

COVID-19 SENTINEL SURVEILLANCE IN MALAWI

WHY WAS COVID-19 SENTINEL SURVEILLANCE A PRIORITY?

Despite the establishment of COVID-19 monitoring measures within the existing routine national surveillance system and significant efforts to conduct testing, contact tracing, and case investigations, Government of Malawi institutions at both the national and district levels faced many challenges in mounting an effective response to the COVID-19 pandemic. The existing COVID-19 surveillance system, relying on retrospective reporting of cases from testing sites, became overwhelmed by the high number of tests being done and struggled to establish the magnitude of community transmission or identify emerging variants. Additionally, during periods of low COVID-19 incidence between waves, there was a relaxation of established COVID-19 measures which increased infection risk. The onset of the polio and cholera outbreaks in early 2022 further compounded the situation and diverted attention and resources away from passive COVID-19 surveillance. These challenges highlighted the need for an active, real-time surveillance system to improve the early detection of cases and variants.

ENHANCED SENTINEL SURVEILLANCE SYSTEM FOR COVID-19 IN MALAWI

Sentinel Sites

Site activations began in June 2022 in seven purposively selected sites in Blantyre (*Limbe Health Centre*), Lilongwe (*Bwaila Hospital*), Zomba (*Matawale Health Centre*), Mzimba North (*Mzuzu Urban Health Centre*), Mangochi (*Mangochi District Hospital*), Mwanza (*Mwanza border*) and Karonga (*Songwe border*), (**Figure 1**). The health facilities were selected from districts with the highest cumulative number of reported COVID-19 infections according to the national Public Health Institute of Malawi (PHIM), Ministry of Health (MOH) weekly epidemiological reports and facilities with a high volume of patients based on the Malawi MOH Health Management Information System (HMIS) data on district and health facility population projections for 2021. The Mwanza and Songwe borders were selected due to their high volume of incoming travelers as per official data shared by the Cross Border Surveillance and Responses Unit at PHIM, MOH.

Sampling Procedures

The COVID-19 sentinel surveillance system was designed to serve as an initial step toward the establishment of a World Health Organization (WHO)-recommended integrated system for COVID-19 and influenza surveillance.¹ This surveillance system utilized a combined case definition for COVID-19 and influenza. At all of the health facilities, from Monday to Friday, the first ten symptomatic patients of all ages and the first five asymptomatic patients aged five years and older that provided their consent / assent were selected to participate in the study through consecutive sampling. At the border sites, ten eligible and consenting travelers aged five years and older passing through the border were systematically sampled every weekday.

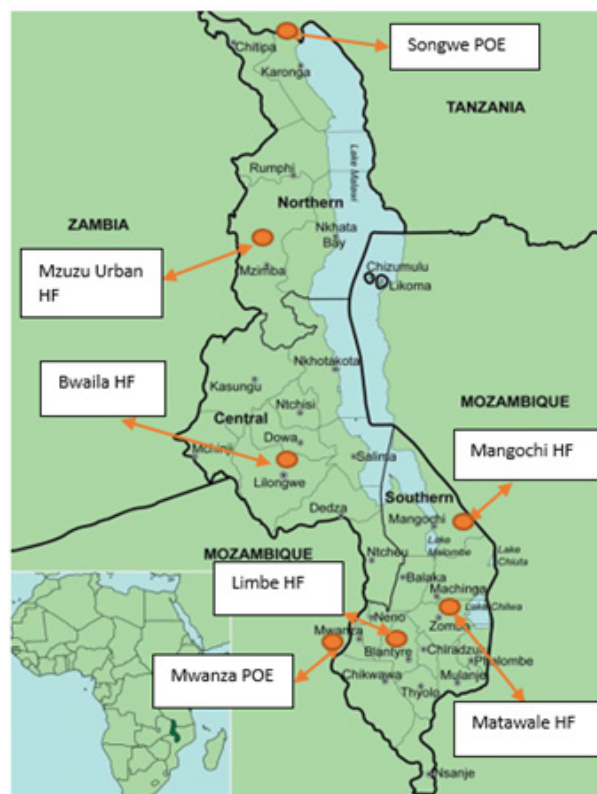


Figure 1. Map showing the seven sentinel sites across Malawi

Data and Specimen Collection

Demographic and behavioral data were collected using a standardized electronic questionnaire and nasopharyngeal (NP) samples were collected from sampled patients and travelers. A real-time polymerase chain reaction (RT-PCR) test was run on site using the GeneXpert platform. Samples positive for SARS-CoV-2 were then sent to the national PHIM Reference Laboratory for genomic sequencing. A total of 10,843 participants were enrolled and 10,536 NP samples collected between June 20, 2022, and January 27, 2023. After filling in the questionnaire, 307 participants withdrew their consents at the time the NP samples were to be taken.

KEY FINDINGS

- Health facility samples initially had a COVID-19 positivity rate of more than 30% followed by a rapid decline until late August 2022, when the positivity rate dropped below 10%. There were spikes in the positivity rate at the end of August 2022, mid-November 2022, mid-December 2022, and early January 2023, prior to decreases in positivity rates (*Figure 2*).
- Throughout the whole period, there was a higher overall positivity rate at health facilities (8.8% vs. 3.4% at points of entry), among those who had symptoms (9.8% vs. 7.0% in those without symptoms), in females (8.2% vs. 7.5% in males) and among individuals with underlying health conditions (9.3% vs. 7.7% in participants without any health conditions).
- A total of 69.3% of those who tested positive for COVID-19 were not vaccinated. Among all participants, 7.0% were fully vaccinated, 17.8% were partially vaccinated, and 75.2% had received no vaccinations at all.
- By the end of the surveillance period, 134 samples obtained sufficient genome coverage for variant characterization. Among these samples Omicron BA.4 and BA.5 were the most predominant sub-lineages, with Omicron XBB and B.Q.1 sub-lineages also detected.

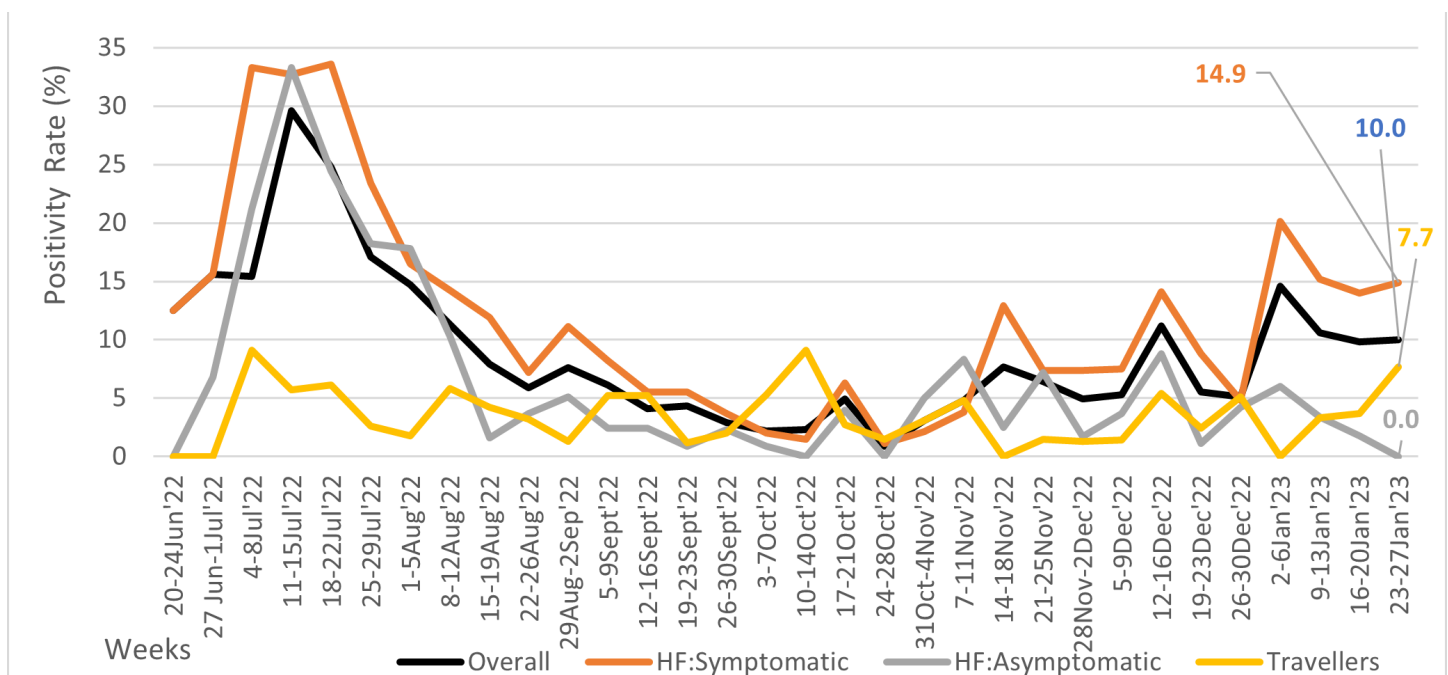


Figure 2. Trends in COVID-19 sentinel surveillance positivity rate among symptomatic, asymptomatic, and travelers (HF=health facilities)

PUBLIC HEALTH IMPLICATIONS

The COVID-19 sentinel surveillance system in Malawi was able to quickly detect changes in positivity rates and the emergence of variants compared to what could have been detected by routine surveillance. This active surveillance complements routine surveillance, especially during a low-incidence period, by providing early detection of cases and variants.

NEXT STEPS

The PHIM plans to use the lessons learned from COVID-19 sentinel surveillance to take additional steps to fully integrate COVID-19 and influenza surveillance, and potentially other conditions. To do so, the PHIM will need further support from partners and stakeholders in Malawi with an interest in the development of integrated disease surveillance systems.

ACKNOWLEDGMENTS

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REFERENCES

1. Tempia S, Abou El Naja H, Barakat A, Abubakar A, Khan W. Integrated surveillance for high-impact respiratory viruses: a necessity for better epidemic and pandemic preparedness. *BMJ Glob Health*. 2022 Jun;7(Suppl 4):e009018. doi: 10.1136/bmjgh-2022-009018. PMID: 35764353; PMCID: PMC9234428.
2. See e.g., 45 C.F.R. part 46.102(l)(2), 21 C.F.R. part 56; 42 U.S.C. §241(d); 5 U.S.C. §552a; 44 U.S.C. §3501 et seq.

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