Strategies to Prevent Spillover (STOP Spillover)

Impact Brief

Cambodia

First-round surveillance findings at the bat-human interface in Kang Meas District, Kampong Cham Province

Activity 2.2.2.2: Coordination and Capacity Building of a Local Sentinel Surveillance Team

INTRODUCTION

The first round of participatory syndromic and active surveillance (SAS) was undertaken at the bat-human interface in Kang Meas district, Kampong Cham province from January 8-12, 2024. The surveillance system employed a combined approach of participatory case finding using symptom-based case definitions and active monitoring to identify individuals with signs suggestive of viral infections, particularly respiratory illnesses linked to coronaviruses and exposure to guano farming. As a result, a case of coronavirus HKU1 infection was detected in a human patient, demonstrating the effectiveness of this approach in detecting coronaviruses in patients with respiratory illness. Environmental samples, including bat guano, and livestock samples, were collected from the home areas of cases meeting the syndromic case definition, to determine if there was a spillover linkage from wildlife and livestock. The approach uses participatory risk-based detection of cases followed by targeted sampling and testing. As opposed to screening surveillance, it is a highly targeted method that makes efficient use of sampling and testing resources.

To facilitate early detection, surveillance teams were trained in participatory methods and actively interviewed community members to search for cases. For cases that met the syndromic case definition for respiratory infections, specimen collection for coronavirus detection and sequencing was conducted from the suspect cases, their environment and associated livestock. This activity targeted both patients who met the case definition of febrile respiratory illness, and family members linked to the index case. Bat guano has been shown to be an indicator of bat infection, and these specimens will be used to determine if the same virus cluster is circulating at these guano farms. Three pre-designated sentinel sites – Kang Meas Referral Hospital, and Roka Ar and Khchau Health Centers – served as sample collection points. Identified cases were asked to travel to the collection point for sampling.

This participatory activity embedded in the community triggers timely identification of potential coronavirus spillover events occurring at the bat-human interface. By analyzing findings from both syndromic and active surveillance from people, the environment and livestock, this pilot program improves our understanding of transmission dynamics and potential spillover agents such as coronaviruses at the bat-human interface, ultimately contributing to enhanced prevention and preparedness efforts for potential disease outbreaks.

SURVEILLANCE OUTCOMES AND RESULTS

Outcomes

The surveillance team interviewed community members and identified 22 individuals (11 suspected cases and 11 family members) for testing potential coronavirus infection. All samples collected from these individuals were sent to the IPC laboratory for testing. Laboratory results detected a positive case of coronavirus HKU1 strain S2628. Coronavirus HKU1 (along with coronaviruses 229E, NL63, OC43) is a common human coronavirus (HCoV). Though also a member of the genus beta coronavirus, it is different from SARS-CoV-2, the causative agent of COVID-19. Common human coronaviruses typically cause mild-moderate upper respiratory illness often referred to as a 'common cold.' In rare cases, infection can progress to pneumonia.

HCoVs are common in human populations all over the world and are transmitted from humans to humans, generally by contact and droplet modes. Transmission peaks in fall and winter in temperate climates. Zoonotic transmission of

HKU1 has not been recorded, and this virus is known only from human specimens. Findings were reported to public health authorities and shared with study participants, who expressed appreciation for the surveillance initiative and their willingness to participate in future efforts to prevent disease outbreaks. The STOP Spillover team appreciated the opportunity to exchange experiences and perspectives with colleagues from diverse One Health sectors (human, animal, and environmental), contributing to a more comprehensive understanding of surveillance pathways and risks.

Results

The SAS team collected 22 samples from humans, 74 samples from livestock, and 59 samples of bat guano and urine. At this time (March 2024), only samples from humans have complete testing results available. Arrangements with the national animal laboratory are being finalized for testing samples from livestock, and bat guano and urine. Information on demographics, human contact with livestock and bats, and symptoms was collected using case information sheets.

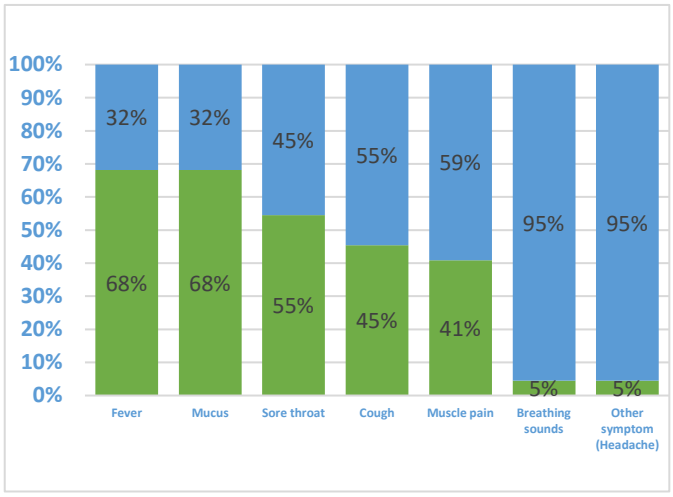

Figure 1: The percentage of the human participants exhibiting specific symptoms of febrile illness (flu-like illness). Green indicates symptomatic, blue indicates asymptomatic.

More than half of SAS participants (59%; n=13) were female, with ages ranging from 6 to 71 years. Interestingly, 68% of participants (n=15) experienced symptoms such as fever and mucus (Fig. 1). The 22 human specimens were tested for coronavirus RNA using two different RT-PCR tests: a broad-spectrum pan-CoV test, and a more specific test targeting E and N genes unique to Sarbecoviruses. The pan-CoV test yielded a positive result for one sample, which was confirmed by Sanger sequencing and search in GenBank to be identical to beta coronavirus HUK1 strain S2628. Results were shared with the community by an OH-DreaM working group member from Khchau Health Center, following consultations with relevant public health institutions. Through individual result-sharing visits, community participants gained valuable insights into community infectious disease patterns, leading to increased awareness and proactive health behaviors.

The SAS team appreciated both the participatory syndromic and active surveillance approaches, recognizing their effectiveness. The team expressed that STOP Spillover-supported training on participatory methods empowered them with new tools to effectively work in the community. They stated that they found the new approach personally rewarding and offered valuable insights for improvement, specifically regarding the use of biosafety practices. They highlighted the importance of using full PPE (aprons, face shields, face masks, gloves, and scrubs) during surveillance to minimize their anxiety during sample collection and shared their expertise packaging and transporting samples while maintaining biosafety protocols. On the other hand, community participants indicated that the use of full PPE contributed to their anxiety and negative community perceptions regarding the surveillance process, especially when samples from livestock are collected directly in the community. They suggested that surveillance teams should rather use just face masks, gloves and plastic-based kitchen aprons.

STOP Spillover Cambodia support to Cambodia's GHSA and JEE scores

Year 4 Activities	GHSA priorities	JEE score (2016)
Activity 1.2.6.1 Bat guano farm study (continued from Y3) Activity 2.2.2.2 Coordination and capacity building of sentinel surveillance team	Category 1: Preventing the emergence or release of pathogens with potential for international concern: Zoonotic diseases (1.2) and biosafety (1.4)	Indicator P.5.1 Surveillance of zoonotic diseases (JEE Score 2 for P4.1 surveillance systems in place for priority zoonotic diseases; and JEE Score 2 for P6.2 biosafety training and practices)
Activities 2.2.2.1 and 2.2.2.3: Community level risk reduction interventions	3.5 Risk Communications	Risk Communication and Community Engagement (RCCE), Indicator R5.2: Risk Communication and R5.3 Community Engagement (JEE score 3 for R5.4 Communication engagement with affected communities)

This brief is made possible by the generous support of the American people through the United States Agency for International Development (USAID). The contents are the responsibility of STOP Spillover implementing partners and do not necessarily reflect the views of USAID or the United States Government.