Specimen-Tracker (S-Tracker): From Sample Collection to Delivery at the PCR Laboratory.

Viral Load assessments are one of the critical laboratory investigations carried out on clients in the HIV treatment cascade. The aim of the test is to measure the level of the virus in blood samples of HIV-infected clients as an indicator of viral suppression. With the huge number of facilities supported in Benue State to conduct the test for clients, APIN implements a "hub and spoke model" in which collected viral load samples are transported from the smaller treatment facilities (Spoke) to the bigger facilities (Hub) for processing.

Several logistic arrangements were put in place to ensure that the samples were safely transported to the hub sites in compliance with laid-down protocols, including storage facilities for safe delivery. In spite of these efforts, some samples still got lost in transit or did not arrive at the hub facilities at the right time. These situations presented a serious concern as they led to increased turn-around times at the PCR laboratory or samples not being processed at all (for those lost in transit).

To address this challenge and provide necessary updates while samples were in transit, APIN designed and deployed the Specimen Tracker (*S-Tracker*) to all receiving facilities and PCR labs. The *S-Tracker* is a user-friendly, android-based software application (App) software which can be

used by sample senders from the spoke facilities and receivers at the Hub or PCR Lab to track samples until they reach the final destination – the PCR Lab. At the point of sample pick-up the number assigned to samples that are ready for pick-up (manifest numbers) are entered on the App. This triggers a notification at the receiving facility (Hub or PCR) that sample transfer has been initiated. In the case of delays during sample transportation, necessary actions or interventions would be taken to address the situation and ensure safe and timely sample delivery.

The *S-Tracker* not only allowed for the estimation of the transit time between Spoke and Hub facilities, which was previously unknown but also helped to generate valuable insight into the points in the viral load sample transportation chain where delays were occurring and the reasons for such. This enabled APIN to shorten the delay periods and prevent them from occurring in the future. Between October 2021 and July 2022, 49 occurrences of delayed sample deliveries involving 890 viral load samples were identified, tracked and appropriate interventions provided. The efficient monitoring of sample transfer through the S-tracker helped to drop the average transit time from Spoke to Hub facilities (or PCR Lab) to 4 days from the 7 days usually spent in transit before the "*S-Tracker*" was introduced.

Overall, the "*S-Tracker*" App has helped to improve the safety of viral load samples in transit while also eliminating viral load sample loses and reducing the transit time from Spoke facilities to receiving Hub facilities or PCR labs.