

Knowledge, Attitude, Practices and Perceptions regarding COVID-19 prevention measures and access to health care services among adult population and health care workers delivering HIV services within select high-risk districts of Zambézia province, Mozambique

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Abbreviations

AIDS	Acquired Immunodeficiency Syndrome
ART	Combination Antiretroviral Therapy
ARV	Antiretroviral Medication
CDC	Centers for Disease Control and Prevention
COVID-19	Novel Coronavirus Disease
HCW	Health Care Worker
HF	Health Facility
HIV	Human Immunodeficiency Virus
IRB	Institutional Review Board
KAP-P	Knowledge, Attitude, Practices and Perceptions
MCH	Maternal and Child Health
MOH	Ministry of Health
nCoV	Novel Coronavirus
TB	Tuberculosis
TPT	Tuberculosis Preventive Treatment
PWH	People with HIV
PPE	Personal Protective Equipment
PrEP	Pre-exposure prophylaxis
SARS	Severe Acute Respiratory Syndrome
SARS-CoV-2	Severe Acute Respiratory Syndrome Coronavirus 2
SD	Standard deviation
SOP	Standard Operating Procedure

Evaluation Summary

Introduction

Since first being identified in Wuhan, China on December 31st, 2019, the SARS-CoV-2 virus that causes coronavirus disease 19 (COVID-19) has been rapidly spreading globally. COVID-19 cases are still occurring across the African continent and Mozambique had a cumulative number of 149,981 cases as of September 9th, 2021 (with a test positivity rate of 17%), rising up to 230,816 (as of December 18th, 2022). Effective infection control and prevention measures for this novel coronavirus are being increasingly studied and there is growing consensus for best practices, however, these remain difficult to implement, especially in resource-constrained settings such as Mozambique. The overall purpose of this evaluation was to assess knowledge, attitudes, practices, and perceptions (KAP-P) related to COVID-19, infection prevention measures, and access to health care during the first year of the COVID-19 pandemic in Mozambique among active community members, persons with HIV (PWH) receiving HIV care at the health facility (HF), as well as health care workers (HCW) providing care to PWH at the HF.

Methods

A KAP-P survey was conducted in three rounds that took place over the course of nine months, involving 900 adults from the community, 900 PWH and 180 HCW from three selected districts of Zambézia Province (Mocuba, Milange and Alto Molócuè) from January to September 2021. Descriptive analyses were presented as means (with standard deviations) and medians (with interquartile ranges) for continuous variables and frequencies (with percentages) for categorical variables. For select survey questions, proportion trend analyses and Spearman correlation analyses were used to determine whether there was a significant trend across rounds 1, 2, and 3 of the survey. A multivariable logistic regression model was built to examine whether a statistically significant association existed between the outcome and exposure of interest for each individual analysis.

Results

Adults

Data were collected from 900 adults interviewed at community bus stops and public markets (680, 75.6%). The mean age was 30 years (standard deviation [SD] 9.4). The sex of adults in the community was well balanced, with slightly more male (486, 54%) participants. Almost all adults (895, 99.4%) received information on the novel coronavirus, or COVID-19. The more frequently reported sources of information were the radio (672, 74.7%), followed by television (TV) (613, 68.1%) and friends/family (595, 66.1%). Sixty percent (543, 60.4%) stated that there was no effective treatment for COVID-19 with only two-thirds (602, 67%) of respondents knowing that COVID-19 vaccines existed. Almost all (876, 97.7%) stated that they could prevent themselves from getting infected with COVID-19. Regarding the specific prevention measures, the most commonly reported mitigation measure was hand washing (861, 95.7%), followed by the use of face mask(s) (825, 91.7%), social distancing (674, 74.9%), and use of hand sanitizers/disinfectants (204, 22.7%). When asked if they agree with the recommendation to avoid going to the HF, 658 (73.3%) agreed. Nevertheless, 663 (73.7%) adults reported they would feel comfortable going to the HF for routine care during the pandemic. The vast majority of adults reported presenting to their nearby HF for some reason since the beginning of the pandemic (776, 86.2%), although largely (605, 78%) perceiving that the way health care was provided had undergone significant changes (605, 78%).

Significant trends were found across survey rounds 1, 2, and 3 with adults, with positive trends seen regarding the level of knowledge on coronavirus transmission, perception that almost all people will get infected by SARS-CoV-2, acknowledging the existence of COVID-19 vaccine and treatment, perceiving they can prevent getting COVID-19, leaving the house less (especially from round 2 to 3), being more anxious for getting infected themselves or a family member, perceiving that the epidemic will last for years, agreeing with the recommendation to avoid going to HF, perceiving less people are going to HF for routine care (TB, HIV, vaccination), perceiving that health care and HF wait time changed due to the pandemic, and knowing someone in their immediate social circle who is or was infected with COVID-19; and a negative trend was found regarding being stressed about the novel coronavirus and being comfortable in going to HF for routine care.

Persons with HIV

Data were collected from 900 ART-treated, PWH receiving care at the HF. The mean age was 35 years (SD 9.94). This group was predominantly female (589, 65.6%). Almost all received information about the novel coronavirus, or COVID-19 (898, 99.8%). The most commonly reported sources for this information were: radio (713, 79.2%), friends/family (579, 64.3%), television (506, 56.2%) and from the HF itself (430, 47.8%). Regarding the prevention measures, the most frequently reported was hand washing (843, 93.7%), followed by the use of face mask(s) (828, 92%), social distancing (695, 77.2%) and use of hand sanitizers (166, 18.4%). When asked if they agree with the recommendation to avoid going to the HF, 666 (74.3%) agreed. Nevertheless, 645 (71.7%) adults reported they would feel comfortable going to the HF for routine care during the pandemic. The vast majority of PWH reported that the way health care was provided had undergone significant changes (654, 72.7%).

Across survey rounds 1, 2, and 3 with PWH, there were a significant positive trends seen regarding the level of knowledge on coronavirus transmission, perception that almost all people will get infected by SARS-CoV-2, acknowledging the existence of a COVID-19 vaccine, leaving the house less, washing hands more often, being more anxious for getting infected themselves or a family member, perceiving that the epidemic will last for years, agreeing with the recommendation to avoid going to HF, agreeing with the decision to close schools, perceiving that health care changed due to the pandemic, perceiving less people are going to HF for routine care (TB, HIV, vaccination), perceiving that HIV care changed due to the pandemic, and knowing someone in their immediate social circle who is or was infected with COVID-19; and a significant negative trend was seen regarding engaging in recent physical contact (shaking hands, kissing or hugging somebody), meeting with more than 20 people, having a face mask, and reporting difficulties in obtaining ART.

HCW delivering HIV services

Data were collected from 182 HCW delivering HIV services at HF. The group was comprised of predominantly females (118, 64.8%), having a mean age of 31 years (SD 6.72). Regarding the specific role of the surveyed HCW within the HF, most worked as health counselors (67, 37%), followed by mid-level nurses (47, 26%), clinic technicians (18, 9.9%), laboratory technicians (10, 5.5%), basic level nurses (5, 2.8%), and other cadres (34, 18.8%). The majority of surveyed HCW had been working in their current positions for more than 1 year (101, 82.8%).

Almost all received information about the novel coronavirus, or COVID-19 (180, 98.9%). The most commonly reported sources for this information were: television (150, 82.4%), radio (104, 57.1%), other HCW (104, 57.1%), friends/family (80, 44%), and social media (70, 38.5%). Regarding the prevention measures, the most frequently reported was hand washing (173, 95.1%), followed by the use of face

mask(s) (173, 95.1%), social distancing (156, 85.7%) and use of hand sanitizers (108, 59.3%). Regarding personal protective equipment (PPE) at work, most (168, 96%) HCW reported that they had received a face covering/mask with fewer (73, 40.1%) reporting that they had received gloves in the prior 30 days. The majority of HCW, however, felt supported by the HF (140, 80.9%), and were interested in their work 145 (79.7%). Of respondents, 20 (11%) HCW did report being depressed several days within the prior two weeks, with a sizable proportion (21, 70%) reporting that they felt worse in general since the pandemic began.

The majority (129, 70.9%) of HCW did feel that the HF was not equipped to manage patients with COVID-19 and agreed with the recommendation that it was best for patients to avoid going to the HF during the pandemic (155, 85.2%). Lastly, approximately two-thirds (118, 65.2%) thought that the interruption of home visits during the pandemic did impact patients' retention in ART care.

There were significant trends found across survey rounds 1, 2 and 3 with HCW, including positive trends seen regarding the level of knowledge on coronavirus transmission, acknowledging the existence of a COVID-19 vaccine, being more anxious for getting infected themselves or a family member, perceiving that the epidemic will last for years, agreeing with the recommendation to avoid going to HF, reporting availability of water/soap or disinfectant at the workplace, perceiving there is enough PPE at HF, perceiving that health care changed due to the pandemic, perceiving less people are going to HF for routine care (TB, HIV, vaccination), perceiving that HIV and TB care changed due to the pandemic, and knowing someone in their immediate social circle who is or was infected with COVID-19; and a significant negative trend was seen regarding the acknowledgement of existing COVID-19 treatment, and participating in a funeral.

Conclusions

Almost all respondents, regardless of the target group interviewed, received information on the novel coronavirus or COVID-19 disease. Providing education messages in local languages was useful as they are spoken by a significant proportion of the respondents.

Despite the pandemic, people had to leave their houses to work or for an income generation activity. Nevertheless, they reported complying with the prevention measures. Health care workers felt comfortable working during the pandemic and were using PPE, mainly a mask, but the availability was not continuous. The majority claimed lack of training on COVID-19.

Over time, the proportion of respondents with anxiety due to the risk of contracting SARS-CoV-2 increased and the vast majority of HCW recognized that they were a high-risk group. However, we found that the majority of HCW were not deemed being at risk for depression or anxiety disorders and felt supported by the HF management.

There was a general perception among all respondent groups that care (including HIV and TB care) in Zambézia changed since the COVID-19 pandemic began and that less people were going to the HF for routine care. Although most PWH did not perceive increased difficulty in accessing treatment services, HCW felt that interruptions in community activities did impact adherence. The majority of HCW thought that the HF were not capable of/equipped to manage patients with COVID-19.

The survey showed that radio and TV are preferred ways for broadcasting messages related to COVID-19. For patients, tailored interventions to monitor retention of ART-treated patients at both the HF and community levels are needed to limit attrition related to COVID-19. For health workers, it is important to

guarantee regular training/ information sessions regarding COVID-19 and prevention measures (e.g., PPE), and offer psychosocial support for those who feel worried or anxious.

Project Background

Coronaviruses are important human and animal pathogens. On December 31st, 2019, a novel coronavirus (nCoV) was identified as the cause of a cluster of pneumonia cases in Wuhan, a city in the Hubei Province of China.⁽¹⁾ It spread rapidly, resulting in an epidemic throughout China, followed by an increasing number of cases globally. In February 2020, the World Health Organization (WHO) designated the disease “COVID-19”, which stands for Coronavirus Disease 2019. The virus that causes COVID-19 was identified to be a severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). On March 11th, 2020, the WHO declared the COVID-19 outbreak a pandemic. Globally, there have been more than 660 million confirmed cases of COVID-19 infection and 6,7 million deaths as of December 18th, 2022.⁽²⁾ In addition to the direct human costs, the pandemic is affecting every facet of society and aggressively testing the resilience of national health systems in more than 200 countries, areas and territories across the world. COVID-19 cases continue to rise rapidly across the African continent. In the WHO African Region, as of December 18th, 2022, there have been 9,4 million confirmed cases and 175,075 deaths.^(2,3)

In Mozambique, the Ministry of Health (MOH) reported the first case of COVID-19 on March 22nd, 2020 in Maputo City.⁽⁴⁾ Since President Filipe Jacinto Nyusi declared a State of Emergency in Mozambique on April 1st, 2020, the number of imported cases has remained low while the number of locally transmitted cases increased from one case on March 22nd, 2020 to 230,918 cases on December 18th, 2022.⁽⁵⁾

Effective infection control and prevention measures for this novel coronavirus are being increasingly studied and there is growing consensus for best practices, however, these remain difficult to implement, especially in resource-constrained settings such as Mozambique, where reliable access to clean water and proper sanitation measures is a challenge, the health system has significant existing physical and human infrastructure constraints including reduced stocks of personal protective equipment (PPE) and the ability to provide adequate social distancing within patient care areas which significantly impact the ability to implement recommended disease prevention and mitigation practices.

In some settings, the implementation of quarantine, social distancing, and community containment measures in response to COVID-19 risks/concerns have already impacted HIV services.^(6,7) There are concerns that the redirection of already constrained resource requirements for the COVID-19 response in many countries will disrupt HIV and other essential health care services, and population confinement mandates implemented in several African countries will interrupt the supply of critical medications such as combination antiretroviral treatment (ART), TB preventive therapy (TPT), as well as anti-tuberculosis (TB) medications.⁽⁸⁾

In addition, there are also worries about the potential immediate and downstream consequences that COVID-19 prevention and mitigation measures will have on patients (i.e. increased isolation, heightened anxiety/stress and other mental health conditions (depression) as well as substance use/abuse) and healthcare workers (HCW) (i.e., increased work stress, depression, substance use/abuse) themselves which could result in a variety of deleterious outcomes.^{(9,10),(11)} Such outcomes at the patient level could include the following: i) care interruptions which could lead to suboptimal adherence to prescribed HIV prevention (i.e. pre-exposure prophylaxis (PrEP)), TB prevention (i.e., TPT) and HIV treatment (i.e., ART) that could result in the development of drug resistance and to both HIV and TB as well as incident HIV and TB infections; ii) worsening or incident anxiety, stress and/or depression that could promote sustained

isolation from the health care system and result in patients becoming lost to follow-up and also developing drug resistance and/or transmitting HIV and/or TB to close/intimate contacts. On the health care provider side, outcomes could include: i) burn-out and stress (possibly resulting in HCW leaving the workforce), ii) development of anxiety and/or depression (which could lead to significant illness and exacerbate existing conditions and lead to substance use/abuse (with its own short- and longer-term consequences), and iii) the provision of poor-quality care due to HCW fears about COVID-19 infection.

Zambézia is one of the poorest provinces in Mozambique, with poor infrastructure and access to water. With a population of approximately 5 million people⁽¹²⁾, HIV prevalence is estimated at 15%⁽¹³⁾. The province has a ratio of health work force of 4.22 per 10,000 habitants⁽¹⁴⁾. The province shares its border with Malawi and the neighboring province of Nampula, where community transmission of SARS-CoV-2 has been declared.

Currently, few studies have evaluated the fidelity of implementation of COVID-19 prevention and mitigation measures and how these policies directly or indirectly influence patient and healthcare providers' knowledge, attitudes, practices and perceptions and the impact these perceptions have at both the individual and larger community, health facility (HF)-level.

This evaluation was designed by investigators from Friends in Global Health (FGH) and its affiliate organization, Vanderbilt University Medical Center (VUMC), in collaboration with provincial health authorities from the Zambézia Provincial Health Directorate (DPS-Z). Its general aim was to evaluate the knowledge, attitudes, practices, risk perceptions (KAP-P) regarding COVID-19, infection prevention measures, as well as access to health care (including HIV care) among adult population and HCW.

We expect that the results from this evaluation will be expediently used primarily for program improvement and strengthening and will support the MOH in its decision making on strategies for the COVID-19 response in Zambézia province, and presumably throughout the country.

Evaluation Purpose

The evaluation aimed to inform the response to COVID-19 in Zambézia province by describing: i) how the general population perceive their risk of infection, ii) preferred actions to be taken to promote infection control and COVID-19 mitigation efforts; and iii) how the MOH can optimally support the front-line HCW.

The primary goal of the evaluation was to assess the knowledge, attitudes, practices and perceptions regarding COVID-19 prevention and mitigation measures and access to health care services among adult population in general, PWH receiving longitudinal HIV care and HCW within select high-risk districts in Zambézia province.

The objectives were:

1. Describe the knowledge, attitude, practices, and perceptions regarding COVID-19, prevention and mitigation measures and access to health care services (including HIV and TB care) among adults residing in the community where the evaluation is being conducted as well as adults receiving longitudinal care at participating HF.

2. Describe the knowledge, attitude, practices (including fidelity of the implementation of COVID-19 guidelines), and perceptions regarding COVID-19 prevention and mitigation measures among health care workers at participating HF.

Evaluation Design/ Methods/ Limitations

Evaluation Design

A serial cross-sectional evaluation was performed. A survey, repeated in three separate rounds over a period of eight months, was used to assess KAP-P regarding SARS-CoV-2 prevention, transmission, and management among adult populations, PWH attending HIV care services, and HCW delivering HIV services, and their perceptions regarding the influence that the COVID-19 pandemic has on the delivery of essential services.

Evaluation Population

The evaluation was conducted in three representative districts in Zambézia province supported by FGH/VUMC (Mocuba, Milange and Alto Molócuè, see **Figure 1** below) with a perceived potential higher risk for COVID-19 infection clusters/outbreaks related to i) being close to an international border, ii) having a large volume of HF located on the country's major transportation corridor, iii) having significant numbers of large congregate settings, iv) being a corridor district, and/or iv) being a densely populated urban or peri-urban location.



Figure 1. Map of the Province of Zambézia. The three districts included in this evaluation are starred.

The evaluation surveyed individuals representing three key groups of interest:

- 1) Adult population “in movement” (i.e., spending time outside/away from their home) present in either the catchment area of the main district HF or at places of aggregation such as a market, or bus stops;

- 2) Adult PWH population attending HIV care at the main district HF;
- 3) HCW offering HIV services who were employed and currently working at the main district HF.

Inclusion and exclusion criteria included the following:

General criteria (for all three groups)

Inclusion criteria:

- Aged 18 years or older;
- Able and willing to give verbal informed consent;

Exclusion criteria:

- Any clinical or mental condition that, in the interviewer’s opinion, would preclude provision of informed consent or make evaluation participation unsafe or unethical;

Specific inclusion criteria

1) *Adult population*

- Live in the catchment area of one of the selected district headquarters HF;
- Be at a community place of aggregation such as a market or bus stop in the central/ headquarters location of the selected district at the time of survey implementation/ data collection.

2) *PWH*

- Have HIV-positive status and be currently enrolled in HIV care and ART services at one of the selected HF (could be already in care or be enrolled on the day of evaluation recruitment);

3) *HCW*

- HCW (e.g., medical doctor, medical officer [“técnico de medicina”], general nurse [“agente de medicina”], maternal and child health [MCH] nurse, pharmacist, laboratory worker, counselor, ancillary worker such as archivist or receptionist, and cough officer) who are employed full-time at one of the selected HF;
- Delivering HIV services.

Sampling Strategy

Due to the exploratory nature of the objectives of this evaluation, sample sizes were not calculated based on existing assumptions. We estimated that 100 interviews with adults per community and 100 PWH per HF would provide us with the requisite baseline preliminary data on KAP-P around COVID-19 infection and prevention recommendations. At each of the three participating HF, we estimated that a minimum of 15-20 HCW would participate in the survey at each of the three data collection time points (baseline at time of evaluation start, and then months 3 and 6 post-evaluation start). **Table 1** shows the sample size of participants surveyed during the evaluation. Participants were randomly sampled based on convenience

and interest, and those participating in any one survey implementation time would not necessarily be the same as in the other survey implementation times. The sample was selected aiming to achieve a proportionally equal number of male and female survey respondents, and a proportional distribution of days of the week.

Table 1. Evaluation’s sample size.

	Adult Population		PWH		HCW	
	Calculated Sample Size (minimum)	Achieved Sample Size	Calculated Sample Size (minimum)	Achieved Sample Size	Calculated Sample Size (minimum)	Achieved Sample Size
Alto-Molôcuè	100 x 3 rounds = 300	100 x 3 rounds = 300	100 x 3 rounds = 300	100 x 3 rounds = 300	45-60	61
Milange	100 x 3 rounds = 300	100 x 3 rounds = 300	100 x 3 rounds = 300	100 x 3 rounds = 300	45-60	60
Mocuba	100 x 3 rounds = 300	100 x 3 rounds = 300	100 x 3 rounds = 300	100 x 3 rounds = 300	45-60	61
Total (all rounds)	900	900	900	900	135-180	182

Data Collection Methods and Rationale

Those who satisfied the inclusion criteria (described above) were invited to participate in the evaluation.

- **Adult population:** Participants were selected via convenience sampling, depending on availability and interest of the approached persons. The survey took place at strategic places in the town centers of district capital locations, specifically at the bus stops and market entrances, with a maximum of 10 participants a day per site per surveyor.
- **PWH enrolled in HIV care:** PWH arriving at one of the three selected HF for regular HIV care were referred for evaluation participation by an HCW to the survey administrator. Participants were selected via convenience sampling and those eligible were recruited consecutively at each HF in the outpatient services (ART, MCH, and HIV/TB), with a maximum of 10 patients a day per HF.
- **HCW offering HIV services:** Information sessions were given to HIV services staff at the three selected HF. Participants were selected via convenience sampling. An appropriate time was scheduled with any interested HCW (e.g., at the end of work hours) for survey implementation so as not to interfere with routine activities at the HF.

If the person voluntarily decided to participate in the evaluation, verbal informed consent was obtained. The interview was administered using a structured questionnaire at the site or a place nearby that was comfortable for the participant, considering personal distancing measures.

The evaluation survey was administered in a secluded and (when possible) open air, space to maintain privacy and confidentiality for evaluation participants and to follow the personal distancing regulations (i.e., greater than 1.5 meters [6 feet] apart) and all prevention strategies in the context of COVID-19 prevention measures (as recommended by MOH and FGH policies). For those in the adult population this was an agreed upon private area near the recruitment site in the community, and for the PWH and HCW this was an agreed upon private area within the HF premises.

Surveys were conducted using a structured and pre-piloted questionnaire in Portuguese or using the local language depending on the preference of each participant. Topics identified by the evaluation team for the survey questions were based on local and cultural context, as well as study findings from neighboring regions, and are described in **Tables 2** and **3**. Evaluation staff engaged with the participants by posing questions in a neutral manner and reiterated at recruitment and during survey administration that participants could decline to respond to any question if they wished.

Table 2. KAP-P Survey – topics and themes (general adult population and adult PWH population)

Themes	Topics
Knowledge	<ul style="list-style-type: none"> • Novel coronavirus, signs and symptoms, prevention, transmission, treatment options • Source of information • Government recommendations
Attitude	<ul style="list-style-type: none"> • Prevention measures • Health-seeking behavior
Practices	<ul style="list-style-type: none"> • Traveling, gathering, distancing, hand washing, use of face mask, use of disinfectant gel
Risk perception	<ul style="list-style-type: none"> • Perception on risk of becoming infected and ill • Perception of risk of infecting family members/others in close proximity to them • Anxiety and depression
Perception on effect of health service provision	<ul style="list-style-type: none"> • Difficulties in receiving medication • Perception on whether care provision will change

Table 3. KAP-P Survey – topics and themes (Health care workers)

Themes	Topics
Knowledge	<ul style="list-style-type: none"> • Novel coronavirus, symptoms, prevention, transmission, treatment options • Source of information • Government recommendations
Practices	<ul style="list-style-type: none"> • Personal practices (Traveling, gathering, distancing, hand washing, use of face mask) • Practices at Health Facility
Risk perception	<ul style="list-style-type: none"> • Perception on risk of becoming infected and ill • Perception of risk of infecting family members/others in close proximity to them • Willingness to care for COVID-19 infected patients • Anxiety around care for COVID-19 suspect or infected patients • Depression
Preparedness (at HF)	<ul style="list-style-type: none"> • Training on protective measures/IPC • Support given by management • Receipt and use protective materials • HF readiness
Access to care	<ul style="list-style-type: none"> • Access to care for patients • Changes in workload (more or less)

	<ul style="list-style-type: none"> Challenges for provision of health care (e.g., possible stock rupture of medication or reagents, changes in staffing, etc.)
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Data Handling and Storage

Evaluation participants were assigned a unique evaluation identification number which was not able to be linked to the evaluation participant’s personally identifiable information. All data collected during the evaluation activities were coded using this evaluation identification number to protect participants’ confidentiality.

Participants’ responses to surveys were recorded using tablets. Data were uploaded daily via telecommunication to a data collection repository at the FGH provincial office using secure REDCap™ software; these data were stored in a database for collected survey responses that was only be accessible on password-protected computers in the evaluation personnel’s locked office(s).

All evaluation-related documentation was stored in locked filing cabinets at the district or provincial FGH offices and accessible only by the site evaluation staff. Documents with identifiable information (e.g., consent forms) were stored separately in a locked archive located in a secure room. Only evaluation staff involved in the evaluation activities and data analysis had access to the evaluation database and files.

Data Quality Assurance

The evaluation staff were trained before each survey round during three to five days on ethics in human research, evaluation protocol, interview techniques, and data management.

The data collection tools were piloted before the implementation of the evaluation.

On-going support, internal monitoring and supervision were performed by the evaluation coordinator and principal and site investigators during the data collection period.

Standard operations procedures (SOP) were developed to ensure compliance to the protocol, including guidance on administration of informed consent and evaluation forms, organization of evaluation files, data entry and management, and incident reporting.

Data Analysis Plan

Descriptive analyses were presented as medians (with interquartile ranges) for continuous variables and frequencies (with percentages) for categorical variables. Kruskal Wallis test was performed for the continuous variable and Chi-square test (or Fisher exact test when the frequency for certain category was less than 5) was performed for the categorical variables to check whether there is significant difference among three rounds. For select survey questions, proportion trend analyses and Spearman correlation analyses were used to check whether there was a significant trend across rounds 1, 2, and 3 (R1, R2, R3). A multivariable logistic regression model was built to examine whether a statistically significant association existed between the interested outcome and exposure in each round.

Limitations of the evaluation

The survey was carried out in only three sites in Zambézia province, so results may not be generalizable to the other areas of the country. There might have been a self-selection bias among those individuals who agreed to participate in the survey on COVID-19 topics, who may have been more interested in and/or concerned about COVID-19 in general, which would possibly make their responses less representative of others in the population.

Ethical considerations

The protocol, patient information forms, consent forms and survey instruments were approved by the Institutional Health Ethics Committee of Zambézia (in Portuguese, *Comité Institucional de Bioética para Saúde - Zambézia*, or CIBS-Z) (approval letter reference: 96/CIBS-Z/20, dated 15 October 2020), the Vanderbilt University Medical Center (VUMC) Institutional Review Board (IRB) (reference #201887, approval date 21Oct2020).

The evaluation activity was reviewed in accordance with the Centers for Disease Control and Prevention (CDC) human research protection procedures and was determined to be research, but CDC investigators did not interact with human subjects or have access to identifiable data or specimens for research purposes. The activity was conducted consistent with applicable federal law, CDC policy, and guiding principles of ethical research.

The evaluation team members were provided with adequate PPE and advised to take precautions to minimize the risk of SARS-CoV-2 infection for themselves and evaluation participants during the project while maintaining the confidentiality of participants (e.g., where possible, conduct evaluation visits in places with open air and/or sufficient ventilation).

Evaluation assistants with fluency in Zambézia province's major local languages were hired to conduct interviews to assure inclusion of individuals who may not speak Portuguese fluently or as a preferred language. All staff involved in this evaluation and/or who have access to participant information were trained regarding the protection of participant data and the importance of participant confidentiality. All evaluation assistants signed a data confidentiality agreement before data collection.

To limit contact and risk of transmission of SARS-CoV-2, verbal consent was obtained before data collection.

Each participant was assigned a unique identification number for use on all evaluation forms. No personal identifiers (e.g., patient names, medical record numbers, addresses, or telephone numbers) were collected on the evaluation forms.

The evaluation staff did not present any conflict of interests.

Stakeholder engagement

The evaluation team engaged the Operational Investigation Committee of Zambézia province in planning and implementation meetings as well the community leaders in the three selected districts and governmental institutions such as municipalities and health local authorities.

Deviations from Scope of Work (SOW)/protocol

There were two incidents which occurred during the evaluation period:

- On May 11, 2021, during the implementation of the second survey round, the research assistant assigned to Milange district conducted a survey interview with a participant and thought he had recorded the survey data on his tablet, but upon the supervisor checking this work, it was observed that the survey data had not been recorded. As a result, one of the surveys that had been carried out on that day was not captured in the study database, and the data were not saved.
- On May 19, 2021, in a routine call with the supervisor monitoring the data, when verifying the consent forms it was found that the research assistant had not correctly saved the survey data from one survey interview carried out on May 14, 2021. As a result, these data were not captured in the study database.

Therefore, data from a total of two completed survey interviews were not captured in Milange district.

Following the identification of these two incidents and recognition that the data of two participants had not been captured, the evaluation team recruited two additional participants to reach the total intended sample size at this district site. This process was carried out in such a way as to avoid repeating the survey with the two participants who had been previously surveyed but whose data had been lost, that is, the research assistant looked for two new eligible participants to be included. The research assistant confirmed that the full sample size had been reached and data collected for all on May 21, 2021.

Due to the study design, where a one-time survey was conducted and contact information was not collected from these individuals, it was not possible to contact these two participants and inform them about the loss of the survey data. These incidents were documented in a note-to-file for the study and were reported as such in the annual report to the local ethics committee (CIBS-Z).

Findings

Demographics

1. Adults

Data were collected from 900 adults (300 per round) interviewed at bus stops and markets within the communities of the selected evaluation sites. They were equally distributed among the three districts included in the evaluation. The majority of interviewees were recruited in the market areas (680, 75.6%). The mean age was 30 years (SD 9.4). The sex of respondents was somewhat balanced having slightly more males (486, 54%). About half had completed primary school (411, 45.7%) and very few had completed a superior level of education (14, 1.6%). Some of the interviewed adults reported that they did not work (179, 19.9%); for those working, the main income source was informal sales (252, 28%) followed by agriculture (178, 19.8%). The majority were married or living with a partner (593, 65.9%). Local languages were the preferred/maternal for the majority, including *Elomwe* (414, 46%) and *Chichewa* (170, 18.9%); only a few reported Portuguese as their mother language (40, 4.4%). Very few people lived alone (19, 2.1%), and 81 (9%) lived without minors and 878 (97.7%) without elderly persons (>65 years). Details are shown in **Table 4**.

Table 4: Sociodemographic of adults.

	[ALL] N=900	Round 1 N=300	Round 2 N=300	Round 3 N=300	P**	N
District	n (%*)	n (%*)	n (%*)	n (%*)	1.000	900
Alto Molócuè	300 (33.3%)	100 (33.3%)	100 (33.3%)	100 (33.3%)		
Milange	300 (33.3%)	100 (33.3%)	100 (33.3%)	100 (33.3%)		
Mocuba	300 (33.3%)	100 (33.3%)	100 (33.3%)	100 (33.3%)		
Recruited at market or bus stop					0.012	900
Bus stop	220 (24.4%)	90 (30.0%)	59 (19.7%)	71 (23.7%)		
Market	680 (75.6%)	210 (70.0%)	241 (80.3%)	229 (76.3%)		
Days of the week recruited					0.001	900
Mon	96 (10.7%)	41 (13.7%)	24 (8.0%)	31 (10.3%)		
Tue	111 (12.3%)	62 (20.7%)	23 (7.7%)	26 (8.7%)		
Wed	162 (18.0%)	66 (22.0%)	46 (15.3%)	50 (16.7%)		
Thu	144 (16.0%)	60 (20.0%)	39 (13.0%)	45 (15.0%)		
Fri	136 (15.1%)	49 (16.3%)	35 (11.7%)	52 (17.3%)		
Sat	214 (23.8%)	16 (5.3%)	111 (37.0%)	87 (29.0%)		
Sun	37 (4.1%)	6 (2.0%)	22 (7.3%)	9 (3.0%)		
Sex					0.807	900
Female	414 (46.0%)	138 (46.0%)	142 (47.3%)	134 (44.7%)		
Male	486 (54.0%)	162 (54.0%)	158 (52.7%)	166 (55.3%)		
Age (years), median (Q1;Q3)					<0.001	898
	28.0 [22.0;35.8]	28.0 [22.0;34.0]	27.0 [22.0;34.0]	31.0 [23.0;39.0]		
Education level completed					<0.001	900
Never went to school	32 (3.6%)	7 (2.3%)	9 (3.0%)	16 (5.3%)		
Alphabetization	181 (20.1%)	62 (20.7%)	50 (16.7%)	69 (23.0%)		

Primary school	411 (45.7%)	129 (43.0%)	166 (55.3%)	116 (38.7%)	
Secondary school	262 (29.1%)	99 (33.0%)	74 (24.7%)	89 (29.7%)	
Superior/university	14 (1.6%)	3 (1.0%)	1 (0.3%)	10 (3.3%)	
Profession/work					<0.001 900
Informal sales	252 (28.0%)	79 (26.3%)	88 (29.3%)	85 (28.3%)	
Do not work (no own income)	179 (19.9%)	66 (22.0%)	84 (28.0%)	29 (9.7%)	
Agriculture	178 (19.8%)	50 (16.7%)	39 (13.0%)	89 (29.7%)	
Taxi driver	67 (7.4%)	17 (5.7%)	28 (9.3%)	22 (7.3%)	
Teacher	58 (6.4%)	15 (5.0%)	15 (5.0%)	28 (9.3%)	
Security	19 (2.1%)	9 (3.0%)	3 (1.0%)	7 (2.3%)	
Bus driver	17 (1.9%)	5 (1.7%)	7 (2.3%)	5 (1.7%)	
Domestic worker	15 (1.7%)	11 (3.7%)	2 (0.7%)	2 (0.7%)	
HCW	6 (0.7%)	2 (0.7%)	3 (1.0%)	1 (0.3%)	
Police	5 (0.6%)	1 (0.3%)	2 (0.7%)	2 (0.7%)	
Other	104 (11.6%)	45 (15.0%)	29 (9.7%)	30 (10.0%)	
Marital status					0.396 900
Married/living together	593 (65.9%)	202 (67.3%)	190 (63.3%)	201 (67.0%)	
Single	211 (23.4%)	68 (22.7%)	78 (26.0%)	65 (21.7%)	
Divorced	63 (7.00%)	23 (7.7%)	22 (7.3%)	18 (6.0%)	
Widow	33 (3.7%)	7 (2.3%)	10 (3.3%)	16 (5.3%)	
Mother language					<0.001 900
Elomwe	414 (46.0%)	143 (47.7%)	136 (45.3%)	135 (45.0%)	
Chichewua	170 (18.9%)	77 (25.7%)	63 (21.0%)	30 (10.0%)	
Chuabo	81 (9.00%)	29 (9.7%)	30 (10.0%)	22 (7.3%)	
Muniga	41 (4.6%)	14 (4.7%)	18 (6.0%)	9 (3.0%)	
Portuguese	40 (4.4%)	4 (1.3%)	12 (4.0%)	24 (8.0%)	
Emakhuwa	29 (3.2%)	8 (2.7%)	9 (3.0%)	12 (4.0%)	
Other	125 (13.9%)	25 (8.3%)	32 (10.7%)	68 (22.7%)	
Number of people in household					0.220 895
1	19 (2.1%)	9 (3.1%)	8 (2.7%)	2 (0.7%)	
2 – 5	493 (55.1%)	162 (54.9%)	175 (58.3%)	156 (52.0%)	
6 – 9	360 (40.2%)	117 (39.7%)	110 (36.7%)	133 (44.3%)	
> 9	23 (2.6%)	7 (2.4%)	7 (2.3%)	9 (3.0%)	

**The sum of percentages potentially not 100 due to rounding. **Kruskal Wallis test was performed for the continuous variable and Chi-square test (or Fisher exact test when the frequency for certain category was less than 5) was performed for the categorical variables to check whether there was significant difference among the three survey rounds.*

2. PWH receiving care at health facilities

Data were collected from 900 PWH (300 per round) receiving care at HF within the communities included in the evaluation. Surveyed PWH were equally distributed in the three districts selected for the evaluation. The mean age was 35 years (SD 9.94). In this group there were more females (589, 65.6%). A significant proportion had obtained a primary level of education (353, 39.3%). Very few completed university level schooling (7, 0.78%). Agriculture and informal sales were the main occupations (377 [41.9%] and 149 [16.6%], respectively) while 170 (18.9%) reported not having their own source of income (i.e., were not working). The majority were married or living with a partner (661, 73.4%). *Elomwe* and *Chichewua* were the maternal languages of the majority (403 [44.8%] and 167 [18.6%], respectively) while Portuguese was

the reported preferred/maternal language for only 22 (2.44%) interviewed PWH. Only 23 (2.6%) live alone, 99 (11%) lived without minors and 867 (96.3%) without elderly (>65 years). Details are shown in **Table 5**.

Table 5: Sociodemographic of PWH receiving care at health facilities.

	[ALL] N=900	Round 1 N=300	Round 2 N=300	Round 3 N=300	P**	N
District	n (%*)	n (%*)	n (%*)	n (%*)	1.000	900
Alto Molócuè	300 (33.3%)	100 (33.3%)	100 (33.3%)	100 (33.3%)		
Milange	300 (33.3%)	100 (33.3%)	100 (33.3%)	100 (33.3%)		
Mocuba	300 (33.3%)	100 (33.3%)	100 (33.3%)	100 (33.3%)		
Days of the week recruited					0.199	899
Mon	190 (21.1%)	66 (22.0%)	59 (19.7%)	65 (21.7%)		
Tue	179 (19.9%)	64 (21.3%)	55 (18.3%)	60 (20.1%)		
Wed	157 (17.5%)	39 (13.0%)	57 (19.0%)	61 (20.4%)		
Thu	183 (20.4%)	57 (19.0%)	64 (21.3%)	62 (20.7%)		
Fri	190 (21.1%)	74 (24.7%)	65 (21.7%)	51 (17.1%)		
Sex					0.196	898
Female	589 (65.6%)	184 (61.5%)	203 (67.7%)	202 (67.6%)		
Male	309 (34.4%)	115 (38.5%)	97 (32.3%)	97 (32.4%)		
Age (years), median (Q1;Q3)					0.265	900
	33.0 [27.0;41.0]	32.0 [27.0;42.0]	33.0 [27.0;41.0]	35.0 [29.0;41.0]		
Educational level					0.004	898
Never went to school	87 (9.7%)	19 (6.4%)	24 (8.0%)	44 (14.7%)		
Alphabetization	278 (31.0%)	82 (27.5%)	99 (33.0%)	97 (32.3%)		
Primary school	353 (39.3%)	131 (44.0%)	109 (36.3%)	113 (37.7%)		
Secondary school	173 (19.3%)	64 (21.5%)	66 (22.0%)	43 (14.3%)		
Superior/university	7 (0.8%)	2 (0.7%)	2 (0.7%)	3 (1.0%)		
Profession/work					<0.001	900
Agriculture	377 (41.9%)	111 (37.0%)	114 (38.0%)	152 (50.7%)		
Do not work (no own income)	170 (18.9%)	72 (24.0%)	80 (26.7%)	18 (6.0%)		
Informal sales	149 (16.6%)	42 (14.0%)	42 (14.0%)	65 (21.7%)		
Teacher	62 (6.9%)	18 (6.0%)	27 (9.0%)	17 (5.7%)		
Security	19 (2.1%)	3 (1.0%)	8 (2.7%)	8 (2.7%)		
Domestic worker	11 (1.2%)	3 (1.0%)	2 (0.7%)	6 (2.0%)		
Police	7 (0.8%)	1 (0.3%)	2 (0.7%)	4 (1.3%)		
Taxi driver	5 (0.6%)	0 (0.0%)	4 (1.3%)	1 (0.3%)		
Bus driver	4 (0.4%)	2 (0.7%)	1 (0.3%)	1 (0.3%)		
HCW	2 (0.2%)	1 (0.3%)	1 (0.3%)	0 (0.0%)		
Other	94 (10.4%)	47 (15.7%)	19 (6.3%)	28 (9.3%)		
Marital status					0.004	900
Married/living together	661 (73.4%)	222 (74.0%)	218 (72.7%)	221 (73.7%)		
Single	57 (6.3%)	28 (9.3%)	21 (7.0%)	8 (2.7%)		
Divorced	111 (12.3%)	25 (8.3%)	37 (12.3%)	49 (16.3%)		
Widow	71 (7.9%)	25 (8.3%)	24 (8.0%)	22 (7.3%)		
Mother language					<0.001	900
Elomwe	403 (44.8%)	146 (48.7%)	138 (46.0%)	119 (39.7%)		
Chichewua	167 (18.6%)	64 (21.3%)	61 (20.3%)	42 (14.0%)		
Chuabo	84 (9.3%)	28 (9.3%)	25 (8.3%)	31 (10.3%)		

Portuguese	22 (2.4%)	1 (0.3%)	7 (2.3%)	14 (4.7%)
Muniga	21 (2.3%)	6 (2.0%)	11 (3.7%)	4 (1.3%)
Emakhuwa	20 (2.2%)	3 (1.0%)	9 (3.0%)	8 (2.7%)
Other	183 (20.3%)	52 (17.3%)	49 (16.3%)	82 (27.3%)
Number of people in household:				0.199 899
1	23 (2.6%)	7 (2.3%)	11 (3.7%)	5 (1.7%)
2 – 5	575 (64.0%)	206 (68.7%)	184 (61.3%)	185 (61.9%)
6 – 9	286 (31.8%)	84 (28.0%)	101 (33.7%)	101 (33.8%)
> 9	15 (1.7%)	3 (1.0%)	4 (1.3%)	8 (2.7%)

**The sum of percentages is potentially not 100 due to rounding. **Kruskal Wallis test was performed for the continuous variable and Chi-square test (or Fisher exact test when the frequency for certain category was less than 5) was performed for the categorical variables to check whether there was significant difference among the three survey rounds.*

3. HCW delivering HIV care

Data were collected from 182 HCW delivering HIV services at HF in the communities included in the evaluation. The group was majoritively female (118, 64.8%). Mean age was 31 years (SD 6.72). The majority reported completion of secondary school (151, 83.9%) and only 17 (9.44%) reported having a superior level of education. Regarding their role in the HF, the majority were health counselors (67, 37%) followed by mid-level nurses (47, 26%), clinic technicians (18, 9.9%), lab technicians (10, 5.5%), basic level nurses (5, 2.8%) and other roles (34, 18.8%). The majority of HCW were working in the position for more than a year (101, 82.8%). The majority were married or living with a partner (124, 68.1%). Only 12 (6.6%) were living alone, 25 (13.7%) without minors and 171 (94%) without elderly (>65 years). Details are shown in **Table 6**.

Table 6: Sociodemographic of HCW delivering HIV care.

	[ALL] N=182	Round 1 N=60	Round 2 N=62	Round 3 N=60	P**	N
District	n (%*)	n (%*)	n (%*)	n (%*)	1.000	182
Alto Molócuè	61 (33.5%)	20 (33.3%)	21 (33.9%)	20 (33.3%)		
Milange	60 (33.0%)	20 (33.3%)	20 (32.3%)	20 (33.3%)		
Mocuba	61 (33.5%)	20 (33.3%)	21 (33.9%)	20 (33.3%)		
Days of the week recruited					0.185	182
Mon	18 (9.9%)	5 (8.3%)	7 (11.3%)	6 (10.0%)		
Tue	34 (18.7%)	10 (16.7%)	17 (27.4%)	7 (11.7%)		
Wed	47 (25.8%)	20 (33.3%)	13 (21.0%)	14 (23.3%)		
Thu	47 (25.8%)	16 (26.7%)	16 (25.8%)	15 (25.0%)		
Fri	36 (19.8%)	9 (15.0%)	9 (14.5%)	18 (30.0%)		
Sex					0.236	182
Female	118 (64.8%)	37 (61.7%)	37 (59.7%)	44 (73.3%)		
Male	64 (35.2%)	23 (38.3%)	25 (40.3%)	16 (26.7%)		
Age (years); median (Q1;Q3)					0.897	182
	29.5 [26.2;34.0]	30.0 [27.0;34.0]	29.5 [26.2;34.0]	29.0 [26.0;33.0]		
Education level completed					0.871	180

Primary school	12 (6.7%)	4 (6.9%)	3 (4.8%)	5 (8.3%)		
Secondary school	151 (83.9%)	50 (86.2%)	52 (83.9%)	49 (81.7%)		
Superior/university	17 (9.4%)	4 (6.9%)	7 (11.3%)	6 (10.0%)		
What is your function at HF					0.203	181
Health Counselor	67 (37.0%)	23 (38.3%)	29 (46.8%)	15 (25.4%)		
MCH nurse, med	28 (15.5%)	10 (16.7%)	9 (14.5%)	9 (15.3%)		
Gen Nurse, mid	19 (10.5%)	4 (6.7%)	7 (11.3%)	8 (13.6%)		
Medical Technician	18 (9.9%)	3 (5.0%)	5 (8.1%)	10 (16.9%)		
Lab Technician	10 (5.5%)	6 (10.0%)	2 (3.2%)	2 (3.4%)		
Pharmacy	9 (5.0%)	2 (3.33%)	1 (1.61%)	6 (10.2%)		
Receptionist	9 (5.0%)	4 (6.67%)	3 (4.84%)	2 (3.39%)		
Cough Officer	8 (4.4%)	3 (5.0%)	1 (1.6%)	4 (6.8%)		
MCH nurse, basic	5 (2.8%)	1 (1.7%)	2 (3.2%)	2 (3.4%)		
Other	8 (4.42%)	4 (6.67%)	3 (4.84%)	1 (1.69%)		
How long have you been working in this role/position at this HF?					0.005	122
Less than 1 year	21 (17.2%)	0 (0.0%)	17 (27.4%)	4 (6.7%)		
More than 1 year	101 (82.8%)	0 (0.0%)	45 (72.6%)	56 (93.3%)		
How many years have you been working in this role (considering all your career)?					< 0.001	182
< 1	21 (11.5%)	0 (0.0%)	17 (27.4%)	4 (6.7%)		
1-5	107 (58.8%)	46 (76.7%)	29 (46.8%)	32 (53.3%)		
6-10	40 (22.0%)	9 (15.0%)	11 (17.7%)	20 (33.3%)		
> 10	14 (7.7%)	5 (8.3%)	5 (8.1%)	4 (6.7%)		
Marital status					0.888	182
Divorced	1 (0.6%)	0 (0.0%)	0 (0.0%)	1 (1.7%)		
Married/living together	124 (68.1%)	40 (66.7%)	42 (67.7%)	42 (70.0%)		
Single	53 (29.1%)	19 (31.7%)	19 (30.6%)	15 (25.0%)		
Widow	4 (2.2%)	1 (1.7%)	1 (1.6%)	2 (3.3%)		
Number of people in household:					0.136	182
1	12 (6.6%)	5 (8.3%)	6 (9.7%)	1 (1.7%)		
2-5	108 (59.3%)	33 (55.0%)	40 (64.5%)	35 (58.3%)		
6-9	59 (32.4%)	22 (36.7%)	14 (22.6%)	23 (38.3%)		
> 9	3 (1.6%)	0 (0.0%)	2 (3.2%)	1 (1.7%)		

**The sum of percentages potentially not 100 due to rounding. **Kruskal Wallis test was performed for the continuous variable and Chi-square test (or Fisher exact test when the frequency for certain category was less than 5) was performed for the categorical variables to check whether there was significant difference among the three survey rounds.*

Knowledge regarding prevention and mitigation COVID-19 measures among adult population, PWH and HCW

1. Adults

Almost all adults (895, 99.4%) received information on the novel coronavirus or COVID-19. The more frequently reported sources of information were the radio (672, 74.7%), followed by television (613, 68.1%) and friends/family (595, 66.1%). The respondents confirmed that these were the main sources of information used by them. Half of the adults (449, 50.2%) received the information in Portuguese and another mother language. The majority found the information sufficient (782, 87.6%) and trustworthy

(876, 98.8%). The majority (532, 59.2%) reported knowing “a little bit” regarding COVID-19 transmission. When asked about COVID-19 transmission, respondents highlighted cough and breathing (699, 77.7%), close contact to infected persons (543, 60.3%), contacting contaminated objects/surfaces (287, 31.9%) and touching a sick person (203, 22.6%) as the main risk factors for disease transmission. When asked about COVID-19 clinical presentation/symptomatology, and specifically the signs and symptoms, the most commonly reported were cough (737, 81.9%), fever (666, 74.0%), headache (481, 53.4%), dyspnea (412, 45.8%), sore throat (322, 35.8%), muscle pains (169, 18.8%), and fatigue (105, 11.7%). “Almost all will be sick” was the predominant response among respondents (371, 41.3%) when queried about disease severity. Sixty percent (543, 60.4%) stated that there was no effective treatment for COVID-19, however two-thirds (602, 67%) of respondents knew that COVID-19 vaccines existed. Almost all (876, 97.7%) stated that they felt they could prevent themselves from getting infected with COVID-19. Regarding the specific prevention measures, the most commonly reported mitigation measure was hand washing (861, 95.7%), followed by the use of a face mask (825, 91.7%), social distancing (674, 74.9%) and use of hand sanitizers/disinfectants (204, 22.7%) (see **Table 7**).

Significant changes were found on the reported data trend over time (among the rounds) and some with a weak to moderate strength of correlation such as an increased knowledge about COVID-19 vaccine and better health care services (see **Supplemental Table 1**).

Table 7: Knowledge regarding prevention and mitigation measures of COVID-19 among adults.

	[ALL]	Round 1 (N=300) (n, %)	Round 2 (N=300) (n, %)	Round 3 (N=300) (n, %)	P*	N
Have you heard about the novel coronavirus or COVID-19?					0.381	900
Yes	895 (99.4%)	300 (100%)	297 (99.0%)	298 (99.3%)		
No	5 (0.6%)	0 (0.0%)	3 (1.0%)	2 (0.7%)		
Source of the information (check all that apply)						
Radio	672 (74.7%)	226 (75.3%)	192 (64.0%)	254 (84.7%)	<0.001	900
TV	613 (68.1%)	204 (68.0%)	183 (61.0%)	226 (75.3%)	0.001	900
Talking to friends/ family	595 (66.1%)	185 (61.7%)	176 (58.7%)	234 (78.0%)	<0.001	900
HF	242 (26.9%)	61 (20.3%)	67 (22.3%)	114 (38.0%)	<0.001	900
Social media	153 (17.0%)	58 (19.3%)	41 (13.7%)	54 (18.0%)	0.155	900
Talking to HCW	33 (3.7%)	11 (3.7%)	10 (3.3%)	12 (4.0%)	0.91	900
Newspaper	24 (2.7%)	5 (1.7%)	6 (2.0%)	13 (4.3%)	0.087	900
Poster leaflet	14 (1.6%)	2 (0.7%)	3 (1.0%)	9 (3.0%)	0.078	900
Other ways	196 (21.8%)	43 (14.3%)	59 (19.7%)	94 (31.3%)	<0.001	900
Main source of information					<0.001	900
TV	417 (46.3%)	112 (37.3%)	113 (37.7%)	192 (64.0%)		
Radio	287 (31.9%)	116 (38.7%)	101 (33.7%)	70 (23.3%)		
Conversation with friends/family	96 (10.7%)	40 (13.3%)	42 (14.0%)	14 (4.7%)		
HF	44 (4.9%)	13 (4.3%)	18 (6.0%)	13 (4.3%)		
Social media	26 (2.9%)	13 (4.3%)	12 (4.0%)	1 (0.3%)		
Conversation with HCW	1 (0.1%)	0 (0.0%)	0 (0.0%)	1 (0.3%)		
Other	29 (3.2%)	6 (2.0%)	14 (4.7%)	9 (3.0%)		
In which language did you receive information (from those who received)?					<0.001	894
Portuguese and Mother language	449 (50.2%)	151 (50.3%)	154 (52.0%)	144 (48.3%)		
Only Portuguese	277 (31.0%)	78 (26.0%)	109 (36.8%)	90 (30.2%)		

Local language (mother language) and Portuguese	114 (12.8%)	62 (20.7%)	7 (2.4%)	45 (15.1%)		
Only mother language	42 (4.7%)	6 (2.0%)	23 (7.8%)	13 (4.4%)		
Local language (not mother language)	12 (1.3%)	3 (1.0%)	3 (1.0%)	6 (2.0%)		
Was information sufficient?					<0.001	893
Yes	782 (87.6%)	242 (80.9%)	264 (89.2%)	276 (92.6%)		
No	111 (12.4%)	57 (19.1%)	32 (10.8%)	22 (7.4%)		
Do you trust information?					0.447	887
Yes	876 (98.8%)	295 (99.3%)	289 (98.3%)	292 (98.6%)		
No	11 (1.2%)	2 (0.7%)	5 (1.7%)	4 (1.4%)		
How do you classify your knowledge on transmission of coronavirus?					<0.001	899
Don't know anything	3 (0.3%)	1 (0.3%)	2 (0.7%)	0 (0.0%)		
Very weak	183 (20.4%)	87 (29.0%)	73 (24.4%)	23 (7.7%)		
A little bit	532 (59.2%)	152 (50.7%)	201 (67.2%)	179 (59.7%)		
A lot	181 (20.1%)	60 (20.0%)	23 (7.7%)	98 (32.7%)		
What are the symptoms of COVID-19?						
Cough	737 (81.9%)	248 (82.7%)	224 (74.7%)	265 (88.3%)	<0.001	900
Fever	666 (74.0%)	206 (68.7%)	212 (70.7%)	248 (82.7%)	<0.001	900
Headache	481 (53.4%)	130 (43.3%)	126 (42.0%)	225 (75.0%)	<0.001	900
Difficulty breathing	412 (45.8%)	110 (36.7%)	128 (42.7%)	174 (58.0%)	<0.001	900
Sore throat	322 (35.8%)	82 (27.3%)	94 (31.3%)	146 (48.7%)	<0.001	900
Muscle aches	169 (18.8%)	51 (17.0%)	36 (12.0%)	82 (27.3%)	<0.001	900
Fatigue	105 (11.7%)	39 (13.0%)	28 (9.3%)	38 (12.7%)	0.302	900
Loss of taste	69 (7.7%)	20 (6.7%)	19 (6.3%)	30 (10.0%)	0.175	900
Diarrhea	68 (7.6%)	21 (7.0%)	16 (5.3%)	31 (10.3%)	0.062	900
Stuffy nose	46 (5.1%)	8 (2.7%)	9 (3.0%)	29 (9.7%)	<0.001	900
Other symptoms	50 (5.6%)	27 (9.0%)	13 (4.3%)	10 (3.3%)	0.005	900
No response	18 (2.0%)	7 (2.3%)	8 (2.7%)	3 (1.0%)	0.304	900
How someone can be infected with COVID-19?						
Cough or breathing	699 (77.7%)	198 (66.0%)	211 (70.3%)	290 (96.7%)	<0.001	900
Close contact to infected persons	543 (60.3%)	178 (59.3%)	182 (60.7%)	183 (61.0%)	0.907	900
Contaminated objects	287 (31.9%)	82 (27.3%)	81 (27.0%)	124 (41.3%)	<0.001	900
Touching a sick person	203 (22.6%)	80 (26.7%)	55 (18.3%)	68 (22.7%)	0.051	900
Use same glass/plate	64 (7.1%)	19 (6.3%)	17 (5.7%)	28 (9.3%)	0.177	900
Blood	8 (0.9%)	4 (1.3%)	4 (1.3%)	0 (0.0%)	0.14	900
Sexual relationships	4 (0.4%)	0 (0.0%)	4 (1.3%)	0 (0.0%)	0.037	900
Mosquito bite	2 (0.2%)	2 (0.7%)	0 (0.0%)	0 (0.0%)	0.333	900
Other transmission ways	177 (19.7%)	95 (31.7%)	63 (21.0%)	19 (6.3%)	<0.001	900
Don't know	12 (1.3%)	4 (1.3%)	7 (2.3%)	1 (0.3%)	0.112	900
No response	4 (0.4%)	2 (0.7%)	2 (0.7%)	0 (0.0%)	0.554	900
How severe can COVID-19 infection be?					0.032	899
Almost all will be sick	371 (41.3%)	102 (34.0%)	129 (43.0%)	140 (46.8%)		
About half will be sick	213 (23.7%)	86 (28.7%)	70 (23.3%)	57 (19.1%)		
Only few people	285 (31.7%)	102 (34.0%)	89 (29.7%)	94 (31.4%)		
Don't know	30 (3.3%)	10 (3.3%)	12 (4.0%)	8 (2.7%)		
Is there treatment for COVID-19?					<0.001	899
Yes	259 (28.8%)	66 (22.1%)	99 (33.0%)	94 (31.3%)		
No	543 (60.4%)	208 (69.6%)	175 (58.3%)	160 (53.3%)		
Don't know	97 (10.8%)	25 (8.4%)	26 (8.7%)	46 (15.3%)		
If yes, what is the treatment?					<0.001	258

Antibiotics	80 (31.0%)	43 (65.2%)	20 (20.4%)	17 (18.1%)		
Don't know	129 (50.0%)	11 (16.7%)	45 (45.9%)	73 (77.7%)		
Other	49 (19.0%)	12 (18.2%)	33 (33.7%)	4 (4.3%)		
Is there vaccine to prevent from COVID-19?					<0.001	899
Yes	602 (67.0%)	84 (28.1%)	233 (77.7%)	285 (95.0%)		
No	250 (27.8%)	190 (63.5%)	49 (16.3%)	11 (3.7%)		
Don't know	47 (5.2%)	25 (8.4%)	18 (6.0%)	4 (1.3%)		
Do you think you can prevent from COVID-19?					0.075	897
Yes	876 (97.7%)	288 (96.6%)	295 (98.3%)	293 (98.0%)		
No	17 (1.9%)	10 (3.4%)	4 (1.3%)	3 (1.0%)		
Don't know	4 (0.5%)	0 (0.0%)	1 (0.3%)	3 (1.0%)		
What are the prevention measures?						
Hand washing	861 (95.7%)	283 (94.3%)	289 (96.3%)	289 (96.3%)	0.381	900
Face mask	825 (91.7%)	274 (91.3%)	267 (89.0%)	284 (94.7%)	0.041	900
Social distancing	674 (74.9%)	201 (67.0%)	207 (69.0%)	266 (88.7%)	<0.001	900
Disinfectant for hands	204 (22.7%)	51 (17.0%)	53 (17.7%)	100 (33.3%)	<0.001	900
Cover nose and mouth	90 (10.0%)	46 (15.3%)	37 (12.3%)	7 (2.3%)	<0.001	900
Self-isolation	85 (9.4%)	32 (10.7%)	2 (0.7%)	51 (17.0%)	<0.001	900
Avoid touching face	42 (4.7%)	19 (6.3%)	7 (2.3%)	16 (5.3%)	0.054	900
Stay at home when sick or fever	20 (2.2%)	7 (2.3%)	9 (3.0%)	4 (1.3%)	0.378	900
Antibiotics	13 (1.4%)	3 (1.0%)	4 (1.3%)	6 (2.0%)	0.691	900
Traditional medicine	9 (1.0%)	3 (1.0%)	2 (0.7%)	4 (1.3%)	0.914	900
Herb supplement	8 (0.9%)	0 (0.0%)	3 (1.0%)	5 (1.7%)	0.108	900
Other measure	94 (10.4%)	57 (19.0%)	35 (11.7%)	2 (0.7%)	<0.001	900
No response	1 (0.1%)	1 (0.3%)	0 (0.0%)	0 (0.0%)	1	900

* Chi-square test (or Fisher exact test when the frequency for certain category was less than 5) was performed to check whether there was significant difference among the three survey rounds.

2. PWH receiving care at health facilities

Almost all received information about the novel coronavirus or COVID-19 (898, 99.8%). The most common reported sources for this information were: radio (713, 79.2%), friends/family (579, 64.3%), television (506, 56.2%) and from the HF itself (430, 47.8%). The information was received mainly in Portuguese and a mother language (467, 52.1%). The majority found the information to be sufficient (750, 83.9%) and trustworthy (875, 97.8%). “A little bit” was the answer of the majority (522, 58.1%) when asked about their knowledge regarding COVID-19 transmission. When asked about COVID-19 transmission, respondents highlighted cough and breathing (718, 79.8%), close contact to infected persons (497, 55.2%), contacting contaminated objects/surfaces (241, 26.8%) and touching a sick person (237, 26.3%) as the main risk factors for disease transmission. When asked about COVID-19 clinical presentation/symptomatology, and specifically signs and symptoms, the most commonly reported were cough (754, 83.8%), fever (627, 69.7%), headache (508, 56.4%), dyspnea (375, 41.7%), sore throat (278, 30.9%), muscle pains (202, 22.4%), and fatigue (109, 12.1%). “Only few people will get sick” was the predominant response among respondents (323, 35.9%) when queried about disease severity. “No treatment for COVID-19” was the response of the majority (559, 62.2%). Most of the respondents knew of the existence of a vaccine for COVID-19 (555, 61.9%). Almost all (872, 97.3%) stated that they could prevent themselves from becoming infected with the disease. Regarding the prevention measures, the most reported was hand washing (843, 93.7%), followed by the use of a face mask (828, 92.0%), social distancing (695, 77.2%) and use of hand sanitizers (166, 18.4%) (see **Table 8**).

Over time (among the rounds), significant changes were found on the trends of the reported data and some with a weak to moderate strength correlation such as increased knowledge regarding the COVID-19 vaccine, more PWH agreeing with the decision to close the schools, more PWH reporting a perceived improvement in health care services since the pandemic began, and more PWH thinking that others are avoiding routine care due to the pandemic (see **Supplemental Table 2**).

Table 8: Knowledge regarding prevention and mitigation measures of COVID-19 among PWH.

	[ALL]	Round 1 (n=300) (n, %)	Round 2 (n=300) (n, %)	Round 3 (n=300) (n, %)	p.over all*	N
Received any information on NC or COVID-19					1.000	900
Yes	898 (99.8%)	300 (100%)	299 (99.7%)	299 (99.7%)		
No	2 (0.2%)	0 (0.0%)	1 (0.3%)	1 (0.3%)		
Received information through						
Radio	713 (79.2%)	237 (79.0%)	207 (69.0%)	269 (89.7%)	<0.001	900
Talking to friends/ family	579 (64.3%)	171 (57.0%)	174 (58.0%)	234 (78.0%)	<0.001	900
TV	506 (56.2%)	172 (57.3%)	157 (52.3%)	177 (59.0%)	0.231	900
HF	430 (47.8%)	64 (21.3%)	164 (54.7%)	202 (67.3%)	<0.001	900
Talking to HCW	65 (7.2%)	37 (12.3%)	17 (5.7%)	11 (3.7%)	<0.001	900
Social media	65 (7.2%)	19 (6.3%)	20 (6.7%)	26 (8.7%)	0.490	900
Newspaper	13 (1.4%)	4 (1.3%)	3 (1.0%)	6 (2.0%)	0.691	900
Poster leaflet	10 (1.1%)	2 (0.7%)	4 (1.3%)	4 (1.3%)	0.784	900
Other ways	204 (22.7%)	44 (14.7%)	45 (15.0%)	115 (38.3%)	<0.001	900
Main source of information					<0.001	900
TV	349 (38.8%)	99 (33.0%)	121 (40.3%)	129 (43.0%)		
Radio	334 (37.1%)	130 (43.3%)	106 (35.3%)	98 (32.7%)		
Conversation with friends/family	85 (9.4%)	33 (11.0%)	20 (6.7%)	32 (10.7%)		
HF	79 (8.8%)	18 (6.0%)	40 (13.3%)	21 (7.0%)		
Social media	7 (0.8%)	5 (1.7%)	1 (0.3%)	1 (0.3%)		
Conversation with HCW	5 (0.6%)	4 (1.3%)	1 (0.3%)	0 (0.0%)		
Newspaper	1 (0.1%)	1 (0.3%)	0 (0.0%)	0 (0.0%)		
Other	40 (4.4%)	10 (3.3%)	11 (3.7%)	19 (6.3%)		
In which language did you receive information?					<0.001	897
Portuguese and Mother language	467 (52.1%)	140 (46.8%)	170 (56.9%)	157 (52.5%)		
Only Portuguese	221 (24.6%)	66 (22.1%)	89 (29.8%)	66 (22.1%)		
Local language (mother language) and Portuguese	116 (12.9%)	72 (24.1%)	4 (1.3%)	40 (13.4%)		
Only mother language	74 (8.3%)	19 (6.4%)	29 (9.7%)	26 (8.7%)		
Local language (not mother language)	19 (2.1%)	2 (0.7%)	7 (2.3%)	10 (3.3%)		
Was information sufficient?					<0.001	894
Yes	750 (83.9%)	192 (64.4%)	280 (93.6%)	278 (93.6%)		
No	144 (16.1%)	106 (35.6%)	19 (6.4%)	19 (6.4%)		
Do you trust information?					0.069	895

Yes	875 (97.8%)	290 (97.3%)	288 (96.6%)	297 (99.3%)		
No	20 (2.2%)	8 (2.7%)	10 (3.4%)	2 (0.7%)		
How do you classify your knowledge on transmission of coronavirus?					<0.001	899
Don't know anything	7 (0.8%)	5 (1.7%)	1 (0.3%)	1 (0.3%)		
Very weak	196 (21.8%)	91 (30.3%)	74 (24.7%)	31 (10.3%)		
A little bit	522 (58.1%)	145 (48.3%)	196 (65.6%)	181 (60.3%)		
A lot	174 (19.4%)	59 (19.7%)	28 (9.4%)	87 (29.0%)		
What are the symptoms of COVID-19?						
Cough	754 (83.8%)	237 (79.0%)	246 (82.0%)	271 (90.3%)	<0.001	900
Fever	627 (69.7%)	191 (63.7%)	195 (65.0%)	241 (80.3%)	<0.001	900
Headache	508 (56.4%)	142 (47.3%)	161 (53.7%)	205 (68.3%)	<0.001	900
Breath	375 (41.7%)	88 (29.3%)	118 (39.3%)	169 (56.3%)	<0.001	900
Throat	278 (30.9%)	57 (19.0%)	86 (28.7%)	135 (45.0%)	<0.001	900
Muscle	202 (22.4%)	70 (23.3%)	45 (15.0%)	87 (29.0%)	<0.001	900
Fatigue	109 (12.1%)	40 (13.3%)	27 (9.0%)	42 (14.0%)	0.125	900
Diarrhea	86 (9.6%)	24 (8.0%)	17 (5.7%)	45 (15.0%)	<0.001	900
Taste	60 (6.7%)	9 (3.0%)	27 (9.0%)	24 (8.0%)	0.007	900
Nose	41 (4.6%)	18 (6.0%)	8 (2.7%)	15 (5.0%)	0.133	900
Other symptoms	37 (4.1%)	21 (7.0%)	4 (1.3%)	12 (4.0%)	0.002	900
Without symptoms	10 (1.1%)	4 (1.3%)	1 (0.3%)	5 (1.7%)	0.366	900
No response	11 (1.2%)	2 (0.7%)	6 (2.0%)	3 (1.0%)	0.409	900
How someone can be infected?						
Cough or breathing	718 (79.8%)	203 (67.7%)	226 (75.3%)	289 (96.3%)	<0.001	900
Close contact to infected persons	497 (55.2%)	172 (57.3%)	180 (60.0%)	145 (48.3%)	0.011	900
Contaminated objects	241 (26.8%)	68 (22.7%)	68 (22.7%)	105 (35.0%)	<0.001	900
Touching a sick person	237 (26.3%)	77 (25.7%)	65 (21.7%)	95 (31.7%)	0.020	900
Use same glass/plate	45 (5.0%)	9 (3.0%)	25 (8.3%)	11 (3.7%)	0.005	900
Sexual relationships	12 (1.3%)	5 (1.7%)	4 (1.3%)	3 (1.0%)	0.934	900
Blood	4 (0.4%)	4 (1.3%)	0 (0.0%)	0 (0.0%)	0.037	900
Mosquito bite	2 (0.2%)	2 (0.7%)	0 (0.0%)	0 (0.0%)	0.333	900
Other transmission ways	131 (14.6%)	55 (18.3%)	53 (17.7%)	23 (7.7%)	<0.001	900
Don't know	24 (2.7%)	7 (2.3%)	13 (4.3%)	4 (1.3%)	0.067	900
How severe can COVID-19 infection be?					<0.001	899
Almost all will be sick	265 (29.5%)	69 (23.1%)	86 (28.7%)	110 (36.7%)		
About half will be sick	262 (29.1%)	109 (36.5%)	93 (31.0%)	60 (20.0%)		
Only few people	323 (35.9%)	104 (34.8%)	101 (33.7%)	118 (39.3%)		
Don't know	49 (5.5%)	17 (5.7%)	20 (6.7%)	12 (4.0%)		
Is there treatment for COVID-19?					0.996	899
Yes	229 (25.5%)	77 (25.8%)	78 (26.0%)	74 (24.7%)		
No	559 (62.2%)	185 (61.9%)	186 (62.0%)	188 (62.7%)		
Don't know	111 (12.3%)	37 (12.4%)	36 (12.0%)	38 (12.7%)		
If yes, what is the treatment?					<0.001	229
Antibiotics	92 (40.2%)	50 (64.9%)	24 (30.8%)	18 (24.3%)		
ART medications	1 (0.4%)	1 (1.3%)	0 (0.0%)	0 (0.0%)		
Other	20 (8.7%)	7 (9.1%)	7 (9.0%)	6 (8.1%)		
Don't know	116 (50.7%)	19 (24.7%)	47 (60.3%)	50 (67.6%)		
If yes, what other treatment?					0.001	20

Vaccine	12 (60.0%)	4 (57.1%)	3 (42.9%)	0 (0.0%)		
Aspirin	1 (5.0%)	1 (14.3%)	0 (0.0%)	0 (0.0%)		
Through ventilators	1 (5.0%)	0 (0.0%)	1 (14.3%)	0 (0.0%)		
Drinking water and lemon	1 (5.0%)	0 (0.0%)	1 (14.3%)	0 (0.0%)		
Pills	1 (5.0%)	1 (14.3%)	0 (0.0%)	0 (0.0%)		
Hot bath with lemon, eucalyptus and guava tree leaves	1 (5.0%)	0 (0.0%)	0 (0.0%)	1 (16.7%)		
Injection	1 (5.0%)	1 (14.3%)	0 (0.0%)	0 (0.0%)		
Washing hands with soap, vegetables and being clean	1 (5.0%)	0 (0.0%)	1 (14.3%)	0 (0.0%)		
Just to follow the recommendations	1 (5.0%)	0 (0.0%)	1 (14.3%)	0 (0.0%)		
Is there vaccine to prevent from COVID-19?					<0.001	897
Yes	555 (61.9%)	52 (17.5%)	228 (76.0%)	275 (91.7%)		
No	263 (29.3%)	192 (64.6%)	50 (16.7%)	21 (7.0%)		
Don't know	79 (8.8%)	53 (17.8%)	22 (7.3%)	4 (1.3%)		
Do you think you can prevent from COVID-19?					0.742	896
Yes	872 (97.3%)	286 (96.6%)	294 (98.0%)	292 (97.3%)		
No	18 (2.0%)	8 (2.7%)	5 (1.7%)	5 (1.7%)		
Don't know	6 (0.7%)	2 (0.7%)	1 (0.3%)	3 (1.0%)		
Prevention measures:						
Hand washing	843 (93.7%)	262 (87.3%)	290 (96.7%)	291 (97.0%)	<0.001	900
Face mask	828 (92.0%)	264 (88.0%)	280 (93.3%)	284 (94.7%)	0.006	900
Social distancing	695 (77.2%)	210 (70.0%)	231 (77.0%)	254 (84.7%)	<0.001	900
Disinfectant for hands	166 (18.4%)	47 (15.7%)	54 (18.0%)	65 (21.7%)	0.161	900
Self-isolation	105 (11.7%)	29 (9.7%)	2 (0.7%)	74 (24.7%)	<0.001	900
Cover nose and mouth	65 (7.2%)	34 (11.3%)	19 (6.3%)	12 (4.0%)	0.002	900
Touching face	33 (3.7%)	18 (6.0%)	7 (2.3%)	8 (2.7%)	0.030	900
Stay at home when sick or fever	24 (2.7%)	14 (4.7%)	6 (2.0%)	4 (1.3%)	0.027	900
Herb supplement	8 (0.9%)	1 (0.3%)	2 (0.7%)	5 (1.7%)	0.293	900
Antibiotics	8 (0.9%)	2 (0.7%)	3 (1.0%)	3 (1.0%)	1.000	900
Traditional medicine	5 (0.6%)	1 (0.3%)	0 (0.0%)	4 (1.3%)	0.134	900
Other measure	71 (7.9%)	39 (13.0%)	24 (8.0%)	8 (2.7%)	<0.001	900
No response	1 (0.1%)	0 (0.0%)	0 (0.0%)	1 (0.3%)	1.000	900

* Chi-square test (or Fisher exact test when the frequency for certain category was less than 5) was performed to check whether there was significant difference among the three survey rounds.

3. HCW delivering HIV care

Almost all HCW received information about the novel coronavirus or COVID-19 (180, 98.9%). The most frequently used sources reported by them were: television (150, 82.4%), radio (104, 57.1%), other HCW (104, 57.1%), friends/family (80, 44%), and social media (70, 38.5%). The majority found the information to be sufficient (140, 78.2%) and trustworthy (178, 98.9%). "A little bit" was the answer of the majority (107, 58.8%) when asked about their knowledge regarding COVID- transmission. When asked about

COVID-19 transmission, respondents highlighted cough and breathing (161, 88.5%), close contact to infected persons (133, 73.1%), contacting contaminated objects/surfaces (114, 62.6%) and touching a sick person by 79 (43.4%) as the main risk factors for disease transmission. When asked about COVID-19 clinical presentation/symptomatology, and specifically signs and symptoms, the most commonly reported were cough (161, 88.5%), fever (151, 83%), dyspnea (111, 61%), headache (105, 57.7%), sore throat (100, 54.9%), muscle pains (66, 36.3%), and fatigue (64, 35.2%). “Only few people will get sick” was the predominant response among respondents (72, 39.6%) when queried about disease severity. “No treatment for COVID-19” was the response of the majority (149, 82.3%). Most of the respondents knew of the existence of a COVID-19 vaccine (129, 71.3%). Regarding the maximum period of incubation for SARS-CoV-2, the most (76, 42.5%) common answer among surveyed HCW was 14 days. Almost all (177, 97.8%) stated that they felt they could prevent themselves from becoming infected with the disease. Regarding the prevention measures, the most frequently reported was hand washing (173, 95.1%), followed by the use of a face mask (173, 95.1%), social distancing (156, 85.7%) and use of hand sanitizers (108, 59.3%) (see **Table 9**).

Across the three rounds significant changes were found on the trend of the reported data regarding the sources and received amount of COVID-related information, knowledge on coronavirus transmission, symptoms, treatment, vaccination and prevention measures (see **Supplemental Table 3**).

Table 9: Knowledge regarding prevention and mitigation measures of COVID-19 among HCW delivering HIV care.

	[ALL] N=182 (n, %)	Round 1 N= 60 (n, %)	Round 2 N= 62 (n, %)	Round 3 N= 60 (n, %)	p.over all*	N
Received any information on novel coronavirus or COVID-19					0.215	182
Yes	180 (98.9%)	60 (100%)	62 (100%)	58 (96.7%)		
No	2 (1.10%)	0 (0.0%)	0 (0.0%)	2 (3.3%)		
Source of information (mark all that apply)						
TV	150 (82.4%)	51 (85.0%)	44 (71.0%)	55 (91.7%)	0.009	182
Radio	104 (57.1%)	34 (56.7%)	35 (56.5%)	35 (58.3%)	0.974	182
Talking to HCW	104 (57.1%)	29 (48.3%)	25 (40.3%)	50 (83.3%)	<0.001	182
Talking to friends/ family	80 (44.0%)	10 (16.7%)	25 (40.3%)	45 (75.0%)	<0.001	182
Social media	70 (38.5%)	19 (31.7%)	27 (43.5%)	24 (40.0%)	0.385	182
IEC ⁱ materials at HF	59 (32.4%)	2 (3.3%)	9 (14.5%)	48 (80.0%)	<0.001	182
MOH algorithms	25 (13.7%)	8 (13.3%)	12 (19.4%)	5 (8.3%)	0.208	182
TV/audio at HF	9 (5.0%)	3 (5.0%)	6 (9.7%)	0 (0.0%)	0.044	182
Through other ways	25 (13.7%)	11 (18.3%)	4 (6.5%)	10 (16.7%)	0.118	182
Was the information sufficient?					0.001	179
Yes	140 (78.2%)	37 (61.7%)	51 (83.6%)	52 (89.7%)		
No	39 (21.8%)	23 (38.3%)	10 (16.4%)	6 (10.3%)		
Do you trust the information?					1.000	180
Yes	178 (98.9%)	59 (98.3%)	61 (98.4%)	58 (100%)		
No	2 (1.11%)	1 (1.7%)	1 (1.6%)	0 (0.0%)		
How do you classify your knowledge on transmission of coronavirus?					<0.001	182
Very weak	3 (1.7%)	1 (1.7%)	1 (1.6%)	1 (1.7%)		
A little bit	107 (58.8%)	42 (70.0%)	43 (69.4%)	22 (36.7%)		
A lot	72 (39.6%)	17 (28.3%)	18 (29.0%)	37 (61.7%)		

ⁱ IEC: Information, Education and Communication.

Symptoms of COVID-19:(mark all that apply)						
Cough	161 (88.5%)	53 (88.3%)	53 (85.5%)	55 (91.7%)	0.565	182
Fever	151 (83.0%)	46 (76.7%)	50 (80.6%)	55 (91.7%)	0.077	182
Breath	111 (61.0%)	25 (41.7%)	41 (66.1%)	45 (75.0%)	0.001	182
Headache	105 (57.7%)	24 (40.0%)	37 (59.7%)	44 (73.3%)	0.001	182
Throat	100 (54.9%)	25 (41.7%)	29 (46.8%)	46 (76.7%)	<0.001	182
Muscle	66 (36.3%)	15 (25.0%)	11 (17.7%)	40 (66.7%)	<0.001	182
Fatigue	64 (35.2%)	17 (28.3%)	17 (27.4%)	30 (50.0%)	0.013	182
Taste	50 (27.5%)	4 (6.7%)	16 (25.8%)	30 (50.0%)	<0.001	182
Nose	40 (22.0%)	11 (18.3%)	8 (12.9%)	21 (35.0%)	0.009	182
Diarrhea	22 (12.1%)	3 (5.0%)	6 (9.7%)	13 (21.7%)	0.015	182
Other symptoms	14 (7.7%)	5 (8.3%)	2 (3.2%)	7 (11.7%)	0.207	182
No response	1 (0.6%)	1 (1.7%)	0 (0.0%)	0 (0.0%)	0.659	182
COVID-19 infection risk:(mark all that apply)						
Cough or breathing	161 (88.5%)	48 (80.0%)	54 (87.1%)	59 (98.3%)	0.007	182
Close contact to infected persons	133 (73.1%)	37 (61.7%)	51 (82.3%)	45 (75.0%)	0.034	182
Contaminated objects	114 (62.6%)	26 (43.3%)	41 (66.1%)	47 (78.3%)	<0.001	182
Touching a sick person	79 (43.4%)	25 (41.7%)	26 (41.9%)	28 (46.7%)	0.824	182
Use same glass/plate	14 (7.7%)	2 (3.3%)	8 (12.9%)	4 (6.7%)	0.146	182
Blood	2 (1.10%)	1 (1.7%)	1 (1.6%)	0 (0.0%)	1.000	182
Sexual relationships	1 (0.6%)	0 (0.0%)	1 (1.6%)	0 (0.0%)	1.000	182
Mosquito bite	1 (0.6%)	0 (0.0%)	1 (1.6%)	0 (0.0%)	1.000	182
Other transmission ways	18 (9.9%)	10 (16.7%)	6 (9.7%)	2 (3.3%)	0.050	182
How severe can COVID-19 infection be?					0.718	182
Almost all will be sick	58 (31.9%)	21 (35.0%)	20 (32.3%)	17 (28.3%)		
About half will be sick	72 (39.6%)	25 (41.7%)	25 (40.3%)	22 (36.7%)		
Only few people	52 (28.6%)	14 (23.3%)	17 (27.4%)	21 (35.0%)		
Is there treatment for COVID-19?					<0.001	181
Yes	23 (12.7%)	15 (25.4%)	8 (12.9%)	0 (0.0%)		
No	149 (82.3%)	39 (66.1%)	52 (83.9%)	58 (96.7%)		
Don't know	9 (5.0%)	5 (8.5%)	2 (3.2%)	2 (3.3%)		
If yes, what is the treatment?					1.000	23
Antibiotics	19 (82.6%)	12 (80.0%)	7 (87.5%)	0 (0.0%)		
Other	1 (4.4%)	1 (6.7%)	0 (0.0%)	0 (0.0%)		
Don't know	3 (13.0%)	2 (13.3%)	1 (12.5%)	0 (0.0%)		
Minimum time for isolation					0.057	180
More than a month	14 (7.78%)	5 (8.47%)	3 (4.92%)	6 (10.0%)		
One month	14 (7.78%)	5 (8.47%)	5 (8.20%)	4 (6.67%)		
A few weeks	8 (4.44%)	2 (3.39%)	6 (9.84%)	0 (0.00%)		
Two weeks	134 (74.4%)	44 (74.6%)	45 (73.8%)	45 (75.0%)		
One week	6 (3.33%)	0 (0.00%)	1 (1.64%)	5 (8.33%)		
Don't know	4 (2.22%)	3 (5.08%)	1 (1.64%)	0 (0.00%)		
Is there vaccine to prevent from COVID-19?					<0.001	181
Yes	129 (71.3%)	13 (22.0%)	61 (98.4%)	55 (91.7%)		
No	48 (26.5%)	42 (71.2%)	1 (1.6%)	5 (8.3%)		
Don't know	4 (2.2%)	4 (6.8%)	0 (0.0%)	0 (0.0%)		
What is maximum period of incubation?					0.012	179
More than 14 days	42 (23.5%)	6 (10.3%)	21 (34.4%)	15 (25.0%)		
14 days	76 (42.5%)	24 (41.4%)	26 (42.6%)	26 (43.3%)		
5 days	27 (15.1%)	13 (22.4%)	6 (9.8%)	8 (13.3%)		
2 days	20 (11.2%)	7 (12.1%)	4 (6.6%)	9 (15.0%)		

0, can be on same day	1 (0.6%)	0 (0.0%)	1 (1.6%)	0 (0.0%)		
At any time	1 (0.6%)	0 (0.0%)	0 (0.0%)	1 (1.7%)		
Don't know	12 (6.7%)	8 (13.8%)	3 (4.9%)	1 (1.7%)		
Do you think you can prevent getting infected by COVID-19?					0.735	181
Yes	177 (97.8%)	59 (100%)	60 (96.8%)	58 (96.7%)		
No	3 (1.7%)	0 (0.0%)	1 (1.6%)	2 (3.3%)		
Don't know	1 (0.6%)	0 (0.0%)	1 (1.6%)	0 (0.0%)		
Prevention measures (mark all that apply)						
Hand washing	173 (95.1%)	57 (95.0%)	58 (93.5%)	58 (96.7%)	0.910	182
Face mask	173 (95.1%)	59 (98.3%)	57 (91.9%)	57 (95.0%)	0.302	182
Social distancing	156 (85.7%)	47 (78.3%)	53 (85.5%)	56 (93.3%)	0.063	182
Disinfectant for hands	108 (59.3%)	17 (28.3%)	39 (62.9%)	52 (86.7%)	<0.001	182
Self-isolation	30 (16.5%)	12 (20.0%)	2 (3.2%)	16 (26.7%)	0.002	182
Avoid touching face	26 (14.3%)	6 (10.0%)	9 (14.5%)	11 (18.3%)	0.426	182
Cover nose and mouth	26 (14.3%)	7 (11.7%)	10 (16.1%)	9 (15.0%)	0.766	182
Stay at home when sick	10 (5.5%)	6 (10.0%)	3 (4.8%)	1 (1.7%)	0.133	182
Herb supplement	2 (1.1%)	0 (0.0%)	1 (1.6%)	1 (1.7%)	1.000	182
Antibiotics	2 (1.1%)	1 (1.7%)	1 (1.6%)	0 (0.0%)	1.000	182
Traditional medicine	2 (1.1%)	0 (0.0%)	1 (1.6%)	1 (1.7%)	1.000	182
Other measure	18 (9.9%)	7 (11.7%)	9 (14.5%)	2 (3.3%)	0.100	182

* Chi-square test (or Fisher exact test when the frequency for certain category was less than 5) was performed to check whether there was significant difference among the three survey rounds.

Practices regarding prevention and mitigation COVID-19 measures among adult population, PWH and HCW

1. Adults

Most of the adults surveyed did report leaving their homes during the previous week (746, 82.9%): to work (219, 29.4%), to sell products or conduct business (197, 26.4%), to visit friends/family (100, 13.4%) and to go shopping (97, 13%). Among interviewed adults, the majority (631, 70.7%) reported working outdoors (i.e., in an open-air environment). The majority also reported not having significant contact with other, namely, shaking hands, kissing, and/or hugging someone in the prior seven days (661, 73.4%). In addition, the majority (662, 73.6%) had not participated in large gatherings/meetings (e.g., involving more than 20 persons, had not attended funerals (704, 78.2%), had not traveled (757, 84.3%), and had not used public transport (760, 84.6%) in the prior seven days. Regarding face masks/coverings, 760 (84.6%) replied “yes” to possessing one, with more than half (539, 59.9%) reporting that they “always use it”, with a third of respondents (302, 33.6%) stating that they wear their face covering only when meeting others or going to the market (297, 33.0%), with significant fewer (97, 10.8%) respondents reporting consistently wearing face coverings/masks when using public transport. More than half (519, 57.7%) stated it was not difficult for them to maintain adequate social distancing from others when they were out and about in the community. The majority (763, 84.8%) reported washing their hands more often since the start of the pandemic and found this mitigation measure easy to comply with (783, 87.0%) (see **Table 10**).

Significant changes across the rounds were found in the practice of leaving the house during the pandemic, more people working outside or open-air working space, less physical contact (shaking hands, kissing and hugging), having/using a face mask and hand washing frequency (see **Supplemental Table 1**).

Table 10: Practices regarding prevention and mitigation measures of COVID-19 among adults.

	[ALL] N=900 (n, %)	Round 1 N=300 (n, %)	Round 2 N=300 (n, %)	Round 3 N=300 (n, %)	p.over all*	N
Did you leave the house last week?					<0.001	900
Yes	746 (82.9%)	258 (86.0%)	268 (89.3%)	220 (73.3%)		
No	154 (17.1%)	42 (14.0%)	32 (10.7%)	80 (26.7%)		
Reason to leave the house (if yes)					0.182	746
Work	219 (29.4%)	75 (29.1%)	68 (25.4%)	76 (34.5%)		
Sales/business	197 (26.4%)	65 (25.2%)	82 (30.6%)	50 (22.7%)		
Visit friends/family	100 (13.4%)	31 (12.0%)	37 (13.8%)	32 (14.5%)		
Shopping	97 (13.0%)	42 (16.3%)	29 (10.8%)	26 (11.8%)		
Physical exercise	1 (0.1%)	0 (0.0%)	0 (0.0%)	1 (0.5%)		
Other	132 (17.7%)	45 (17.4%)	52 (19.4%)	35 (15.9%)		
What type of space do you work in?					<0.001	893
Outside, open air	631 (70.7%)	189 (64.3%)	210 (70.2%)	232 (77.3%)		
Closed space/ office	141 (15.8%)	46 (15.6%)	43 (14.4%)	52 (17.3%)		
Work from home	121 (13.5%)	59 (20.1%)	46 (15.4%)	16 (5.3%)		
Did you shake hand, kissed or hugged somebody in last 7 days (not in household)?					0.004	900
Yes	238 (26.4%)	95 (31.7%)	83 (27.7%)	60 (20.0%)		
No	661 (73.4%)	205 (68.3%)	217 (72.3%)	239 (79.7%)		
Don't remember	1 (0.1%)	0 (0.0%)	0 (0.0%)	1 (0.3%)		
Were you meeting with more than 20 people in the last week?					0.100	900
Yes	238 (26.4%)	85 (28.3%)	87 (29.0%)	66 (22.0%)		
No	662 (73.6%)	215 (71.7%)	213 (71.0%)	234 (78.0%)		
Were you at a funeral in the last week?					0.373	900
Yes	196 (21.8%)	59 (19.7%)	73 (24.3%)	64 (21.3%)		
No	704 (78.2%)	241 (80.3%)	227 (75.7%)	236 (78.7%)		
Did you travel in the last 7 days?					0.053	898
Yes, to other country	3 (0.33%)	0 (0.00%)	1 (0.3%)	2 (0.7%)		
Yes, to other province	21 (2.34%)	13 (4.4%)	6 (2.0%)	2 (0.7%)		
Yes, in same province	117 (13.0%)	37 (12.4%)	43 (14.3%)	37 (12.4%)		
No	757 (84.3%)	249 (83.3%)	250 (83.3%)	258 (86.3%)		
Did you use public transport with more than 20 people in last 7 days?					0.495	898
Yes	138 (15.4%)	48 (16.1%)	50 (16.7%)	40 (13.4%)		
No	760 (84.6%)	251 (83.9%)	250 (83.3%)	259 (86.6%)		
Do you have a face mask?					0.007	898
Yes	760 (84.6%)	260 (86.7%)	238 (79.3%)	262 (87.9%)		
No	138 (15.4%)	40 (13.3%)	62 (20.7%)	36 (12.1%)		
(If yes) When do you use the face mask?						
Always	539 (59.9%)	147 (49.0%)	142 (47.3%)	250 (83.3%)	<0.001	900
Meeting many people	302 (33.6%)	198 (66.0%)	96 (32.0%)	8 (2.7%)	<0.001	900
Going to market	297 (33.0%)	192 (64.0%)	99 (33.0%)	6 (2.0%)	<0.001	900
Public transport	97 (10.8%)	57 (19.0%)	36 (12.0%)	4 (1.3%)	<0.001	900
Never	1 (0.1%)	1 (0.3%)	0 (0.0%)	0 (0.0%)	1.000	900
Other situations	18 (2.0%)	10 (3.3%)	7 (2.3%)	1 (0.3%)	0.028	900
No response	1 (0.1%)	0 (0.0%)	1 (0.3%)	0 (0.0%)	1.000	900
How difficult is it to keep the recommended distance from others?					0.071	900
Sometimes difficult	364 (40.4%)	117 (39.0%)	116 (38.7%)	131 (43.7%)		
Not difficult	519 (57.7%)	181 (60.3%)	179 (59.7%)	159 (53.0%)		

I don't follow those recommendations	17 (1.9%)	2 (0.7%)	5 (1.7%)	10 (3.3%)		
Since the start of the pandemic, have you washed your hands more often?					<0.001	900
More	763 (84.8%)	263 (87.7%)	223 (74.3%)	277 (92.3%)		
Same/ did not change	91 (10.1%)	29 (9.7%)	47 (15.7%)	15 (5.0%)		
Less	41 (4.6%)	7 (2.3%)	26 (8.7%)	8 (2.7%)		
Don't know	5 (0.6%)	1 (0.3%)	4 (1.3%)	0 (0.0%)		
Do you have difficulties in washing your hands?					<0.001	900
Yes, no soap	83 (9.2%)	39 (13.0%)	32 (10.7%)	12 (4.0%)		
Yes, no water	21 (2.3%)	3 (1.0%)	8 (2.7%)	10 (3.3%)		
Yes, no water and soap	13 (1.4%)	6 (2.0%)	5 (1.7%)	2 (0.7%)		
No	783 (87.0%)	252 (84.0%)	255 (85.0%)	276 (92.0%)		

* Chi-square test (or Fisher exact test when the frequency for certain category was less than 5) was performed to check whether there was significant difference among the three survey rounds.

2. PWH receiving care at health facilities

Most of the PWH surveyed did report leaving their homes during the previous week (607, 67.4%): to work (189, 31.1%), to go shopping (101, 16.6%), to visit friends/family (100, 16.5%) and to sell products or conduct business (77, 12.7%). Among the interviewed PWH, the majority (705, 78.6%) reported working outdoors (i.e., in an open-air environment). The majority also reported not having significant contact with others, namely, shaking hands, kissing, and/or hugging someone in the prior seven days (732, 81.3%). In addition, the majority (626, 69.7%) had not participated in large gatherings/meetings (e.g., involving more than 20 persons), had not attended funerals (628, 69.9%), had not traveled (770, 85.7%), and had not used public transport (779, 86.7%) in the prior seven days. Regarding face masks/coverings, the vast majority (877, 97.4%) replied “yes” to possessing one, with more than two thirds (635, 70.6%) reporting that they “always use it”, with more than one third of respondents (372, 41.3%) stating that they wear their face covering when meeting others or going to the market (326, 36.2%), with significantly fewer (89, 9.9%) respondents reporting consistently wearing face coverings/masks when using public transport. More than half (539, 60%) stated it was not difficult for them to maintain adequate social distancing from others when they were out and about in the community. The majority (800, 88.9%) reported washing their hands more often since the start of the pandemic and found this mitigation measure easy to comply with (755, 84%) (see **Table 11**).

Significant changes across the rounds were found in the practice of leaving the house during the pandemic, more people working outside or in open spaces, people reported less physical contact (shaking hands, kissing and hugging), less gatherings, having/using a face mask and hand washing frequency (see **Supplemental Table 2**).

Table 11: Practices regarding prevention and mitigation measures of COVID-19 among PWH.

	[ALL] N=900 (n, %)	Round 1 N=300 (n, %)	Round 2 N=300 (n, %)	Round 3 N=300 (n, %)	p.over all*	N
Did you leave the house last week?					<0.001	900
Yes	607 (67.4%)	201 (67.0%)	229 (76.3%)	177 (59.0%)		
No	293 (32.6%)	99 (33.0%)	71 (23.7%)	123 (41.0%)		
Reason to leave the house (if yes)					0.002	607

Work	189 (31.1%)	70 (34.8%)	62 (27.1%)	57 (32.2%)		
Shopping	101 (16.6%)	28 (13.9%)	35 (15.3%)	38 (21.5%)		
Visit friends/family	100 (16.5%)	41 (20.4%)	34 (14.8%)	25 (14.1%)		
Sales/business	77 (12.7%)	17 (8.5%)	29 (12.7%)	31 (17.5%)		
Other	140 (23.1%)	45 (22.4%)	69 (30.1%)	26 (14.7%)		
What type of space do you work in?					<0.001	897
Outside, open air	705 (78.6%)	227 (76.2%)	224 (74.7%)	254 (84.9%)		
Work from home	114 (12.7%)	55 (18.5%)	41 (13.7%)	18 (6.0%)		
Closed space/ office	78 (8.7%)	16 (5.4%)	35 (11.7%)	27 (9.0%)		
Did you shake hand, kissed or hugged somebody in last 7d (not in household)?					0.003	900
Yes	166 (18.4%)	58 (19.3%)	69 (23.0%)	39 (13.0%)		
No	732 (81.3%)	242 (80.7%)	229 (76.3%)	261 (87.0%)		
Don't remember	2 (0.2%)	0 (0.0%)	2 (0.7%)	0 (0.0%)		
Were you meeting with more than 20 people in last week?					<0.001	898
Yes	272 (30.3%)	132 (44.0%)	80 (26.8%)	60 (20.1%)		
No	626 (69.7%)	168 (56.0%)	219 (73.2%)	239 (79.9%)		
Were you at a funeral last week?					0.096	899
Yes	271 (30.1%)	102 (34.1%)	78 (26.0%)	91 (30.3%)		
No	628 (69.9%)	197 (65.9%)	222 (74.0%)	209 (69.7%)		
Did you travel in last 7 days?					0.079	898
Yes, to other country	1 (0.1%)	1 (0.3%)	0 (0.0%)	0 (0.0%)		
Yes, to other province	20 (2.2%)	9 (3.0%)	9 (3.0%)	2 (0.7%)		
Yes, in same province	107 (11.9%)	40 (13.4%)	38 (12.7%)	29 (9.7%)		
No	770 (85.7%)	249 (83.3%)	253 (84.3%)	268 (89.6%)		
Did you use public transport with more than 20p in last 7 days?					0.169	899
Yes	120 (13.3%)	45 (15.1%)	44 (14.7%)	31 (10.3%)		
No	779 (86.7%)	254 (84.9%)	256 (85.3%)	269 (89.7%)		
Do you have a face mask?					<0.001	900
Yes	877 (97.4%)	297 (99.0%)	298 (99.3%)	282 (94.0%)		
No	23 (2.6%)	3 (1.0%)	2 (0.7%)	18 (6.0%)		
When do you use mask (if yes)?						
Always	635 (70.6%)	158 (52.7%)	201 (67.0%)	276 (92.0%)	<0.001	900
When meeting many people	372 (41.3%)	232 (77.3%)	135 (45.0%)	5 (1.7%)	<0.001	900
When going to market	326 (36.2%)	204 (68.0%)	118 (39.3%)	4 (1.33%)	<0.001	900
When public transport	89 (9.9%)	50 (16.7%)	35 (11.7%)	4 (1.3%)	<0.001	900
Other situations	13 (1.4%)	9 (3.0%)	3 (1.0%)	1 (0.3%)	0.028	900
How difficult is it to keep distance?					0.224	898
Sometimes difficult	344 (38.3%)	112 (37.3%)	109 (36.5%)	123 (41.1%)		
Not difficult	539 (60.0%)	186 (62.0%)	185 (61.9%)	168 (56.2%)		
I don't follow recommendations	15 (1.7%)	2 (0.7%)	5 (1.7%)	8 (2.7%)		
Since pandemic, have you washed your hands more often?					<0.001	900
More	800 (88.9%)	266 (88.7%)	247 (82.3%)	287 (95.7%)		
Same/ did not change	60 (6.7%)	25 (8.3%)	28 (9.3%)	7 (2.3%)		
Less	38 (4.2%)	9 (3.0%)	23 (7.7%)	6 (2.0%)		
Don't know	2 (0.2%)	0 (0.0%)	2 (0.7%)	0 (0.0%)		
Do you have difficulties to wash your hands?					0.019	899
Yes, no soap	126 (14.0%)	57 (19.1%)	33 (11.0%)	36 (12.0%)		
Yes, no water	11 (1.2%)	6 (2.0%)	3 (1.0%)	2 (0.7%)		
Yes, no water and soap	7 (0.8%)	4 (1.3%)	2 (0.7%)	1 (0.3%)		
No	755 (84.0%)	232 (77.6%)	262 (87.3%)	261 (87.0%)		

* Chi-square test (or Fisher exact test when the frequency for certain category was less than 5) was performed to check whether there was significant difference among the three survey rounds.

3. HCW delivering HIV care

The majority (109, 59.9%) of surveyed HCW reported washing their hands numerous (> 5 times) times per day, and not shaking hands, kissing, and/or hugging someone in the prior seven days. In addition, the majority (149, 81.9%) had not participated in large gatherings/meetings (e.g., involving more than 20 persons), had not attended funerals (160, 87.9%), had not traveled (167, 92.8%), and had not used public transport (167, 92.3%) in the prior seven days. Regarding face masks/coverings, the vast majority (176, 96.7%) replied “yes” to possessing one, with most (159, 87.4%) reporting that they “always use it”, with a fraction (45, 24.7%) of surveyed HCW stating that they wear their face covering when meeting others or going to the market (33, 18.1%), with significantly fewer (12, 6.6%) respondents reporting consistently wearing face coverings/masks when using public transport. More than half (93, 51.1%) stated it was not difficult for them to maintain adequate social distancing from others when they were out and about in the community (see **Table 12**).

Significant changes across the rounds were found having less HCW participating in a funeral (see **Supplemental Table 3**).

Table 12: Practices regarding prevention and mitigation measures of COVID-19 among HCW delivering HIV care.

	[ALL] N= 182 (n, %)	Round 1 N= 60 (n, %)	Round 2 N= 62 (n, %)	Round 3 N= 60 (n, %)	p.over all*	N	
How many times did you wash your hands yesterday?						0.086	182
>5x	109 (59.9%)	41 (68.3%)	36 (58.1%)	32 (53.3%)			
4-5x	34 (18.7%)	9 (15.0%)	11 (17.7%)	14 (23.3%)			
1 to 3x	25 (13.7%)	10 (16.7%)	8 (12.9%)	7 (11.7%)			
I did not wash my hands	1 (0.6%)	0 (0.0%)	0 (0.0%)	1 (1.7%)			
Don't remember	13 (7.1%)	0 (0.0%)	7 (11.3%)	6 (10.0%)			
Did you shake hands, kiss or hug someone (not from your household) in last 7 days?						0.913	182
Yes	35 (19.2%)	11 (18.3%)	13 (21.0%)	11 (18.3%)			
No	147 (80.8%)	49 (81.7%)	49 (79.0%)	49 (81.7%)			
Were you meeting with more than 20 people in last week?						0.052	182
Yes	33 (18.1%)	13 (21.7%)	15 (24.2%)	5 (8.33%)			
No	149 (81.9%)	47 (78.3%)	47 (75.8%)	55 (91.7%)			
Were you at a funeral in the last week?						0.032	182
Yes	22 (12.1%)	11 (18.3%)	9 (14.5%)	2 (3.3%)			
No	160 (87.9%)	49 (81.7%)	53 (85.5%)	58 (96.7%)			
Did you travel in the last 7 days?						0.775	180
Yes, to other province	2 (1.1%)	0 (0.0%)	1 (1.6%)	1 (1.7%)			
Yes, in same province	11 (6.1%)	3 (5.0%)	3 (4.8%)	5 (8.6%)			
No	167 (92.8%)	57 (95.0%)	58 (93.5%)	52 (89.7%)			
Did you use public transport with more than 20p in last 7 days?						0.416	181
Yes	14 (7.7%)	7 (11.7%)	4 (6.5%)	3 (5.1%)			
No	167 (92.3%)	53 (88.3%)	58 (93.5%)	56 (94.9%)			

Do you have a face mask?					0.699	182
Yes	176 (96.7%)	59 (98.3%)	60 (96.8%)	57 (95.0%)		
No	6 (3.3%)	1 (1.7%)	2 (3.2%)	3 (5.0%)		
When do you use mask (if yes)?						
Always	159 (87.4%)	47 (78.3%)	55 (88.7%)	57 (95.0%)	0.021	182
When meeting many people	45 (24.7%)	28 (46.7%)	16 (25.8%)	1 (1.7%)	<0.001	182
When going to market	33 (18.1%)	21 (35.0%)	12 (19.4%)	0 (0.0%)	<0.001	182
When in public transport	12 (6.6%)	11 (18.3%)	1 (1.6%)	0 (0.0%)	<0.001	182
Other situations	3 (1.7%)	2 (3.3%)	0 (0.0%)	1 (1.7%)	0.322	182
How difficult is to keep distance at the health facility?					0.244	182
Sometimes difficult	88 (48.4%)	33 (55.0%)	25 (40.3%)	30 (50.0%)		
Not difficult	93 (51.1%)	27 (45.0%)	37 (59.7%)	29 (48.3%)		
I don't follow recommendations	1 (0.6%)	0 (0.0%)	0 (0.0%)	1 (1.7%)		

* Chi-square test (or Fisher exact test when the frequency for certain category was less than 5) was performed to check whether there was significant difference among the three survey rounds.

Practices at health facilities

In terms of the specific practices at the HF, the majority (126, 69.6%) of HCW felt comfortable working during the pandemic (126, 69.6%), with approximately two-thirds (124, 68.1%) of respondents stating that they had not received training on COVID-19, but with a sizable proportion (92, 75.4%) reporting that they had participated in work-based information sessions. When asked if they follow the hand washing recommendations at work, the majority (148, 81.3%) of HCW replied “always”, with a very similar proportion (144, 79.1%) reporting consistent use of alcohol or water/soap to attend patients, and the majority (142, 78%) stating that water/soap and/or disinfectants were routinely available at the workplace. Regarding PPE, most (168, 96%) HCW reported that they had received a face covering/mask, with fewer (73, 40.1%) reporting that they had received gloves in the prior 30 days. Many HCW also reported that the stocks of PPE that they received were not consistent. The answer was “always” for more than three-quarters (138, 76.2%) of surveyed HCW when asked if they used the PPE as indicated/recommended in the workplace. More than half (104, 57.1%) of all respondents reported that the HF they were working at had inadequate PPE stocks. Two-thirds (122, 67%) of respondents did report maintaining the recommended 1.5-meter distance when caring for patients in their respective HF. Details are shown below in **Table 13**.

Table 13: Practices at HF among HCW delivering HIV care regarding prevention and mitigation measures of COVID-19.

	[ALL] N=182 (n, %)	Round 1 N=60 (n, %)	Round 2 N=62 (n, %)	Round 3 N=60 (n, %)	p.over all*	N
Do you feel comfortable working at the HF?					0.043	181
Comfortable to work at HF	126 (69.6%)	40 (67.8%)	50 (80.6%)	36 (60.0%)		
Not comfortable to work at HF	55 (30.4%)	19 (32.2%)	12 (19.4%)	24 (40.0%)		
Have you received training on COVID-19?					0.815	182
Yes	58 (31.9%)	18 (30.0%)	19 (30.6%)	21 (35.0%)		
No	124 (68.1%)	42 (70.0%)	43 (69.4%)	39 (65.0%)		

When did you receive training on COVID-19 (if yes)?					0.001	58
1-4 weeks ago	5 (8.62%)	0 (0.0%)	3 (15.8%)	2 (9.5%)		
4-8 weeks ago	6 (10.3%)	6 (33.3%)	0 (0.0%)	0 (0.0%)		
More than 2 months ago	41 (70.7%)	12 (66.7%)	15 (78.9%)	14 (66.7%)		
Don't remember	6 (10.3%)	0 (0.0%)	1 (5.3%)	5 (23.8%)		
Have you received information session on COVID-19 (only asked in Rounds 2 and 3)?					0.001	122
Yes	92 (75.4%)	0 (0.0%)	38 (61.3%)	54 (90.0%)		
No	30 (24.6%)	0 (0.0%)	24 (38.7%)	6 (10.0%)		
When did you receive information session (if yes, round 2 and 3)?					0.030	92
Last week	22 (23.9%)	0 (0.0%)	4 (10.5%)	18 (33.3%)		
1-4 weeks ago	8 (8.7%)	0 (0.0%)	6 (15.8%)	2 (3.7%)		
4-8 weeks ago	6 (6.5%)	0 (0.0%)	4 (10.5%)	2 (3.7%)		
More than 2 months ago	46 (50.0%)	0 (0.0%)	20 (52.6%)	26 (48.1%)		
Don't remember	10 (10.9%)	0 (0.0%)	4 (10.5%)	6 (11.1%)		
Do you follow handwashing recommendations at work?					0.006	182
Always as recommended	148 (81.3%)	41 (68.3%)	52 (83.9%)	55 (91.7%)		
Most of the time	26 (14.3%)	14 (23.3%)	8 (12.9%)	4 (6.7%)		
Occasionally	7 (3.9%)	5 (8.3%)	2 (3.2%)	0 (0.0%)		
Rarely	1 (0.6%)	0 (0.0%)	0 (0.0%)	1 (1.7%)		
Are you able to use alcohol or water/soap to attend patients?					0.256	182
Always as recommended	144 (79.1%)	43 (71.7%)	48 (77.4%)	53 (88.3%)		
Most of the time	25 (13.7%)	12 (20.0%)	9 (14.5%)	4 (6.7%)		
Occasionally	5 (2.8%)	1 (1.7%)	3 (4.8%)	1 (1.7%)		
Rarely	8 (4.4%)	4 (6.7%)	2 (3.2%)	2 (3.3%)		
Is there water/soap or disinfectant at the place you work:					<0.001	182
Always	142 (78.0%)	41 (68.3%)	44 (71.0%)	57 (95.0%)		
Sometimes	27 (14.8%)	16 (26.7%)	10 (16.1%)	1 (1.7%)		
Never received	13 (7.1%)	3 (5.0%)	8 (12.9%)	2 (3.3%)		
Did you receive PPE from work in the last 30 days?						
Surgical OR cloth OR N95 mask	168 (96.0%)	53 (100%)	59 (95.2%)	56 (93.3%)	0.179	175
Surgical mask	163 (89.6%)	53 (88.3%)	57 (91.9%)	53 (88.3%)	0.753	182
Gloves	73 (40.1%)	23 (38.3%)	15 (24.2%)	35 (58.3%)	0.001	182
N95 mask	23 (18.9%)	0 (0.0%)	4 (6.5%)	19 (31.7%)	0.001	122
Gown	32 (17.6%)	4 (6.7%)	8 (12.9%)	20 (33.3%)	<0.001	182
Cloth face mask	4 (2.2%)	1 (1.7%)	1 (1.6%)	2 (3.3%)	0.846	182
Other	43 (23.6%)	21 (35.0%)	10 (16.1%)	12 (20.0%)	0.036	182
Did not receive any	10 (5.5%)	4 (6.7%)	2 (3.2%)	4 (6.7%)	0.663	182
How frequently have you received a surgical mask?					0.023	181
Receive whenever I need at HF	81 (44.8%)	24 (40.0%)	21 (34.4%)	36 (60.0%)		
Receive sometimes	88 (48.6%)	32 (53.3%)	33 (54.1%)	23 (38.3%)		
Never received	12 (6.6%)	4 (6.7%)	7 (11.5%)	1 (1.7%)		
How frequently have you received a cloth mask?					0.642	181
Receive whenever I need at HF	3 (1.7%)	1 (1.7%)	0 (0.0%)	2 (3.3%)		
Receive sometimes	12 (6.6%)	3 (5.1%)	4 (6.5%)	5 (8.3%)		
Never received	166 (91.7%)	55 (93.2%)	58 (93.5%)	53 (88.3%)		
How frequently have you received gloves?					<0.001	181
Receive whenever I need at HF	68 (37.6%)	22 (36.7%)	11 (17.7%)	35 (59.3%)		
Receive sometimes	35 (19.3%)	15 (25.0%)	12 (19.4%)	8 (13.6%)		
Never received	78 (43.1%)	23 (38.3%)	39 (62.9%)	16 (27.1%)		

How frequently have you received a gown?					<0.001	182
Receive whenever I need at HF	30 (16.5%)	3 (5.0%)	5 (8.1%)	22 (36.7%)		
Receive sometimes	14 (7.7%)	4 (6.7%)	6 (9.7%)	4 (6.7%)		
Never received	138 (75.8%)	53 (88.3%)	51 (82.3%)	34 (56.7%)		
Do you use PPE as indicated?					0.048	181
Always, as per risk evaluation	138 (76.2%)	41 (68.3%)	45 (73.8%)	52 (86.7%)		
Most of the time, as per risk evaluation	32 (17.7%)	15 (25.0%)	12 (19.7%)	5 (8.3%)		
Occasionally	6 (3.3%)	3 (5.0%)	3 (4.9%)	0 (0.0%)		
Rarely	5 (2.8%)	1 (1.7%)	1 (1.6%)	3 (5.0%)		
Do you think there is enough PPE at the HF?					0.001	182
Yes	70 (38.5%)	14 (23.3%)	25 (40.3%)	31 (51.7%)		
No	104 (57.1%)	39 (65.0%)	36 (58.1%)	29 (48.3%)		
Don't know	8 (4.4%)	7 (11.7%)	1 (1.6%)	0 (0.0%)		
Do you use a surgical mask when attending patient?					0.082	182
Always	170 (93.4%)	55 (91.7%)	55 (88.7%)	60 (100%)		
Sometimes	8 (4.4%)	3 (5.0%)	5 (8.1%)	0 (0.0%)		
Never	4 (2.2%)	2 (3.3%)	2 (3.2%)	0 (0.0%)		
Do you keep 1.5m distance from others when working at the HF?					0.003	182
Yes	122 (67.0%)	42 (70.0%)	32 (51.6%)	48 (80.0%)		
No	60 (33.0%)	18 (30.0%)	30 (48.4%)	12 (20.0%)		

* Chi-square test (or Fisher exact test when the frequency for certain category was less than 5) was performed to check whether there was significant difference among the three survey rounds.

Risk perceptions regarding COVID-19 among adult population, PWH and HCW

1. Adults

Respondents reported that they (themselves) (458, 50.9%) or a family member (306, 34.1%) were at high risk of being infected by the novel coronavirus. Forty-four percent (395) of adults reported being “very anxious” when asked about the possibility of them or a family member being infected, and 531 (59.1%) were worried about their own personal health. Of the adults, 371 (43.6%) perceived that the number of infected people will increase and 481 (67.5%) stated that the pandemic will last for many years. When asked if they agree with the recommendation to avoid going to the HF, 658 (73.3%) agreed. Nevertheless, 663 (73.7%) adults reported they would feel comfortable going to the HF for routine care during the pandemic. Among respondents, 694 (77.1%) also agreed with the decision to close the schools with 566 (62.9%) reporting that they would send their children back to school once they re-opened. Two thirds (609, 67.7%) stated that the borders surrounding Mozambique should remain open during the pandemic (see **Table 14**).

Significant changes across the rounds were seen related to perceived high risk/increased anxiety related to oneself or a family member becoming infected with COVID-19, higher numbers of COVID-19 cases, long duration of the epidemic (for many years), agreeing to avoid the HF visits when possible but feeling comfortable to go for routine care and agreeing with the decision to close the schools (see **Supplemental Table 1**).

Table 14: Risk perceptions regarding prevention and mitigation measures of COVID-19 among adults.

	[ALL] N=900 (n, %)	Round 1 N=300 (n, %)	Round 2 N=300 (n, %)	Round 3 N=300 (n, %)	p.over all*	N
What do you think the probability is for you to be infected by COVID-19?					<0.001	900
High risk	458 (50.9%)	171 (57.0%)	119 (39.7%)	168 (56.0%)		
Considerable risk	162 (18.0%)	48 (16.0%)	79 (26.3%)	35 (11.7%)		
Minimal risk	240 (26.7%)	76 (25.3%)	91 (30.3%)	73 (24.3%)		
No risk	35 (3.9%)	1 (0.3%)	10 (3.3%)	24 (8.0%)		
Don't know	5 (0.6%)	4 (1.3%)	1 (0.3%)	0 (0.0%)		
What do you think the probability is for your family member to be infected by COVID-19?					<0.001	898
High risk	306 (34.1%)	96 (32.1%)	66 (22.1%)	144 (48.0%)		
Considerable risk	212 (23.6%)	107 (35.8%)	69 (23.1%)	36 (12.0%)		
Minimal risk	321 (35.7%)	86 (28.8%)	147 (49.2%)	88 (29.3%)		
No risk	43 (4.8%)	7 (2.3%)	8 (2.7%)	28 (9.3%)		
Don't know	16 (1.8%)	3 (1.0%)	9 (3.0%)	4 (1.3%)		
How anxious are you that you or a family member will be infected by COVID-19?					<0.001	898
Very anxious	395 (44.0%)	92 (30.9%)	81 (27.0%)	222 (74.0%)		
Anxious	214 (23.8%)	93 (31.2%)	83 (27.7%)	38 (12.7%)		
Little anxious	238 (26.5%)	98 (32.9%)	113 (37.7%)	27 (9.0%)		
Not anxious	51 (5.7%)	15 (5.0%)	23 (7.7%)	13 (4.3%)		
What does the new coronavirus mean to you?					<0.001	899
Stressful	330 (36.7%)	90 (30.0%)	87 (29.1%)	153 (51.0%)		
Worried about my health	531 (59.1%)	207 (69.0%)	190 (63.5%)	134 (44.7%)		
Not really a problem for me	38 (4.2%)	3 (1.0%)	22 (7.4%)	13 (4.3%)		
Do you think that the case numbers will get worse?					<0.001	851
Will be worse (increase)	371 (43.6%)	132 (47.8%)	106 (38.4%)	133 (44.5%)		
Will remain same	178 (20.9%)	78 (28.3%)	71 (25.7%)	29 (9.7%)		
Will be less (cases)	302 (35.5%)	66 (23.9%)	99 (35.9%)	137 (45.8%)		
How long do you think the epidemic will last?					<0.001	713
Will continue for many years	481 (67.5%)	92 (52.6%)	145 (59.7%)	244 (82.7%)		
Will continue for another few months	158 (22.2%)	65 (37.1%)	59 (24.3%)	34 (11.5%)		
Will end shortly	74 (10.4%)	18 (10.3%)	39 (16.0%)	17 (5.8%)		
How do you feel about the recommendation to avoid going to HF?					<0.001	898
Agree	658 (73.3%)	182 (60.7%)	203 (67.7%)	273 (91.6%)		
Do not agree	239 (26.6%)	118 (39.3%)	96 (32.0%)	25 (8.4%)		
Don't know	1 (0.1%)	0 (0.0%)	1 (0.3%)	0 (0.0%)		
What do you think of the decision to close schools?					<0.001	900
Agree	694 (77.1%)	199 (66.3%)	225 (75.0%)	270 (90.0%)		
Do not agree	203 (22.6%)	99 (33.0%)	74 (24.7%)	30 (10.0%)		
Don't know	3 (0.3%)	2 (0.7%)	1 (0.3%)	0 (0.0%)		
Do you think borders should stay open or be closed?					0.025	899
Should remain open	609 (67.7%)	190 (63.5%)	197 (65.7%)	222 (74.0%)		
Should be closed	273 (30.4%)	105 (35.1%)	94 (31.3%)	74 (24.7%)		
Don't know	17 (1.9%)	4 (1.3%)	9 (3.0%)	4 (1.3%)		
Do you/would you feel comfortable in sending your children to school when they reopen?					<0.001	900
Yes	566 (62.9%)	149 (49.7%)	267 (89.0%)	150 (50.0%)		
No	322 (35.8%)	140 (46.7%)	32 (10.7%)	150 (50.0%)		

Don't know	12 (1.3%)	11 (3.7%)	1 (0.3%)	0 (0.0%)		
Would you feel comfortable in going to the HF for routine care (during the pandemic)?					<0.001	899
Yes	663 (73.7%)	220 (73.6%)	248 (82.7%)	195 (65.0%)		
No	234 (26.0%)	79 (26.4%)	50 (16.7%)	105 (35.0%)		
Don't know	2 (0.2%)	0 (0.0%)	2 (0.7%)	0 (0.0%)		

* Chi-square test (or Fisher exact test when the frequency for certain category was less than 5) was performed to check whether there was significant difference among the three survey rounds.

2. PWH receiving care at health facilities

Respondents reported that they (themselves) (271, 30.1%) or a family member (203, 22.6%) were at high risk of being infected by the novel coronavirus. Forty percent (365) of adult PWH reported being “very anxious” when asked about the possibility of them or a family member being infected, and 565 (62.8%) were worried about their own personal health. Of the PWH surveyed, 330 (40.6%) perceived that the number of people infected with COVID-19 will increase and 495 (69%) stated that the pandemic will last for many years. When asked if they agree with the recommendation to avoid going to the HF, 666 (74.3%) agreed. Nevertheless, 645 (71.7%) adults reported they would feel comfortable going to the HF for routine care during the pandemic. Among respondents, 706 (78.4%) also agreed with the decision to close the schools with 552 (61.4%) reporting that they would send their children back to school once they re-opened. Two-thirds (610, 67.9%) stated that the borders surrounding Mozambique should remain open during the pandemic (see **Table 15**).

Across the rounds, significant changes were seen related to perceived high risk/increased anxiety about oneself or a family member becoming infected, higher numbers of COVID-19 cases, long duration of the epidemic (for many years) and agreeing to avoid visiting the HF when possible (see **Supplemental Table 2**).

Table 15: Risk perceptions regarding prevention and mitigation measures of COVID-19 among PWH.

	[ALL] N=900 (n, %)	Round 1 N=300 (n, %)	Round 2 N=300 (n, %)	Round 3 N=300 (n, %)	p.over all*	N
What do you think the probability is for you to be infected by COVID-19?					<0.001	899
High risk	271 (30.1%)	80 (26.7%)	78 (26.0%)	113 (37.8%)		
Considerable risk	178 (19.8%)	68 (22.7%)	90 (30.0%)	20 (6.7%)		
Minimal risk	361 (40.2%)	131 (43.7%)	106 (35.3%)	124 (41.5%)		
No risk	71 (7.9%)	16 (5.3%)	17 (5.7%)	38 (12.7%)		
Don't know	18 (2.0%)	5 (1.7%)	9 (3.0%)	4 (1.3%)		
What do you think the probability is for your family member to be infected by COVID-19?					<0.001	900
High risk	203 (22.6%)	60 (20.0%)	41 (13.7%)	102 (34.0%)		
Considerable risk	198 (22.0%)	94 (31.3%)	83 (27.7%)	21 (7.0%)		
Minimal risk	395 (43.9%)	123 (41.0%)	143 (47.7%)	129 (43.0%)		
No risk	77 (8.6%)	17 (5.7%)	22 (7.3%)	38 (12.7%)		
Don't know	27 (3.0%)	6 (2.0%)	11 (3.7%)	10 (3.3%)		
How anxious are you that you or a family member will be infected by COVID-19?					<0.001	893
Very anxious	365 (40.9%)	79 (26.6%)	72 (24.3%)	214 (71.3%)		
Anxious	190 (21.3%)	81 (27.3%)	86 (29.1%)	23 (7.7%)		
Little anxious	255 (28.6%)	97 (32.7%)	109 (36.8%)	49 (16.3%)		

Not anxious	83 (9.3%)	40 (13.5%)	29 (9.8%)	14 (4.7%)		
What does the new coronavirus mean to you?					0.002	899
Stressful	295 (32.8%)	80 (26.7%)	91 (30.4%)	124 (41.3%)		
Worried about my health	565 (62.8%)	208 (69.3%)	194 (64.9%)	163 (54.3%)		
Not really a problem for me	39 (4.3%)	12 (4.0%)	14 (4.7%)	13 (4.3%)		
Do you think that the case numbers will get worse?					<0.001	812
Will be worse (increase #)	330 (40.6%)	106 (40.3%)	103 (40.2%)	121 (41.3%)		
Will remain same	175 (21.6%)	81 (30.8%)	64 (25.0%)	30 (10.2%)		
Will be less (cases)	307 (37.8%)	76 (28.9%)	89 (34.8%)	142 (48.5%)		
How long do you think the epidemic will last?					<0.001	717
Will continue for many years	495 (69.0%)	109 (54.8%)	165 (69.3%)	221 (78.9%)		
Will continue for another few months	152 (21.2%)	66 (33.2%)	48 (20.2%)	38 (13.6%)		
Will end shortly	70 (9.8%)	24 (12.1%)	25 (10.5%)	21 (7.5%)		
How do you feel about the recommendation to avoid going to HF?					<0.001	896
Agree	666 (74.3%)	182 (60.9%)	213 (71.0%)	271 (91.2%)		
Do not agree	229 (25.6%)	117 (39.1%)	86 (28.7%)	26 (8.8%)		
Don't know	1 (0.1%)	0 (0.0%)	1 (0.3%)	0 (0.0%)		
What do you think of the decision to close schools?					<0.001	900
Agree	706 (78.4%)	188 (62.7%)	232 (77.3%)	286 (95.3%)		
Do not agree	188 (20.9%)	110 (36.7%)	64 (21.3%)	14 (4.7%)		
Don't know	6 (0.7%)	2 (0.7%)	4 (1.3%)	0 (0.0%)		
Do you think borders should stay open or be closed?					<0.001	899
Should remain open	610 (67.9%)	190 (63.3%)	187 (62.5%)	233 (77.7%)		
Should be closed	258 (28.7%)	104 (34.7%)	94 (31.4%)	60 (20.0%)		
Don't know	31 (3.5%)	6 (2.0%)	18 (6.0%)	7 (2.3%)		
Do you/would you feel comfortable in sending your children to school when they reopen?					<0.001	899
Yes	552 (61.4%)	155 (51.7%)	259 (86.6%)	138 (46.0%)		
No	338 (37.6%)	139 (46.3%)	39 (13.0%)	160 (53.3%)		
Don't know	9 (1.0%)	6 (2.0%)	1 (0.3%)	2 (0.7%)		
Would you feel comfortable in going to the HF for routine care (during the pandemic)?					<0.001	900
Yes	645 (71.7%)	197 (65.7%)	257 (85.7%)	191 (63.7%)		
No	250 (27.8%)	101 (33.7%)	42 (14.0%)	107 (35.7%)		
Don't know	5 (0.6%)	2 (0.7%)	1 (0.3%)	2 (0.7%)		

* Chi-square test (or Fisher exact test when the frequency for certain category was less than 5) was performed to check whether there was significant difference among the three survey rounds.

3. HCW delivering HIV care

Almost all (178, 97.8%) HCW agreed that they are at higher risk of infection by the novel coronavirus, followed by the elderly (77, 42.3%), PWH (53, 29.1%), and children (53, 29.1%). Among respondents, less than half (72, 40%) thought that they would become moderately ill if they got COVID-19. Half (90, 49.7%) reported a perceived high risk of their family members becoming infected with COVID-19 (90, 49.7%). “Very anxious” was the answer of 95 (52.5%) HCW when asked about the possibility of them or a family member becoming infected, with more than half (107, 58.8%) of respondents being worried about their own personal health. More than half of the HCW (94, 53.1%) perceived that the number of people infected with COVID-19 will increase and 129 (84.3%) stated that the pandemic will last for many years. The majority of HCW, however, felt supported by the HF (140, 80.9%), and were interested in their work 145

(79.7%). Of respondents, 20 (11%) HCW did report being depressed several days within the prior two weeks, with a sizable proportion (21, 70%) reporting that they felt worse in general since the pandemic began. When asked if they agree with the recommendation to avoid going to the HF, the majority (151, 83.4%) agreed that this would be best (see **Table 16**).

Across the rounds, significant changes were found on the perceptions regarding perceived high risk/increased anxiety about oneself or a family member becoming infected with COVID-19, higher numbers of COVID-19 cases, long duration of the epidemic (for many years), agreeing to avoid visiting the HF when possible and being anxious to work during the pandemic (see **Supplemental Table 3**).

Table 16: Risk perceptions regarding prevention and mitigation measures of COVID-19 among HCW delivering HIV care.

	[ALL] N=182 (n, %)	Round 1 N=60 (n, %)	Round 2 N=62 (n, %)	Round 3 N=60 (n, %)	p.over all*	N
What do you think the probability is for you to be infected by COVID-19?					0.015	182
High risk	139 (76.4%)	51 (85.0%)	39 (62.9%)	49 (81.7%)		
Considerable risk	18 (9.9%)	6 (10.0%)	8 (12.9%)	4 (6.7%)		
Minimal risk	24 (13.2%)	3 (5.0%)	15 (24.2%)	6 (10.0%)		
No risk	1 (0.6%)	0 (0.0%)	0 (0.0%)	1 (1.7%)		
How severe do you think COVID-19 can be if you would be infected?					0.198	180
Very sick	32 (17.8%)	12 (20.0%)	9 (14.8%)	11 (18.6%)		
Moderately sick	72 (40.0%)	22 (36.7%)	28 (45.9%)	22 (37.3%)		
Little bit sick	57 (31.7%)	15 (25.0%)	19 (31.1%)	23 (39.0%)		
Won't be sick/ have symptoms	19 (10.6%)	11 (18.3%)	5 (8.2%)	3 (5.1%)		
What do you think the probability is for your family member to be infected by COVID-19?					0.014	181
High risk	90 (49.7%)	32 (53.3%)	22 (36.1%)	36 (60.0%)		
Considerable risk	30 (16.6%)	7 (11.7%)	18 (29.5%)	5 (8.3%)		
Minimal risk	52 (28.7%)	17 (28.3%)	18 (29.5%)	17 (28.3%)		
No risk	7 (3.9%)	4 (6.7%)	1 (1.6%)	2 (3.3%)		
Don't know	2 (1.1%)	0 (0.0%)	2 (3.3%)	0 (0.0%)		
How anxious are you that you or family member will be infected by COVID-19?					<0.001	181
Very anxious	95 (52.5%)	20 (33.3%)	28 (45.9%)	47 (78.3%)		
Anxious	43 (23.8%)	17 (28.3%)	21 (34.4%)	5 (8.3%)		
Little anxious	32 (17.7%)	16 (26.7%)	10 (16.4%)	6 (10.0%)		
Not anxious	11 (6.1%)	7 (11.7%)	2 (3.3%)	2 (3.3%)		
What does the new coronavirus mean to you?					0.001	182
Stressful	69 (37.9%)	12 (20.0%)	34 (54.8%)	23 (38.3%)		
Worried about my health	107 (58.8%)	46 (76.7%)	27 (43.5%)	34 (56.7%)		
Not really a problem for me	6 (3.30%)	2 (3.33%)	1 (1.61%)	3 (5.00%)		
Do you think that the case numbers will get worse?					<0.001	177
Will be worse (increase #)	94 (53.1%)	37 (64.9%)	26 (42.6%)	31 (52.5%)		
Will remain same	16 (9.0%)	11 (19.3%)	3 (4.9%)	2 (3.4%)		
Will be less (cases)	67 (37.9%)	9 (15.8%)	32 (52.5%)	26 (44.1%)		
How long do you think the epidemic will last?					0.017	153
Will continue for many years	129 (84.3%)	31 (72.1%)	42 (82.4%)	56 (94.9%)		
Will continue for another few months	14 (9.2%)	8 (18.6%)	5 (9.8%)	1 (1.7%)		
Will end shortly	10 (6.5%)	4 (9.3%)	4 (7.8%)	2 (3.4%)		
Do you think that HCW are at higher risk of infection?					0.551	182
Yes	178 (97.8%)	59 (98.3%)	59 (95.2%)	60 (100%)		

No, risk is the same	2 (1.1%)	0 (0.0%)	2 (3.2%)	0 (0.0%)		
Don't know	2 (1.1%)	1 (1.7%)	1 (1.6%)	0 (0.0%)		
Who do you think are at higher risk of getting infected?						
Elderly	77 (42.3%)	20 (33.3%)	26 (41.9%)	31 (51.7%)	0.126	182
Children	53 (29.1%)	20 (33.3%)	17 (27.4%)	16 (26.7%)	0.678	182
Patients with HIV	53 (29.1%)	18 (30.0%)	17 (27.4%)	18 (30.0%)	0.936	182
All have same risk	46 (25.3%)	20 (33.3%)	10 (16.1%)	16 (26.7%)	0.088	182
Patients with TB	34 (18.7%)	13 (21.7%)	10 (16.1%)	11 (18.3%)	0.732	182
Pregnant women	28 (15.4%)	14 (23.3%)	5 (8.1%)	9 (15.0%)	0.065	182
Obese people	16 (8.8%)	4 (6.7%)	5 (8.1%)	7 (11.7%)	0.607	182
Malnourished people	1 (0.6%)	0 (0.0%)	1 (1.6%)	0 (0.0%)	1.000	182
Other	78 (42.9%)	18 (30.0%)	29 (46.8%)	31 (51.7%)	0.042	182
Do you feel supported by the HF?					0.060	173
Yes	140 (80.9%)	40 (76.9%)	56 (90.3%)	44 (74.6%)		
No	33 (19.1%)	12 (23.1%)	6 (9.7%)	15 (25.4%)		
PHQ-2 Categorized					0.938	182
Major depressive disorder risk	13 (7.1%)	5 (8.3%)	4 (6.5%)	4 (6.7%)		
No major depressive disorder	169 (92.9%)	55 (91.7%)	58 (93.5%)	56 (93.3%)		
risk						
Are you anxious to work at the HF since the pandemic began?					<0.001	182
Very anxious	20 (11.0%)	6 (10.0%)	2 (3.23%)	12 (20.0%)		
Much more anxious	22 (12.1%)	11 (18.3%)	7 (11.3%)	4 (6.7%)		
A little bit more anxious	48 (26.4%)	15 (25.0%)	27 (43.5%)	6 (10.0%)		
Not more anxious	92 (50.5%)	28 (46.7%)	26 (41.9%)	38 (63.3%)		
How do you feel about the recommendation for patients to avoid the HF if possible?					0.009	181
Agree	151 (83.4%)	46 (78.0%)	48 (77.4%)	57 (95.0%)		
Do not agree	29 (16.0%)	12 (20.3%)	14 (22.6%)	3 (5.0%)		
Don't know	1 (0.6%)	1 (1.7%)	0 (0.0%)	0 (0.0%)		
GAD-2 Categorized					0.737	182
Major anxiety disorder risk	11 (6.0%)	5 (8.3%)	3 (4.8%)	3 (5.0%)		
No major anxiety disorder risk	171 (94.0%)	55 (91.7%)	59 (95.2%)	57 (95.0%)		

* Chi-square test (or Fisher exact test when the frequency for certain category was less than 5) was performed to check whether there was significant difference among the three survey rounds.

Perceptions regarding access to care among adult population, PWH and HCW

1. Adults

The vast majority of adults reported presenting to their nearby HF for some reason since the beginning of the pandemic (776, 86.2%), although largely (605, 78%) perceiving that the way health care was provided had undergone significant changes (605, 78%). Looking more in-depth to how they perceived the provision of healthcare had changed following the pandemic, the majority 525 (68%) responded that health care was more focused on reducing clinic wait times for patients (443, 49.2%), with lower proportions stating that the care provided was more attentive (226, 25.1%) to the need for more space/less crowding, and that physicians appeared to have more time for patients (112, 12.4%). Nearly half (434, 48.4%) of those surveyed thought that fewer people would go to HF for routine care. The majority (730, 81.3%) of adult respondents did not know anyone within their immediate social circle that tested positive for the novel

coronavirus. Among respondents, very few (5, 0.6%) reported that they personally had a suspected case of COVID-19 but did not undergo formal COVID-19 testing (see **Table 17**).

Significant changes across the rounds were found on going to the HF for any reason, health care change in the HF, waiting time change due to less people going to the HF and knowing people with COVID-19 (or suspected) in their immediate social circle (see **Supplemental Table 1**).

Table 17: Adults’ perceptions regarding access to care during COVID pandemic.

	[ALL] N=900 (n, %)	Round 1 N=300 (n, %)	Round 2 N=300 (n, %)	Round 3 N=300 (n, %)	p.over all*	N
Were you at the HF for any reason since April 2020?					<0.001	900
Yes	776 (86.2%)	248 (82.7%)	247 (82.3%)	281 (93.7%)		
No	124 (13.8%)	52 (17.3%)	53 (17.7%)	19 (6.3%)		
Were you at the HF for any reason in the last month?					<0.001	776
Yes	563 (72.6%)	215 (86.7%)	151 (61.1%)	197 (70.1%)		
No	213 (27.4%)	33 (13.3%)	96 (38.9%)	84 (29.9%)		
Did care change (if yes on question ‘if been in HF since April 2020’)?					<0.001	776
Yes, care changed	605 (78.0%)	178 (71.8%)	179 (72.5%)	248 (88.3%)		
No, care is the same	160 (20.6%)	69 (27.8%)	58 (23.5%)	33 (11.7%)		
Don’t know	11 (1.4%)	1 (0.4%)	10 (4.1%)	0 (0.0%)		
How did care change (if yes on question ‘if been in HF since April 2020’ and changed)?					<0.001	772
Better	525 (68.0%)	124 (50.2%)	153 (62.7%)	248 (88.3%)		
Same	171 (22.2%)	82 (33.2%)	59 (24.2%)	30 (10.7%)		
Worse	76 (9.8%)	41 (16.6%)	32 (13.1%)	3 (1.1%)		
Better care (mark all that apply)						
Shorter wait time	443 (49.2%)	84 (28.0%)	118 (39.3%)	241 (80.3%)	<0.001	900
People were more spaced out	226 (25.1%)	41 (13.7%)	21 (7.0%)	164 (54.7%)	<0.001	900
Doctor has more time for me	112 (12.4%)	21 (7.0%)	28 (9.3%)	63 (21.0%)	<0.001	900
Doctors seem to care more	71 (7.9%)	29 (9.7%)	14 (4.7%)	28 (9.3%)	0.040	900
Received a mask	7 (0.8%)	3 (1.0%)	3 (1.0%)	1 (0.3%)	0.710	900
Other reason	144 (16.0%)	60 (20.0%)	76 (25.3%)	8 (2.7%)	<0.001	900
Did wait time change due to recommendation to avoid going to HF?					<0.001	899
Shorter wait time	660 (73.4%)	198 (66.2%)	180 (60.0%)	282 (94.0%)		
Will be same	64 (7.1%)	24 (8.0%)	28 (9.3%)	12 (4.0%)		
Longer wait time	133 (14.8%)	56 (18.7%)	73 (24.3%)	4 (1.3%)		
Don’t know	42 (4.7%)	21 (7.0%)	19 (6.3%)	2 (0.7%)		
Do you think less people go for routine care such as TB, HIV, vaccination?					<0.001	896
Yes	434 (48.4%)	95 (32.1%)	137 (45.7%)	202 (67.3%)		
No	420 (46.9%)	182 (61.5%)	146 (48.7%)	92 (30.7%)		
Don’t know	42 (4.7%)	19 (6.4%)	17 (5.7%)	6 (2.0%)		
Do you know somebody in your immediate social circle who is(was) infected with COVID-19?					<0.001	898
Yes, confirmed	40 (4.5%)	3 (1.0%)	6 (2.0%)	31 (10.3%)		
Yes, suspect but not tested	9 (1.0%)	1 (0.3%)	6 (2.0%)	2 (0.7%)		
Nobody from my social circle was infected	119 (13.3%)	49 (16.4%)	41 (13.7%)	29 (9.7%)		
Don’t know anybody that was infected	730 (81.3%)	246 (82.3%)	246 (82.3%)	238 (79.3%)		
Were you infected with COVID-19?					0.005	899

Was confirmed	2 (0.2%)	0 (0.0%)	0 (0.0%)	2 (0.7%)
Was not diagnosed	877 (97.6%)	292 (97.7%)	288 (96.0%)	297 (99.0%)
Was suspect but did not test	5 (0.6%)	2 (0.7%)	2 (0.7%)	1 (0.3%)
Don't know if I was infected	15 (1.7%)	5 (1.7%)	10 (3.3%)	0 (0.0%)

* Chi-square test (or Fisher exact test when the frequency for certain category was less than 5) was performed to check whether there was significant difference among the three survey rounds.

2. Persons with HIV

The vast majority of PWH reported that the way health care was provided had undergone significant changes (654, 72.7%). Looking more in-depth to how they perceived the provision of health care had changed following the pandemic, the majority 576 (64.1%) said it was better, and of those, it was better because health care delivery was more focused on reducing clinic wait times for patients (443, 49.2%), with lower proportions stating that the care provided was more attentive (226, 25.1%) to the need for more space/less crowding, and that physicians appeared to have more time for patients (112, 12.4%). The majority of respondents also perceived changes in the way routine HIV care (645, 71.7%) and TB care (49, 57%) was provided following the pandemic. The majority (785, 87.5%) of surveyed PWH stated that they did not have any difficulty obtaining their prescribed ART regimens and were not worried about their health (628, 69.9%). Almost half (436, 48.6%) of those surveyed thought that fewer people would go to HF for routine care. A small proportion (106, 11.8%) of PWH missed their child's follow-up visits. The majority consented for home visits (659, 73.3%) and of those, most (439, 66.6%) reported that they had actually received home visits. Interestingly, the majority of respondents (664, 79.8%) did not note a difference, specifically related to the interruption of home visits due to pandemic mitigation measures. The majority (772, 85.9%) of adult respondents did not know anyone within their immediate social circle that tested positive for the novel coronavirus. Among respondents, very few (9, 1%) reported that they personally had a suspected case of COVID-19 but did not undergo formal COVID-19 testing (see **Table 18**).

Significant changes across the rounds were found on health care change in the HF, waiting time change due to less people going to the HF, feeling worried about their health, being affected by the interrupted home visits done by volunteers and knowing people with COVID-19 (or suspected) in their immediate social circle (see **Supplemental Table 2**).

Table 18: Perceptions of PWH regarding access to care during COVID-19 pandemic.

	[ALL] N=900 (n, %)	Round 1 N=300 (n, %)	Round 2 N=300 (n, %)	Round 3 N=300 (n, %)	p.over all*	N
Did care change?					<0.001	900
Yes, care changed	654 (72.7%)	189 (63.0%)	216 (72.0%)	249 (83.0%)		
No, care is same	237 (26.3%)	110 (36.7%)	79 (26.3%)	48 (16.0%)		
Don't know	9 (1.0%)	1 (0.3%)	5 (1.7%)	3 (1.0%)		
How were the services compared to period before April 2020?					<0.001	899
Better	576 (64.1%)	144 (48.0%)	178 (59.3%)	254 (84.9%)		
Same	236 (26.3%)	115 (38.3%)	81 (27.0%)	40 (13.4%)		
Worse	87 (9.7%)	41 (13.7%)	41 (13.7%)	5 (1.7%)		
Better care, because (mark all that apply)						
Shorter wait time	523 (58.1%)	120 (40.0%)	154 (51.3%)	249 (83.0%)	<0.001	900

People were more spaced out	230 (25.6%)	49 (16.3%)	17 (5.7%)	164 (54.7%)	<0.001	900
Doctor has more time for me	134 (14.9%)	18 (6.0%)	39 (13.0%)	77 (25.7%)	<0.001	900
Doctors seem to care more	68 (7.6%)	24 (8.0%)	13 (4.3%)	31 (10.3%)	0.020	900
Received a mask	12 (1.3%)	1 (0.3%)	11 (3.7%)	0 (0.0%)	<0.001	900
Other reason	126 (14.0%)	45 (15.0%)	72 (24.0%)	9 (3.0%)	<0.001	900
No response	3 (0.3%)	2 (0.7%)	0 (0.0%)	1 (0.3%)	0.777	900
Did you have difficulties in getting your ART?					0.105	897
Yes	112 (12.5%)	46 (15.4%)	37 (12.3%)	29 (9.7%)		
No	785 (87.5%)	252 (84.6%)	263 (87.7%)	270 (90.3%)		
Did you feel worried about your health in last 2 weeks?					0.034	899
Yes	271 (30.1%)	74 (24.7%)	102 (34.0%)	95 (31.8%)		
No	628 (69.9%)	226 (75.3%)	198 (66.0%)	204 (68.2%)		
Do you think HIV care changed since April 2020?					<0.001	899
Yes	645 (71.7%)	206 (68.7%)	190 (63.3%)	249 (83.3%)		
No	251 (27.9%)	93 (31.0%)	108 (36.0%)	50 (16.7%)		
Don't know	3 (0.3%)	1 (0.3%)	2 (0.7%)	0 (0.0%)		
Are you on TB treatment?					0.947	898
Yes	86 (9.6%)	30 (10.0%)	28 (9.3%)	28 (9.4%)		
No	812 (90.4%)	269 (90.0%)	272 (90.7%)	271 (90.6%)		
Do you think TB care changed since April 2020?					0.076	86
Yes	49 (57.0%)	12 (40.0%)	17 (60.7%)	20 (71.4%)		
No	36 (41.9%)	17 (56.7%)	11 (39.3%)	8 (28.6%)		
Don't know	1 (1.2%)	1 (3.3%)	0 (0.0%)	0 (0.0%)		
Did wait time change due to recommendation to avoid going to HF?					<0.001	898
Shorter wait time	816 (90.9%)	272 (91.0%)	258 (86.0%)	286 (95.7%)		
Will be same	41 (4.6%)	16 (5.4%)	14 (4.7%)	11 (3.7%)		
Longer wait time	41 (4.6%)	11 (3.7%)	28 (9.3%)	2 (0.7%)		
Do you think less people go for routine care such as TB, HIV, vaccinations and others?					<0.001	898
Yes	436 (48.6%)	89 (29.8%)	121 (40.3%)	226 (75.6%)		
No	425 (47.3%)	194 (64.9%)	159 (53.0%)	72 (24.1%)		
Don't know	37 (4.1%)	16 (5.4%)	20 (6.7%)	1 (0.3%)		
Have you missed any well child or early child diagnosis visit?					0.003	899
Yes	106 (11.8%)	42 (14.0%)	42 (14.0%)	22 (7.4%)		
No	711 (79.1%)	237 (79.0%)	220 (73.3%)	254 (84.9%)		
Not applicable	82 (9.1%)	21 (7.0%)	38 (12.7%)	23 (7.7%)		
Did you consent for home visits?					0.002	899
Yes	659 (73.3%)	217 (72.3%)	201 (67.0%)	241 (80.6%)		
No	231 (25.7%)	78 (26.0%)	96 (32.0%)	57 (19.1%)		
Don't remember	9 (1.0%)	5 (1.7%)	3 (1.0%)	1 (0.3%)		
Do you usually receive home visits?					0.001	659
Yes	439 (66.6%)	137 (63.1%)	120 (59.7%)	182 (75.5%)		
No	220 (33.4%)	80 (36.9%)	81 (40.3%)	59 (24.5%)		
When was the last time you met a health volunteer at your home?					<0.001	439
More than 2 months ago	186 (42.4%)	73 (53.3%)	65 (54.2%)	48 (26.4%)		
1-2 months ago	82 (18.7%)	34 (24.8%)	15 (12.5%)	33 (18.1%)		
1-4 weeks ago	46 (10.5%)	18 (13.1%)	9 (7.5%)	19 (10.4%)		
Last week	50 (11.4%)	4 (2.92%)	2 (1.7%)	44 (24.2%)		
Don't remember	75 (17.1%)	8 (5.8%)	29 (24.2%)	38 (20.9%)		
There was an interruption regarding the home visits by volunteers due COVID-19. If you usually get visit from volunteers, did the interruption make a difference for you?					0.015	832
Yes, changed	168 (20.2%)	47 (18.1%)	71 (25.9%)	50 (16.8%)		

No, did not change	664 (79.8%)	213 (81.9%)	203 (74.1%)	248 (83.2%)		
Do you know somebody in your immediate social circle who is(was) infected with COVID-19?					<0.001	899
Yes, confirmed	36 (4.0%)	0 (0.0%)	13 (4.3%)	23 (7.7%)		
Yes, suspect but not tested	17 (1.9%)	3 (1.0%)	8 (2.7%)	6 (2.0%)		
Nobody from my social circle was infected	74 (8.2%)	17 (5.7%)	25 (8.3%)	32 (10.7%)		
Don't know anybody that was infected	772 (85.9%)	280 (93.3%)	254 (84.7%)	238 (79.6%)		
Were you infected with COVID-19?					0.108	899
Was not diagnosed	882 (98.1%)	296 (98.7%)	291 (97.0%)	295 (98.7%)		
Was suspect but did not test	9 (1.0%)	1 (0.3%)	4 (1.3%)	4 (1.3%)		
Don't know if I was infected	8 (0.9%)	3 (1.0%)	5 (1.7%)	0 (0.0%)		

* Chi-square test (or Fisher exact test when the frequency for certain category was less than 5) was performed to check whether there was significant difference among the three survey rounds.

3. HCW delivering HIV care

The majority (129, 70.9%) of HCW did feel that the HF was not equipped to manage patients with COVID-19 and agreed with the recommendation that it was best for patients to avoid going to the HF during the pandemic (155, 85.2%). Among respondents, the majority (114, 63%) did not feel that patients were scared to go to the HF due to COVID-19-specific concerns but did note a significant decrease in patient flow at the HF (126, 70%). Almost all (164, 90.1%) surveyed HCW did not perceive any difficulties in HF service delivery and noted shorter wait times (132, 72.5%). Half (92, 50.5%) of the respondents did feel that less people would go to HF for routine care. Among respondents, the majority (134, 73.6%) reported that HIV care had changed, with one-third (60, 33%) stating that TB care specifically had changed in the period since the pandemic began. Approximately two-thirds (118, 65.2%) thought that the interruption of home visits during the pandemic did impact patients' retention in ART care, while more than half (98, 54.1%) of surveyed HCW stated that they did not know someone in their immediate social circle that had become infected by the novel coronavirus (see **Table 19**).

Significant changes across the rounds were found on agreeing with the recommendation to avoid going to the HF, changed patient flow, changed waiting time, changed HIV and TB care, less people going to the HF and knowing people with COVID-19 (or suspected) in their immediate social circle (see **Supplemental Table 3**).

Table 19: Perceptions of HCW delivering HIV care regarding access to care during COVID-19 pandemic.

	[ALL]	Round 1	Round 2	Round 3	p.over all*	N
	N=182 (n, %)	N=60 (n, %)	N=62 (n, %)	N=60 (n, %)		
Do you think the health facility is able to give care to COVID-19 infected patients?					0.531	182
Capable	47 (25.8%)	17 (28.3%)	16 (25.8%)	14 (23.3%)		
Not capable	129 (70.9%)	39 (65.0%)	45 (72.6%)	45 (75.0%)		
Don't know	6 (3.3%)	4 (6.7%)	1 (1.6%)	1 (1.7%)		
How do you feel about the recommendation for patients to avoid the health facility if possible?					<0.001	182
Agree	155 (85.2%)	46 (76.7%)	49 (79.0%)	60 (100%)		

Do not agree, HF should function as before	27 (14.8%)	14 (23.3%)	13 (21.0%)	0 (0.0%)		
Do you think patients are scared to go to HF because of COVID-19?					0.180	181
Will be scared	65 (35.9%)	26 (43.3%)	16 (26.2%)	23 (38.3%)		
Will not be scared	114 (63.0%)	33 (55.0%)	44 (72.1%)	37 (61.7%)		
Don't know	2 (1.1%)	1 (1.7%)	1 (1.6%)	0 (0.0%)		
Have you experienced a difference in patient flow?					0.037	180
Less patients	126 (70.0%)	35 (59.3%)	50 (82.0%)	41 (68.3%)		
Is the same	25 (13.9%)	13 (22.0%)	6 (9.8%)	6 (10.0%)		
More patients	29 (16.1%)	11 (18.6%)	5 (8.2%)	13 (21.7%)		
Have you experienced difficulties in giving care at the health facility?					0.592	182
Yes	18 (9.89%)	7 (11.7%)	7 (11.3%)	4 (6.67%)		
No	164 (90.1%)	53 (88.3%)	55 (88.7%)	56 (93.3%)		
What were those difficulties (mark all that apply)?						
Less medication available	5 (2.8%)	1 (1.7%)	3 (4.8%)	1 (1.7%)	0.622	182
Less lab tests available	4 (2.2%)	1 (1.7%)	2 (3.2%)	1 (1.7%)	1.000	182
Longer wait time due to COVID19 flow	3 (1.7%)	0 (0.0%)	1 (1.6%)	2 (3.3%)	0.545	182
Less clinicians available	2 (1.1%)	1 (1.7%)	1 (1.6%)	0 (0.0%)	1.000	182
Other difficulties:	11 (6.0%)	6 (10.0%)	5 (8.1%)	0 (0.0%)	0.035	182
Do you think that the waiting time changed?					<0.001	182
Shorter wait time	132 (72.5%)	33 (55.0%)	46 (74.2%)	53 (88.3%)		
Longer wait time	20 (11.0%)	6 (10.0%)	10 (16.1%)	4 (6.7%)		
Did not change	29 (15.9%)	20 (33.3%)	6 (9.7%)	3 (5.0%)		
Don't know	1 (0.6%)	1 (1.7%)	0 (0.0%)	0 (0.0%)		
Do you think that less people will go to the HF for routine care such as vaccination, or HIV care or TB care (and missing the visits)?					<0.001	182
Yes	92 (50.5%)	21 (35.0%)	28 (45.2%)	43 (71.7%)		
No	87 (47.8%)	36 (60.0%)	34 (54.8%)	17 (28.3%)		
Don't know	3 (1.7%)	3 (5.0%)	0 (0.0%)	0 (0.0%)		
Do you think that health care for HIV positive patients has changed?					<0.001	182
Yes	134 (73.6%)	36 (60.0%)	41 (66.1%)	57 (95.0%)		
No	46 (25.3%)	24 (40.0%)	19 (30.6%)	3 (5.0%)		
Don't know	2 (1.1%)	0 (0.0%)	2 (3.2%)	0 (0.0%)		
Do you think that health care for patients with TB has changed?					<0.001	182
Yes	60 (33.0%)	10 (16.7%)	14 (22.6%)	36 (60.0%)		
No	107 (58.8%)	46 (76.7%)	40 (64.5%)	21 (35.0%)		
Don't know	15 (8.2%)	4 (6.7%)	8 (12.9%)	3 (5.0%)		
Do you think that interruption of volunteer's activities affects ART retention?					0.224	181
Yes	118 (65.2%)	35 (58.3%)	38 (62.3%)	45 (75.0%)		
No	59 (32.6%)	23 (38.3%)	21 (34.4%)	15 (25.0%)		
Don't know	4 (2.2%)	2 (3.3%)	2 (3.3%)	0 (0.0%)		
Do you know somebody in your immediate social circle who are or were infected with the novel coronavirus?					<0.001	181
Yes, confirmed	69 (38.1%)	8 (13.3%)	25 (41.0%)	36 (60.0%)		
Yes, suspect but not tested	6 (3.3%)	1 (1.7%)	4 (6.6%)	1 (1.7%)		
Nobody from my social circle was infected	8 (4.4%)	3 (5.0%)	5 (8.2%)	0 (0.0%)		
Don't know anybody that was infected	98 (54.1%)	48 (80.0%)	27 (44.3%)	23 (38.3%)		
Have you been infected with the novel coronavirus?					1.000	181
Was not diagnosed	179 (98.9%)	60 (100%)	60 (98.4%)	59 (98.3%)		

Don't know if I was infected 2 (1.1%) 0 (0.0%) 1 (1.6%) 1 (1.7%)

* Chi-square test (or Fisher exact test when the frequency for certain category was less than 5) was performed to check whether there was significant difference among the three survey rounds.

Additional analyses

We explored the association of HCW receiving protective materials or training regarding COVID-19 and how comfortable they feel. A logistic regression analysis was made by treating “do you feel comfortable working at the HF” as an outcome (i.e., the response “Not Comfortable” was treated as an interested “event”) and the other variable as exposure and adjusted for survey round (see **Table 20**). There was a positive correlation for “Not comfortable” with “not receiving a face mask for 30 days” (OR 1.77, p-value = 0.484), or “not receiving training on COVID-19” (OR 1.22, p-value = 0.583), or “not receiving information sessions on COVID-19” (OR 1.70, p-value = 0.306), or “PPE not being enough at the workplace” (OR 1.63, p-value = 0.175). But all these observed positive correlations were not statistically significant.

Table 20. Association of HCW receiving PPE or training and level of comfort reported

“Not Comfortable” vs. “No Mask”				“Not Comfortable” vs. “COVID Training Not Received”			
Predictors	Odds Ratios	CI	p	Predictors	Odds Ratios	CI	p
Round 2	0.49	0.20 – 1.15	0.107	Round 2	0.51	0.22 – 1.15	0.110
Round 3	1.36	0.62 – 3.00	0.444	Round 3	1.42	0.67 – 3.05	0.360
Prot_mask [No]	1.77	0.32 – 8.85	0.484	Train [No]	1.22	0.61 – 2.51	0.583
Observations	175			Observations	181		
“Not Comfortable” vs. “COVID Information Not Received”				“Not Comfortable” vs. “EPI Not Enough”			
Predictors	Odds Ratios	CI	p	Predictors	Odds Ratios	CI	p
Round 3	3.30	1.38 – 8.44	0.009	Round 2	0.54	0.22 – 1.26	0.156
Info_session [No]	1.70	0.61 – 4.77	0.306	Round 3	1.55	0.70 – 3.51	0.282
				Enough_prot [No]	1.63	0.81 – 3.36	0.175
Observations	122			Observations	173		

Discussion and Conclusions

The first COVID-19 wave in Mozambique in 2021 occurred between January and February, the same period that the first KAP-P survey round was implemented in Zambézia province, and the second wave occurred from August to September 2021, which coincided with the third KAP-P survey round of this evaluation.

Demographics

Regarding the adults and PWH a significant proportion had completed education only through primary school and very few had completed the superior level of education. This reflects the literacy picture in Mozambique, where overall literacy rate is 47% and female literacy (28%) lags far behind that of males (60%)⁽¹⁵⁾. Regarding the main income sources, 28% earned from informal sales and 20% were farmers.

The majority of HCW delivering HIV services (84%) reported completion of secondary school and only 9% reported completing a superior level of education. Regarding their role in the HF, the majority were counselors (67%) followed by mid-level nurses (26%), clinic technicians (10%), lab technicians (6%), basic level nurses (3%) and others (19%). The majority of HCW were working in their position for more than a year (83%), therefore, had been in the HF since before the beginning of the pandemic.

Knowledge regarding prevention and mitigation COVID-19 measures among adult population, PWH and HCW

Almost all respondents, regardless of the target group interviewed, received information on the novel coronavirus or COVID-19 disease. The more frequently reported sources of information used were the radio, TV and friends/family. For the HCW, additional sources reported were: other HCW and social media. Similarly, other Africa-based KAP studies performed in 2020, during the COVID-19 outbreak, reported that nearly everyone had heard about COVID-19⁽¹⁶⁾ and mainly through television (TV) and radio.⁽¹⁷⁾ A 2022 study in Namibia reported social media, TV, and friends/family as main sources of information about COVID-19.⁽¹⁸⁾

The majority of adults and PWH received information through their mother languages and Portuguese and found the information enough and trustworthy. It is important to have information spread in local languages if a significant proportion of the respondents speaks them.

Slightly above half of adults and PWH perceived their knowledge about the ways of transmission of the novel coronavirus as very weak. Approximately twice as many HCW (62%) felt they knew a lot about the novel coronavirus transmission in R3 compared to survey R1 and R2. A similar scenario occurred in the other two groups (adults and PWH), with the highest proportion of people reporting to know a lot about the ways of COVID-19 transmission seen in R3. This could be explained by a raised level of interest and/or access to information about the coronavirus among all groups regarding the ways of transmission somewhere between the first and the second COVID-19 waves, as information campaigns were held regularly by MOH.

Symptoms of COVID-19 most frequently reported by all groups included: cough, fever, headache, difficulty breathing, sore throat, muscle pain and fatigue.

The majority correctly indicated that there was (at the time of the surveys) no treatment for COVID-19 but that a vaccine existed that could protect them from the disease (numbers increased significantly throughout the survey rounds for all respondents).

Almost all perceived they could prevent themselves from becoming infected with the COVID-19 disease through hand washing, use of a face mask, social distancing and/or disinfecting their hands. These findings related to the perception of efficacy of these measures were similar to what was found in a 2020 Democratic Republic of Congo (DRC) study, conducted when the DRC was facing an emergency state just as Mozambique faced throughout the implementation period for this survey.⁽¹⁷⁾ The results also showed that adults and PWH reported washing their hands significantly more often from R2 to R3. This suggests that adherence to MOH-recommended prevention measures, especially hand washing, may have been influenced by the occurrence of the first COVID-19 wave in Mozambique, i.e., a higher number of confirmed cases.

Practices regarding prevention and mitigation COVID-19 measures among adult population, PWH and HCW

There were significant changes in the proportion of adults and PWH who reported leaving their house between survey rounds. There was a significant decrease in the proportion leaving the house between the second and the third survey round. Given that R3 coincided with a COVID-19 wave, it is possible that the increase in confirmed COVID-19 cases (i.e., occurrence of a pandemic wave) could have influenced people's behaviors related to leaving their home. The main reason reported for leaving the house was to go to work.

The majority of all groups reported complying with the following prevention measures: did not shake hands, kiss or hug someone in the previous seven days, did not participate in meetings with more than 20 people, did not participate in funerals, did not travel and did not use public transport. Significant changes among the rounds were found in physical contact (e.g., shaking hands, kissing and hugging) for adults and PWH. Interestingly, among the HCW, significant changes among the rounds were found regarding decreased participation in funerals. This may suggest increased awareness of the novel coronavirus.

Regarding having a face mask, the majority of all respondents reported that they had one and usually used it when leaving the house. The proportion of respondents having/using a face mask changed significantly among the rounds. With each consecutive survey round, increasingly more respondents in each group reported they were always using a mask instead of only using a mask when meeting with many people. Possibly, a raised level of interest and/or access to information about the coronavirus among all groups increased awareness and practice regarding use of face mask.

Almost all HCW reported use of PPE as indicated/recommended, however, some reported it was not always available at their HF.

About 50-60% of all respondents felt that it was not difficult to keep their distance from other people.

The majority of respondents from all three groups reported washing their hands more often since the start of the pandemic and found this prevention measure easy to comply with. Hand washing frequency for adults and PWH changed significantly among the rounds.

Regarding the HCW practices at the HF, the majority of them felt comfortable working during the pandemic (70%) although the proportions in the R1 and R3 were lower. Possibly, this is related to the

timing of the COVID-19 waves. The majority did not receive specific training on COVID-19 but received information sessions. Lack of training to prevent infection was reported as well in a retrospective cross-sectional multi-country pan-African qualitative survey in 2020.⁽¹⁹⁾ It was expected, as health professionals are considered at higher risk, for them to have training on COVID-19 regarding prevention (especially the right utilization and disposal of PPE) and patient management. Nevertheless, an increasing proportion of HCW, along the survey rounds, were fully following the recommendation to wash their hands at work and, per survey reports, the availability of water/soap or disinfectant at HF locations increased as well. Regarding access to PPE, the majority (96%) of HCW received a mask in the previous 30 days. The frequency with which HCW received PPE was not continuous. The majority (76%) reported always using the protection equipment as indicated. Although there was a significant increase in the proportion of HCW along the rounds reporting that there was enough PPE at the HF, the highest proportion (survey R3) was 52%. The majority reported keeping a 1.5-meter distance when working at the HF, especially in R1 and R3.

Risk perceptions regarding COVID-19 among adult population, PWH and HCW

Regarding the risk perceptions, in a general way, an increasing proportion of respondents along the survey rounds significantly were very anxious about the possibility of themselves or a family member becoming infected with COVID-19, especially in R3 among adults and PWH. Almost all HCW agreed that they are at higher risk of infection by the novel coronavirus (98%), followed by elderly (42%) and patients with HIV (29%).

A significant proportion of all respondents perceived that the number of infected people would increase. Over the three survey rounds, increasingly, the respondents stated that the pandemic would last for many years. The change in perception regarding the pandemic lasting more years was significant across the rounds.

Increasing proportions of all groups across the three rounds agreed with the recommendation to avoid going to the HF. Nevertheless, the majority of adults and PWH felt comfortable in going to the HF for routine care during the pandemic. This feeling decreased significantly in survey R3.

The majority of adults and PWH agreed with the decision to close the schools, although reported that they would send their children to school when schools reopened. These perception changes were significant across the rounds with an increasing proportion of respondents agreeing with both statements. They opined as well that the country's borders should remain open during the pandemic.

The majority of HCW (81%) felt supported by the HF and were interested in their work (80%), but a minority reported being anxious about working during the pandemic. The perception changes on this anxiety to work, among the rounds, were significant. Unfortunately, 11% of HCW reported experiencing symptoms of depression on several days within the previous two weeks which worsened as the pandemic went on.

Perceptions regarding access to care among adult population, PWH and HCW

The majority of respondents in all groups stated that health care had changed since the pandemic began, especially HIV and TB care. Increasingly more PWH reported this perception along the survey rounds and

this increase was significant. Increasingly along the rounds, significantly marked in R3, HCW reported that HIV and TB care changed since pandemic (74% and 33%, respectively).

The majority of adults and PWH perceived that health care services were better. Shorter waiting time was the main reason (a huge increase in R3), followed by people being more spaced out in the HF and that the doctor/provider had more time for them. HCW noted shorter wait times at the HF but not related to good/bad services. They noted significantly, increasingly along the rounds, shorter waiting time.

A significant proportion of all respondents thought that less people would go to HF for routine care. The majority of HCW did not think patients were scared to go to the HF because of COVID-19 (63%) but noted a decrease in patient flow at the HF (70%).

The majority of PWH reported they did not have difficulties picking up their ART during this period (88%). A small proportion reported missing their child's follow-up visit(s) (12%). The majority consented for home visits (73%) and reported actually receiving these visits (67%). Nevertheless, the majority did not note a difference with the interruption of home visits due the pandemic (80%) although this perception changed significantly among the rounds.

The majority of HCW thought that the HF where they worked was not capable of managing patients with COVID-19 (71%). Still, almost all HCW reported that they did not perceive difficulties in service delivery (90%) since the pandemic began. However, two-thirds thought that the interruption of home visits during the pandemic affected ART retention (65%). It was also seen that there was less probability, although not statistically significant, of a HCW reporting being comfortable working at the HF if there was a lack of a) face masks, b) COVID-19 training and information sessions, and c) PPE in general.

As stated previously, the first and third rounds of the survey occurred during "COVID-19 waves" (i.e., periods with higher numbers of confirmed cases). The results in the second round of the survey may have been influenced by the fact that it was conducted between identified waves (i.e., compared to R1 and R3 survey timepoints, had decreased numbers of confirmed COVID-19 cases) when people seemed less anxious. For example, in R2 fewer people reported having a face mask (adults group: R1 [86.7%], R2 [79.3%], R3 [87.9%]), more people felt comfortable going to HF for routine care (adults group: R1 [73.6%], R2 [82.7%], R3 [65.0%]; PWH group: R1 [65.7%], R2 [85.7%], R3 [63.7%]), fewer people perceived a shorter wait time due the recommendation to avoid going to the HF (adults group: R1 [66.2%], R2 [60.0%], R3 [94.0%]; PWH group: R1 [91.0%], R2 [86.0%], R3 [95.7%]), more people reported recently shaking hands, kissing or hugging someone (PWH group: R1 [19.3%], R2 [23.0%], R3 [13.0%]) and fewer people reported washing their hands more often (PWH group, R1 [88.7%], R2 [82.3%], R3 [95.7%]).

Conclusions

Almost all respondents, regardless of the target group interviewed, received information on the novel coronavirus or COVID-19 disease, namely modes of transmission, symptoms, treatment and prevention. Information was spread mainly through radio, TV and friends/family. Providing education messages in local languages was useful as they are spoken by a significant proportion of the respondents.

Despite the pandemic, people had to leave their houses to work or for an income generation activity. Nevertheless, they reported complying with the prevention measures, using a mask outside their house, keeping socially distant, washing their hands, avoiding shaking hands, kissing or hugging someone, meetings with more than 20 people, participating in funerals, traveling and utilizing public transport.

Health care workers felt comfortable working during the pandemic and were using PPE, mainly a mask, but PPE availability was not continuous. The majority claimed lack of training on COVID-19. These two mitigating measures for HCW, training and PPE, are crucial when COVID-19 infection risk is high. Gaps in receiving these forms of support demand more attention from top management.

Over time, the proportion of respondents with anxiety due to the risk of contracting SARS-CoV-2 increased and the vast majority of HCW recognized that they were a high-risk group. This may have been a source of stress for some of them. However, we found that the majority of HCW were not deemed being at risk for depression or anxiety disorders and felt supported by the HF management.

There was a general perception among all respondent groups that care (including HIV and TB care) in Zambézia changed since the COVID-19 pandemic began and that less people were going to the HF for routine care. Although most PWH did not perceive increased difficulty in accessing treatment services, HCW felt that interruptions in community activities did impact adherence. The majority of HCW thought that HF were not capable of managing/equipped to manage patients with COVID-19.

Recommendations:

- Recommendation 1: Radio and TV are preferred ways for broadcasting messages related to COVID-19; Include messaging options in local languages to spread health information.
- Recommendation 2: Officials at the top tiers of health system management must consider and prioritize COVID-19 training and ongoing supervision of PPE availability for personnel in the HF.
- Recommendation 3: Given the report by some HCW of being anxious about working at HF during the pandemic, care for health providers which could include work-based counseling and support services should be considered.
- Recommendation 4: Tailored interventions to monitor retention of ART-treated patients at both the HF and community levels are needed to limit attrition related to COVID-19.
- Recommendation 5: Health facilities must be supported and HCW need to be empowered with access to resources (including training) to receive and treat COVID-19 cases.

Dissemination Plan

This report will be shared (in English and/or Portuguese, according to the target group) with the community leaders, IRB committees, CDC Mozambique, district health directorate, provincial health directorate and the MOH. The findings will be disseminated via suitable means according to the audience.

In addition, it is expected that findings from this evaluation will be reported in both scientific journals and international scientific conferences. Confidentiality of participants will be maintained by the fact that no individual results will be reported or published, only aggregate results.

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List of Appendices

Appendices 1-7, listed below, will be submitted as separate documents with this report

Appendix 1. Approved protocol

Appendix 2. Informed consent for adults from the community

Appendix 3. Informed consent for PWH

Appendix 4. Informed consent for HCW

Appendix 5. KAP-P Survey questionnaire for adults from the community

Appendix 6. KAP-P Survey questionnaire for PWH

Appendix 7. KAP-P Survey questionnaire for HCW

[**Note:** Appendix 1 (evaluation protocol) and Appendix 7 (survey questionnaire for HCW) were approved by all reviewing entities as Version 1.0. Due to minor modifications requested by the CDC-HQ Division of Global HIV/AIDS and Tuberculosis (DGHT) reviewers, Appendices 2-6 (the informed consent forms and survey questionnaires for adults in the community and PWH) were approved as Version 1.1.]

Appendix 8 – Principal Investigators’ Bio-sketches and List of Collaborators

Bio-sketches (provided for main investigators of this evaluation)

BIOGRAPHICAL SKETCH

NAME: Caroline De Schacht

eRA COMMONS USER NAME (credential, e.g., agency login): cdeschacht

POSITION TITLE: Director of Evaluations

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.*)

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
Ghent University, Ghent, Belgium	Licentiate	07/1998	General Medicine
Ghent University, Ghent, Belgium	Specialization	07/2000	Family Medicine

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
Prince Leopold Institute of Tropical Medicine, Antwerp, Belgium	Diploma	02/2001	Tropical Medicine
London School of Hygiene and Tropical Medicine (Distance learning)	MSc	07/2008	Clinical Trials
Ghent University, Ghent, Belgium	PhD	11/2015	Biomedical Science

A. Personal Statement

For about 20 years, I have been working as an HIV technical advisor and researcher in resource-poor settings, including the last 16 years in Mozambique. As technical advisor, I worked closely with the Ministry of Health and the Provincial Health authorities, and have gained valuable insight into the Mozambican Health System which I will use to help develop study protocols and design. In addition, I managed the start-up of an HIV care and treatment project in Tete and Gaza Provinces, which involved bringing together and coordinating a diverse group of stakeholders. As a researcher, I have been coordinating clinical and operational research activities since 2008. I have been the lead investigator on several studies in Mozambique, of which several related to PMTCT/ HIV prevention. I have been collaborating with the Polana Caniço Research Centre in HIV prevention research among young adults, such as the HIV incidence study, HIV vaccine trial (Tamovac I) and socio-behavioral studies on HIV prevention trials in Maputo city. In my current position, I am the lead of several HIV-related operational research projects in Zambézia province, and manage various secondary data analyses of HIV-program results.

Together with the Provincial Health services, and/ or National Institute of Health Mozambique, I have been serving as a trainer in different capacity building areas (quantitative and qualitative research methods, GCP/research ethics, protocol/abstract/manuscript writing, etc.), and mentor/supervise young researchers and PhD students, since 2005. I am also invited member of the UEM/INS Jury for the Masters in Field Epidemiology (FELTP), and member of the scientific committee of the Mozambican Health Conference where capacity building on dissemination of scientific results is an important component.

I'd like to highlight the following ongoing projects:

Ongoing Research Support

R01MH113478-01 (Audet, PI)

05/14/2017-05/30/2022

The primary objectives of Partners-based HIV Treatment for Sero-concordant Couples attending Antenatal Care are to evaluate the impact and cost-effectiveness of couples-centered services for HIV-infected seroconcordant pregnant women and their partners. Our intervention includes: (1) ANC-based couples HIV testing, ART enrollment, and care for HIV+ expectant couples; (2) Couple-based treatment in the post-partum period; (3) Couple-based education and skills building; and (4) Treatment continuity with the support of expert-patient (peer) supporters from couples who have successfully navigated EMTCT.

Role: In-Country Principal Investigator

U2GGH001943 Centers for Disease Control and Prevention

06/01/2020-12/01/2022

Title: Impact of COVID-19 epidemic on clinical outcomes and service delivery among people living with HIV and health care workers in Mozambique. The goal of this protocol is to determine the incidence, prevalence, and clinical manifestations of SARS-CoV-2 among adults living with HIV and healthcare the health care providers, and to assess the impact that COVID-19 has on them and on the healthcare system.

Role: Co-principal Investigator

GH002367-01-00 Centers for Disease Control and Prevention (PI: Wester)

9/30/2021 - /29/2026

Title - Quality Improvement for HIV Care and Treatment in Zambézia province of the Republic of Mozambique under the President's Emergency Plan for AIDS Relief (PEPFAR)

The purpose of the protocol is to review and summarize all routinely collected data from the HIV care and treatment program in Zambézia province from 2012 onwards. This data will be used for program evaluation, continuous program improvement, and to help inform evidence-based decisions on policies/guidelines, approaches, programs, and interventions that can best address the HIV/AIDS epidemic in Zambézia province. Key programmatic areas include: i) prevention; ii) adult care, support and treatment; iii) HIV/TB; and iv) pediatric care, support, and treatment.

Role: Co-Investigator

B. Positions and Honors

2017 - present Evaluations Director, Friends in Global Health, Mozambique

2014 - 2017 Project Coordinator/Research Advisor, Health Alliance International, Maputo, Mozambique

2008 - 2014 Public Health Evaluation Coordinator, Elizabeth Glaser Pediatric AIDS Foundation, Maputo, Mozambique

2006 - 2008 Clinical Advisor, Care and Treatment, Elizabeth Glaser Pediatric AIDS Foundation, Gaza, Mozambique

2005 - 2006 HIV Advisor/Project Manager, Pharmaccess Foundation, Maputo, Mozambique

2003 - 2004 HIV Clinical Advisor, Prince Leopold Institute of Tropical Medicine, Tete, Mozambique

2003 - 2004 HIV Clinical Advisor, Médecins sans Frontières, Ethiopia and Cambodia

2002 - 2003 HIV Clinician, Prince Leopold Institute of Tropical Medicine, Antwerp, Belgium

2001 - 2002 Project Coordinator, Médecins sans Frontières, Benin

2015; 2018; 2019 Member of Scientific Committee Provincial and National Health Conferences Mozambique

2016- Member of Jury – Masters Course in Field Epidemiology and Laboratory Practices

2010- Member of International Aids Society (IAS)

C. Contributions to Science

HIV epidemiology

Dr. De Schacht contributed to major studies in the epidemiology of HIV in Mozambique. She participated in the first cohort HIV incidence studies among vulnerable populations in Mozambique (youth, pregnant and breastfeeding women). She was PI on the HIV incidence cohort study of pregnant and breastfeeding women. Through the research work, we have been able to estimate the incidence of HIV among pregnant and breastfeeding women in a high HIV prevalence regions of Mozambique, found to be very high.

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Mother-to-Child Transmission of HIV

These publications are result of the contributions to research on mother-to-child transmission of HIV, looking at several aspects that influence retention to PMTCT care, and interventions to decrease vertical transmission rate, such as partner-based treatment.

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BIOGRAPHICAL SKETCH

NAME Matsimbe, Julieta Manuela		POSITION TITLE Clinical Implementation Director	
eRA COMMONS USER NAME (credential, e.g., agency login)		FGH	
EDUCATION/TRAINING (<i>Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.</i>)			
INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
Eduardo Mondlane University, Maputo	M.D.	04/11	Medicine
Catholic University, Quelimane	MPH	ongoing	Public Health

A. Personal Statement

Julieta Matsimbe is the FGH Clinical Implementation Director, based in Quelimane, Zambézia Province. Julieta is responsible for the implementation of all FGH supported clinical activities. Under her leadership at the provincial level, FGH has expanded and improved HIV care and treatment services across Zambézia Province, building strong relationships with both government and community health partners. Prior to joining FGH, Julieta worked as a general practitioner in Maputo and as a resident physician in Nampula and Maputo Provinces. Julieta began her work with FGH as a District Clinic Advisor supporting Ile and Mulevala Districts, and later supporting Maganja da Costa and Mocubela Districts. She then became the Clinical Implementation Manager in Quelimane, where she led the implementation of HIV program activities in alignment with Ministry of Health guidelines. Julieta has a medical degree from Eduardo Mondlane University and is currently earning a Master of Public Health at the Catholic University, Mozambique.

B. Positions

Positions and Employment

2018 to Present	Clinical Implementation Director
2017	Clinical Implementation Manager
2015 & 2016	District Clinical Advisor at Ile, Mulevala, Mocubela and Maganja da Costa
2011 – 2014	Medical residency in gynecology and obstetrics at Nampula & Maputo Central Hospital
2013	Physician at Centro Médico Magan, Nampula

Professional Memberships and Other Experiences

2020 – Present Member of the *Associação C-Saude*

2011 – Present Member of the *Ordem dos Médicos de Moçambique*

C. Publications

Mayra Melo, Caroline De Schacht, Themosis Ntasis, José Tique, Julieta Matsimbe, Gaël Claquin, Fernanda Alvim, Eurico Jose, Hamilton Mutemba, Antonieta Inácio, Anibal Naftal Fernando, Gustavo Amorim, C. William Wester, Sara Van Rompaey. Melhoria nas taxas de retenção em TARV de 12 meses através da monitoria intensiva de medidas de processo na província da Zambézia, Moçambique. 10th IAS Conference on HIV Science, July 21-24, 2019, Mexico City, Mexico; Jornadas Provinciais 2019.

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Belo C., Matsimbe J., Padama F., Lucas Fonseca C., Paulo P., Wester C., Graves E., Audet C., Yu Z., Amorim G., De Schacht C. Perceptions Regarding Impact of COVID-19 on Access to Healthcare among Persons with HIV and Healthcare Workers Providing HIV Care in Zambézia Province, Mozambique. 16th International Workshop on HIV Treatment, Pathogenesis and Prevention Research in Resource-Limited Settings, INTEREST 2022, 10-13 May 2022, Kampala, Uganda.

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Caroline De Schacht, Gustavo Amorim, Lazaro Calvo, Paula Paulo, Efthymios Ntasis, Sara Van Rompaey, Julieta Matsimbe, Samuel Martinho, Erin Graves, Rui Esmael, Maria Fernanda Sardella Alvim, Ann Green, Hidayat Kassim, Inoque Carlos Carlos, C. William Wester, Carolyn

Audet. Assessing Patient Satisfaction at Health Care Facilities in Zambézia Province, Mozambique. ESoP Final Report submitted to CDC on June 2022.

Caroline De Schacht, Gustavo Amorim, Sara Van Rompaey, Julieta Matsimbe, Anibal Naftal Fernando, José A. Tique, Isabel Torres, Erin Graves, Leide Dique, Efthymios Ntasis, C. William. Wester. Positive Effects of Intensified Preventive Calls/Home Visits on Early Retention Among Adults Newly Initiated on Antiretroviral Therapy in Zambézia Province, Mozambique. ESoP Final Report submitted to CDC on September 2020.

D. Research Support



Brief description of roles and responsibilities of other evaluation collaborators

Name, Title and Affiliation	Role	Responsibilities
Caroline De Schacht, MD, Msc, PhD Director of Evaluations Friends in Global Health (FGH), Maputo caroline.deschacht@fgh.org.mz	Principal Investigator	Overall coordination and oversight. Protocol development, analysis, result interpretation, manuscript development, dissemination of results.
Julieta Matsimbe, MD Clinical Director Zambézia Province Friends in Global Health (FGH), Quelimane Julieta.matsimbe@fgh.org.mz	Co-Principal Investigator	Coordination at provincial and district level; input/review of protocol, result interpretation; manuscript review; dissemination of results
Fernando Manuel Padama Provincial Research Unit Zambézia ferpadama@yahoo.com.br	Co-investigator	Coordination; input in protocol development; input in analysis, manuscript development
Carlota Lucas Fonseca Senior Evaluations Officer Friends in Global Health (FGH), Maputo Carlota.lucas@fgh.org.mz	Co-investigator	Site coordination, training, assistance in the protocol development, results interpretation, manuscript development, dissemination of results.
Paula Paulo Evaluations Officer Friends in Global Health (FGH), Maputo Paula.paulo@fgh.org.mz	Co-investigator	Site monitoring, training; results interpretation, input in manuscript development, dissemination of results.
C. William Wester Professor of Medicine Vanderbilt University Medical Center (VUMC) William.wester@vumc.org	Co-investigator	Assistance in the protocol development, results interpretation, manuscript development, dissemination of results.
Erin Graves Senior Program Manager Vanderbilt University Medical Center (VUMC) erin.r.graves.1@vumc.org	Co-investigator	Assistance in the protocol development, results interpretation, manuscript development, dissemination of results.
Carolyn Audet Assistant Professor Department of Health Policy Vanderbilt University Medical Center (VUMC) carolyn.m.audet@vumc.org	Collaborator	Review protocol; interpretation of results; manuscript development

Zhihong Yu Biostatistician II Department of Biostatistics Vanderbilt University Medical Center (VUMC) Zhihong.yu@vumc.org	Collaborator	Review protocol; analysis; manuscript development
Gustavo Amorim Research Assistant Professor Department of Biostatistics Vanderbilt University Medical Center (VUMC) Gustavo.g.amorim@vumc.org	Collaborator	Review protocol; analysis; manuscript development
Celso Belo Evaluations Manager Friends in Global Health (FGH), Maputo celso.belo@fgh.org.mz	Co-Investigator	Coordination, training, results interpretation, manuscript development, dissemination of results.

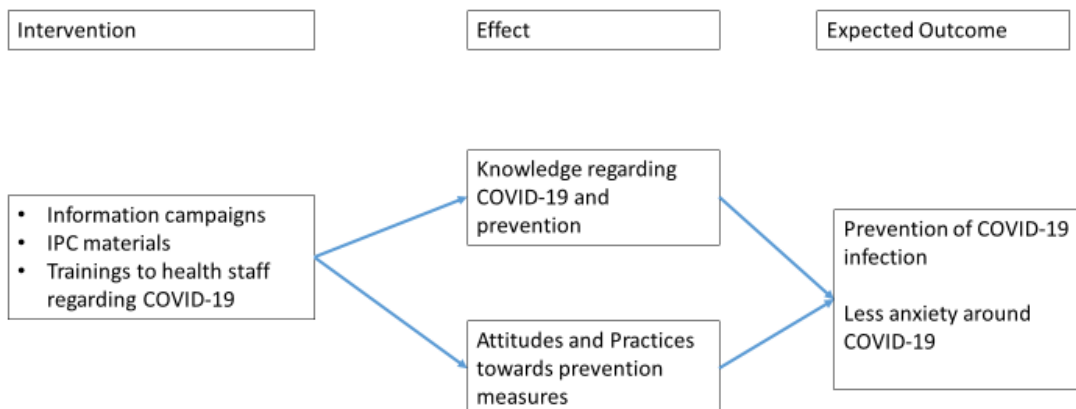
Appendix 9 – Evaluation costs

The budget to support the evaluation included funding for surveyors/evaluation staff, training costs, travel for supervision visits, PPE protection materials, fabric masks (as incentives for participants), and other direct costs. The estimated costs for this evaluation were \$US 15,387.

Appendix 10 – Conflict of interest statement

The collaborators in this evaluation have no conflicts of interest to declare.

Appendix 11 – Results or Logical Framework



Appendix 12. Supplemental tables (1-3)

Supplemental Table 1. Trend analysis for interested questions in adult population.

Question	Answers*	R1	R2	R3	p.trend**
Received any information on NC or COVID19	Yes, No	100.0	99.0	99.3	0.272
Do you trust information	Yes, No	99.3	98.3	98.6	0.455
how do you classify your knowledge on transmission of coronavirus?	A lot, Nothing / weak / a little	20.0	7.7	32.7	0.000
How severe can COVID19 infection be	Almost all, Only few / About half	35.2	44.8	48.1	0.002
Is there treatment for COVID19	Yes, No	24.1	36.1	37.0	0.001
Is there vaccine to prevent from COVID19	Yes, No	30.7	82.6	96.3	0.000
Do you think you can prevent from COVID19	Yes, No	96.6	98.7	99.0	0.037
did you leave the house last week	Yes, No	86.0	89.3	73.3	0.000
did you shake hand, kiss, or hug somebody in last 7d (not in household)	Yes, No	31.7	27.7	20.1	0.001
were you in meeting with more than 20people in last week	Yes, No	28.3	29.0	22.0	0.079
were you at a funeral last week	Yes, No	19.7	24.3	21.3	0.621
did you travel in last 7 days	Yes, No	0.4	0.0	0.4	0.984
did you use public transport with more than 20p in last 7d	Yes, No	16.1	16.7	13.4	0.364
do you have a facemask	Yes, No	86.7	79.3	87.9	0.675
since pandemic, have you washed your hands more often	Yes, No	88.0	75.3	92.3	0.130
how anxious are you for you or family member to be infected	Anxious / Very anxious, Not / Little anxious	62.1	54.7	86.7	0.000
what does new coronavirus mean to you	Worried / Stressful, Not a problem	99.0	92.6	95.7	0.042
do you think that numbers will get worse	Yes, No	47.8	38.4	44.5	0.448
how long will the epidemic last	Many years, Few months / Ends shortly	52.6	59.7	82.7	0.000
how do you feel with recommendation to avoid going to HF	Agree, Do not agree	60.7	67.9	91.6	0.000
do you/would you feel comfortable in sending your children to school when open	Yes, No	51.6	89.3	50.0	0.606

Question	Answers*	R1	R2	R3	p.trend**
would you feel comfortable in going to HF for routine care	Yes , No	73.6	83.2	65.0	0.017
did care change? (if Yes, No on Q if been in HF since April 2020)?	Yes , No	72.1	75.5	88.3	0.000
how did care change (if Yes, No on Q if been in HF since April 2020 and changed)	Better , Not better	50.2	62.7	88.3	0.000
Did wait time change due to recommendation to avoid going to HF?	Yes , No	91.4	90.0	96.0	0.032
Do you think less people go for routine care such as TB, HIV, Vaccination	Yes , No	34.3	48.4	68.7	0.000
Do you know somebody in your immediate social circle who are or were infected with COVID19?	Confirmed / Suspected , Don't know / Nobody	1.3	4.0	11.0	0.000
Were you infected with COVID19?	Confirmed / Suspected , Don't know / Not diagnosed	0.7	0.7	1.0	0.645

* The answers for each question were collapsed into two categories (for those with “/”) or originally had two categories (for those without “/”). The bolded category was set as reference and its percentage in each round were shown respectively in column R1, R2, and R3.

** Cochran-Armitage trend test was performed to check whether there is a significant trend over the three rounds.

Supplemental Table 2. Trend analysis for interested questions in PWH population.

Question	Answers*	R1	R2	R3	p.trend**
Received any information on NC or COVID19	Yes, No	100.0	99.7	99.7	0.386
Do you trust information	Yes, No	97.3	96.6	99.3	0.095
how do you classify your knowledge on transmission of coronavirus?	A lot, Nothing / weak / a little	19.7	9.4	29.0	0.004
How severe can COVID19 infection be	Almost all, Only few / About half	24.5	30.7	38.2	0.000
Is there treatment for COVID19	Yes, No	29.4	29.5	28.2	0.773
Is there vaccine to prevent from COVID19	Yes, No	21.3	82.0	92.9	0.000
Do you think you can prevent from COVID19	Yes, No	97.3	98.3	98.3	0.371
did you leave the house last week	Yes, No	67.0	76.3	59.0	0.037
did you shake hand, kiss, or hug somebody in last 7d (not in household)	Yes, No	19.3	23.2	13.0	0.046
were you in meeting with more than 20people in last week	Yes, No	44.0	26.8	20.1	0.000
were you at a funeral last week	Yes, No	34.1	26.0	30.3	0.314
did you travel in last 7 days	Yes, No	0.4	0.0	0.4	0.966
did you use public transport with more than 20p in last 7d	Yes, No	15.1	14.7	10.3	0.090
do you have a facemask	Yes, No	99.0	99.3	94.0	0.000
since pandemic, have you washed your hands more often	Yes, No	88.7	82.9	95.7	0.006
how anxious are you for you or family member to be infected	Anxious / Very anxious, Not / Little anxious	53.9	53.4	79.0	0.000
what does new coronavirus mean to you	Worried / Stressful, Not a problem	96.0	95.3	95.7	0.841
do you think that numbers will get worse	Yes, No	40.3	40.2	41.3	0.808
how long will the epidemic last	Many years, Few months / Ends shortly	54.8	69.3	78.9	0.000
how do you feel with recommendation to avoid going to HF	Agree, Don't agree	60.9	71.2	91.2	0.000
what do you think of decision to close schools	Agree, Don't agree	63.1	78.4	95.3	0.000
would you feel comfortable in going to HF for routine care	Yes, No	66.1	86.0	64.1	0.584

Question	Answers*	R1	R2	R3	p.trend**
did care change?	Yes , No	63.2	73.2	83.8	0.000
How were the services compared to period before April 2020?	Better , Not better	48.0	59.3	84.9	0.000
Did wait time change due to recommendation to avoid going to HF?	Yes , No	94.6	95.3	96.3	0.327
Do you think less people go for routine care such as TB, HIV, Vaccination	Yes , No	31.4	43.2	75.8	0.000
did you have difficulties in getting your ART	Yes , No	15.4	12.3	9.7	0.034
do you feel worried about your health in last 2 weeks	Yes , No	24.7	34.0	31.8	0.058
do you think HIV care changed since April 2020	Yes , No	68.9	63.8	83.3	0.000
did the interruption make a difference for you	Yes , No	18.1	25.9	16.8	0.622
Do you know somebody in your immediate social circle who are or were infected with COVID19?	Confirmed / Suspected , Don't know / Nobody	1.0	7.0	9.7	0.000
Were you infected with COVID19?	Confirmed / Suspected , Don't know / Not diagnosed	0.3	1.3	1.3	0.217

* The answers for each question were collapsed into two categories (for those with “/”) or originally had two categories (for those without “/”). The bolded category was set as reference and its percentage in each round were shown respectively in column R1, R2, and R3.

** Cochran-Armitage trend test was performed to check whether there is a significant trend over the three rounds.

Supplemental Table 3. Trend analysis for interested questions in HCW population.

Question	Answers*	R1	R2	R3	p.trend**
Received any information on NC or COVID19	Yes, No	100.0	100.0	96.7	0.080
Do you trust information	Yes, No	98.3	98.4	100.0	0.390
how do you classify your knowledge on transmission of coronavirus?	A lot, Nothing / weak / a little	28.3	29.0	61.7	0.000
How severe can COVID19 infection be	Almost all, Only few / About half	35.0	32.3	28.3	0.433
Is there treatment for COVID19	Yes, No	27.8	13.3	0.0	0.000
Is there vaccine to prevent from COVID19	Yes, No	23.6	98.4	91.7	0.000
Do you think you can prevent from COVID19	Yes, No	100.0	98.4	96.7	0.156
did you shake hand, kiss, or hug somebody in last 7d (not in household)	Yes, No	18.3	21.0	18.3	1.000
were you in meeting with more than 20people in last week	Yes, No	21.7	24.2	8.3	0.058
were you at a funeral last week	Yes, No	18.3	14.5	3.3	0.012
did you travel in last 7 days	Yes, No	0.0	0.0	3.7	0.074
did you use public transport with more than 20p in last 7d	Yes, No	11.7	6.5	5.1	0.178
do you have a facemask	Yes, No	98.3	96.8	95.0	0.307
How many times did you wash your hands yesterday	> 5 times, <= 5 times	68.3	65.5	60.4	0.379
how anxious are you for you or family member to be infected	Anxious / Very anxious, Not / Little anxious	61.7	80.3	86.7	0.001
what does new coronavirus mean to you	Worried / Stressful, Not a problem	96.7	98.4	95.0	0.609
do you think that numbers will get worse	Yes, No	64.9	42.6	52.5	0.189
how long will the epidemic last	Many years, Few months / Ends shortly	72.1	82.4	94.9	0.002
how severe do you think COVID19 can be if you would be infected	Moderate / Very sick, Not / Little sick	56.7	60.7	55.9	0.938
how do you feel with recommendation to avoid going to HF	Agree, Don't agree	79.3	77.4	95.0	0.020
Do you know somebody in your immediate social circle who are or were infected with COVID19?	Confirmed / Suspected, Don't know / Nobody	15.0	47.5	61.7	0.000
Were you infected with COVID19?	Was not diagnosed,	100.0	98.4	98.3	0.383

Question	Answers*	R1	R2	R3	p.trend**
	Dont' know if I was infected				
do you feel supported by the HF	Yes, No	76.9	90.3	74.6	0.687
loss in interest in the last 2 weeks	Some / More than half / Almost every day, Not at all	18.3	25.8	16.7	0.821
depressed in last 2 weeks	Some / More than half / Almost every day, Not at all	18.3	14.5	16.7	0.806
are you anxious to work at HF since pandemic	Much more / Very anxious, Not / Little anxious	28.3	14.5	26.7	0.828
anxious feeling in last 2 weeks	Some / More than half / Almost every day, Not at all	27.1	24.2	15.0	0.111
worried in last 2 weeks	Some / More than half / Almost every day, Not at all	26.7	16.1	8.3	0.008
PHQ-2 Categorized	No major depressive disorder Risk, Major depressive disorder Risk	91.7	93.5	93.3	0.723
GAD-2 Categorized	No major anxiety disorder Risk, Major anxiety disorder Risk	91.7	95.2	95.0	0.444
do you feel comfortable working at the HF	Comfortable, Not comfortable	67.8	80.6	60.0	0.349
have you received training on covid19	Yes, No	30.0	30.6	35.0	0.557
do you follow handwashing recommendations at work	Most of the time / Always, Rarely / Occasionally	91.7	96.8	98.3	0.075
is there water/soap or disinfectant at the place you work	Always, Never received / Sometimes	68.3	71.0	95.0	0.000
do you think there is enough EPI at HF	Yes, No	26.4	41.0	51.7	0.006
do you keep 1.5m distance when working at HF	Yes, No	70.0	51.6	80.0	0.244
do you think HF is capable to care for patients with COVID19	Capable, Not capable	30.4	26.2	23.7	0.423

Question	Answers*	R1	R2	R3	p.trend**
what do you think about recommendation of patients avoiding HF	Agree, Don't agree	76.7	79.0	100.0	0.000
do you think patients are scared to go to HF because of COVID19	Will be scared, Won't be scared	44.1	26.7	38.3	0.521
have you seen change in patient flow	Changed, Same	78.0	90.2	90.0	0.058
have you felt difficulties in service delivery	Yes, No	11.7	11.3	6.7	0.359
do you think wait time changed	Changed, Same	66.1	90.3	95.0	0.000
Do you think less people go for routine care such as TB, HIV, Vaccination	Yes, No	36.8	45.2	71.7	0.000
do you think HIV care changed	Yes, No	60.0	68.3	95.0	0.000
do you think TB care changed	Yes, No	17.9	25.9	63.2	0.000
do you think that interruption of volunteers' activities affects ART retention	Yes, No	60.3	64.4	75.0	0.091

* The answers for each question were collapsed into two categories (for those with "/") or originally had two categories (for those without "/"). The bolded category was set as reference and its percentage in each round were shown respectively in column R1, R2, and R3.

** Cochran-Armitage trend test was performed to check whether there is a significant trend over the three rounds.