

# Strategies to Prevent Spillover (STOP Spillover) Impact Brief – Côte D'Ivoire

## Activity 1.4.6: Waste Water and Waste Effluent Surveillance: Initial Sampling and Results

### INTRODUCTION

Prior work shows that wastewater surveillance can help identify disease clusters and provide two to three weeks of early warning of emerging trends in the prevalence of certain pathogens, including viruses. In Côte d'Ivoire, a sample collection and analysis protocol developed by STOP Spillover Consortium experts, and approved by USAID, has been validated by stakeholders for the Wastewater Surveillance (WWS) and Liquid Effluent Surveillance (WES) activity.

Training for collectors designated by laboratories and entities at the national level was held in Man (District des Montagnes), and in Greater Abidjan (Yopougon and Grand Bassam) in 2022.

During the training, high-risk sample collection points were selected. In Yopougon, two collection points in discharge canals from slum areas were selected, for testing for SARS-CoV-2. These are being sampled with both an existing active sampling (grab sampling) program, adding a passive sampling method to see if it is as sensitive. Passive sampling is a potentially preferred alternative to collecting large volumes of liquid.

For passive sampling, the technique involved attaching a heavy object (e.g., a stone) to the passive sampler before submerging it in the discharge canal. In Grand Bassam, sites were identified at the poultry market, where passive sampling of liquid waste effluent on market surfaces will be used for testing of Influenza A viruses (IAV) (all IAV positives to be screened for highly pathogenic avian influenza (HPAI)).

In November-December 2023, the laboratories began a 12-week sampling period. Each week, samples will be collected and tested for SARS-CoV-2 in the discharge canal and IAV/HPAI in the chicken slaughtering market.

### Process

- The laboratories, IPCI and LANADA, are collecting samples each week, from the discharge canal (SARS-CoV-2) and the chicken slaughtering market (IAV/HPAI), respectively.
- Samples are then analyzed by the laboratories.
- Results are reported, on a bi-weekly basis, to partners/government in Côte d'Ivoire, and USAID.



*Passive sampling in discharge canals (SARS-CoV-2)*



*Passive sampling in slaughtering liquid waste effluent (IAV/HPAI)*



*Safe sample collection equipment*

## Results

The first weeks of sampling have been completed, and both laboratories have identified positive samples using both passive and active sampling protocols.

- A total of 16 wastewater samples have been tested by IPCI and nine (five passive and four active samples) were positive for SARS-COV 2. After Week 1, during Weeks 2-4, there was an increase in positive samples using the passive method.
- LANADA has identified positive IAV samples in the chicken slaughtering liquid waste effluent in the second week of sampling. A total of four passive samples were collected and two samples were positive for IAV. None of the positive IAV samples were found to be HPAI.
- These novel results are important for science because they demonstrate the utility and benefits of wastewater and liquid waste surveillance (most commonly done in high-income countries with expensive automated samplers in sewered wastewater facilities) to low- and middle-income countries, and shows that waste streams and effluent can be sampled with inexpensive passive samplers to obtain high-quality results.
- This is also a practical result that is important for low- and middle-income countries, because: 1) it is much easier and less expensive to sample using passive samplers (organic cotton) than it is to sample with automated samplers; and, 2) waste streams are more common than piped wastewater in low- and middle-income countries.

## Next Steps

- We will continue sampling for IAV/HPAI and SARS-CoV-2 until we have 12 weeks of data. After this, we will review results and document best practices, so WWS and WES can be integrated into routine monitoring/surveillance.
- Now that we have proof-of-concept of using passive sampling in Côte d'Ivoire, we may potentially include sampling for Lassa in rural hospital waste effluent streams, using this passive method.
- We will write these results up as an invited Letter to the Editor in the high-impact journal Environmental Science & Technology.



IPCI Sampling in the Discharge Canals



LANADA Sampling in the poultry slaughtering waste

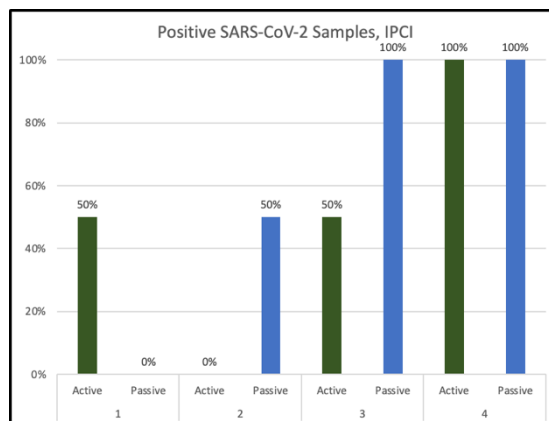
Date de rendu de résultat : 28-11-2023

Résultat de la PCR qualitative : Positif

Nature du pathogène détecté : SARS-CoV2

Observations : Echantillon d'un prélèvement passif

IPCI Positive Results in Passive Sampler



IPCI Comparative Results for SARS-CoV-2 (Active (green) vs. Passive (blue))