

## COVID-19 COMMUNITY- AND FACILITY-BASED SEROSURVEY IN MALAWI

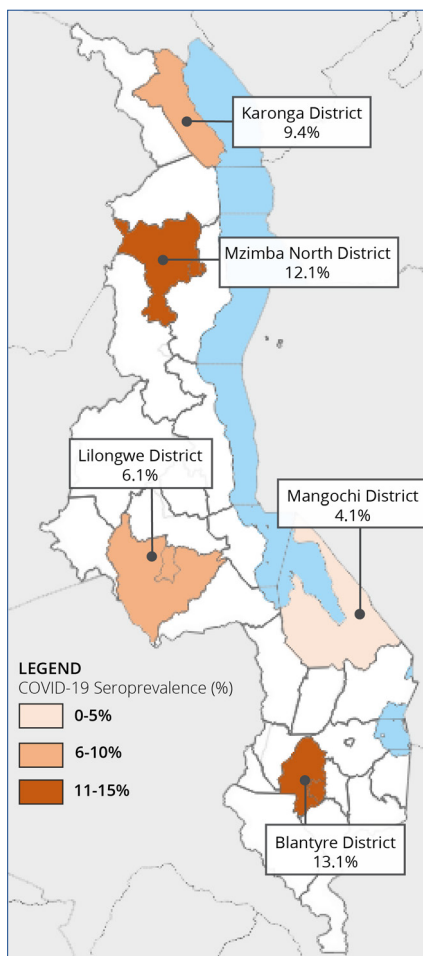


Figure 1: Results of October 2020 COVID-19 seroprevalence survey in Malawi, by district.

On 2 April 2020, Malawi registered its first coronavirus disease 2019 (COVID-19) case. To investigate the spread of the virus in the country, community- and health facility-based COVID-19 seroprevalence and RT-PCR (real time polymerase chain reaction) surveys were conducted in five districts (Lilongwe, Blantyre, Mzimba North, Karonga & Mangochi). The five districts selected for the survey were categorized as areas at high risk for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infections because of high population density and the volume of travel to and from high-risk countries.

The study used a cross-sectional multistage cluster design. Samples were taken in households from participants aged 10 and older and in health facilities from healthcare workers (HCW) 18 and older. The survey data and sample collection took place from 14 October through 8 December 2020. Each participant was asked questions about their symptoms and possible exposure to COVID-19 and asked to provide nasopharyngeal and blood specimens for testing.

The target survey sample size was 8,100 community participants and 1,600 HCW in health facilities. Sample sizes were calculated using an estimated 6% infection prevalence in the community and 12% among HCW, based on national surveillance data available at the time. The analysis plan included calculation of weighted infection prevalence estimates and crude and adjusted odds ratios (OR) derived from bivariate and multivariable logistic regression. Final serologic results were available for 4,261 community and 970 HCW participants and final RT-PCR results were available for 4,679 community and 845 HCW participants.

All participants provided informed consent or assent to participate in the survey. This project was reviewed by the Centers for Disease Control and Prevention and was determined to not meet the definition of research.<sup>1</sup>

<sup>1</sup> <https://www.hhs.gov/ohrp/regulations-and-policy/regulations/45-cfr-46/index.html>

## KEY FINDINGS

- Seroprevalence was 7.8% in the community (95% CI: 6.3-9.6) whereas the number of persons PCR-positive for SARS-CoV-2 showed an overall prevalence of only 0.3% (95% CI: 0.2-0.5); seroprevalence was thus 26-fold higher than infection prevalence.
- Seroprevalence was 9.7% in health facilities (95% CI: 6.4-14.5) and the number of HCW who were PCR-positive for SARS-CoV-2 was 0.5% (0.1-1.2%); thus, both were slightly higher than community prevalence.
- Using the seroprevalence rate, the estimated number of infections in the five districts during the period April-December 2020 was 533,752 compared to 4,319 reported RT-PCR-confirmed cases under the national surveillance program – an underestimation by a factor of 124 (see Table 1).
- Among community participants who tested positive for SARS-CoV-2 antibodies, most (84.7%; 95% CI: 78.4-89.4) reported no symptoms in the last 6 months; also, 76% of HCW who tested positive for SARS-CoV-2 antibodies reported no symptoms (95% CI: 57.9-87.9).
- The mean age of all seropositive people was 35 years (SD=14.9). This mean age is similar to the median age of infections found through routine surveillance (34 years) but higher than the age group reporting the highest number of infections (persons aged 20-29 years) as part of official Government surveillance.

## RECOMMENDATIONS

- National COVID-19 responses could use alternative surveillance and testing strategies to accurately track transmission and the effect of interventions.
- Research on predictors of symptomatic disease, in a setting with mostly asymptomatic infections, could be prioritized to inform a contextualized surveillance and response strategy.

## COVID-19 Seroprevalence by Age Group

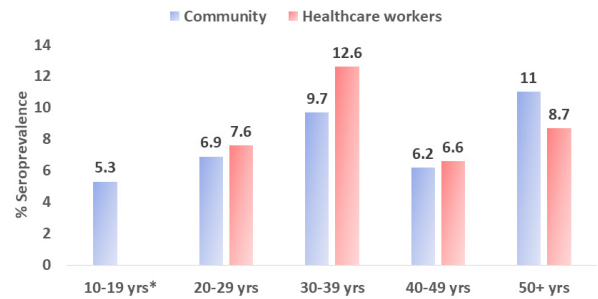


Figure 2: Seroprevalence by age group among community participants and healthcare workers.

\* Four HCWs (one 18 yrs and three 19 yrs) were in this age group and three of the four were seropositive.

## DISCUSSION

- The huge discrepancy between number of infections estimated based on the survey and the official national tally from case-based surveillance was previously documented in Malawi and the region and may be explained by the high proportion of asymptomatic SARS-CoV-2 infections and limited testing
- The high proportion of young participants may explain why most participants were asymptomatic or reported mild symptoms.

Table 1. Number of Cases based on Seroprevalence Compared to Facility Reported Cases

District	District Population	Case Estimates per 100,000	Total District Case Estimates			Reported Cases	Reported Cases per 100,000	Under-estimation Factor
			Lower Bound	Middle Estimate	Higher Bound			
Blantyre	1,304,357	13,100	117,392	170,871	243,915	2,065	158	82.7
Karonga	380,608	9,400	27,784	35,777	46,434	91	24	393.2
Lilongwe	2,770,840	6,100	96,979	169,021	282,626	1,412	51	119.7
Mangochi	1,224,716	4,100	31,843	50,213	75,932	157	13	319.8
Mzimba North	1,162,456	12,100	101,134	140,657	192,968	594	51	236.8
<b>Total</b>	<b>6,842,977</b>	<b>7,800</b>	<b>431,108</b>	<b>533,752</b>	<b>656,926</b>	<b>4,319</b>	<b>63</b>	<b>123.6</b>

## ACKNOWLEDGMENTS

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## CONTACT INFORMATION

**Yusuf Babaye, MBA, MSc (Pharma)**

Country Representative, I-TECH Malawi

Capital City Lilongwe 3 Plot 13/14, 1st Floor ARWA House  
City Centre, Lilongwe MALAWI

Tel: + (265) 1 77 07 90

Email: [ybabaye@itech-malawi.org](mailto:ybabaye@itech-malawi.org)

**Dr. Annie Chauma-Mwale, MBBS, MPH**

Epidemiology and Surveillance Division, Public Health Institute of Malawi,  
Ministry of Health and Population

Box 30377, Lilongwe MALAWI

Tel: + (265) 1 78 94 00

Email: [annie.chaumamwale@health.gov.mw](mailto:annie.chaumamwale@health.gov.mw)