors along the wildlife farming value chain to describe barriers that limit the adoption of biosafety practices.

"I have only heard that there is disease from animals to humans, but in reality, I do not know what disease and how dangerous it is. My family has been raising wildlife for many generations but has never felt sick. If there is any evidence about zoonosis, you have to train farmers so that we know how to prevent [it]."
– Wildlife farm owner in Vinh Cuu district, Dong Nai province, and participant at OM workshop in Viet Nam.

BANGLADESH: Planned interventions and studies

INTERVENTION 1: Develop a holistic, multi-pronged design for LBMs with improved biosecurity and hygiene measures that reduce the risk of spillover.

Justification for intervention: LBMs in Dhaka are typically not designed with biosecurity measures in mind. There is a need to strengthen infrastructure at LBMs to improve biosecurity measures and minimize the risk of spillover of zoonotic viral pathogens.

What we'll do: We will work directly with international, national and local stakeholders to design infrastructural improvements, biosecurity and hygiene guidelines/SOPs, and biosecurity and hygiene compliance monitoring plans for LBMs. There will be multiple components to this intervention, including:

- supporting LBM stakeholders to design evidence-based biosecure LBMs with infrastructure designed to reduce risk of spillover (note: construction of infrastructure at LBMs will not be financed through STOP Spillover funding).
- supporting LBM stakeholders to develop and implement context-appropriate and easy-to-understand-and-implement biosecurity and hygiene guidelines/SOPs.
- supporting LBM stakeholders to develop a coordinated monitoring plan to be used by regulatory bodies internal and external to LBMs to assess compliance with biosecurity measures.
- supporting local authorities and LBM stakeholders to develop coordinated, sustainable funding mechanisms to support changes to improve biosecurity conditions and hygiene practices in the LBMs.
- developing and implementing a comprehensive SBC strategy to increase understanding of the risk of spillover from LBMs, the need for improved biosecurity and hygiene practices, and improved compliance among LBM workers, consumers, and policymakers.

INTERVENTION 2: Establish an integrated, coordinated and sustainable platform for information sharing, advocacy, and co-designing, co-implementation, and co-monitoring of surveillance activities and interventions at the LBMs.

Justification for intervention: Surveillance activities in the LBMs have been criticized for being conducted in silos, with data not being shared beyond the implementing organizations/institutes or the scientific community.

What we'll do: We will support local stakeholders to develop a coordinated and sustainable platform for pathogen surveillance in LBMs, and to enhance coordination and collaboration among different national and international stakeholders linked with LBMs, ensuring that surveillance data is shared and

utilized with all relevant actors and stakeholders. There will be multiple components to this intervention, including:

- establishing a process of dialogue to create an integrated, coordinated and sustainable surveillance system for LBMs.
- identifying key data gaps and information needs, and suggesting areas for improvement in system governance, data analysis and use, resource allocation and digital infrastructure requirements using the OHIAT.
- enhancing common integrated platforms for information sharing, co-designing, co-implementation, and co-monitoring of surveillance and interventions at the LBMs.

INTERVENTION 3: Develop and support utilization of an integrated and coordinated app-based system to report poultry workers' health status or unusual mortality in poultry and/or crows in and around LBMs.

Justification for intervention: Early detection of zoonotic diseases allows for the implementation of early response measures which may reduce loss of human life and economic disruption. Mobile phones can be used to acquire real-time information, even for low-income countries where Internet connection is not widely available.

What we'll do: We will work with LBM stakeholders to develop and implement an app-based system to collect and report LBM workers' health status or unusual mortality of poultry and/or crows in and near LBMs. The system will involve local market stakeholders in risk characterization and development of informed risk management options.

RESEARCH STUDY 1: Explore factors contributing to failures and success of previous interventions to improve biosecurity in the LBMs, surveillance activities, and early warning systems.

Justification for study: The data collected from this study will inform the design of all three interventions planned in Bangladesh, helping to understand what has worked in the past, and what has not.

What we'll do: We will explore factors that have contributed to the success or failure of interventions previously implemented to tackle hygiene and biosecurity issues at LBMs.

RESEARCH STUDY 2: Conduct a willingness-to-pay analysis to identify consumer considerations in relation to pricing, and a barrier analysis to identify barriers faced by stakeholders with regards to changing practices to improve biosecurity, biosecurity reporting, or price changes.

Justification for study: Improving hygiene and biosecurity at LBMs may come at a cost to stakeholders, with those costs likely being passed on to the consumer. Understanding these economic issues are critical to designing biosecurity measures that stakeholders will consider implementing. The data collected from this study will inform the design of Intervention 1.

What we'll do: We will conduct an assessment among LBM stakeholders and consumers to assess willingness to pay for certain changes, and economic, customary or sociocultural barriers to implementing, adopting and maintaining the changes. In particular, we will aim to understand consumer considerations with regards to pricing (e.g., how willing are consumers to pay more for a product that is safer due to vendor adherence/compliance with biosecurity protocols?).

Caged bamboo rats at a wildlife farm in Dong Nai Province. Photo credit: VOHUN

Formation of OH-DReaM Working Groups

OH-DReaM working groups are central to STOP Spillover's plans for sustainable, country-led programming. OH-DReaM working groups are technical groups formed at the country level to address a specific thematic area. Once a work plan for a given country has been endorsed, OH-DReaM working groups will be formed to design, implement and validate interventions to mitigate viral spillover and spread of zoonotic diseases, or close an information or data gap to inform the design of interventions. Led by a STOP Spillover country team member, with a technical co-lead from the consortium, and supported by global resource hub subject matter experts in areas relevant to the working group, OH-DReaM working groups will comprise key in-country stakeholders and technical experts from the private sector, academia, and NGOs, as well as representatives from communities at the specific high-risk interface of focus and government officials. Up to five OH-DReaM working groups may be active in a given country, depending upon the activities required to implement the risk reduction interventions and studies in the country's work plan. Guided by the activities within the approved work plan, each OH-DReaM working group will create its vision and timeline of what it wants to achieve.

STOP Spillover has developed standardized processes for establishing and operationalizing OH-DReaM working groups across the countries supported by the project. We have a transparent process for constituting each group and ensuring equitable representation across genders, age, and ethnicity. Following the approval of work plans in Uganda and Viet Nam, the respective country teams began work towards establishing OH-DReaM working groups.

This process began in Viet Nam as the reporting period drew to a close, but the Uganda country team has successfully formed five OH-DReaM working groups to implement the three interventions and two research studies around which Uganda's Year 2 work plan is based. These five groups convened in March. After being oriented on STOP Spillover and the activities for which they are being formed, the five OH-DReaM working groups developed detailed action plans, laying out the work that the group will pursue and the corresponding timelines. The process of developing these action plans ensured integration across the five groups and appropriate coordination for related activities. Technical review of these action plans leveraged technical expertise from across STOP Spillover, with each action plan being reviewed by at least three subject matter experts. As the reporting period drew to a close, action plans were being finalized. For any intervention or study that requires ethical approval, the necessary approvals will be sought through both Tufts and the appropriate in-country ethical review board.

Indicator 1.2.a # of unique sectors included in OH-DReaM working groups conducting hypothesis-driven epidemiological, ecological, behavioral and socio-economic studies

6

| Government | Private | Non-profit |
| Community-based organizations | Faith-based organizations | University |

Surveillance

STOP Spillover's three core objectives focus on reducing the risk of spillover, amplification and spread of prioritized zoonotic viruses (Figure 1). Designing, implementing and validating effective interventions to reduce the risk of spillover, amplification and spread requires supporting surveillance activities to provide data. Much of STOP Spillover's biological sampling and laboratory testing activities will be tailored to the specific interfaces and interventions of focus in each of our countries. While surveillance that contributes to informing and assessing our intervention strategies is a priority, we will also incorporate surveillance activities outside the strict limits of specific interventions and related studies with the goal of strengthening in-country capacity to detect and mitigate the risk of spillover of prioritized pathogens. STOP Spillover aims for surveillance activities to be implemented in partnership with relevant in-country stakeholders and seeks to reinforce One Health approaches. STOP Spillover will avoid duplicative or conflicting surveillance activities within each of our supported countries, and strives to leverage existing in-country capacities.

During this reporting period, the STOP Spillover surveillance strategy focused on two key areas: (i) assessing in-country surveillance capacity to develop a more thorough understanding of existing surveillance systems, personnel and information collection activities; and (ii) developing novel diagnostic tools in support of building viral surveillance platforms.

Surveillance Assessments

Conducting surveillance assessments increases understanding of existing surveillance resources with respect to systems, networks, personnel, expertise, and capacities. Information captured through our surveillance assessments ensures that surveillance-related activities of STOP Spillover complement current in-country surveillance activities and build on current in-country capacity. Crucially, surveillance assessments serve to identify gaps at the country level, helping to propose solutions toward achieving project goals while adding value to national protocols. STOP Spillover's approach to assessing surveillance in each targeted country builds a sense of ownership and may lead to synergistic activities and partnerships that will strengthen a country's surveillance framework.

During this reporting period, surveillance assessments were initiated in Liberia, Bangladesh, and Viet Nam. Uganda's surveillance assessment was completed in Year 1. Country teams, supported by STOP Spillover resource hub members with expertise in surveillance and sampling, conduct surveillance assessments by employing a standardized information gathering framework. In each country, identified stakeholders are requested to complete standardized questionnaires, the results of which are collected into a final surveillance assessment report. The assessment will serve as a resource for countries, contribute to their learning and aid them in strengthening their own activities.

> **Indicator 1.4.c # and type of surveillance activities being implemented**
>
> **3: Surveillance assessments conducted in Bangladesh, Vietnam, and Liberia**

Novel Diagnostic Tools

STOP Spillover partner the Broad Institute leads the project's work on the development of diagnostic tools in support of building viral surveillance platforms. Working closely with surveillance experts from STOP Spillover's Surveillance, Mapping and Modeling (SMM) resource hub, the Sabeti Lab from the Broad Institute has focused on the development of best-in-class polymerase chain reaction (PCR) assays for all pathogens prioritized by STOP Spillover, as well as point-of-care (POC) assays for filoviruses (Marburg and Ebola) and Lassa using clustered regularly interspaced short palindromic repeats (CRISPR) technology.

PCR assays are currently the most widely used nucleic acid testing available for pathogen surveillance and detection. The Sabeti Lab has validated the following PCR assays: Ebola, Marburg, Lassa, Nipah, SARS-CoV-2, and Influenza A. Each of these PCR assays are currently being tested with a variety of sample matrices (feces, urine, blood, saliva, and wastewater) to maximize their utility.

Although PCR is a global gold-standard diagnostic tool – diagnosis of infection during the current COVID-19 pandemic uses a PCR assay – there is a continued need for field-deployable, front-line, and highly accurate POC tests. To address this unmet need, the Sabeti Lab has developed SHINE (streamlined highlighting of infections to navigate epidemics), a point of care CRISPR-based assay that can be used in low-resource settings with little-to-no equipment needed. SHINE avoids the need for RNA extraction from samples, is functional at ambient temperature, and maintains the high levels of specificity and sensitivity characteristic of nucleic acid assays. Novel SHINE assays in support of STOP Spillover prioritized pathogens are being developed. In January 2022, work began on designing and validating SHINE assays targeting (separately) all viruses from the

Filoviridae family and the entire range of Lassa viruses. Development of a SHINE assay specific for SARS-CoV-2 will be added soon.

Looking ahead: The Broad Institute will complete the development and testing of all PCR-based assays for all priority STOP Spillover pathogens, validating them in feces, urine, blood, saliva, and wastewater sample matrices. Likewise, the development and validation of SHINE assays for filoviruses, Lassa and SARS-Cov-2 will be completed. Comprehensive protocols for all PCR and CRISPR assays will be developed and shared. After assay development in the laboratory is complete, all assays will be validated in the field, with field validation initially focusing on Liberia. STOP Spillover will engage and train relevant stakeholders in Liberia to ensure that the assays deliver the expected results in a real-life setting by people who will actually use them.

Activities Implemented, by Cross-Cutting Area

Monitoring, Evaluation and Learning (MEL)

Monitoring, evaluation, and learning (MEL) is a fully integrated component of STOP Spillover. The MEL Team, composed of experts from Tufts and John Snow Research & Training Institute, Inc. (JSI) provides tailored monitoring and evaluation (M&E)-related technical support to STOP Spillover country teams.

In December 2021, the MEL Team submitted an updated MEL Plan to USAID, incorporating an updated table of key performance indicators (KPIs) which STOP Spillover will report against semi-annually or annually (depending on the indicator). USAID endorsed the revised MEL Plan, including updated KPIs, in March 2022.

The STOP Spillover digital monitoring system, GENOME (Global Electronic Network of Monitoring and Evaluation) went live in January. Manuals and guidance documents were created to give direction on the collection, storage, organization, and presentation of data and information needed to manage project operations and performance. As work plans for each country are endorsed, the MEL Team has supported country teams to input information pertinent to each activity that will be implemented so that progress can be tracked and data collected. GENOME data was used in the creation of this Semi-Annual Report. At the end of March 2022, there were nine project activities for which data was being inputted and tracked through GENOME.

The MEL Team plays a critical role in evaluations conducted as part of STOP Spillover activities. The MEL Team has been reviewing the action plans developed by OH-DReaM working groups in Uganda, aiming to ensure that, where appropriate, evaluations and appropriate tools are incorporated into the plans of each OH-DReaM working group. As more activity-generated data is captured within GENOME, the MEL Team will prioritize their Learning Agenda to address assumptions and gaps outlined in STOP Spillover's Theory of Change.

Looking ahead: The MEL Team will continue to provide comprehensive M&E technical assistance – including support for data management and storage – to country teams and OH-DReaM working groups as interventions and research studies are conducted. The MEL Team will organize a Collaborating, Learning, and Adapting (CLA) workshop towards the end of Project Year 2 to discuss best M&E practices, lessons learned, standardization, and other topics important for ensuring that STOP Spillover continues to gather quality data to inform evidence-based decision making across all activities.

Communications and Outreach

STOP Spillover's Technology, Innovation, Partner Support, and Communications (TIPC) group ensures that internal consortium partners and external stakeholders receive accurate, timely information and communications related to STOP Spillover.

> **STOP Spillover in the news – recent highlights**
>
> News Medical: Why are spillover diseases increasing?
>
> Dan Viet: Pilot project to prevent the spread of diseases from animals to humans
>
> Bao Dong Nai: Prevent the spread of diseases from animals to humans
>
> The Conversation: Preventing future pandemics starts with recognizing links between human and animal health

Throughout this reporting period, TIPC continued to highlight STOP Spillover's mission and ongoing work to our target audiences, including priority country stakeholders, global development donors, policymakers, and practitioners, and the broader One Health advocacy and research communities. TIPC leverages different approaches to highlight STOP Spillover's work, including the STOP Spillover website (STOPSpillover.org), regular newsletters, social media posts (Twitter, Facebook and LinkedIn), and regular blogs published on the project's website.

TIPC also supports STOP Spillover by promoting technology and innovation. TIPC shares monthly TechBytes in the STOP Spillover newsletter to inspire and encourage STOP Spillover country team members, OH-DReaM working groups and other readers of the STOP Spillover monthly newsletter to adapt and adopt technology and innovative approaches into their One Health

interventions to reduce zoonotic spillover risk. TechByte topics have included wastewater surveillance approaches, USAID's Digital Strategy and highlights from a recent DevEx Prescription for Progress webinar.

The inaugural meeting of STOP Spillover's External Advisory Board (EAB) was convened on December 13, 2021. The EAB includes prominent representatives from the private sector (Private Sector Roundtable (PSRT) in support of the Global Health Security Agenda (GHSA)) and diverse representation from One Health communities (Food and Agriculture Organization [FAO], World Health Organization [WHO], Centers for Disease Control and Prevention [CDC], U.S. Department of Health and Human Services Office of Global Affairs/Office of Pandemics and Emerging Threats, Afrique One, and World Wildlife Fund [WWF]). While not a decision-making body, the EAB functions to help

STOP Spillover gain diverse perspectives and insights and identify opportunities for advancing the project's work, providing knowledge, critical thinking and analysis to inform the project's vision and mission.

Looking ahead: One unique component of STOP Spillover is its focus on specific potentially high-risk spillover points and locations. As these interfaces are chosen in each country – working with local stakeholders through the intensive OM process – TIPC will highlight these potential spillover interfaces to stakeholders, partners, and the media. As OH-DReaM working groups are established and begin their work, we will announce to stakeholders, partners and media how these groups are core to the project's in-country work, highlighting the diversity of each group and the local-first approach that STOP Spillover is taking. The second meeting of STOP Spillover's EAB is planned for June 2022.

More than 4,400 visitors to STOPSpillover.org — **up 110% from the preceding six months**.

4,400 visitors

30% Our newsletter subscriber list has **increased by 30% over the past six months**.

More than **29% of visitors to STOPSpillover.org are from our priority countries** (compared to 15% in the preceding six months). Visitors to the website from Uganda went up 16%, visitors from Vietnam went up 10%.

Uganda 16% **Vietnam 10%**

Our newsletter has an average open rate of 49% — compared to a 12% industry standard — which demonstrates that the content we are producing consistently matches the interests of our list.

49%

More than **44,000** individuals saw STOP Spillover's social media posts over the past six months, including:

LinkedIn **40,000** Twitter **1,953** Facebook **2,344**

Six blog posts published on STOPSpillover.org. These commentary pieces discussed the One Health nexus between gender, food security, disaster risk and spillover, and introduced key in-country project staff and partners.

3. Progress, Challenges and Next Steps

During Project Year 1, STOP Spillover focused on four countries: Uganda, Liberia, Bangladesh, and Viet Nam. Project Year 2 welcomed two more countries to STOP Spillover: Cambodia and Sierra Leone.

In this section, we report on progress made during the first six months of Project Year 2, challenges encountered, and next steps in each of these countries.

Prioritizing and planning interventions: a snapshot by country

Uganda: Endorsed work plan for Project Year 2 (November 2021 – April 2022) incorporates three interventions and two research studies. Five OH-DReaM working groups have been convened, and action plans for each intervention and study are being developed.

Viet Nam: Endorsed work plan for Project Year 2 (February – September 2022) incorporates three interventions and two research studies. The process of establishing five OH-DReaM working groups has been initiated, and preliminary action plans for each intervention and study are being drafted.

Bangladesh: Endorsed work plan for Project Year 2 (March – September 2022) incorporates three interventions and two research studies. The process of establishing OH-DReaM working groups has been initiated.

Liberia: Informed by OM, a set of interventions and research studies to pursue was recommended by Liberia's ISSP, and a work plan built around these recommended activities is being prepared.

Cambodia: Stakeholder engagement to elicit buy-in for STOP Spillover has begun and plans for selecting the first prioritized interface and conducting OM are underway.

Sierra Leone: STOP Spillover's office has been established and the country team has been recruited. Plans for engaging key stakeholders to elicit buy-in for STOP Spillover has begun.

UGANDA

Progress made: STOP Spillover partner Africa One Health University Network (AFROHUN) leads the project's implementation in Uganda. After successfully conducting national- and interface-level OM workshops in Project Year 1, Uganda was the first country to convene an ISSP. Conducted in October 2021, this virtual workshop engaged technical expertise from across STOP Spillover to synthesize the information gathered during the OM workshops in Bundibugyo and decide on the most appropriate risk-reduction activities to proceed with. Led by the Uganda country team, and engaging experts from across STOP Spillover, in-depth discussions took place about the proposed interventions and knowledge gaps that emerged from OM. The output from this ISSP was a set of recommended interventions and aligned research studies to pursue at the bat-human interface in Bundibugyo district in Uganda (see "Risk Reduction Interventions and Studies at Prioritized Interfaces"). These activities were incorporated into a work plan for Project Year 2 (November 2021 – April 2022), which was endorsed by USAID in January 2022.

Upon endorsement of the work plan, the Uganda country team, supported by global STOP Spillover colleagues, began the process of establishing OH-DReaM working groups to implement the approved activities. Between February and March, five OH-DReaM working groups were successfully established by the Uganda country team. The three OH-DReaM working groups focused on interventions were brought together for a three-day design thinking workshop in March to help them think through what's required to design and implement their respective interventions. This process proved to be helpful for the groups as they developed their respective action plans. Action plans from all five OH-DReaM working groups were submitted for review by technical experts from across STOP Spillover in March. As the reporting period drew to a close, action plans were being finalized, incorporating the feedback provided by STOP Spillover technical experts. Some of these activities will require ethical approval – either from an Institutional Review Board (IRB), in the case of human subjects/participants, or an Institutional Animal Care and Use Committee (IACUC), in the case of animal subjects – while others will not. For those requiring ethical approval, activities cannot begin until ethical approval is received from both Tufts and the in-country ethical review board (School of Public Health, Makerere University (for IRB) and College of Veterinary Medicine, Animal Resources and Biosecurity, Makerere University (for IACUC)). For those not requiring ethical approval, activities will get underway as soon as the action plans are finalized.

Challenges: Uganda was the first country to conduct OM workshops – which were completed in Project Year 1 – and continues to be the first country to conduct key activities, including convening an ISSP, establishing OH-DReaM working groups, and supporting the groups to develop action plans. Establishing the procedures for these activities is a learning process for the project; there have been some delays along the way as the Uganda team, supported by STOP Spillover management, develop processes that balance the needs on the ground with the needs of a global USAID-funded project. The hard work and learning of the Uganda country team and AFROHUN will help colleagues in other STOP Spillover-supported

countries as the project refines and improves its processes. STOP Spillover's Regional Lead Africa, based at the AFROHUN secretariat in Kampala, stepped down from her role in February. AFROHUN, with the support of STOP Spillover senior management at the global level, is currently recruiting her replacement. In the interim, the country team Lead for Uganda has stepped up to serve in an acting role for this position.

Next steps: Activities of OH-DReaM working groups that are not dependent upon ethical approval will be initiated in April. The current Uganda work plan runs through April 31, 2022. As the reporting period draws to a close, the Uganda country team, supported by global STOP Spillover colleagues, is drafting an extended work plan to run through the remainder of Project Year 2 (May 1 – September 30, 2022). This will be submitted to USAID in April. Finalizing the recruitment of the Regional Lead for Africa is also planned for April.

VIET NAM

Progress made: The Viet Nam One Health University Network (VOHUN), under the auspices of STOP Spillover partner South East Asia One Health University Network (SEAOHUN), leads project implementation in Viet Nam. In November, the Viet Nam country team conducted consultative meetings with key stakeholders in Dong Nai province – including Dong Nai Department of Health (DOH), DOH sub-department of Food Safety, Dong Nai Center for Disease Control (CDC), Dong Nai Department of Agriculture and Rural Development (DARD sub-department of Animal Husbandry, and DARD sub-department of Forest Protection – in order to identify critical partners to invite to the OM workshop. A major milestone for STOP Spillover in Viet Nam was reached in December when the project successfully completed OM. Between 7 and 10 December 2021, a hybrid in-person/virtual OM workshop was conducted in Dong Nai province, bringing together stakeholders from national, provincial and local levels. The first three days of the workshop targeted stakeholders from the national and provincial levels. Eighty participants at this first phase of the workshop included representatives from: General Department of Preventive Medicine, MOH; MARD; Dong Nai DOH; Dong Nai DARD; Dong Nai Department of Natural Resources and Environment (DONRE); Dong Nai Department of Industry and Trade (DOIT); Division of Environmental Police, Ministry of Public Security (MPS); Dong Nai Department of Information and Communication; Dong Nai CDC; Women's Union; Dong Nai PPC; and officials from four of Dong Nai's districts). The final day of the four-day workshop targeted community-level stakeholders involved in the wildlife trade in Dong Nai. Thirty participants at this event included representatives from various sectors, including: wildlife and domestic animal farm owners; wildlife farm workers; restaurant owners; consumers of farmed wildlife; community leaders; Women's Union; Youth Union; community veterinarians; and community health workers). Participants identified knowledge gaps and barriers that need to be addressed to reduce spillover risk at captive wildlife farms, as well as opportunities. Participants also discussed potential interventions to reduce spillover risk at captive wildlife farms and desired outcomes for critical partners involved in the wildlife value chain.

Following the OM workshop in Dong Nai, VOHUN led an ISSP in January, engaging technical expertise from across STOP Spillover to synthesize the information gathered during the OM workshop in Dong Nai and decide on the most appropriate risk-reduction activities. Thirty-seven members of STOP Spillover participated in Viet Nam's ISSP, discussing in-depth the proposed interventions and knowledge gaps that emerged from OM. The recommendation from Viet Nam's ISSP was to proceed with three interventions and two aligned research studies (see "Risk Reduction Interventions and Studies at Prioritized Interfaces"). Subsequently, activities for operationalizing these interventions and aligned studies were incorporated into the Viet Nam Year 2 work plan. This work plan was endorsed by USAID in March. Following endorsement of the work plan, the Viet Nam country team, supported by global STOP Spillover colleagues, began the process of establishing OH-DReaM working groups and developing the respective action plans for each of the OH-DReaM working groups. This process will continue into the next reporting period

An assessment of in-country surveillance capacity was initiated in March. Supported by technical experts from STOP Spillover's resource hubs, the Viet Nam country team has identified the stakeholders to be engaged as part of the surveillance assessment in order to develop a more thorough understanding of existing surveillance systems, personnel and information collection activities in Viet Nam. This surveillance assessment will continue into the next reporting period.

Throughout this reporting period, VOHUN engaged relevant organizations – including the Wildlife Conservation Society (WCS); World Wide Fund for Nature (WWF; referred to as World Wildlife Fund in the USA and Canada), and FAO – and other USAID-funded projects – including Wildlife TRAPS and DEEP VZN – to introduce them to STOP Spillover and identify potential synergies. Fostering and maintaining relationships with these stakeholders allows STOP Spillover in Viet Nam to learn from other stakeholders and explore opportunities for potential future collaboration.

Challenges: Recruitment of the country team took longer than expected. However, the full country team was in place in November. COVID-19 continues to present challenges; however, many of the restrictions that had been put in place by the Government of Viet Nam in 2020 were eased in March 2022.

Next steps: The country team, with support from STOP Spillover's resource hubs, will complete the establishment of OH-DReaM working groups and the development of their respective action plans. Activities of OH-DReaM working groups that are not dependent upon ethical approval will be initiated in April; for any activity that requires ethical approval, the necessary approvals will be sought through both Tufts and Hanoi University of Public Health before field implementation begins. The Viet Nam country team will also continue the surveillance assessment by engaging the identified stakeholders.

BANGLADESH

Progress made: STOP Spillover partner icddr,b leads project implementation in Bangladesh. The poultry–human interface – specifically, LBMs in Dhaka – was identified as the prioritized interface during a national-level OM workshop during Project Year 1, and during this reporting period three separate OM engagements were conducted to focus on Dhaka's LBMs. The first interface OM workshop, held on November 21, 2021, targeted stakeholders from a retail LBM operated under private ownership. The second interface OM workshop, held over three days – December 9-11, 2021 – targeted stakeholders from a wholesale LBM (including some retail poultry shops) operated under Dhaka City Corporation. In total, the 76 participants of these two workshops included representatives from market committees, poultry shop owners, poultry shop workers/slaughterers, mobile poultry vendors, mobile poultry slaughterers, cleaners, live poultry transporters (long haul and rickshaw van), restaurant owners, fishery owners and workers, and staff of poultry dealers. The third interface OM workshop, conducted on December 28, 2021, targeted national-level stakeholders involved in various capacities with the poultry value chain interface. Forty-one participants at this one-day workshop included representatives from government departments, regulatory bodies, research organizations, and non-government organizations (NGOs). While this workshop targeted national-level stakeholders, the LBMs were also represented. Across these three interface OM workshops, a total of 117 participants identified knowledge gaps and barriers, as well as opportunities, to be addressed in order to reduce spillover risk at Dhaka's LBMs. Potential interventions to reduce spillover risk were discussed by participants, as were desired outcomes for critical partners involved in the poultry value chain.

Following the completion of OM workshops in Bangladesh, icddr,b led an ISSP in January, engaging technical expertise from across STOP Spillover to synthesize the information gathered during the OM workshops and decide on the most appropriate risk-reduction activities. Led by the Bangladesh country team, and with participation from across STOP Spillover, in-depth discussions took place about the proposed interventions and knowledge gaps that emerged from OM. The recommendation from Bangladesh's ISSP was to proceed with three interventions and two aligned research studies (see "Risk Reduction Interventions and Studies at Prioritized Interfaces"*)*. Subsequently, activities for operationalizing these interventions and aligned studies were incorporated into the Bangladesh Year 2 work plan. This work plan was approved by USAID at the end of this reporting period. While awaiting approval of the Year 2 work plan, the Bangladesh County Team and global STOP Spillover colleagues planned for the establishment of OH-DReaM working groups.

icddr,b continued engaging key government stakeholders as the work plan was being finalized. In late March, icddr,b convened a meeting with the Department of Livestock Services (DLS) and another with the Institute of Epidemiology Disease Control and Research (IEDCR) and the One Health Secretariat (OHS). These meetings reinforced interest in and support for STOP Spillover in Bangladesh. In all cases, attendees were positive about project plans and were enthusiastic about continuing to build partnerships.

An assessment of in-country surveillance capacity was initiated in November. The Bangladesh country team has engaged stakeholders involved in surveillance activities in Bangladesh, requesting them to complete questionnaires designed to provide STOP Spillover with a thorough understanding of existing surveillance systems, personnel and information collection activities in Bangladesh. Questionnaires have been completed by DLS, Bangladesh Livestock Research Institute (BLRI), Central Disease Investigation Laboratory (CDIL), Bangladesh Agricultural University (BAU), Chattogram Veterinary and Animal Sciences University (CVASU), International Union for Conservation of Nature (IUCN), FAO, and colleagues at icddr,b. One additional stakeholder involved in surveillance activities in Bangladesh – IEDCR – is currently being engaged. The surveillance assessment will continue into April, with the final report expected soon thereafter.

Challenges: The prioritized interface in Bangladesh is complex. The significance of the poultry industry in Bangladesh, both politically and commercially, necessitates engaging a wide range of stakeholders and balancing many different perspectives. Bringing all the relevant stakeholders on board takes time. Local customs and practices, specifically in terms of bringing different types of stakeholders together in Bangladesh, present challenges when scheduling participatory OM workshops, often necessitating separate meetings for specific sets of stakeholders. Scheduling the OM workshop at the wholesale LBM, in particular, proved challenging, given its complex operational structure and diversity of stakeholders. Conducting the surveillance assessment in Bangladesh has presented challenges, with some stakeholders reluctant to participate at first. This challenge is being resolved by the country team having one-on-one meetings with key stakeholders to help them better understand the value in the surveillance assessment and how the information will be used. COVID-19 presented challenges, with countrywide movement restrictions affecting the scheduling of activities. Travel restrictions have been eased, and going forward into the next reporting period, COVID-19 is expected to be less challenging.

Next steps: Bangladesh's Year 2 work plan was endorsed at the end of the current reporting period. As we move into the next reporting period, the country team will begin the process of establishing five OH-DReaM working groups which will subsequently develop detailed action plans, laying out how the interventions and aligned studies that are included in the approved work plan will be operationalized. For any intervention or study that requires ethical approval, the necessary approvals will be sought through both Tufts and icddr,b; pending receiving necessary ethical approvals, the five OH-DReaM working groups formed in Bangladesh will be ready to move forward with their respective work. The surveillance assessment will be finalized, organizing information collected through our standardized information gathering framework.

LIBERIA

Progress made: STOP Spillover partner AFROHUN leads the project's implementation in Liberia. Recruitment for the four technical country team members was finalized, with the full country team in-place in January.

Lassa virus, a priority pathogen for the Government of Liberia, was selected by STOP Spillover as the priority pathogen for the project's initial work in Liberia. Nimba County was selected as the specific location to focus initial efforts to reduce the risk of Lassa virus spillover. This decision was based on data from the National Public Health Institute of Liberia (NPHIL), which indicated a high number of infections and deaths from Lassa fever. Also, Nimba County shares an international border with two Lassa-endemic countries (the Republic of Guinea and Côte d'Ivoire).

The Liberia country team met key government stakeholders at the central and county levels to introduce STOP Spillover and to discuss and seek concurrence on focusing the project's initial activities on Lassa fever in Nimba County. Stakeholders engaged included: the Senior USAID Mission Global Health Security Agenda Advisor; the Minister of Health; the Coordinator of the One Health Platform; the Vice President of the University of Liberia, College of Health Sciences; the Executive Director of the Environmental Protection Agency (EPA); the Director-General of NPHIL and her key collaborators; the Chief Veterinary Officer of the Ministry of Agriculture; the Nimba County Health Team; and the Nimba County Superintendent Office. The Liberia country team also participated in a meeting of the National Emergency Preparedness and Response Committee (NEPRC). NEPRC meetings are organized by NPHIL and attended by representatives from various institutions, including WHO, USAID, CDC, One Health Platform, partners and other government agencies, to share disease updates and activities. All stakeholders welcomed USAID's STOP Spillover consortium and concurred with the decision that the starting point should be Lassa fever in Nimba County, noting that in subsequent years the project will consider other key interfaces, locations, and pathogens of interest.

STOP Spillover organized a Lassa Summit on February 18, 2022. Thirty-six participants comprising the Liberia country team, global STOP Spillover resource hub members and a small number of external experts convened virtually and in-person for this one-day meeting. The Lassa Summit provided an opportunity in advance of OM for STOP Spillover global experts to learn about the drivers, ongoing disease control efforts, and context of Lassa fever in Liberia, particularly Nimba County, and for the Liberia country team to learn from expert consortium and external partners on experiences related to Lassa fever.

A major milestone was reached in February when the project successfully conducted an OM workshop at the project's first prioritized interface in Liberia. The Liberia Mission recommended that STOP Spillover's OM strategy forgo a national-level workshop (as conducted in Bangladesh and Uganda during Project Year 1) and go directly to the interface (as per the strategy applied in Viet Nam). Between February 23-25, a "hybrid" in-person/virtual OM workshop was conducted in Ganta, Nimba County. The three-day workshop was attended by 56 participants in-person and eight online via Zoom. Stakeholders

from national, county and local levels were represented, including representatives from the MOH, Ministry of Internal Affairs, Ministry of Agriculture (MOA), NPHIL, EPA, University of Liberia College of Health Sciences, Water, Sanitation and Hygiene (WASH) Commission, FDA, FAO, Breakthrough Action, International Rescue Committee, Nimba County Health Team, and traditional and religious leaders. The workshop served as a forum for participants to discuss the context of Lassa fever in Nimba County, and identify opportunities, gaps, and barriers to minimizing the transmission, spread and amplification of Lassa virus. Potential interventions to reduce spillover risk of Lassa virus– from rodents to humans, from human to human, and from human to rodents – were discussed by participants, as were desired outcomes for identified critical partners. Immediately after the workshop, the country team, supported by STOP Spillover colleagues from Tufts and STOP Spillover partner Right Track Africa, paid a one-day visit to the Boe Community in Nimba County to ascertain the conditions of the community with respect to Lassa fever, including practices, type of housing, and access to health care.

Following the completion of OM workshops in Liberia, an ISSP was conducted in March, engaging technical expertise from across STOP Spillover to synthesize the information gathered during the OM workshops in Nimba County and decide on the most appropriate risk-reduction activities. Led by the Liberia country team, and with participation from across STOP Spillover, in-depth discussions took place around the proposed interventions and knowledge gaps that emerged from OM. The output from this ISSP was a recommended set of interventions and aligned research studies to pursue in Liberia. As the reporting period drew to a close, these activities were being formulated into a work plan to be submitted to USAID for review.

Challenges: The country team has only been in place since January, so guidance from STOP Spillover's Regional Lead for Africa is considered important as key activities are being planned and implemented. The Regional Lead for Africa left the project in February and this has presented challenges. Additionally, as the University of Liberia – where STOP Spillover's Liberia country team resides – is a new member of AFROHUN, support and guidance from the Regional Lead for Africa is needed to help them build their capacity and understand AFROHUN processes and procedures. Recruitment for a new Regional Lead is ongoing.

Next steps: Liberia's work plan for the remainder of Project Year 2 is currently being developed for submission to USAID. Pending endorsement of the work plan, the country team will begin the process of establishing OH-DReaM working groups, which will subsequently develop detailed action plans, laying out how the interventions and aligned studies that are included in the approved work plan will be operationalized. For any intervention or study that requires ethical approval, the necessary approvals will be sought through both Tufts and the University of Liberia (for IRB) and Ministry of Agriculture (for IACUC); pending receiving necessary ethical approvals, the OH-DReaM working groups formed in Liberia will be ready to move forward with their respective work. Liberia's surveillance assessment will be finalized, collating information collected through our standardized information gathering framework.

Pending completion of laboratory-validation of PCR- and CRISPR-based diagnostic tools by the Broad Institute, the country team in Liberia will engage relevant stakeholders with a view towards testing and validating the assays in the field. It is critical that these novel assays deliver the expected results in a real-life setting by the people who will actually use them.

CAMBODIA

Progress made: Preliminary discussions for adding Cambodia to the project occurred during Project Year 1. Funds were obligated in the final month of Year 1. Cambodia did not fully come on board until the start of Project Year 2. The Cambodia One Health University Network (CAMBOHUN), under the auspices of SEAOHUN, leads project implementation in Cambodia. As Cambodia is a new country to STOP Spillover, a major focus of the current reporting period was orienting CAMBOHUN to the project and recruiting the country team. The Country Team Lead for Cambodia was recruited in February, and the technical member of the country team aligned with STOP Spillover's SMM resource hub was recruited in March. The country team member aligned with STOP Spillover's Risk Reduction and Communication (RAC) resource hub was also recruited and officially starts in April. Recruitment of the remaining technical country team members is being completed with all hires anticipated by mid-May.

Although the Cambodia Country Team Lead has only been in his role since late February, he has been actively engaging key stakeholders. Meetings have been convened with the offices of the Ministry of Environment, the Ministry of Health, FAO, the Institute Pasteur du Cambodge, WaterAid, the CDC-Defense Threat Reduction Agency and others to introduce STOP Spillover, elicit buy-in, explore opportunities for potential future collaboration and identify potential synergies. Additional stakeholders have already been contacted with a view towards convening meetings in April. All stakeholders engaged to date were positive and enthusiastic about STOP Spillover and building partnerships and indicated that they will participate at STOP Spillover's national kick-off meeting planned for the next quarter.

Challenges: Recruitment presented a challenge to STOP Spillover in Cambodia. The process for recruiting technical positions has taken longer than anticipated, and the final two technical positions will be filled by mid-May. CAMBOHUN is young, and close mentorship from SEAOHUN will be needed to facilitate a successful partnership with STOP Spillover and value added for the country. The need for SEAOHUN's mentorship intensified as the reporting period drew to a close due to staffing issues at CAMBOHUN. SEAOHUN and STOP Spillover's Regional Lead for Asia are working diligently to support the Cambodia Country Team Lead as strategies are being developed to support and strengthen CAMBOHUN.

Next steps: Stakeholder engagement will continue throughout April. A national kick-off meeting will be convened in May, bringing together key national-level stakeholders to introduce them to STOP Spillover. Cambodia will follow the same direct-to-interface hybrid OM model applied in Viet Nam and Liberia. The interface and priority pathogen for STOP Spillover's initial work in Cambodia will be identified through stakeholder engagement at multiple levels. Subsequently, an OM workshop – planned for June – will be conducted at the prioritized interface. Following OM, CAMBOHUN will lead an ISSP to discuss the interventions and studies that emerge from OM, and to decide on the appropriate activities to incorporate into the Cambodia work plan. When the country team member aligned with the SMM

resource hub is oriented, an assessment of in-country surveillance capacity will be done to develop a more thorough understanding of existing surveillance systems, personnel and information collection activities in Cambodia.

Progress made: Sierra Leone is the most recent addition to STOP Spillover. Beginning in December 2021, STOP Spillover partner Tetra Tech initiated the administrative processes – including renewing registration – to establish an in-country presence to support project implementation. The country office is set to open in April 2022.

While awaiting completion of administrative processes, Tetra Tech, supported by subject matter experts from across STOP Spillover, developed a comprehensive desktop review of the spillover ecosystem in Sierra Leone. Desktop reviews have been written for each country supported by STOP Spillover, serving to provide a clear picture of what is known in the country in relation to zoonotic viral spillover and amplification. The data review built on previous work, including existing International Health Regulations-Joint External Evaluation (IHR-JEE) Reports, National Action Plans for Health Security, World Organization for Animal Health (OIE) Performance of Veterinary Service and Gap Analysis reports, and national zoonotic disease prioritization. This review was designed to collate important information that could inform various components of STOP Spillover's work in Sierra Leone, including: OM design and plans; surveillance systems; field and laboratory research; national capacity-building activities; dialogue relating to government policies and strategies; and risk reduction interventions.

A key focus for Tetra Tech has been recruitment of the country team. The Country Team Lead, the four technical country team members aligned with each of STOP Spillover's resource hubs and the administrative/finance support team member have been recruited and will officially start in April.

Challenges: A remote start-up is always a challenge. However, we are fortunate that Tetra Tech identified three experienced former Tetra Tech administrative staff in Sierra Leone to lead the start-up process. As the newly-established country team comes on board, connections will be made with the STOP Spillover Liberia team to learn from their start-up experiences. STOP Spillover partners JSI and the Broad Institute, as well as Tuft's wildlife ecologist and the Tetra Tech lead on STOP Spillover, have deep experience in Sierra Leone which will be important to leverage. COVID-19 regulations and protocols in Sierra Leone are still quite restrictive for international travelers. As a result, the entire staff orientation process will be conducted remotely.

Next steps: The Sierra Leone country team will be fully established in April. Following orientation, the country team will engage key national-level stakeholders to introduce STOP Spillover and elicit buy-in

for the project from the Government of Sierra Leone. An official STOP Spillover launch event will be held in Freetown in May, after which OM will begin. The first step in the OM process will be a one-day consultative meeting where national-level stakeholders from various sectors will be brought together to discuss priority viral zoonotic threats and potential high-risk interfaces in Sierra Leone, and to identify appropriate stakeholders to be invited to subsequent OM workshops. A national-level OM workshop or an alternative stakeholder approach will provide an opportunity to prioritize the interface and viral pathogen(s) for STOP Spillover's initial work in Sierra Leone. A subsequent interface-level OM workshop will be convened to identify interventions to reduce spillover risk at the prioritized interface, fill knowledge gaps in order to design appropriate interventions, and identify critical partners needed to achieve targeted outcomes.

Live bird market, Dhaka, Bangladesh. Photo credit: icddr,b
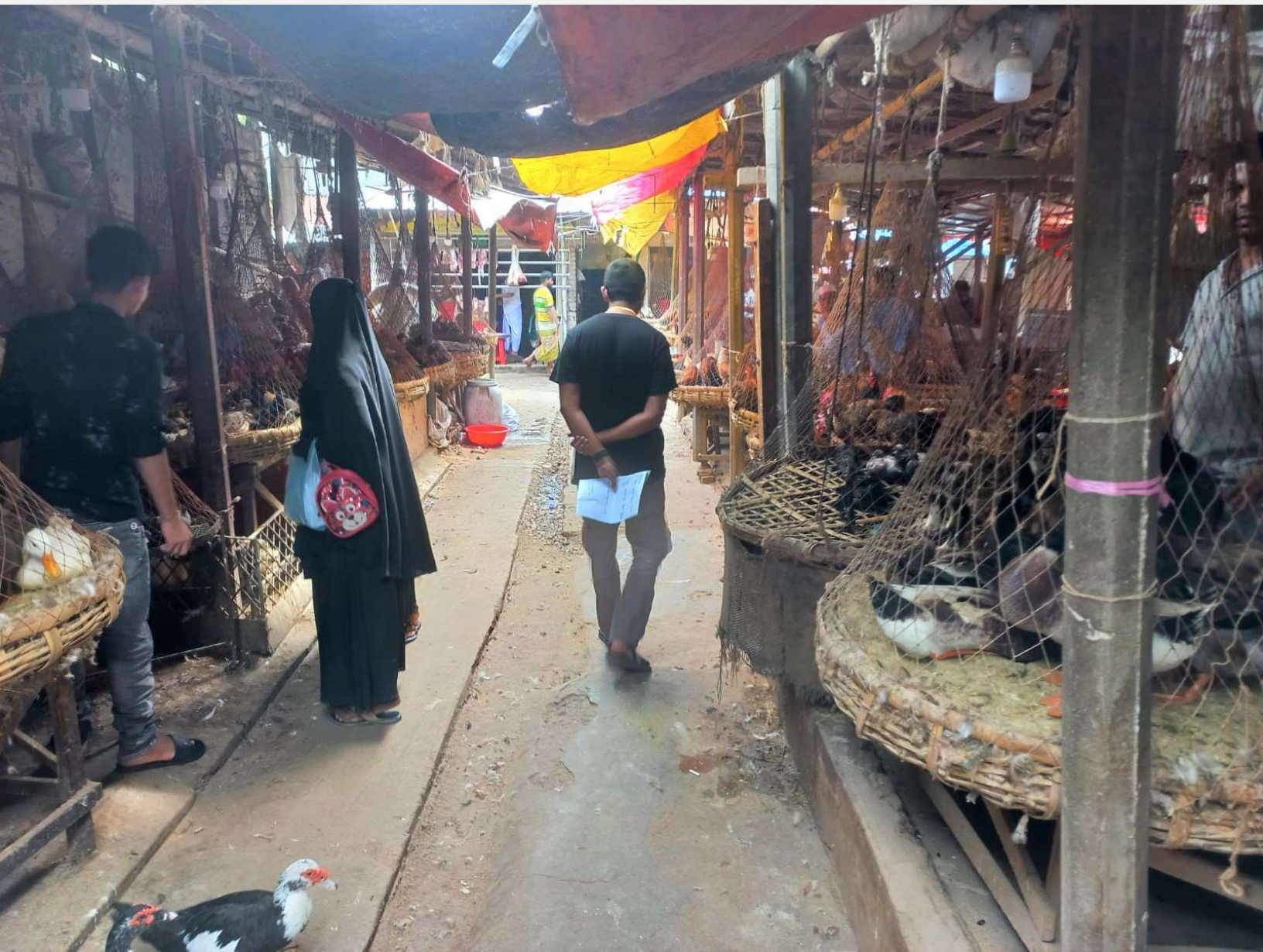
4. Progress on Indicators

Progress on STOP Spillover's KPIs is described in Figure 2. Project Year 2 updates are captured in the PY2 column. Progress updates are only included if implementation commenced for a given activity and data collection began during the first half of Project Year 2. The majority of indicators do not have progress to report at this point in the project because there has not been data to track. Tracking of more indicators will begin when more activity implementation begins.

Figure 2. Progress on STOP Spillover's KPIs

	Indicator	Definition	Data Source/ Method	Data Collection Frequency	Data Reporting Frequency	Dis-aggregations	Type of Result (output, outcome, impact)	PY1	PY2	Comments	Justification / notes
Program Goal: To enhance the capacity of local, national and regional institutions to understand the Spillover Ecosystem (SE) and to use existing and new evidence to advance, deploy, and assess interventions to reduce the spillover of emerging zoonotic viruses at high-risk animal-human interfaces while reducing amplification and spread											
Objective 1: Strengthen country capacity to monitor, analyze and characterize the risk of priority emerging zoonotic viruses spilling over from animals to people											
1.a	% of unique individuals whose capacity has been strengthened to monitor and address spillover issues	# of unique individuals attending trainings and other capacity building activities achieving proficient or higher in skills assessments / # individuals attending trainings and other capacity building activities	Training rosters, trainee surveys	Quarterly	Annual	Region, Country, Training Type, Gender, Sector,	Outcome	–	–	All trainings and other capacity building activities will include assessments of participant improved knowledge and/or skills	
1.b	% of risk-based surveillance activities that generate new evidence about the spillover ecosystem	# of risk-based surveillance activities generating novel evidence / total # of risk-based surveillance activities	Wastewater, surveillance data	Semi-annual	Annual	Virus, country	Outcome	–	–	Targets are unknown, as risk-based surveillance in each country will be determined during OM and work planning	
1.c	# of laboratory and field-based surveillance activities that incorporate innovative assay technology for detection of known zoonotic viruses in animals	# of laboratory and field-based surveillance activities that incorporate innovative assay technology for detection of known zoonotic viruses in animals	Surveillance data	Semi-annually	Annually	Species, virus, country	Outcome	–	–		* for USAID - this was a reinserted indicator from Y1 USAID and has not accrued data due to lack of activity implementation
1.d	% of wastewater surveillance activities that capture signals of zoonotic pathogens of public health importance	# of wastewater activities detecting zoonotic priority viruses / total # of wastewater activities	Wastewater surveillance data	Semi-annually	Annually	Virus, country	Outcome	–	–		* for USAID - this was a reinserted indicator from Y1 USAID and has not accrued data due to lack of activity implementation

Strategy 1.1 Participatory Outcome Mapping for stakeholder and gap analysis											
1.1.a	# of OM related activities engaging national and community stakeholder knowledge, priorities, and perspectives	# of OM activities (workshops/meeting) leveraging national and community stakeholder knowledge, priorities, and perspectives	Activity documentation; OM journals	Annual	Annual	Region, country, location	Output	6	5	Every country will have a series of initial OM stakeholder workshops followed by routine meetings to assess progress	
1.1.b	# of unique stakeholders engaged through OM process	# of organizations/groups participating in the OM processes	Internal project records, OM workshop reports	Semi-annual	Semi-annual	Region, country, Sector, Gender	Output	214	259	Most individuals will be captured during the initial OM workshops	
Strategy 1.2. Characterize risk associated with spillover, amplification and spread, using One Health-Design Research and Mentorship (OH-DReaM) working groups											
1.2.a	# of unique sectors included in OH-DReaM working groups conducting hypothesis-driven epidemiological, ecological, behavioral and socio-economic studies	# of unique sectors included in OH-DReaM working groups conducting hypothesis-driven epidemiological, ecological, behavioral and socio-economic studies	Project documents	Semi-annual	Annual	Region, country, Sector	Outcome	–	6	Targets will be established once OH-DReaM working groups have been officially formed.	
1.2.b	# previously uncharacterized risks of spillover, amplification or spread, identified by OH-DReaM working groups	# previously uncharacterized risks of spillover, amplification and spread, identified by OH-DReaM working groups	Project reports, publications	Annual	Annual	Region, country, Sector	Outcome	–	–	Targets will be established once OH-DReaM working groups have been officially formed.	
Strategy 1.3. Support Country Teams, OH-DReaM Working Groups, and other stakeholders with training, courses, and mentorship											
1.3.a	# of new/amended virtual courses developed and conducted	# of new/amended virtual courses developed and, conducted	project reports, Training materials	Semi-annual	Semi-annual	Course Topic	Output	–	–	Trainings include topics such as: Risk framing, Qualitative risk analysis, Quantitative risk analysis, Viral profiles, Transmission pathways, Sampling strategies, Statistical methods, Epidemiological models, Accessing data, Risk perception, Risk communication, Decision analytics, Risk evaluation. Given workplans are current being drafted, targets are set at 2 per year per country starting in Y2 and will be adjusted as needs are further identified.	

1.3.b	% of trainees and mentees who report using new knowledge and skills to address spillover risks	# of One Health STOP Spillover virtual course and training attendees who report using new knowledge and skills to address spillover risks / # of One Health STOP Spillover trainees and mentees	Trainee follow-up surveys	Semi-annual	Annual	Region, country, sex/gender	Output	--	--	All trainings will include a short follow-up survey sent by email 3-6 months after completing training. Target is 100% of those who respond to emailed survey.	
Strategy 1.4 Targeted Strengthening of Risk-Based Surveillance											
1.4.a	# of labs relevant to the objectives of STOP Spillover	# of individual labs relevant to the objectives of STOP Spillover	Project reports	Annual	Annual	Region, country, type (animal, human, enviro, other)	Outcome	--	--	Baseline and targets will be set once all surveillance assessments are completed in the Y1 countries.	*for USAID - this indicator was revised to reflect # of labs "relevant to STOP Spillover" instead of all labs
1.4.b	% of labs relevant to the objectives of STOP Spillover with increased capacity for diagnostics, biosecurity management, and other activities related to target pathogens	# of labs with increased capacity for target pathogens	Laboratory surveys	Annual	Annual	Region, country, type (animal, human, enviro, other)	Outcome	--	--	In first two years this may not be measurable, however in Y3-5 we will send surveys to or conduct assessments with labs	
1.4.c	# and type of surveillance activities being implemented	# and type of new surveillance activities being implemented	Surveillance reports	Monthly	Semi-annual	Region, country, virus, method	Output	1	3	Baseline informed by Surveillance assessments. Subsequent yearly targets will be informed by country need. Baseline and targets will be set in the second half of Y2	Surveillance assessment in Bangladesh, Liberia, Vietnam
1.4.d	# of wildlife and ecological surveillance activities reporting data to national surveillance systems	# of wildlife and ecological surveillance activities reporting data to national surveillance systems	Surveillance reports	Annual	Annual	Region, country, method (active, passive, syndromic)	Outcome	--	--	Baseline to be determined through surveillance assessments thereafter. Baseline and targets will be set in the second half of Y2	
1.4.e	# of individuals trained to use innovative assay technology	# of individuals trained to use Custom PCR and/or CRISPR assay technology and integrate these skills into practice	Activity reports	Semi-annually	Semi-annually	Region, country	Output	--	--	No baseline will be measured as no country is currently using Broad technology	* for USAID - this was a reinserted indicator from Y1 USAID and has not accrued data due to lack of activity implementation

1.4.f	% of labs integrating innovative assay technology into practice	# of labs reporting use of Custom PCR and/or CRISPR assay technology during reporting period/ # of labs trained in innovation assay technology	Activity reports	Semi-annually	Semi-annually	Region, country	Output	--	--	No baseline will be measured as no country is currently using Broad technology	* for USAID - this was a reinserted indicator from Y1 USAID and has not accrued data due to lack of activity implementation
Strategy 1.5 Supporting the Development of a One Health Information Assessment Tool (OHIAT)											
1.5.a	# and instances of use of the OHIAT tool in STOP Spillover focal countries	# and instances of use of the OHIAT tool in STOP Spillover focal countries	OHIAT documentation; Google Analytics	Annual	Annual	Region, country	Output	--	--	OHIAT was developed in Y1, will be tested starting in Y2	
1.5.b	# of OHIAT downloads, website visits, requests for OHIAT technical support	# of OHIAT downloads, website visits, requests for OHIAT technical support	Google Analytics; website requests data	Annual	Annual	Region, country,	Output	--	--	Targets are unknown but will be revised based on stakeholder engagement	
Objective 2: Strengthen country capacity to develop, validate, and implement interventions to reduce risk of priority emerging zoonotic viruses spilling over from animals to people											
2.a	# of unique individuals whose capacity has been strengthened to develop, validate, and implement interventions to reduce risk of priority emerging zoonotic viruses spilling over from animals to people	# of unique individuals whose capacity has been strengthened to develop, validate, and implement interventions to reduce risk of priority emerging zoonotic viruses spilling over from animals to people	Intervention documentation, training data, post-training surveys	Annual	Annual	Training Type, Gender, Sector, region, country	Outcome	--	--		
2.b	# of community groups and other stakeholders that have increased capacity to implement interventions, policies and regulations to reduce spillover of priority emerging zoonotic viruses	Increased capacity measured based on evidence gathered in Y2-5	Annual self-report survey, assessments, semi-structured interviews	Annual	Annual	Region, country, Sector, Training Type	Outcome	--	--	Targets will be established in the first half of Y2. Capacity will be measured through a self-report survey (at a minimum) or other more formal and independent type of evaluation, as required, that will be administered at the end of each project year. For additional details, we may also interview select community members.	
2.c	% of submitted papers which first and senior authors are country national	# of country national first/senior authors/ total number of manuscripts submitted	Reports and publications tracker	Semi annual	Annual	Region, Country, gender	Outcome	--	--		

Strategy 2.1: Promote effective policies and regulatory changes that enhance understanding and reduction of risk of zoonotic viral spillover, amplification and spread											
2.1.a	# policies and practices recommended by STOP Spillover's team that have been adopted at the local and national level in priority countries	# policies and practices recommended by STOP Spillover's team that have been adopted at the local and national level in priority countries	Policy documentation	Annual	Annual	Country	Outcome	--	--	An inventory and map of knowledge sources relevant to advocacy for policy and regulatory change will be created for each country by April 2022 so targets will be established after the initial mapping is complete.	*note to USAID that this indicator incorporated an original indicator, 1.4g - # of social and economic drivers of spillover reported in national surveillance systems
Strategy 2.2: Use OH-DReaM Working Groups to design interventions to reduce the risk of priority zoonotic viruses spilling over from animals to people											
2.2.a	# of research studies designed and implemented to inform interventions	# of research studies designed and implemented to inform interventions	Intervention reporting	Semi annual	Annual	Region, country	Output	--	--	Research studies are prioritized based on gaps identified in Outcome Mapping, therefore the target is at least one research study per country per year.	
2.2.b	# of interventions designed and implemented	# of interventions designed and implemented	Intervention reporting	Semi annual	Annual	Region, country, sector, type (prevent, detect, respond)	Output	--	--	A minimum of one intervention per country, per year will be implemented	
Strategy 2.3: Validation of interventions to prevent spillover											
2.3.a	# of interventions tested and validated for effectiveness	# of interventions with documented outcomes /# of interventions assessed	Project Documentation	Annual	Annual	Country, Sector	Output	--	--	A minimum of one intervention per country - Given that interventions take time to be implemented and evaluated, we don't expect outcomes for any interventions until Y3 from Y1 countries (4). Interventions will be evaluated and as part of this, certain parameters like context appropriateness, gender responsive, cultural acceptability, and cost may be included.	
2.3.b	# of STOP Spillover-related reports disseminated or manuscripts submitted / accepted for peer-reviewed publication	# of STOP Spillover-related manuscripts submitted and accepted for peer-reviewed publication	Reports and publications tracker	Semi annual	Annual	Region, Country	Output	--	--	4 Y1 country publications in Y3 and 3 Y2 country publications in Y4, at minimum	
2.3.c	# of publications (peer-reviewed pubs, white	# of publications (peer-reviewed pubs, white papers,	Publications tracker; Google Analytics	Annual	Annual	Region, country, type, gender of first	Outcome	--	--	We cannot anticipate the target for this, but	

papers, policy briefs, blog posts, etc.) characterizing risks for pathogen spillover	policy briefs, etc.) characterizing risks for pathogen spillover, resulting from OH-DReaM Working Groups pathogen spillover risk research					and senior author				at least one publication for one research project per country is the minimum	
Objective 3: Strengthen country capacity to mitigate amplification and spread of priority zoonotic diseases in human populations											
3.a	# of countries with increased capacity to mitigate risks and plan an appropriate response to contain amplification and spread of zoonotic disease events originating from wildlife	# countries with strengthened surveillance systems and new or revitalized One Health platforms, and have instituted new tools to evaluate risk (e.g. forecasting tools, early warning systems, etc.) demonstrating increased capacity to mitigate risk	Annual survey	Annual	Annual	Country	Outcome	–	–	We expect strengthened capacity to be measurable in Y3-5. While a formal baseline will not be included, any assessment of increased capacity will include reflection on country capacities prior to engagement with STOP Spillover.	
3.b	% of high-risk stakeholders who can rapidly recognize and effectively respond to suspected zoonotic disease events originating from animals	# high-risk stakeholders who can rapidly recognize and effectively respond to suspected zoonotic disease events originating from animals / # of high-risk stakeholders engaged	Community capacity reporting via post-training surveys, semi-structured interviews, surveillance reports, and updated surveillance systems	Annual	Annual	Country, Gender	Outcome	–	–	Though baseline will not be measured across all stakeholders, all capacity building activities will include post-pre-post or similar assessments for participants to identify their perceived improved knowledge and skills from their own baseline	
Strategy 3.1: Strengthen existing systems and One Health platforms for coordinated, country owned, and sustained surveillance											
3.1.a	Timeliness of reporting from enhanced surveillance systems	Timeliness includes number of sites reporting by the deadline of reporting / number of sites reporting	Surveillance systems, HMIS, One Health Information Systems	Quarterly	Semi-annual	Country, Sector	Outcome	–	–	Baselines will set by country teams through stakeholder interviews if this Strategy is included in future workplans.	
3.1.b	Completeness of reporting from enhanced surveillance systems	Completeness of reporting (number of sites reporting 95% or more of expected information) / total number of those reported).	Surveillance systems, HMIS, One Health Information Systems	Quarterly	Semi-annual	Country, Sector	Outcome	–	–	Baselines will set by country teams through stakeholder interviews if this Strategy is included in future workplans.	
3.1.c	% of One Health sectors integrated or sharing zoonotic surveillance data	# of One Health sectors integrated or sharing zoonotic surveillance data / # of OH sectors	Surveillance systems, HMIS, One Health Information Systems	Semi-annual	Annual	Country, Sector	Outcome	–	–	Baselines will set by country teams through stakeholder interviews if this Strategy is included in future workplans.	
3.1.d	# of outbreak investigations	# of outbreak investigations	Surveillance systems, HMIS,	Semi-annual	Annual	Country, Sector	Outcome	–	–	This is an output indicator and no	

	triggered based on data reported in OH information systems	triggered based on data reported in OH information systems	One Health Information Systems							inference will be made about decreases or increases in the incidences of outbreak investigations as a result of triggers, unless warranted	
Strategy 3.2: Introduce new tools and platforms, including climate risk reduction, to improve preparedness and build partnerships											
3.2.a	# of countries with new forecasting and preparedness tools developed	# of countries with forecasting tools developed	Forecasting tools; Forecasting tool implementation tracker	Annual	Annual	Country, type (including climate risk reduction)	Output	–	–		
3.2.b	# of people trained in the use of forecasting and preparedness tools	People trained in the use of the tool	Training agendas; training rosters; trainee surveys	Annual	Quarterly	Country, Gender, Sector	Output	–	–	Training targets to be determined in stakeholder mapping	
3.2.c	% of quarterly risk assessments conducted and results disseminated through appropriate mechanisms	The forecasting tool should be used routinely to assess the the factors associated with spillover and gauge risk. The results should be disseminated to appropriate stakeholders.	Climate Risk Trends Analysis tool output	Quarterly	Quarterly	Country	Output	–	–		* for USAID - this was a reinserted indicator from Y1 USAID and has not accrued data due to lack of activity implementation
3.2.d	# of countries with risk communication plans developed and operational, updated annually	# of countries with risk communication plans both developed and operational	Risk communication plans and project reporting	Annually	Annually	Country	Output	–	–		* for USAID - this was a reinserted indicator from Y1 USAID and has not accrued data due to lack of activity implementation
Strategy 3.3: Build media capacity for risk communication and media-based interventions by partnering with local stakeholders											
3.3.a	# of training events hosted by local stakeholders/partners with the support of STOP Spillover, that are conducted to build the capacity of journalists to cover issues related to zoonotic spillover and how to prevent it	# of training events that emerge from local partnerships. Training is based on the findings of the analysis of the information ecosystem.	Training agendas; training rosters; trainee surveys	Quarterly	Quarterly	Country	Output	–	–	One training event per year per country is the target	
3.3.b	# of journalists trained to cover zoonotic spillover	# of unique journalists trained during events	Training agendas; training rosters; trainee surveys	Semi-annual	Semi-annual	Country, Gender	Output	–	–	We will aspire to achieve maximum participation in each country and will strive to increase participation by	

										10% per country per year	
3.3.c	# systems in place for monitoring media and communication channels for rumors, misinformation	# of established monitoring systems actively collecting information on media and communication channels for rumors, misinformation	Project reporting	Semi-annually	Semi-annually	Country	Output	–	–		* for USAID - this was a reinserted indicator from Y1 USAID and has not accrued data due to lack of activity implementation
3.3.d	# of countries adapting the information ecosystem toolkit for local use and applying it in country	country has adapted and applied the toolkit	Adapted information ecosystem toolkits	Annually	Annually	Country	Output	–	–		* for USAID - this was a reinserted indicator from Y1 USAID and has not accrued data due to lack of activity implementation
3.3.e	# of applications for Media Grants	# of applications for media grants receiving funding/total # of application for media grants	Media grant applications	Semi-annually	Semi-annually	Country	Output	–	–		* for USAID - this was a reinserted indicator from Y1 USAID and has not accrued data due to lack of activity implementation
3.3.f	# of inter-agency teams instituted for communications with the public	inter-agency team is one that has representation from relevant stakeholder organizations with appropriate expertise to deliver necessary information to the public via country appropriate mechanisms and frequency	Country reporting	Semi-annually	Semi-annually	Country	Output	–	–		* for USAID - this was a reinserted indicator from Y1 USAID and has not accrued data due to lack of activity implementation
Strategy 3.4: Assist countries with applied research, training, and "after-action reviews" related to reducing risk of amplification and spread of zoonotic pathogens in high-risk human populations											
3.4.a	# of countries with virtual Resource Hubs and S2S networks	# of countries with virtual resource hubs and S2S networks	Resource hub reporting	Semi-annually	Semi-annually	Country	Output	–	–		* for USAID - this was a reinserted indicator from Y1 USAID and has not accrued data due to lack of activity implementation
Strategy 3.5: Support Zoonotic Disease Outbreak Investigations											
3.5.a	# of outbreak investigation capacity assessments conducted	Countries conducted outbreak investigation capacity assessments	Capacity assessments	Semi-annual	Annual	Region, country	Output	–	–		
3.5.b	# of countries implementing strategies to improve capacity for outbreak investigation	Countries outlined gap analysis and outbreak investigation capacity strengthening plans	Gender gap analysis, action plans for outbreak investigation	Semi-annual	Annual	Country, Region	Output	–	–		

3.5.c	# of people trained to conduct outbreak investigations	# unique individuals trained to conduct outbreak investigations	Training rosters	Semi-annually	Semi-annually	Country, sex, cadre	Output	–	–		* for USAID - this was a reinserted indicator from Y1 USAID and has not accrued data due to lack of activity implementation
3.5.d	# of countries with outbreak investigation contingency plans developed	# of countries with outbreak investigation contingency plans developed and available in draft form	Contingency plans, outbreak reports	Semi-annually	Annually	Country, Region	Output	–	–		* for USAID - this was a reinserted indicator from Y1 USAID and has not accrued data due to lack of activity implementation
4. Cross Cutting											
4.1 Monitoring, Evaluation, & Learning (MEL)											
4.1.a	% of relevant individuals trained on Digital M&E system	# relevant staff trained / # of relevant staff	MEL monitoring log	Quarterly	Semi-annual	Country, region, Gender	Output	100%	100%	GENOME users at the end of March 2022 totaled 118	
4.1.b	# of unique individuals trained in monitoring and evaluation topics	# of unique individuals trained in monitoring and evaluation topics	MEL training documentation, participant rosters	Quarterly	Semi-annual	Country, region, Gender	Output	–	12	12 participants in Uganda MEL M&E session February 2022	
4.1.c	% of planned research, evaluation, and learning activities launched	# of planned research, evaluation, and learning activities launched / Total planned research, evaluation, and learning activities launched	MEL monitoring log	Quarterly	Annual	Country, region,	Output	–	–		
4.2 Gender Strategy											
4.2.a	% of activities in annual workplan including gender and sex-specific topics	# of activities in annual workplan including gender and sex-specific topics / all activities	Workplan, Activity Template	Semi-annual	Annual	Country	Output	N/A	40%	4/10 USAID approved activities (75% target)	
4.2.b	% of interventions that address gender associated risks	# of interventions that directly address gender associated risks / all interventions	Project documentation	Semi-annual	Annual	Country	Output	N/A	100%	3/3 Uganda interventions address gender risk (75% target)	
4.3 Communications											
4.3.a	# of unique IP addresses visiting Stopspillover.org	# of unique IP addresses visiting Stopspillover.org	Google analytics	Semi-annual	Annual	Country	Output	3000	4400		
4.3.b	# of social media engagement	# of engagements with Facebook and LinkedIn (clicks, likes, shares); and Twitter (clicks, likes, retweets, expands)	Social media analytics	Semi-annual	Annual	Country	Output	8600	44000		

5. Financial Summary

Pipeline budget analysis and burn rate analysis by country are shown in Annex 1 and 2, respectively. Expenditures are in line with the project's one-month and six-month Global Work Plan budget (November 16, 2021), and there have been no unexpected outliers of expenditures or cost overruns. All unliquidated expenses incurred but not yet paid include outstanding amounts to consultants, subcontractors, vendors, and salary and fringe for all Tufts personnel involved in the project through September 30, 2022.

We anticipate expenditures to begin rising through the end of Project Year 2 as action plans are approved in Uganda, Vietnam, Bangladesh and Liberia. Action plan budgets are being developed for the approved work plan activities involving the OH- DReaM working groups. In addition, both Sierra Leone and Cambodia will have increased expenditures as country staff are hired and OM activities dates are set.

Annex 1: Pipeline Budget Analysis

USAID Pipeline Budget Analysis							
Contractor/Recipient:	Tufts University						
Award No.:	7200AA20CA00032						
Performance Period:	10/1/2020 - 9/30/2025						
Period of Report:	10/1/21-03/31/2022						
Contact Person (E-mail & Phone):	Odette Lobo, Odette.Lobo@Tufts.edu						

A	B	C	D	E = C + D	F = B - E	G	H = A - (B + G)
Original or Revised Total Estimated Cost (Total YR01 & YR02 USAID Budget Amount from Original Submission)	**Obligated Amt. to Date**	**Costs Incurred to Date**	**Outstanding Commitments**	**Total Expenditures**	**Unexpended Balance**	**Funding Request (AOR Consultation Required)**	**Additional Funding Required to Expend TEC**
$21,142,442	$ 10,667,392.68	$ 7,924,854.91	$ 3,080,652.21	$ 11,005,507.12	$ (338,114.44)	$ -	$ -
Tufts Salary, Fringe, Consultants, Contractor, IDC (4/1/22-9/30/22)			$ 1,114,810.12				
HOT - Subcontract			$ 16,335.49				
University of Nebraska Medical Center - Subcontract			$ 52,520.69				
Tetra Tech ARD - Subcontract			$ 71,147.13				
SEAOHUN - Subcontract			$ 326,513.50				
University of Washington - Subcontract			$ 486,190.76				
UCLA - Subcontract			$ 118,143.28				
AFROHUN - Subcontract			$ 185,882.50				
JSI - Subcontract			$ 244,805.15				
Glasgow University - Subcontract			$ 9,519.67				
icddr,b - Subcontract			$ 147,351.29				
Internews - Subcontract			$ 100,051.47				
Right Track Africa - Subcontract			$ 71,497.24				
Broad Institute - Subcontract			$ 135,883.92				

*Column D represents the outstanding commitments made through Tuft's payroll system, consultant contracts, or subawards. The amounts are reflective of th Tufts PO system. It does not reflect any planned or projected activites between 4/1/22-9/30/22.

*See the USAID Current & Planned Expenditure Burn Rate Calculation by Country for a more inclusive amount of the Planned/ Estimated Expenses through 9/30/22.

Annex 2: Expenditure Burn Rate, by Country

USAID Current & Planned Expenditure Burn Rate Calculation by Country

Contractor/Recipient:	*Tufts University*
Award No.:	*7200AA20CA00032*
Performance Period:	*10/1/2020 - 9/30/2025*
Report as of:	*3/31/2022*

Expense Category	PY01 Total Expense PY01	PY02 Total Expense PY02 thru 3/31/22	PY02 Planned / Estimated Exp. thru 9/30/22	TOTAL EXPENDITURES PY02	Viet nam (440)	Bangladesh (388)	Cambodia (442)	Uganda (617)	Liberia (669)	Sierra Leone (636)	DRC (660)	Total
Salary	1,060,336.24	694,097.86	816,987.42	1,511,085	269,697	269,697	269,697	269,697	269,697	162,601		1,511,085
Fringe	277,560.19	178,591.69	211,312.00	389,904	69,629	69,629	69,629	69,629	69,629	41,757		389,904
Travel	-	-	70,000.00	70,000	14,000	14,000	14,000	14,000	14,000	-		70,000
Supplies	4,492.00	45,246.41	63,775.00	109,021	20,135	20,135	20,135	20,135	20,135	8,349		109,021
Subcontracts Subtotal	**1,563,095.96**	**2,474,504.04**	**3,690,985.28**	**6,165,489.32**	**1,138,522.22**	**1,013,025.27**	**928,923.11**	**1,114,083.94**	**1,166,043.75**	**804,891.04**		**6,165,489**
Africa One Health University N	205,000.00	527,587.50	465,320.00	992,908	-	-	-	464,806	516,766	11,335		992,908
Broad Institute Inc,The	8,155.85	205,541.23	182,413.00	387,954	70,001	70,001	67,774	70,001	70,001	40,175		387,954
University Court of the Univ o	30,196.33	55,784.16	142,083.33	197,867	38,811	38,811	24,865	38,811	38,811	17,760		197,867
Humanitarian OpenStreetMap Tea	-	7,317.04	72,000.00	79,317	13,820	13,820	13,820	13,820	13,820	10,220		79,317
Intl Centre for Diarrhoeal Dis	4,597.27	93,747.44	270,000.00	363,747	-	363,747	-	-	-	-		363,747
Internews Network	-	24,956.53	68,000.00	92,957	17,156	17,156	13,866	17,156	17,156	10,466		92,957
JSI Research & Training Instit	553,828.41	791,366.44	642,861.50	1,434,228	275,115	275,115	182,955	275,115	275,115	150,812		1,434,228
Right Track Africa Limited	18,861.62	46,861.14	33,030.00	79,891	15,051	15,051	11,648	15,051	15,051	8,038		79,891
Seaohun Foundation	35,839.76	233,050.74	675,871.00	908,922	489,244	-	419,677	-	-	-		908,922
Tetra Tech ARD	183,314.75	127,309.52	625,674.95	752,984	58,823	58,823	54,770	58,823	58,823	462,922		752,984
Univ of California Los Angeles	36,263.74	53,550.98	83,164.08	136,715	25,357	25,357	19,722	25,357	25,357	15,564		136,715
University of Nebraska	20,300.68	32,178.63	38,933.16	71,112	12,176	12,176	12,176	12,176	12,176	10,230		71,112
University of Washington	466,737.55	275,252.69	391,634.25	666,887	122,967	122,967	107,651	122,967	122,967	67,370		666,887
Other Direct Costs	**163,552.33**	**90,908.09**	**118,510.70**	**209,418.79**	**37,312.48**	**37,312.48**	**37,312.48**	**37,312.48**	**37,312.48**	**22,856.40**		**209,419**
Purchased Services	48,700.00	5,000.00	32,000.00	37,000	6,433	6,433	6,433	6,433	6,433	4,833		37,000
Consultants	114,852.33	85,908.09	86,510.70	172,419	30,879	30,879	30,879	30,879	30,879	18,023		172,419
Total Direct Costs	**3,069,036.72**	**3,483,348.09**	**4,971,570.40**	**8,454,918**	**1,549,295**	**1,423,799**	**1,339,696**	**1,524,857**	**1,576,817**	**1,040,454**		**8,454,918**
Indirect Costs	843,413.55	529,056.55	618,526.68	1,147,583	215,356	197,724	186,025	205,546	214,033	128,899	-	1,147,583
Grand Total	**3,912,450.27**	**4,012,404.64**	**5,590,097.08**	**9,602,502**	**1,764,652**	**1,621,523**	**1,525,721**	**1,730,403**	**1,790,850**	**1,169,353**	**-**	**9,602,502**

Pipeline Balance	Planned/Estimated	Viet nam (440)	Bangladesh (388)	Cambodia (442)	Uganda (617)	Liberia (669)	Sierra Leone (636)	DRC (660)
Current Obligations	10,667,392.68	2,169,947.04	2,085,085.00	1,000,000.00	2,123,961.00	2,115,807.64	300,000.00	872,592.00
ACTUAL Expenditures to Date (3/31/22)	7,924,854.91	1,731,300.16	1,620,364.94	513,873.94	1,879,140.43	1,919,573.66	260,601.77	
Available Pipeline	**2,742,537.77**	**438,646.88**	**464,720.06**	**486,126.06**	**244,820.57**	**196,233.98**	**39,398.23**	**872,592.00**

Estimated/Planned Monthly Burn Rate	Planned/Estimated	Viet nam (440)	Bangladesh (388)	Cambodia (442)	Uganda (617)	Liberia (669)	Sierra Leone (636)	DRC (660)
Number of Months remaining in PY02	6	6	6	6	6	6	6	
Planned Expenditures	$ 5,590,097	$ 985,944	$ 922,508	$ 1,011,848	$ 900,695	$ 860,351	$ 908,751	$ -
Estimated/ Planned Monthly Burn Rate	**931,683**	**164,324**	**153,751**	**168,641**	**150,116**	**143,392**	**151,458**	**-**
Estimated number of months in Available pipeline		**2.7**	**3.0**	**2.9**	**1.6**	**1.4**	**0.3**	**-**

Africa One Health University Network

Southeast Asia One Health University Network

icddr,b

Right Track Africa

JSI Research & Training Institute, Inc.

Tetra Tech

University of Washington

University of Glasgow

University of California, Los Angeles

Broad Institute

University of Nebraska Medical Center

Humanitarian OpenStreetMap Team

Internews